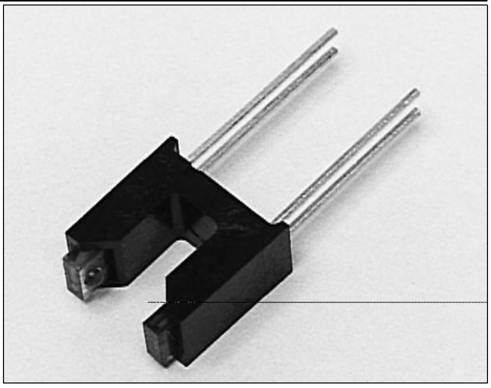
HOA0825

Transmissive Sensor

FEATURES

- Phototransistor output
- Four mounting configurations
- 0.165 in.(4.2 mm) slot width



INFRA-52.TIF

DESCRIPTION

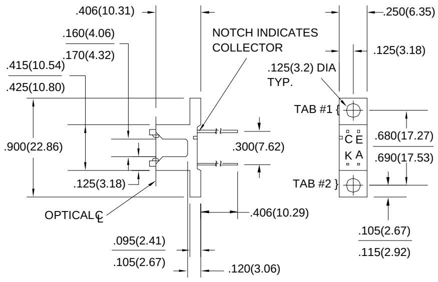
The HOA0825 series consists of an infrared emitting diode facing an NPN silicon phototransistor encased in a black thermoplastic housing. A slot in the housing between emitter and detector provides the means for mechanically interrupting the emitter beam. The phototransistor switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA0825 series employs plastic molded components. For additional component information see SEP8506 and SDP8406.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

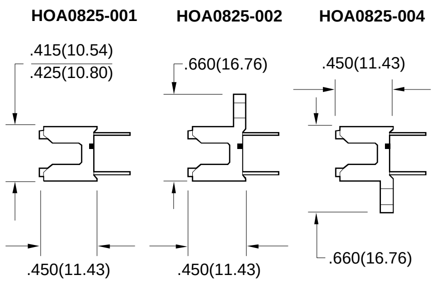
OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

HOA0825-003



DIM_040.ds4



DIM_40b.ds4

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HOA0825

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

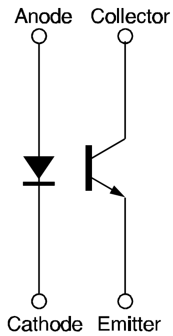
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 μA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, I_F=0
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=0.5 V
HOA0825-001, -002, -003, -004		0.5				I_F=20 mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_F=20 mA, I_C=250 μA
Rise And Fall Time	t_r, t_f		15		μs	V_{CC}=5 V, I_C=1 mA, R_L=1000 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Collector DC Current	30 mA

SCHEMATIC



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HOA0825

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

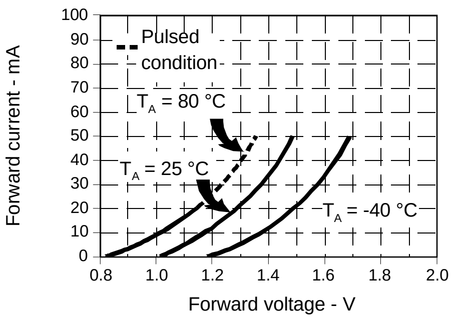


Fig. 2 Non-Saturated Switching Time vs Load Resistance

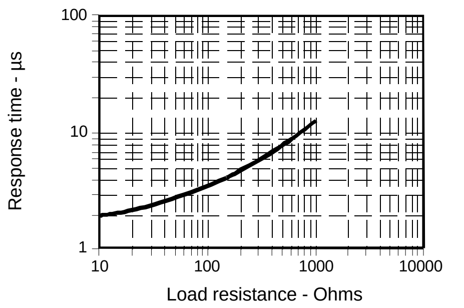


Fig. 3 Dark Current vs Temperature

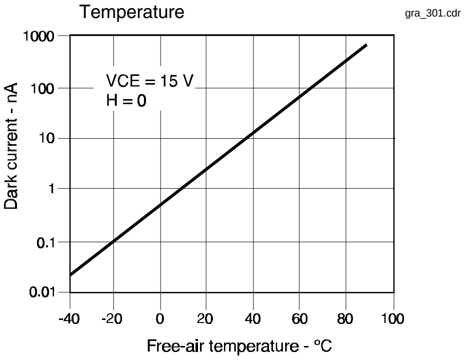
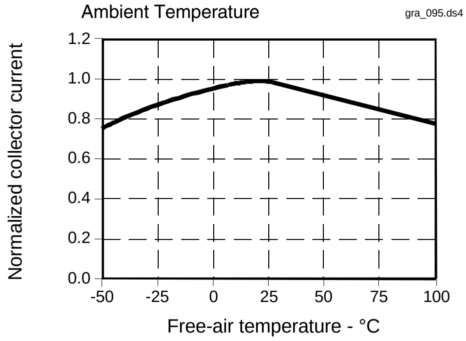


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

HOA0825

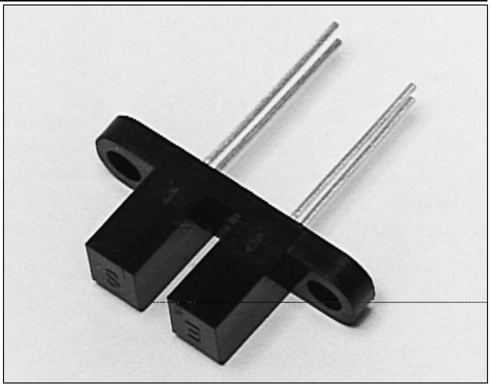
Transmissive Sensor

HOA086X/087X

Transmissive Sensor

FEATURES

- Phototransistor output
- Accurate position sensing
- Four mounting configurations
- 0.125 in.(3.18 mm) slot width
- Choice of detector aperture
- Choice of opaque or IR transmissive housings



INFRA-33.TIF

DESCRIPTION

The HOA086X/087X series consists of an infrared emitting diode facing an NPN silicon phototransistor encased in a black thermoplastic housing. The phototransistor switching takes place whenever an opaque object passes through the slot between emitter and detector. This series allows the user to choose from available options: (1) mounting tab configurations, (2) lead spacing, (3) electro-optical characteristics, (4) detector aperture size, and (5) housing materials.

The HOA086X series utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The HOA087X series employs an opaque polysulfone housing with aperture openings for use in applications in which maximum rejection of ambient light is important and in situations where maximum position resolution is desired. The HOA086X/087X series employs plastic molded components. For additional component information see SEP8506 and SDP8406.

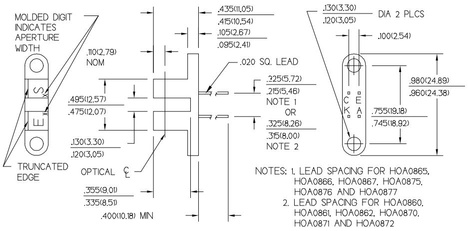
Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

To specify the complete product characteristics, see the PART NUMBER GUIDE.

OUTLINE DIMENSIONS in inches (mm)

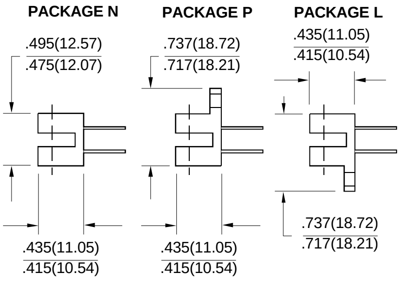
Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

Package T



DIM_041a.cdr

Packages N/P/L



DIM_41b.ds4

HOA086X/087X

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

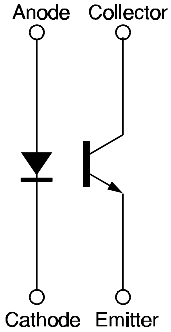
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 μA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, I_F=0
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	
Parameter A (HOA0860/0865/0870/0875)		0.5				V_{CE}=10, I_F=20 mA
Parameter B (HOA0861/0866/0871/0876)		1.0				V_{CE}=5 V, I_F=10 mA
Parameter C (HOA0862/0867/0872/0877)		1.8				V_{CE}=0.6, I_F=20 mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	
Parameter A (HOA0860/0865/0870/0875)				0.4		I_C=0.4 mA, I_F=20 mA
Parameter B (HOA0860/0866/0871/0876)				0.4		I_C=0.8 mA, I_F=10 mA
Parameter C (HOA0862/0867/0872/0877)				0.6		I_C=1.8 mA, I_F=20 mA
Rise And Fall Time	t_r, t_f		15		μs	V_{CC}=5 V, I_C=1 mA R_L=1000 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Collector DC Current	30 mA

SCHEMATIC



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HOA086X/087X

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

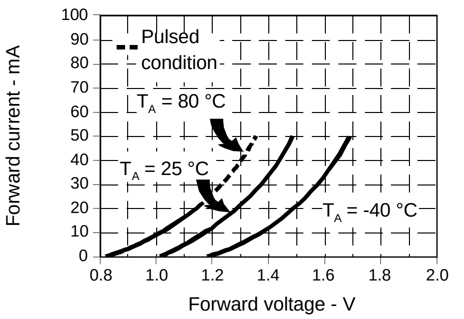


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_093.ds4

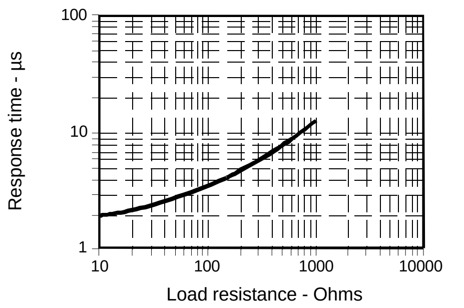


Fig. 3 Dark Current vs Temperature

gra_301.cdr

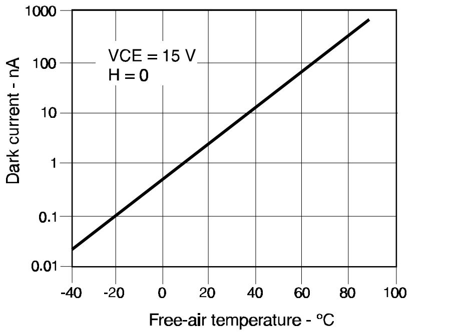
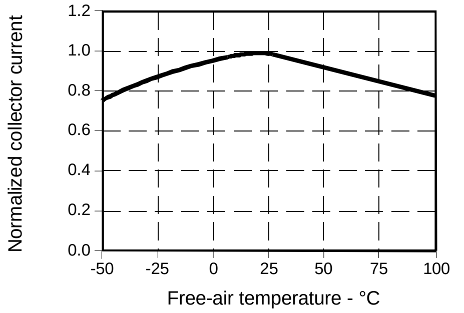


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

PART NUMBER GUIDE

HOA08XX-XXX

Housing Material
6 = Polysulfone, IR transmissive
7 = Polysulfone, opaque

Mechanical and Electrical Specifications
0 = Electrical Parameter A/lead spacing .320 in. (8.13 mm)
1 = Electrical Parameter B/lead spacing .320 in. (8.13 mm)
2 = Electrical Parameter C/lead spacing .320 in. (8.13 mm)
5 = Electrical Parameter A/lead spacing .220 in. (5.59 mm)
6 = Electrical Parameter B/lead spacing .220 in. (5.59 mm)
7 = Electrical Parameter C/lead spacing .220 in. (5.59 mm)

Aperture Width In Front Of Detector
*1 = 0.010 in. (0.25 mm)
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Aperture Width In Front Of IRED
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Mounting Configuration
L = Single mounting tab, emitter side
N = No mounting tabs
P = Single mounting tab, detector side
T = Two mounting tabs

*0.010 in. (.25 mm) aperture available with electrical Parameter A only

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HOA086X/087X
Transmissive Sensor

HOA088X/089X

Transmissive Sensor

FEATURES

- Phototransistor output
- Four mounting configurations
- Accurate position sensing
- 0.125 in.(3.18 mm) slot width
- Choice of detector aperture
- 24.0 in.(610 mm) min. 26 AWG UL 1429 wire leads
- Choice of opaque or IR transmissive housings

DESCRIPTION

The HOA088X/089X series consists of an infrared emitting diode facing an NPN silicon phototransistor encased in a black thermoplastic housing. Phototransistor switching takes place whenever an opaque object passes through the slot between emitter and detector. This series allows the user to choose from available options: (1) mounting tab configuration, (2) detector aperture size, (3) electro-optical characteristics, and (4) housing materials.

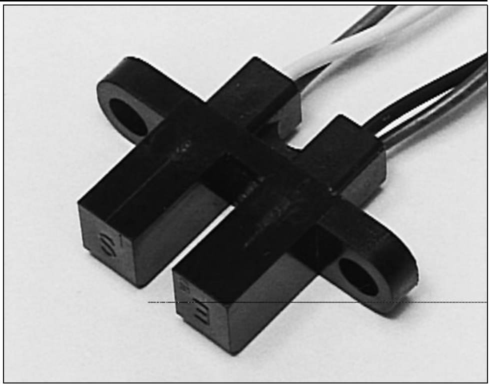
All devices employ a built-in strain relief for maximum wire attachment strength. The HOA088X series utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The HOA089X series employs an opaque polysulfone housing with aperture openings for use in applications in which maximum rejection of ambient light is important and in situations where maximum position resolution is desired. The HOA088X/089X series employs plastic molded components. For additional component information see SEP8506 and SDP8406.

Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

The detector to emitter lead spacing is 0.32 in.(8.13 mm) for all versions. Wire color code and functions are:

Red - IRED Anode	White - Detector Collector
Black - IRED Cathode	Green - Detector Emitter

To specify the complete product characteristics, see PART NUMBER GUIDE.

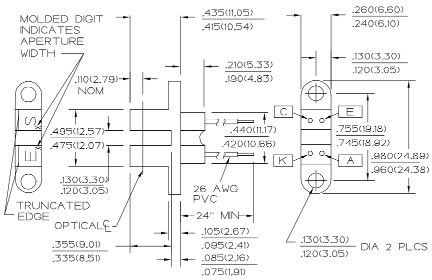


INFRA-66.TIF

OUTLINE DIMENSIONS in inches (mm)

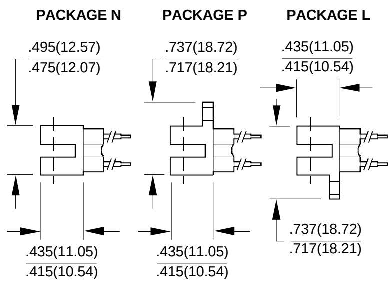
Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

Package T



DIM_042.cdr

Packages N/P/L



DIM_067.ds4

Honeywell

HOA088X/089X

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

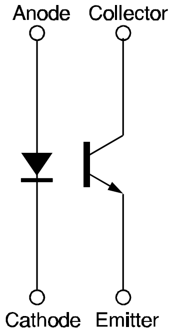
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 μA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, I_F=0
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	
Parameter A (HOA0880/0890)		0.5				V_{CE}=10, I_F=20 mA
Parameter B (HOA0881/0891)		1.0				V_{CE}=5 V, I_F=10 mA
Parameter C (HOA0882/0892)		1.8				V_{CE}=0.6, I_F=20 mA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	
Parameter A (HOA0880/0890)				0.4		I_C=0.4 mA, I_F=20 mA
Parameter B (HOA0881/0891)				0.4		I_C=0.8 mA, I_F=10 mA
Parameter C (HOA0882/0892)				0.6		I_C=1.8 mA, I_F=20 mA
Rise And Fall Time	t_r, t_f		15		μs	V_{CC}=5 V, I_C=1 mA R_L=1000 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Collector DC Current	30 mA

SCHEMATIC



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HOA088X/089X

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

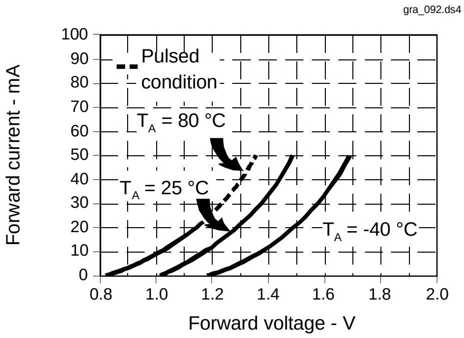


Fig. 2 Non-Saturated Switching Time vs Load Resistance

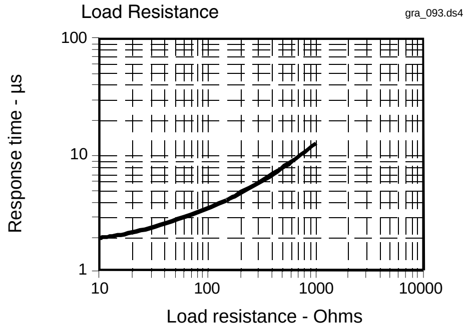


Fig. 3 Dark Current vs Temperature

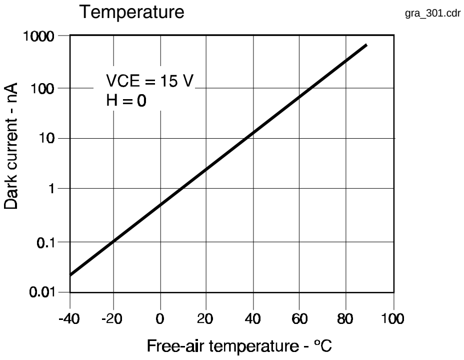
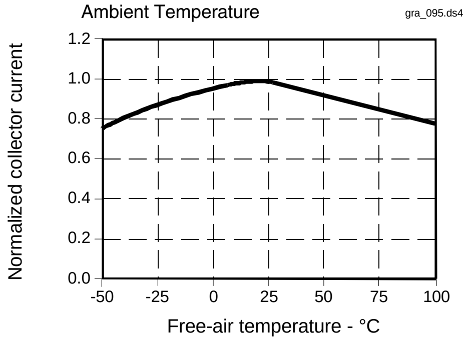


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

PART NUMBER GUIDE

HOA08XX-XXX

Housing Material
8 = Polysulfone, IR transmissive
9 = Polysulfone, opaque

Electrical Specifications
0 = Parameter A
1 = Parameter B
2 = Parameter C

*0.010 in. (.25 mm) aperture available with electrical Parameter A only

Aperture Width In Front Of Detector
*1 = 0.010 in. (0.25 mm)
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Aperture Width In Front Of IRED
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Mounting Configuration
L = Single mounting tab, emitter side
N = No mounting tabs
P = Single mounting tab, detector side
T = Two mounting tabs

Honeywell

HOA088X/089X

Transmissive Sensor

HOA0901

Transmissive Encoder Sensor

FEATURES

- Dual channel IC
- Direct TTL interface
- Inverting logic output
- Resolution to 0.009 in.(.229 mm)
- Internal temperature compensation
- 0.126 in.(3.2 mm) slot width
- Two mounting configurations

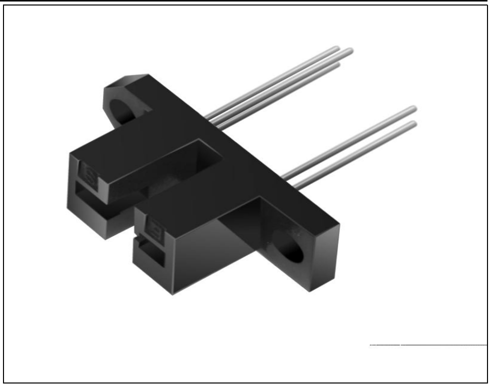
DESCRIPTION

The HOA0901 sensor consists of a dual channel IC detector and an IRED encased in a black thermoplastic housing. The device is typically used with an interrupter strip or disk (code wheel) to encode the rate and direction of mechanical motion. Applications include linear and rotary encoders; it is especially suited for the encoding function in an optical mouse. As the interruptive pattern moves, the detector generates two output signals which can be processed to provide speed and direction information.

The detector is a monolithic IC which consists of two narrow adjacent photodiodes, amplifiers, and Schmitt trigger output stages. The outputs are NPN collectors with internal 10 kΩ (nominal) pull-up resistors to V_{CC} which are capable of directly driving TTL loads. The IC design incorporates circuitry to compensate the sensitivity for the output power vs. temperature characteristic of the IRED. The sensing areas of the IC are each 0.008 in.(.203 mm) in width and .015 in.(.381mm) in height with a 0.001 in.(.0254 mm) separation for a center- to- center spacing of 0.009 in.(.229 mm) and outside edge to edge distance of 0.017 in.(.432 mm). The device is designed to operate with an encoder period as small as 0.036 in.(.914 mm) and, with proper processing logic, can resolve motion to 0.009 in.(.229 mm).

Two package styles are available. HOA0901- 011 is primarily intended for direct PCB mounting. HOA0901- 012 has mounting tabs for chassis mounting. The HOA0901 series employs plastic molded components. For additional component information see SEP8506 and HLC2701.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

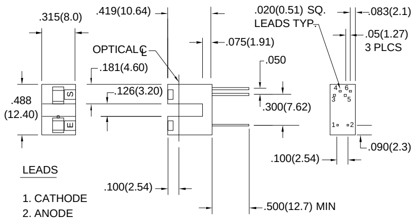


INFRA-78.TIF

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

HOA0901-011

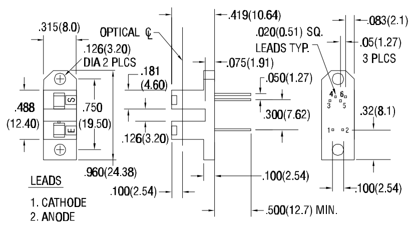


LEADS

1. CATHODE
2. ANODE
3. OUTPUT A
4. GND
5. Vcc
6. OUTPUT B

DIM_059.ds4

HOA0901-012



LEADS

1. CATHODE
2. ANODE
3. OUTPUT A
4. GND
5. Vcc
6. OUTPUT B

DIM_59b.ds4

Honeywell

HOA0901

Transmissive Encoder Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		5.5	V	
Supply Current	I_{CC}			7.0	mA	V_{CC}=5.25 V
High Level Output Voltage (A and B)	V_{OH}	4.5			V	V_{CC}=5 V, I_{OH}=0, I_F=0
Low Level Output Voltage (A and B)	V_{OL}			0.4	V	V_{CC}=5 V, I_{OL}=1.6 mA, I_F=15 mA
Internal Pull-up Resistor (A and B)	R_{INT}	5	10	20	kΩ	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		µs	V_{CC}=5 V, R_L=1 kΩ
Output Rise Time, Output Fall Time	t_r, t_f		100		ns	V_{CC}=5 V, R_L=1 kΩ
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}				mA	V_{CC}=5 V
HOA0901-011, -012				15		

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	5.5 V
Duration of Output Short to V_{CC} or Ground	1.0 sec.

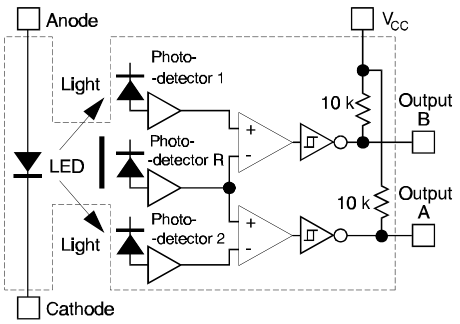
Notes
1. Derate linearly 0.75 mW/°C above 25°C.

HOA0901

Transmissive Encoder Sensor

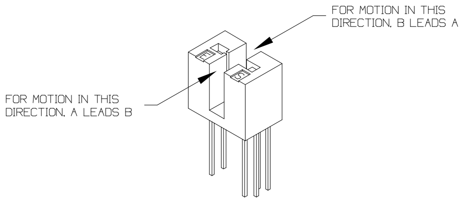
FUNCTIONAL BLOCK DIAGRAM

sch_042.cdr



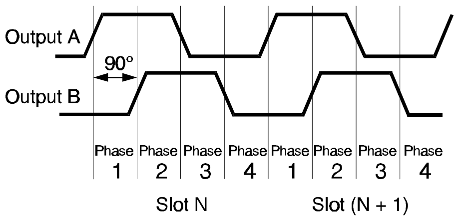
OUTPUT CONFIGURATION WITH MOTION

SCH_039.cdr



OUTPUT TIMING DIAGRAM

cir_010.cdr



SWITCHING WAVEFORM

cir_011.cdr

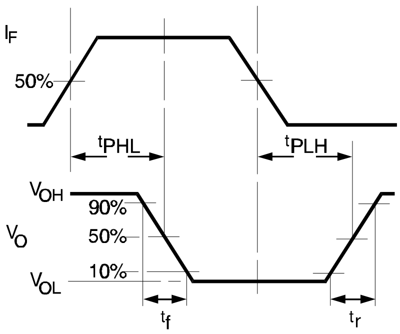


Fig. 1 IRED Forward Bias Characteristics

gra_073.ds4

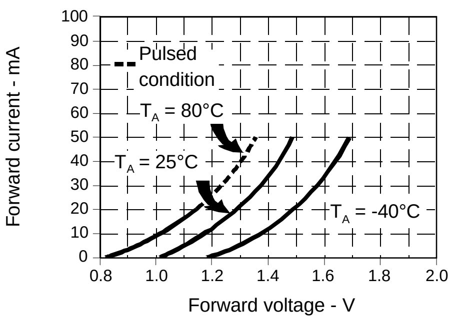
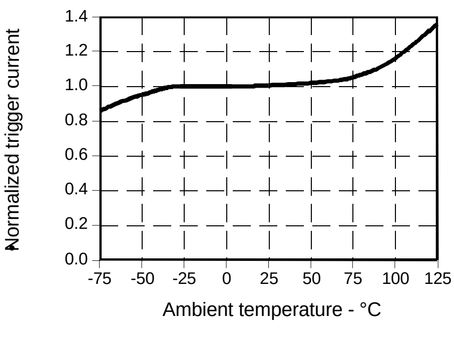


Fig. 2 IRED Trigger Current vs Temperature

gra_098.ds4



All Performance Curves Show Typical Values

Honeywell

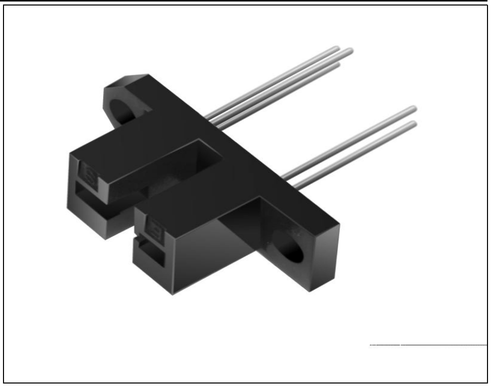
HOA0901
Transmissive Encoder Sensor

HOA0902

Transmissive Encoder Sensor

FEATURES

- Dual channel IC
- Direct TTL interface
- Resolution to 0.018 in.(.457)
- Internal temperature compensation
- 0.126 in.(3.2 mm) slot width
- Two mounting configurations



INFRA-78.TIF

DESCRIPTION

The HOA0902 assembly consists of a dual channel IC detector and an IRED encased in a black thermoplastic housing. The device is typically used with an interrupter strip or disk (code wheel) to encode the rate and direction of mechanical motion. Applications include linear and rotary encoders; it is especially suited for the encoding function in an optical mouse.

The detector is a monolithic IC which consists of two narrow adjacent photodiodes, amplifiers stages and quadrature logic circuitry which provides two outputs; (1) a fixed-duration, low level active tachometer (counting) pulse which is generated whenever the illumination level passes through the sensing threshold, and (2) a direction output which is set to a logic high or low level dependent on which of the two channels is illuminated first. The tachometer output is an NPN collector which is internally connected to V_{CC} through a 10 kΩ (nominal) resistor; the direction output is a totem-pole configuration. Both outputs are capable of directly driving TTL loads. The IC design incorporates circuitry to compensate the sensitivity for the output power vs. temperature characteristic of the IRED.

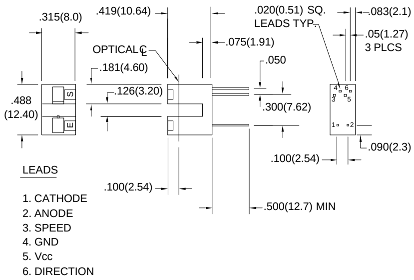
The tachometer pulse is generated at both the increasing and decreasing illumination thresholds of the sensing channel, resulting in two tach pulses for each mechanical period of the interrupter. The HOA0902 is designed to work with a mechanical period as small as 0.036 in.(.914 mm), providing resolution to 0.018 in.(.457 mm). For additional component information see SEP8506 and HLC2705.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

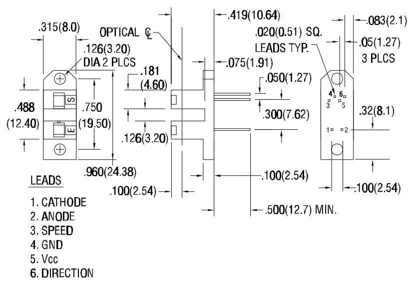
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

HOA0902-011



DIM_060.ds4

HOA0902-012



DIM_060b.cdr

Honeywell

HOA0902

Transmissive Encoder Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		5.5	V	
Supply Current	I_{CC}			12	mA	V_{CC}=5.25 V
Tach Output, inactive	$V_{OL,TACH}$	4.5			V	V_{CC}=5 V, I_{OH}=0
Tach Pulse Level, active				0.4	V	V_{CC}=5 V, I_{OL}=1.6 mA
Direction Output, B leads A	$V_{OH,DIR}$	2.4			V	V_{CC}=5 V, I_{OH}=-10 µA
Direction Output, A leads B	$V_{OL,DIR}$			0.4	V	V_{CC}=5 V, I_{OL}=1.6 mA
Tach Pulse Width	T_{PW}	3.0		20	µs	V_{CC}=5 V, I_{OL}=1.6 mA
IRED Trigger Current	I_{FT}				mA	V_{CC}=5 V
HOA0902-011, -012				15	mA	

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	5.5 V
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

Notes
1. Derate linearly 0.78 mW/°C above 25°C.

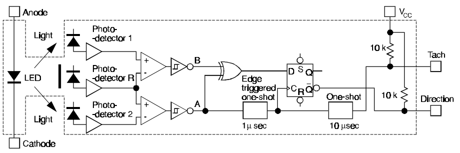
SCHEMATIC

HOA0902

Transmissive Encoder Sensor

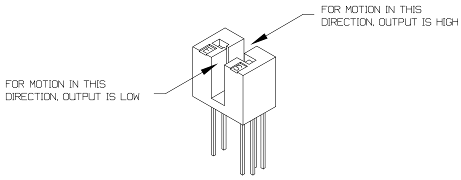
FUNCTIONAL BLOCK DIAGRAM

sch_043.cdr



OUTPUT CONFIGURATION WITH MOTION

SCH_038.cdr



OUTPUT TIMING DIAGRAM

cir_012.cdr

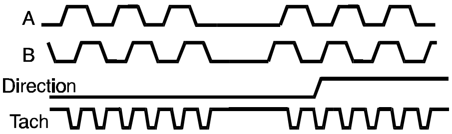


Fig. 1 IRED Forward Bias Characteristics

gra_073.ds4

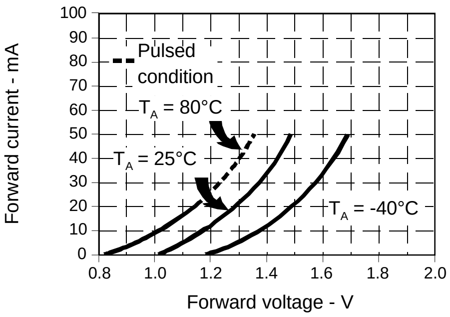
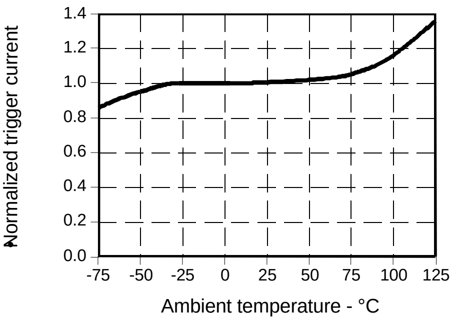


Fig. 2 IRED Trigger Current vs Temperature

gra_098.ds4



All Performance Curves Show Typical Values

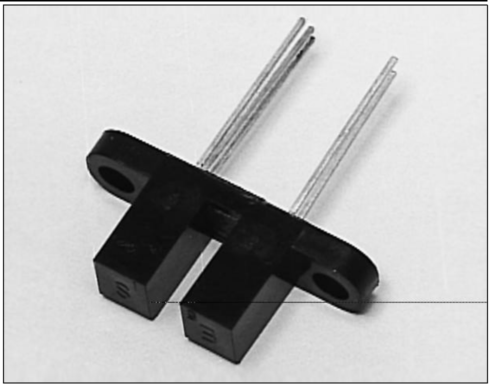
HOA0902

Transmissive Encoder Sensor

HOA096X/097X

Transmissive Optoschmitt Sensor

FEATURES
- Direct TTL interface
- Accurate position sensing
- Four mounting configurations
- Buffer or inverting logic available
- Choice of detector aperture
- 0.125 in.(3.18 mm) slot width



INFRA-26.TIF

DESCRIPTION
The HOA096X/097X series consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. The user can choose from available options: (1) detector aperture size, (2) mounting tab configuration, and (3) housing material.

The HOA096X series utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The HOA097X series employs an opaque polysulfone housing with aperture openings for use in applications where maximum rejection of ambient light is important and in situations in which maximum position resolution is desired. The HOA096X/097X series employs plastic molded components. For additional component information see SEP8506 and SDP8600.

Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

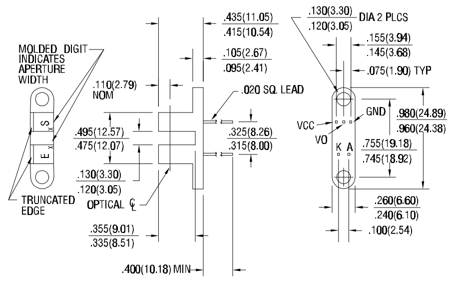
Device Polarity:
  Buffer - Output is LO when optical path is blocked.
  Inverter - Output is HI when optical path is blocked.

To specify the complete product characteristics, see PART NUMBER GUIDE.

OUTLINE DIMENSIONS in inches (mm)

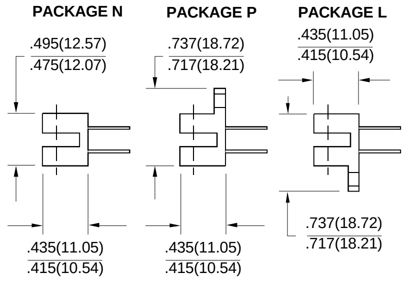
Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

Package T



DIM_066a.cdr

Packages N/P/L



DIM_41b.ds4

Honeywell

HOA096X/097X

Transmissive Optoschmitt Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		10	V	
Low Level Supply Current	I_{CCL}	4.0		12	mA	V_{CC}=5 V
Low Level Supply Current		5.0		15		V_{CC}=12 V
High Level Supply Current	I_{CCH}	2.0		10	mA	V_{CC}=5 V
High Level Supply Current		3.0		12		V_{CC}=12 V
Low Level Output Voltage	V_{OL}				V	I_{OL}=12.8 mA
HOA0961/0971				0.4		I_F=0 mA
HOA0963/0973				0.4		I_F=20 mA
High Level Output Voltage	V_{OH}				V	I_{OH}=0
HOA0961/0971		2.4				I_F=20 mA
HOA0963/0973		2.4				I_F=0 mA
Hysteresis (2)	HYST		10		%	
Propagation Delay, Low-High	t_{PLH}		5		μs	V_{CC}=5 V, I_F=20 mA
Propagation Delay, High-Low	t_{PHL}		5		μs	V_{CC}=5 V, I_F=20 mA
Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}				mA	V_{CC}=5 V
All Series				20		

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

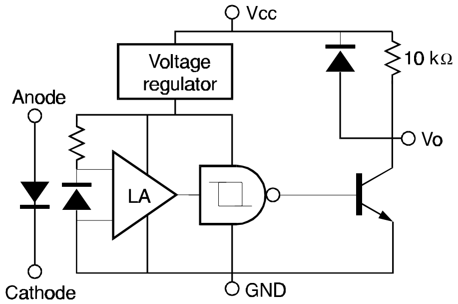
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	12 V (2)
Output Sink Current	18 mA
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

SCHEMATIC

HOA09X1 BUFFER, 10 kΩ PULL-UP

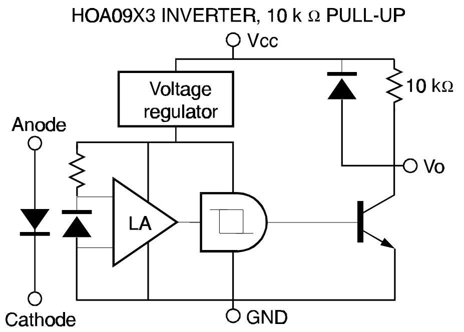


HOA096X/097X

Transmissive Optoschmitt Sensor

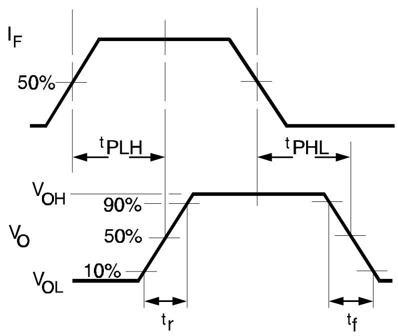
SCHEMATIC

SCH_029.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

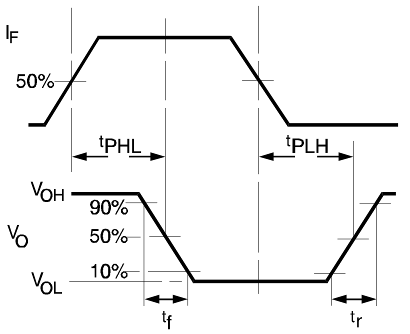


Fig. 1 IRED Forward Bias Characteristics

gra_073.ds4

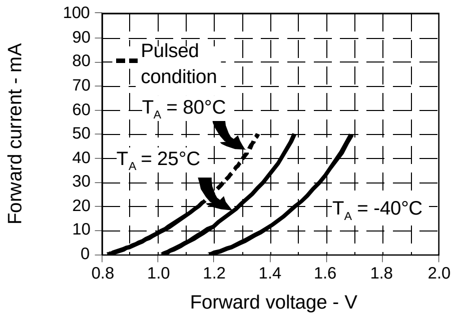
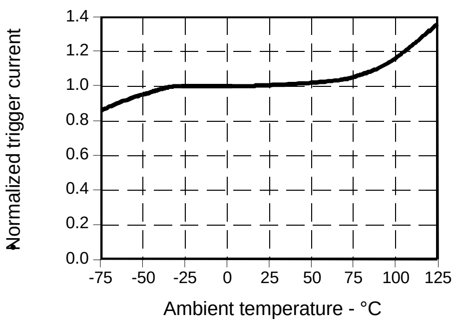


Fig. 2 IRED Trigger Current vs Temperature

gra_098.ds4



All Performance Curves Show Typical Values

HOA096X/097X

Transmissive Optoschmitt Sensor

PART NUMBER GUIDE

HOA09XX-XXX

Housing Material
6 = Polysulfone, IR transmissive
7 = Polysulfone, opaque

Output Configuration
1 = Buffer, output high with light on
3 = Inverter, output low with light on

Aperture Width In Front Of Detector
1 = 0.010 in. (0.25 mm)
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Aperture Width In Front Of IRED
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

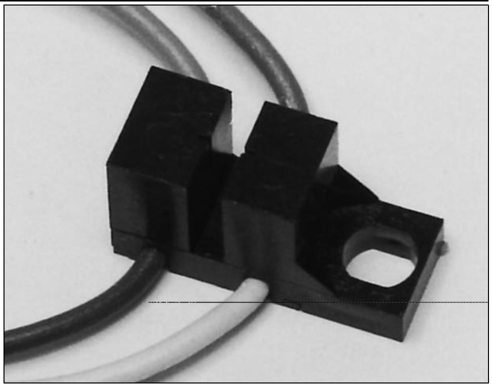
Mounting Configuration
L = Single mounting tab, emitter side
N = No mounting tabs
P = Single mounting tab, detector side
T = Two mounting tabs

HOA1870

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Accurate position sensing
- 0.070 in.(1.78 mm) slot width
- 18.0 in.(457 mm) min. 22 AWG UL 1007 wire leads



INFRA--7.TIF

DESCRIPTION

The HOA1870 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1870- 031) or photodarlington (HOA1870- 033) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. A minimum of 18.0 in.(457 mm) lead wires provides alternate electrical connection when PC board mounting is not possible. This device is ideal for use in applications in which maximum position resolution is desired. Both emitter and detector have a 0.006 in.(0.152 mm) x 0.040 in.(1.02 mm) vertical aperture. The HOA1870 series employs plastic molded components. For additional component information see SEP8506, SDP8406 and SDP8106.

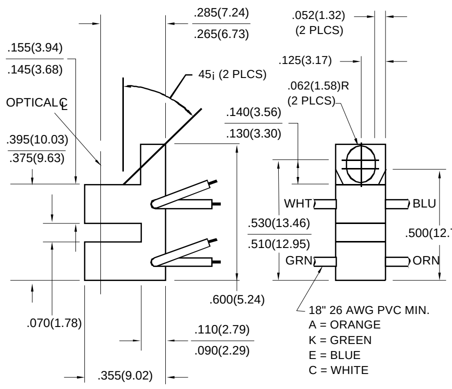
Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Wire color code and functions are:

Orange - IRED Anode
White - Detector Collector
Green - IRED Cathode
Blue - Detector Emitter

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_043.ds4

Honeywell

HOA1870

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

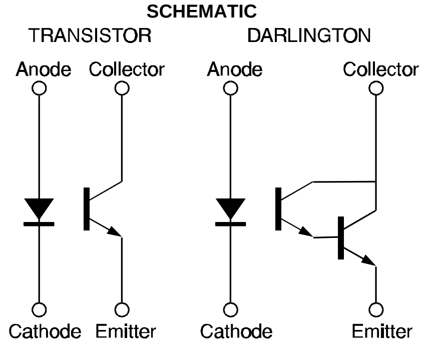
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1870-031		30				
HOA1870-033		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1870-031				100		I_F=0
HOA1870-033				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1870-031		0.3				I_F=20 mA
HOA1870-033		2.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1870-031				0.4		I_C=40 μA
HOA1870-033				1.1		I_C=250 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1870-031			15			R_L=1000 Ω
HOA1870-033			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-40°C to 85°C	
Soldering Temperature (5 sec)	240°C	
IR EMITTER		
Power Dissipation	100 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	100 mW (1)	100 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

HOA1870

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

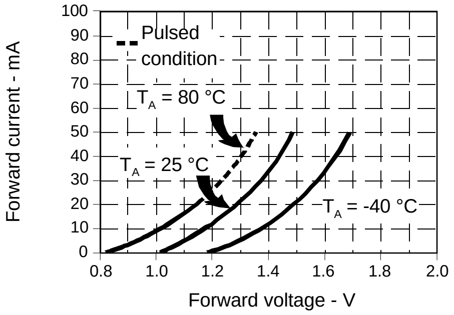


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_096.ds4

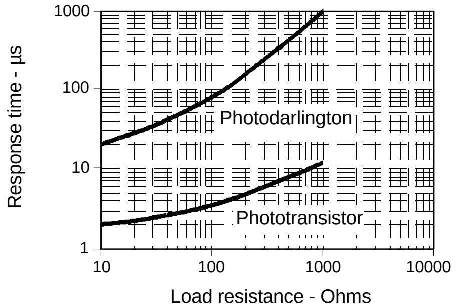


Fig. 3 Dark Current vs Temperature

gra_301.cdr

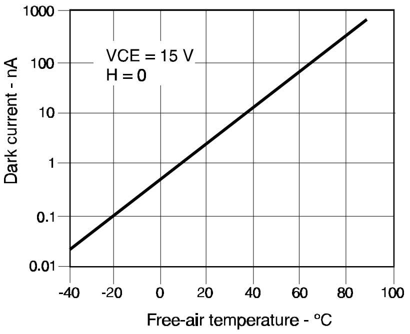
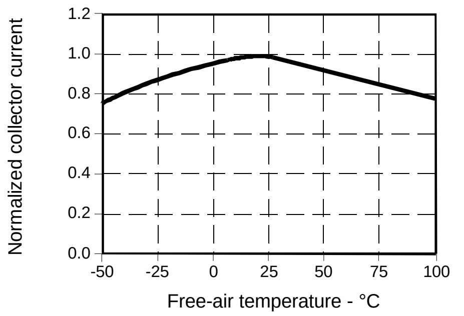


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

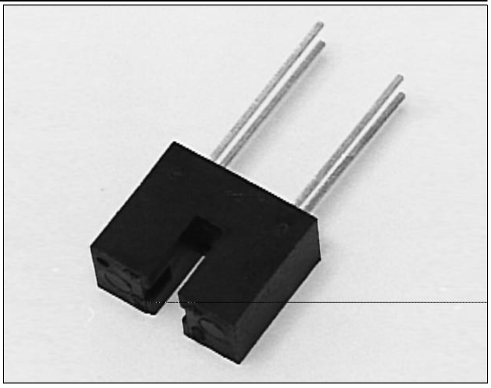
HOA1870
Transmissive Sensor

HOA1872

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Three sensitivity ranges
- Choice of metal can package or plastic molded components
- 0.100 in.(2.54 mm) slot width



INFRA-14.TIF

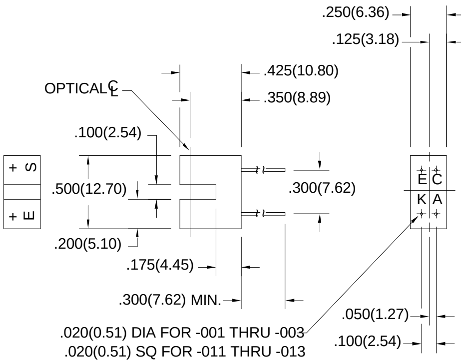
DESCRIPTION

The HOA1872 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1872- 001, - 002, - 011, - 012) or photodarlington (HOA1872- 003, - 013) encased in a black thermoplastic housing. Detector switching takes place wherever an opaque object passes through the slot between emitter and detector. The HOA1872- 001, - 002 and - 003 have a 0.050 in.(1.27 mm)dia. detector aperture and employ metal can packaged components, while the HOA1872- 011, - 012, and - 013 have a 0.060 in.(1.52 mm) dia. detector aperture and contain plastic molded components. For additional component information see SE1450, SD1440, SD1410, SEP8506, SDP8406, and SDP8106.

Housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_044.ds4

Honeywell

HOA1872

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1872-001, -002, -011, -012		30				
HOA1872-003, -013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1872-001, -002, -011, -012				100		I_F=0
HOA1872-003, -013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1872-001, -011		0.3				I_F=20 mA
HOA1872-002, -012		1.8				
HOA1872-003, -013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1872-001, -011				0.4		I_C=40 μA
HOA1872-002, -012				0.4		I_C=230 μA
HOA1872-003, -013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1872-001, -002, -011, -012			15			R_L=1000 Ω
HOA1872-003, -013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	
HOA1872-001, -002, -003	-55°C to 100°C
HOA1872-011, -012, -013	-40°C to 85°C
Storage Temperature Range	
HOA1872-001, -002, -003	-55°C to 125°C
HOA1872-011, -012, -013	-40°C to 85°C
Soldering Temperature	
HOA1872-001, -002, -003	260°C (10 sec.)
HOA1872-011, -012, -013	240°C (5 sec.)
IR EMITTER	
Power Dissipation	
HOA1872-001, -002, -003	75 mW
HOA1872-011, -012, -013	100 mW
Reverse Voltage	3 V

ABSOLUTE MAXIMUM RATINGS (continued)

Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation		
HOA1872-001, -002, -003	75 mW (1)	75 mW (1)
HOA1872-011, -012, -013	100 mW (2)	100 mW (2)
Collector DC Current	30 mA	30 mA

Notes

1. Derate linearly at 0.71 mW/°C above 25°C.
2. Derate linearly at 0.78 mW/°C above 25°C.

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

HOA1872

Transmissive Sensor

SCHEMATIC

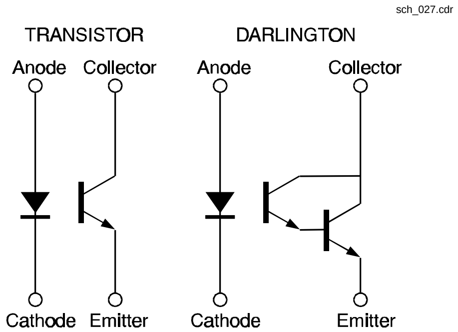


Fig. 1 IRED Forward Bias Characteristics

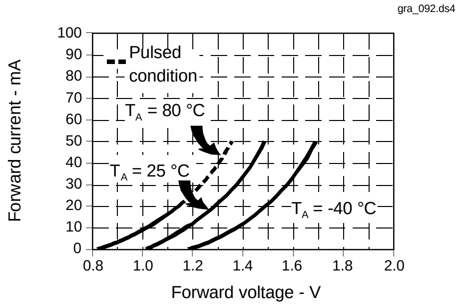


Fig. 2 Non-Saturated Switching Time vs Load Resistance

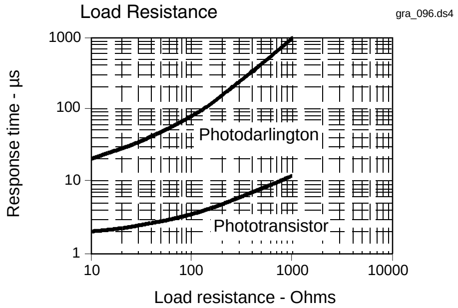


Fig. 3 Dark Current vs Temperature

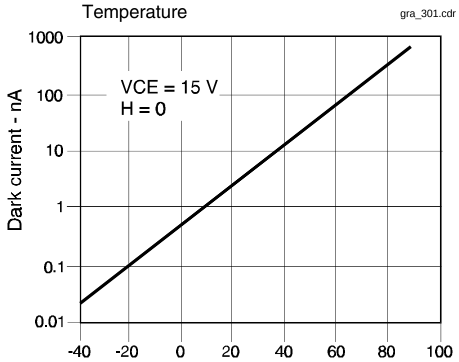
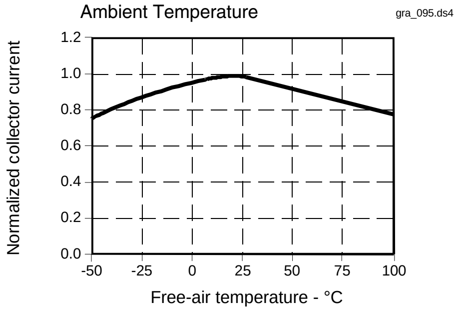


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

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HOA1872

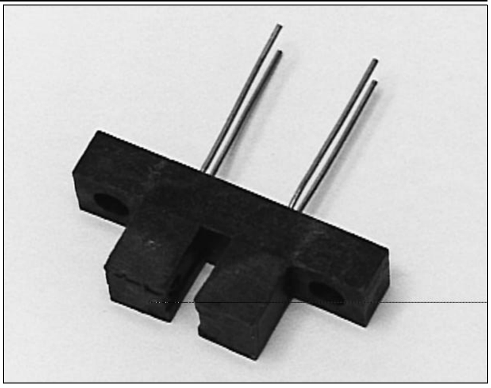
Transmissive Sensor

HOA1873

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Three sensitivity ranges
- Choice of metal can package or plastic molded components
- 0.100 in.(2.54 mm) slot width



INFRA-13.TIF

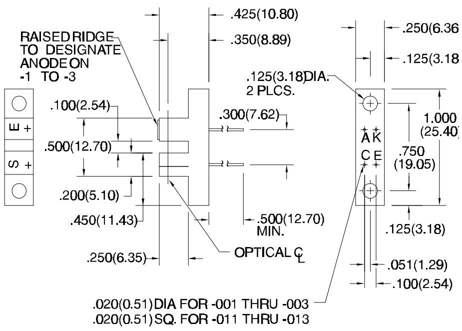
DESCRIPTION

The HOA1873 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1873- 001, - 002, - 011, - 012) or photodarlington (HOA1873- 003, - 013) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1873- 001, - 002, and - 003 have a 0.050 in.(1.27 mm) dia. detector aperture and employ metal can packaged components, while the HOA1873- 011, - 012, and - 013 have a 0.060 in.(1.52 mm) dia. detector aperture and contain plastic molded components. For additional component information see SE1450, SD1440, SD1410, SEP8506, SDP8406, and SDP8106.

HOA1873-001, 002, 003 housing material is acetal copolymer. HOA1873-011, 012, 013 housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_045.cdr

Honeywell

HOA1873

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1873-001, -002, -011, -012		30				
HOA1873-003, -013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1873-001, -002, -011, -012				100		I_F=0
HOA1873-003, -013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1873-001, -011		0.3				I_F=20 mA
HOA1873-002, -012		1.8				
HOA1873-003, -013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1873-001, -011				0.4		I_C=40 μA
HOA1873-002, -012				0.4		I_C=230 μA
HOA1873-003, -013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1873-001, -002, -011, -012			15			R_L=1000 Ω
HOA1873-003, -013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	
HOA1873-001, -002, -003	-55°C to 100°C
HOA1873-011, -012, -013	-40°C to 85°C
Storage Temperature Range	
HOA1873-001, -002, -003	-55°C to 125°C
HOA1873-011, -012, -013	-40°C to 85°C
Soldering Temperature	
HOA1873-001, -002, -003	260°C (10 sec)
HOA1873-011, -012, -013	240°C (5 sec)
IR EMITTER	
Power Dissipation:	
HOA1873-001, -002, -003	75 mW
HOA1873-011, -012, -013	100 mW
Reverse Voltage	3 V

ABSOLUTE MAXIMUM RATINGS (continued)

Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation		
HOA1873-001, -002, -003	75 mW (1)	75 mW (1)
HOA1873-011, -012, -013	100 mW (2)	100 mW (2)
Collector DC Current	30 mA	30 mA

Notes
1. Derate linearly at 0.71 mW/°C above 25°C.
2. Derate linearly at 0.78 mW/°C above 25°C.

Honeywell

HOA1873

Transmissive Sensor

SCHEMATIC

sch_027.cdr

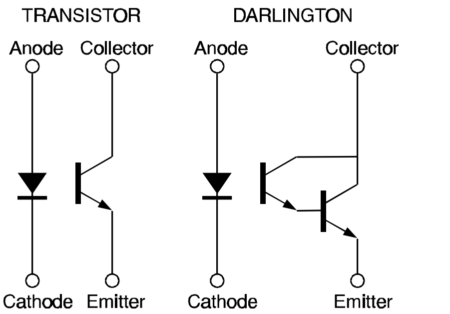


Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

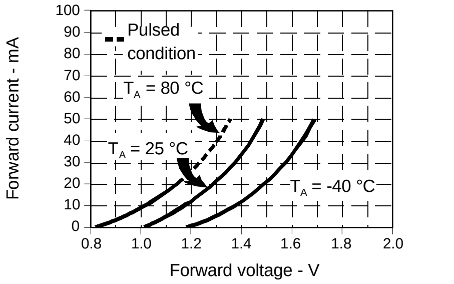


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_096.ds4

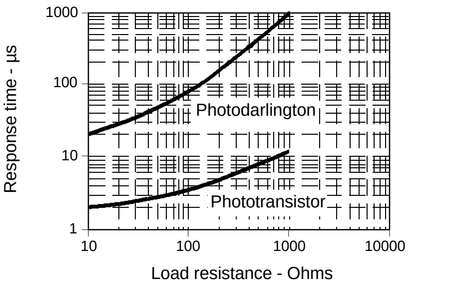


Fig. 3 Dark Current vs Temperature

gra_303.cdr

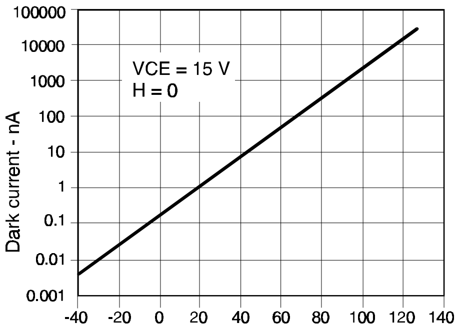
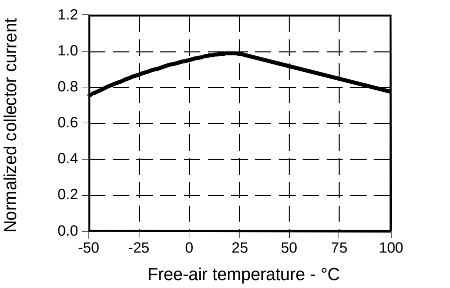


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

Honeywell

HOA1873

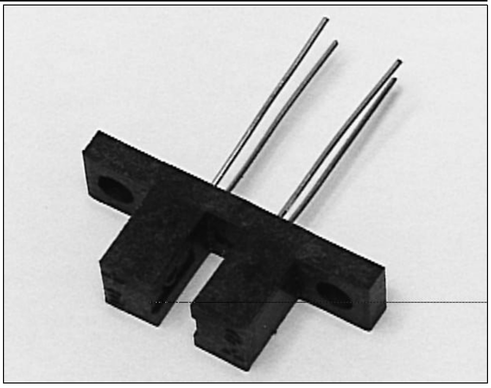
Transmissive Sensor

HOA1874

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Three sensitivity ranges
- Choice of metal can package or plastic molded components
- 0.120 in.(3.05 mm) slot width



INFRA-15.TIF

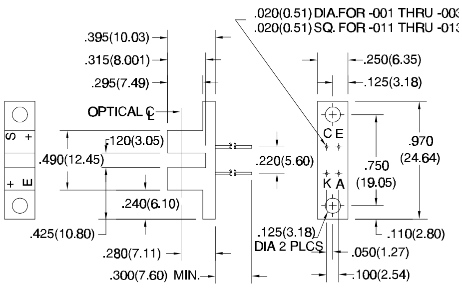
DESCRIPTION

The HOA1874 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1874- 001, - 002, - 011, - 012) or photodarlington (HOA1874- 003, - 013) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1874- 001, - 002, and - 003 have a 0.050 in.(1.27 mm) dia. detector aperture and employ metal can packaged components, while the HOA1874- 011,- 012, and - 013 have a 0.060 in.(1.52 mm) dia. detector aperture and contain plastic molded components. For additional component information see SE1450, SD1440, SD1410, SEP8506, SDP8406, and SDP8106.

HOA1874-001, 002, 003 housing material is acetal copolymer. HOA1874-011, 012, 013 housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_046.cdr

Honeywell

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HOA1874

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1874-001, -002, -011, -012		30				
HOA1874-003, -013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1874-001, -002, -011, -012				100		I_F=0
HOA1874-003, -013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1874-001, -011		0.3				I_F=20 mA
HOA1874-002, -012		1.8				
HOA1874-003, -013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1874-001, -011				0.4		I_C=40 μA
HOA1874-002, -012				0.4		I_C=230 μA
HOA1874-003, -013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1874-001, -002, -011, -012			15			R_L=1000 Ω
HOA1874-003, -013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	
HOA1874-001, -002, -003	-55°C to 100°C
HOA1874-011, -012, -013	-40°C to 85°C
Storage Temperature Range	
HOA1874-001, -002, -003	-55°C to 125°C
HOA1874-011, -012, -013	-40°C to 85°C
Soldering Temperature	
HOA1874-001, -002, -003	260°C (10 sec)
HOA1874-011, -012, -013	240°C (5 sec)
IR EMITTER	
Power Dissipation:	
HOA1874-001, -002, -003	75 mW
HOA1874-011, -012, -013	100 mW
Reverse Voltage	3 V

ABSOLUTE MAXIMUM RATINGS (continued)

Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation:		
HOA1874-001, -002, -003	75 mW (1)	75 mW (1)
HOA1874-011, -012, -013	100 mW (2)	100 mW (2)
Collector DC Current	30 mA	30 mA

Notes

1. Derate linearly at 0.71 mW/°C above 25°C.
2. Derate linearly at 0.78 mW/°C above 25°C.

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

HOA1874

Transmissive Sensor

SCHEMATIC

sch_027.cdr

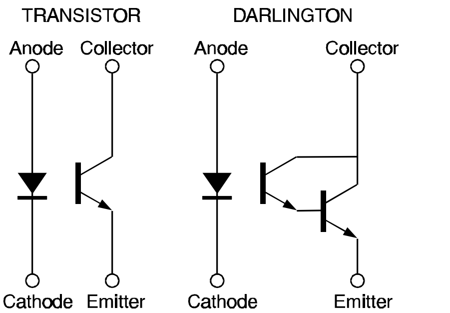


Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

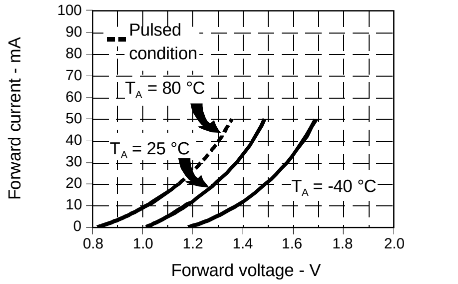


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_096.ds4

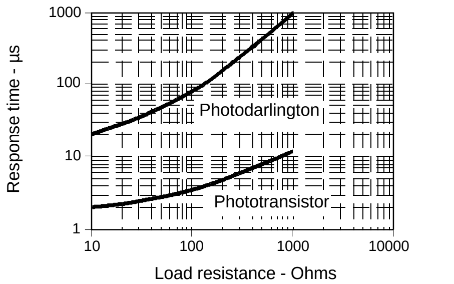


Fig. 3 Dark Current vs Temperature

gra_303.cdr

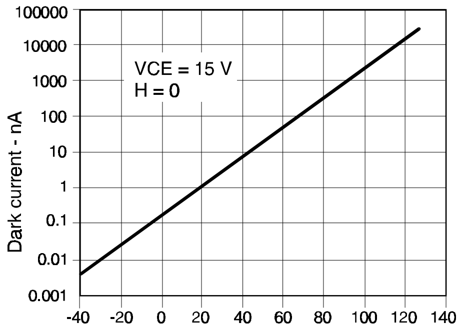
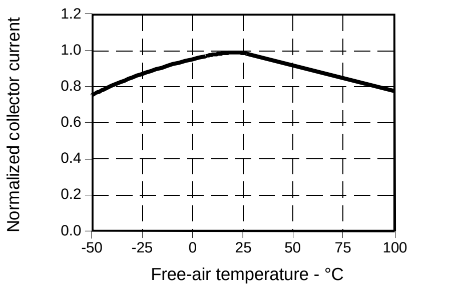


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

Honeywell

HOA1874

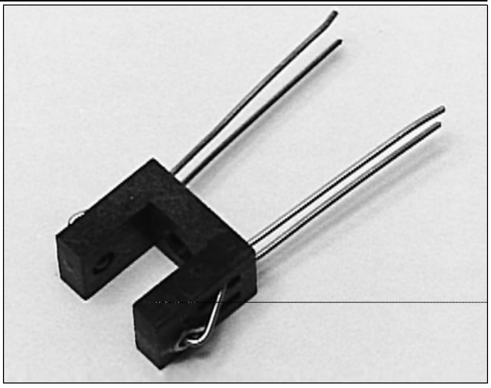
Transmissive Sensor

HOA1875

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Low profile package
- Wide operating temperature range (- 55°C to +100°C)
- 0.200 in.(5.08 mm) slot width



INFRA-12.TIF

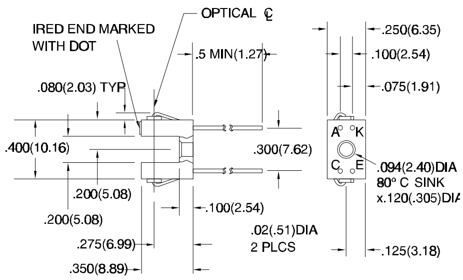
DESCRIPTION

The HOA1875 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1875- 001, - 002) or photodarlington (HOA1875- 003) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1875 series has a 0.050 in.(1.27 mm) dia. detector aperture and employs metal can packaged components. For additional component information see SE1450, SD1440, and SD1410.

Housing material is opaque polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_047.cdr

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

HOA1875

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

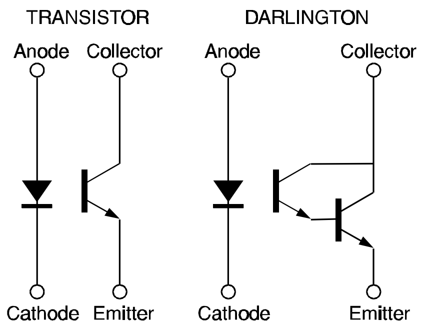
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1875-001, -002		30				
HOA1875-003		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1875-001, -002				100		I_F=0
HOA1875-003				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1875-001		0.15				I_F=30 mA
HOA1875-002		0.6				
HOA1875-003		1.8				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1875-001				0.4		I_C=20 μA
HOA1875-002				0.4		I_C=80 μA
HOA1875-003				1.1		I_C=230 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1875-001, -002			15			R_L=1000 Ω
HOA1875-003			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-55°C to 100°C	
Storage Temperature Range	-55°C to 125°C	
Soldering Temperature (10 sec)	260°C	
IR EMITTER		
Power Dissipation	75 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	75 mW (1)	75 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

HOA1875

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

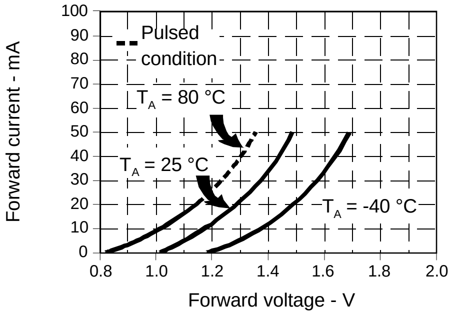


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_096.ds4

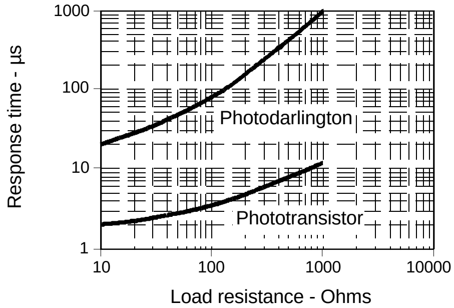


Fig. 3 Dark Current vs Temperature

gra_303.cdr

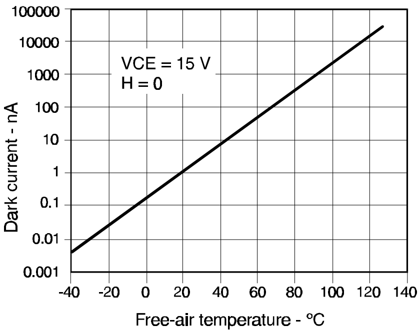
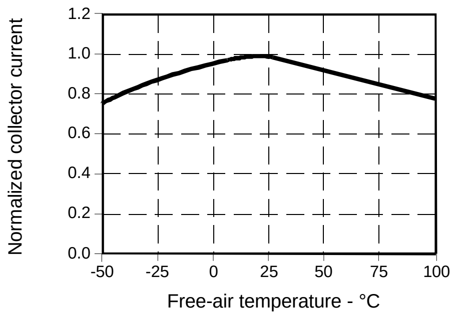


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

Honeywell

HOA1875

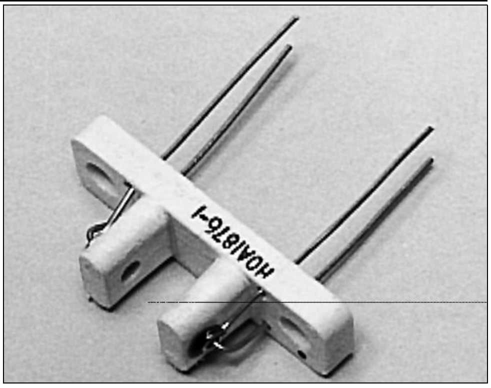
Transmissive Sensor

HOA1876

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Wide lead spacing
- Wide operating temperature range (- 55°C to +100°C)
- 0.200 in.(5.08 mm) slot width



INFRA-30.TIF

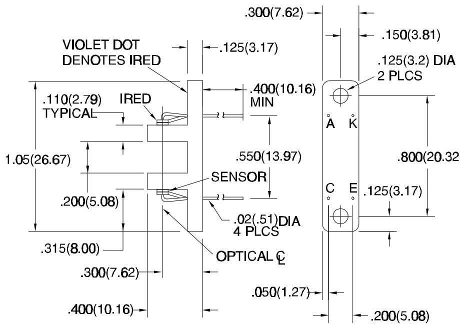
DESCRIPTION

The HOA1876 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1876- 001, - 002) or photodarlington (HOA1876- 003) encased in a white thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1876 series has a 0.050 in.(1.27 mm) dia. detector aperture and employs metal can packaged components. For additional component information see SE1450, SD1440, and SD1410.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



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HOA1876

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

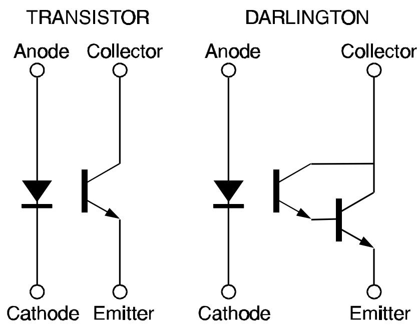
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1876-001, -002		30				
HOA1876-003		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1876-001, -002				100		I_F=0
HOA1876-003				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1876-001		0.15				I_F=30 mA
HOA1876-002		0.6				
HOA1876-003		1.8				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=30 mA
HOA1876-001				0.4		I_C=20 μA
HOA1876-002				0.4		I_C=80 μA
HOA1876-003				1.1		I_C=230 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1876-001, -002			15			R_L=1000 Ω
HOA1876-003			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-55°C to 100°C	
Storage Temperature Range	-55°C to 125°C	
Soldering Temperature (10 sec)	260°C	
IR EMITTER		
Power Dissipation	75 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	75 mW (1)	75 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



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HOA1876

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

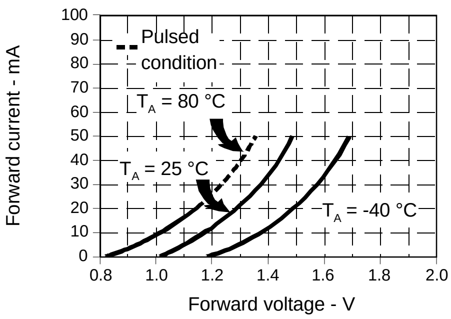


Fig. 2 Non-Saturated Switching Time vs Load Resistance

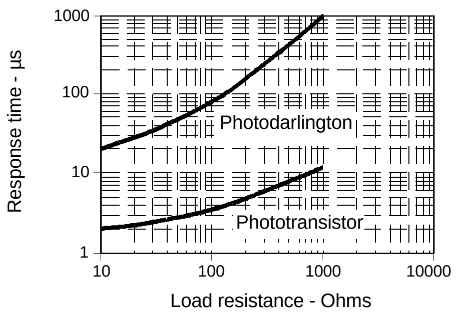


Fig. 3 Dark Current vs Temperature

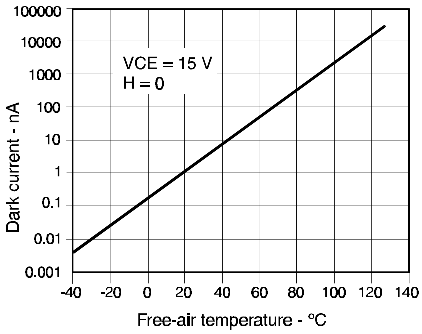
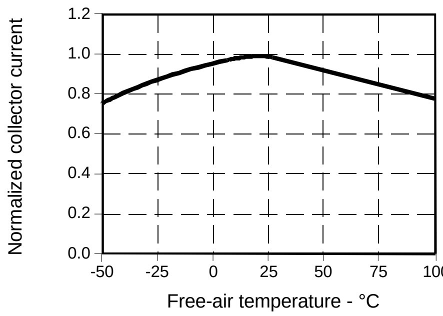


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

HOA1876

Transmissive Sensor

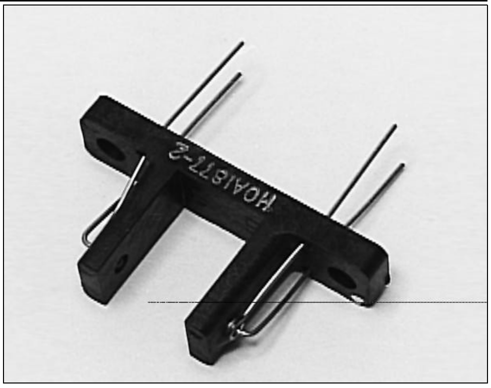
Honeywell

HOA1877

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Wide operating temperature range (- 55°C to +100°C)
- 0.50 in.(12.7 mm) high optical axis position
- 0.375 in.(9.52 mm) slot width



INFRA-47.TIF

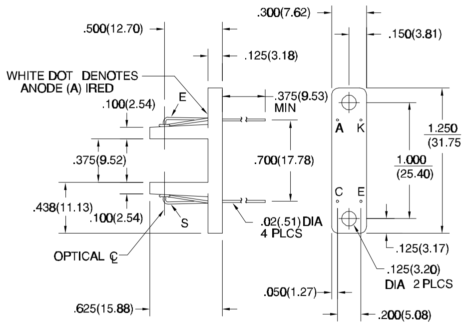
DESCRIPTION

The HOA1877 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1877- 001, - 002) or photodarlington (HOA1877- 003) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1877 series has a 0.050 in.(1.27 mm) dia. detector aperture and employs metal can packaged components. For additional component information see SE1450, SD1440, and SD1410.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



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Honeywell

HOA1877

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

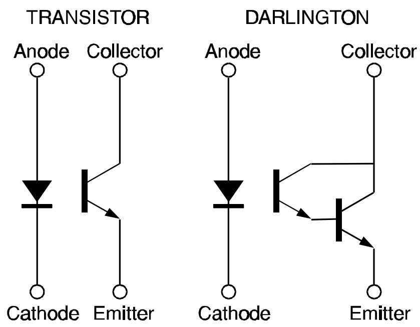
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1877-001, -002		30				
HOA1877-003		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1877-001, -002				100		I_F=0
HOA1877-003				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1877-001		0.1				I_F=30 mA
HOA1877-002		0.5				
HOA1877-003		1.5				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=30 mA
HOA1877-001				0.4		I_C=10 μA
HOA1877-002				0.4		I_C=60 μA
HOA1877-003				1.1		I_C=190 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1877-001, -002			15			R_L=1000 Ω
HOA1877-003			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-55°C to 100°C	
Storage Temperature Range	-55°C to 125°C	
Soldering Temperature (10 sec)	260°C	
IR EMITTER		
Power Dissipation	75 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	75 mW (1)	75 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



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HOA1877

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

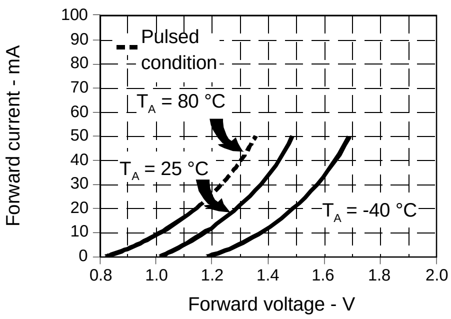


Fig. 2 Non-Saturated Switching Time vs Load Resistance

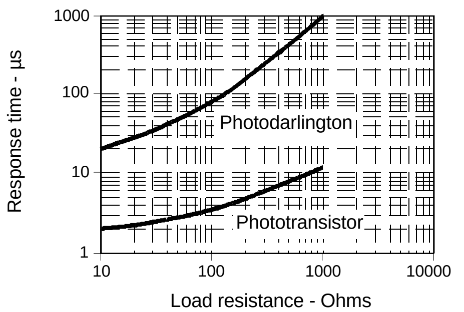


Fig. 3 Dark Current vs Temperature

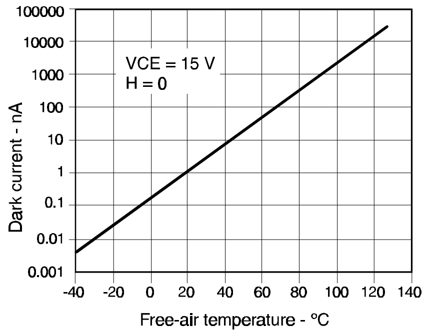
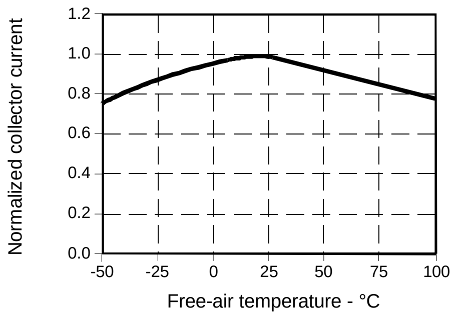


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

HOA1877

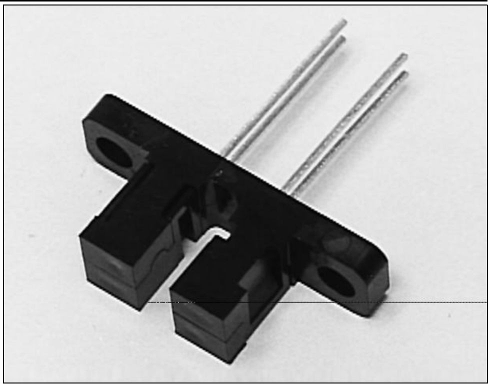
Transmissive Sensor

HOA1879

Transmissive Sensor

FEATURES

- Phototransistor output
- Accurate position sensing
- Choice of detector aperture
- 0.125 in.(3.18 mm) slot width
- Dust protective housing



INFRA-40.TIF

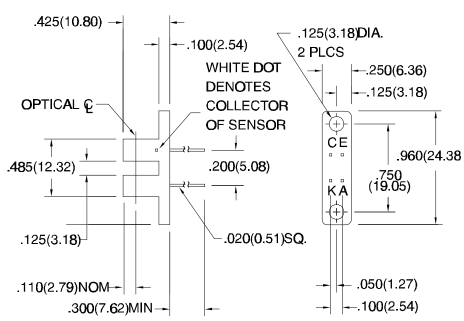
DESCRIPTION

The HOA1879 series consists of an infrared emitting diode facing an NPN silicon phototransistor encased in a black IR transmissive thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1879 series employs an IR transmissive housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The HOA1879-011 and -012 have a 0.060 in.(1.52 mm) dia. detector aperture, while the HOA1879-015 has a 0.010 in.(.25 mm) x 0.040 in. (1.02 mm) vertical aperture in front of the detector. This feature is ideal for use in applications where maximum position resolution is desired. The HOA1879 series employs plastic molded components. For additional component information see SEP8506 and SDP8406.

Housing material is IR transmissive polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



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HOA1879

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

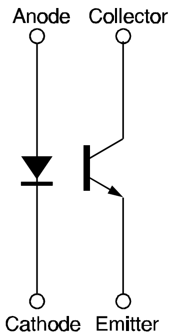
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 μA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, I_F=0
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1879-011		0.4				I_F=20 mA
HOA1879-012		1.8				
HOA1879-015		0.5				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1879-011				0.4		I_C=50 μA
HOA1879-012				0.4		I_C=220 μA
HOA1879-015				0.4		I_C=60 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1879-011, -012, -015			15			R_L=1000 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Collector DC Current	30 mA

SCHEMATIC



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HOA1879

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

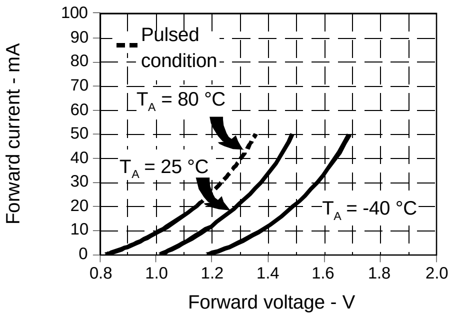


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_096.ds4

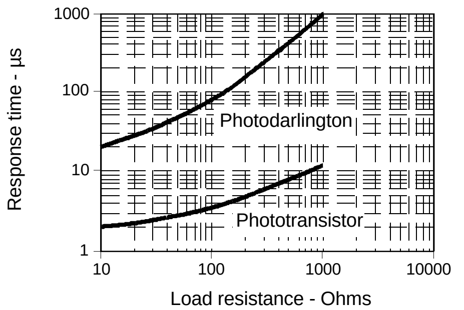


Fig. 3 Dark Current vs Temperature

gra_301.cdr

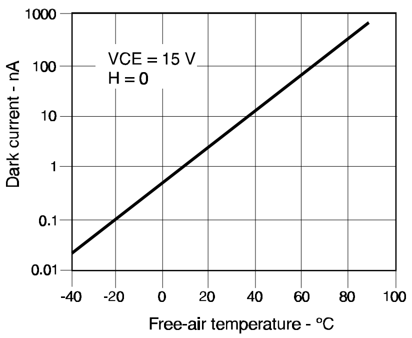
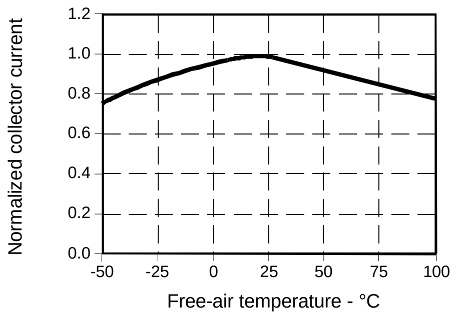


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

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HOA1879

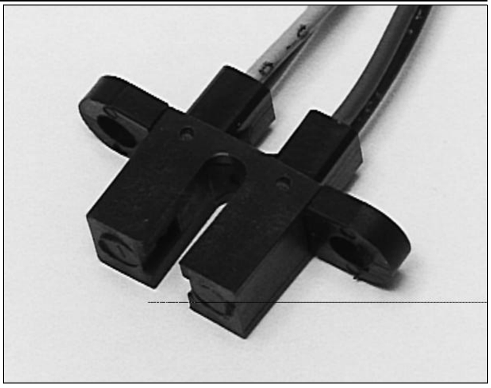
Transmissive Sensor

HOA1881

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- 0.060 in.(1.52 mm)dia. detector aperture
- 0.125 in.(3.18 mm) slot width
- 18.0 in.(457 mm) min. 22 AWG UL 1429 wire leads



INFRA--9.TIF

DESCRIPTION

The HOA1881 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1881- 011, - 012) or photodarlington (HOA1881- 013) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The lead wires of minimum length 18.0 in.(457 mm) provide alternate electrical connection when PC board mounting is not possible. The HOA1881 series employs plastic molded components. For additional component information see SEP8506, SDP8406, and SDP8106.

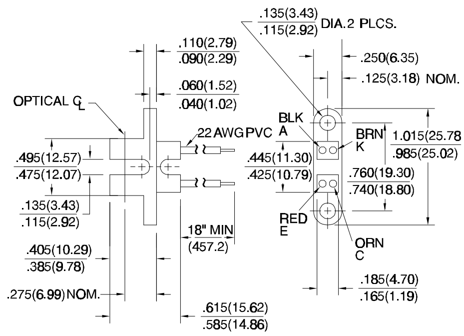
Housing material is nylon. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Wire color code and functions are:

Black - IRED Anode
Orange - Detector Collector
Brown - IRED Cathode
Red - Detector Emitter

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_052.cdr

Honeywell

HOA1881

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

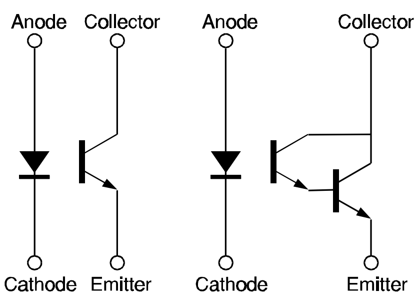
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1881-011, -012		30				
HOA1881-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1881-011, -012				100		I_F=0
HOA1881-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1881-011		0.3				I_F=20 mA
HOA1881-012		1.8				
HOA1881-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1881-011				0.4		I_C=40 μA
HOA1881-012				0.4		I_C=230 μA
HOA1881-013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1881-011, -012			15			R_L=1000 Ω
HOA1881-013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-40°C to 85°C	
Soldering Temperature (5 sec)	240°C	
IR EMITTER		
Power Dissipation	100 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	100 mW (1)	100 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



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Honeywell

HOA1881

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

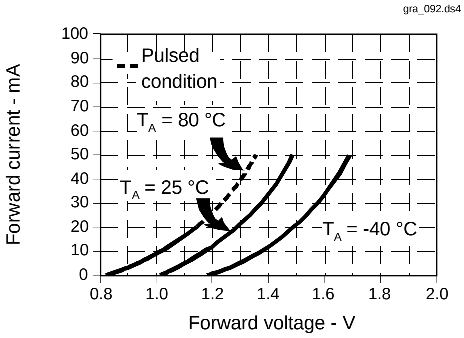


Fig. 2 Non-Saturated Switching Time vs Load Resistance

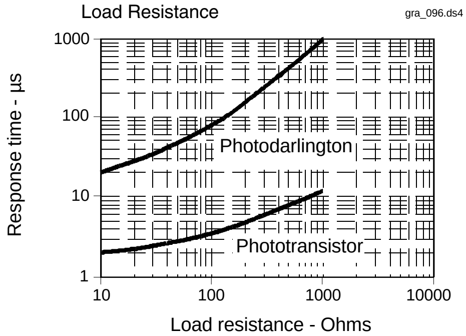


Fig. 3 Dark Current vs Temperature

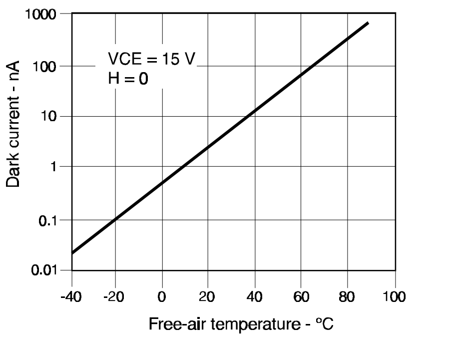
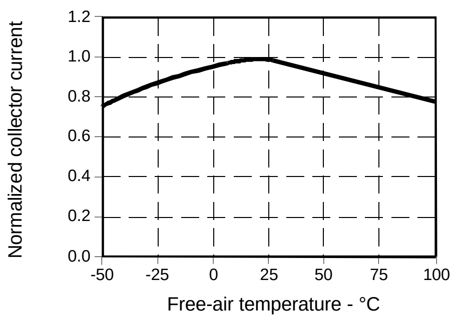


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

HOA1881

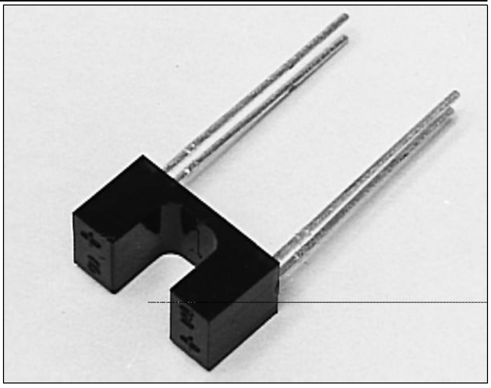
Transmissive Sensor

HOA1882

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Compact package size
- Dust protective housing
- 0.060 in.(1.52 mm)dia. detector aperture
- 0.200 in.(5.08 mm) slot width



INFRA-25.TIF

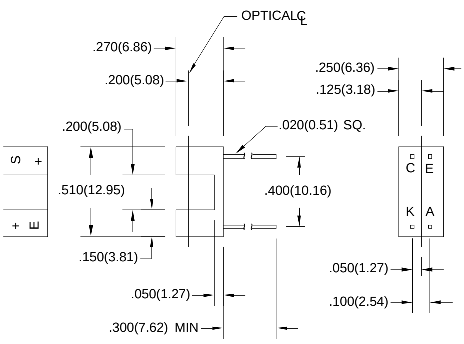
DESCRIPTION

The HOA1882 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1882- 011, - 012) or photodarlington (HOA1882- 013) encased in a black IR transmissive thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1882 series employs an IR transmissive housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The HOA1882 series employs plastic molded components. For additional component information see SEP8506/8706, SDP8406, and SDP8106.

Housing material is IR transmissive polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_053.cdr

Honeywell

HOA1882

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1882-011, -012		30				
HOA1882-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1882-011, -012				100		I_F=0
HOA1882-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1882-011		0.3				I_F=20 mA
HOA1882-012		1.8				
HOA1882-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1882-011				0.4		I_C=40 μA
HOA1882-012				0.4		I_C=230 μA
HOA1882-013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1882-011, -012			15			R_L=1000 Ω
HOA1882-013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

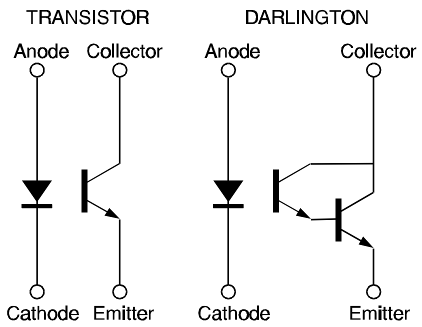
(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-40°C to 85°C	
Soldering Temperature (5 sec)	240°C	
IR EMITTER		
Power Dissipation	100 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	100 mW (1)	100 mW (1)

Notes

1. Derate linearly at 0.78 mW/°C above 25°C.

SCHEMATIC



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HOA1882
Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

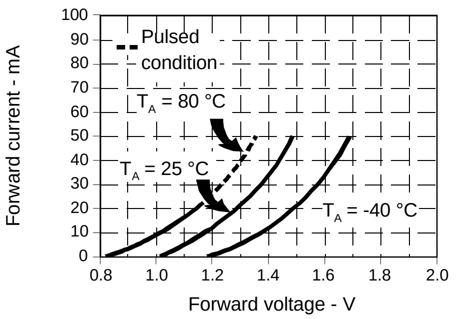


Fig. 2 Non-Saturated Switching Time vs Load Resistance

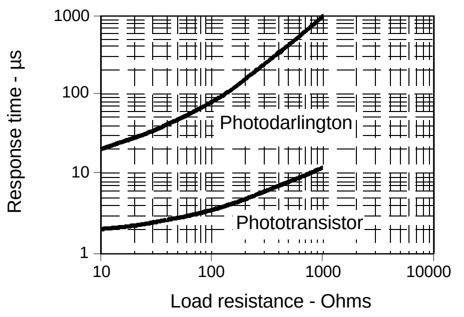


Fig. 3 Dark Current vs Temperature

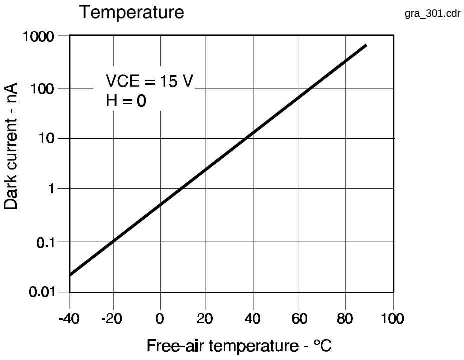
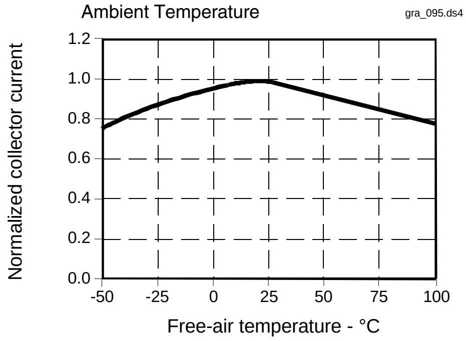


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

HOA1882
Transmissive Sensor

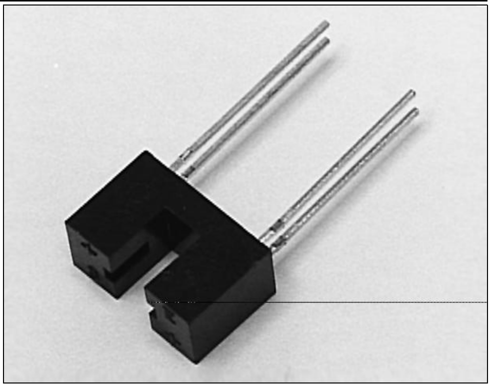
Honeywell

HOA1883

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Wide lead spacing
- 0.060 in.(1.52 mm)dia. detector aperture
- 0.140 in.(3.56 mm) slot width



INFRA-41.TIF

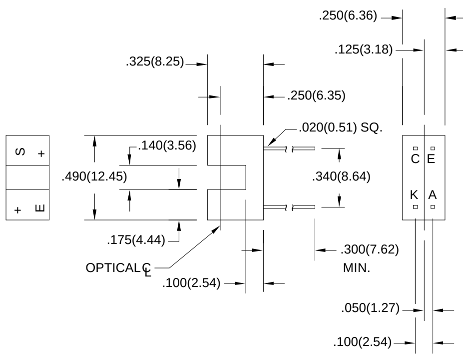
DESCRIPTION

The HOA1883 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1883- 011, - 012) or photodarlington (HOA1883- 013) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1883 series employs plastic molded components. For additional component information see SEP8506, SDP8406, and SDP8106.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_068.ds4

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HOA1883

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 µA
HOA1883-011, -012		30				
HOA1883-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1883-011, -012				100		I_F=0
HOA1883-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1883-011		0.3				I_F=20 mA
HOA1883-012		1.8				
HOA1883-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1883-011				0.4		I_C=40 µA
HOA1883-012				0.4		I_C=230 µA
HOA1883-013				1.1		I_C=500 µA
Rise And Fall Time	t_r, t_f				µs	V_{CC}=5 V, I_C=1 mA
HOA1883-011, -012			15			R_L=1000 Ω
HOA1883-013			75			R_L=100 Ω

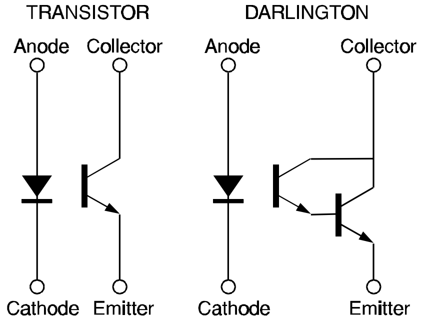
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-40°C to 85°C	
Soldering Temperature (5 sec)	240°C	
IR EMITTER		
Power Dissipation	100 mW [1]	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	100 mW [1]	100 mW [1]

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.

SCHEMATIC



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HOA1883

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

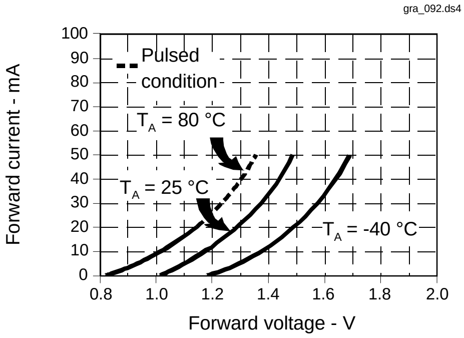


Fig. 2 Non-Saturated Switching Time vs Load Resistance

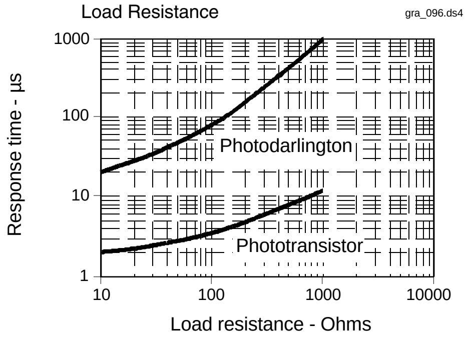


Fig. 3 Dark Current vs Temperature

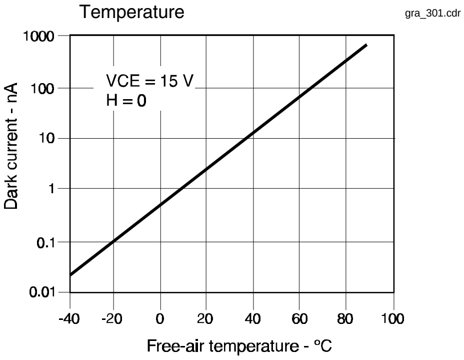
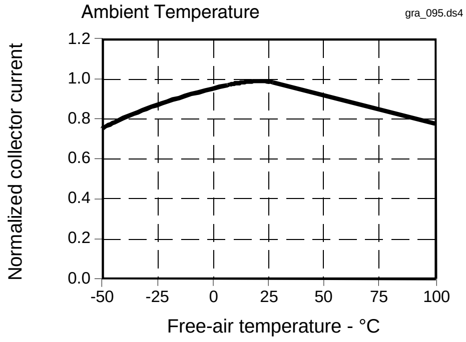


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

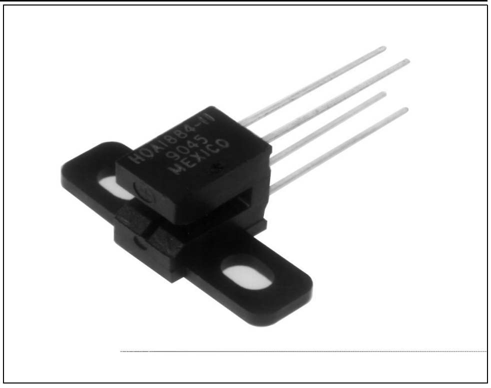
HOA1883

Transmissive Sensor

HOA1884

Transmissive Sensor

FEATURES
- Choice of phototransistor or photodarlington output
- Side mount package
- Accurate position sensing
- 0.125 in.(3.18 mm) slot width



INFRA-75.TIF

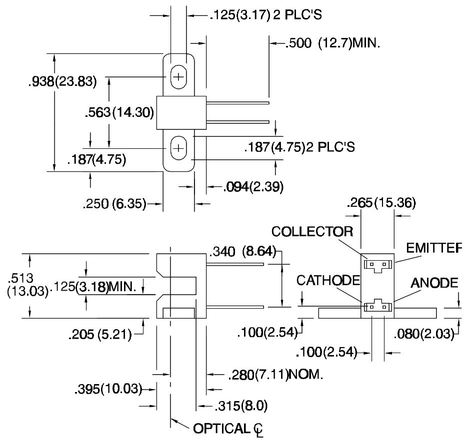
DESCRIPTION

The HOA1884 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1884- 011, - 012) or photodarlington (HOA1884- 013) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The side mounting package is useful in applications in which the interruptive element is parallel to the mounting plane. Both emitter and detector have a 0.020 in.(.508 mm) x 0.040 in.(1.02 mm) vertical aperture. The HOA1884 series employs plastic molded components. For additional component information see SEP8506, SDP8406, and SDP8106.

Housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_054.cdr

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HOA1884

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

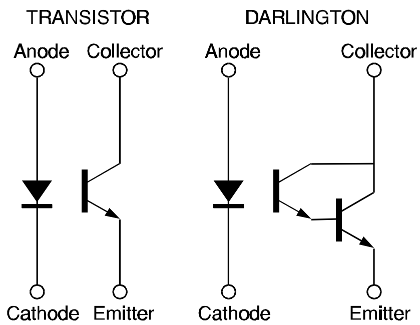
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1884-011, -012		30				
HOA1884-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1884-011, -012				100		I_F=0
HOA1884-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1884-011		0.3				I_F=20 mA
HOA1884-012		1.8				
HOA1884-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1884-011				0.4		I_C=40 μA
HOA1884-012				0.4		I_C=230 μA
HOA1884-013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1884-011, -012			15			R_L=1000 Ω
HOA1884-013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-40°C to 85°C	
Soldering Temperature (5 sec)	240°C	
IR EMITTER		
Power Dissipation	100 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	100 mW (1)	100 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



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HOA1884

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

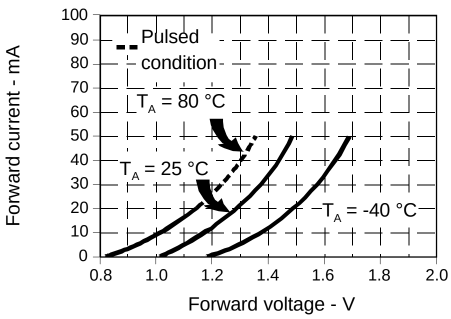


Fig. 2 Non-Saturated Switching Time vs Load Resistance

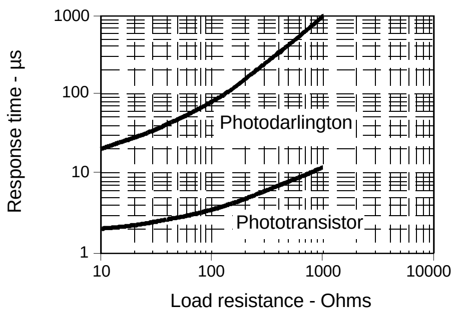


Fig. 3 Dark Current vs Temperature

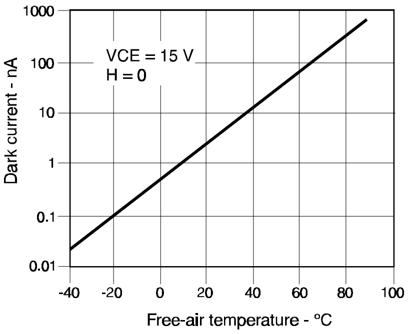
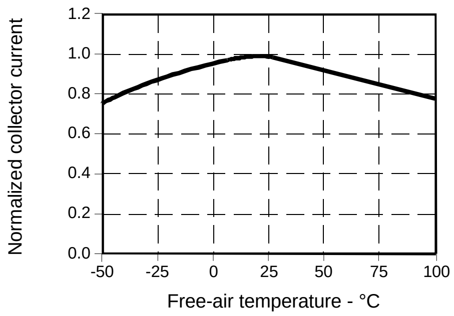


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

HOA1884

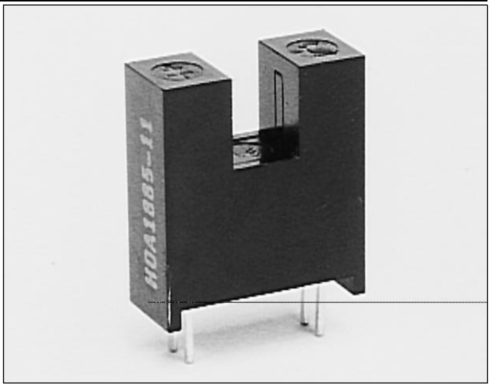
Transmissive Sensor

HOA1885

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- High profile package for raised optical centerline
- Ambient light and dust protective filter
- 0.200 in.(5.08 mm) slot width



INFRA-69.TIF

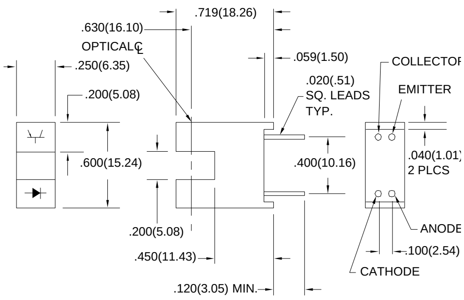
DESCRIPTION

The HOA1885 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1885- 011, - 012) or photodarlington (HOA1885- 013) encased in a black thermoplastic housing with IR transmissive inserts which form the optical windows. This arrangement provides excellent protection against ambient light while eliminating aperture openings which could be clogged by airborne contaminants. The high profile package raises the optical centerline to a nominal height of 0.063 in.(16.0 mm) from the mounting plane. This is a significant feature for applications in which surrounding components might interfere with the interrupting element if the optical centerline were lower. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1885 series employs plastic molded components and has a 0.050 in.(1.27 mm) x 0.060 in.(1.52 mm) vertical aperture in front of the detector. For additional component information see SEP8506/8706, SDP8406, and SDP8106.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_055.ds4

Honeywell

HOA1885

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 µA
HOA1885-011, -012		30				
HOA1885-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1885-011, -012				100		I_F=0
HOA1885-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1885-011		0.3				I_F=20 mA
HOA1885-012		1.8				
HOA1885-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1885-011				0.4		I_C=40 µA
HOA1885-012				0.4		I_C=230 µA
HOA1885-013				1.1		I_C=500 µA
Rise And Fall Time	t_r, t_f				µs	V_{CC}=5 V, I_C=1 mA
HOA1885-011, -012			15			R_L=1000 Ω
HOA1885-013			75			R_L=100 Ω

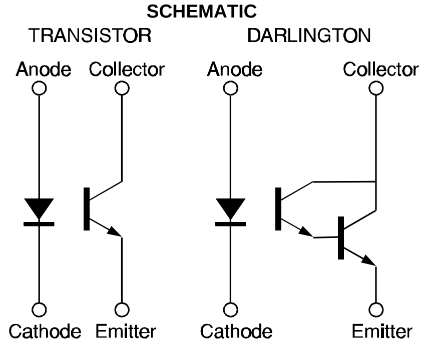
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.

SCHEMATIC



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Honeywell

HOA1885

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

gra_092.ds4

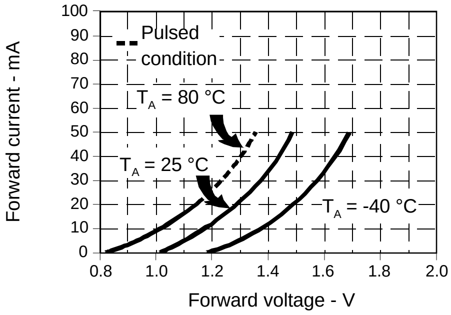


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_096.ds4

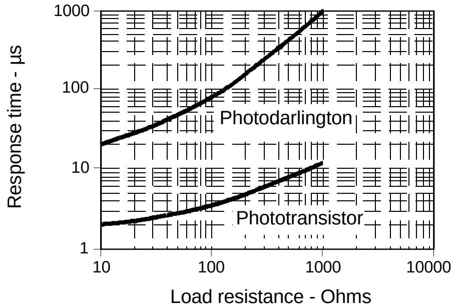


Fig. 3 Dark Current vs Temperature

gra_301.cdr

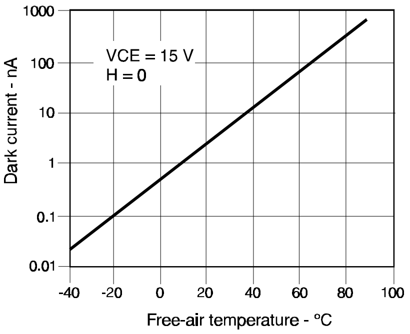
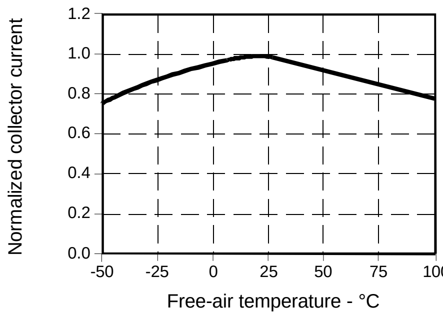


Fig. 4 Collector Current vs Ambient Temperature

gra_095.ds4



All Performance Curves Show Typical Values

Honeywell

HOA1885

Transmissive Sensor

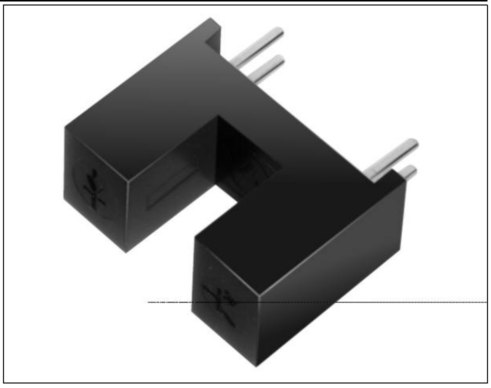
Honeywell

HOA1886

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Ambient light and dust protective filter
- 0.200 in.(5.08 mm) slot width



INFRA-76.TIF

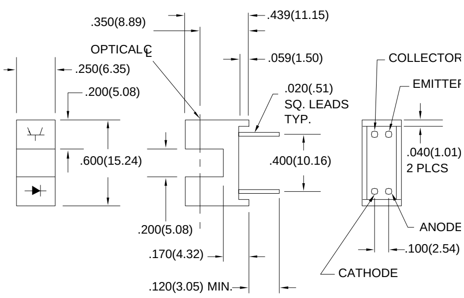
DESCRIPTION

The HOA1886 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1886- 011, - 012) or photodarlington (HOA1886- 013) encased in a black thermoplastic housing with IR transmissive inserts which form the optical windows. This arrangement provides excellent protection against ambient light while eliminating aperture openings which could be clogged by airborne contaminants. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA1886 series employs plastic molded components and has a 0.050 in.(1.27 mm) x 0.060 in.(1.52 mm) vertical aperture in front of the detector. For additional component information see SEP8506/8706, SDP8406, and SDP8106.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_056.ds4

Honeywell

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HOA1886

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 µA
HOA1886-011, -012		30				
HOA1886-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1886-011, -012				100		I_F=0
HOA1886-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1886-011		0.3				I_F=20 mA
HOA1886-012		1.8				
HOA1886-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1886-011				0.4		I_C=40 µA
HOA1886-012				0.4		I_C=230 µA
HOA1886-013				1.1		I_C=500 µA
Rise And Fall Time	t_r, t_f				µs	V_{CC}=5 V, I_C=1 mA
HOA1886-011, -012			15			R_L=1000 Ω
HOA1886-013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

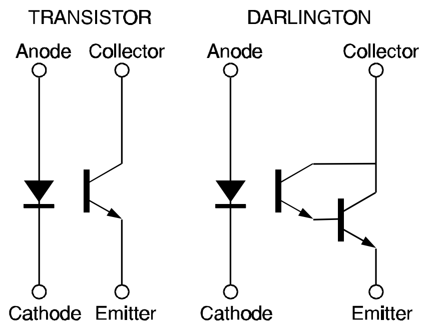
(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW [1]
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW [1]

Notes

1. Derate linearly at 0.78 mW/°C above 25°C.

SCHEMATIC



Honeywell

HOA1886
Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

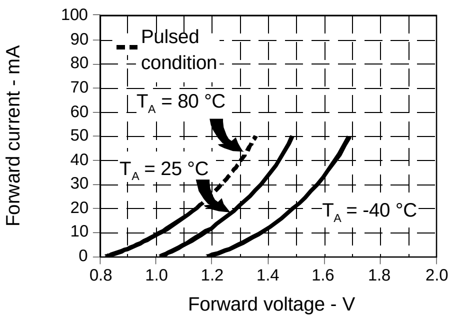


Fig. 2 Non-Saturated Switching Time vs Load Resistance

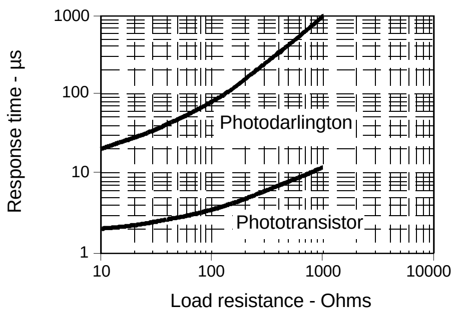


Fig. 3 Dark Current vs Temperature

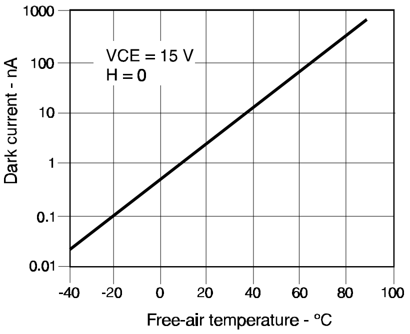
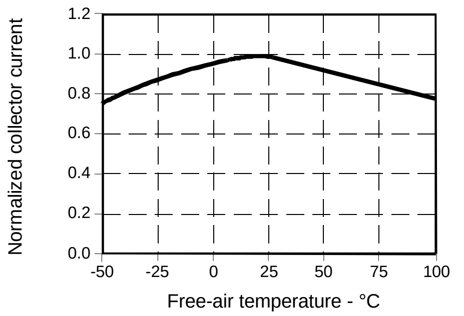


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

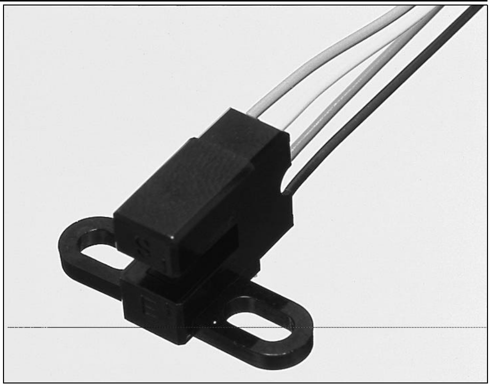
HOA1886
Transmissive Sensor

HOA1887

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Side mount package
- Ambient light and dust protective filter
- Accurate position sensing
- 0.010 in.(0.25mm) aperture windows
- 0.125 in.(3.18 mm) slot width
- 24.0 in.(610 mm) min. 26 AWG UL 1429 wire leads



INFRA-89.TIF

DESCRIPTION

The HOA1887 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA1887- 011, - 012) or photodarlington (HOA1887- 013) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The side mounting package is useful in applications in which the interruptive element is parallel to the mounting plane. Both emitter and detector have a 0.010 in.(0.25 mm) x 0.60 in(1.52 mm) vertical aperture. This feature is ideal for use in applications in which maximum position resolution is desired.

All devices employ a built- in strain relief for maximum wire attachment strength. The sensor housing contains IR transmissive optical windows. This arrangement provides excellent protection against ambient light while eliminating aperture openings which could be clogged by airborne contaminants. The HOA1887 series contains plastic molded components. For additional component information see SEP8506, SDP8406, and SDP8106.

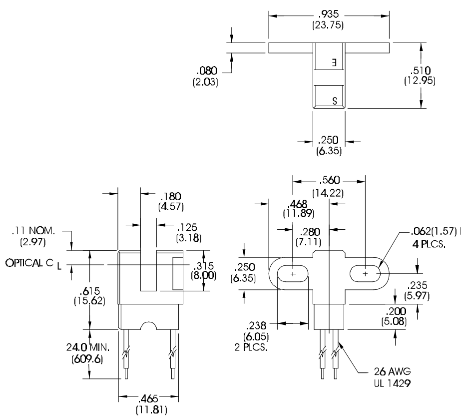
Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Wire color and functions are:

Red - IRED Anode
Black - IRED Cathode
White - Detector Collector

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



dim_107.CDR

Honeywell

HOA1887

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

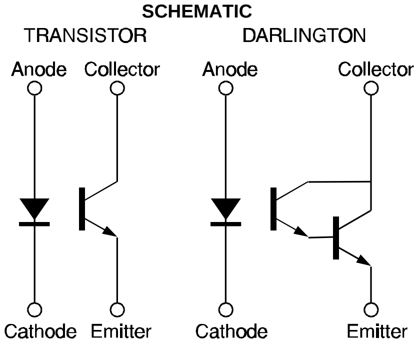
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA1887-011, -012		30				
HOA1887-013		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA1887-011, -012				100		I_F=0
HOA1887-013				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA1887-011		0.3				I_F=20 mA
HOA1887-012		1.8				
HOA1887-013		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA1887-011				0.4		I_C=40 μA
HOA1887-012				0.4		I_C=230 μA
HOA1887-013				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA1887-011, -012			15			R_L=1000 Ω
HOA1887-013			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-40°C to 85°C	
Soldering Temperature (5 sec)	240°C	
IR EMITTER		
Power Dissipation	100 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	100 mW (1)	100 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



Honeywell

HOA1887

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

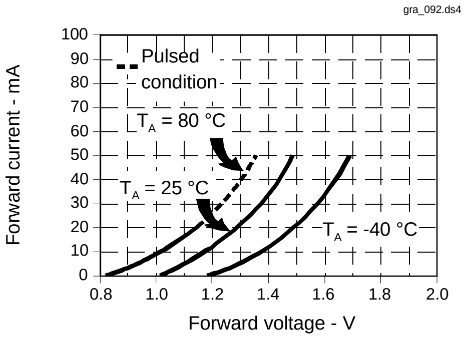


Fig. 2 Non-Saturated Switching Time vs Load Resistance

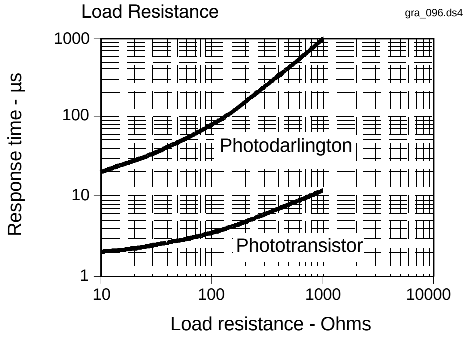


Fig. 3 Detector Dark Current vs Temperature

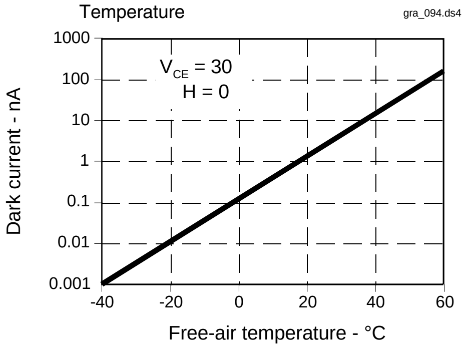
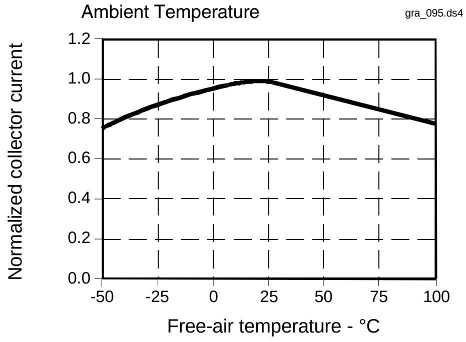


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

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HOA1887

Transmissive Sensor

Honeywell

HOA2001

Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- Buffer logic
- 0.060 in.(1.52 mm) dia. detector aperture
- 0.120 in.(3.05 mm) slot width
- 0.050 in.(1.27) offset pin circle detector eads

INFRA-45.TIF

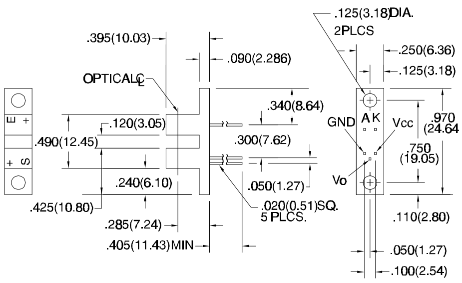
DESCRIPTION

The HOA2001 consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. The buffer logic provides a high output when the optical path is clear, and a low output when the path is interrupted. The HOA2001 employs plastic molded components. For additional component information see SEP8506 and SDP8600.

Housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_062.ds4

Honeywell

HOA2001

Transmissive Optoschmitt Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		10	V	
Low Level Supply Current	I_{CCL}	4.0		12	mA	V_{CC}=5 V
Low Level Supply Current		5.0		15		V_{CC}=12 V
High Level Supply Current	I_{CCH}	2.0		10	mA	V_{CC}=5 V
High Level Supply Current		3.0		12		V_{CC}=12 V
Low Level Output Voltage	V_{OL}			0.4	V	I_{OL}=12.8 mA, I_F=0 mA
High Level Output Voltage	V_{OH}	2.4			V	I_{OH}=0, I_F=10 mA
Hysteresis (2)	HYST		10		%	
Propagation Delay, Low-High	t_{PLH}		5		μs	V_{CC}=5 V, I_F=10 mA
Propagation Delay, High-Low	t_{PHL}		5		μs	V_{CC}=5 V, I_F=10 mA
Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}				mA	V_{CC}=5 V
HOA2001-001				10		

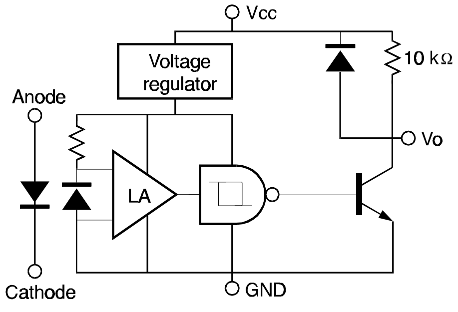
Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	12 V (2)
Output Sink Current	18 mA
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

SCHEMATIC



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HOA2001

Transmissive Optoschmitt Sensor

SWITCHING WAVEFORM

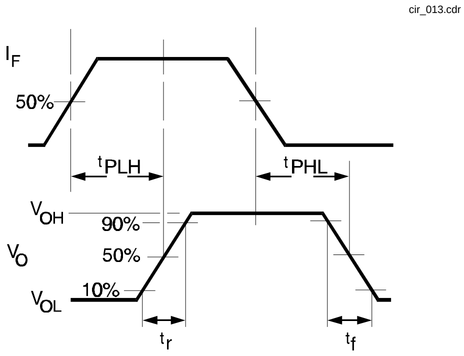


Fig. 1 IRED Forward Bias Characteristics

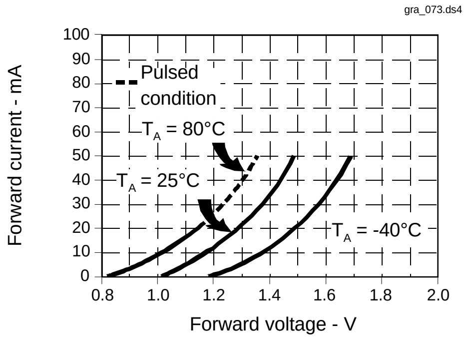
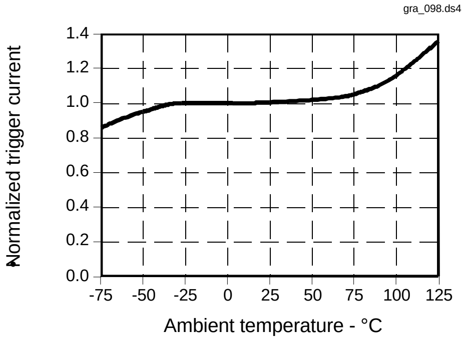


Fig. 2 IRED Trigger Current vs Temperature



All Performance Curves Show Typical Values

Honeywell

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HOA2001
Transmissive Optoschmitt Sensor

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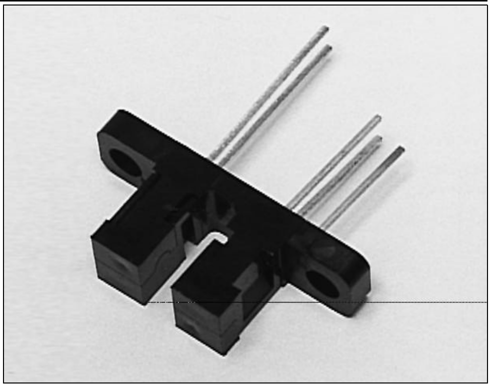
Honeywell

HOA2003

Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- Buffer logic
- 0.010 in.(2.54 mm) offset detector leads
- 0.125 in.(3.18 mm) slot width
- Accurate position sensing
- Dust protective housing



INFRA-42.TIF

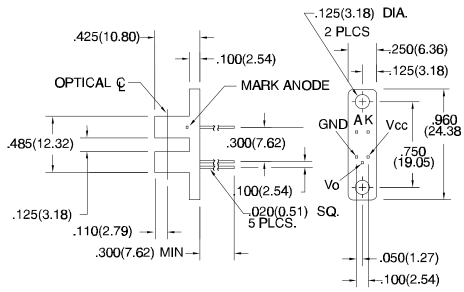
DESCRIPTION

The HOA2003 consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. The buffer logic provides a high output when the optical path is clear, and a low output when the path is interrupted. The HOA2003 utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The detector has a 0.010 in.(.254 mm) x 0.040 in.(1.02 mm) vertical aperture which is ideal for use in applications in which maximum position resolution is desired. The HOA2003 employs plastic molded components. For additional component information see SEP8506 and SDP8600.

Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_064.ds4

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

HOA2003

Transmissive Optoschmitt Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		10	V	
Low Level Supply Current	I_{CCL}	4.0		12	mA	V_{CC}=5 V
Low Level Supply Current		5.0		15		V_{CC}=12 V
High Level Supply Current	I_{CCH}	2.0		10	mA	V_{CC}=5 V
High Level Supply Current		3.0		12		V_{CC}=12 V
Low Level Output Voltage	V_{OL}			0.4	V	I_{OL}=12.8 mA, I_F=0 mA
High Level Output Voltage	V_{OH}	2.4			V	I_{OH}=0, I_F=20 mA
Hysteresis (2)	HYST		10		%	
Propagation Delay, Low-High	t_{PLH}		5		µs	V_{CC}=5 V, I_F=20 mA
Propagation Delay, High-Low	t_{PHL}		5		µs	V_{CC}=5 V, I_F=20 mA
Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}				mA	V_{CC}=5 V
HOA2003-001				20		

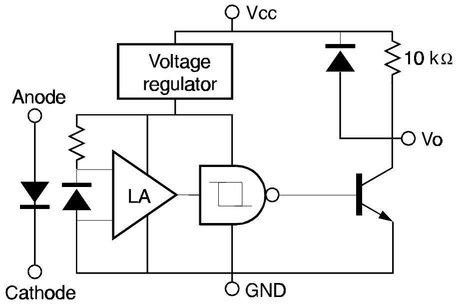
Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	12 V (2)
Output Sink Current	18 mA
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

SCHEMATIC



Honeywell

SWITCHING WAVEFORM

cir_013.cdr

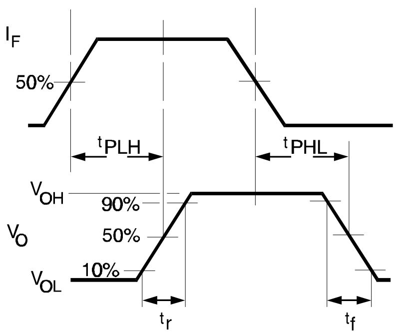


Fig. 1 IRED Forward Bias Characteristics

gra_073.ds4

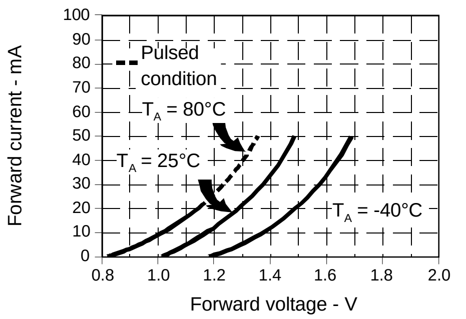
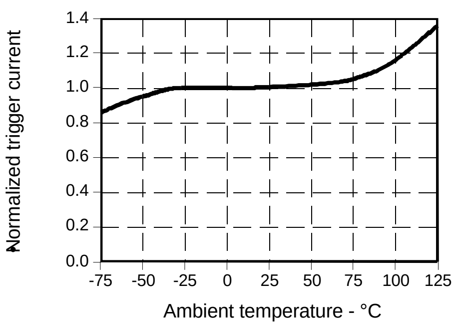


Fig. 2 IRED Trigger Current vs Temperature

gra_098.ds4



All Performance Curves Show Typical Values

HOA2003

Transmissive Optoschmitt Sensor

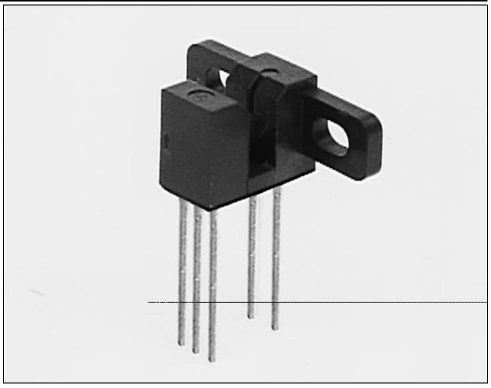
Honeywell

HOA2004

Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- Buffer logic
- Side mount package
- 0.125 in.(3.18 mm) slot width



INFRA-67.TIF

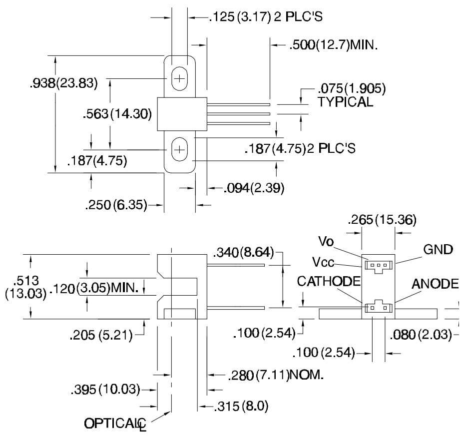
DESCRIPTION

The HOA2004 consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. The buffer logic provides a high output when the optical path is clear, and a low output when the path is interrupted. The side mounting package is useful in applications in which the interruptive element is parallel to the mounting plane. Both emitter and detector have a 0.020 in.(.508 mm) x 0.040 in.(1.02 mm) vertical aperture. The narrow aperture is ideal for use in applications in which maximum position resolution is desired. The HOA2004 employs plastic molded components. For additional component information see SEP8506 and SDP8600.

Housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_065.ds4

Honeywell

HOA2004

Transmissive Optoschmitt Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		12	V	
Low Level Supply Current	I_{CCL}	4.0		12	mA	V_{CC}=5 V
Low Level Supply Current		5.0		15		V_{CC}=12 V
High Level Supply Current	I_{CCH}	2.0		10	mA	V_{CC}=5 V
High Level Supply Current		3.0		12		V_{CC}=12 V
Low Level Output Voltage	V_{OL}			0.4	V	I_{OL}=12.8 mA, I_F=0 mA
High Level Output Voltage	V_{OH}	2.4			V	I_{OH}=0, I_F=20 mA
Hysteresis (2)	HYST		10		%	
Propagation Delay, Low-High	t_{PLH}		5		µs	V_{CC}=5 V, I_F=20 mA
Propagation Delay, High-Low	t_{PHL}		5		µs	V_{CC}=5 V, I_F=20 mA
Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}				mA	V_{CC}=5 V
HOA2004-001				20		

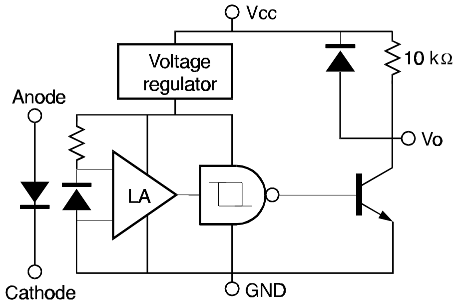
Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	12 V (2)
Output Sink Current	18 mA
Duration of Output Short to V_{CC} or Ground	1.0 sec.

SCHEMATIC



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Honeywell

HOA2004

Transmissive Optoschmitt Sensor

SWITCHING WAVEFORM

cir_013.cdr

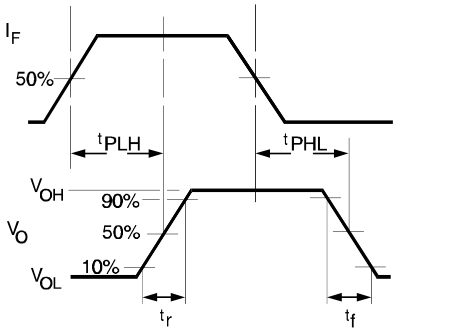


Fig. 1 IRED Forward Bias Characteristics

gra_073.ds4

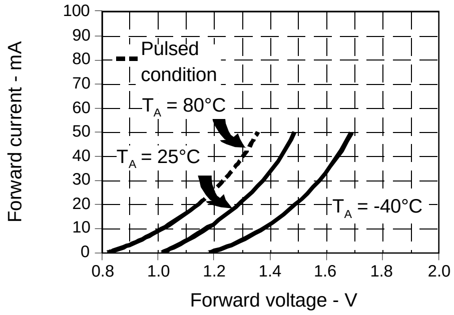
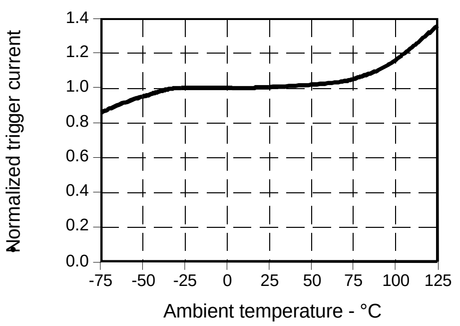


Fig. 2 IRED Trigger Current vs Temperature

gra_098.ds4



All Performance Curves Show Typical Values

Honeywell

HOA2004

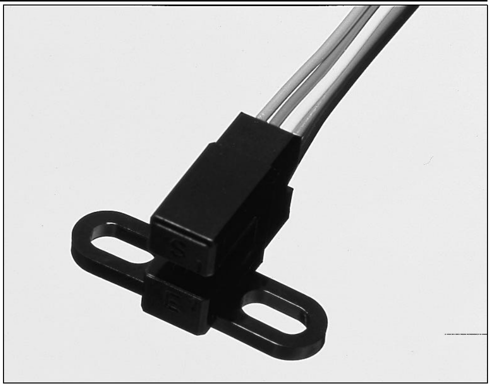
Transmissive Optoschmitt Sensor

HOA2005

Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- Buffer logic
- Side mount package
- Ambient light and dust protective filter
- Accurate position sensing
- 0.010 in.(0.25mm) aperture windows
- 0.125 in.(3.18 mm) slot width
- 24.0 in.(610 mm) min. 26 AWG UL 1429 wire leads



INFRA-90.TIF

DESCRIPTION

The HOA2005 consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. The buffer logic provides a high output when the optical path is clear, and a low output when the path is blocked.The side mounting package is useful in applications in which the interruptive element is parallel to the mounting plane. Both emitter and detector have a 0.010 in.(.25 mm) x .060 in.(1.52 mm) vertical aperture. This feature is ideal for use in applications in which maximum postion resolution is desired.

All devices employ a built- in strain relief for maximum wire attachment strength. The sensor housing contains IR transmissive optical windows. This arrangement provides excellent protection against ambient light while eliminating aperture openings which could be clogged by airborne contaminants. The HOA2005 series employs plastic molded components. For additional component information see SEP8506, and SDP8600.

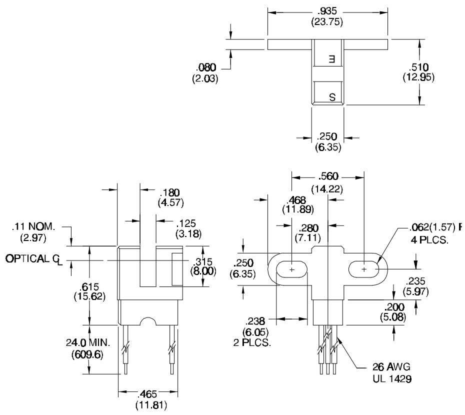
Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Wire color and functions are:

Red - IRED Anode
Black - IRED Cathode
Green - Detector Ground
White - Detector Vcc
Blue - Detector Output

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_063.cdr

Honeywell

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HOA2005

Transmissive Optoschmitt Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		12	V	
Low Level Supply Current	I_{CCL}	4.0		12	mA	V_{CC}=5 V
		5.0		15		V_{CC}=12 V
High Level Supply Current	I_{CCH}	2.0		10	mA	V_{CC}=5 V
		3.0		12		V_{CC}=12 V
Low Level Output Voltage	V_{OL}			0.4	V	I_{OL}=12.8 mA, I_F=0 mA
High Level Output Voltage	V_{OH}	2.4			V	I_{OH}=0, I_F=20 mA
Hysteresis (2)	HYST		10		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=20 mA
Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Fall Time	t_f		6		ns	R_L=390 Ω, C_L=50 pF
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			20	mA	V_{CC}=5 V
HOA2005-001				20		

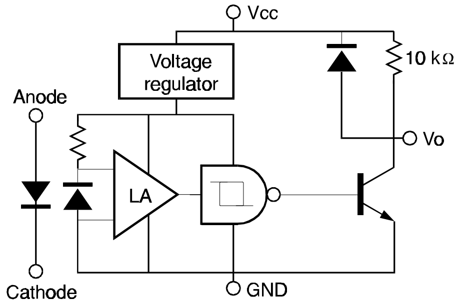
Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage	12 V (2)
Output Sink Current	18 mA
Duration of Output	
Short to V_{CC} or Ground	1.0 sec

SCHEMATIC



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Honeywell

HOA2005

Transmissive Optoschmitt Sensor

SWITCHING WAVEFORM

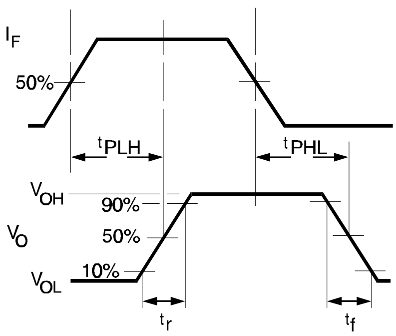


Fig. 1 SWITCHING WAVEFORM

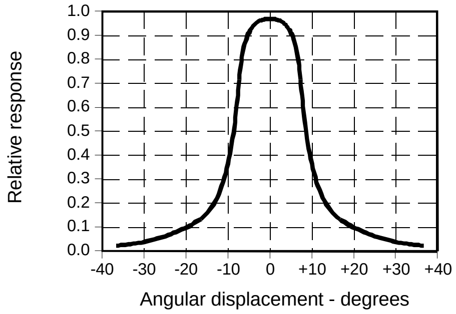


Fig. 2 IRED Forward Bias Characteristics

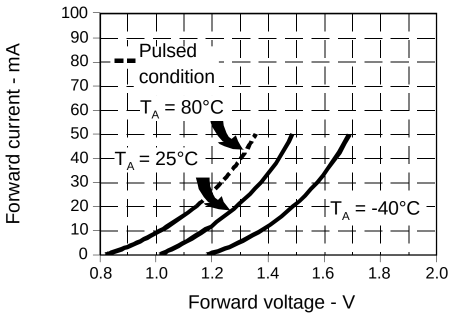
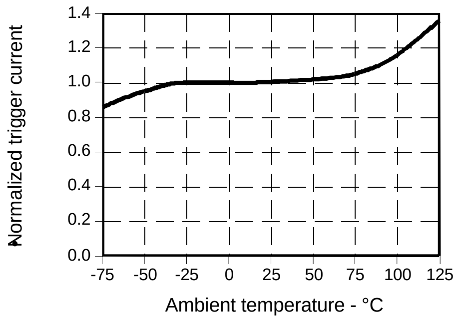


Fig. 3 IRED Trigger Current vs Temperature



All Performance Curves Show Typical Values

Honeywell

HOA2005
Transmissive Optoschmitt Sensor

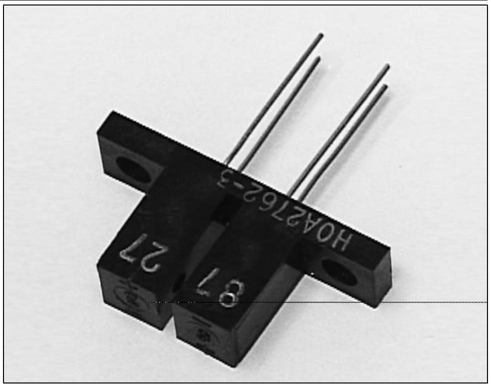
HOA2762

Transmissive Sensor

Not recommended for new designs

FEATURES

- Choice of phototransistor or photodarlington output
- Wide operating temperature range (- 55°C to +100°C)
- Deep slot package
- Accurate position sensing
- 0.060 in.(1.52 mm) slot width



INFRA-48.TIF

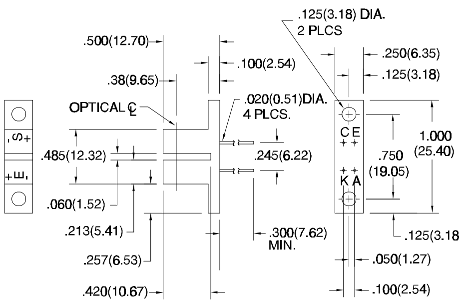
DESCRIPTION

The HOA2762 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA2762- 001, - 002) or photodarlington (HOA2762- 003) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA2762 series employs metal can packaged components and has a 0.007 in.(.178 mm) x 0.040 in.(1.02 mm) vertical aperture in front of the detector. The narrow detector aperture is ideal for use in applications in which the maximum rejection of ambient light is important and in situations where maximum position resolution is desired. For additional component information see SE1450, SD1440, and SD1410.

Housing material is polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



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Honeywell

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HOA2762

Transmissive Sensor

Not recommended for new designs

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

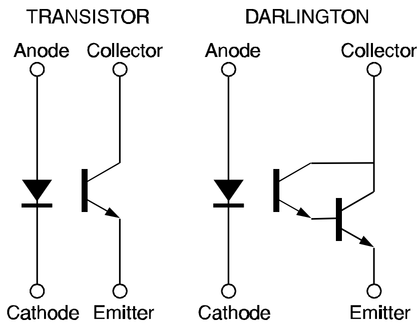
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	µA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 µA
HOA2762-001, -002		30				
HOA2762-003		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA2762-001, -002				100		I_F=0
HOA2762-003				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA2762-001		0.1				I_F=20 mA
HOA2762-002		1.0				
HOA2762-003		2.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA2762-001				0.4		I_C=13 µA
HOA2762-002				0.4		I_C=125 µA
HOA2762-003				1.1		I_C=250 µA
Rise And Fall Time	t_r, t_f				µs	V_{CC}=5 V, I_C=1 mA
HOA2762-001, -002			15			R_L=1000 Ω
HOA2762-003			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-55°C to 100°C	
Storage Temperature Range	-55°C to 125°C	
Soldering Temperature (10 sec)	260°C	
IR EMITTER		
Power Dissipation	75 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	75 mW (1)	75 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



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Honeywell

HOA2762

Transmissive Sensor

Not recommended for new designs

Fig. 1 IRED Forward Bias Characteristics

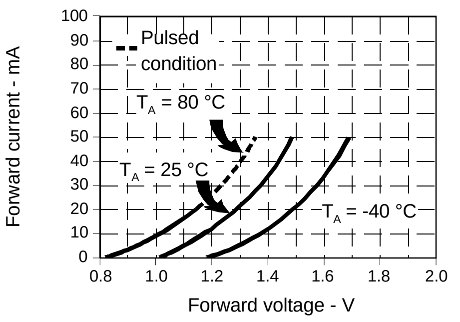


Fig. 2 Non-Saturated Switching Time vs Load Resistance

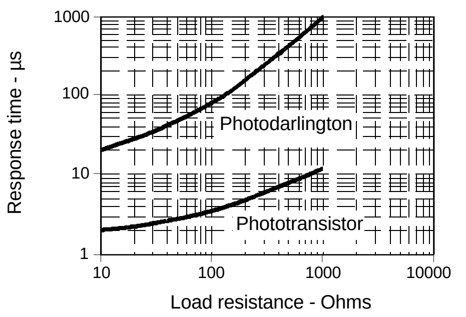


Fig. 3 Dark Current vs Temperature

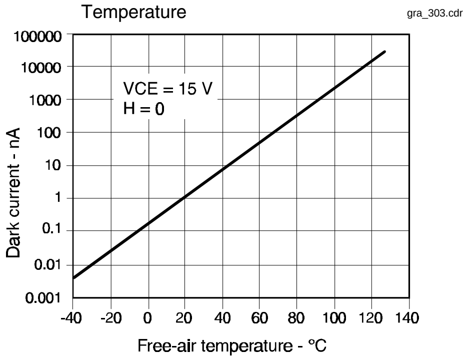
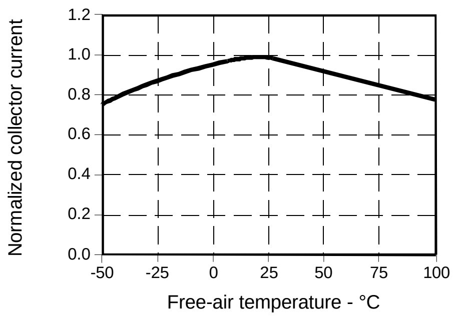


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

HOA2762

Transmissive Sensor

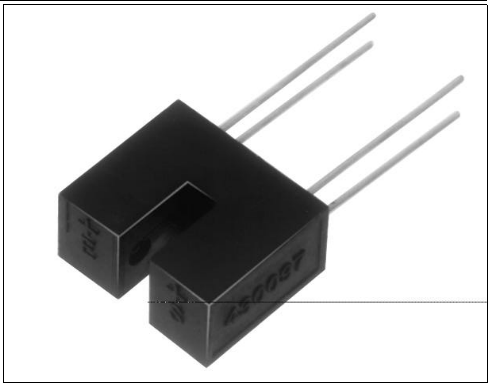
Not recommended for new designs

HOA2862

Transmissive Sensor

FEATURES

- Choice of phototransistor or photodarlington output
- Wide operating temperature range (- 55°C to +100°C)
- Accurate position sensing
- 0.100 in.(2.54 mm) slot width



INFRA-77.TIF

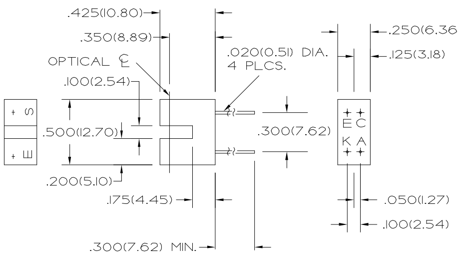
DESCRIPTION

The HOA2862 series consists of an infrared emitting diode facing an NPN silicon phototransistor (HOA2862- 001, - 002) or photodarlington (HOA2862- 003) encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The HOA2862 series employs metal can packaged components and has a 0.025 in.(.635 mm) x 0.040 in.(1.02 mm) vertical aperture in front of the detector. The narrow detector aperture is ideal for use in applications in which the maximum rejection of ambient light is important. For additional component information see SE1450, SD1440, and SD1410.

Housing material is polyester. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



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Honeywell

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HOA2862

Transmissive Sensor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

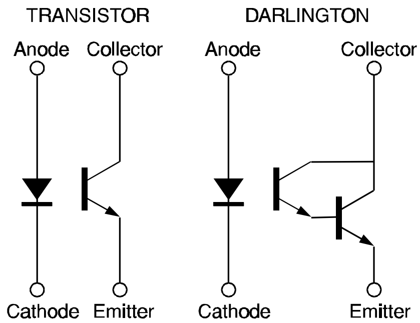
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA
Reverse Leakage Current	I_R			10	μA	V_R=3 V
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$				V	I_C=100 μA
HOA2862-001, -002		30				
HOA2862-003		15				
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector Dark Current	I_{CEO}				nA	V_{CE}=10 V
HOA2862-001, -002				100		I_F=0
HOA2862-003				250		
COUPLED CHARACTERISTICS						
On-State Collector Current	$I_{C(ON)}$				mA	V_{CE}=5 V
HOA2862-001		0.2				I_F=20 mA
HOA2862-002		1.8				
HOA2862-003		4.0				
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$				V	I_F=20 mA
HOA2862-001				0.4		I_C=25 μA
HOA2862-002				0.4		I_C=75 μA
HOA2862-003				1.1		I_C=500 μA
Rise And Fall Time	t_r, t_f				μs	V_{CC}=5 V, I_C=1 mA
HOA2862-001, -002			15			R_L=1000 Ω
HOA2862-003			75			R_L=100 Ω

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-55°C to 100°C	
Storage Temperature Range	-55°C to 125°C	
Soldering Temperature (10 sec)	260°C	
IR EMITTER		
Power Dissipation	75 mW (1)	
Reverse Voltage	3 V	
Continuous Forward Current	50 mA	
DETECTOR	**TRANS.**	**DARLINGTON**
Collector-Emitter Voltage	30 V	15 V
Emitter-Collector Voltage	5 V	5 V
Power Dissipation	75 mW (1)	75 mW (1)
Collector DC Current	30 mA	30 mA

SCHEMATIC



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Honeywell

HOA2862

Transmissive Sensor

Fig. 1 IRED Forward Bias Characteristics

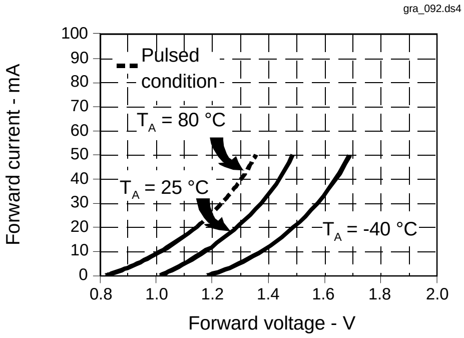


Fig. 2 Non-Saturated Switching Time vs Load Resistance

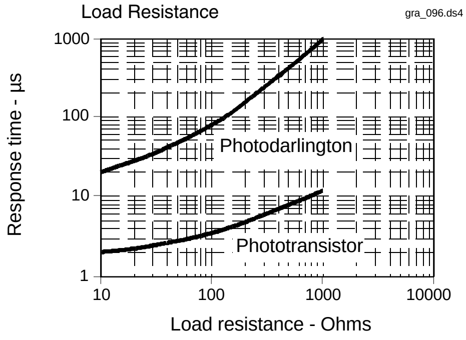


Fig. 3 Dark Current vs Temperature

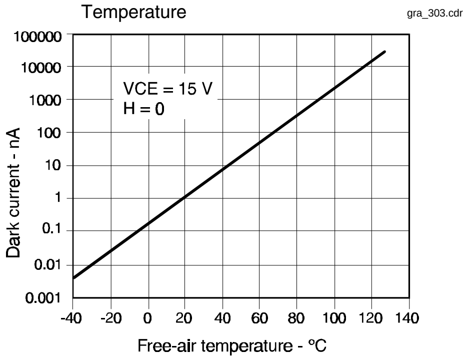
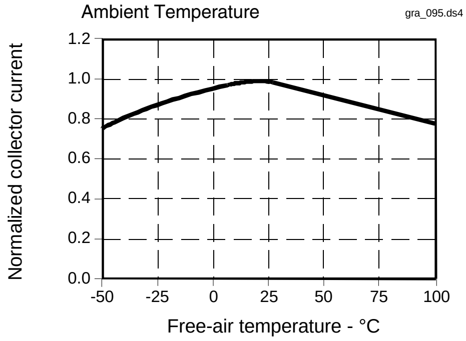


Fig. 4 Collector Current vs Ambient Temperature



All Performance Curves Show Typical Values

Honeywell

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HOA2862
Transmissive Sensor

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

HOA696X/697X

Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- Buffer or inverting logic available
- Three device output options
- Four mounting configurations
- Choice of detector aperture
- 0.125 in.(3.18 mm) slot width

DESCRIPTION

The HOA696X/697X series consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and various output configurations. The user can choose from available options: (1) detector aperture, (2) mounting tab configuration, (3) detector output configuration, and (4) housing material.

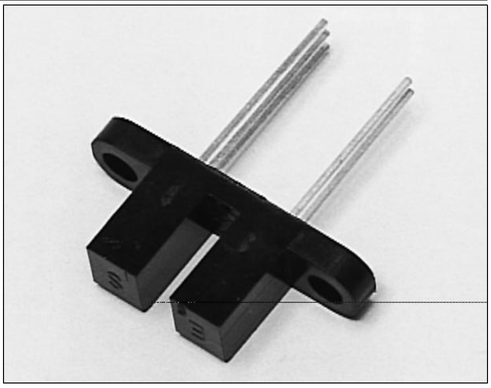
The HOA696X series utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility.

The HOA697X series employs an opaque polysulfone housing with aperture openings for use in applications in which maximum rejection of ambient light is important, and situations in which maximum position resolution is desired. The HOA696X/697X series employs plastic molded components. For additional component information see SEP8506 and SDP8XX4.

Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Device Polarity:
Buffer - Output is LO when optical path is blocked.
Inverter - Output is HI when optical path is blocked.

To specify the complete product characteristics, see PART NUMBER GUIDE.

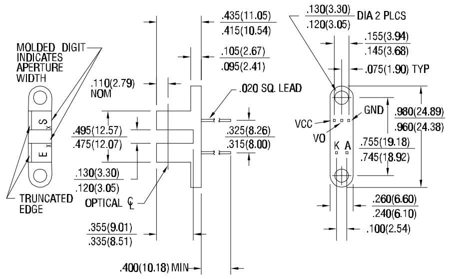


INFRA-32.TIF

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

Package T



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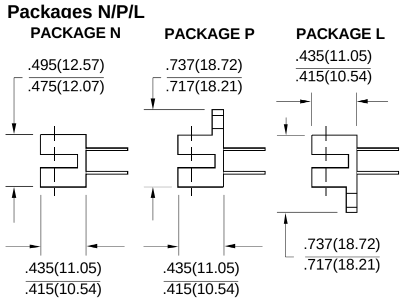
Packages N/P/L



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Honeywell

HOA696X/697X

Transmissive Optoschmitt Sensor
Totem-Pole Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA, T_A=25°C
Reverse Leakage Current	I_R			10	μA	V_R=3 V, T_A=25°C
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		7.0	V	T_A=25°C
Low Level Supply Current	I_{CCL}			15	mA	V_{CC}=5.25 V
High Level Supply Current	I_{CCH}			15	mA	V_{CC}=5.25 V
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.75 V, I_{OL}=12.8 mA
HOA6960/6970				0.4		I_F=0 mA
HOA6962/6972				0.4		I_F=15 mA
High Level Output Voltage	V_{OH}				V	V_{CC}=4.75 V, I_{OH}=800 μA,
HOA6960/6970		2.4				I_F=15 mA
HOA6962/6972		2.4				I_F=0 mA
Short Circuit Output Current	I_{OS}				mA	V_{CC}=5.25 V, Output=GND
HOA6960/6970		-20		-100		I_F=15 mA
HOA6962/6972		-20		-100		I_F=0 mA
Hysteresis (2)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=0 or 15 mA R_L=8 TTL Loads
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, I_F=0 or 15 mA R_L=8 TTL Loads
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage:	
Totem-Pole Output	7 V (2)
All Others	12 V (2)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.
2. Derate linearly from 25°C to 5.5 V at 70°C.

HOA696X/697X

Transmissive Optoschmitt Sensor
Open-Collector Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA, T_A=25°C
Reverse Leakage Current	I_R			10	μA	V_R=3 V, T_A=25°C
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		12	V	T_A=25°C
Low Level Supply Current	I_{CCL}			15	mA	V_{CC}=5.25 V
High Level Supply Current	I_{CCH}			15	mA	V_{CC}=5.25 V
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.75 V, I_{OL}=12.8 mA
HOA6961/6971				0.4		I_F=0 mA
HOA6963/6973				0.4		I_F=15 mA
High Level Output Current	I_{OH}				μA	V_{CC}=4.75 V V_{OH}=30 V
HOA6961/6971				100		I_F=15 mA
HOA6963/6973				100		I_F=0 mA
Hysteresis (2)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 70°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage:	
Totem-Pole Output	7 V (2)
All Others	12 V (2)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.
Applied Output Voltage	35 V

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.
2. Derate linearly from 25°C to 5.5 V at 70°C.

Honeywell

HOA696X/697X

Transmissive Optoschmitt Sensor
10 kOhm Pull-Up Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA, T_A=25°C
Reverse Leakage Current	I_R			10	μA	V_R=3 V, T_A=25°C
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		12	V	T_A=25°C
Low Level Supply Current	I_{CCL}			15	mA	V_{CC}=5.25 V
High Level Supply Current	I_{CCH}			15	mA	V_{CC}=5.25 V
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.75 V, I_{OL}=12.8 mA
HOA6964/6974				0.4		I_F=0 mA
HOA6965/6975				0.4		I_F=15 mA
High Level Output Voltage	V_{OH}				V	V_{CC}=4.75 V, I_{OH}=100 μA,
HOA6964/6974		2.4				I_F=15 mA
HOA6965/6975		2.4				I_F=0 mA
Hysteresis [2]	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW [1]
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage:	
Totem-Pole Output	7 V [2]
All Others	12 V [2]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

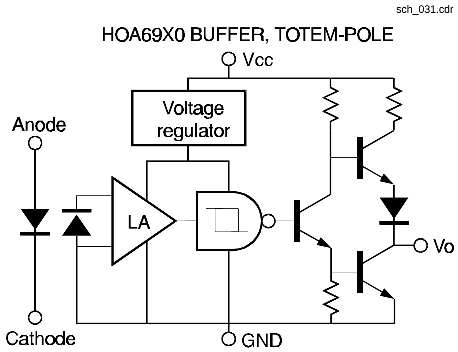
Notes
1. Derate linearly at 0.78 mW/°C above 25°C.
2. Derate linearly from 25°C to 5.5 V at 70°C.

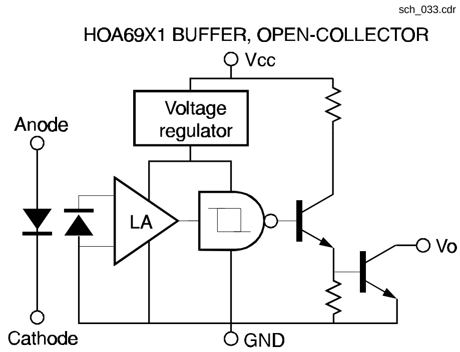
Honeywell

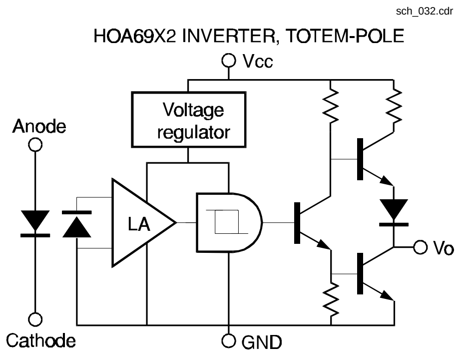
HOA696X/697X

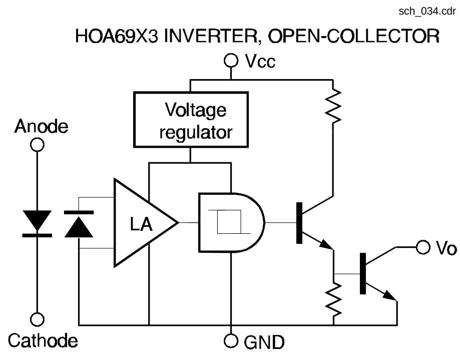
Transmissive Optoschmitt Sensor

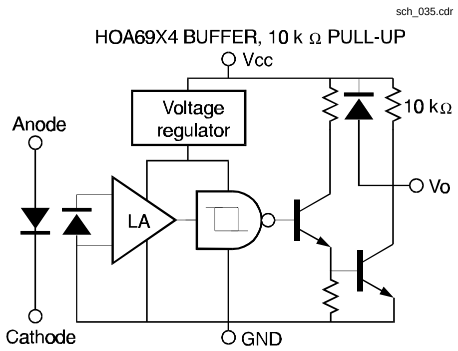
SCHEMATIC FOR HOA696X/697X

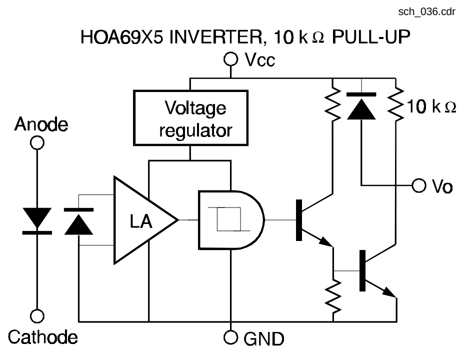










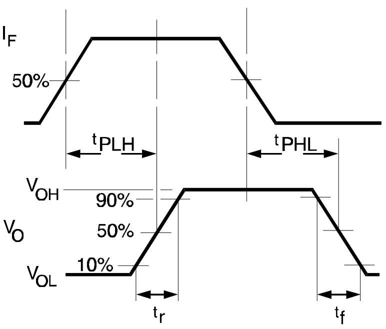


Honeywell

HOA696X/697X

Transmissive Optoschmitt Sensor

SWITCHING WAVEFORM FOR BUFFERS



SWITCHING WAVEFORM FOR INVERTERS

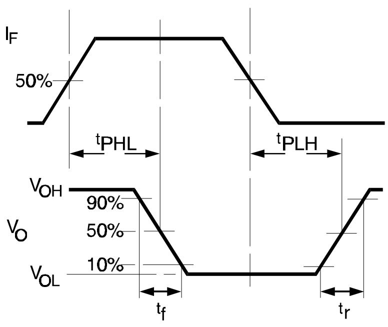


Fig. 1 IRED Forward Bias Characteristics

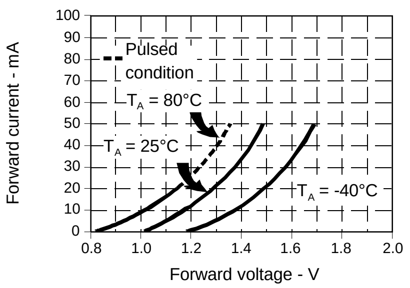
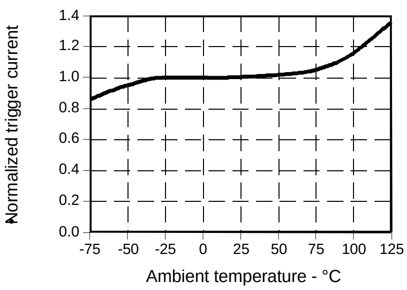


Fig. 2 IRED Trigger Current vs Temperature



All Performance Curves Show Typical Values

PART NUMBER GUIDE

HOA69XX-XXX

Housing Material
6 = Polysulfone, IR transmissive
7 = Polysulfone, opaque

Output Configuration
0 = Totem-pole, buffer
1 = Open-collector, buffer
2 = Totem-pole, inverter
3 = Open-collector, inverter
4 = 10 kΩ pull-up, buffer
5 = 10 kΩ pull-up, inverter

Aperture Width In Front Of Detector
1 = 0.010 in. (0.25 mm)
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Aperture Width In Front Of IRED
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Mounting Configuration
L = Single mounting tab, emitter side
N = No mounting tabs
P = Single mounting tab, detector side
T = Two mounting tabs

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

HOA698X/699X

Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- Buffer or inverting logic available
- Three device output options
- Four mounting configurations
- Choice of detector aperture
- 0.125 in.(3.18 mm) slot width
- 24.0 in.(610 mm) min. 26 AWG UL 1429 wire leads

DESCRIPTION

The HOA698X/699X series consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. Detector switching takes place whenever an opaque object passes through the slot between emitter and detector. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and various output configurations. The user can choose from available options: (1) detector aperture, (2) mounting tab configuration, (3) detector output configuration, and (4) housing material.

The HOA698X series utilizes an IR transmissive polysulfone housing which features smooth optical faces without external aperture openings; this feature is desirable when aperture blockage from airborne contaminants is a possibility. The HOA699X series employs an opaque polysulfone housing with aperture openings for use in applications in which maximum rejection of ambient light is important, and situations in which maximum position resolution is desired. The HOA698X/699X series employs plastic molded components. For additional component information see SEP8506 and SDP8XX4.

Housing material is polysulfone. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

Device Polarity:

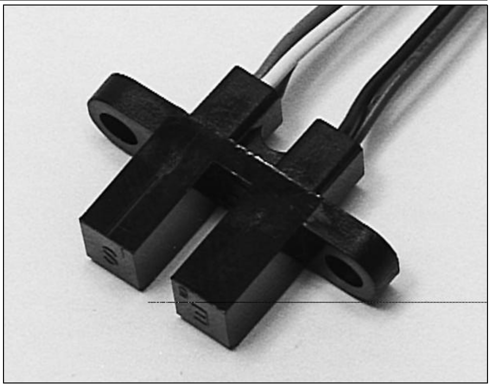
Buffer - Output is LO when optical path is blocked.

Inverter - Output is HI when optical path is blocked.

Wire color code and functions are:

Red - IRED Anode	White - Detector V_{CC}
Black - IRED Cathode	Blue - Detector Output
Green - Detector Ground	

To specify the complete product characteristics, see PART NUMBER GUIDE.

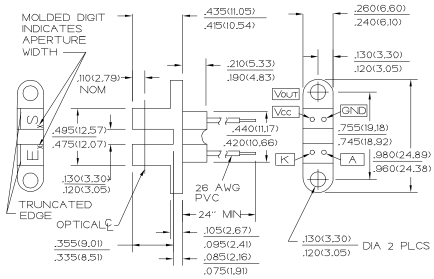


INFRA--4.TIF

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)

Package T



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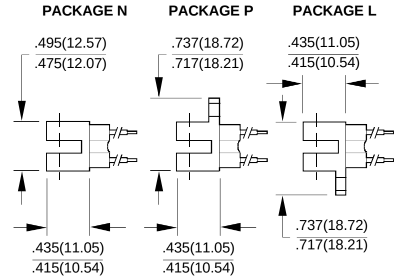
Packages N/P/L



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HOA698X/699X

Transmissive Optoschmitt Sensor
Totem-Pole Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA, T_A=25°C
Reverse Leakage Current	I_R			10	μA	V_R=3 V, T_A=25°C
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		7.0	V	T_A=25°C
Low Level Supply Current	I_{CCL}			15	mA	V_{CC}=5.25 V
High Level Supply Current	I_{CCH}			15	mA	V_{CC}=5.25 V
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.75 V, I_{OL}=12.8 mA
HOA6980/6990				0.4		I_F=0 mA
HOA6982/6992				0.4		I_F=15 mA
High Level Output Voltage	V_{OH}				V	V_{CC}=4.75 V, I_{OH}=800 μA,
HOA6980/6990		2.4				I_F=15 mA
HOA6982/6992		2.4				I_F=0 mA
Short Circuit Output Current	I_{OS}				mA	V_{CC}=5.25 V, Output=GND
HOA6980/6990		-20		-100		I_F=15 mA
HOA6982/6992		-20		-100		I_F=0 mA
Hysteresis (2)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=0 or 15 mA R_L=8 TTL Loads
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, I_F=0 or 15 mA R_L=8 TTL Loads
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage:	
Totem-Pole Output	7 V (2)
All Others	12 V (2)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec.

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.
2. Derate linearly from 25°C to 5.5 V at 70°C.

Honeywell

HOA698X/699X

Transmissive Optoschmitt Sensor
Open-Collector Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA, T_A=25°C
Reverse Leakage Current	I_R			10	μA	V_R=3 V, T_A=25°C
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		12	V	T_A=25°C
Low Level Supply Current	I_{CCL}			15	mA	V_{CC}=5.25 V
High Level Supply Current	I_{CCH}			15	mA	V_{CC}=5.25 V
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.75 V, I_{OL}=12.8 mA
HOA6981/6991				0.4		I_F=0 mA
HOA6983/6993				0.4		I_F=15 mA
High Level Output Current	I_{OH}				μA	V_{CC}=4.75 V V_{OH}=30 V
HOA6981/6991				100		I_F=15 mA
HOA6983/6993				100		I_F=0 mA
Hysteresis (2)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 70°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage:	
Totem-Pole Output	7 V (2)
All Others	12 V (2)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Applied Output Voltage	35 V

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.
2. Derate linearly from 25°C to 5.5 V at 70°C.

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

HOA698X/699X

Transmissive Optoschmitt Sensor
10 kOhm Pull-Up Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
IR EMITTER						
Forward Voltage	V_F			1.6	V	I_F=20 mA, T_A=25°C
Reverse Leakage Current	I_R			10	μA	V_R=3 V, T_A=25°C
DETECTOR						
Operating Supply Voltage	V_{CC}	4.5		12	V	T_A=25°C
Low Level Supply Current	I_{CCL}			15	mA	V_{CC}=5.25 V
High Level Supply Current	I_{CCH}			15	mA	V_{CC}=5.25 V
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.75 V, I_{OL}=12.8 mA
HOA6984/6994				0.4		I_F=0 mA
				0.4		I_F=15 mA
High Level Output Voltage	V_{OH}				V	V_{CC}=4.75 V, I_{OH}=100 μA,
HOA6984/6994		2.4				I_F=15 mA
HOA6985/6995		2.4				I_F=0 mA
Hysteresis (2)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, I_F=0 or 15 mA R_L=390 Ω
COUPLED CHARACTERISTICS						
IRED Trigger Current	I_{FT}			15	mA	V_{CC}=5 V

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C
IR EMITTER	
Power Dissipation	100 mW (1)
Reverse Voltage	3 V
Continuous Forward Current	50 mA
DETECTOR	
Supply Voltage:	
Totem-Pole Output	7 V (2)
All Others	12 V (2)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec

Notes
1. Derate linearly at 0.78 mW/°C above 25°C.
2. Derate linearly from 25°C to 5.5 V at 70°C.

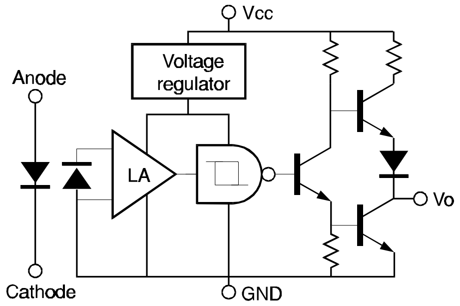
HOA698X/699X

Transmissive Optoschmitt Sensor

SCHEMATIC FOR HOA698X/699X

sch_031.cdr

HOA69X0 BUFFER, TOTEM-POLE



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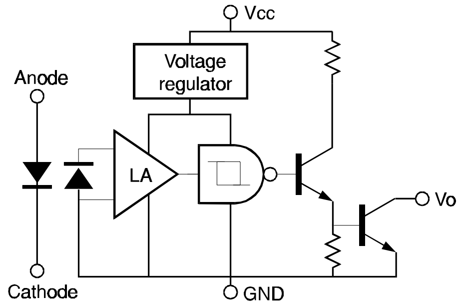
HOA69X1 BUFFER, OPEN-COLLECTOR



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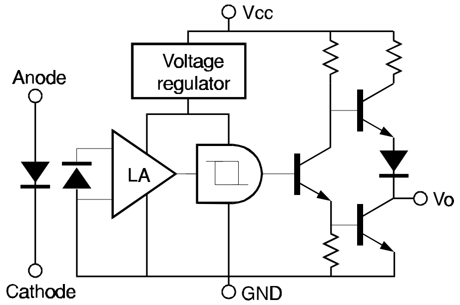
HOA69X2 INVERTER, TOTEM-POLE



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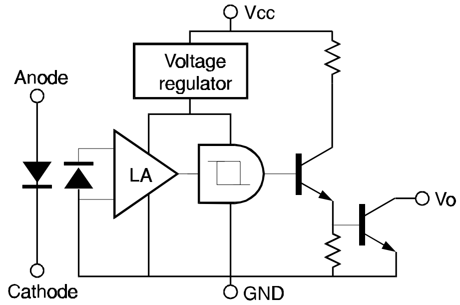
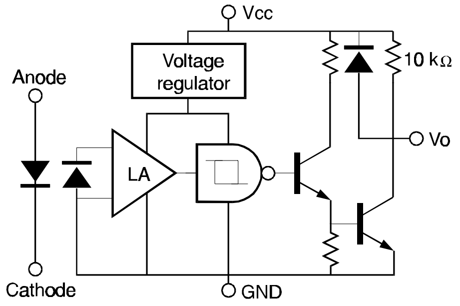
HOA69X3 INVERTER, OPEN-COLLECTOR



sch_035.cdr

HOA69X4 BUFFER, 10 k Ω PULL-UP



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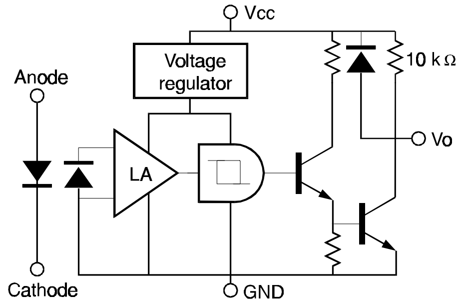
HOA69X5 INVERTER, 10 k Ω PULL-UP

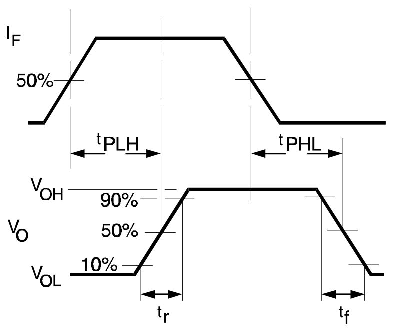


HOA698X/699X

Transmissive Optoschmitt Sensor

SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

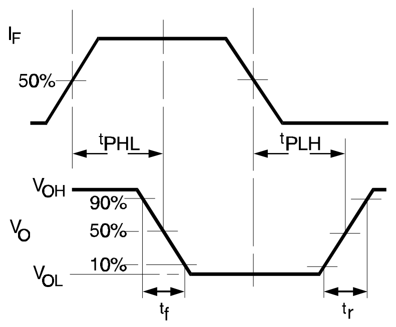


Fig. 1 IRED Forward Bias Characteristics

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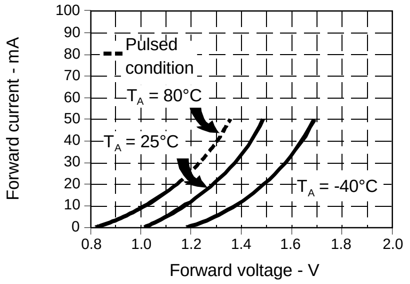
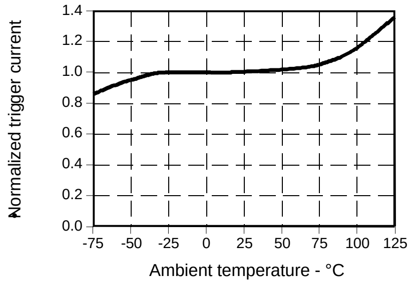


Fig. 2 IRED Trigger Current vs Temperature

gra_098.ds4



All Performance Curves Show Typical Values

PART NUMBER GUIDE

HOA69XX-XXX

Housing Material
8 = Polysulfone, IR transmissive
9 = Polysulfone, opaque

Output Configuration
0 = Totem-pole, buffer
1 = Open-collector, buffer
2 = Totem-pole, inverter
3 = Open-collector, inverter
4 = 10 kΩ pull-up, buffer
5 = 10 kΩ pull-up, inverter

Aperture Width In Front Of Detector
1 = 0.010 in. (0.25 mm)
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Aperture Width In Front Of IRED
5 = 0.050 in. (1.27 mm)
Aperture length is 0.060 in. (1.52 mm)

Mounting Configuration
L = Single mounting tab, emitter side
N = No mounting tabs
P = Single mounting tab, detector side
T = Two mounting tabs

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

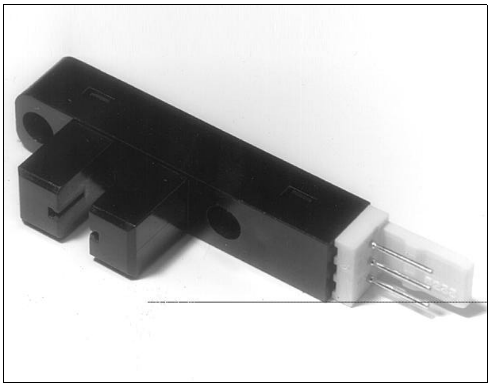
Honeywell

HOA7720/7730

Connectorized Transmissive Optoschmitt Sensor

FEATURES

- Direct TTL interface
- No interface circuits required
- Inverting logic
- Two device output options
- High resolution
- 0.118 in.(3.00 mm) slot width



INFRA-85.TIF

DESCRIPTION

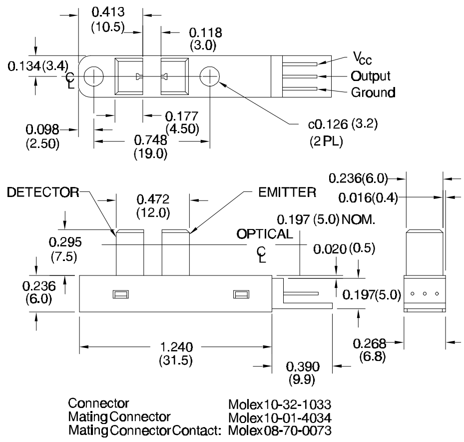
The HOA7720/7730 Series consists of an infrared emitting diode facing an Optoschmitt detector encased in a black thermoplastic housing. The photodetector consists of a photodiode, amplifier, voltage regulator and Schmitt trigger with two output configurations. The user can choose from available options of totem pole (HOA7720-M22) or open collector (HOA7730-M22) output. The totem pole output is well suited for applications which require fast transition times. The open collector allows the output of the sensor to interface with circuit elements driven by supply voltages other than Vcc supply. The inverting logic provides a high output when the optical path is interrupted, and a low output when the path is clear. The infrared emitting diode is biased internally eliminating the need for any external circuitry. Interconnection is simplified through the use of an integral Molex three pin connector.

Both emitter and detector have a 0.020 in.(.508 mm) x 0.070 in.(1.78 mm) vertical aperture. The narrow aperture is ideal for use in applications in which maximum rejection of ambient light is important, and maximum position resolution is desired. The HOA7720/7730 series employ plastic molded components. For additional component information see SEP8506, SDP8014 and SDP8314.

Housing material is opaque polycarbonate. Housings are soluble in chlorinated hydrocarbons and ketones. Recommended cleaning agents are methanol and isopropanol.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.010(0.25)
	2 plc decimals	±0.020(0.51)



DIM_073.ds4

Honeywell

HOA7720-M22

Connectorized Transmissive Optoschmitt Sensor
Totem-Pole Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		5.5	V	T_A=25°C
Supply Current	I_{CC}			40	mA	V_{CC}=5.5 V
Low Level Output Voltage	V_{OL}			0.4	V	V_{CC}=4.5 V, I_{OL}=12.8 mA
High Level Output Voltage	V_{OH}	2.4			V	V_{CC}=4.5 V, I_{OH}=-800 µA (2)
Short Circuit Output Current	I_{OS}	-20		-100	mA	V_{CC}=5.25 V, Output=GND
Hysteresis (3)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		µs	V_{CC}=5 V
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	RL=8 TTL Loads

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Output is HI when the optical path is interrupted.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Power Dissipation	220 mW
Supply Voltage	5.5 V
Supply Current	40 mA
Low Level Output Current	12.8 mA
Duration of Output	
Short to V_{CC} or Ground	1.0 sec

Honeywell

HOA7730-M22

Connectorized Transmissive Optoschmitt Sensor
Open-Collector Output

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		5.5	V	T_A=25°C
Supply Current	I_{CC}			40	mA	V_{CC}=5.5 V
Low Level Output Voltage	V_{OL}			0.4	V	V_{CC}=4.5 V, I_{OL}=12.8 mA
High Level Output Current	I_{OH}			100	μA	V_{CC}=5.5 V V_{OH}=28 V
Hysteresis (3)	HYST		50		%	
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5		μs	V_{CC}=5 V
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	RL=8 TTL Loads

Notes
1. It is recommended that a bypass capacitor, 0.1 μF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. Output is HI when the optical path is interrupted.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS
(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Power Dissipation	220 mW
Supply Voltage	5.5 V
Supply Current	40 mA
Low Level Output Current	12.8 mA
Duration of Output Short to V_{CC} or Ground	1.0 sec.
Applied Output Voltage	35 V

Honeywell

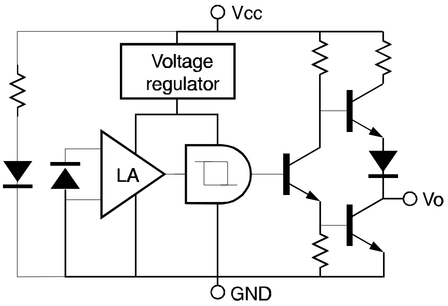
HOA7720/7730

Connectorized Transmissive Optoschmitt Sensor

SCHEMATICS FOR HOA7720/7730

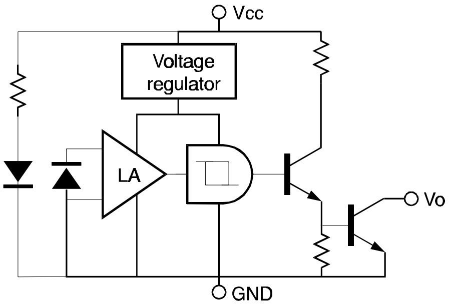
sch_040.cdr

INVERTER, TOTEM-POLE



sch_041.cdr

INVERTER, OPEN-COLLECTOR



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

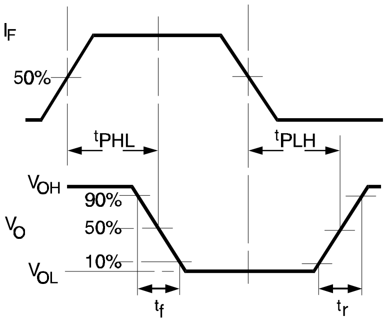


Fig. 1 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

gra_061.ds4

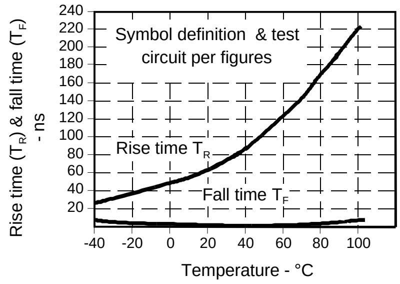
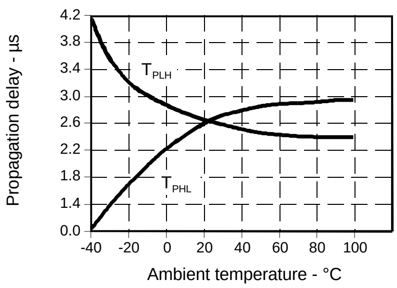


Fig. 2 Delay Time vs Temperature

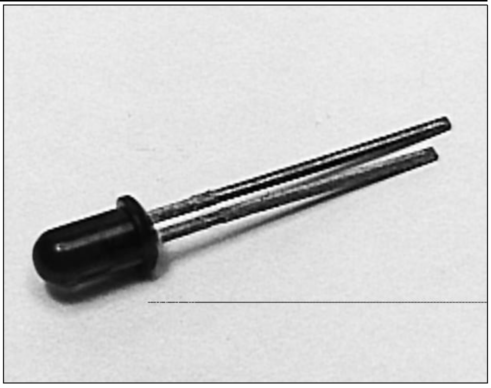
gra_062.ds4



All Performance Curves Show Typical Values

SDP8105
Silicon Photodarlington

FEATURES
- T-1 plastic package
- 20° (nominal) acceptance angle
- Consistent optical properties
- Mechanically and spectrally matched to SEP8505 and SEP8705 infrared emitting diodes

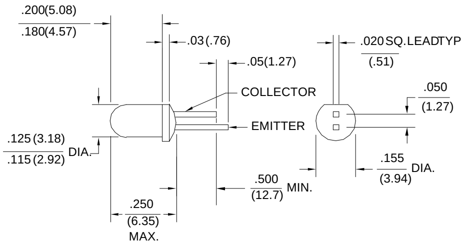


INFRA-55.TIF

DESCRIPTION
The SDP8105 is an NPN silicon photodarlington transfer molded in a T-1 black plastic package to minimize effect of visible ambient light. Transfer molding of this device assures superior optical centerline performance compared to other molding processes. Lead lengths are staggered to provide a simple method of polarity identification.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_100.ds4

Honeywell

SDP8105

Silicon Photodarlington

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current SDP8105-001	I_L	 0.5			mA	V_{CE}=5 V H=0.025 mW/cm² (1)
Collector Dark Current	I_{CEO}			250	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			1.1	V	I_C=I_L/8 H=0.025 mW/cm²
Angular Response (2)	Ø		20		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		75		µs	V_{CC}=5 V, I_L=1 mA R_L=100 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 935 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

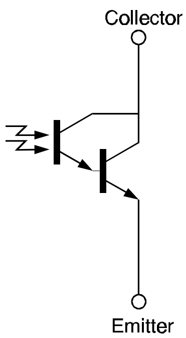
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	15 V
Emitter-Collector Voltage	5 V
Power Dissipation	70 mW (1)
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.18 mW/°C.

SCHEMATIC



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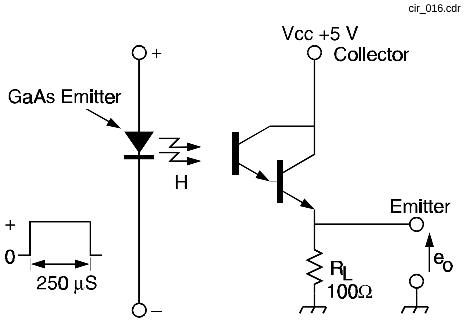
Honeywell

SDP8105

Silicon Photodarlington

SWITCHING TIME TEST CIRCUIT



SWITCHING WAVEFORM

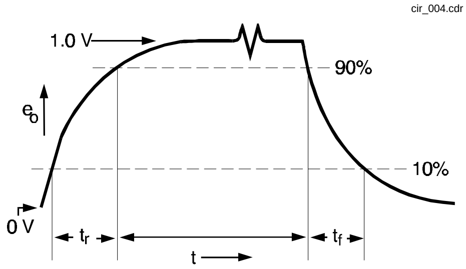


Fig. 1 Responsivity vs Angular Displacement

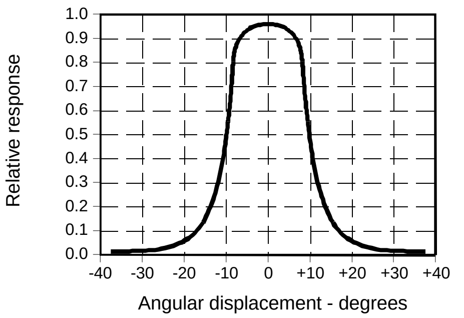


Fig. 2 Non-Saturated Switching Time vs Load Resistance

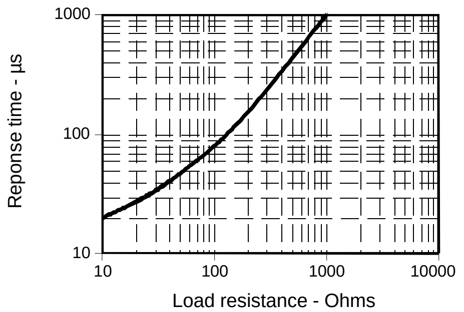
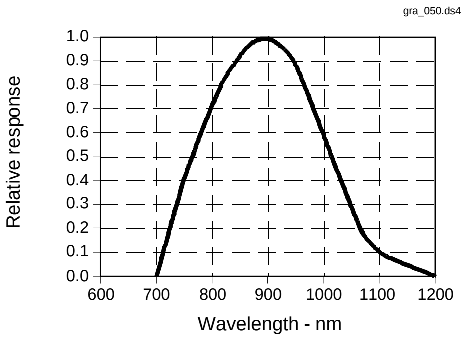


Fig. 3 Spectral Responsivity



All Performance Curves Show Typical Values

Honeywell

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SDP8105

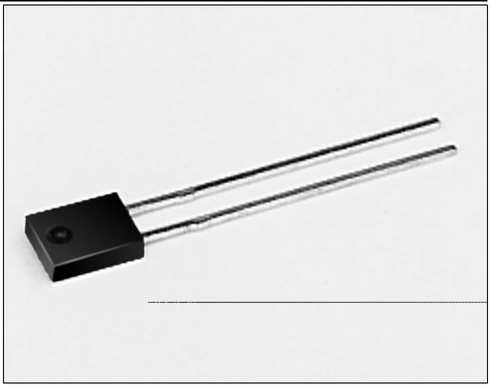
Silicon Photodarlington

SDP8106

Silicon Photodarlington

FEATURES

- Side-looking plastic package
- 50° (nominal) acceptance angle
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



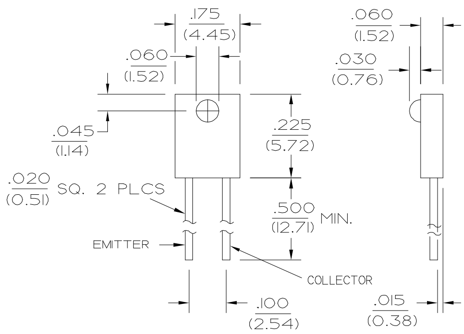
INFRA-79.TIF

DESCRIPTION

The SDP8106 is an NPN silicon photodarlington molded in a side-looking black plastic package to minimize effect of visible ambient light. The chip is positioned to accept radiation through a plastic lens from the side of the package.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_023.cdr

Honeywell

SDP8106

Silicon Photodarlington

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SDP8106-001		1.0				H=1 mW/cm² (1)
Collector Dark Current	I_{CEO}			250	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			1.1	V	I_C=1 mA H=5 mW/cm²
Angular Response (2)	Ø		50		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		75		µs	V_{CC}=5 V, I_L=1 mA R_L=100 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 935 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

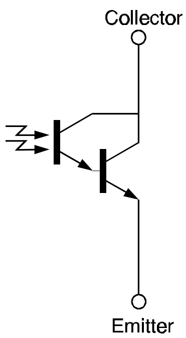
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	15 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC

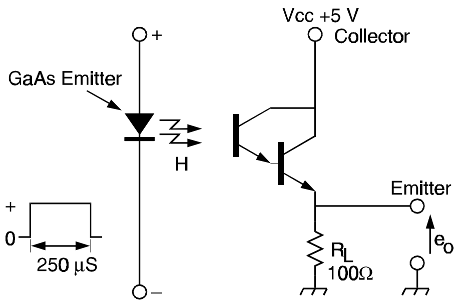


SDP8106

Silicon Photodarlington

SWITCHING TIME TEST CIRCUIT

cir_016.cdr



SWITCHING WAVEFORM

cir_004.cdr

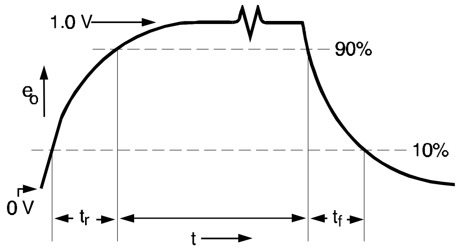


Fig. 1 Responsivity vs Angular Displacement

gra_059.ds4

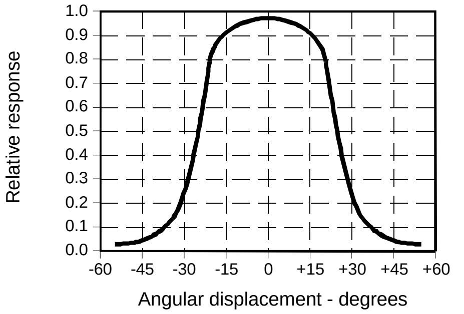


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_049.ds4

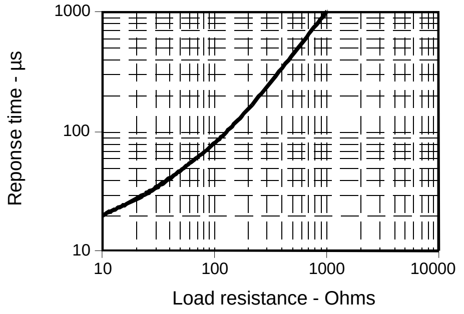
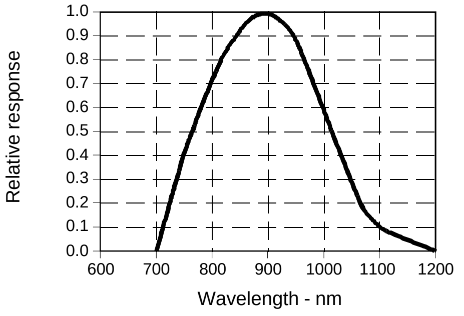


Fig. 3 Spectral Responsivity

gra_050.ds4



All Performance Curves Show Typical Values

Honeywell

SDP8106

Silicon Photodarlington

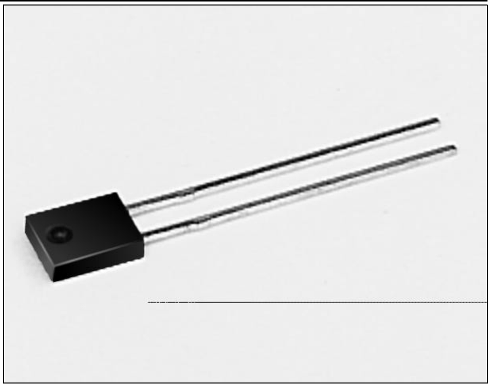
Honeywell

SDP8276

Silicon Photodiode

FEATURES

- Side-looking plastic package
- Linear response
- Fast response time
- Internal visible light rejection filter
- 50° (nominal) acceptance angle
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



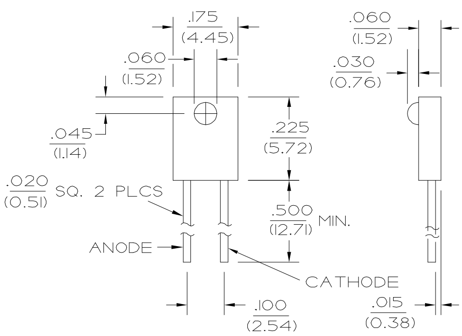
INFRA-79.TIF

DESCRIPTION

The SDP8276 is a PN silicon photodiode, transfer molded in a side- looking black plastic package, to minimize the effects of visible ambient light. The chip is positioned to accept radiant energy through a lens on the side of the package. The SDP8276 photodiode offers fast response time and a linear output. It is ideal for battery powered systems or anywhere power is at a premium.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_074.cdr

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SDP8276

Silicon Photodiode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L	4	7		µA	V_R=20 V H=1 mW/cm² (1)
Dark Current	I_D			50	nA	H=0, V_R=20 VDC
Reverse Breakdown Voltage	V_{BR}	50			V	I_R=10 µA, H=0
Angular Response (2)	Ø		50		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		50		ns	V_R=20 V, R_L=50 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 935 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

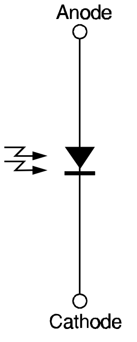
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Operating Temperature Range	-40 to +85°C
Storage Temperature Range	-40 to +85°C
Soldering Temperature (5 sec)	240°C
Cathode Anode Voltage	50 V
Power Dissipation	100 mW (1)

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

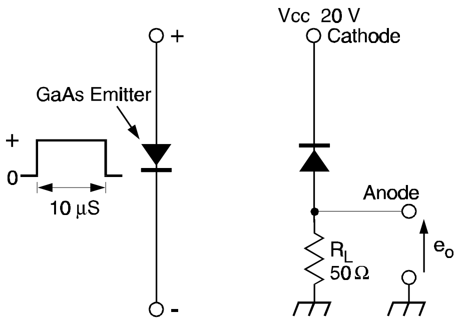
Honeywell

SDP8276

Silicon Photodiode

SWITCHING TIME TEST CIRCUIT

cir_001.cdr



SWITCHING WAVEFORM

cir_002.cdr

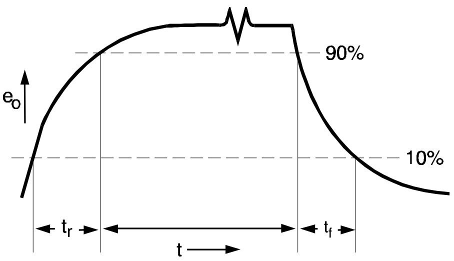


Fig. 1 Responsivity vs Angular Displacement

gra_054.ds4

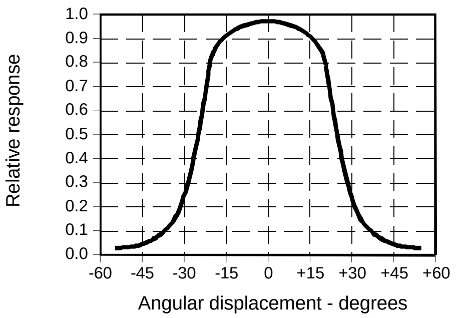


Fig. 2 Dark Current vs Temperature

gra_304.cdr

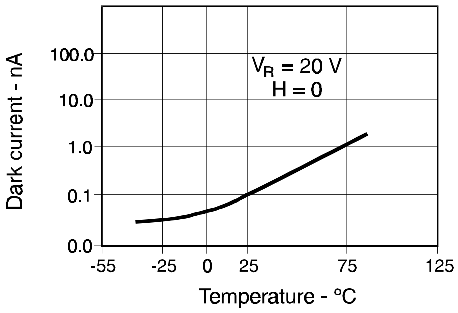
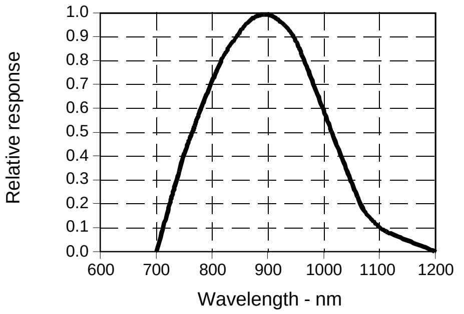


Fig. 3 Spectral Responsivity

gra_050.ds4



All Performance Curves Show Typical Values

Honeywell

SDP8276

Silicon Photodiode

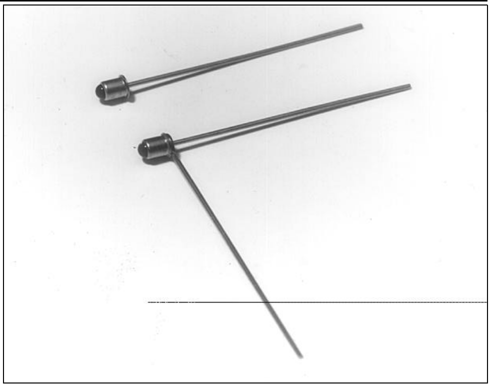
Honeywell

SD1410

Silicon Photodarlington

FEATURES

- Compact metal can coaxial package
- 24° (nominal) acceptance angle
- High output currents
- Wide sensitivity ranges
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SE1450 and SE1470 infrared emitting diodes



INFRA-63.TIF

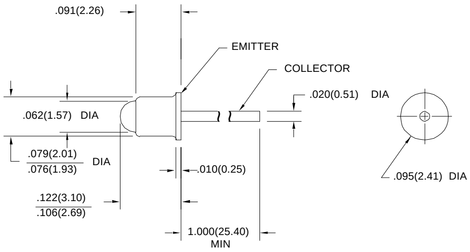
DESCRIPTION

The SD1410 is an NPN silicon photodarlington mounted in a glass lensed metal can coaxial package. The package may have a tab or second lead welded to the can as an optional feature (SD1410-XXXL). Both leads are flexible and may be formed as required to fit various mounting configurations.

OUTLINE DIMENSIONS in inches (mm)

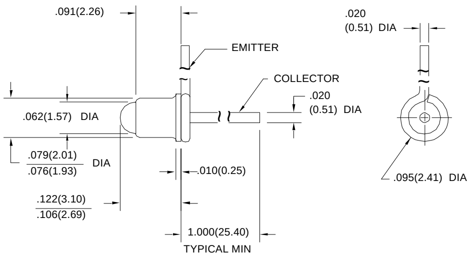
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SD1410-XXX



DIM_20a.ds4

SD1410-XXXL



DIM_20b.ds4

Honeywell

SD1410

Silicon Photodarlington

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SD1410-001, SD1410-001 L		0.6				H=0.2 mW/cm² [1]
SD1410-002, SD1410-002 L		2.0				
SD1410-003, SD1410-003 L		4.0				
SD1410-004, SD1410-004 L		8.0				
Collector Dark Current	I_{CEO}			250	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			1.1	V	I_C=1 mA H=1 mW/cm²
Angular Response [2]	Ø		24		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		75		µs	V_{CC}=5 V, I_L=1 mA R_L=100 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

ABSOLUTE MAXIMUM RATINGS

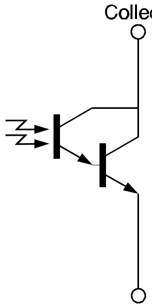
(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	15 V
Emitter-Collector Voltage	5 V
Power Dissipation	75 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.71 mW/°C.

SCHEMATIC

Collector



Emitter

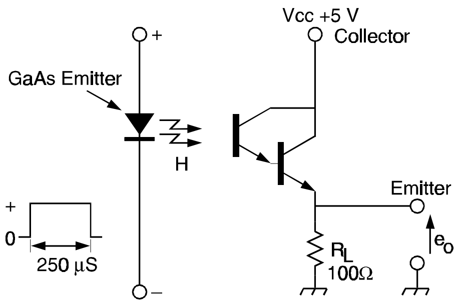
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SD1410
Silicon Photodarlington

SWITCHING TIME TEST CIRCUIT

cir_016.cdr



SWITCHING WAVEFORM

cir_004.cdr

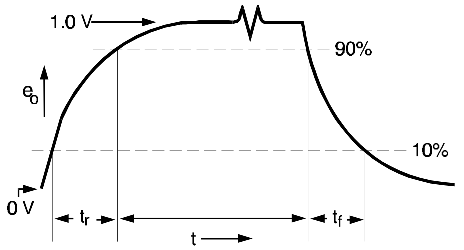


Fig. 1 Responsivity vs Angular Displacement

gra_057.ds4

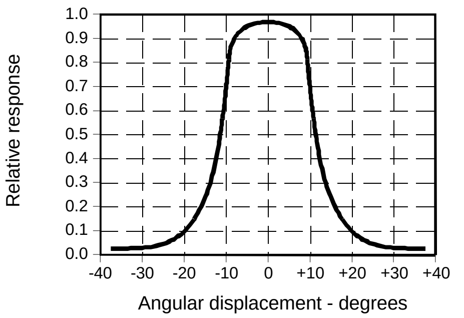


Fig. 2 Spectral Responsivity

gra_036.ds4

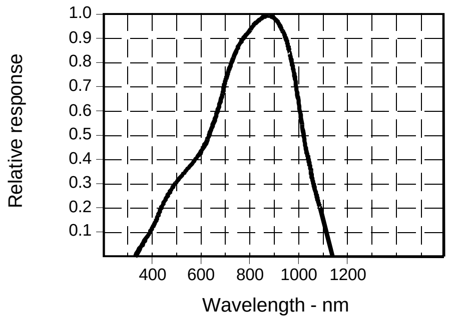
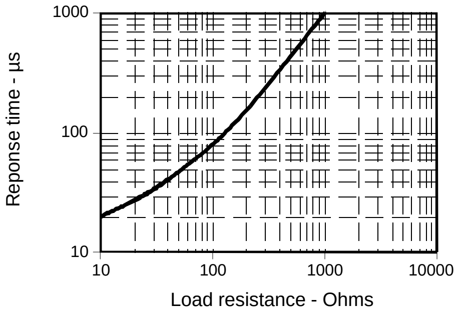


Fig. 3 Non-Saturated Switching Time vs Load Resistance

gra_049.ds4



All Performance Curves Show Typical Values

Honeywell

SD1410

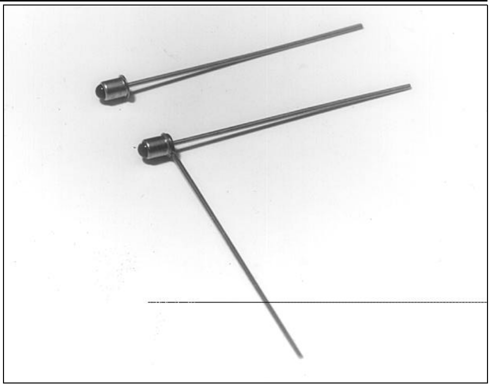
Silicon Photodarlington

SD1420

Silicon Photodiode

FEATURES

- Compact, metal can coaxial package
- 24° (nominal) acceptance angle
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SE1450 and SE1470 infrared emitting diodes



INFRA-63.TIF

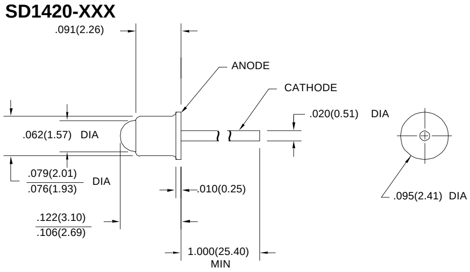
DESCRIPTION

The SD1420 is a PN junction silicon photodiode mounted in a glass lensed metal can coaxial package. The package may have a tab or second lead welded to the can as an optional feature (SD1420-XXXL). Both leads are flexible and may be formed as required to fit various mounting configurations.

OUTLINE DIMENSIONS in inches (mm)

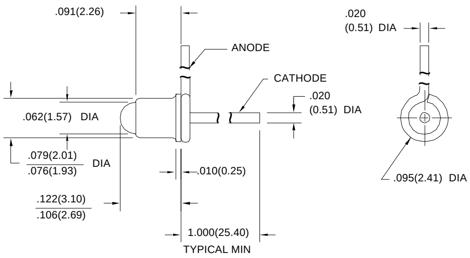
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SD1420-XXX



DIM_10a.ds4

SD1420-XXXL



DIM_10b.ds4

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SD1420

Silicon Photodiode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current SD1420-002, SD1420-002L	I_L	5.0			µA	V_R=20 V H=5 mW/cm² [1]
Dark Current	I_D			5.0	nA	V_R=20 V H=0
Reverse Breakdown Voltage	V_{BR}	50			V	I_R=10 µA
Angular Response [2]	Ø		24		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		50		ns	V_R=20 V R_L=50 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

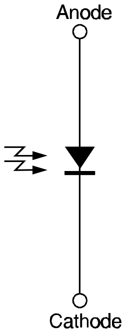
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Cathode Anode Voltage	50 V
Power Dissipation	75 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.71 mW/°C.

SCHEMATIC



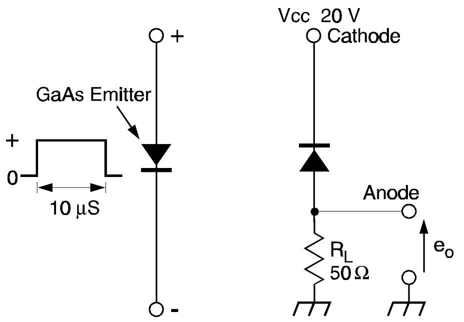
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SD1420
Silicon Photodiode

SWITCHING TIME TEST CIRCUIT

cir_001.cdr



SWITCHING WAVEFORM

cir_002.cdr

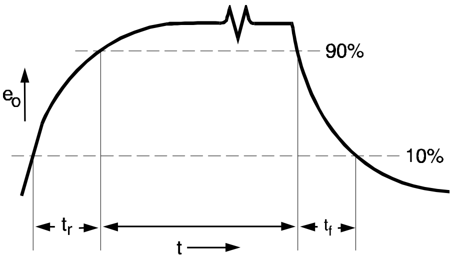


Fig. 1 Responsivity vs Angular Displacement

gra_051.ds4

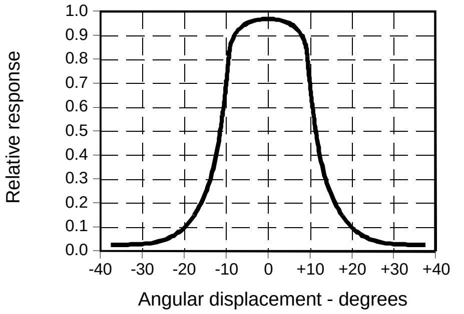


Fig. 2 Dark Current vs Temperature

gra_035.ds4

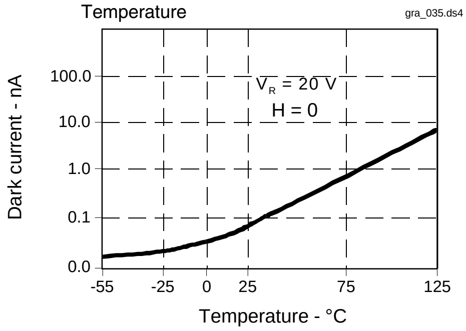
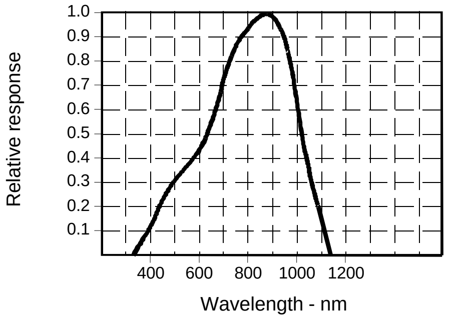


Fig. 3 Spectral Responsivity

gra_036.ds4



All Performance Curves Show Typical Values

Honeywell

SD1420

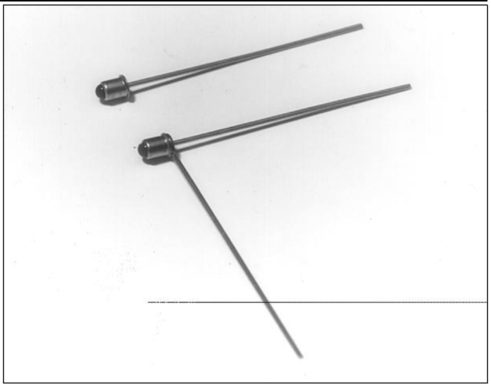
Silicon Photodiode

SD1440

Silicon Phototransistor

FEATURES

- Compact, metal can coaxial package
- 24° (nominal) acceptance angle
- Wide sensitivity ranges
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SE1450 and SE1470 infrared emitting diodes



INFRA-63.TIF

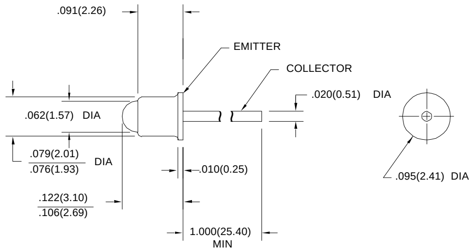
DESCRIPTION

The SD1440 is an NPN silicon phototransistor mounted in a glass lensed metal can coaxial package. The package may have a tab or second lead welded to the can as an optional feature (SD1440-XXXL). Both leads are flexible and may be formed to fit various mounting configurations.

OUTLINE DIMENSIONS in inches (mm)

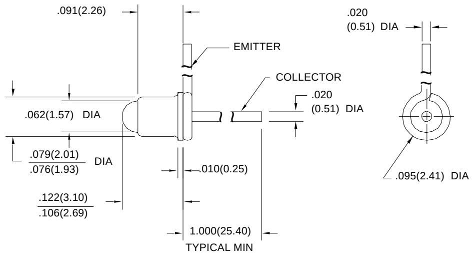
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SD1440-XXX



DIM_12a.ds4

SD1440-XXXL



DIM_12b.ds4

SD1440

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SD1440-001, SD1440-001 L		0.7				H=5 mW/cm² (1)
SD1440-002, SD1440-002 L		1.5				
SD1440-003, SD1440-003 L		3.0				
SD1440-004, SD1440-004 L		6.0				
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=0.4 mA H=5 mW/cm²
Angular Response (2)	Ø		24		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

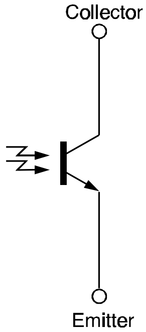
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	75 mW (1)
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.71 mW/°C.

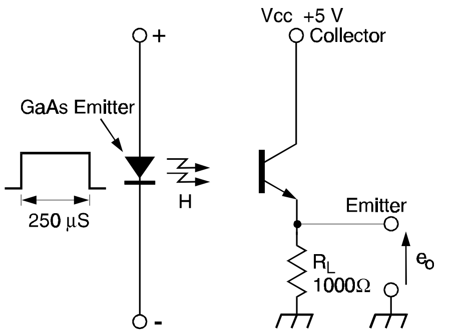
SCHEMATIC



SD1440
Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

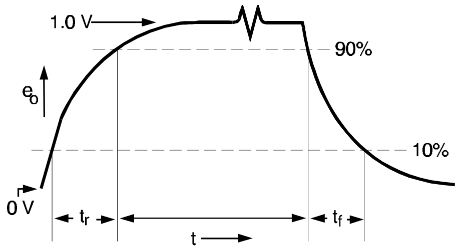


Fig. 1 Responsivity vs Angular Displacement

gra_051.ds4

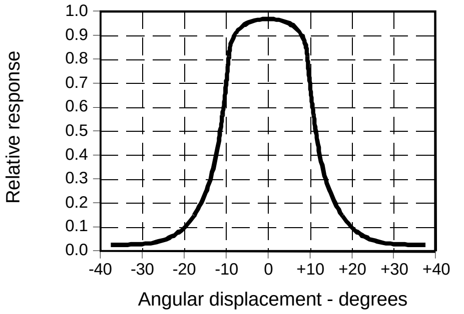


Fig. 2 Collector Current vs Ambient Temperature

gra_039.ds4

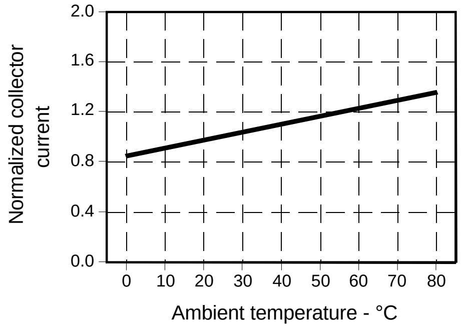


Fig. 3 Dark Current vs Temperature

gra_303.cdr

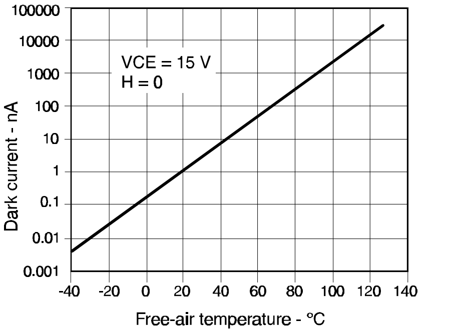
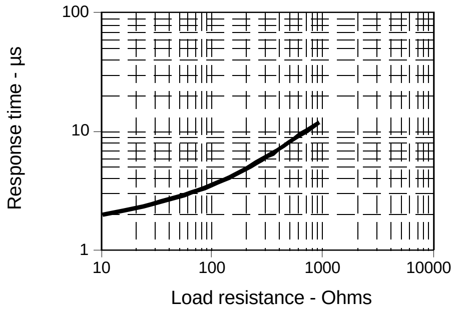


Fig. 4 Non-Saturated Switching Time vs Load Resistance

gra_041.ds4



Honeywell

SD1440

Silicon Phototransistor

Fig. 5 Spectral Responsivity

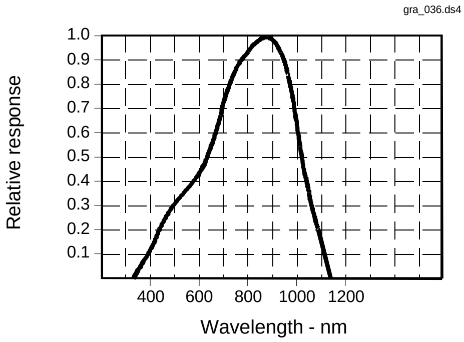
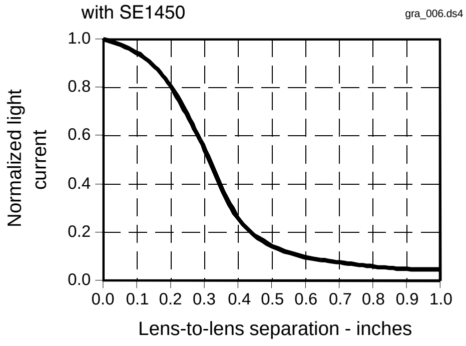


Fig. 6 Coupling Characteristics with SE1450



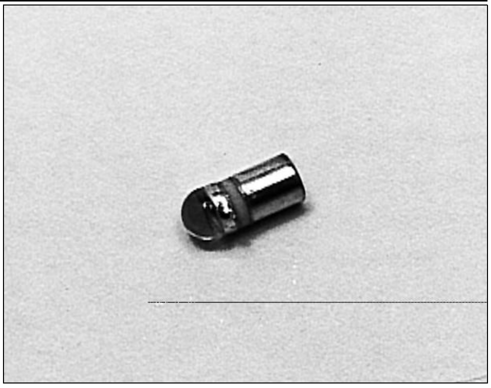
All Performance Curves Show Typical Values

SD2410

Silicon Photodarlington

FEATURES

- Miniature, hermetically sealed, pill style, metal can package
- 48° (nominal) acceptance angle
- Wide operating temperature range (- 55°C to +125°C)
- Ideal for direct mounting to printed circuit boards
- Wide sensitivity ranges
- Mechanically and spectrally matched to SE2460 and SE2470 infrared emitting diodes



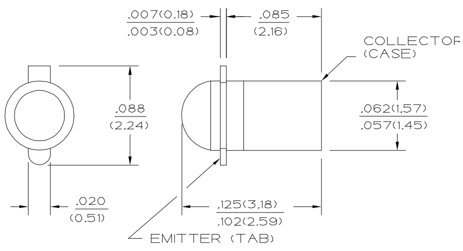
INFRA--1.TIF

DESCRIPTION

The SD2410 is an NPN silicon photodarlington mounted in a hermetically sealed glass lensed metal can package. This package directly mounts in double sided PC boards.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_013.cdr

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SD2410

Silicon Photodarlington

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SD2410-001		1.0				H=1 mW/cm² [1]
SD2410-002		3.0				
SD2410-003		6.0				
Collector Dark Current	I_{CEO}			250	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15			V	I_C=100 μA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			1.1	V	I_C=1 mA, H=5 mW/cm²
Angular Response [2]	Ø		48		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		75		μs	V_{CC}=5 V, I_L=1 mA, R_L=100 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

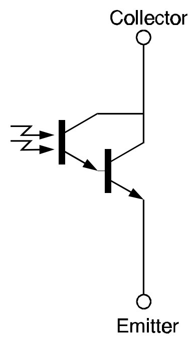
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	15 V
Emitter-Collector Voltage	5 V
Power Dissipation	125 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.19 mW/°C.

SCHEMATIC



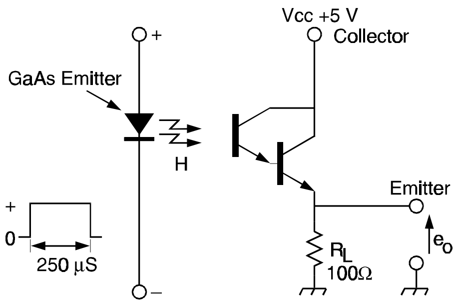
Honeywell

SD2410

Silicon Photodarlington

SWITCHING TIME TEST CIRCUIT

cir_016.cdr



SWITCHING WAVEFORM

cir_004.cdr

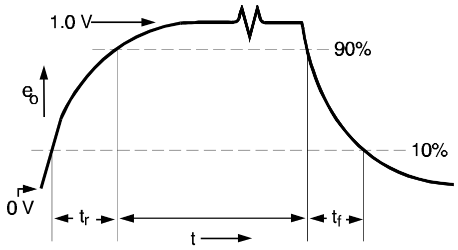


Fig. 1 Responsivity vs Angular Displacement

gra_037.ds4

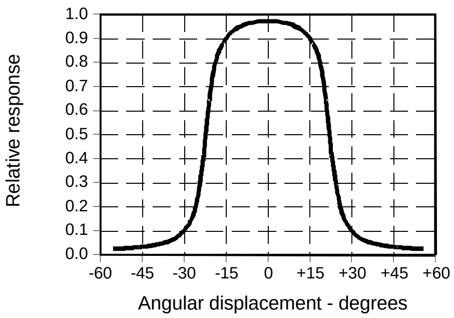


Fig. 2 Non-Saturated Switching Time vs Load Resistance

gra_049.ds4

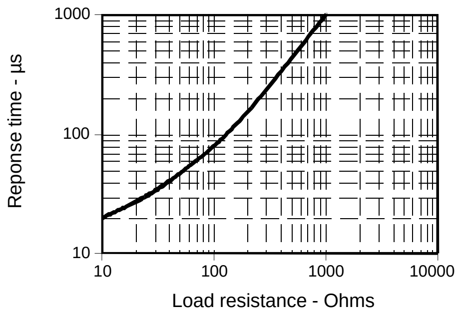
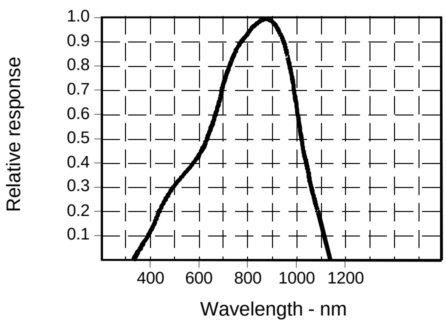


Fig. 3 Spectral Responsivity

gra_036.ds4



All Performance Curves Show Typical Values

Honeywell

SD2410

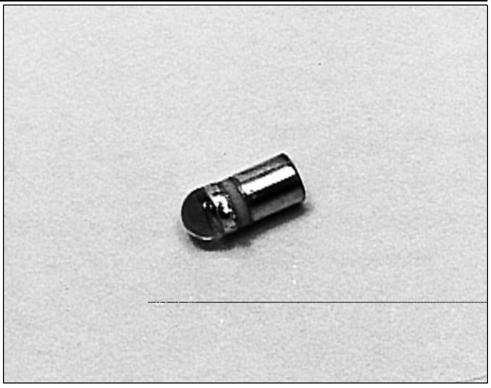
Silicon Photodarlington

SD2420

Silicon Photodiode

FEATURES

- Miniature, hermetically sealed, pill style, metal can package
- 48° (nominal) acceptance angle
- Wide operating temperature range (- 55°C to +125°C)
- Ideal for direct mounting to printed circuit boards
- Mechanically and spectrally matched to SE2460 and SE2470 infrared emitting diodes



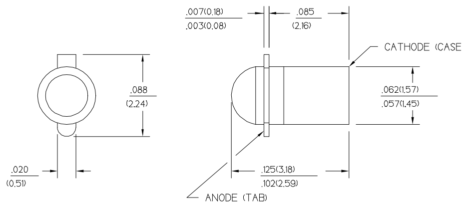
INFRA--1.TIF

DESCRIPTION

The SD2420 is a PN silicon photodiode mounted in a hermetically sealed, glass lensed, metal can package. This package directly mounts in double sided PC boards.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_014.cdr

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SD2420

Silicon Photodiode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current SD2420-002	I_L	7.0			μA	V_R=20 V H=20 mW/cm² (1)
Dark Current	I_D			5.0	nA	V_R=20 V H=0
Reverse Breakdown Voltage	V_{BR}	50			V	I_R=10 μA
Angular Response (2)	Ø		48		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		50		ns	V_R=20 V R_L=50 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

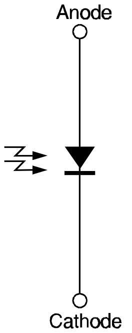
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Cathode Anode Voltage	50 V
Power Dissipation	125 mW (1)
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.19 mW/°C.

SCHEMATIC



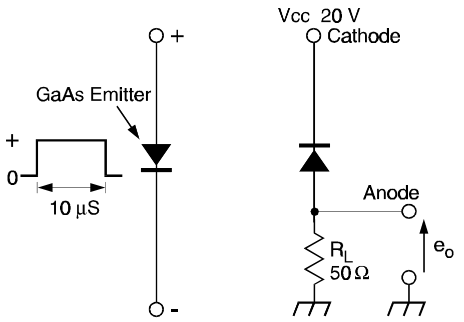
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SD2420
Silicon Photodiode

SWITCHING TIME TEST CIRCUIT

cir_001.cdr



SWITCHING WAVEFORM

cir_002.cdr

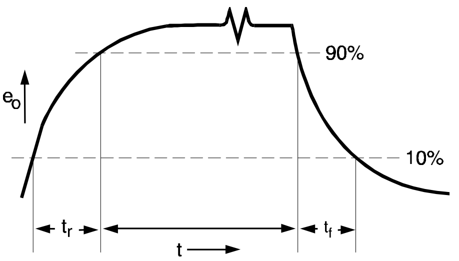


Fig. 1 Responsivity vs Angular Displacement

gra_037.ds4

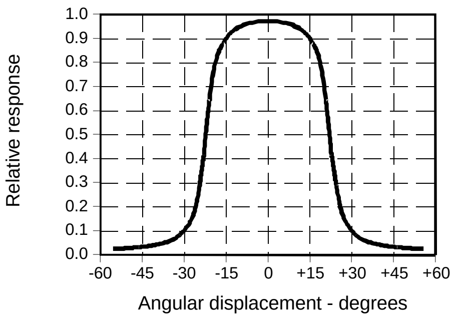


Fig. 2 Dark Current vs Temperature

gra_035.ds4

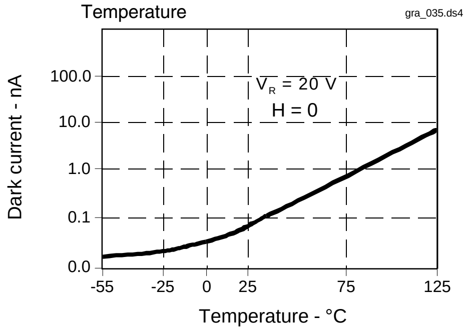
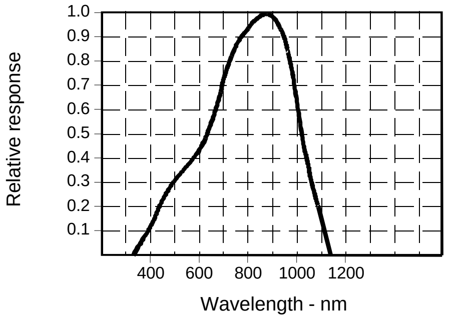


Fig. 3 Spectral Responsivity

gra_036.ds4



All Performance Curves Show Typical Values

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

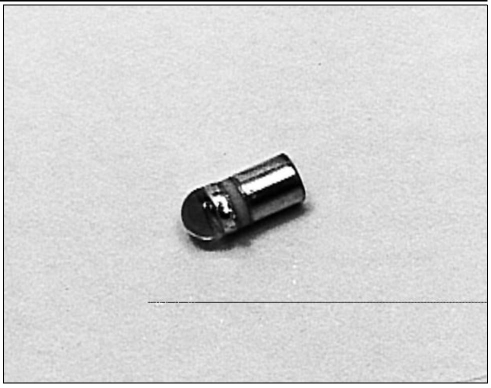
SD2420
Silicon Photodiode

SD2440

Silicon Phototransistor

FEATURES

- Miniature, hermetically sealed, pill style, metal can package
- 48° acceptance angle
- Wide operating temperature range (- 55°C to +125°C)
- Ideal for direct mounting to printed circuit boards
- Wide sensitivity ranges
- Mechanically and spectrally matched to SE2460 and SE2470 infrared emitting diodes



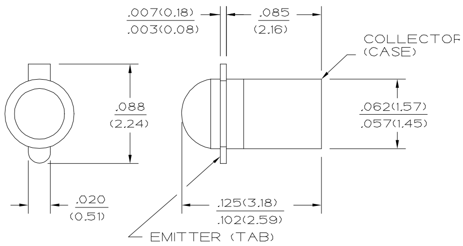
INFRA--1.TIF

DESCRIPTION

The SD2440 is an NPN silicon phototransistor mounted in a hermetically sealed glass lensed metal can package. This package directly mounts in a double sided PC board.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_013.cdr

Honeywell

SD2440

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SD2440-001		0.5				H=20 mW/cm² [1]
SD2440-002		2.0				
SD2440-003		4.0				
SD2440-004		7.0				
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=I_L/8 H=20 mW/cm²
Angular Response [2]	Ø		48		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

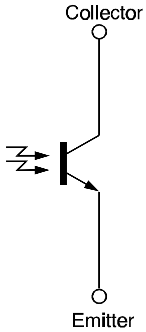
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	125 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.19 mW/°C.

SCHEMATIC

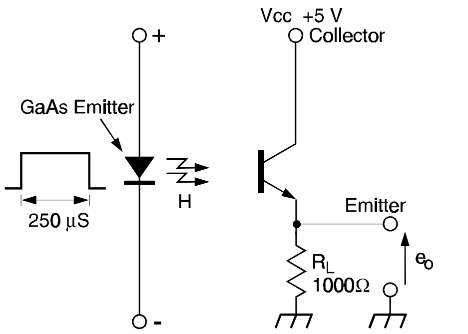


SD2440

Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

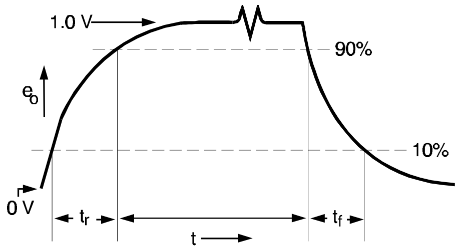


Fig. 1 Responsivity vs Angular Displacement

gra_037.ds4

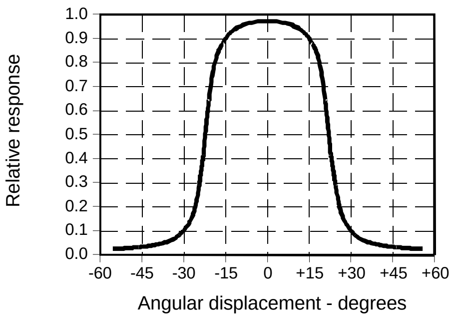


Fig. 2 Collector Current vs Ambient Temperature

gra_039.ds4

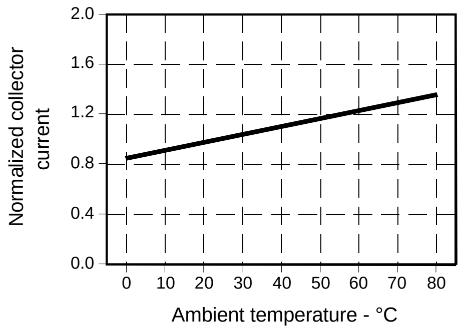


Fig. 3 Dark Current vs Temperature

gra_303.cdr

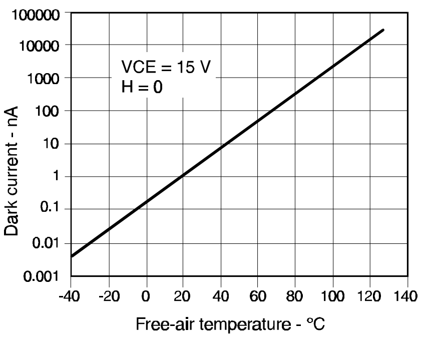
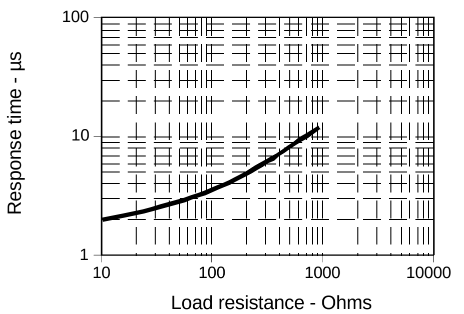


Fig. 4 Non-Saturated Switching Time vs Load Resistance

gra_041.ds4



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SD2440

Silicon Phototransistor

Fig. 5 Spectral Responsivity

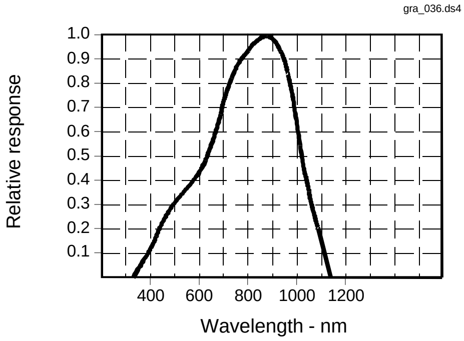
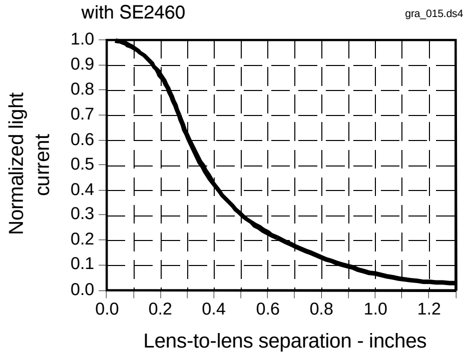


Fig. 6 Coupling Characteristics with SE2460



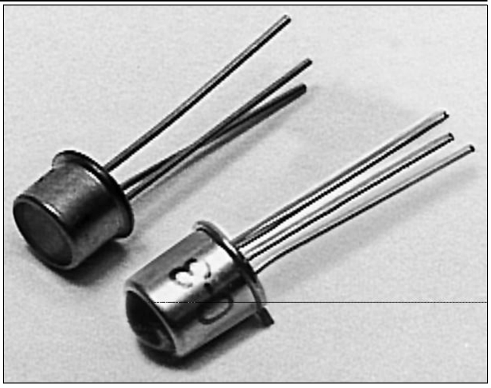
All Performance Curves Show Typical Values

SD3410/5410

Silicon Photodarlington

FEATURES

- TO-46 metal can package
- Choice of flat window or lensed package
- 90° or 12° (nominal) acceptance angle option
- Wide operating temperature range (- 55°C to +125°C)
- Wide sensitivity ranges
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



INFRA-17.TIF

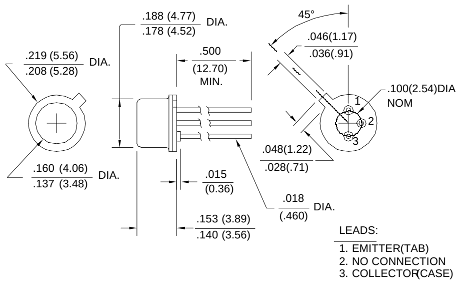
DESCRIPTION

The SD3410/5410 series consists of an NPN silicon photodarlington mounted in a TO-46 metal can package. The SD3410 has flat window cans providing a wide acceptance angle, while the SD5410 has glass lensed cans providing a narrow acceptance angle. The TO-46 packages are ideally suited for operation in hostile environments.

OUTLINE DIMENSIONS in inches (mm)

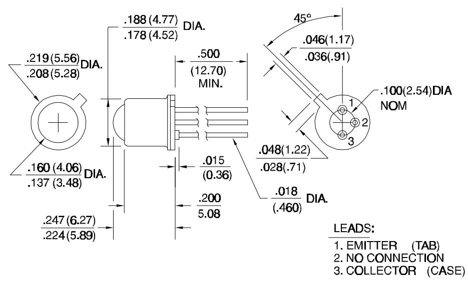
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SD3410



DIM_021.ds4

SD5410



DIM_21b.ds4

Honeywell

SD3410/5410

Silicon Photodarlington

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SD3410-001		0.6				H=2 mW/cm² [1]
SD3410-002		2.0				
SD3410-003		4.0				
SD3410-004		8.0				
Light Current	I_L				mA	V_{CE}=5 V
SD5410-001		2.0				H=0.2 mW/cm² [1]
SD5410-002		4.0				
SD5410-003		8.0				
Collector Dark Current	I_{CEO}			250	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	15			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			1.1	V	I_C=1 mA
SD3410						H=2 mW/cm²
SD5410						H=0.2 mW/cm²
Angular Response [2]	Ø				degr.	I_F=Constant
SD3410			90			
SD5410			12			
Rise And Fall Time	t_r, t_f		75		µs	V_{CC}=5 V, I_L=1 mA R_L=100 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

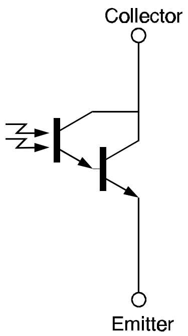
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	15 V
Emitter-Collector Voltage	5 V
Power Dissipation	150 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

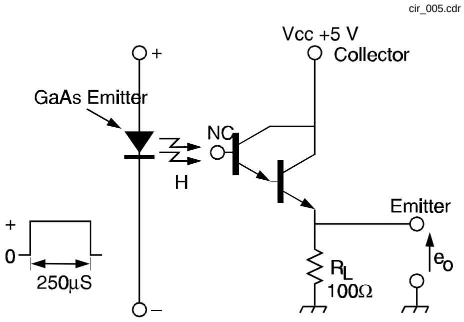
SCHEMATIC



Honeywell

SD3410/5410
Silicon Photodarlington

SWITCHING TIME TEST CIRCUIT



SWITCHING WAVEFORM

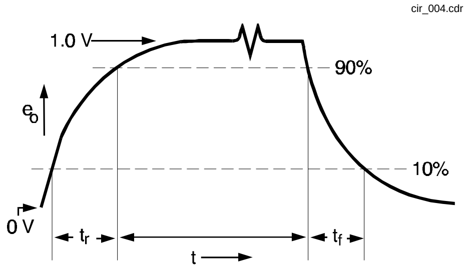


Fig. 1 Responsivity vs Angular Displacement (SD3410)

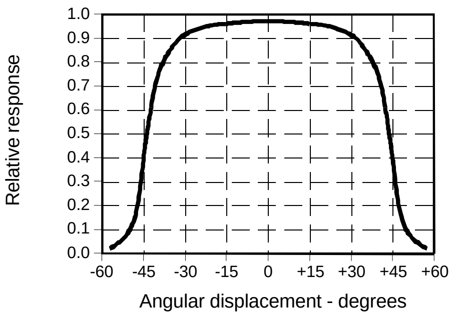


Fig. 2 Responsivity vs Angular Displacement (SD5410)

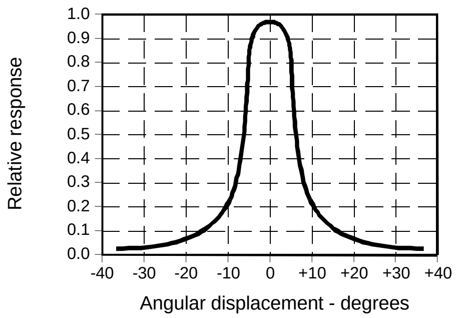


Fig. 3 Non-Saturated Switching Time vs Load Resistance

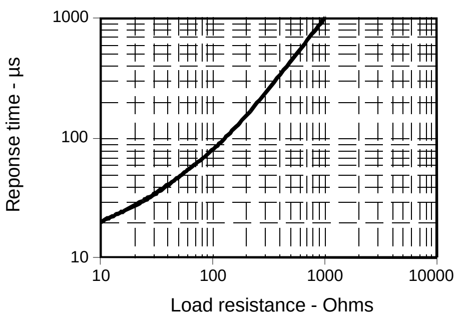
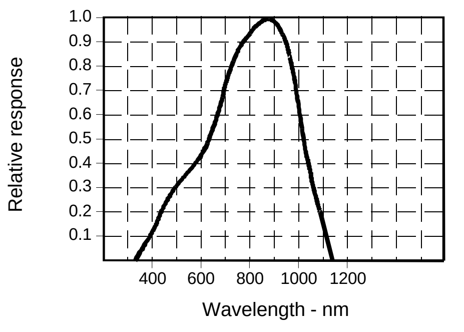


Fig. 4 Spectral Responsivity



All Performance Curves Show Typical Values

Honeywell

SD3410/5410

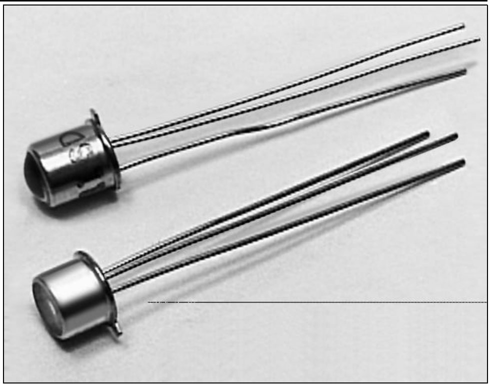
Silicon Photodarlington

SD3421/5421

Silicon PIN Photodiode

FEATURES

- TO-46 metal can package
- Choice of flat window or lensed package
- 90° or 18° (nominal) acceptance angle option
- Fast response time
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



INFRA-57.TIF

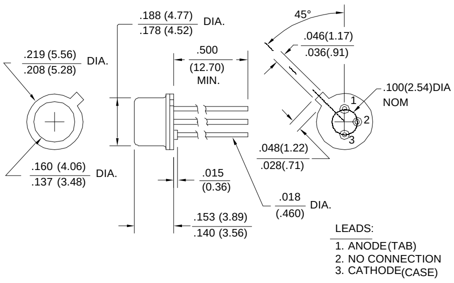
DESCRIPTION

The SD3421/5421 series consists of PIN photodiodes mounted in a TO-46 metal can package. The SD3421 utilizes flat window cans providing a wide acceptance angle, while the SD5421 employs glass lensed cans providing a narrow acceptance angle. The TO-46 packages are ideally suited for operation in hostile environments.

OUTLINE DIMENSIONS in inches (mm)

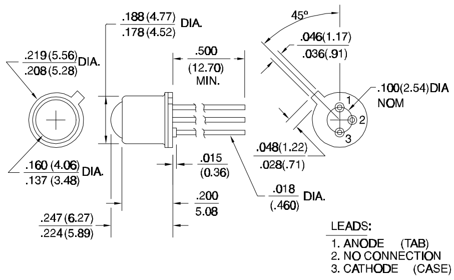
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SD3421



DIM_011.ds4

SD5421



DIM_11b.cdr

Honeywell

SD3421/5421

Silicon PIN Photodiode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				μA	V_R=20 V H=5 mW/cm^2 [1]
SD3421-002		10.0				
SD5421-002		40.0				
Dark Current	I_D			20	nA	V_R=20 V H=0
Reverse Breakdown Voltage	V_{BR}	75			V	I_R=10 μA
Angular Response [2]	Ø				degr.	I_F=Constant
SD3421			90			
SD5421			18			
Rise And Fall Time	t_r, t_f		15		ns	V_R=20 V R_L=50 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

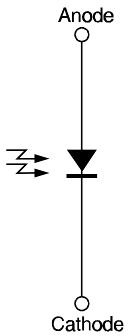
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Cathode Anode Voltage	75 V
Power Dissipation	150 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

SCHEMATIC

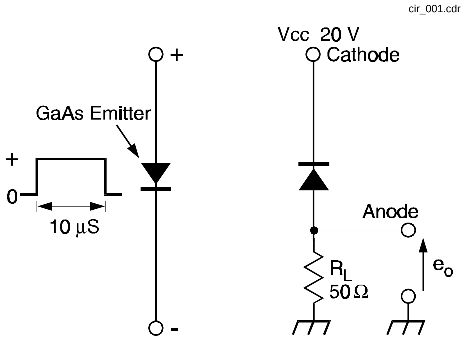


Honeywell

SD3421/5421

Silicon PIN Photodiode

SWITCHING TIME TEST CIRCUIT



SWITCHING WAVEFORM

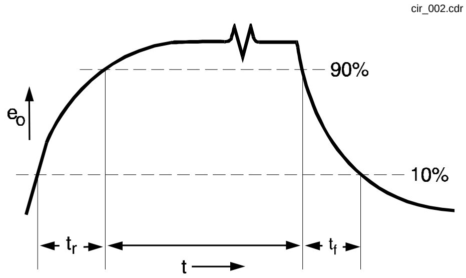


Fig. 1 Responsivity vs Angular Displacement (SD3421)

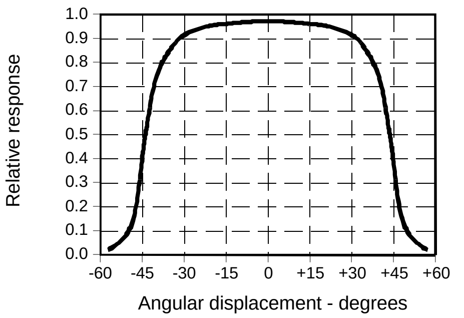


Fig. 2 Responsivity vs Angular Displacement (SD5421)

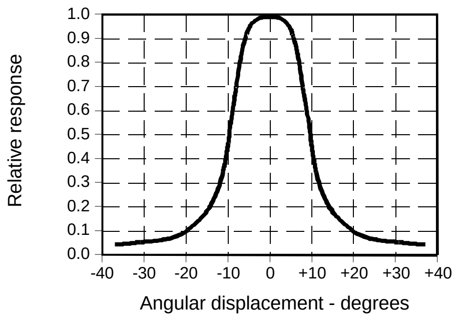


Fig. 3 Dark Current vs Temperature

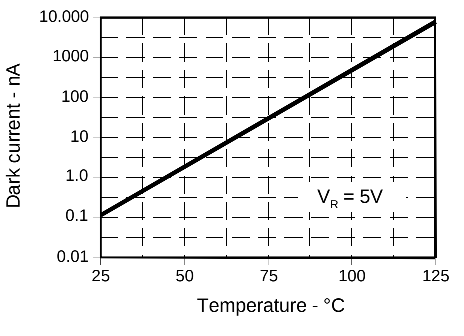
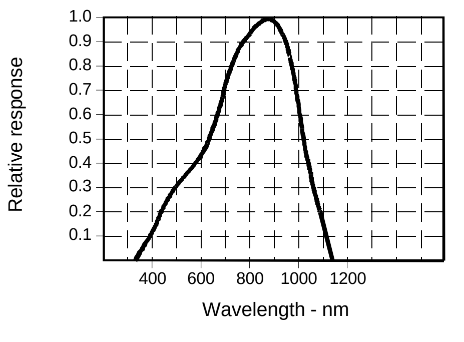


Fig. 4 Spectral Responsivity



All Performance Curves Show Typical Values

Honeywell

SD3421/5421

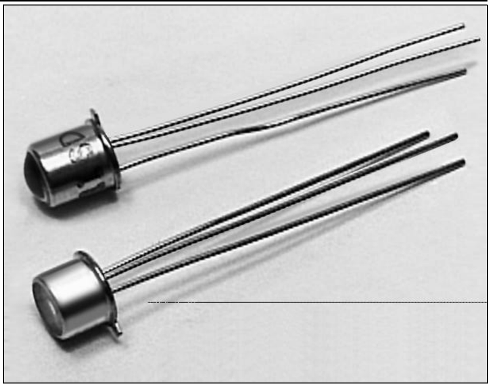
Silicon PIN Photodiode

SD3443/5443

Silicon Phototransistor

FEATURES

- TO-46 metal can package
- Choice of flat window or lensed package
- 90° or 18° (nominal) acceptance angle option
- Wide operating temperature range (- 55°C to +125°C)
- External base connection for added control
- High sensitivity
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



INFRA-57.TIF

DESCRIPTION

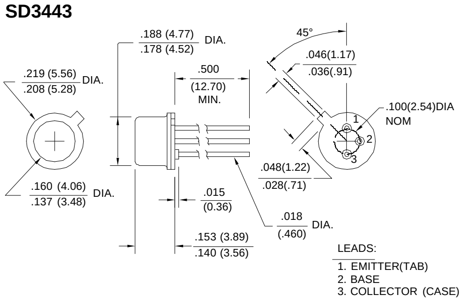
The SD3443/5443 series consists of an NPN silicon phototransistor mounted in a TO-46 metal can package. The SD3443 has flat window cans providing a wide acceptance angle, while the SD5443 has glass lensed cans providing a narrow acceptance angle. The TO-46 packages are ideally suited for operation in hostile environments.

The base is connected on all SD3443 and SD5433 standard products.

OUTLINE DIMENSIONS in inches (mm)

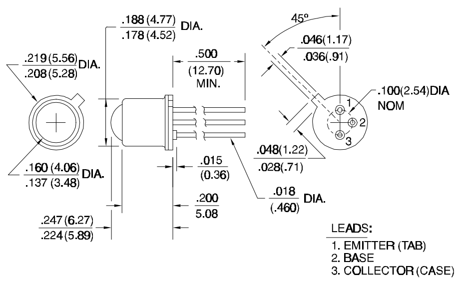
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SD3443



DIM_015.ds4

SD5443



DIM_15b.ds4

Honeywell

SD3443/5443

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V H=5 mW/cm² [1]
SD3443-001		0.50				
SD3443-002		1.00				
SD3443-003		2.00				
SD5443-001		1.00				
SD5443-002		4.00				
SD5443-003		8.00				
SD5443-004		16.0				
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=0.4 mA H=5 mW/cm²
Angular Response [2]	Ø				degr.	I_F=Constant
SD3443			90			
SD5443			18			
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. Angular response is defined as the total included angle between the half sensitivity points.

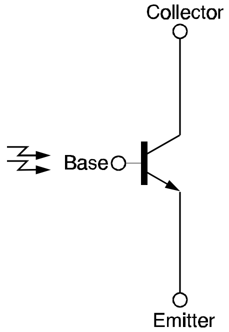
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	150 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

SCHEMATIC



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

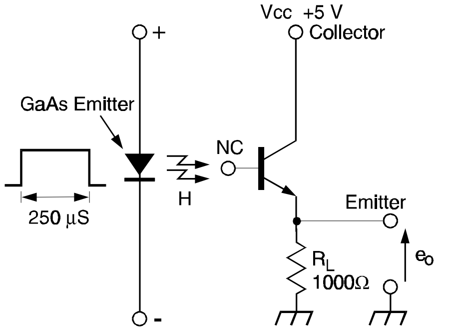
Honeywell

SD3443/5443

Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_03b.cdr



SWITCHING WAVEFORM

cir_004.cdr

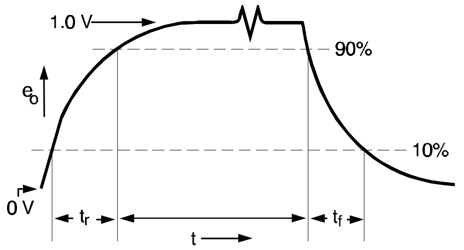


Fig. 1 Responsivity vs Angular Displacement (SD3443)

gra_052.ds4

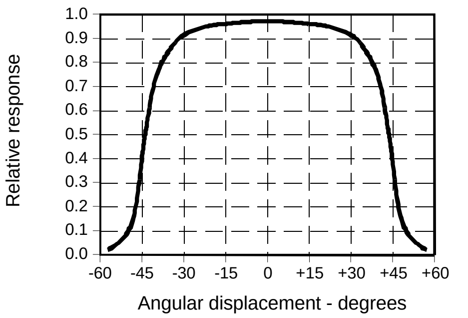


Fig. 2 Responsivity vs Angular Displacement (SD5443)

gra_053.ds4

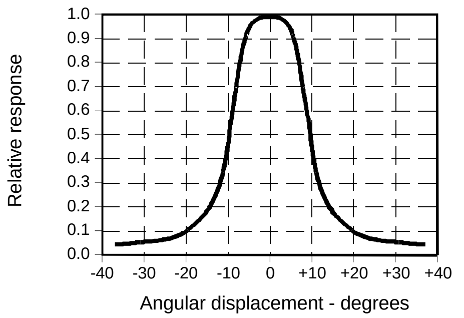


Fig. 3 Dark Current vs Temperature

gra_303.cdr

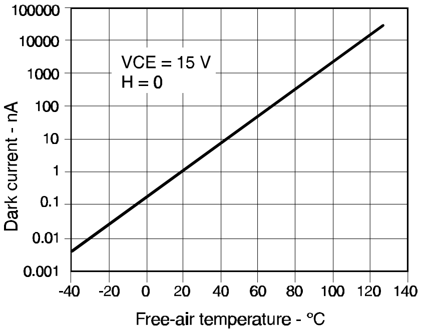
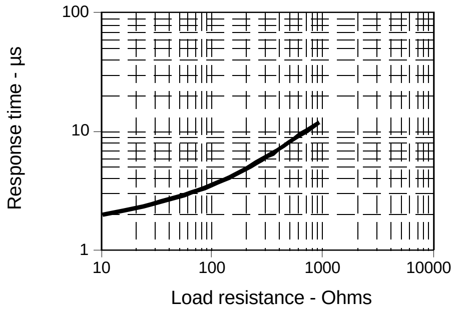


Fig. 4 Non-Saturated Switching Time vs Load Resistance

gra_041.ds4



Honeywell

SD3443/5443

Silicon Phototransistor

Fig. 5 Spectral Responsivity

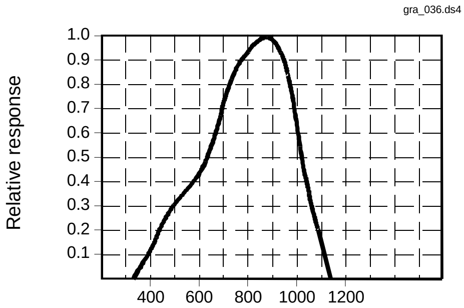


Fig. 6 Coupling Characteristics SE3450 with SD3443

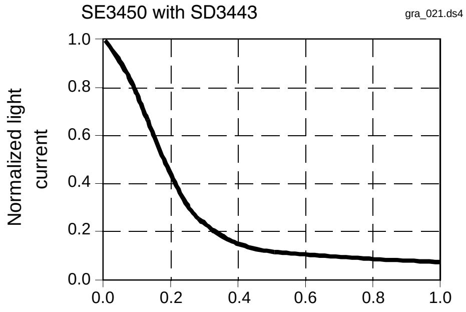


Fig. 7 Coupling Characteristics SE5450 with SD5443

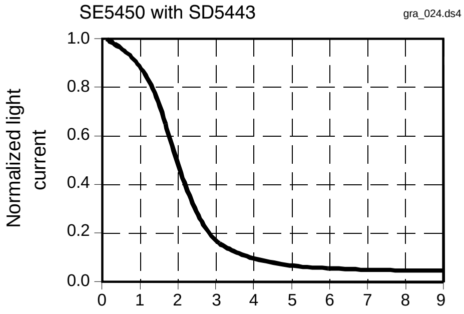
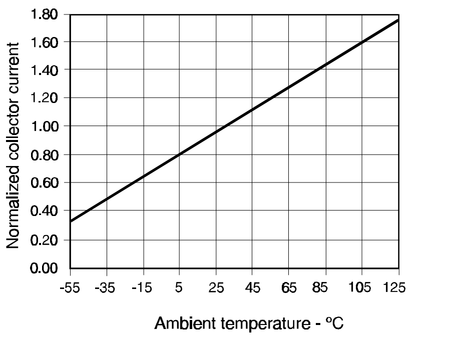


Fig. 8 Collector Current vs Ambient Temperature



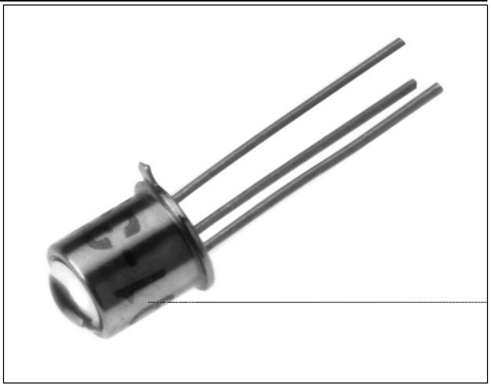
All Performance Curves Show Typical Values

SD5491

Silicon Phototransistor

FEATURES

- TO-18 metal can package
- 12° (nominal) acceptance angle
- Wide operating temperature range (- 55°C to +125°C)
- Fast response time
- Wide sensitivity ranges
- External base connection for added control
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



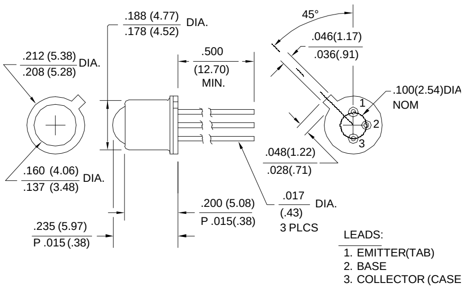
INFRA-70.TIF

DESCRIPTION

The SD5491 is an NPN silicon phototransistor mounted in a TO-18 metal can package. A biconvex lens provides high optical sensitivity with a narrow acceptance angle to enable maximum radiation coupling. The TO-18 package offers protection against harsh environments as well as excellent thermal characteristics.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_016.ds4

SD5491

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SD5491-001		0.50				H=1.5 mW/cm² [1]
SD5491-002		0.50		3.00		
SD5491-003		2.00		5.00		
SD5491-004		4.00		8.00		
SD5491-005		7.00		22.0		
SD5491-006		15.0				
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=0.4 mA H=1.5 mW/cm²
Angular Response [2]	Ø		12		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		2.0		µs	V_{CC}=5 V, I_L=1 mA R_L=100 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 935 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

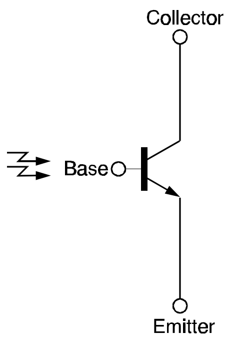
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	150 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

SCHEMATIC



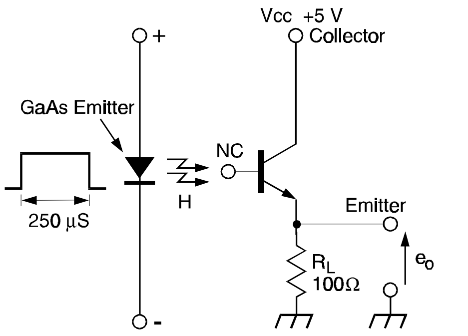
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SD5491

Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT



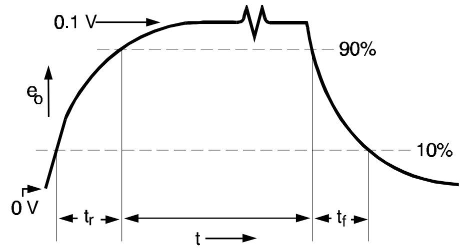


Fig. 1 Responsivity vs Angular Displacement

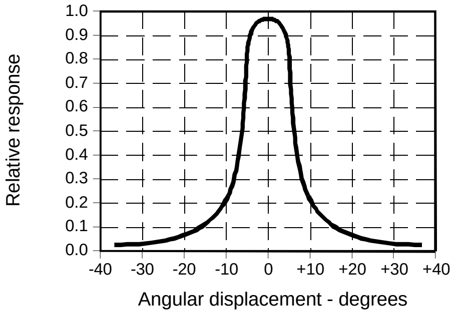


Fig. 2 Collector Current vs Irradiance

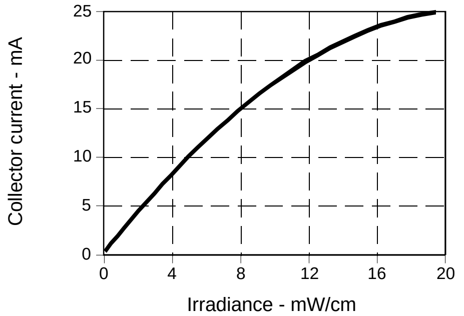


Fig. 3 Dark Current vs Temperature

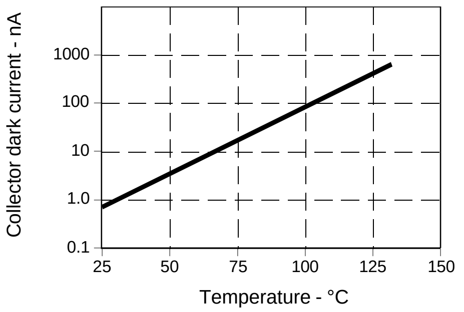
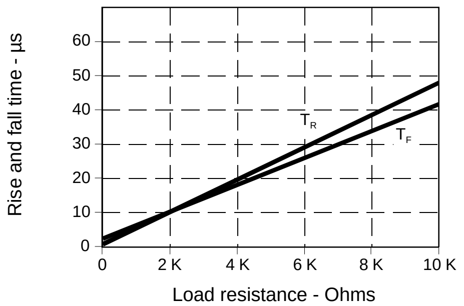


Fig. 4 Rise and Fall Time vs Load Resistance



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SD5491

Silicon Phototransistor

Fig. 5 Spectral Responsivity

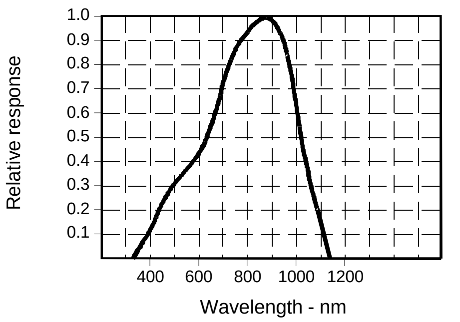


Fig. 6 Coupling Characteristics with SE5470

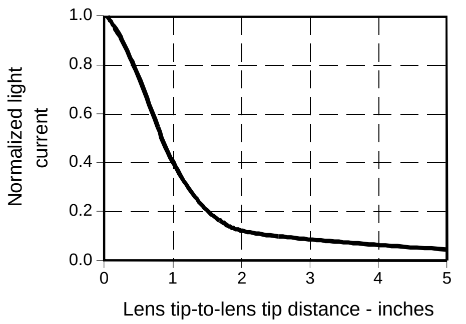
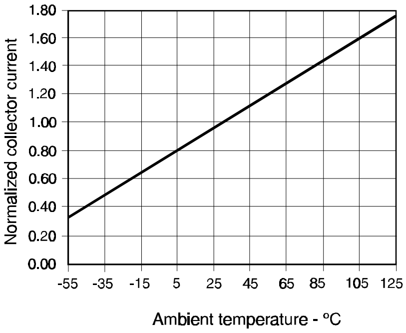


Fig. 7 Collector Current vs Ambient Temperature



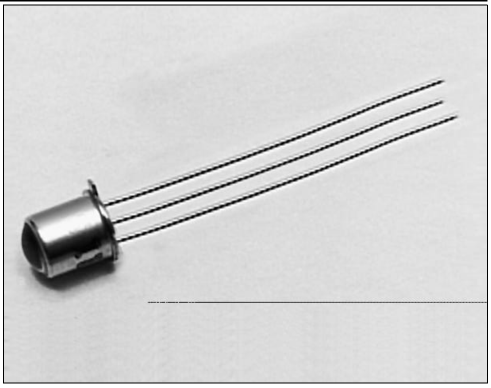
All Performance Curves Show Typical Values

SD5600/5610

Optoschmitt Detector

FEATURES

- TO-46 metal can package
- 6° (nominal) acceptance angle
- High noise immunity output
- TTL/LSTTL/CMOS compatible
- Buffer (SD5600) or inverting (SD5610) logic available
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



INFRA-81.TIF

DESCRIPTION

The SD5600/5610 series is a family of single chip Optoschmitt IC detectors mounted in a TO-46 metal can package. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. Output rise and fall times are independent of the rate of change of incident light. Detector sensitivity has been internally temperature compensated. The TO-46 package is ideally suited for operation in hostile environments.

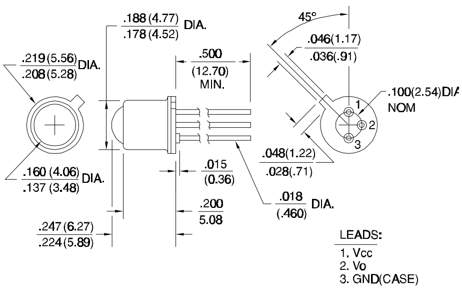
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_025.cdr

SD5600/5610

Optoschmitt Detector

ELECTRICAL CHARACTERISTICS (-40°C to +100°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		16.0	V	T_A=25°C
Turn-on Threshold Irradiance [2]	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SD5600-001, SD5610-001				2.50		T_A=25°C
Hysteresis [3]	HYST	5		30	%	
Supply Current	I_{CC}				mA	E_e=0 Or 3.0 mW/cm²
				12.0		V_{CC}=5 V
				15.0		V_{CC}=16 V
High Level Output Voltage	V_{OH}				V	V_{CC}=5 V, I_{OH}=0
SD5600		2.4				E_e=0
SD5610		2.4				E_e=3.0 mW/cm²
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SD5600				0.4		E_e=0
SD5610				0.4		E_e=3.0 mW/cm²
Internal Pull-Up Resistor	R_{INT}	5.0	10.0	20.0	kΩ	
Operate Point Temperature Coefficient	O_{PTC}		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Output Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5.0		µs	R_L=390 Ω, C_L=50 pF
Clock Frequency				100	kHz	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

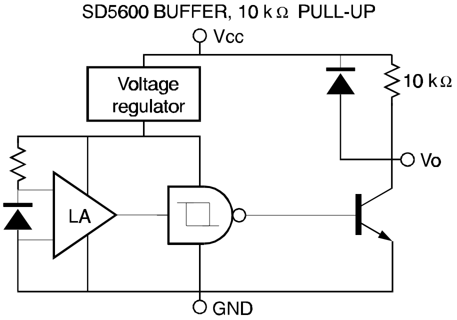
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	16 V [1]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Output Current	18 mA
Operating Temperature Range	-40°C to 100°C
Storage Temperature Range	-55°C to 125°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C to 7 V at 100°C.

SCHEMATIC

SD5600 BUFFER, 10 kΩ PULL-UP



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

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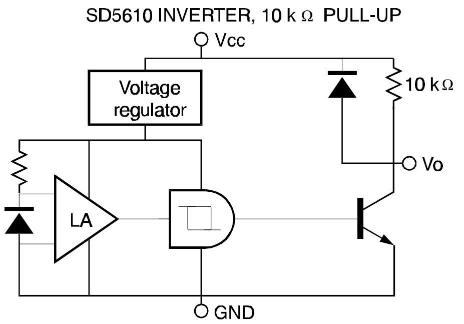
SD5600/5610

Optoschmitt Detector

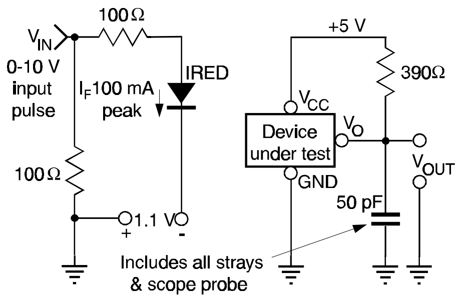
SCHEMATIC

SCH_013.cdr



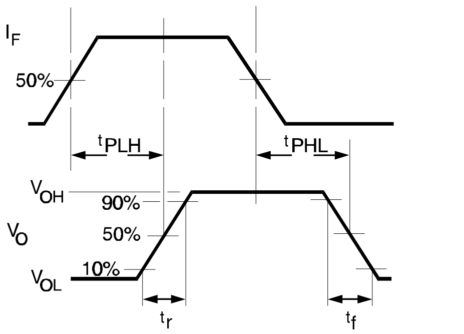
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

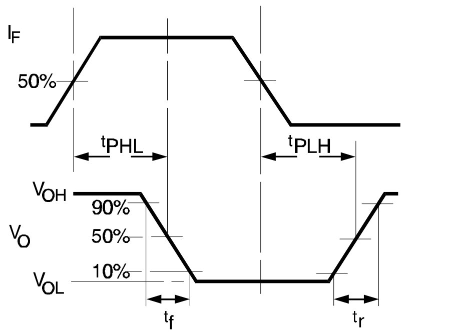


Fig. 1 Responsivity vs Angular Displacement

gra_064.ds4

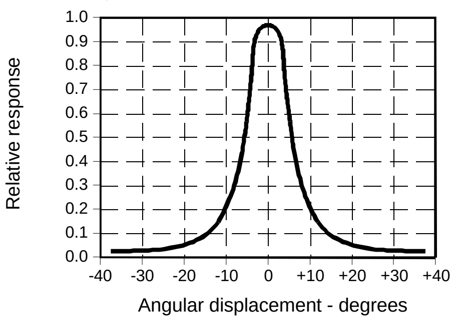
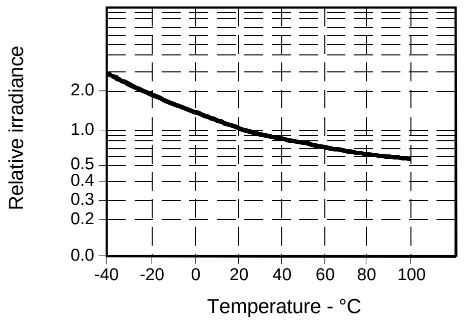


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



Honeywell

SD5600/5610

Optoschmitt Detector

Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

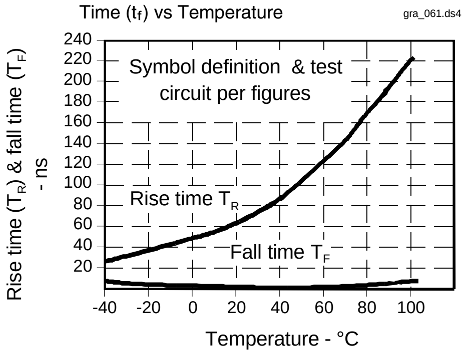


Fig. 4 Delay Time vs Temperature

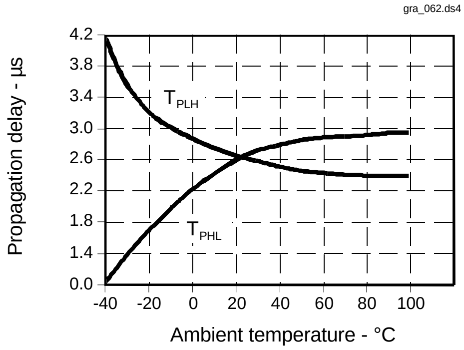
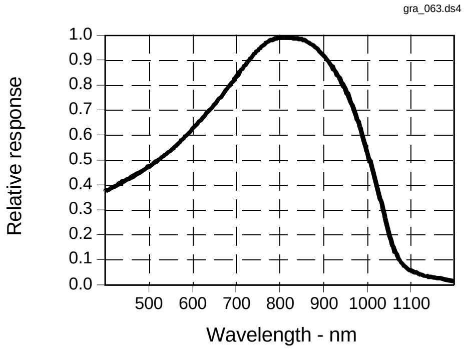


Fig. 5 Spectral Responsivity



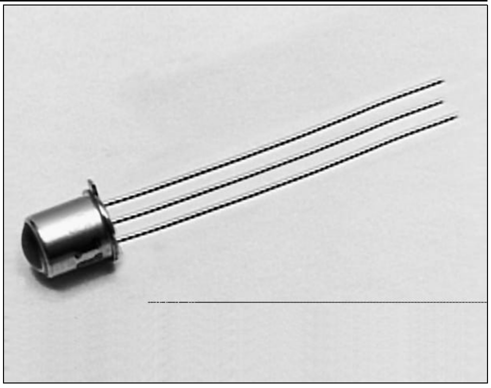
All Performance Curves Show Typical Values

SD5620/5630

Optoschmitt Detector

FEATURES

- TO-46 metal can package
- 6° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- High noise immunity output
- Buffer (SD5620) or inverting (SD5630) logic available
- Two sensitivity ranges
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



INFRA-81.TIF

DESCRIPTION

The SD5620/5630 series is family of single chip Optoschmitt IC detectors mounted in a TO-46 metal can package. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with a 10 kΩ (nominal) pull-up resistor. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. The TO-46 package is ideally suited for operation in hostile environments.

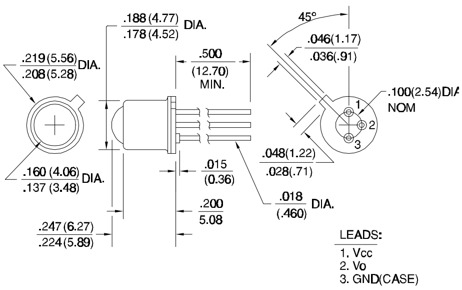
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_025.cdr

Honeywell

SD5620/5630

Optoschmitt Detector

ELECTRICAL CHARACTERISTICS (-40°C to +100°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		16.0	V	T_A=25°C
Turn-on Threshold Irradiance (2)	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SD5620-001, SD5630-001				0.25		T_A=25°C
SD5620-002, SD5630-002				0.13		
Hysteresis (3)	HYST	5		30	%	
Supply Current	I_{CC}				mA	E_e=0 Or 3.0 mW/cm²
				12.0		V_{CC}=5 V
				15.0		V_{CC}=16 V
High Level Output Voltage	V_{OH}				V	V_{CC}=5 V, I_{OH}=0
SD5620		2.4				E_e=3.0 mW/cm²
SD5630		2.4				E_e=0
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SD5620				0.4		E_e=0
SD5630				0.4		E_e=3.0 mW/cm²
Internal Pull-Up Resistor	R_{INT}	5.0	10.0	20.0	kΩ	
Operate Point Temperature Coefficient	O_{PTC}		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Output Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5.0		µs	R_L=390 Ω, C_L=50 pF
Clock Frequency				100	kHz	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

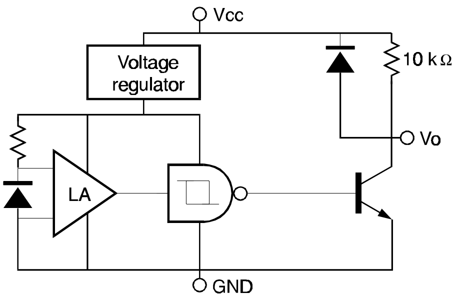
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	16 V (1)
Duration of Output Short to V_{CC} or Ground	1.0 sec.
Output Current	18 mA
Operating Temperature Range	-40°C to 100°C
Storage Temperature Range	-55°C to 125°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C to 7 V at 100°C.

SCHEMATIC

SD5620 BUFFER, 10 kΩ PULL-UP



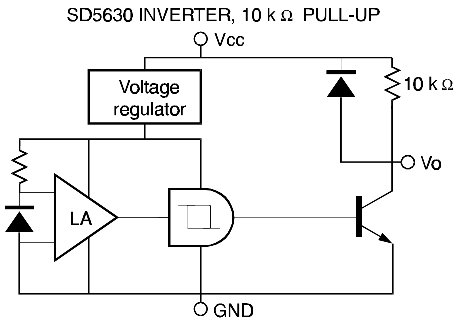
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SD5620/5630
Optoschmitt Detector

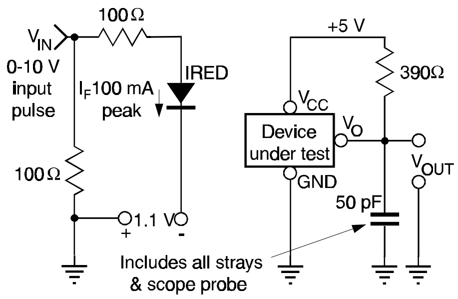
SCHEMATIC

SCH_015.cdr



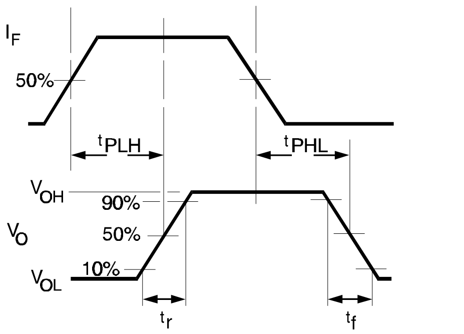
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

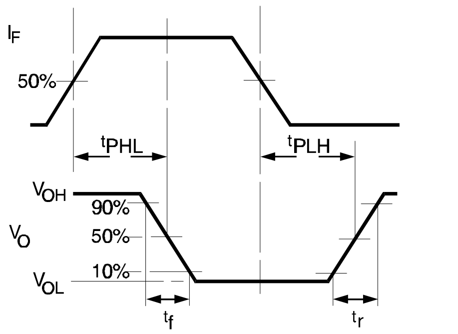


Fig. 1 Responsivity vs Angular Displacement

gra_064.ds4

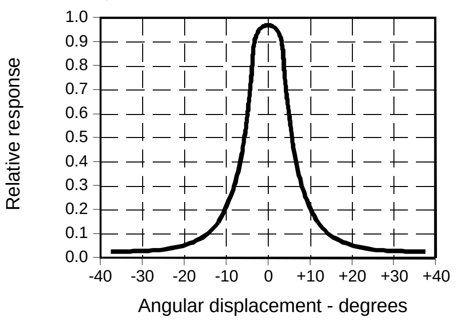


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4

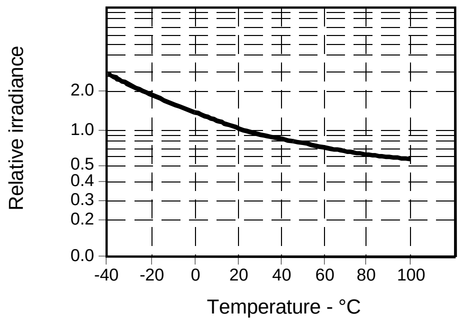


Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

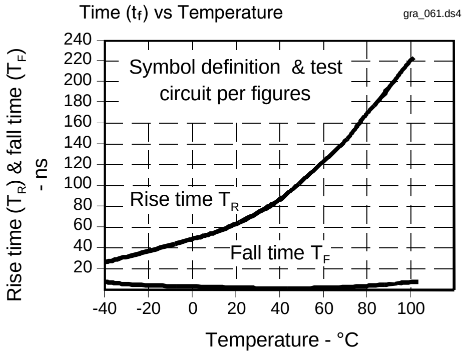


Fig. 4 Delay Time vs Temperature

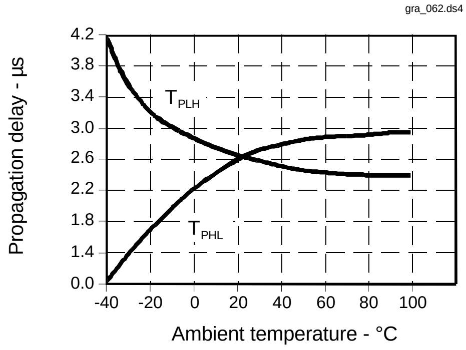
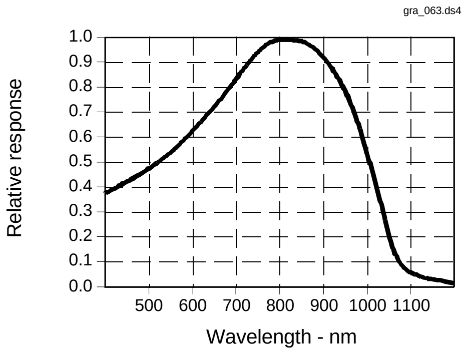


Fig. 5 Spectral Responsivity



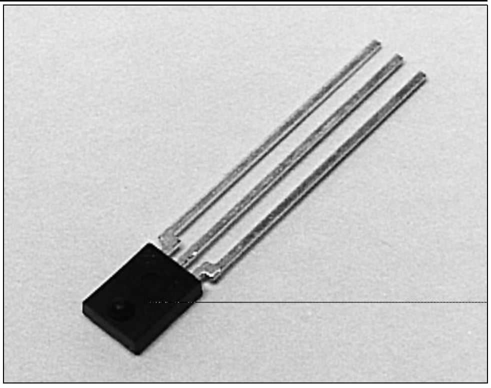
All Performance Curves Show Typical Values

SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

FEATURES

- Side-looking plastic package
- 55° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- Totem- pole output
- Buffer (SDP8004) or inverting (SDP8014) logic available
- High noise immunity output
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--8.TIF

DESCRIPTION

The SDP8004/8014 series consists of a high speed IC molded in a side- looking black plastic package to minimize the effect of visible ambient light. The detector incorporates a Schmitt trigger which provides pulse shaping and hysteresis for noise immunity. The totem- pole output is well- suited for applications which require fast transition times. The output can drive 10 TTL loads. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. For additional output configuration options refer to SDP8304/8314 and SDP8604/8614.

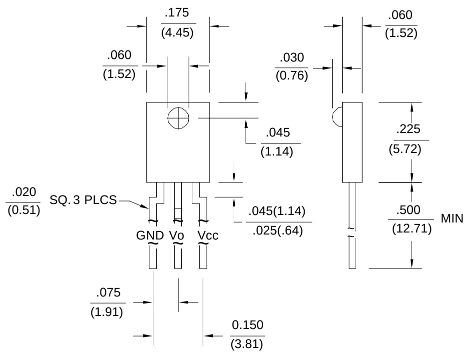
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_026.ds4

Honeywell

SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		7.0	V	T_A=25°C
Turn-on Threshold Irradiance [2] SDP8004-301, SDP8014-301	$E_{eT(+)}$	0.06		0.37	mW/cm²	V_{CC}=5 V T_A=25°C
Hysteresis [3]	HYST	33		67	%	
Supply Current	I_{CC}			15.0	mA	V_{CC}=5.5 V E_e=0 Or 3.0 mW/cm²
High Level Output Voltage SDP8004 SDP8014	V_{OH}	 2.4 2.4			V	V_{CC}=4.5 V, I_{OH}=0.8 mA E_e=3.0 mW/cm² E_e=0
Low Level Output Voltage SDP8004 SDP8014	V_{OL}			 0.4 0.4	V	V_{CC}=5.5 V, I_{OL}=12.8 mA E_e=0 E_e=3.0 mW/cm²
Short Circuit Output Current SDP8004 SDP8014	I_{OS}	 -20 -20		 -100 -100	mA	V_{CC}=5.5 V, Output=GND E_e=3.0 mW/cm² E_e=0
Operate Point Temperature Coefficient	O_{PTC}		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=8 TTL Loads
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		2.5	5.0	µs	V_{CC}=5 V, T_A=25°C E_e=0.5 mW/cm² f=10.0 kHz, D.C.=50% R_L=8 TTL Loads
Clock Frequency				100	kHz	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

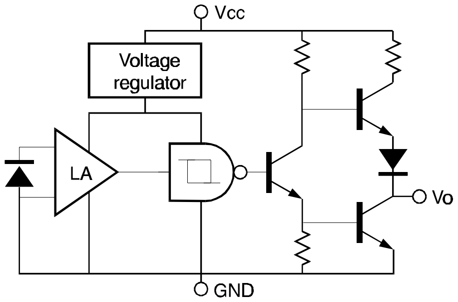
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	7 V [1]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
High Level Output Current	1.0 mA
Irradiance	25 mW/cm²
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC
SDP8004 BUFFER, TOTEM-POLE



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

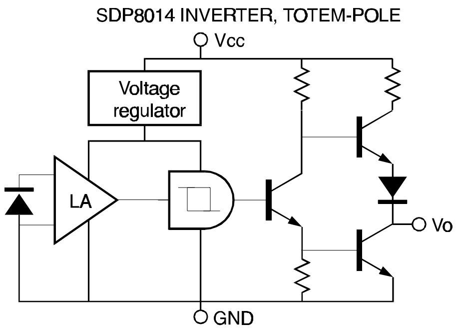
Honeywell

SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

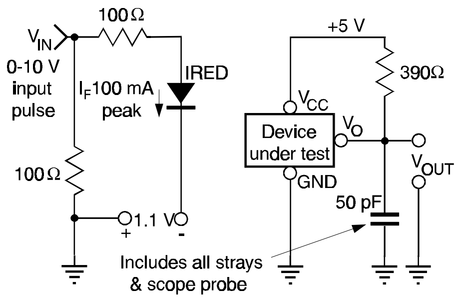
SCHEMATIC

SCH_017.cdr



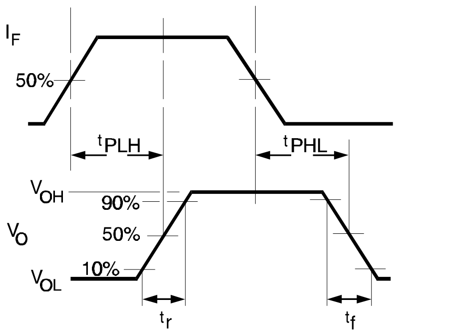
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

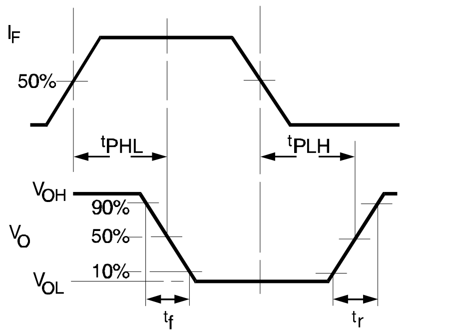


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

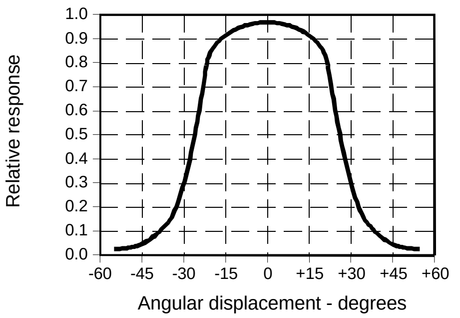
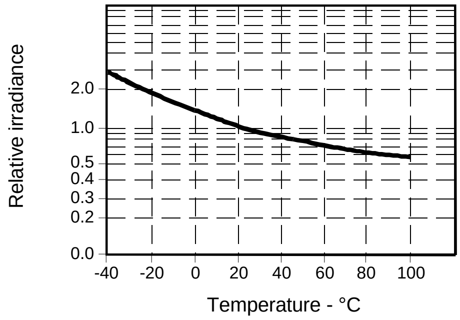


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



Honeywell

SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

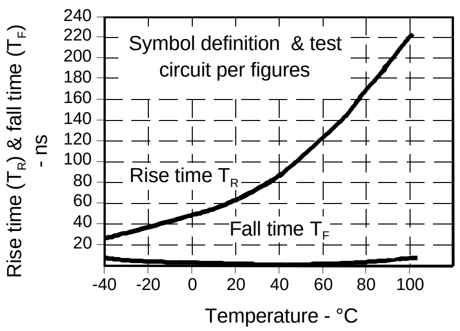


Fig. 4 Delay Time vs Temperature

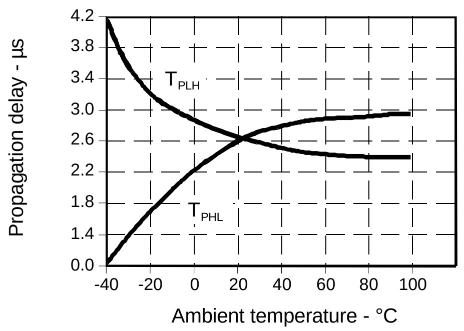
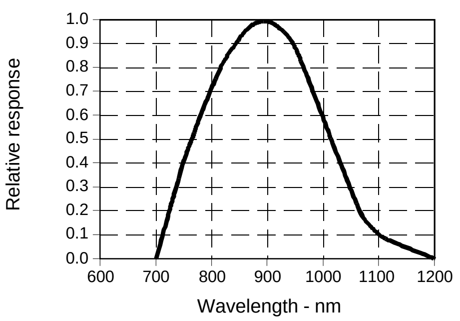


Fig. 5 Spectral Responsivity



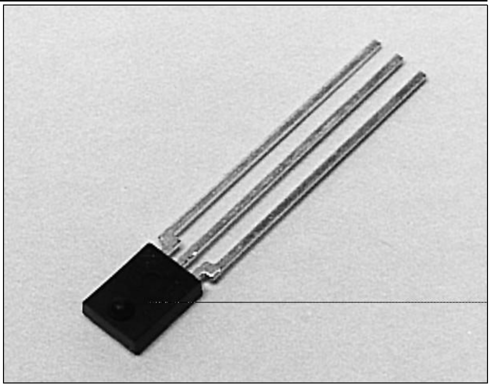
All Performance Curves Show Typical Values

SDP8304/8314

Optoschmitt Detector
Open-Collector Output

FEATURES

- Side-looking plastic package
- 55° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- Open collector output
- Buffer (SDP8304) or inverting (SDP8314) logic available
- High noise immunity output
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--8.TIF

DESCRIPTION

The SDP8304/8314 series consists of a high speed IC molded in a side-looking black plastic package to minimize the effect of visible ambient light. The detector incorporates a Schmitt trigger which provides pulse shaping and hysteresis for noise immunity. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. The output stage is an open collector NPN transistor. This configuration allows the sensor to interface with circuit elements driven by supply voltages other than the V_{CC} supply. For additional output configuration options refer to SDP8004/8014 and SDP8604/8614.

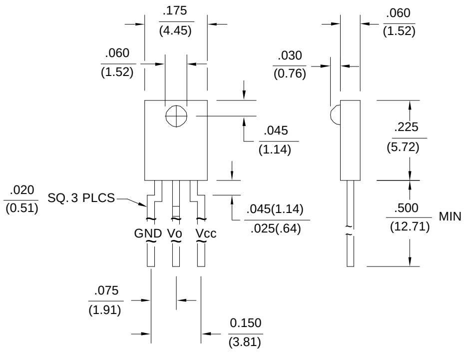
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_026.ds4

SDP8304/8314

Optoschmitt Detector
Open-Collector Output

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		12.0	V	T_A=25°C
Turn-on Threshold Irradiance [2]	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SDP8304-301, SDP8314-301		0.06		0.37		T_A=25°C
Hysteresis [3]	HYST	33		67	%	
Supply Current	I_{CC}			15.0	mA	V_{CC}=12 V E_e=0 Or 3.0 mW/cm²
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SDP8304				0.4		E_e=0
SDP8314				0.4		E_e=3.0 mW/cm²
High Level Output Current	I_{OH}				µA	V_{CC}=4.5 V V_{OH}=30 V
SDP8304				100		E_e=3.0 mW/cm²
SDP8314				100		E_e=0
Operate Point Temperature Coefficient			-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t_r, t_f		7.0		ns	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		2.5	5.0	µs	V_{CC}=5 V, T_A=25°C E_e=0.5 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
Clock Frequency				100	kHz	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

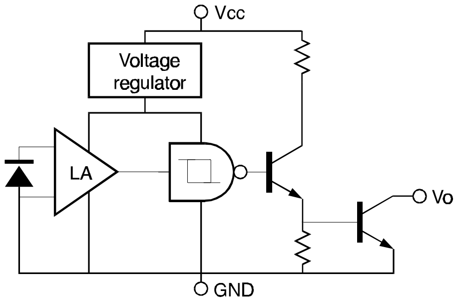
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	12 V [1]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Applied Output Voltage	35 V
Low Level Output Current	16 mA
Irradiance	25 mW/cm²
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8304 BUFFER, OPEN-COLLECTOR



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

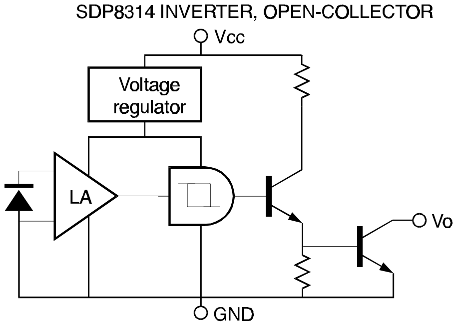
Honeywell

SDP8304/8314

Optoschmitt Detector
Open-Collector Output

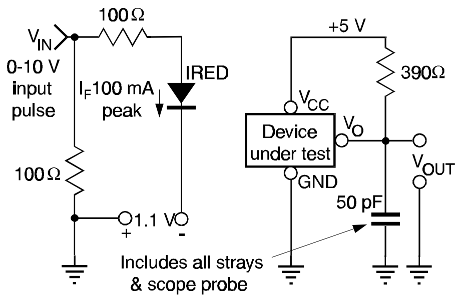
SCHEMATIC

SCH_019.cdr



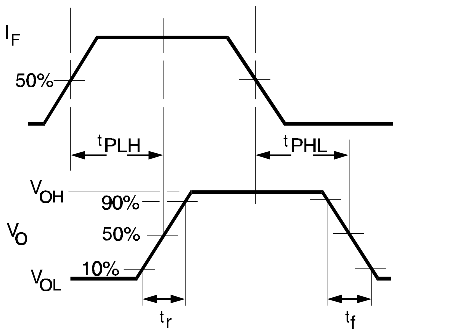
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

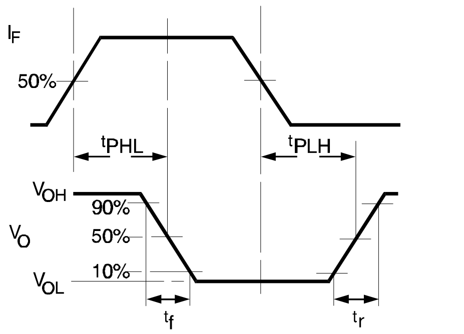


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

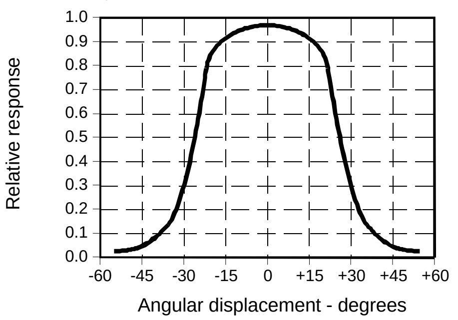
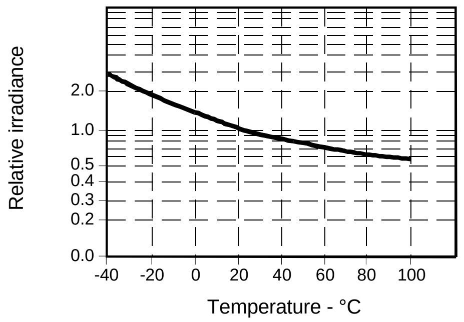


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



Honeywell

SDP8304/8314

Optoschmitt Detector
Open-Collector Output

Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

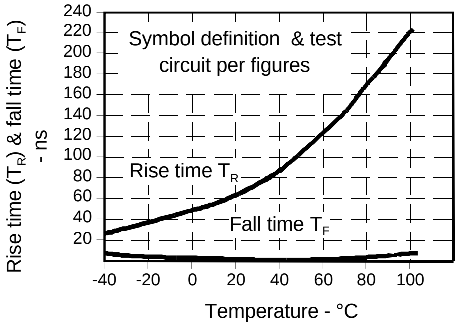


Fig. 4 Delay Time vs Temperature

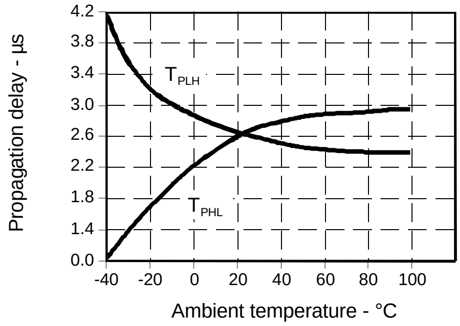
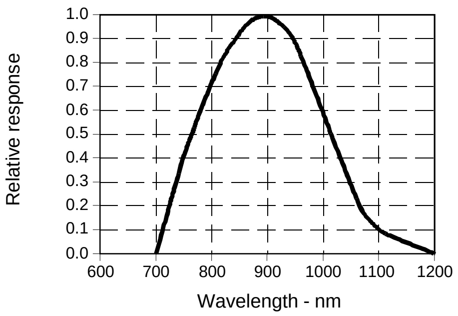


Fig. 5 Spectral Responsivity



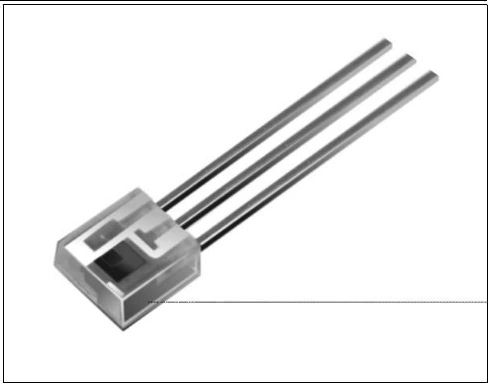
All Performance Curves Show Typical Values

SDP8371

Precision Optoschmitt Detector

FEATURES

- Side-looking plastic package
- 180° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- Precision laser- trimmed switch points
- Highly sensitive, no lens necessary
- Wide field of view
- 30 kHz frequency range
- Spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



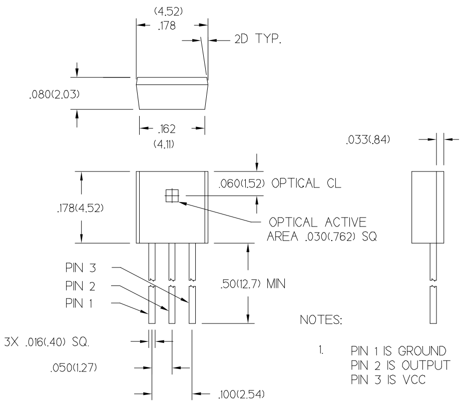
INFRA-72.TIF

DESCRIPTION

The SDP8371 is a precision Optoschmitt detector molded in a side-looking clear plastic package. The detector is a monolithic IC, consisting of a 0.030 in.(0.762 mm) square photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN open-collector output transistor. The output is a buffer logic type, switching from low to high when illumination is increased to the threshold irradiance. Detector sensitivity has been internally temperature compensated and laser trimmed for narrow sensitivity range.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_027.cdr

Honeywell

SDP8371

Precision Optoschmitt Detector

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.0		15.0	V	T_A=25°C
Supply Current	I_{CC}		4.0	8.0	mA	V_{CC}=5.5 V
High Level Output Current	I_{OH}			1.0	µA	V_{CC}=5 V E_e=.1mW/cm², V_{OH}=5 V
Low Level Output Voltage	V_{OL}			0.5	V	V_{CC}=5 V, I_{OL}=15 mA E_e=0
Release Point SDP8371-001	R_P	 45	 55	 65	µW/cm²	V_{CC}=5 V (2)
Operate Point	O_P		62		µW/cm²	V_{CC}=5 V (2)
Hysteresis (3)	HYST	8	12	20	%	
Operate Point Temperature Coefficient			-1.0		%/°C	Emitter @ Constant Temperature
Output Rise Time	t_r		200		ns	R_L=390 Ω, C_L=50 pF
Output Fall Time	t_f		200		ns	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 880 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

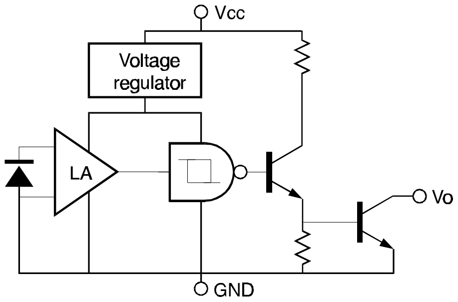
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	15 V (1)
Duration of Output Short to V_{CC} or Ground	1.0 sec
Applied Output Voltage	15 V
Output Current	25 mA
Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 70°C.

SCHEMATIC

SDP8371 BUFFER, OPEN-COLLECTOR

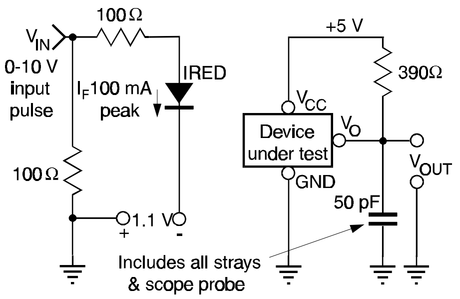


SDP8371

Precision Optoschmitt Detector

SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM

cir_013.cdr

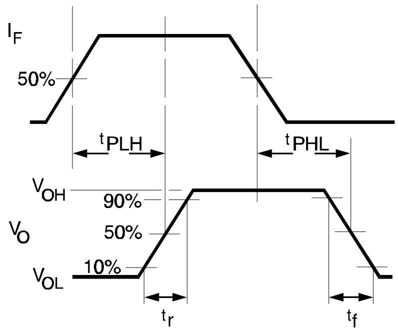


Fig. 1 Responsivity vs Angular Displacement

gra_066.ds4

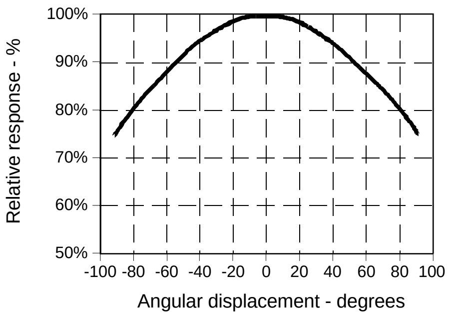


Fig. 2 Propagation Delay as a Function of Illumination Intensity

gra_067.ds4

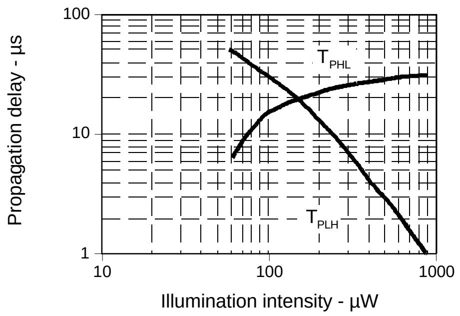


Fig. 3 Low Level Output Voltage vs Temperature

gra_068.ds4

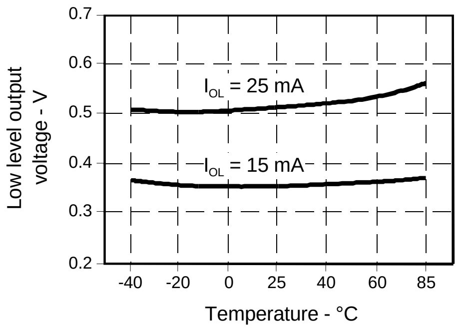
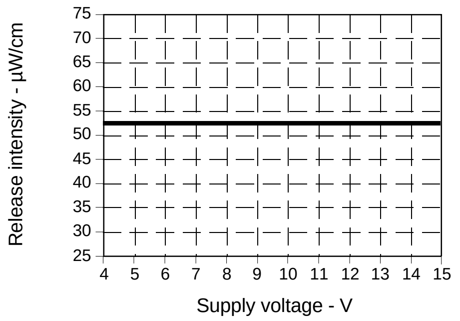


Fig. 4 Sensitivity vs Supply Voltage

gra_069.ds4



SDP8371

Precision Optoschmitt Detector

Fig. 5 Spectral Responsivity

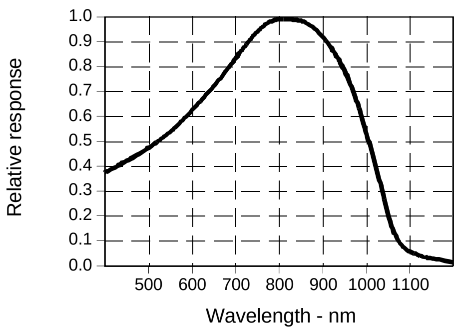
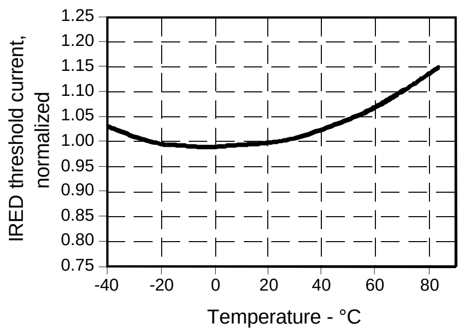


Fig. 6 Sensitivity vs Temperature



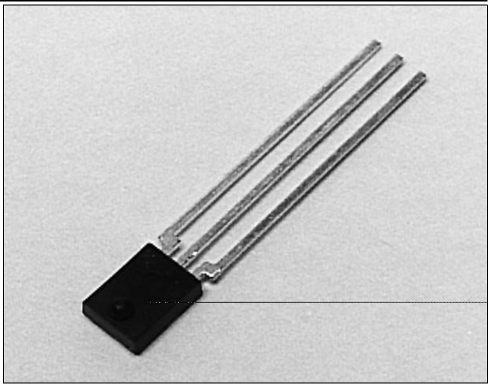
All Performance Curves Show Typical Values

SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

FEATURES

- Side-looking plastic package
- 55° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- 10Ω pull- up output
- Buffer or inverting logic available
- High noise immunity output
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--8.TIF

DESCRIPTION

The SDP8604/8614 series consists of a high speed IC molded in a side-looking black plastic package to minimize the effect of visible ambient light. The detector incorporates a Schmitt trigger which provides pulse shaping and hysteresis for noise immunity. Detector output is an NPN silicon transistor with a 10 kΩ (nominal) pull-up resistor. This option eliminates the need for an external load resistor to generate an output signal voltage. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. For additional output configuration options refer to SDP8004/8014 and SDP8304/8314.

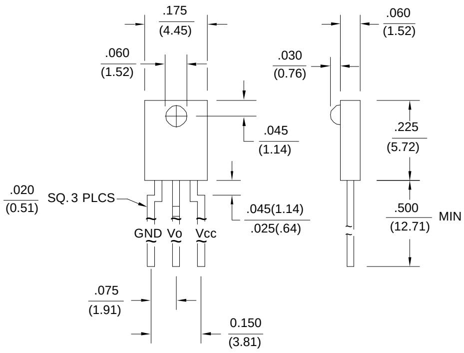
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_026.ds4

Honeywell

SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		12.0	V	T_A=25°C
Turn-on Threshold Irradiance [2] SDP8604-301, SDP8614-301	$E_{eT(+)}$	0.06		0.37	mW/cm²	V_{CC}=5 V T_A=25°C
Hysteresis [3]	HYST	33		67	%	
Supply Current	I_{CC}			15.0	mA	V_{CC}=12 V E_e=0 Or 3.0 mW/cm²
High Level Output Voltage SDP8604 SDP8614	V_{OH}	 2.4 2.4			V	V_{CC}=4.5 V, I_{OH}=0 E_e=3.0 mW/cm² E_e=0
Low Level Output Voltage SDP8604 SDP8614	V_{OL}			 0.4 0.4	V	V_{CC}=4.5 V, I_{OL}=12.8 mA E_e=0 E_e=3.0 mW/cm²
Internal Pull-Up Resistor	R_{INT}	5.0	10.0	20.0	kΩ	
Operate Point Temperature Coefficient			-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		2.5	5.0	µs	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
Clock Frequency				100	kHz	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

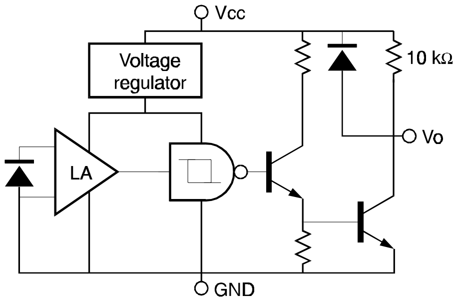
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	12 V [1]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Low Level Output Current	16.0 mA
Irradiance	25 mW/cm²
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8604 BUFFER, 10 k Ω PULL-UP



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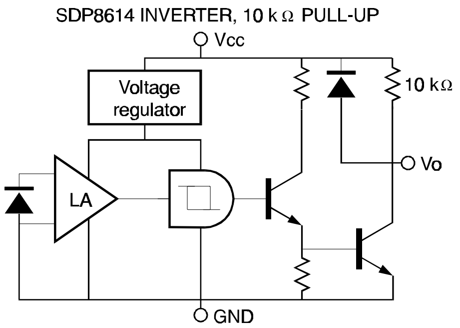
Honeywell

SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

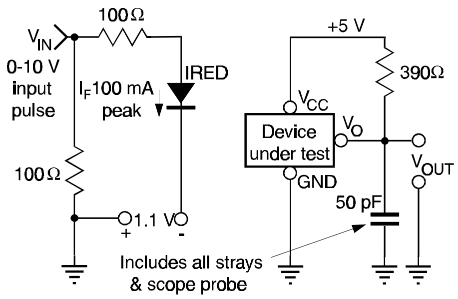
SCHEMATIC

SCH_021.cdr



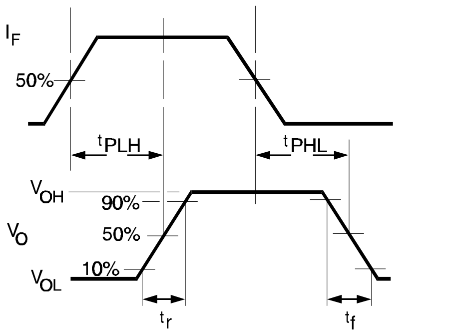
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

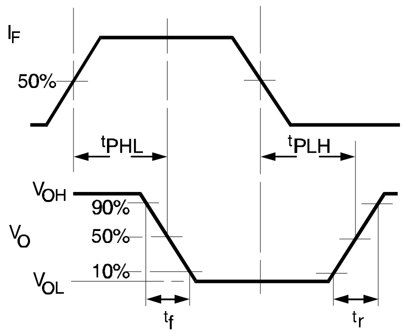


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

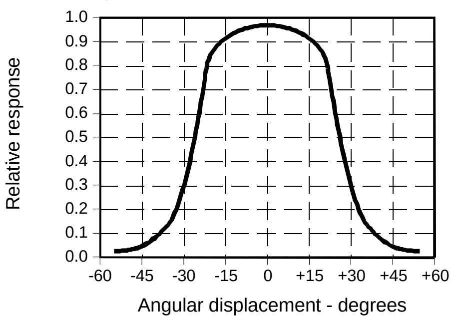
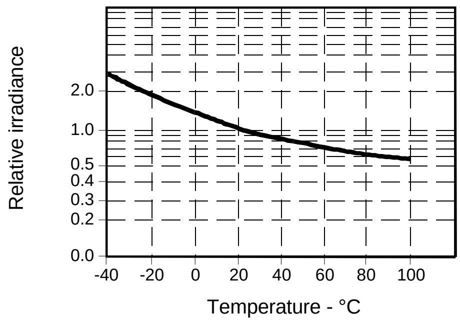


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



Honeywell

SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

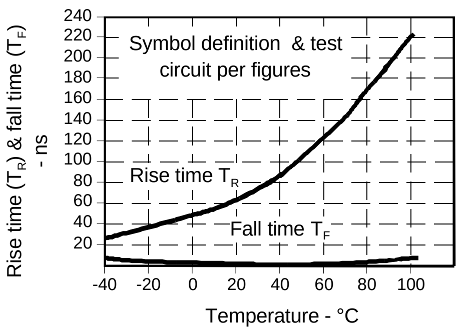


Fig. 4 Delay Time vs Temperature

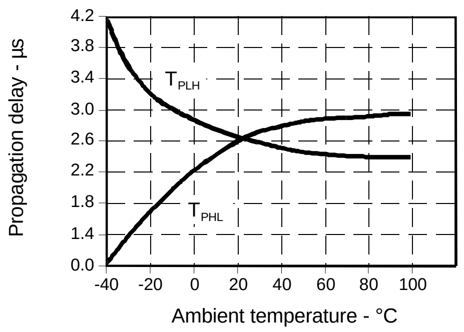
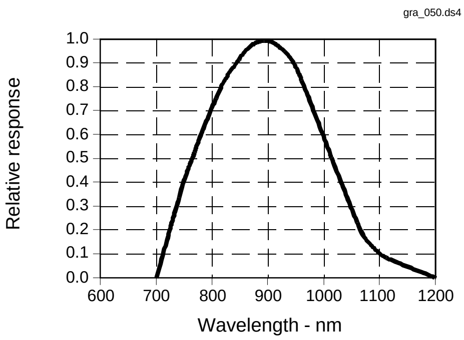


Fig. 5 Spectral Responsivity

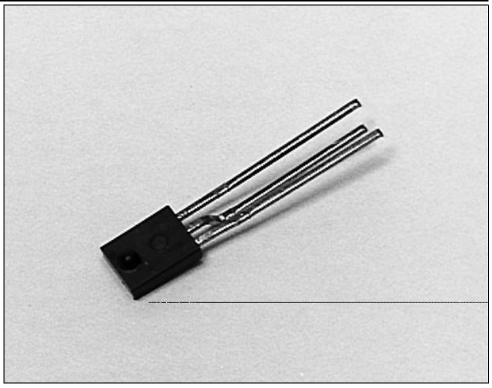


All Performance Curves Show Typical Values

Honeywell

SDP86XX
Optoschmitt Detector

FEATURES
- Side-looking plastic package
- 55° (nominal) acceptance angle
- Wide sensitivity ranges
- TTL/LSTTL/CMOS compatible
- Buffer (SDP8600/8601/8602) or inverting (SDP8610/8611/8612) logic available
- Three different lead spacing arrangements
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--6.TIF

DESCRIPTION
The SDP86XX series is a family of single chip Optoschmitt IC detectors molded in a side-looking black plastic package to minimize the effect of visible ambient light. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with a 10 kΩ (nominal) pull-up resistor. Output rise and fall times are independent of the rate of change of incident light. Detector sensitivity has been internally temperature compensated. Flexibility of use is enhanced by a choice of three different lead configurations; in-line (SDP8601/8611), 0.05 in.(1.27 mm) offset pin circle (SDP8600/8610) and 0.10 in. (2.54 mm) offset center lead (SDP8602/8612).

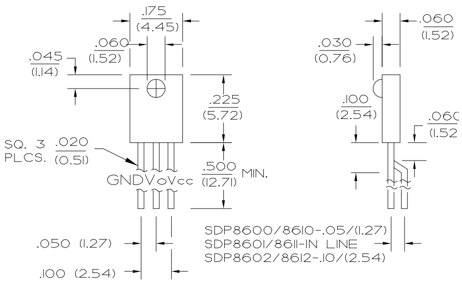
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_028.cdr

Honeywell

SDP86XX

Optoschmitt Detector

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		12.0	V	T_A=25°C
Turn-on Threshold Irradiance	$E_{eT}(+)$				mW/cm²	V_{CC}=5 V
SDP86XX-001				2.5		T_A=25°C
SDP86XX-002				1.2		(2)
SDP86XX-003				0.6		
Hysteresis (3)	HYST	5		30	%	
Supply Current	I_{CC}				mA	E_e=0 Or 3.0 mW/cm²
				12.0		V_{CC}=5 V
				15.0		V_{CC}=12 V
High Level Output Voltage	V_{OH}				V	V_{CC}=5 V, I_{OH}=0
SDP8600/8601/8602		2.4				E_e=3.0 mW/cm²
SDP8610/8611/8612		2.4				E_e=0
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SDP8600/8601/8602				0.4		E_e=0
SDP8610/8611/8612				0.4		E_e=3.0 mW/cm²
Internal Pull-Up Resistor	R_{INT}	5.0	10.0	20.0	kΩ	
Operate Point Temperature Coefficient	O_{PTC}		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Output Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5.0		µs	R_L=390 Ω, C_L=50 pF
Clock Frequency				100	kHz	R_L=390 Ω, C_L=50 pF

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between V_{CC} and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

ABSOLUTE MAXIMUM RATINGS

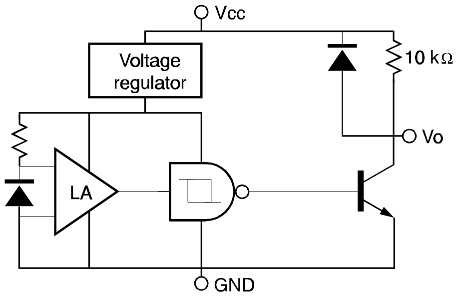
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	12 V (1)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Output Current	18 mA
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8600/8601/8602 BUFFER, 10 kΩ PULL-UP



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

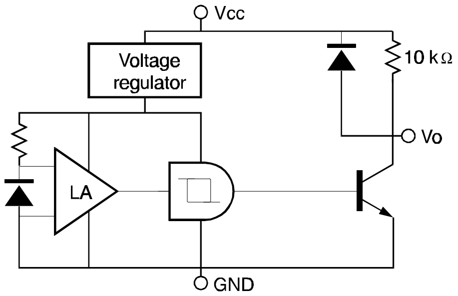
Honeywell

SDP86XX
Optoschmitt Detector

SCHEMATIC

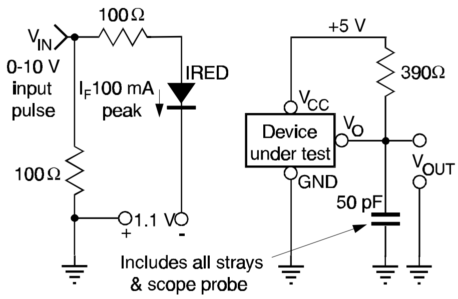
SCH_024.cdr

SDP8610/8611/8612 INVERTER, 10 k Ω PULL-UP



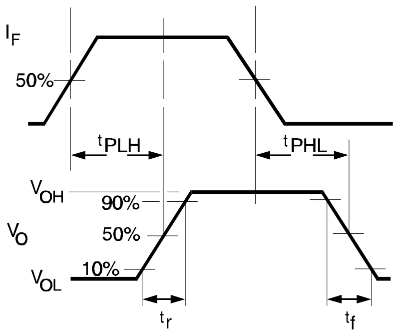
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

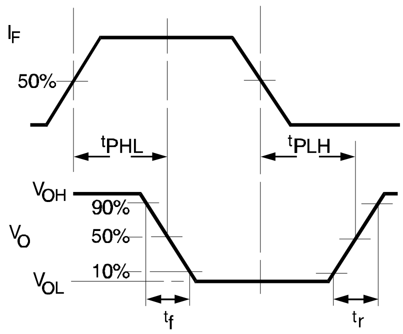


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

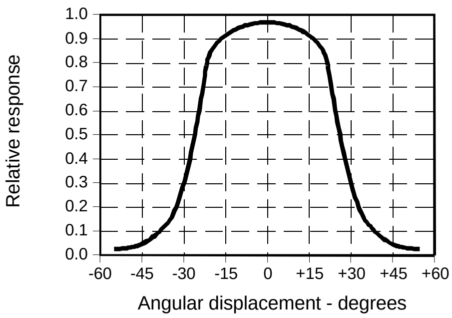
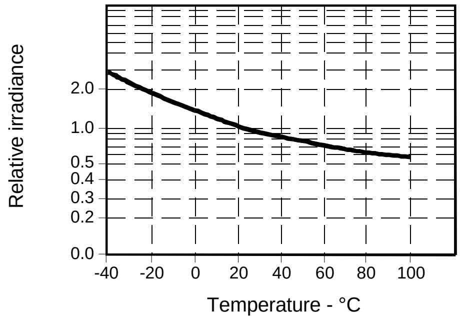


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



Honeywell

Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

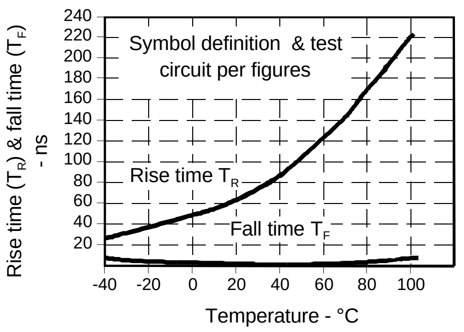


Fig. 4 Delay Time vs Temperature

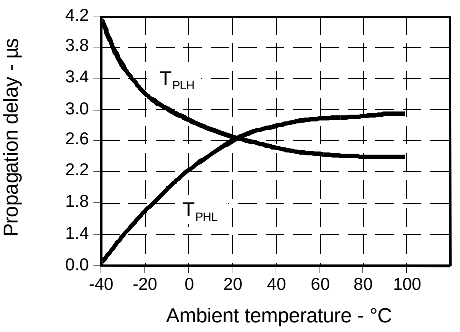
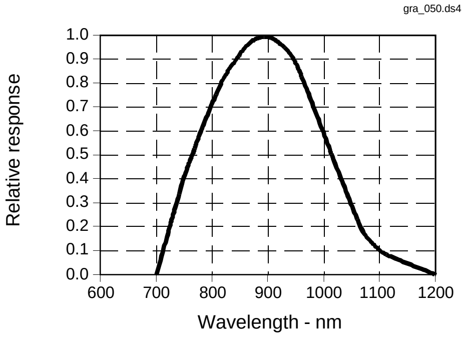


Fig. 5 Spectral Responsivity



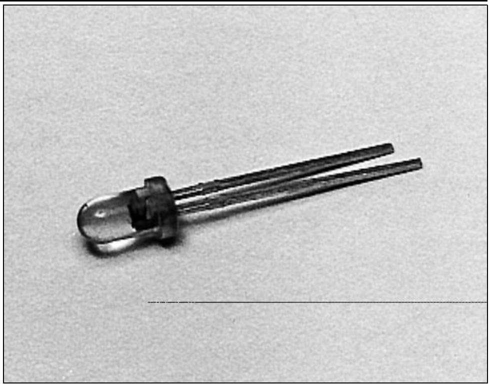
All Performance Curves Show Typical Values

SDP8405

Silicon Phototransistor

FEATURES

- T-1 plastic package
- 20° (nominal) acceptance angle
- Consistent optical properties
- Wide sensitivity ranges
- Mechanically and spectrally matched to SEP8505 and SEP8705 infrared emitting diodes



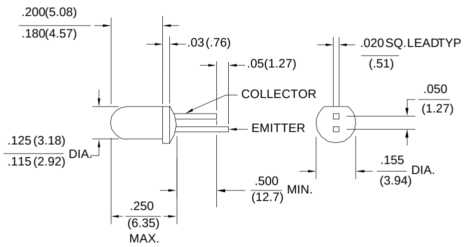
INFRA-22.TIF

DESCRIPTION

The SDP8405 is an NPN silicon phototransistor transfer molded in a T-1 clear plastic package. Transfer molding of this device assures superior optical centerline performance compared to other molding processes. Lead lengths are staggered to provide a simple method of polarity identification.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_100.ds4

Honeywell

SDP8405

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V
SDP8405-001		1.00				H=5 mW/cm² [1]
SDP8405-002		7.00		14.0		
SDP8405-003		12.0		24.0		
Light Current	I_L				mA	V_{CE}=5 V
SDP8405-011		0.16				H=0.25 mW/cm² [2]
SDP8405-012		0.16		0.46		
SDP8405-013		0.32		0.92		
SDP8405-014		0.64		1.85		
SDP8405-015		1.25				
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=15 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 μA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 μA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=I_L/8
SDP8405-001 to -003						H=5 mW/cm²
SDP8405-011 to -015						H=0.25 mW/cm²
Angular Response [3]	Ø		20		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		μs	V_{CC}=5 V, I_L=1 mA, R_L=1000 Ω

Notes
1. The radiation source is a tungsten lamp operating at a color temperature of 2870°K.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Angular response is defined as the total included angle between the half sensitivity points.

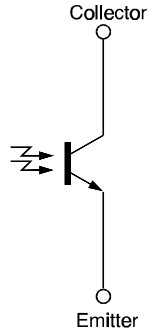
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	70 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.18 mW/°C.

SCHEMATIC



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

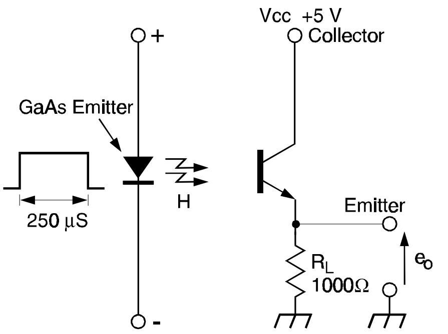
Honeywell

SDP8405

Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

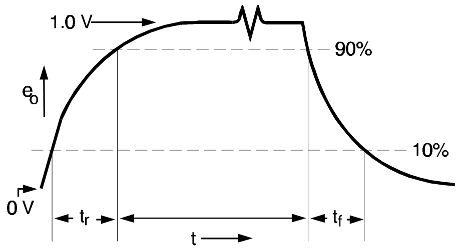


Fig. 1 Responsivity vs Angular Displacement

gra_047.ds4

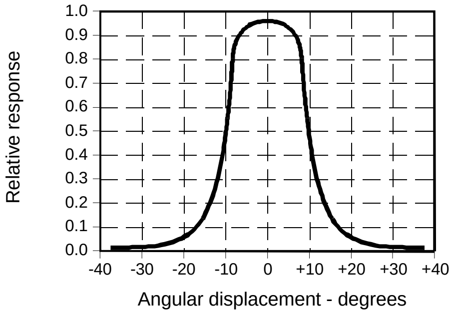


Fig. 2 Collector Current vs Ambient Temperature

gra_039.ds4

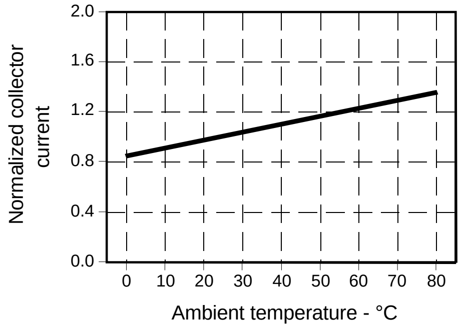


Fig. 3 Dark Current vs Temperature

gra_301.cdr

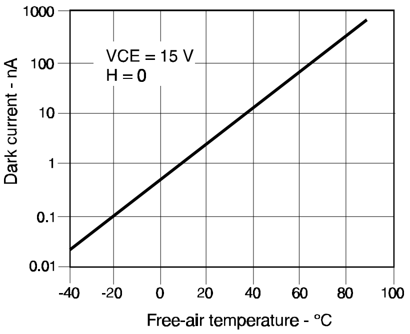
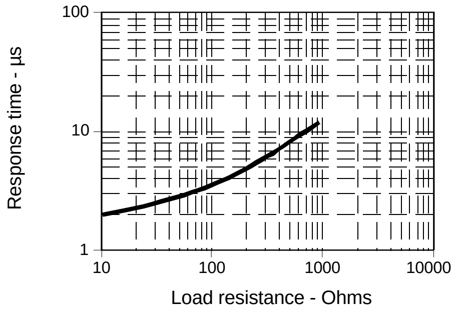


Fig. 4 Non-Saturated Switching Time vs Load Resistance

gra_041.ds4



Honeywell

SDP8405

Silicon Phototransistor

Fig. 5 Spectral Responsivity

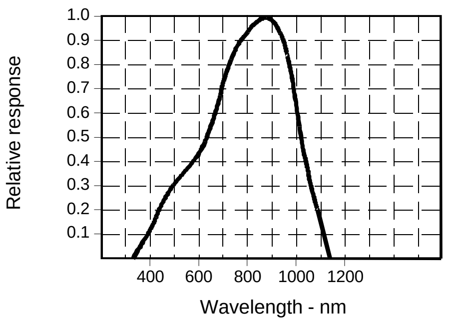
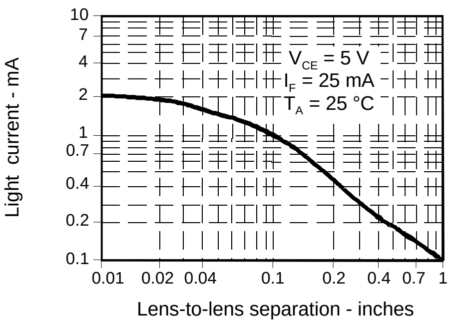


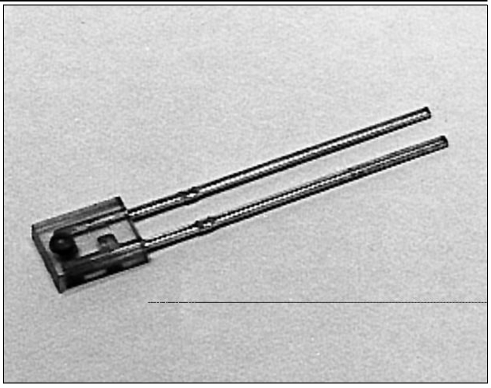
Fig. 6 Coupling Characteristics with SEP8505



All Performance Curves Show Typical Values

SDP8406
Silicon Phototransistor

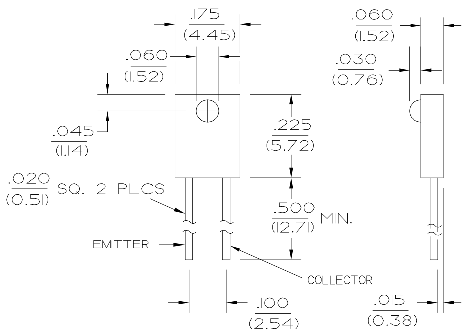
FEATURES
- Side-looking plastic package
- 50° (nominal) acceptance angle
- Wide sensitivity ranges
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes


INFRA-21.TIF

DESCRIPTION
The SDP8406 is an NPN silicon phototransistor molded in a side-looking clear plastic package. The chip is positioned to accept radiation through a plastic lens from the side of the package.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_017.ds4

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SDP8406

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V H=1 mW/cm² (1)
SDP8406-001		0.15		1.90		
SDP8406-002		1.80		3.60		
SDP8406-003		3.40		6.50		
SDP8406-004		6.40		12.0		
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=15 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=I_L/8 H=1 mW/cm²
Angular Response (2)	Ø		50		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 935 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

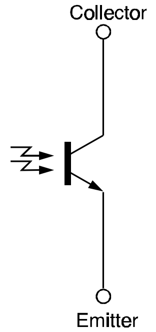
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC



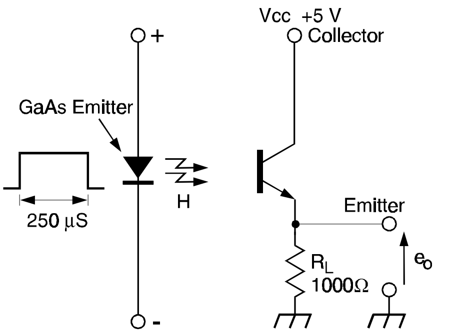
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SDP8406
Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

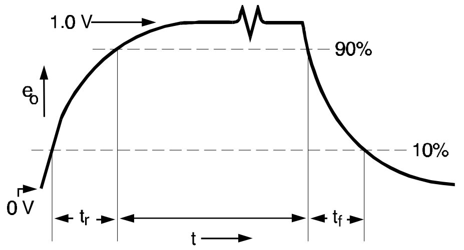


Fig. 1 Responsivity vs Angular Displacement

gra_054.ds4

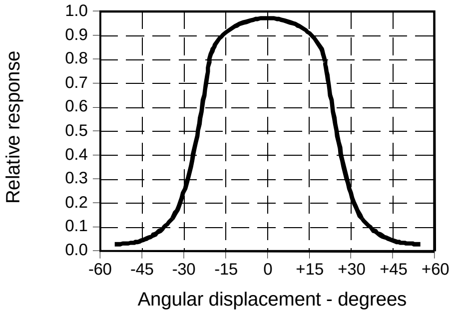


Fig. 2 Collector Current vs Ambient Temperature

gra_039.ds4

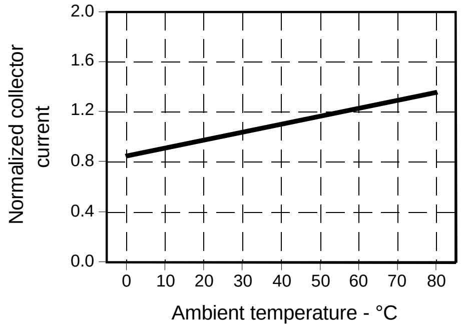


Fig. 3 Dark Current vs Temperature

gra_301.cdr

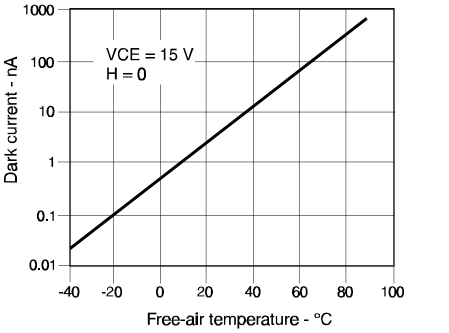
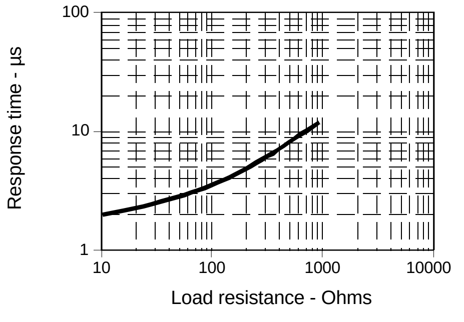


Fig. 4 Non-Saturated Switching Time vs Load Resistance

gra_041.ds4



SDP8406
Silicon Phototransistor

Fig. 5 Spectral Responsivity

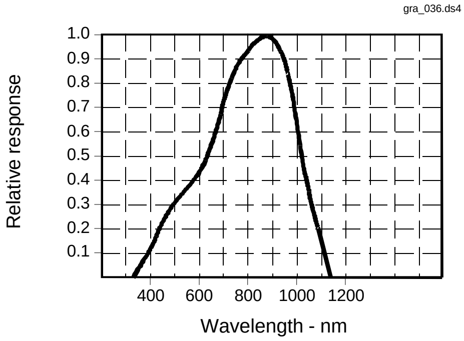
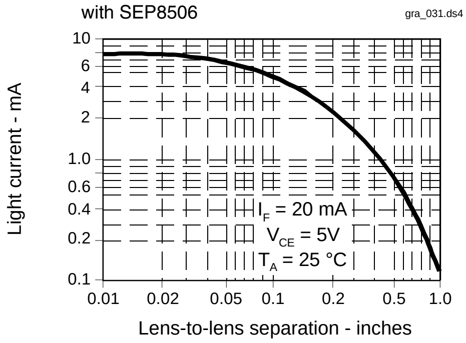


Fig. 6 Coupling Characteristics with SEP8506



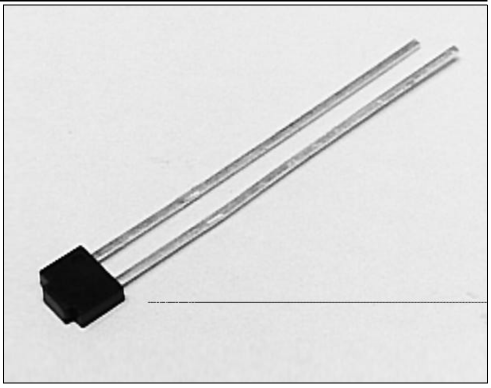
All Performance Curves Show Typical Values

SDP8407

Silicon Phototransistor

FEATURES

- End-looking plastic package
- 135° (nominal) acceptance angle
- Low profile for design flexibility
- Mechanically and spectrally matched to SEP8507 infrared emitting diode



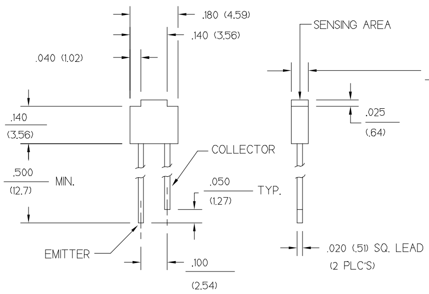
INFRA-16.TIF

DESCRIPTION

The SDP8407 is an NPN silicon phototransistor molded in an end-looking black plastic package. The chip is positioned to accept radiation from the top of the package. Lead lengths are staggered to provide a simple method of polarity identification.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.008(0.20)
	2 plc decimals	±0.020(0.51)



DIM_018.ds4

SDP8407

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current SDP8407-001	I_L	 0.10			mA	V_{CE}=5 V H=1 mW/cm² [1]
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=10 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=10 µA H=1 mW/cm²
Angular Response [2]	Ø		135		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 935 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

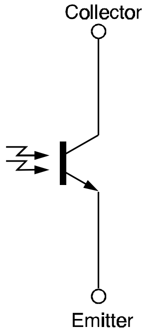
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW [1]
Operating Temperature Range	-40°C to 85C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.66 mW/°C.

SCHEMATIC

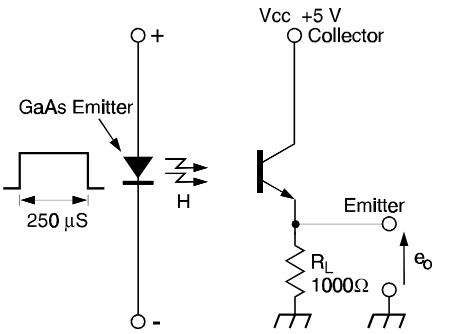


SDP8407

Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

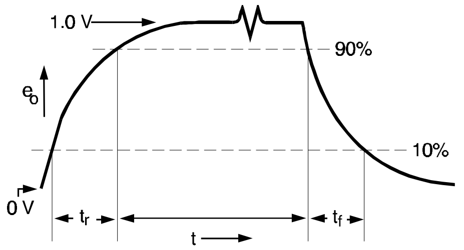


Fig. 1 Responsivity vs Angular Displacement

gra_055.ds4

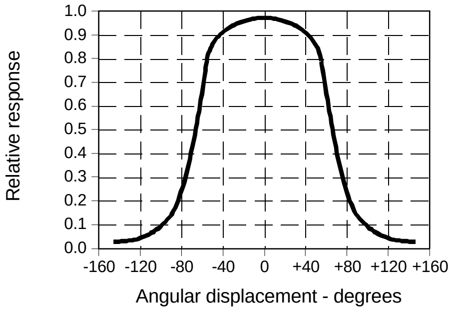


Fig. 2 Collector Current vs Ambient Temperature

gra_039.ds4

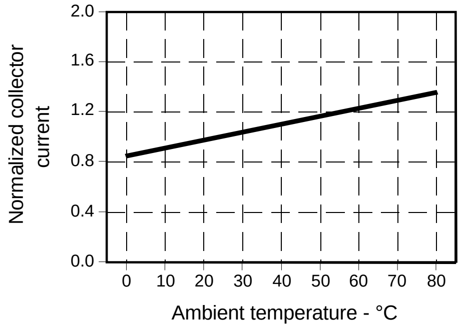


Fig. 3 Dark Current vs Temperature

gra_301.cdr

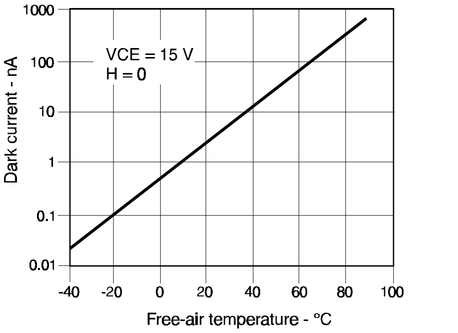
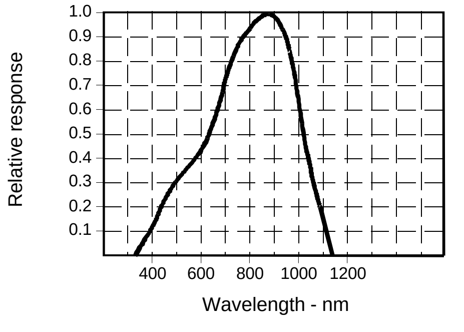


Fig. 4 Spectral Responsivity

gra_036.ds4



All Performance Curves Show Typical Values

Honeywell

SDP8407

Silicon Phototransistor

SDP8436

Silicon Phototransistor

FEATURES

- Side-looking plastic package
- 18° (nominal) acceptance angle
- Enhanced coupling distance
- Internal visible light rejection filter
- Low profile for design flexibility
- Wide sensitivity ranges
- Mechanically matched to SEP8736 infrared emitting diode

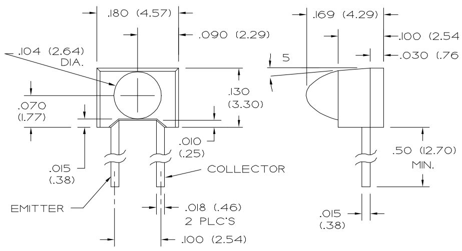
INFRA-82.TIF

DESCRIPTION

The SDP8436 is an NPN silicon phototransistor molded in a black plastic package which combines the mounting advantages of a side-looking package with the narrow acceptance angle and high optical gain of a T- 1 package. The SDP8436 is designed for those applications which require longer coupling distances than standard side- looking devices can provide, such as touch screens. The device is also well suited to applications in which adjacent channel crosstalk could be a problem. The package is highly transmissive to the IR source energy while it provides effective shielding against visible ambient light.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_019.ds4

Honeywell

SDP8436

Silicon Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current	I_L				mA	V_{CE}=5 V H=1 mW/cm² (1)
SDP8436-001		0.50				
SDP8436-002		4.00		10.0		
SDP8436-003		7.00		17.5		
SDP8436-004		12.5				
Collector Dark Current	I_{CEO}			100	nA	V_{CE}=15 V, H=0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	5.0			V	I_E=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=0.1 mA H=1 mW/cm²
Angular Response (2)	Ø		18		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The radiation source is an IRED with a peak wavelength of 880 nm.
2. Angular response is defined as the total included angle between the half sensitivity points.

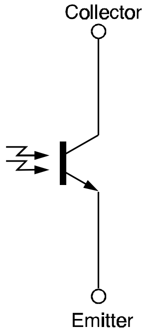
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW (1)
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

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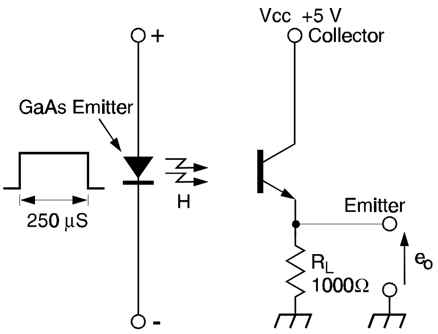
SDP8436

Silicon Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

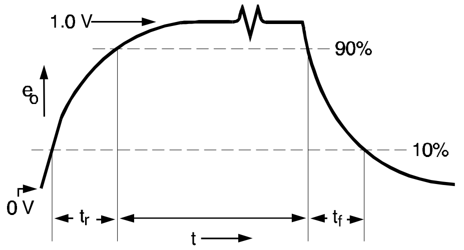


Fig. 1 Responsivity vs Angular Displacement

gra_013.ds4

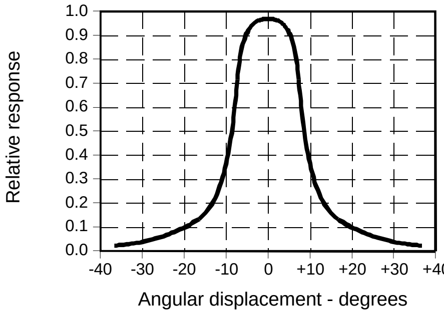


Fig. 2 Collector Current vs Ambient Temperature

gra_039.ds4

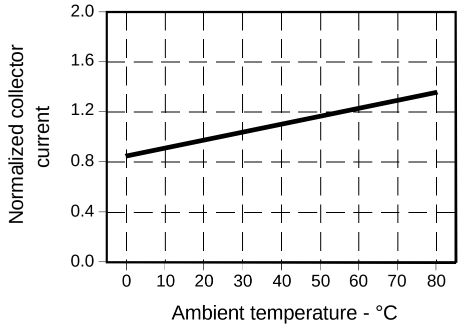


Fig. 3 Dark Current vs Temperature

gra_301.cdr

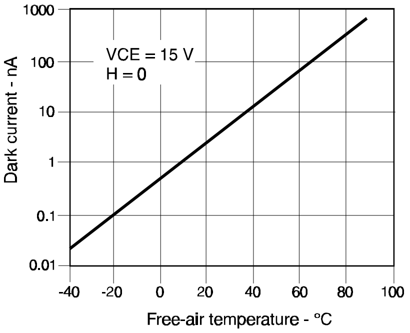
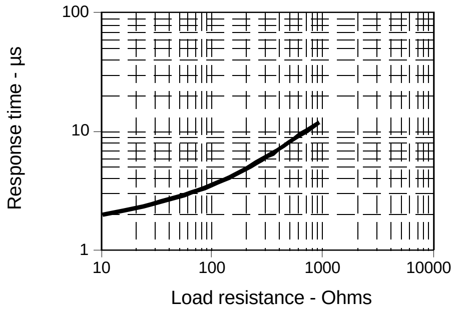


Fig. 4 Non-Saturated Switching Time vs Load Resistance

gra_041.ds4



Honeywell

SDP8436
Silicon Phototransistor

Fig. 5 Spectral Responsivity

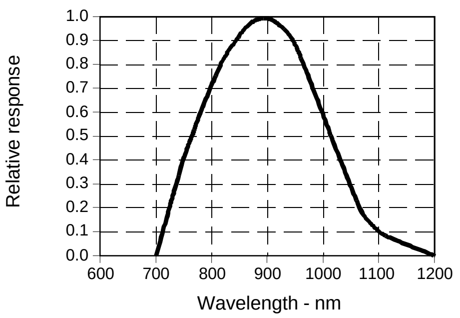
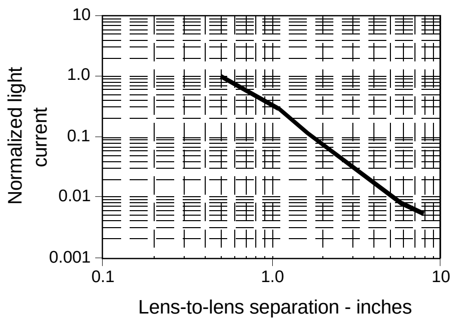


Fig. 6 Coupling Characteristics with SEP8736



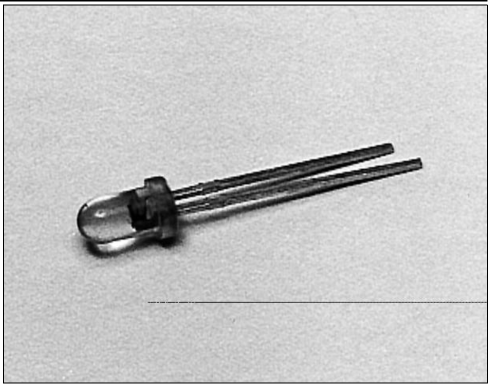
All Performance Curves Show Typical Values

SDP8475-201

Low Light Rejection Phototransistor

FEATURES

- T-1 plastic package
- Low light level immunity
- 20° (nominal) acceptance angle
- Mechanically and spectrally matched to SEP8505 and SEP8705 infrared emitting diodes



INFRA-22.TIF

DESCRIPTION

The SDP8475 is an NPN silicon phototransistor which internal base- emitter shunt resistance. Transfer molding of this device in a clear T- 1 plastic package assures superior optical centerline performance compared to other molding processes. Lead lengths are staggered to provide a simple method of polarity identification.

Distinguising Feature:

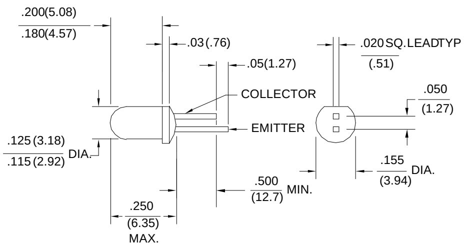
This device incorporates all of the desired features of a standard phototransistor with the advantage of low light immunity. The phototransistor switching occurs when the incident light increases above the threshold (knee point). When the light level exceeds the knee point of the device, it will function as a standard phototransistor. Chart A illustrates the light current output of the low light rejection phototransistor as compared to a standard phototransistor with similar sensitivity.

Typical Application Uses:

Ideally suited for use in applications which require ambient light rejection, or in transmissive applications where the interrupter media is semi- transparent to infrared energy. This device also provides high contrast ratio in reflective applications where unwanted background reflection is a possibility.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_100.ds4

Honeywell

SDP8475-201

Low Light Rejection Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current Slope [1] [2] SDP8475-201	I_L Slope	4.0		14.0	mA/mW/cm²	V_{CE}=5 V H_1= 0.5 mW/cm² H_2= 0.25 mW/cm²
Knee Point [3]			0.125		mW/cm²	V_{CE}=5 V
Collector Dark Current	I_{CEO}			100	nA	H=0 mW/cm², V_{CE}=15 V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=I_L/8 H=0.25mW/cm²
Reverse Current	I_R			40	mA	V_{CE}=-5.0 V
Angular Response [4]	Ø		20		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The Slope is calculated with the following equation: (I_{L1} (@ H_1) - I_{L2} (@ H_2)) / (H_1 - H_2).
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Knee Point is defined as being the source irradiance required to increase I_L to 50 µA.
4. Angular response is defined as the total included angle between the half sensitivity points.

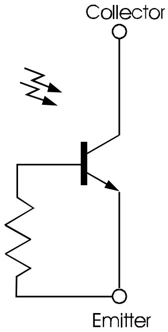
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Power Dissipation	70 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.18 mW/°C.

SCHEMATIC



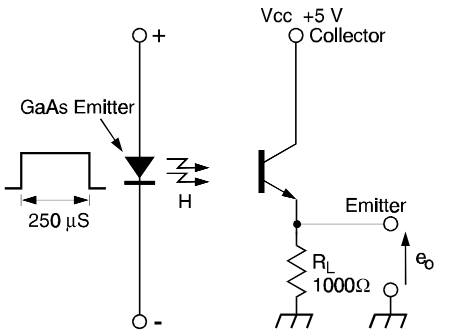
Honeywell

SDP8475-201

Low Light Rejection Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

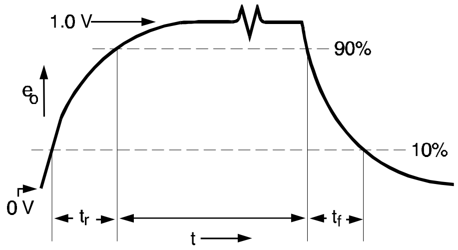


Fig. 1 Responsivity vs Angular Displacement

gra_047.ds4

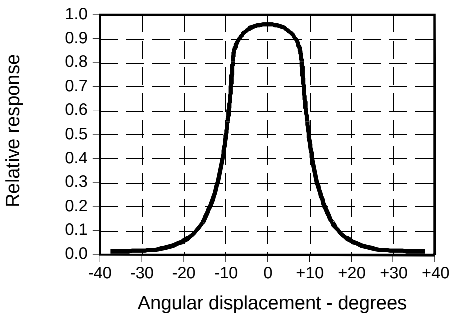


Fig. 2 Spectral Responsivity

gra_036.ds4

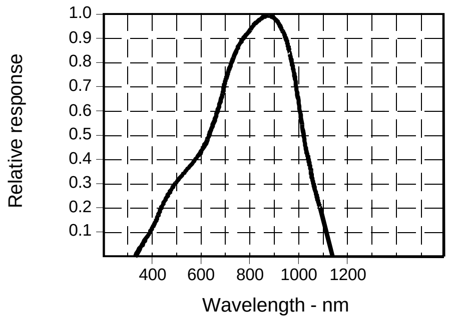


Fig. 3 Dark Current vs Temperature

gra_310.ds4

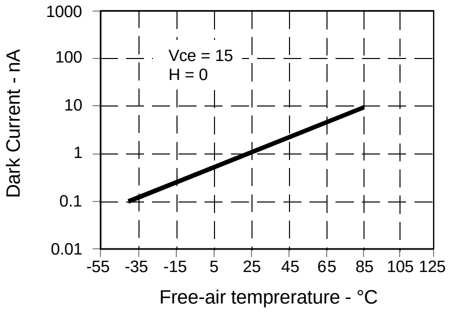
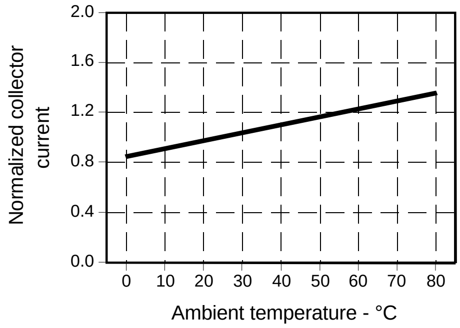


Fig. 4 Collector Current vs Ambient Temperature

gra_039.ds4



All Performance Curves Show Typical Values

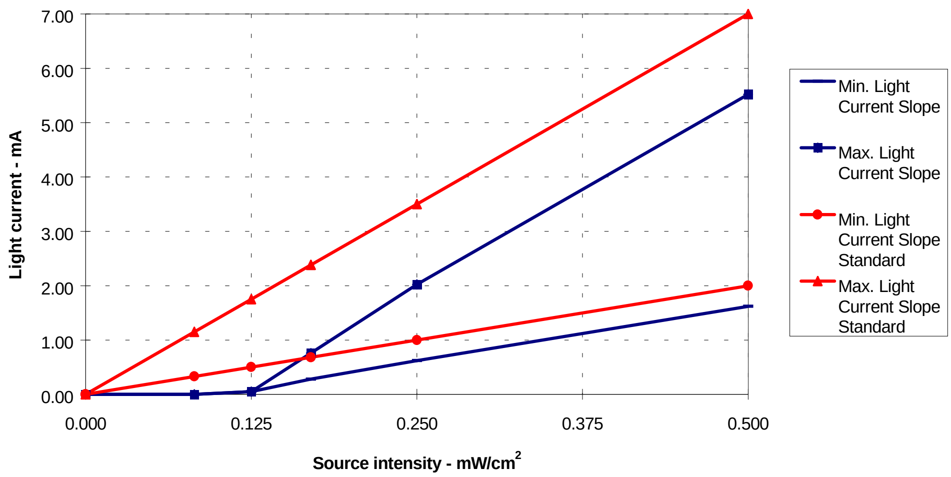
Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SDP8475-201

Low Light Rejection Phototransistor

Chart A. Low Light Rejection Phototransistor vs. Standard Phototransistor



Designing with the Low Light Rejection Phototransistor:
The Low Light Rejection detector is tested at different incident light levels to determine adherence to the specified knee point and light current slope. This method assures proper functionality vs. standard phototransistors, and guarantees required light current output.

The light current slope is the change in light current output at two given source irradiances divided by the change in the two source irradiances.

(**Formula # 1)**

I_L Slope = [I_{L1} (@ H_1) - I_{L2} (@ H_2)] / [H_1 - H_2]

Where:

- I_L slope is the light current slope in mA/mW/cm^2
- I_L is the light current output in mA
- H is the source intensity in mW/cm^2

Chart A shows the specified limits of light current slope for the low light rejection phototransistor which begins its slope at the typical knee point, 0.125mW/cm^2. To make a clear distinction between this device and a standard phototransistor, light current slopes for high and low sensitivity standard phototransistors are also shown. Note that for phototransistors of the same gain, the slopes of the two products are parallel.

The knee point, the source irradiance needed to increase I_L to 50uA, is a necessary parameter for circuit design. All variation in the knee point will be offset by the internally guardbanded light current slope limits. The appropriate formula for circuit design is the following:

(**Formula # 2)**

I_L = I_L slope$_{MIN.}$ * (H_A - H_{KP})

Where:

- I_L is the light current output in mA
- I_L slope$_{MIN.}$ is the minimum limit on the light current slope (i.e. 4.0mA/mW/cm^2)
- H_A is the source light incident on the detector for the application
- H_{KP} is the specified level of source light incident on the detector at the typical knee point (i.e. 0.125 mW/cm^2)

Example :
To design a transmissive sensor with two of Honeywell's standard components, the SEP8505-002 and the SDP8475-201, it is first necessary to determine the irradiance level in mW/cm^2 that will be incident on the detector. The application conditions are the following:

SDP8475-201

Low Light Rejection Phototransistor

Supply voltage = 5V
Distance between emitter and detector = 0.4 in.
(10.16mm)
IRED drive current = 20mA

The SEP8505-002 gives 1.0mW/cm^2 min. to 4.0mW/cm^2 max. under the above conditions. To obtain minimum light current output, use the minimum irradiance limit.

Light current output = I_L slope$_{MIN.}$ * (H_A - H_{KP})
Light current output = 4.0 mA/mW/cm^2 min. * (1.0 mW/cm^2 min. - 0.125 mW/cm^2) = 3.5mA min.

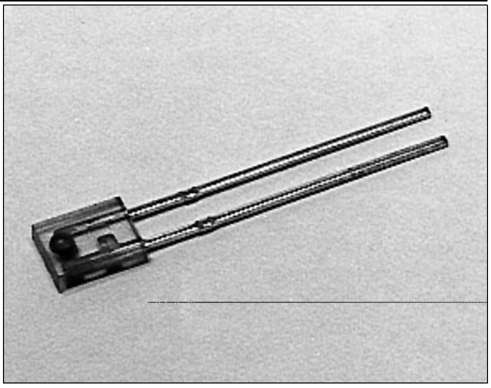
Honeywell

SDP8476-201

Low Light Rejection Phototransistor

FEATURES

- Side-looking plastic package
- Low light level immunity
- 50° (nominal) acceptance angle
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA-21.TIF

DESCRIPTION

The SDP8476 is an NPN silicon phototransistor which internal base- emitter shunt resistance. Transfer molding of this device in a clear T- 1 plastic package assures superior optical centerline performance compared to other molding processes. Lead lengths are staggered to provide a simple method of polarity identification.

Distinguising Feature:

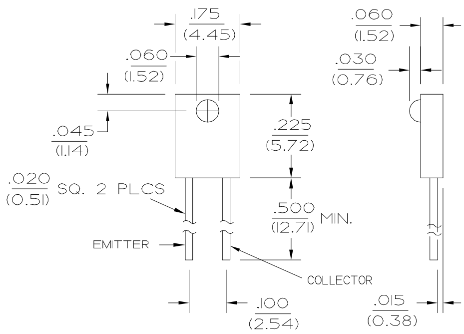
This device incorporates all of the desired features of a standard phototransistor with the advantage of low light immunity. The phototransistor switching occurs when the incident light increases above the threshold (knee point). When the light level exceeds the knee point of the device, it will function as a standard phototransistor. Chart A illustrates the light current output of the low light rejection phototransistor as compared to a standard phototransistor with similar sensitivity.

Typical Application Uses:

Ideally suited for use in applications which require ambient light rejection, or in transmissive applications where the interrupter media is semi- transparent to infrared energy. This device also provides high contrast ratio in reflective applications where unwanted background reflection is a possibility.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_017.ds4

Honeywell

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SDP8476-201

Low Light Rejection Phototransistor

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Light Current Slope [1] [2] SDP8476-201	I_L Slope	1.0		6.0	mA/mW/cm²	V_{CE}=5 V H_1= 1 mW/cm² H_2= 0.5 mW/cm²
Knee Point [3]			0.125		mW/cm²	V_{CE}=5 V
Collector Dark Current	I_{CEO}			100	nA	H=0 mW/cm², V_{CE}=15 V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30			V	I_C=100 µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$			0.4	V	I_C=I_L/8 H=1mW/cm²
Reverse Current	I_R			40	mA	V_{CE}=-5.0 V
Angular Response [4]	Ø		20		degr.	I_F=Constant
Rise And Fall Time	t_r, t_f		15		µs	V_{CC}=5 V, I_L=1 mA R_L=1000 Ω

Notes
1. The Slope is calculated with the following equation: (I_{L1} (@ H_1) - I_{L2} (@ H_2)) / (H_1 - H_2).
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Knee Point is defined as being the source irradiance required to increase I_L to 50 µA.
4. Angular response is defined as the total included angle between the half sensitivity points.

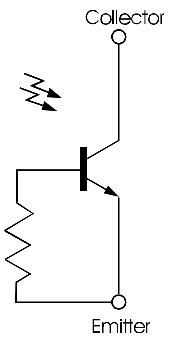
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Collector-Emitter Voltage	30 V
Power Dissipation	100 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC

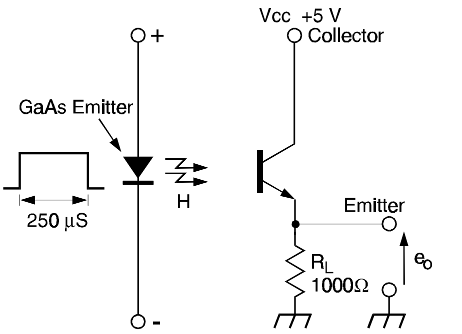


SDP8476-201

Low Light Rejection Phototransistor

SWITCHING TIME TEST CIRCUIT

cir_015.cdr



SWITCHING WAVEFORM

cir_004.cdr

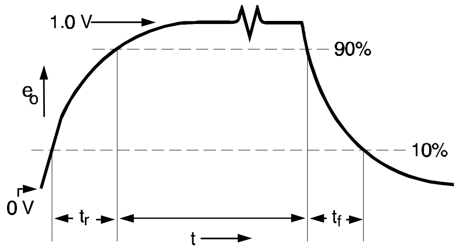


Fig. 1 Responsivity vs Angular Displacement

gra_054.ds4

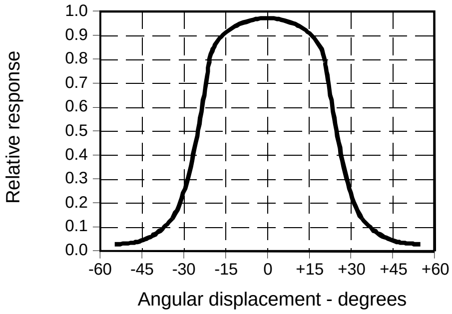


Fig. 2 Spectral Responsivity

gra_036.ds4

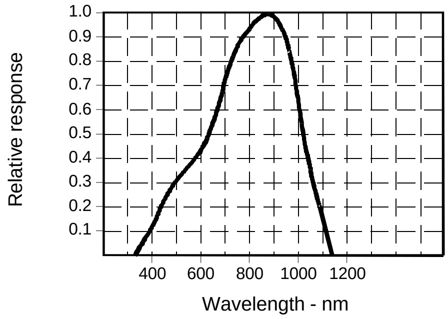


Fig. 3 Dark Current vs Temperature

gra_310.ds4

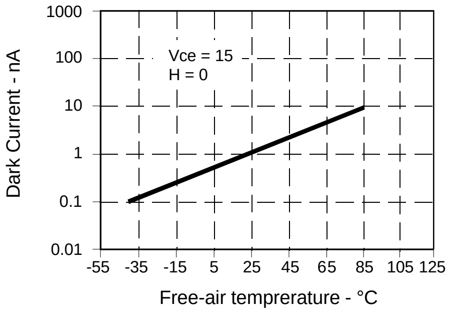
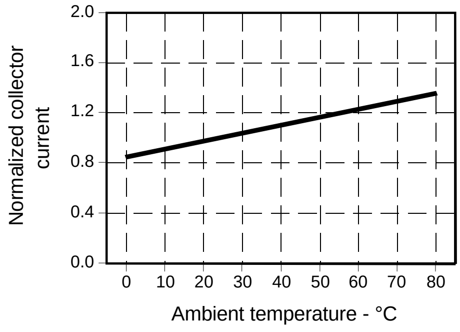


Fig. 4 Collector Current vs Ambient Temperature

gra_039.ds4



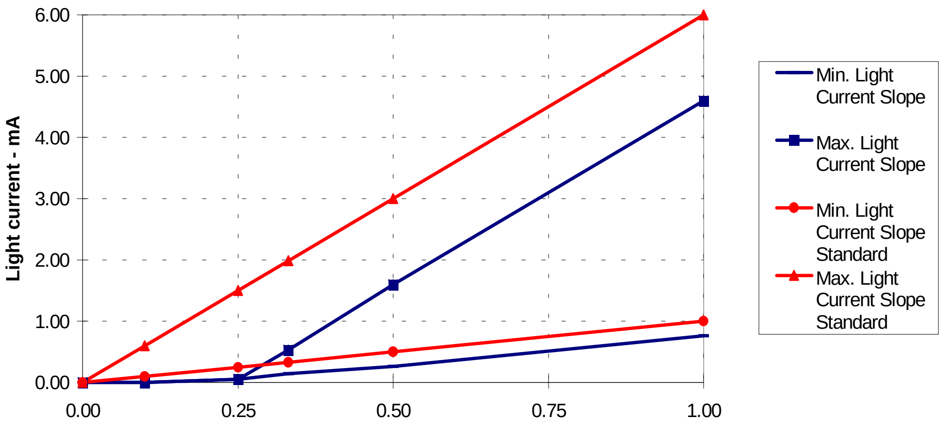
All Performance Curves Show Typical Values

Honeywell

SDP8476-201

Low Light Rejection Phototransistor

Chart A. Low Light Rejection Phototransistor vs. Standard Phototransistor



Designing with the Low Light Rejection Phototransistor:
The Low Light Rejection detector is tested at different incident light levels to determine adherence to the specified knee point and light current slope. This method assures proper functionality vs. standard phototransistors, and guarantees required light current output.

The light current slope is the change in light current output at two given source irradiances divided by the change in the two source irradiances.

(**Formula # 1)**

I_L Slope = $[I_{L1}$ (@ H_1) - I_{L2} (@ H_2)] / $[H_1$ - $H_2]$

Where:

- I_L slope is the light current slope in mA/mW/cm^2
- I_L is the light current output in mA
- H is the source intensity in mW/cm^2

Chart A shows the specified limits of light current slope for the low light rejection phototransistor which begins its slope at the typical knee point, 0.25mW/cm^2. To make a clear distinction between this device and a standard phototransistor, light current slopes for high and low sensitivity standard phototransistors are also shown. Note that for phototransistors of the same gain, the slopes of the two products are parallel.

The knee point, the source irradiance needed to increase I_L to 50uA, is a necessary parameter for circuit design. All variation in the knee point will be offset by the internally guardbanded light current slope limits.   The appropriate formula for circuit design is the following:

(**Formula # 2)**

I_L = I_L slope$_{MIN.}$ * (H_A - H_{KP})

Where:

- I_L is the light current output in mA
- I_L slope$_{MIN.}$ is the minimum limit on the light current slope (i.e. 1.0mA/mW/cm^2)
- H_A is the source light incident on the detector for the application
- H_{KP} is the specified level of source light incident on the detector at the typical knee point (i.e. 0.125 mW/cm^2)

To design a transmissive sensor with two of Honeywell's standard components, the SEP8506-003 and the SDP8476-201, it is first necessary to determine the irradiance level in mW/cm^2 that will be incident on the detector. The application conditions are the following:

Honeywell

SDP8476-201

Low Light Rejection Phototransistor

Supply voltage = 5V
Distance between emitter and detector = 0.535 in. (13.6mm)
IRED drive current = 20mA

The SEP8506-003 gives 0.45mW/cm^2 min. to 0.90mW/cm^2 max. under the above conditions. To obtain minimum light current output, use the minimum irradiance limit.

Light current output = I_L slope$_{MIN.}$ * (H_A - H_{KP})
Light current output = 1.0 mA/mW/cm^2 min. * (0.45mW/cm^2 min. - 0.25 mW/cm^2) = 0.2mA min.

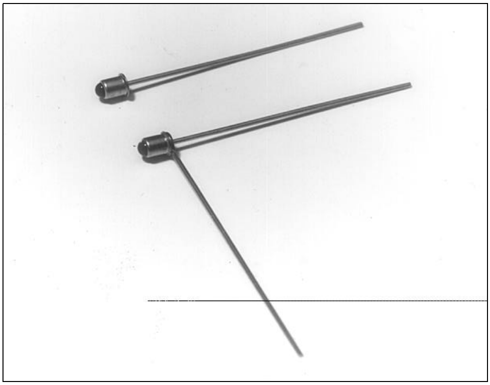
Honeywell

SE1450

GaAs Infrared Emitting Diode

FEATURES

- Compact, metal can coaxial package
- 24° (nominal) beam angle
- 935 nm wavelength
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SD1420 photodiode, SD1440 phototransistor and SD1410 photodarlington



INFRA-63.TIF

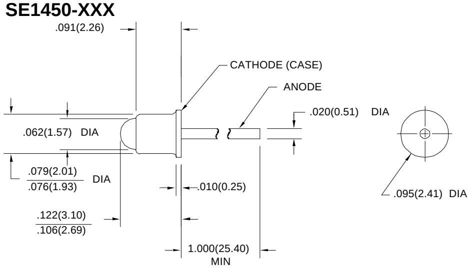
DESCRIPTION

The SE1450 is a gallium arsenide infrared emitting diode mounted in a glass lensed, metal can coaxial package. The package may have a tab or second lead welded to the can as an optional feature (SE1450- XXXL). Both leads are flexible and may be formed as required to fit various mounting configurations.

OUTLINE DIMENSIONS in inches (mm)

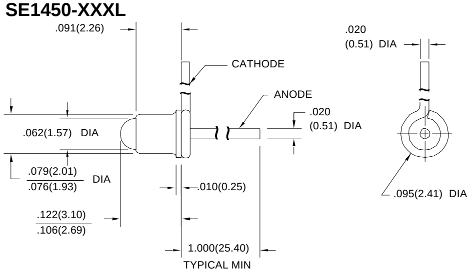
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SE1450-XXX



DIM_001a.ds4

SE1450-XXXL



DIM_001b.ds4

Honeywell

SE1450

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Total Power Output	P_O				mW	I_F=50 mA
SE1450-001, SE1450-001 L		0.20				
SE1450-002, SE1450-002 L		0.35				
SE1450-003, SE1450-003 L		0.70				
SE1450-004, SE1450-004 L		1.00				
Forward Voltage	V_F			1.6	V	I_F=50 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 μA
Peak Output Wavelength	λ_p		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.3		nm/°C	
Beam Angle (1)	Ø		24		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		μs	

Notes
1. Beam angle is defined as the total included angle between the half intensity points.

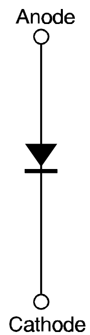
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	75 mW (1)
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.71 mW/°C.

SCHEMATIC



SE1450

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

gra_001.ds4

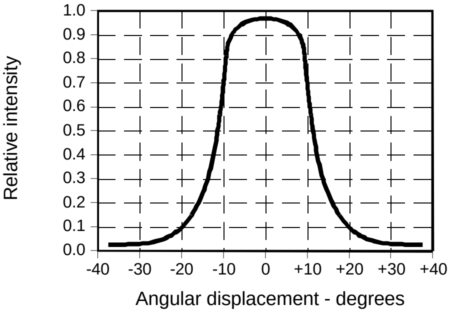


Fig. 2 Radiant Intensity vs Forward Current

gra_002.ds4

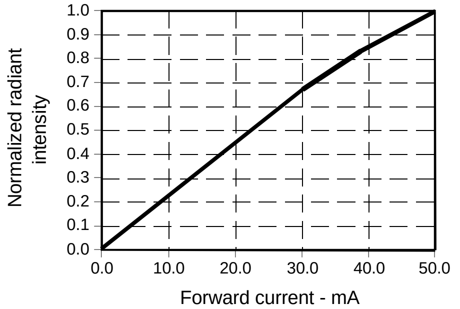


Fig. 3 Forward Voltage vs Forward Current

gra_003.ds4

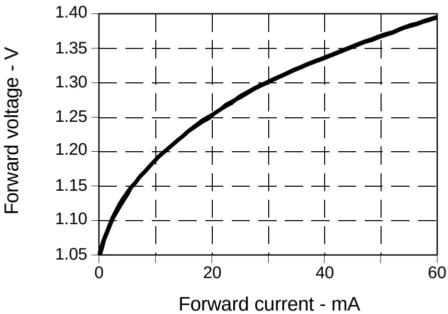


Fig. 4 Forward Voltage vs Temperature

gra_200.ds4

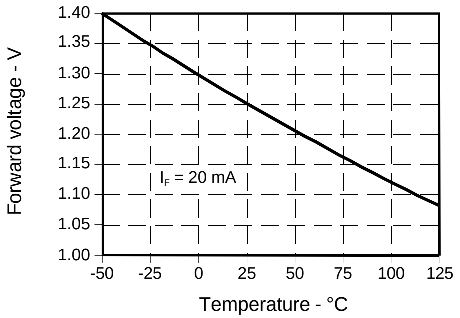


Fig. 5 Spectral Bandwidth

gra_005.ds4

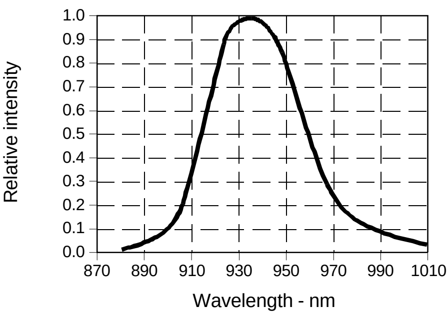
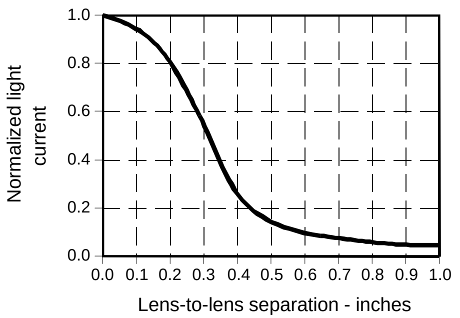


Fig. 6 Coupling Characteristics with SD1440

gra_006.ds4



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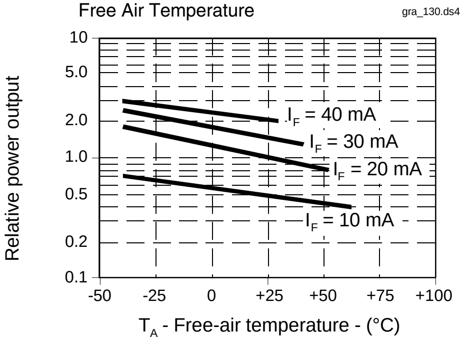
SE1450

GaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs
Free Air Temperature



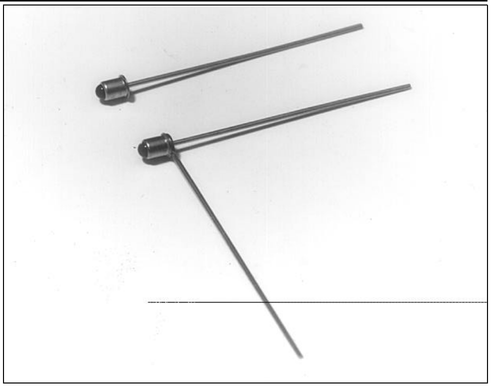
All Performance Curves Show Typical Values

SE1470

AlGaAs Infrared Emitting Diode

FEATURES

- Compact metal can coaxial package
- 24° (nominal) beam angle
- 880 nm wavelength
- Higher output power than GaAs at equivalent drive currents
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SD1420 photodiode, SD1440 phototransistor and SD1410 photodarlington



INFRA-63.TIF

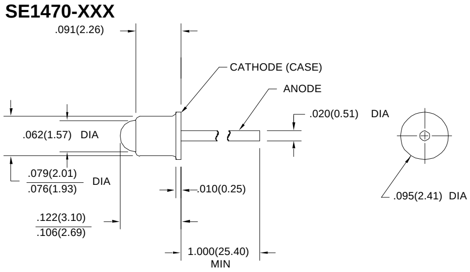
DESCRIPTION

The SE1470 is a high intensity aluminum gallium arsenide infrared emitting diode mounted in a glass lensed metal can coaxial package. The package may have a tab or second lead welded to the can as an optional feature (SE1470-XXXL). Both leads are flexible and may be formed as required to fit various mounting configurations. These devices typically exhibit 70% greater power intensity than gallium arsenide devices at the same forward current.

OUTLINE DIMENSIONS in inches (mm)

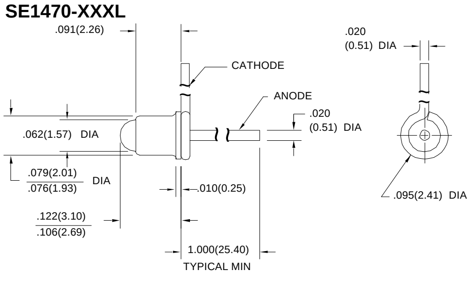
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SE1470-XXX



DIM_001a.ds4

SE1470-XXXL



DIM_001b.ds4

Honeywell

SE1470

AlGaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm²	I_F=20 mA
SE1470-001, SE1470-001 L		0.35				
SE1470-002, SE1470-002 L		0.65				
SE1470-003, SE1470-003 L		1.10		4.5		
SE1470-004, SE1470-004 L		1.65				
Forward Voltage	V_F			1.8	V	I_F=50 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_p		880		nm	
Spectral Bandwidth	$\Delta\lambda$		80		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.2		nm/°C	
Beam Angle [2]	Ø		24		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Measured in mW/cm² into a 0.104 (2.64) diameter aperture placed 0.535(13.6) from the lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

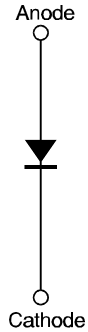
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	75 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.71 mW/°C.

SCHEMATIC



SE1470

AlGaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

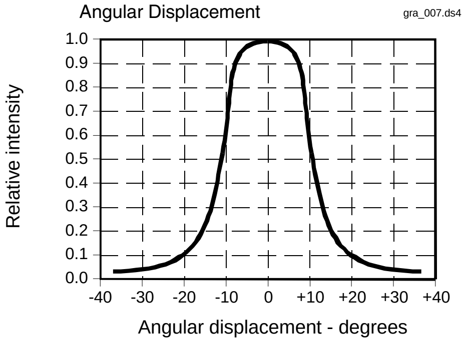


Fig. 2 Radiant Intensity vs Forward Current

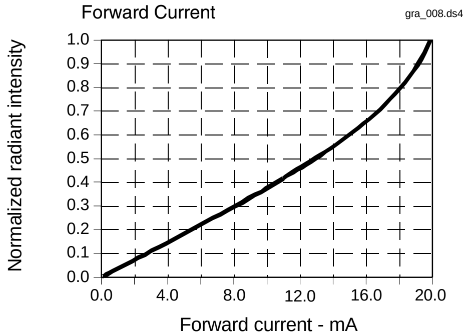


Fig. 3 Forward Voltage vs Forward Current

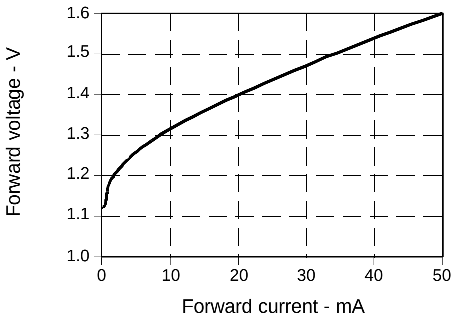


Fig. 4 Forward Voltage vs Temperature

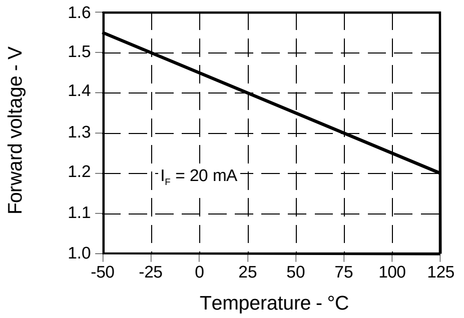


Fig. 5 Spectral Bandwidth

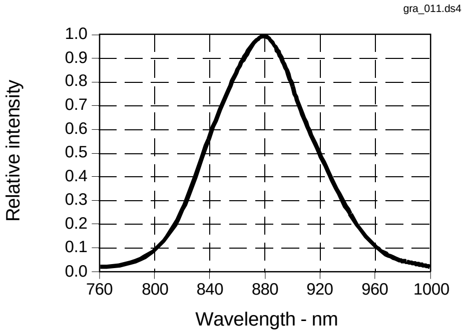
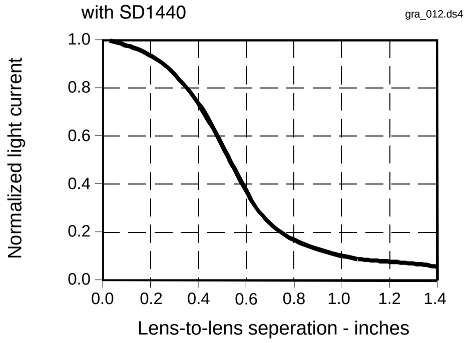


Fig. 6 Coupling Characteristics with SD1440



Honeywell

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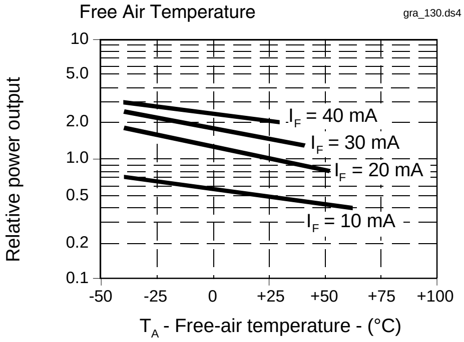
SE1470

AlGaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs Free Air Temperature



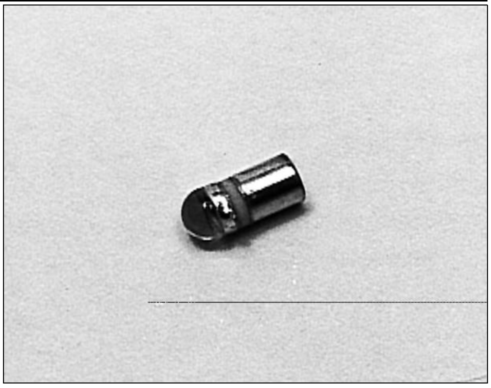
All Performance Curves Show Typical Values

SE2460

GaAs Infrared Emitting Diode

FEATURES

- Miniature, hermetically sealed, pill style, metal can package
- 18° (nominal) beam angle
- Wide operating temperature range (- 55°C to +125°C)
- Ideal for direct mounting to printed circuit boards
- 935 nm wavelength
- Mechanically and spectrally matched to SD2420 photodiode, SD2440 phototransistor and SD2410 photodarlington



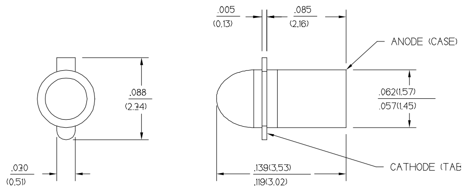
INFRA--1.TIF

DESCRIPTION

The SE2460 is a gallium arsenide infrared emitting diode mounted in a hermetically sealed, glass lensed, metal can package. This package directly mounts in double sided PC boards.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_002.ds4

SE2460

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Total Power Output	P_O				mW	I_F=50 mA
SE2460-001		0.27				
SE2460-002		0.40				
SE2460-003		1.00				
Forward Voltage	V_F			1.6	V	I_F=50 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 μA
Peak Output Wavelength	λ_P		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_P/\Delta_T$		0.3		nm/°C	
Beam Angle [1]	∅		18		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		μs	

Notes
1. Beam angle is defined as the total included angle between the half intensity points.

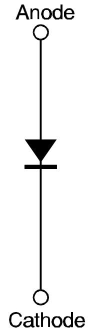
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	75 mA
Power Dissipation	125 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.19 mW/°C,when soldered into a double sided printed circuit board.

SCHEMATIC



SE2460

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

gra_111.ds4

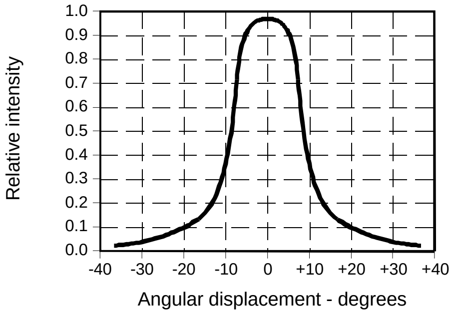


Fig. 2 Radiant Intensity vs Forward Current

gra_014.ds4

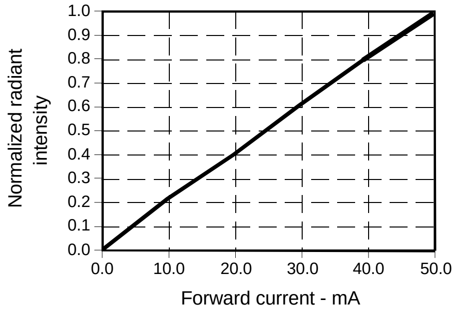


Fig. 3 Forward Voltage vs Forward Current

gra_203.ds4

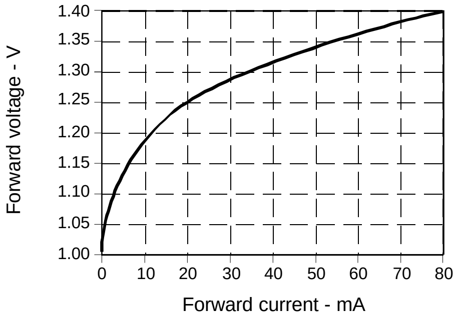


Fig. 4 Forward Voltage vs Temperature

gra_200.ds4

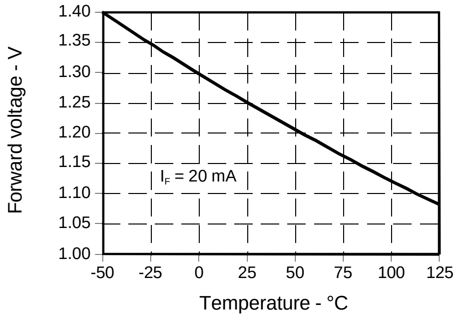


Fig. 5 Spectral Bandwidth

gra_005.ds4

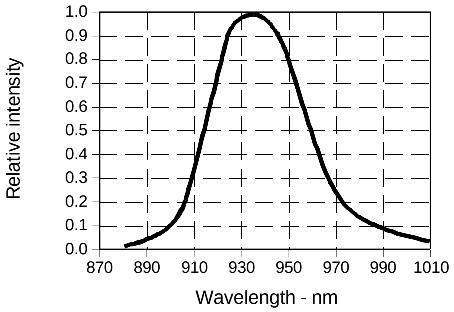
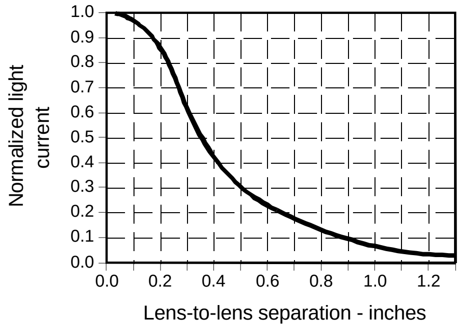


Fig. 6 Coupling Characteristics with SD2440

gra_015.ds4



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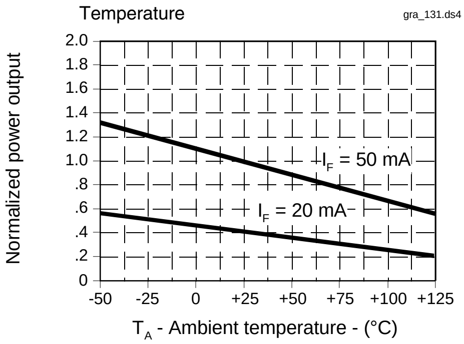
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

SE2460

GaAs Infrared Emitting Diode

Fig. 7 Normalized Power Output vs Temperature



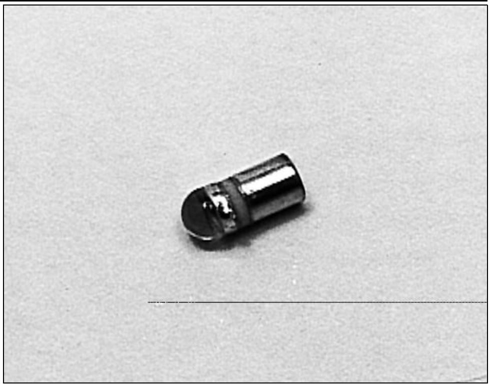
All Performance Curves Show Typical Values

SE2470

AlGaAs Infrared Emitting Diode

FEATURES

- Miniature, hermetically sealed, pill style, metal can package
- 18° (nominal) beam angle
- Wide operating temperature range (- 55°C to +125°C)
- Higher power output than GaAs at equivalent drive currents
- Ideal for direct mounting to printed circuit boards
- 880 nm wavelength
- Mechanically and spectrally matched to SD2420 photodiode, SD2440 phototransistor and SD2410 photodarlington



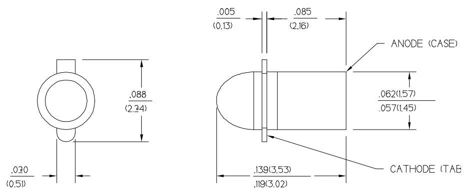
INFRA--1.TIF

DESCRIPTION

The SE2470 is a high intensity aluminum gallium arsenide infrared emitting diode mounted in a hermetically sealed, glass lensed, metal can package. This package directly mounts in double sided PC boards. These devices typically exhibit 70% greater power intensity than gallium arsenide devices at the same forward current.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_002.ds4

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SE2470

AlGaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Radiant Intensity [1]	I_E				mW/sr	I_F=50 mA
SE2470-001		1.7				
SE2470-002		6.0				
Forward Voltage	V_F			1.8	V	I_F=50 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_p		880		nm	
Spectral Bandwidth	$\Delta\lambda$		80		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.2		nm/°C	
Beam Angle [2]	Ø		18		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Measured in mW/steradian (sr) into 0.01 steradians.
2. Beam angle is defined as the total included angle between the half intensity points.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	75 mA
Power Dissipation	125 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.19 mW/°C,when soldered into a double sided printed circuit board.

SCHEMATIC

Anode

Cathode

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

Honeywell

SE2470

AlGaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

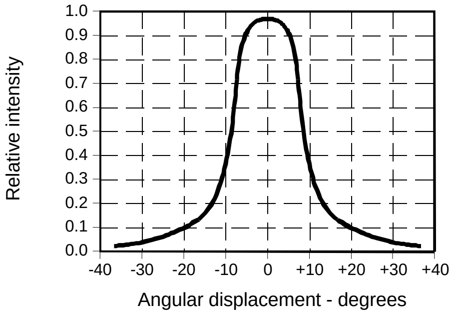


Fig. 2 Radiant Intensity vs Forward Current

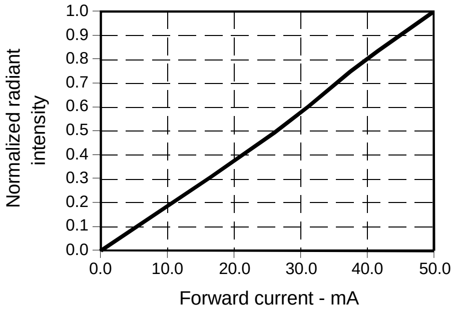


Fig. 3 Forward Voltage vs Forward Current

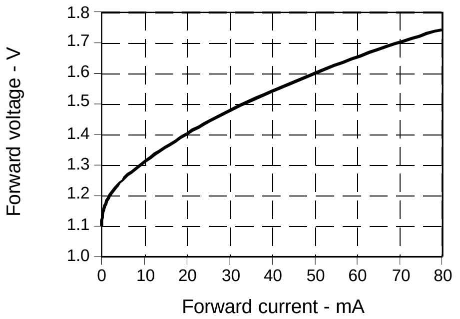


Fig. 4 Forward Voltage vs Temperature

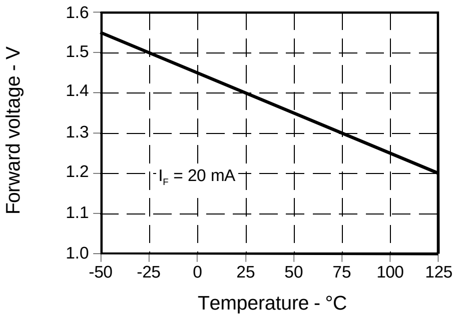


Fig. 5 Spectral Bandwidth

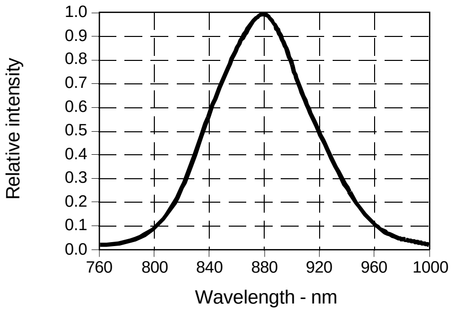
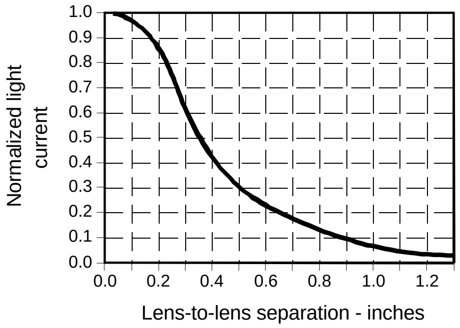


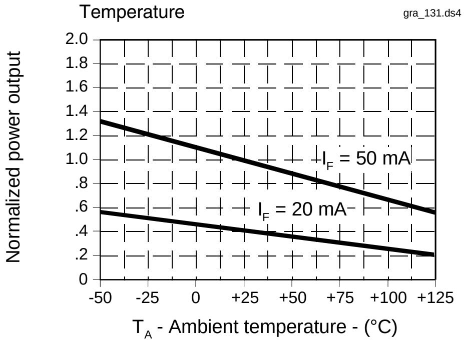
Fig. 6 Coupling Characteristics with SD2440



Honeywell

SE2470
AlGaAs Infrared Emitting Diode

Fig. 7 Normalized Power Output vs Temperature



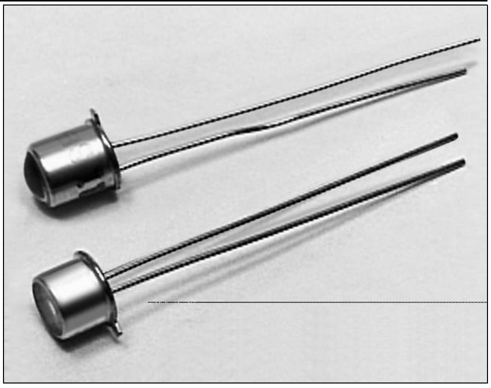
All Performance Curves Show Typical Values

SE3450/5450

GaAs Infrared Emitting Diode

FEATURES

- TO-46 metal can package
- Choice of flat window or lensed package
- 90° or 20° (nominal) beam angle option
- 935 nm wavelength
- Wide operating temperature range (- 55°C to +125°C)
- Mechanically and spectrally matched to SD3421/5421 photodiode, SD3443/5443/5491phototransistor, SD3410/5410 photodarlington and SD5600 series Schmitt trigger



INFRA-83.TIF

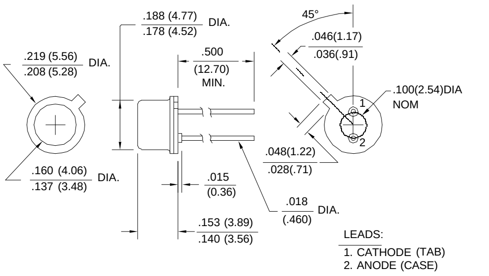
DESCRIPTION

The SE3450/5450 series consists of a gallium arsenide infrared emitting diode mounted in a TO-46 metal can package. The SE3450 series has flat window cans providing a wide beam angle, while the SE5450 series has glass lensed cans providing a narrow beam angle. The TO-46 packages offer high power dissipation capability and are ideally suited for operation in hostile environment.

OUTLINE DIMENSIONS in inches (mm)

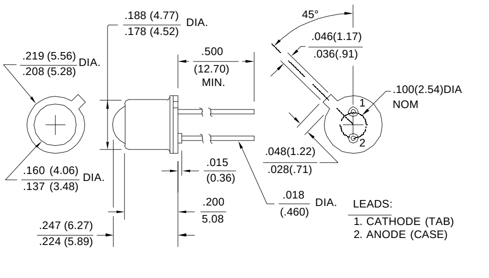
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SE3450



DIM_003a.ds4

SE5450



DIM_003b.ds4

SE3450/5450

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm²	I_F=100 mA
SE3450-011, SE5450-011		0.30				
SE3450-012, SE5450-012		0.50				
SE3450-013, SE5450-013		1.00				
SE3450-014, SE5450-014		1.50				
Forward Voltage	V_F			1.7	V	I_F=100 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_p		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.3		nm/°C	
Beam Angle [2]	Ø				degr.	I_F=Constant
SE3450			90			
SE5450			20			
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. SE3450 measured into a 0.250 (6.35) diameter aperture placed 0.33(8.4) from window surface. SE5450 measured into a 0.250 (6.35) diameter aperture placed 1.20 (30.5) from lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

ABSOLUTE MAXIMUM RATINGS

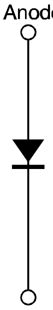
(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	100 mA
Power Dissipation	150 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

SCHEMATIC

Anode



Cathode

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

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SE3450/5450

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement (SE3450)

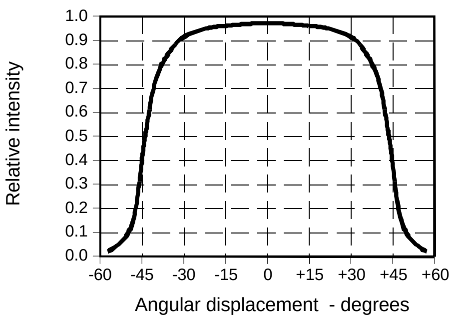


Fig. 2 Radiant Intensity vs Angular Displacement (SE5450)

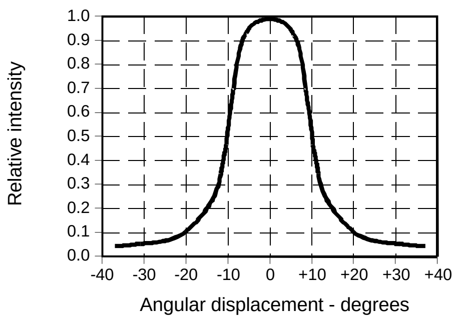


Fig. 3 Radiant Intensity vs Forward Current

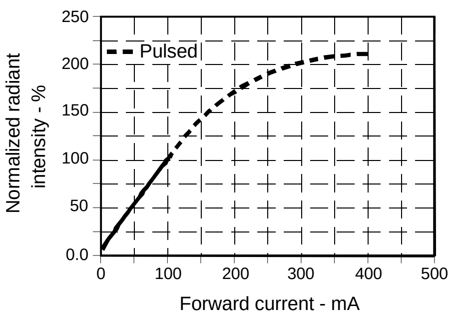


Fig. 4 Forward Voltage vs Forward Current

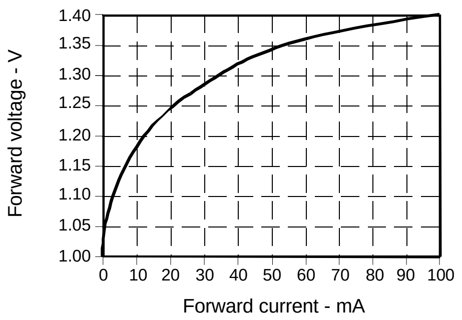


Fig. 5 Forward Voltage vs Temperature

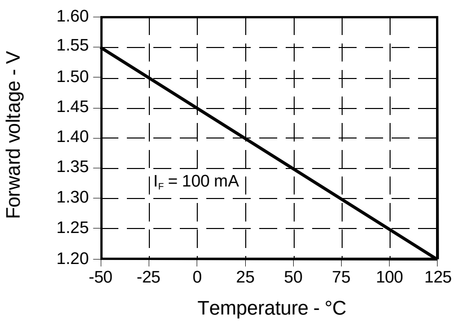
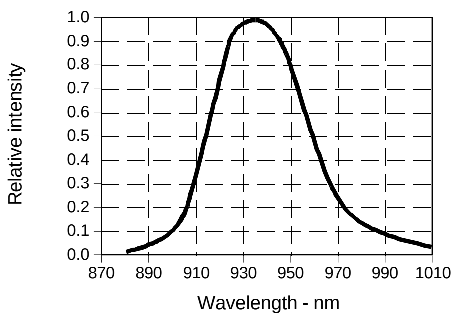


Fig. 6 Spectral Bandwidth



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SE3450/5450

GaAs Infrared Emitting Diode

Fig. 7 Coupling Characteristics SE3450 with SD3443

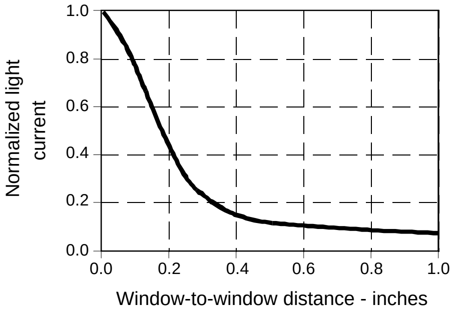


Fig. 8 Coupling Characteristics SE5450 with SD5443

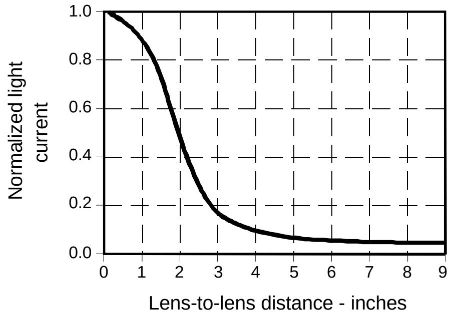
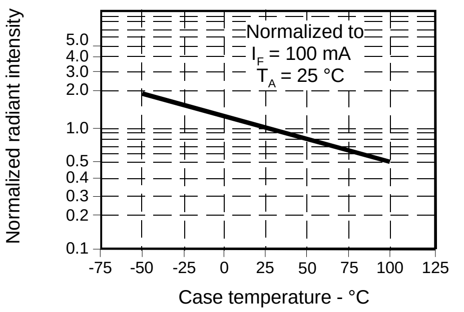


Fig. 9 Radiant Intensity vs Case Temperature



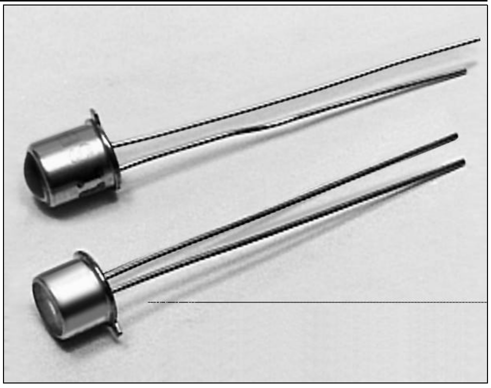
All Performance Curves Show Typical Values

SE3455/5455

GaAs Infrared Emitting Diode

FEATURES

- TO-46 metal can package
- Choice of flat window or lensed package
- 90° or 20° (nominal) beam angle option
- 935 nm wavelength
- Wide operating temperature range (- 55°C to +125°C)
- Ideal for high pulsed current applications
- Mechanically and spectrally matched to SD3421/5421 photodiode, SD3443/5443/5491phototransistor, SD3410/5410 photodarlington and SD5600 series Schmitt trigger



INFRA-83.TIF

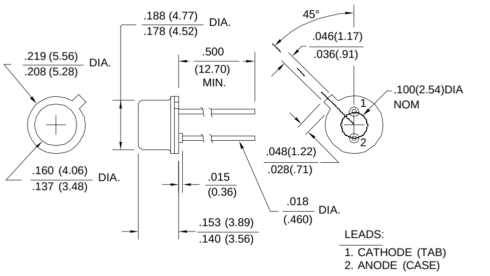
DESCRIPTION

The SE3455/5455 series consists of a gallium arsenide infrared emitting diode mounted in a TO-46 metal can package. The SE3455 series has flat window cans providing a wide beam angle, while the SE5455 series has glass lensed cans providing a narrow beam angle. These devices are constructed with dual bond wires suitable for pulsed current applications. The TO-46 packages offer high power dissipation capability and are ideally suited for operation in hostile environments.

OUTLINE DIMENSIONS in inches (mm)

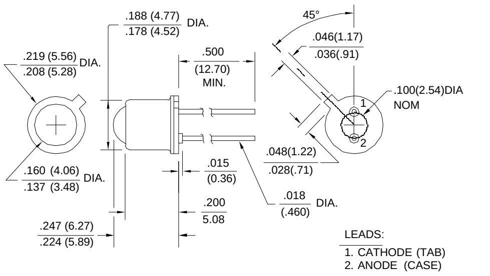
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SE3455



DIM_005a.ds4

SE5455



DIM_005b.ds4

Honeywell

SE3455/5455

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Total Power Output	P_O				mW	I_F=100 mA
SE3455-001, SE5455-001		2.0				
SE3455-002, SE5455-002		3.5				
SE3455-003, SE5455-003		4.8				
SE3455-004, SE5455-004		5.4				
Forward Voltage	V_F			1.7	V	I_F=100 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_p		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.3		nm/°C	
Beam Angle (1)	Ø				degr.	I_F=Constant
SE3455			90			
SE5455			20			
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Beam angle is defined as the total included angle between the half intensity points.

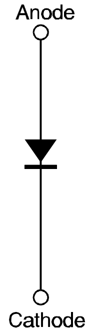
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	100 mA
Peak Forward Current	3 A
(1µs pulse width, 300 pps)	
Power Dissipation	150 mW (1)
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

SCHEMATIC



SE3455/5455

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement (SE3455) gra_017.ds4

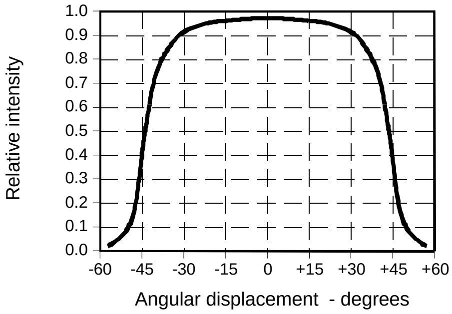


Fig. 2 Radiant Intensity vs Angular Displacement (SE5455) gra_023.ds4

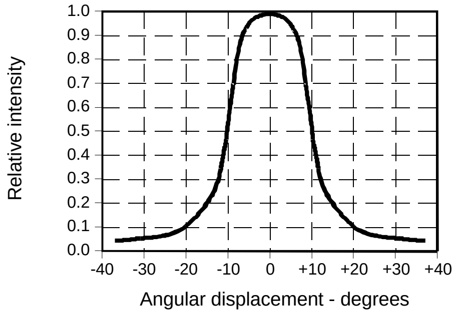


Fig. 3 Radiant Intensity vs Forward Current gra_018.ds4

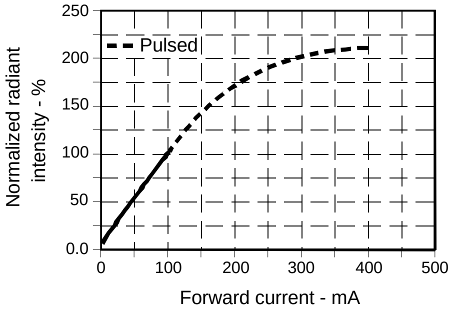


Fig. 4 Forward Voltage vs Forward Current gra_019.ds4

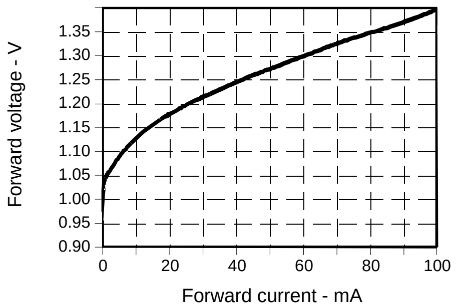


Fig. 5 Forward Voltage vs Temperature gra_020.ds4

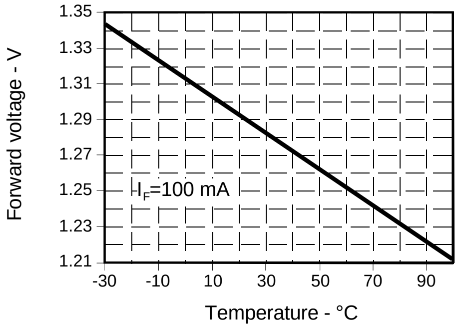
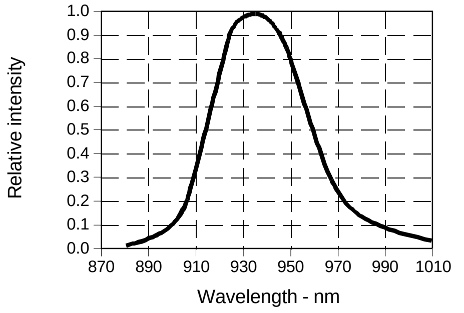


Fig. 6 Spectral Bandwidth gra_005.ds4



Honeywell

SE3455/5455

GaAs Infrared Emitting Diode

Fig. 7 Coupling Characteristics
SE3455 with SD3443

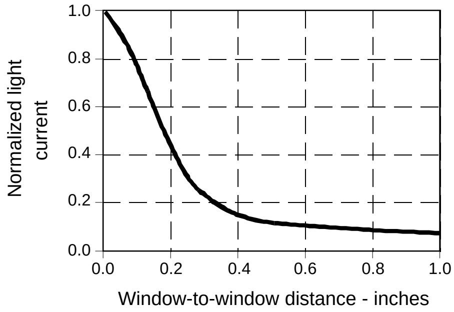


Fig. 8 Coupling Characteristics
SE5455 with SD5443

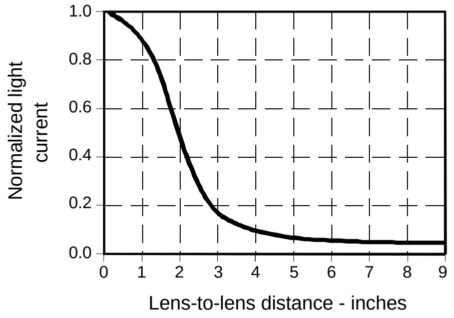
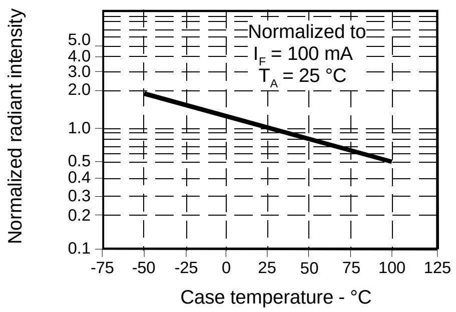


Fig. 9 Radiant Intensity vs
Case Temperature



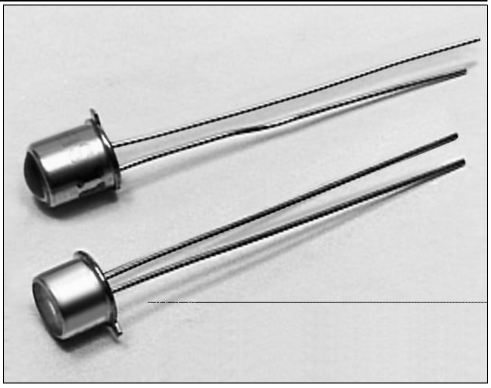
All Performance Curves Show Typical Values

SE3470/5470

AlGaAs Infrared Emitting Diode

FEATURES

- TO-46 metal can package
- Choice of flat window or lensed package
- 90° or 20° (nominal) beam angle option
- 880 nm wavelength
- Higher output power than GaAs at equivalent drive currents
- Wide operating temperature range (- 55°C to +125°C)
- Ideal for high pulsed current applications
- Mechanically and spectrally matched to SD3421/5421 photodiode, SD3443/5443/5491phototransistor, SD3410/5410 photodarlington and SD5600 series Schmitt trigger



INFRA-83.TIF

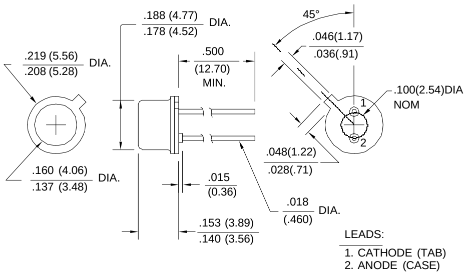
DESCRIPTION

The SE3470/5470 series consists of aluminum gallium arsenide infrared emitting diode mounted in a TO-46 metal can package. The SE3470 series has flat window cans providing a wide beam angle, while the SE5470 series has glass lensed cans providing a narrow beam angle. These devices typically exhibit 70% greater power output than gallium arsenide devices at the same forward current. The TO-46 packages offer high power dissipation capability and are ideally suited for operation in hostile environments.

OUTLINE DIMENSIONS in inches (mm)

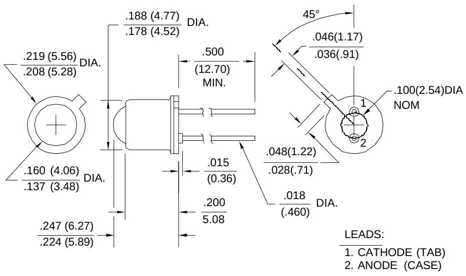
Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)

SE3470



DIM_005a.ds4

SE5470



DIM_005b.ds4

SE3470/5470

AlGaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Total Power Output [1]	P_O				mW	I_F=100 mA
SE3470-001		7.0				
SE3470-002		9.0				
SE3470-003		10.5				
SE5470-001		7.0				
Irradiance [2]	H				mW/cm²	I_F=100 mA
SE5470-002		1.5				
SE5470-003		2.6		5.9		
SE5470-004		3.5				
Forward Voltage	V_F			1.9	V	I_F=100 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_p		880		nm	
Spectral Bandwidth	$\Delta\lambda$		80		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.2		nm/°C	
Beam Angle [3]	Ø				degr.	I_F=Constant
SE3470			90			
SE5470			20			
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Total power emitted from the package in mW.
2. Measured into a 0.25 (6.35) aperture placed at 1.20(30.5) from lens tip.
3. Beam angle is defined as the total included angle between the half intensity points.

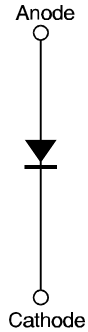
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	100 mA
Peak Forward Current (1µs pulse width, 300 pps)	3 A
Power Dissipation	150 mW [1]
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Soldering Temperature (10 sec)	260°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 1.43 mW/°C.

SCHEMATIC



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SE3470/5470

AlGaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement (SE3470) gra_017.ds4

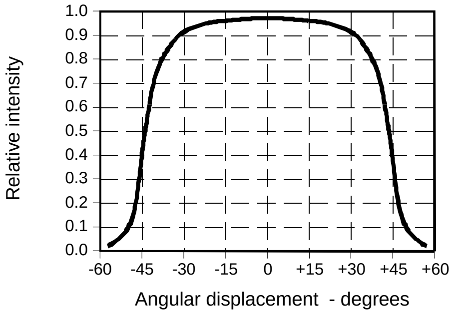


Fig. 2 Radiant Intensity vs Angular Displacement (SE5470) gra_023.ds4

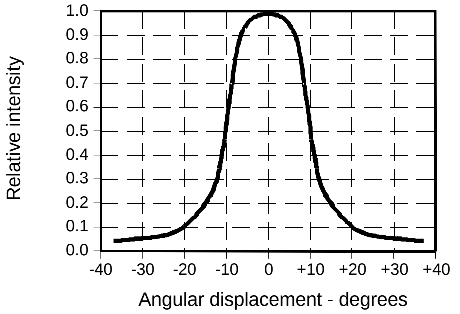


Fig. 3 Radiant Intensity vs Forward Current gra_018.ds4

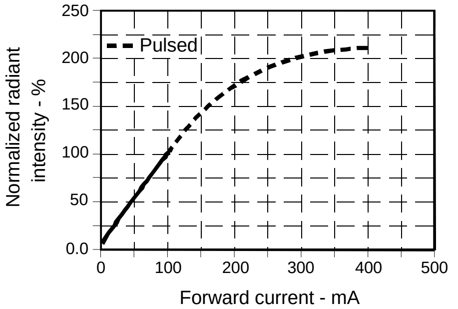


Fig. 4 Forward Voltage vs Forward Current gra_026.ds4

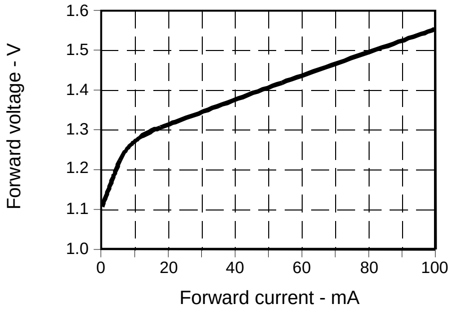


Fig. 5 Forward Voltage vs Temperature gra_025.ds4

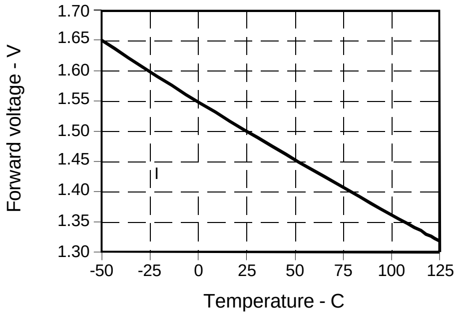
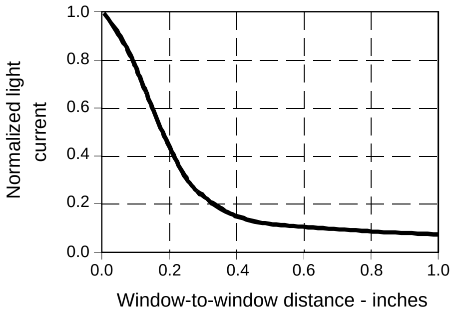


Fig. 6 Coupling Characteristics SE3470 with SD3443 gra_021.ds4



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SE3470/5470

AlGaAs Infrared Emitting Diode

Fig. 7 Spectral Bandwidth

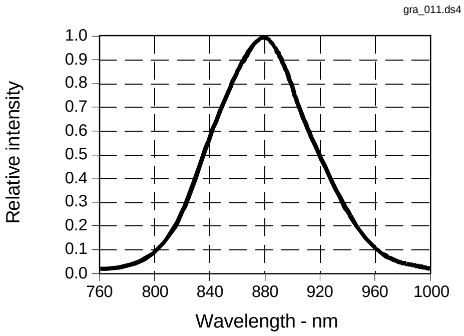


Fig. 8 Radiant Intensity vs Case Temperature

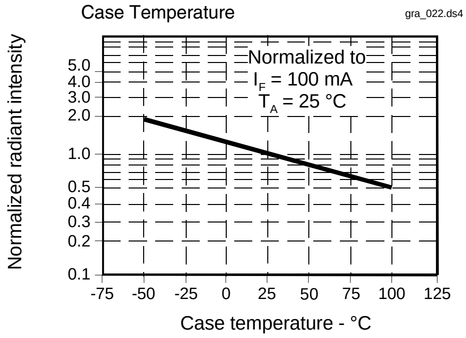
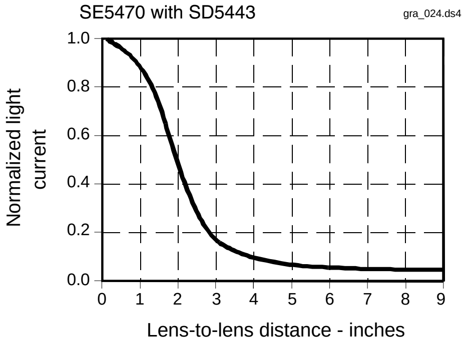


Fig. 9 Coupling Characteristics SE5470 with SD5443



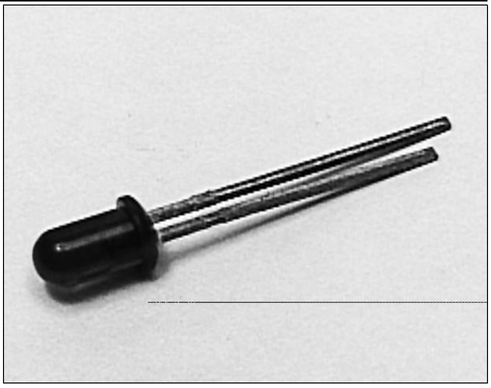
All Performance Curves Show Typical Values

SEP8505

GaAs Infrared Emitting Diode

FEATURES

- T-1 package
- 15° (nominal) beam angle
- 935 nm wavelength
- Consistent on-axis optical properties
- Mechanically and spectrally matched to SDP8405 phototransistor and SDP8105 photodarlington



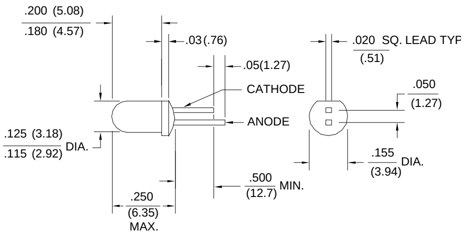
INFRA-55.TIF

DESCRIPTION

The SEP8505 is a gallium arsenide infrared emitting diode transfer molded in a T-1 red plastic package. Transfer molding of this device assures superior optical centerline performance compared to other molding processes. Lead lengths are staggered to provide a simple method of polarity identification.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_101.ds4

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SEP8505

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm^2	I_F=20 mA
SEP8505-001		0.5				
SEP8505-002		1.0		4.0		
SEP8505-003		2.0		4.0		
Forward Voltage	V_F			1.5	V	I_F=20 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_P		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_P/\Delta_T$		0.3		nm/°C	
Beam Angle [2]	Ø		15		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Measured in mW/cm^2 into a 0.081(2.05) diameter aperture placed 0.40(10.16) from the lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

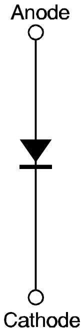
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	70 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.18 mW/°C.

SCHEMATIC



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SEP8505

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

gra_027.ds4

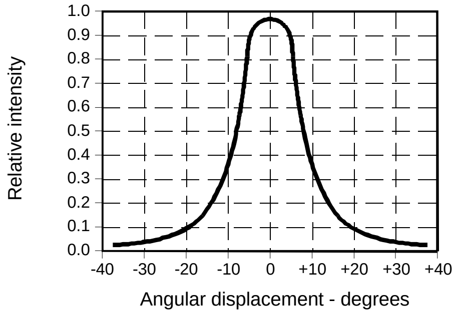


Fig. 2 Radiant Intensity vs Forward Current

gra_028.ds4

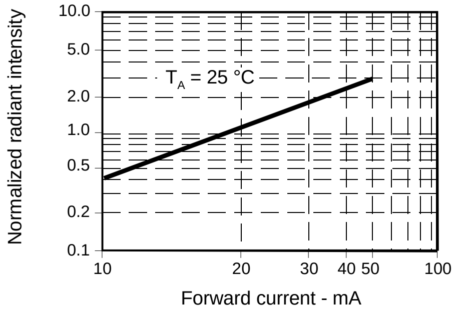


Fig. 3 Forward Voltage vs Forward Current

gra_003.ds4

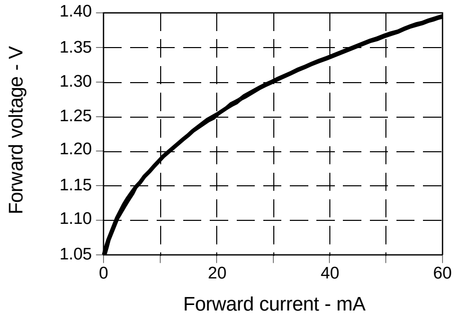


Fig. 4 Forward Voltage vs Temperature

gra_207.ds4

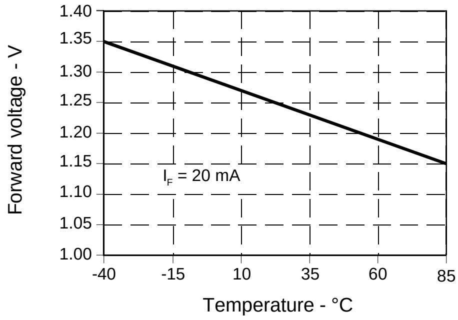


Fig. 5 Spectral Bandwidth

gra_005.ds4

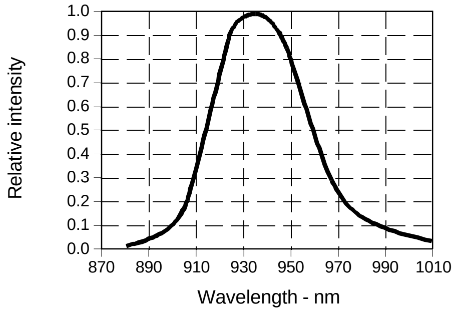
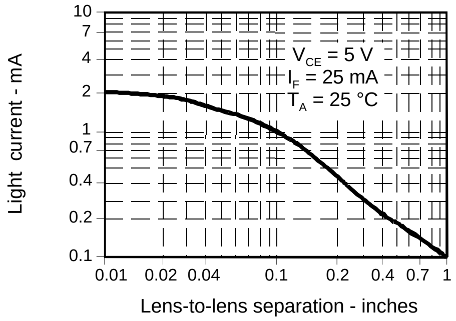


Fig. 6 Coupling Characteristics with SDP8405

gra_029.ds4



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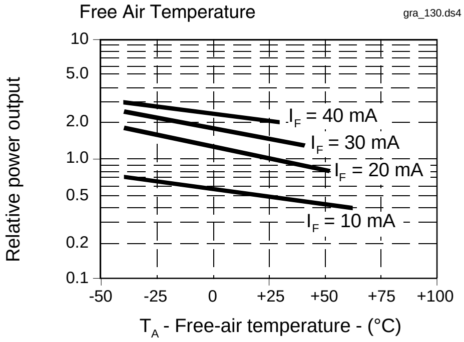
SEP8505
GaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs Free Air Temperature



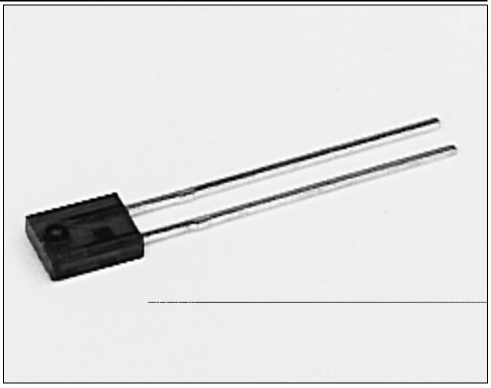
All Performance Curves Show Typical Values

SEP8506

GaAs Infrared Emitting Diode

FEATURES

- Side-emitting plastic package
- 50° (nominal) beam angle
- 935 nm wavelength
- Mechanically and spectrally matched to SDP8406 phototransistor, SDP8106 photodarlington and SDP8000/8600 series Schmitt trigger



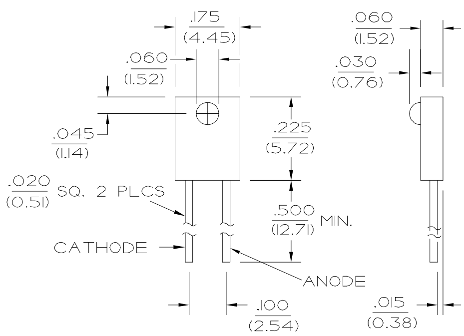
INFRA-20.TIF

DESCRIPTION

The SEP8506 is a gallium arsenide infrared emitting diode molded in a side-emitting red plastic package. The chip is positioned to emit radiation through a plastic lens from the side of the package.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_071.ds4

Honeywell

SEP8506

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm^2	I_F=20 mA
SEP8506-001		0.05		0.36		
SEP8506-002		0.33		0.52		
SEP8506-003		0.45		0.90		
Forward Voltage	V_F			1.5	V	I_F=20 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 μA
Peak Output Wavelength	λ_P		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_P/\Delta_T$		0.3		nm/°C	
Beam Angle [2]	Ø		50		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		μs	

Notes
1. Measured in mW/cm^2 into a 0.104 (2.64) diameter aperture placed 0.535 (13.6) from the lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

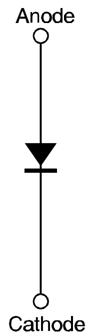
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	100 mW [1]
Storage Temperature Range	-40°C to 85°C
Operating Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC



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SEP8506

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

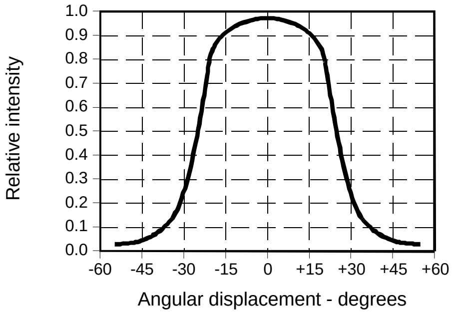


Fig. 2 Radiant Intensity vs Forward Current

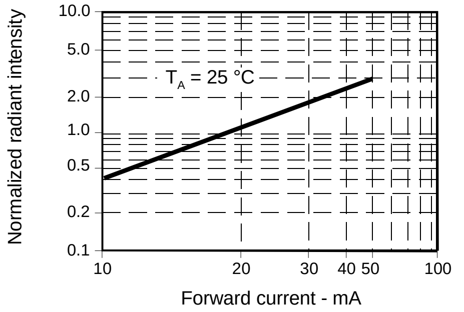


Fig. 3 Forward Voltage vs Forward Current

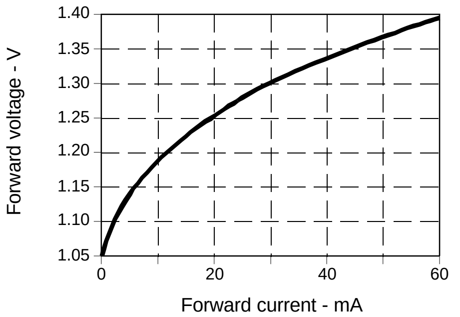


Fig. 4 Forward Voltage vs Temperature

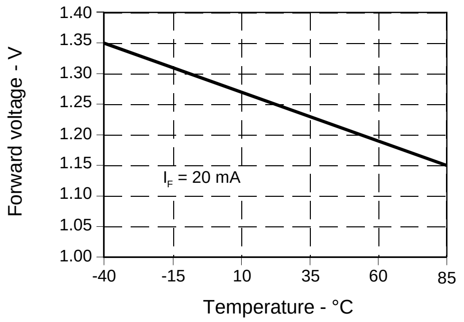


Fig. 5 Spectral Bandwidth

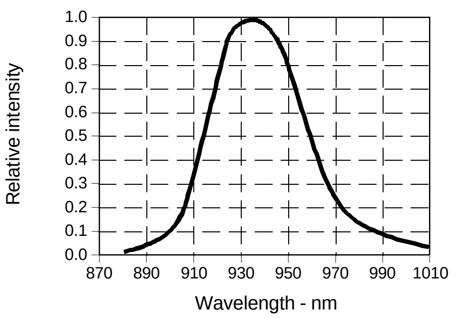
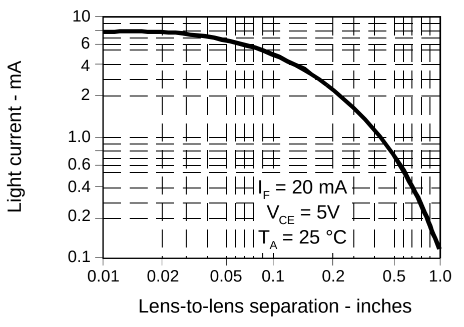


Fig. 6 Coupling Characteristics with SDP8406



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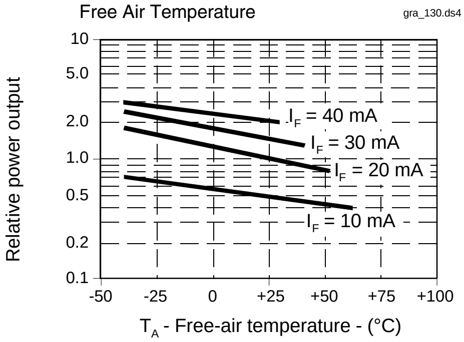
SEP8506
GaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs Free Air Temperature



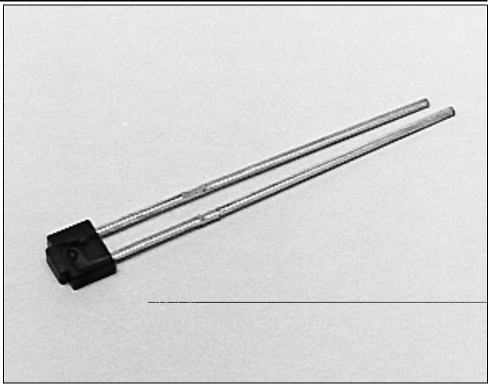
All Performance Curves Show Typical Values

SEP8507

GaAs Infrared Emitting Diode

FEATURES

- End-emitting plastic package
- 135° (nominal) beam angle
- 935 nm wavelength
- Low profile for design flexibility
- Mechanically and spectrally matched to SDP8407 phototransistor



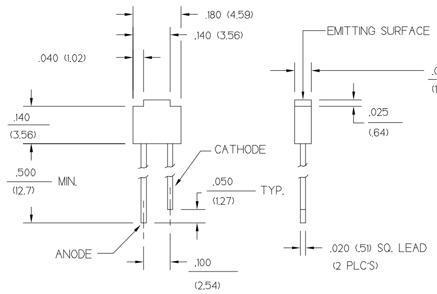
INFRA-18.TIF

DESCRIPTION

The SEP8507 is a gallium arsenide infrared emitting diode molded in an end-emitting red plastic package. The chip is positioned to emit radiation from the top of the package. Lead lengths are staggered to provide a simple method of polarity identification.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.008(0.20)
	2 plc decimals	±0.020(0.51)



DIM_009.cdr

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SEP8507

GaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Total Power Output SEP8507-001	P_O	 0.40			mW	I_F=20 mA
Forward Voltage	V_F			1.5	V	I_F=20 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_p		935		nm	
Spectral Bandwidth	$\Delta\lambda$		50		nm	
Spectral Shift With Temperature	$\Delta\lambda_p/\Delta_T$		0.3		nm/°C	
Beam Angle [1]	Ø		135		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Beam angle is defined as the total included angle between the half intensity points.

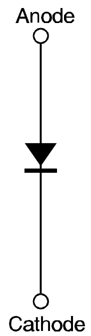
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	60 mA
Power Dissipation	100 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.66 mW/°C.

SCHEMATIC



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SEP8507

GaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

gra_032.ds4

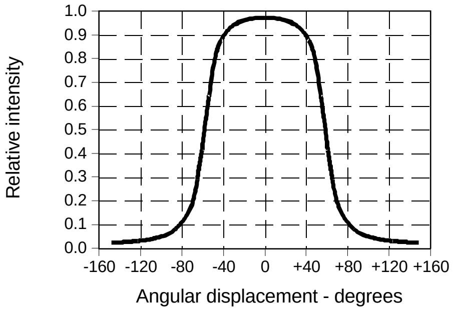


Fig. 2 Radiant Intensity vs Forward Current

gra_028.ds4

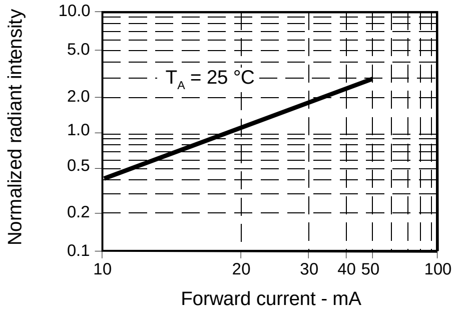


Fig. 3 Forward Voltage vs Forward Current

gra_003.ds4

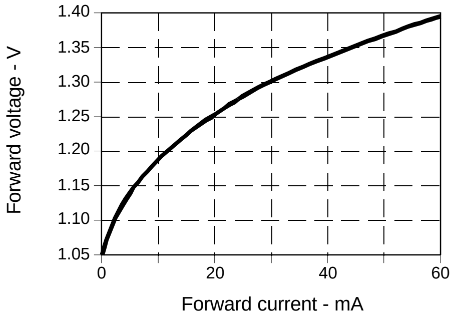


Fig. 4 Forward Voltage vs Temperature

gra_207.ds4

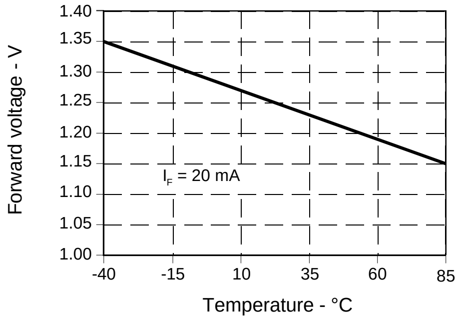


Fig. 5 Spectral Bandwidth

gra_005.ds4

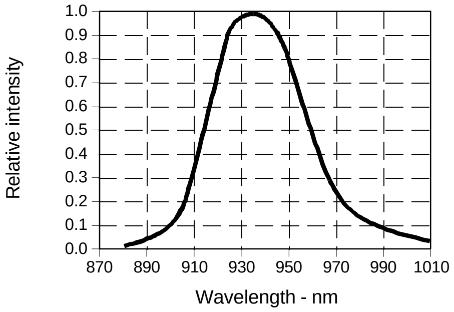
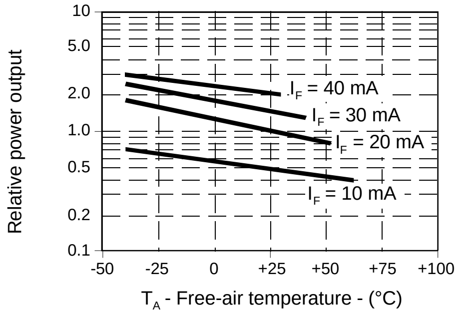


Fig. 6 Relative Power Output vs Free Air Temperature

gra_130.ds4



All Performance Curves Show Typical Values

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SEP8507

GaAs Infrared Emitting Diode

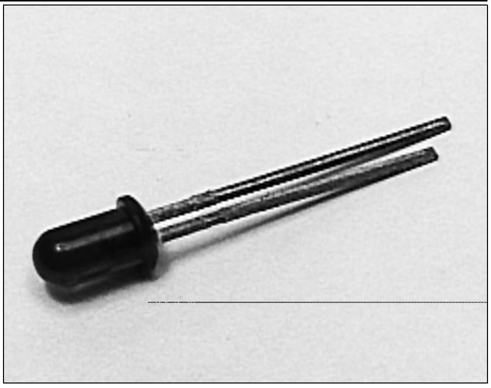
Honeywell

SEP8705

AlGaAs Infrared Emitting Diode

FEATURES

- T-1 package
- 15° (nominal) beam angle
- 880 nm wavelength
- Consistent optical properties
- Higher output than GaAs at equivalent drive current
- Mechanically and spectrally matched to SDP8405 phototransistor and SDP8105 photodarlington



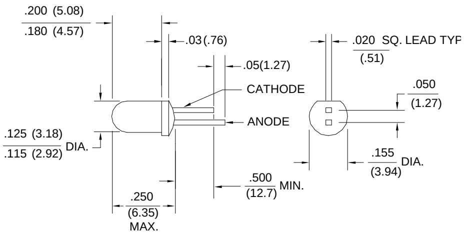
INFRA-55.TIF

DESCRIPTION

The SEP8705 is an aluminum gallium arsenide infrared emitting diode transfer molded in a T-1 smoke gray plastic package. Transfer molding of this device assures superior optical centerline performance compared to other molding processes. These devices typically exhibit 70% greater power intensity compared to GaAs devices at the same forward current. Lead lengths are staggered to provide a simple method of polarity identification.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_101.ds4

Honeywell

SEP8705

AlGaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm^2	I_F=20 mA
SEP8705-001		0.54				
SEP8705-002		1.4		5.6		
SEP8705-003		2.7		7.8		
Forward Voltage	V_F			1.7	V	I_F=20 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_P		880		nm	
Spectral Bandwidth	$\Delta\lambda$		80		nm	
Spectral Shift With Temperature	$\Delta\lambda_P/\Delta_T$		0.2		nm/°C	
Beam Angle [2]	Ø		15		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Measured in mW/cm^2 into a 0.081(2.05) diameter aperture placed 0.40(10.16) from the lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

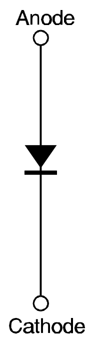
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	70 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.18 mW/°C.

SCHEMATIC



SEP8705

AlGaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

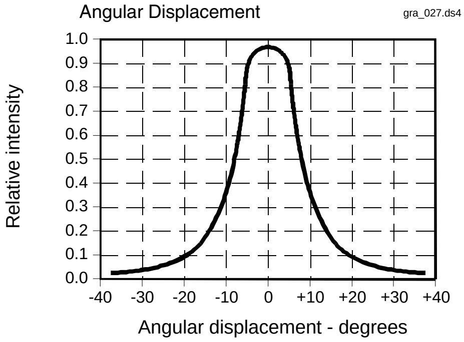


Fig. 2 Radiant Intensity vs Forward Current

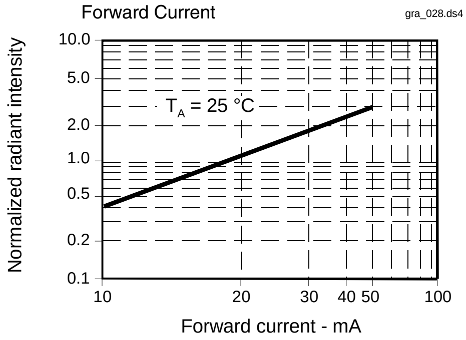


Fig. 3 Forward Voltage vs Forward Current

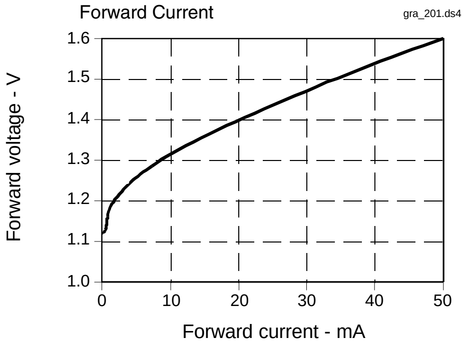


Fig. 4 Forward Voltage vs Temperature

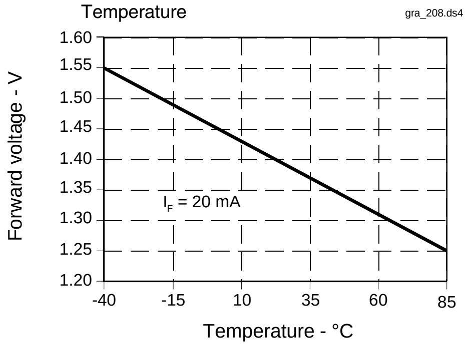


Fig. 5 Spectral Bandwidth

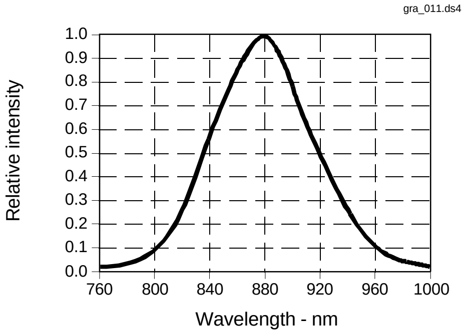
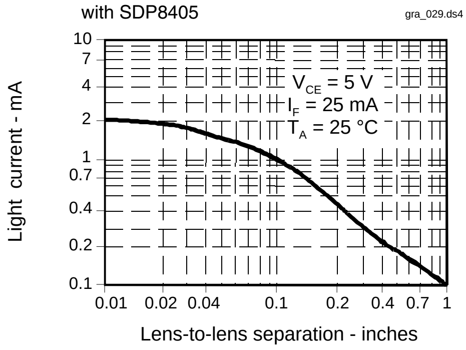


Fig. 6 Coupling Characteristics with SDP8405



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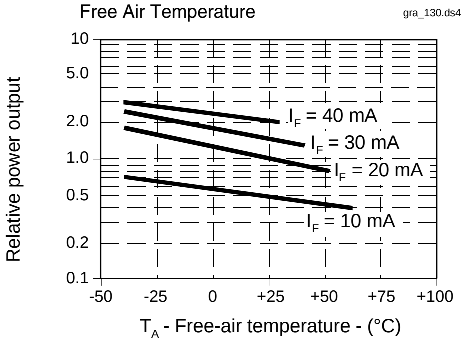
SEP8705

AlGaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs Free Air Temperature



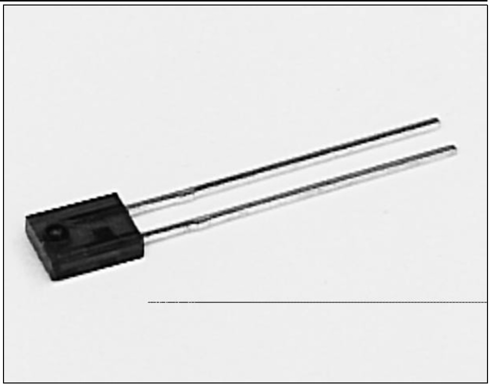
All Performance Curves Show Typical Values

SEP8706

AlGaAs Infrared Emitting Diode

FEATURES

- Side-looking plastic package
- 50° (nominal) beam angle
- 880 nm wavelength
- Higher output power than GaAs at equivalent drive currents
- Mechanically and spectrally matched to SDP8406 phototransistor, SDP8106 photodarlington and SDP8000/8600 series Schmitt trigger



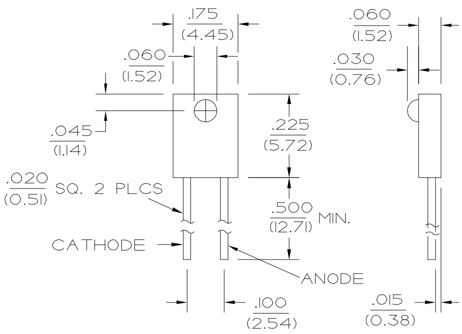
INFRA-20.TIF

DESCRIPTION

The SEP8706 is an aluminum gallium arsenide infrared emitting diode molded in a side-emitting smoke gray plastic package. The chip is positioned to emit radiation through a plastic lens from the side of the package. These devices typically exhibit 70% greater power intensity than gallium arsenide devices at the same forward current.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_071.ds4

SEP8706

AlGaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm²	I_F=20 mA
SEP8706-001		0.20				
SEP8706-002		0.45		2.6		
SEP8706-003		0.65				
Forward Voltage	V_F			1.7	V	I_F=20 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_P		880		nm	
Spectral Bandwidth	$\Delta\lambda$		80		nm	
Spectral Shift With Temperature	$\Delta\lambda_P/\Delta_T$		0.2		nm/°C	
Beam Angle [2]	Ø		50		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Measured in mW/cm² into a 0.104 (2.64) diameter aperture placed 0.535(13.6) from the lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

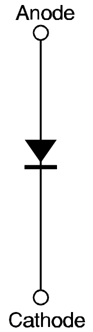
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	100 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC



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SEP8706

AlGaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

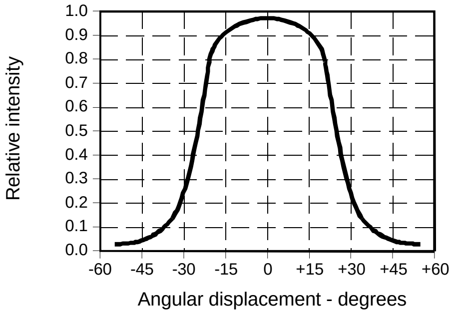


Fig. 2 Radiant Intensity vs Forward Current

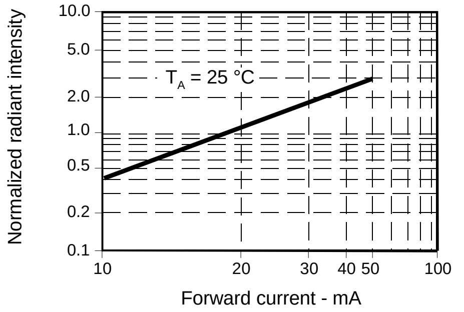


Fig. 3 Forward Voltage vs Forward Current

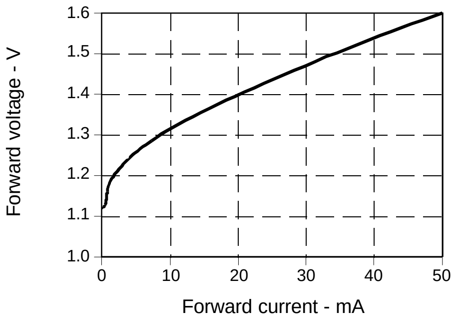


Fig. 4 Forward Voltage vs Temperature

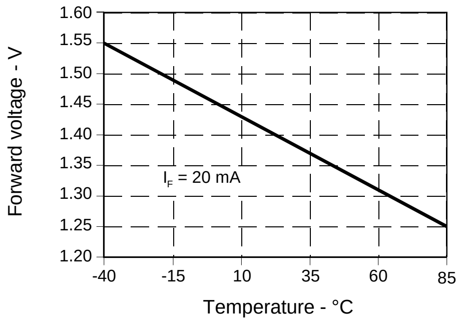


Fig. 5 Spectral Bandwidth

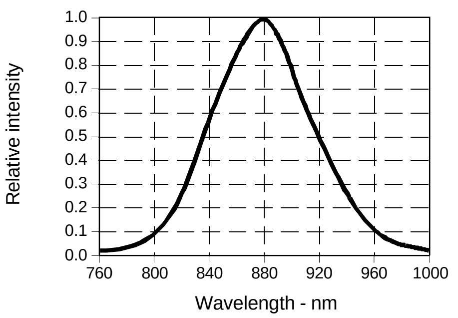
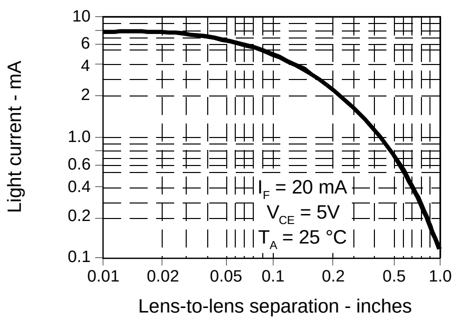


Fig. 6 Coupling Characteristics with SDP8406



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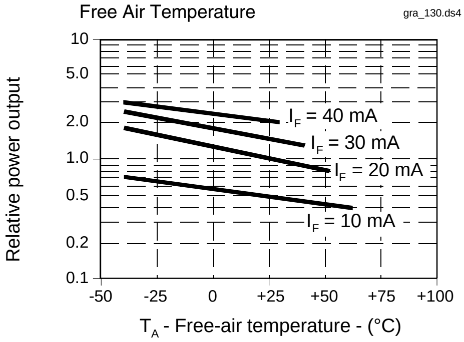
SEP8706
AlGaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs Free Air Temperature



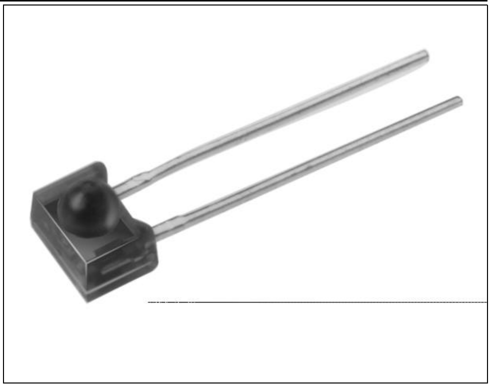
All Performance Curves Show Typical Values

SEP8736

AlGaAs Infrared Emitting Diode

FEATURES

- Side-looking plastic package
- 10° (nominal) beam angle
- 880 nm wavelength
- Enhanced coupling distance
- Mechanically and spectrally matched to SDP8436 phototransistor



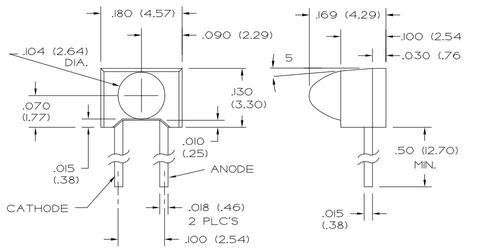
INFRA-80.TIF

DESCRIPTION

The SEP8736 is an aluminum gallium arsenide infrared emitting diode molded in a side-emitting smoke gray plastic package. The body and integral lens design combines the mounting advantage of a side-emitting package with the narrow emission pattern of a T-1 style device. The SEP8736 IRED is designed for those applications which require longer coupling distances than standard side-emitting devices can provide, such as touch screens. The IRED is also especially well suited to applications in which adjacent channel crosstalk could be a problem.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_070.ds4

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SEP8736

AlGaAs Infrared Emitting Diode

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Irradiance [1]	H				mW/cm^2	I_F=20 mA
SEP8736-001		0.5				
SEP8736-002		1.2		3.0		
SEP8736-003		1.7				
Forward Voltage	V_F			1.7	V	I_F=20 mA
Reverse Breakdown Voltage	V_{BR}	3.0			V	I_R=10 µA
Peak Output Wavelength	λ_P		880		nm	
Spectral Bandwidth	$\Delta\lambda$		80		nm	
Spectral Shift With Temperature	$\Delta\lambda_P/\Delta_T$		0.2		nm/°C	
Beam Angle [2]	Ø		10		degr.	I_F=Constant
Radiation Rise And Fall Time	t_r, t_f		0.7		µs	

Notes
1. Measured in mW/cm^2 into a 0.104 (2.64) diameter aperture placed 0.500(12.7) from the lens tip.
2. Beam angle is defined as the total included angle between the half intensity points.

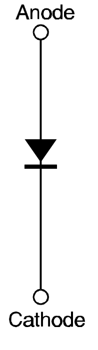
ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Continuous Forward Current	50 mA
Power Dissipation	100 mW [1]
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C free-air temperature at the rate of 0.78 mW/°C.

SCHEMATIC



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SEP8736

AlGaAs Infrared Emitting Diode

Fig. 1 Radiant Intensity vs Angular Displacement

gra_097.ds4

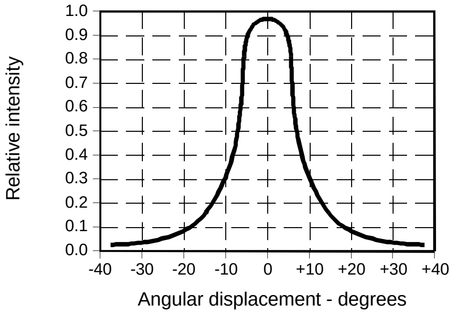


Fig. 2 Radiant Intensity vs Forward Current

gra_033.ds4

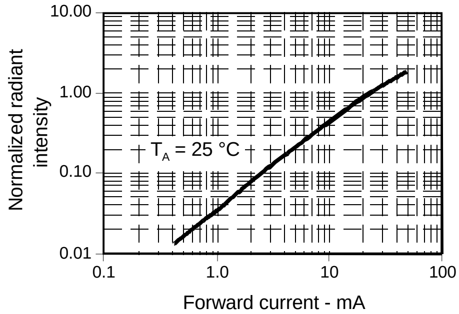


Fig. 3 Forward Voltage vs Forward Current

gra_201.ds4

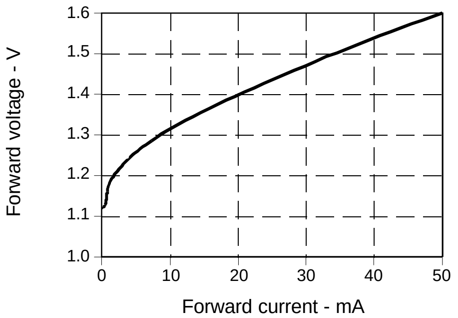


Fig. 4 Forward Voltage vs Temperature

gra_208.ds4

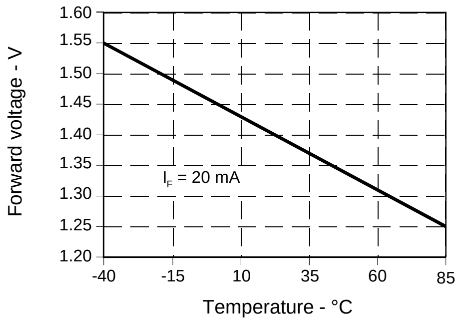


Fig. 5 Spectral Bandwidth

gra_011.ds4

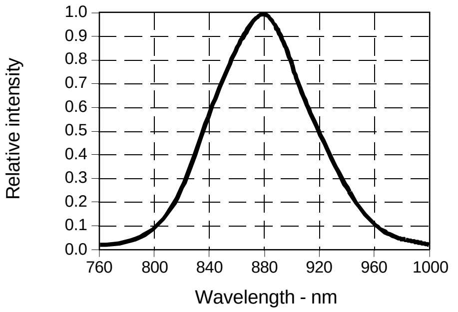
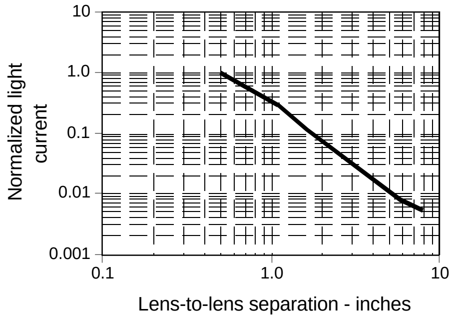


Fig. 6 Coupling Characteristics with SDP8436

gra_034.ds4



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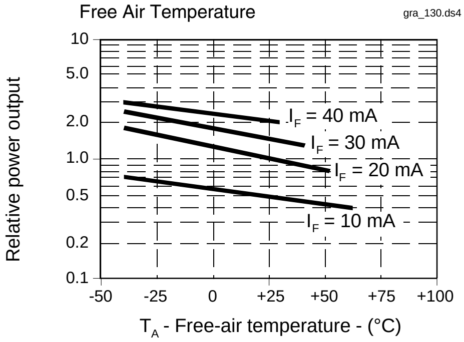
SEP8736

AlGaAs Infrared Emitting Diode

Fig. 7 Relative Power Output vs Free Air Temperature



All Performance Curves Show Typical Values

HFD3020-002/XXX

TTL Output Receiver

FEATURES

- Converts fiber optic input signals to TTL digital outputs
- Typical sensitivity 500 nW peak (-33 dBm)
- Wide variety of cable options, operates with 50/125, 62.5/125, and 100/140 µm cables
- Edge detection circuitry gives 20 dB minimum dynamic range, low Pulse Width Distortion
- Operates up to 10 Mbps NRZ
- Designed to operate with Honeywell 850 nm LEDs
- Single 5 V supply requirement
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFD3020-002/XXX is a sensitive differentiating optical receiver designed for use in short distance, 850 nm fiber optic systems. The receiver uses a hybrid construction consisting of a PIN photodiode, bipolar integrated receiver circuit with internal voltage regulation and external bypass capacitor. The TTL output allows the HFD3020-002/XXX to be interfaced directly with standard TTL circuits.

APPLICATION

Digital HFD3020-002/XXX fiber optic receivers convert the optical signal in a point to point data communications fiber optic link to a TTL output. The HFD3020-002/XXX consists of a base fiber optic component (HFD3020) which is mounted in a fiber optic connector.

Electrical isolation is important in obtaining the maximum performance of this high sensitivity receiver. A 0.1 µF ceramic capacitor must be connected between pin #1 and pin #4. This minimizes external noise on the power leads. Shielding can reduce coupled noise and allow the maximum sensitivity to be obtained. This can include the use of ground planes in the PCB, shielding around the device, and shielding around the leads. The specified maximum operating temperature of 100°C allows the HFD3020-002/XXX to be designed into a broad variety of applications.

HFD3020-002/XXX

TTL Output Receiver

APPLICATION (continued)

Honeywell also offers companion transmitters designed to operate in conjunction with the HFD3020-002/XXX.

Optical power (photons) from the fiber strikes the photodiode and is converted to electrical current. This current is then converted into a voltage in the transimpedance preamplifier. The postamplifier is a voltage gain stage with excellent temperature tracking. The edge detection circuit includes an operational amplifier configured as a differentiator, whose output is proportional to the rate of change of the optical signal. A latch retains the most recent edge transition and an inverting buffer drives the TTL output. For example, a light On to light Off transition of the input produces a TTL high output logic level.

Bandwidth has been limited to minimize noise problems. Reduced pulse width distortion (PWD) is a by-product of the bandwidth limitation. The output of the differentiator has a fixed settling time, assuring good PWD in most applications. Another effect of fixed settling time is the increase of PWD with increased optical power. Very high input optical power may overdrive the differentiator, causing high PWD due to the settling time. The accompanying curves illustrate how PWD increases with increased optical power, increased temperature, and decreased duty cycle.

PWD manifests itself as an increase in the width of the TTL low portion of an output waveform, with the TTL high portion decreasing by a like amount. The amount of PWD that a given system can tolerate without an error due to a missing bit of information, is dependant upon system considerations. The output of the HFD3020-002/XXX will typically connect to the input of some form of a Serial Interface Adaptor IC. The specifications for that IC govern the amount of PWD that can be tolerated in that system.

The edge detection circuit monitors the output of the differentiator, and triggers when its output exceeds preset levels. These levels are established to be sufficiently above the worst case RMS noise level to allow excellent bit error rate and are low enough to give high sensitivities which permit operation over long link lengths. This circuitry recognizes the polarity of the change of the optical signal, setting the latch to a "1" when the optical input decreases.

Note: the final output stage inverts the polarity. When initially powered up, the output state is set to a "1". After setting of the device occurs, incoming edge transitions are recognized and logic switching occurs.

Because the HFD3020-002/XXX reacts to transitions in the optical signal rather than DC levels, it shows excellent stability versus temperature and other operating conditions. Also, the device is much less sensitive to the absolute level of the optical signal than DC coupled receivers, allowing for a large range of optical source powers and/or link distances to be directly interfaced.

Honeywell

HFD3020-002/XXX

TTL Output Receiver

ELECTRO-OPTICAL CHARACTERISTICS (V_{CC}= 5.0 VDC, T_C = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Minimum Input Sensitivity	P_{IN} (Peak)		0.5	1.0	µW	f = 2.5 MHz, 100 µm core fiber λ = 850 nm, Duty Cycle = 50%
High Level Logic Output Voltage	V_{OH}	2.4	3.3		V	$P_{IN} \leq 0.1$ µW, $I_O \leq 0.8$ mA
Low Level Logic Output Voltage	V_{OL}			0.4	V	$P_{IN} \geq 1$ µW, $I_O \leq 0.8$ mA
Power Supply Current	I_{CC}		15	20	mA	$P_{IN} \geq 1.0$ µW, V_{CC} = 5 V
Rise/Fall Time	t_R		12		ns	P_{IN} = 1.0 µW peak
	t_F		3		ns	λ = 850 nm
Pulse Width Distortion	PWD				%	f = 2.5MHz, Duty Cycle = 50%
			5	10		P_{IN} = 1.0 µW peak
			20	25		P_{IN} = 100 µW peak

ABSOLUTE MAXIMUM RATINGS

(Tcase = 25°C unless otherwise noted)

Storage temperature	-40 to +100°C
Operating temperature	-40 to +100°C
Lead solder temperature	260°C for 10 s
Junction temperature	150°C
Supply voltage	+6.0 V

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED OPERATING CONDITIONS

Operating temperature	-40 to +85°C
Supply voltage	+4.5 to +5.5 V
Optical input power	1.0 to 100 µW
Input signal pulse width	> 100 ns
Optical signal edges (10 to 90%)	< 20 ns

HFD3020-002/XXX

TTL Output Receiver

ORDER GUIDE

Description	Catalog Listing
Fiber Optic TTL Receiver	HFD3020-002/XXX

MOUNTING OPTIONS

Substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 441

CAUTION

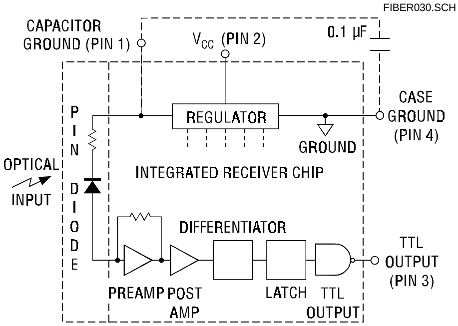
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

FIBER INTERFACE

Honeywell detectors are designed to interface with multimode fibers with sizes (core/cladding diameters) ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 100/140 micron core fiber. The fiber chosen by the end user will depend upon a number of application issues (distance, link budget, cable attenuation, splice attenuation, and safety margin). The 50/125 and 62.5/125 micron fibers have the advantages of high bandwidth and low cost, making them ideal for higher bandwidth installations. The use of 100/140 and 200/230 micron core fibers results in greater power being coupled by the transmitter, making it easier to splice or connect in bulkhead areas. Optical cables can be purchased from a number of sources.

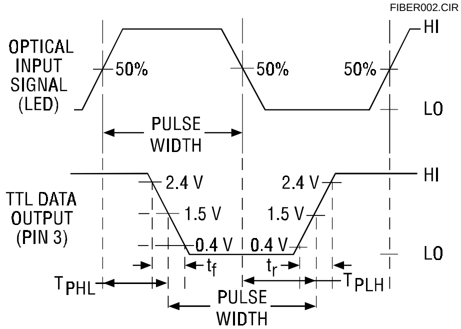
BLOCK DIAGRAM

FIBER030.SCH



SWITCHING WAVEFORM

FIBER002.CIR



HFD3020-002/XXX

TTL Output Receiver

Fig. 1 Pulse Width Distortion vs Temperature

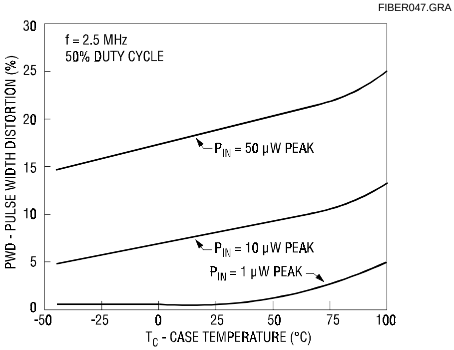


Fig. 2 Pulse Width Distortion vs Frequency

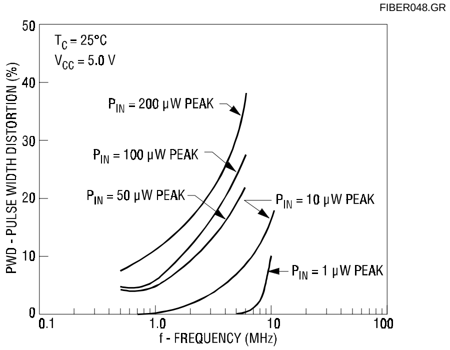


Fig. 3 Pulse Width Distortion vs Optical Input Power

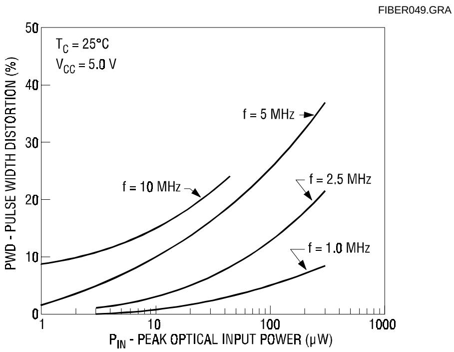


Fig. 4 Propagation Delay vs Optical Input Power

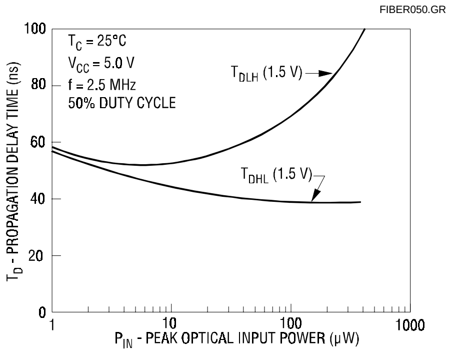


Fig. 5 Supply Current vs Temperature

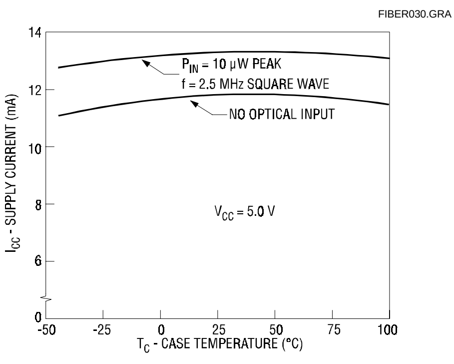
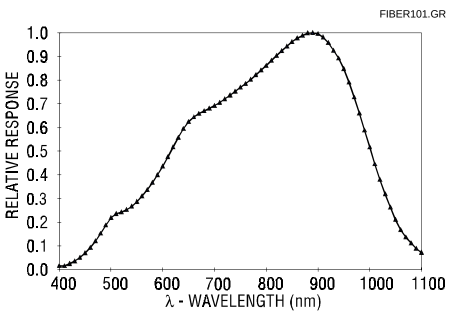


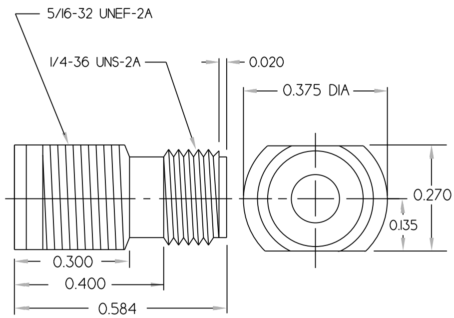
Fig. 6 Spectral Responsivity



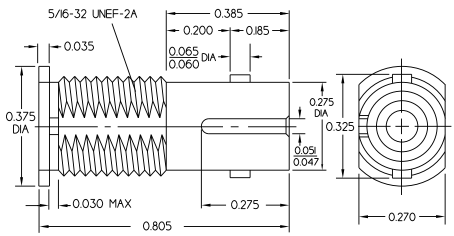
European Connectorized Receivers

Honeywell receiver components are available in the following connector styles. Each style has a three-digit reference used in the order guides.

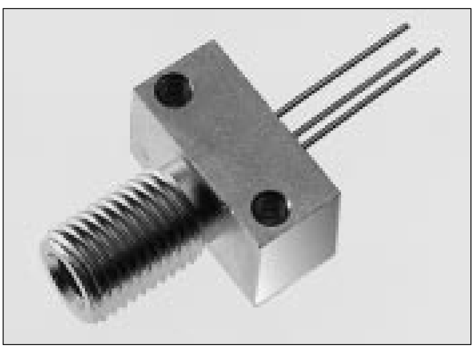
SMA SINGLE HOLE MOUNTING (REF.: AAA)

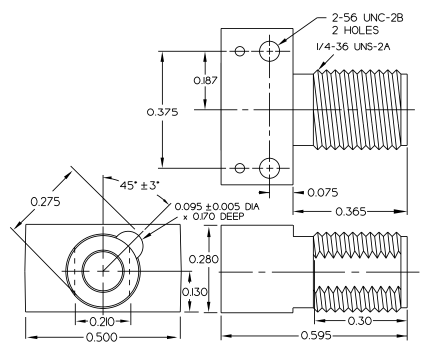


ST SINGLE HOLE MOUNTING (REF.: BAA)



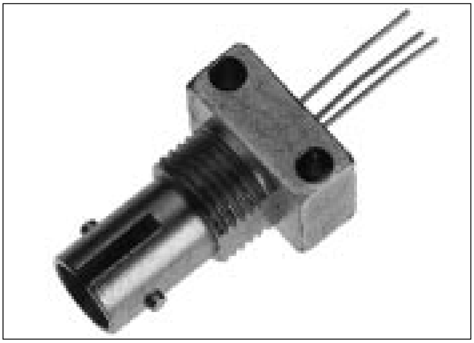
SMA PCB MOUNTING (REF.: ABA)

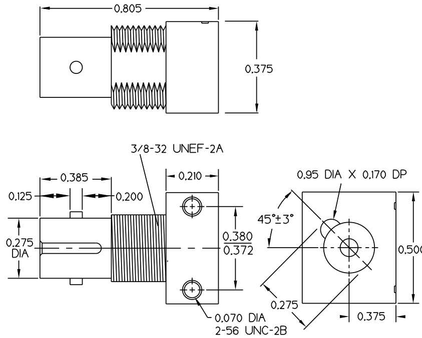




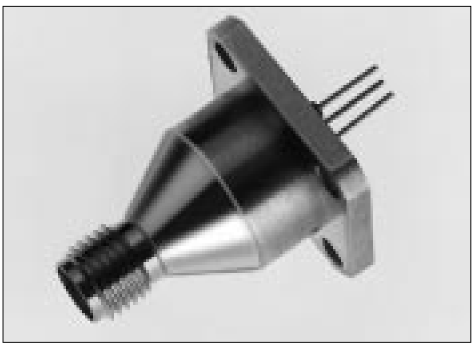
European Connectorized Receivers

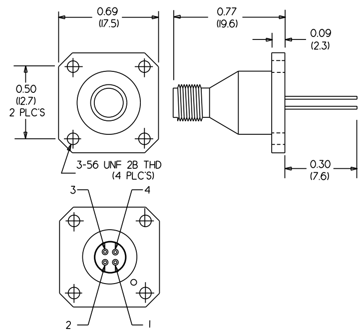
ST PCB MOUNTING (REF.: BBA)





SMA 4 HOLE MOUNTING (REF.: ADA)





Honeywell

HFD3023-002/XXX

5 Mbit Direct Coupled Receiver

FEATURES

- Converts fiber optic input signals to TTL digital outputs
- Typical sensitivity 2 µW peak (-27 dBm)
- Wide variety of cable options, operates with 50/125, 62.5/125, and 100/140 µm cables
- Direct coupled receiver circuit
- Designed to operate with Honeywell 850 nm LEDs
- Single 5 V supply requirement
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFD3023-002/XXX is a sensitive Direct Coupled (DC) optical receiver designed for use in short distance, 850 nm fiber optic systems. The receiver contains a monolithic IC, consisting of a photodiode, DC amplifier, and open collector Schottky output transistor. The output allows it to be directly interfaced with standard TTL circuits. The HFD3023-002/XXX receiver is comprised of a HFD3023 receiver component packaged in a fiber optic connector.

APPLICATION

The HFD3023-002/XXX fiber optic receiver converts the optical signal in a point to point data communications fiber optic link to a TTL output. Its 0.006 in. photodiode with a 0.024 in. microlens (to enhance the optics) is mechanically centered within the fiber optic connector.

Electrical isolation is important in obtaining the maximum performance. A 0.1 µF bypass capacitor must be connected between V_{CC} and ground. This minimizes power supply noise, increasing the signal quality. Shielding can also reduce coupled noise, through use of ground plane PCB, shielding around the device, and shielding around the leads.

The HFD3023-002/XXX is designed for a wide optical input range. The optical input dynamic range is guaranteed from the maximum sensitivity of 3.0 µW to 100 µW or greater than 15 dB.

HFD3023-002/XXX

5 Mbit Direct Coupled Receiver

APPLICATION (continued)

Optical power from the fiber strikes the photodiode and is converted to electrical current. This current couples to the DC amplifier, which drives an open collector transistor output. The output when connected to a pull up resistor can interface to TTL loads. The electrical signal is the inverse of the input light signal. When light strikes the photodiode, the output is a low logic level. When no light strikes the photodiode, the output is a high logic level.

Pulse Width Distortion (PWD) is an increase in the output pulse width (for high level optical input). The typical performance curves illustrate how PWD varies with optical power, temperature and frequency for the HFD3023-002/XXX. The amount of PWD that a given system can tolerate without an error due to a missing bit of information, is dependent upon system considerations. The output of the HFD3023-002/XXX will typically connect to the input of some form of a serial interface adaptor IC. The specifications for that IC govern the amount of PWD that can be tolerated in the system.

HFD3023-002/XXX

5 Mbit Direct Coupled Receiver

ELECTRO-OPTICAL CHARACTERISTICS

(V_{CC}= 5.0 VDC, T_C = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Minimum Input Sensitivity	P_{IN} (Peak)					f = 2.5 MHz, 100/140 µm core fiber
Minimum Input Sensitivity						λ = 850 nm, Duty Cycle = 50%
Minimum Input Sensitivity						PWD ≤ 10%
			2	3	µW	
			-27	-25.2	dBm	
High Level Logic Output Voltage	V_{OH}	2.4	4.5		V	P_{IN} ≤ 0.1 µW, R_L = 560 Ω
Low Level Logic Output Voltage	V_{OL}		0.25	0.5	V	P_{IN} ≥ 3 µW, R_L = 560 Ω
Power Supply Current	I_{CC}		4.5	6.5	mA	P_{IN} ≤ 0.1 µW
Power Supply Current			13	15		P_{IN} ≥ 3 µW
Rise Time	t_R		6	9	ns	P_{IN} = 10µW, V_O = 0.5 to 2.4V
Fall Time	t_F		6	9	ns	P_{IN} = 10 µW, V_O = 2.4 to 0.5 V
Pulse Width Distortion	PWD				%	f = 2.5MHz, Duty Cycle = 50%
			5	10		P_{IN} = 3 µW peak
			25	35		P_{IN} = 80 µW peak

ABSOLUTE MAXIMUM RATINGS

(Tcase = 25°C unless otherwise noted)

Storage temperature	-40 to +100°C
Operating temperature	-40 to +100°C
Lead solder temperature	260°C for 10 s
Junction temperature	150°C
Supply voltage	+6.0 V

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED OPERATING CONDITIONS

Operating temperature	-40 to +85°C
Supply voltage	+4.5 to +5.5 V
Optical input power	3.0 to 100 µW
Optical signal pulse width	> 100 ns
Optical signal edges (10 to 90%)	< 20 ns

Honeywell

HFD3023-002/XXX

5 Mbit Direct Coupled Receiver

ORDER GUIDE

Description	Catalog Listing
Fiber Optic Direct Coupled Receiver	HFD3023-002/XXX

MOUNTING OPTIONS

Substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 441

CAUTION

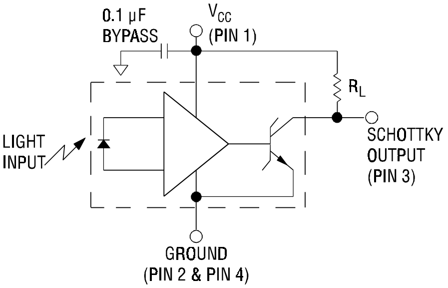
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

FIBER INTERFACE

Honeywell detectors are designed to interface with multimode fibers with sizes (core/cladding diameters) ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 100/140 micron core fiber. The fiber chosen by the end user will depend upon a number of application issues (distance, link budget, cable attenuation, splice attenuation, and safety margin). The 50/125 and 62.5/125 micron fibers have the advantages of high bandwidth and low cost, making them ideal for higher bandwidth installations. The use of 100/140 and 200/230 micron core fibers results in greater power being coupled by the transmitter, making it easier to splice or connect in bulkhead areas. Optical cables can be purchased from a number of sources.

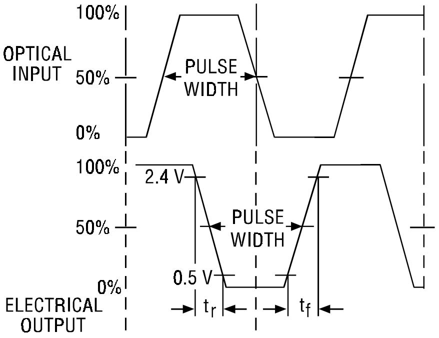
BLOCK DIAGRAM

FIBER004.SCH



SWITCHING WAVEFORM

FIBER004.CIR



HFD3023-002/XXX

5 Mbit Direct Coupled Receiver

Fig. 1 Pulse Width Distortion vs Optical Input Power

FIBER054.GRA

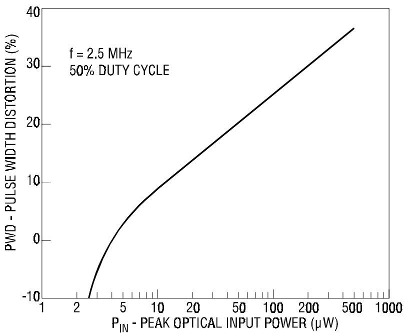


Fig. 2 Pulse Width Distortion vs Temperature

FIBER055.GRA

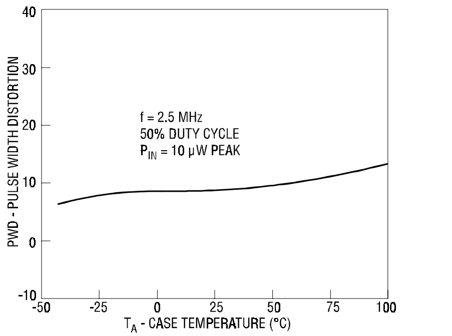


Fig. 3 Pulse Width Distortion vs Frequency

FIBER056.GRA

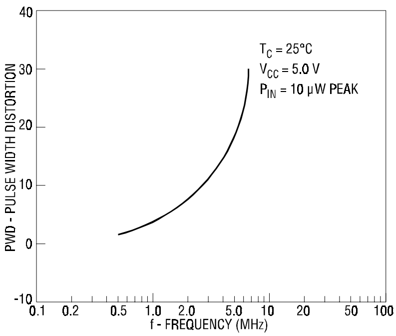
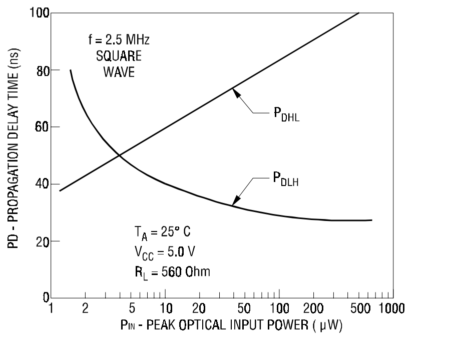


Fig. 4 Propagation Delay Time vs Peak Optical Input Power

FIBER057.GRA



Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

HFD3029-002/XXX

Schmitt Input, Non-Inverting TTL Output Receiver

FEATURES

- Converts fiber optic input signals to TTL totem pole outputs
- Maximum sensitivity 1.5 μW peak (-28.2 dBm)
- Wide variety of cable options, operates with 50/125, 62.5/125, and 100/140 μm cables
- Schmitt circuitry gives 17dB minimum dynamic range and low Pulse Width Distortion
- Operates up to 200K bps NRZ
- Designed to operate with Honeywell 850 nm LEDs
- Single 5 V supply requirement
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFD3029-002/XXX is a sensitive Schmitt triggered optical receiver designed for use in short distance, 850 nm fiber optic systems. The bipolar integrated receiver circuit has internal voltage regulation. The HFD3029-002/XXX also uses an internal photodiode. The TTL non-inverting output allows the HFD3029-002/XXX to be directly interfaced with standard digital TTL circuits.

APPLICATION

The HFD3029-002/XXX fiber optic receiver converts the optical signal in a point to point data communications fiber optic link to a TTL output. It is mounted in a fiber optic connector that aligns the optical axis of the component to the axis of the optical fiber.

Electrical isolation is important in obtaining the maximum performance of this high sensitivity receiver. Shielding can reduce coupled noise and allow maximum sensitivity to be obtained. This can include the use of ground planes in the PCB, shielding around the device, and shielding around the leads.

HFD3029-002/XXX

Schmitt Input, Non-Inverting TTL Output Receiver

APPLICATION (continued)

An internal voltage regulator allows operation with a 5 volt supply. An external bypass capacitor (0.1 µF) between V_{CC} (pin 1) and ground (pin 3) is recommended for maximum power supply noise rejection.

Honeywell also offers companion transmitters designed to operate in conjunction with the HFD3029-002/XXX.

Optical power (photons) from the fiber strikes the photodiode and is converted to electrical current. The current is converted into voltage in the transimpedance preamplifier. The Schmitt trigger circuitry in the comparator stage provides proper output signals. The Schmitt detection circuit monitors the input preamplifier, and triggers when its output exceeds present levels. Preset levels are above worst case RMS noise level, with 1 x 10^{-9} bit error rate, while low enough for enough sensitivity to allow operation over long links. This circuitry recognizes positive and negative going input signals. When the optical input goes from low to high, the electrical output changes to "1" (high). The output changes to "0" (low) when the optical input goes from high to low. Bandwidth has been limited to minimize noise problems. The output of the Schmitt Trigger detector stage is designed for good pulse width distortion (PWD).

HFD3029-002/XXX

Schmitt Input, Non-Inverting TTL Output Receiver

ELECTRO-OPTICAL CHARACTERISTICS (V_{CC} = 5.0 V ±0.5 VDC, -40°C < T_C < +85°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Minimum Input Sensitivity T= 25°C	P_{IN} (Peak)		1	1.5	µW	100 µm core fiber Duty Cycle = 50%, 850 µm
High Level Logic Output Voltage	V_{OH}	2.4	3.3		V	P_{IN} ≥ 1.5 µW, V_{CC} = 5.0 VDC
Low Level Logic Output Voltage	V_{OL}		0.3	0.4	V	P_{IN} ≤ 0.1 µW, V_{CC} = 5.0 VDC I_O ≤ 16 mA
Power Supply Current	I_{CC}		6	12	mA	
Rise Time	t_R		12		ns	P_{IN} ≥ 1.5µW, V_O = 0.4 to 2.4V
Fall Time	t_F		3		ns	P_{IN} ≤ 0.1µW, V_O = 2.4 to 0.4V
Pulse Width Distortion T = 25°C	PWD		 5 5	 10 10	%	f = 20 kHz, Duty Cycle = 50% P_{IN} ≥ 1.5 µW peak P_{IN} ≥ 100 µW
Bandwidth	BW			200	kHz	P_{IN} ≥1.0µW, Duty Cycle = 50%
Output Impedance	I_O		20		Ω	

ABSOLUTE MAXIMUM RATINGS

(Tcase = 25°C unless otherwise noted)

Storage temperature	-40 to +100°C
Supply voltage	+4.5 to +7.0 V
Lead solder temperature	260°C for 10 s
Junction temperature	150°C

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED OPERATING CONDITIONS

Operating temperature	-40 to +100°C
Supply voltage	+4.5 to +7.0 V
Optical input power	1.5 to 100 µW
Optical signal pulse width	> 4 µs

HFD3029-002/XXX

Schmitt Input, Non-Inverting TTL Output Receiver

ORDER GUIDE

Description	Catalog Listing
Fiber Optic Schmitt Input, Non inverting, TTL Output Receiver	HFD3029-002/XXX

MOUNTING OPTIONS

Substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 441

CAUTION

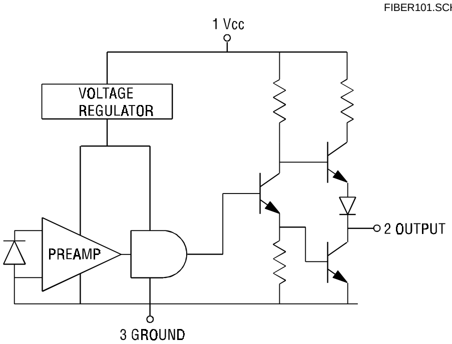
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

FIBER INTERFACE

Honeywell detectors are designed to interface with multimode fibers with sizes (core/cladding diameters) ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 100/140 micron core fiber. The fiber chosen by the end user will depend upon a number of application issues (distance, link budget, cable attenuation, splice attenuation, and safety margin). The 50/125 and 62.5/125 micron fibers have the advantages of high bandwidth and low cost, making them ideal for higher bandwidth installations. The use of 100/140 and 200/230 micron core fibers results in greater power being coupled by the transmitter, making it easier to splice or connect in bulkhead areas. Optical cables can be purchased from a number of sources.

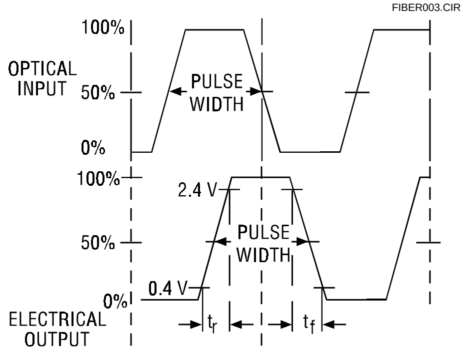
BLOCK DIAGRAM

FIBER101.SCH



SWITCHING WAVEFORM

FIBER003.CIR



Honeywell

HFD3029-002/XXX

Schmitt Input, Non-Inverting TTL Output Receiver

Fig. 1 Pulse Width Distortion vs Temperature

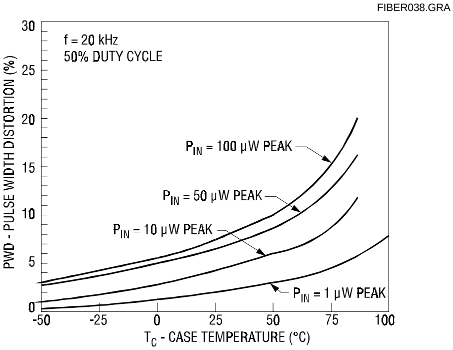


Fig. 2 Pulse Width Distortion vs Frequency

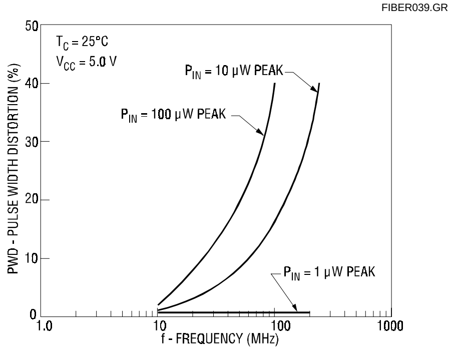


Fig. 3 Pulse Width Distortion vs Optical Input Power

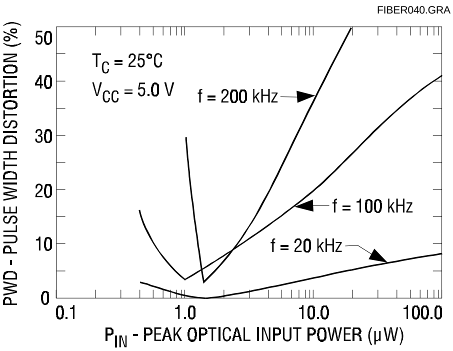
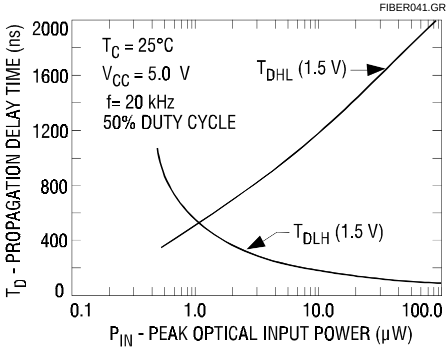


Fig. 4 Propagation Delay vs Optical Input Power



HFD3033-002/XXX

Silicon PIN Photodiode

FEATURES

- Low capacitance
- High speed: t_r = 1.2 ns typical
- High responsivity: 0.33 A/W typical
- Housing electrically isolated
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFD3033-002/XXX PIN Photodiode is designed for high speed use in fiber optic receivers. It has a large area detector, providing efficient response to 50 - 100 µm diameter fibers at wavelengths of 650 to 950 nanometers. Light is collected using a 600 micron micro lens mounted on the detector surface. The HFD3033-002/XXX is comprised of an HFD3033 PIN photodiode which is mounted in a fiber optic connector which aligns the component's optical axis with the axis of the optical fiber.

The HFD3033-002/XXXs case is electrically isolated from the anode and cathode terminals to enhance the EMI/RFI shielding which increases the sensitivity and speed. The housing acts as a shield for the PIN photodiode component.

HFD3033-002/XXX

Silicon PIN Photodiode

ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Flux Responsivity, λ= 850 nm	R	0.30	0.33		A/W	50 µm core fiber
Dark Current	I_D		0.05	1.5	nA	V_R = 30 V
Total Capacitance	C		1.5		pF	V_R = 5 V
Response Time						
10-90%	t_R		1.2	3	ns	V_R = 3.5 V
90-10%	t_F		1.2	3	ns	V_R = 3.5 V
Field of View	FoV		32		Degrees	

ABSOLUTE MAXIMUM RATINGS

(Tcase = 25°C unless otherwise noted)

Storage temperature	-40 to +100°C
Operating temperature	-40 to +100°C
Lead solder temperature	260°C for 10 s
Reverse voltage	50 V

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

HFD3033-002/XXX

Silicon PIN Photodiode

ORDER GUIDE

Description	Catalog Listing
Standard silicon PIN photodiode	HFD3033-002/XXX

MOUNTING OPTIONS

Substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 441

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

FIBER INTERFACE

Honeywell detectors are designed to interface with multimode fibers with sizes (core/cladding diameters) ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 100/140 micron core fiber. The fiber chosen by the end user will depend upon a number of application issues (distance, link budget, cable attenuation, splice attenuation, and safety margin). The 50/125 and 62.5/125 micron fibers have the advantages of high bandwidth and low cost, making them ideal for higher bandwidth installations. The use of 100/140 and 200/230 micron core fibers results in greater power being coupled by the transmitter, making it easier to splice or connect in bulkhead areas. Optical cables can be purchased from a number of sources.

Fig. 1 Relative Response vs Polar Angle

FIBER043.GRA

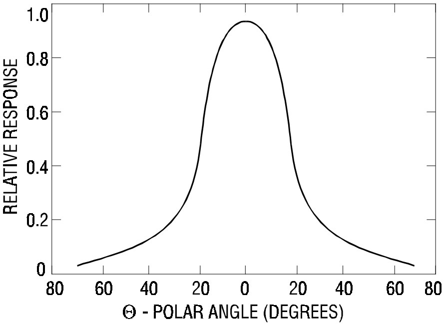
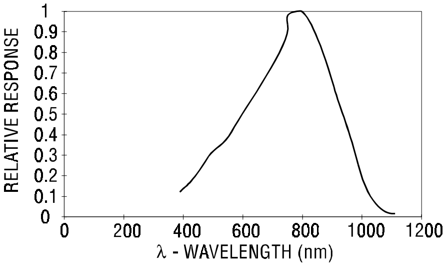


Fig. 2 Spectral Responsivity

FIBER102.GR



HFD3033-002/XXX

Silicon PIN Photodiode

Fig. 3 Relative Responsivity vs Temperature

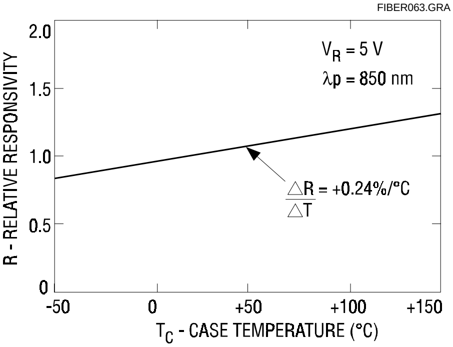
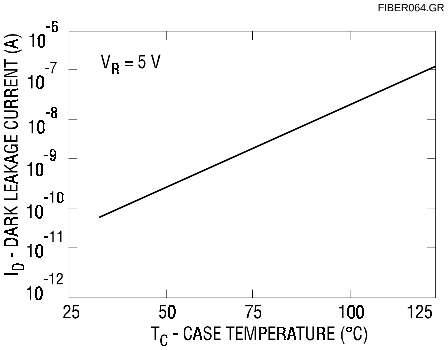


Fig. 4 Dark Leakage Current vs Temperature



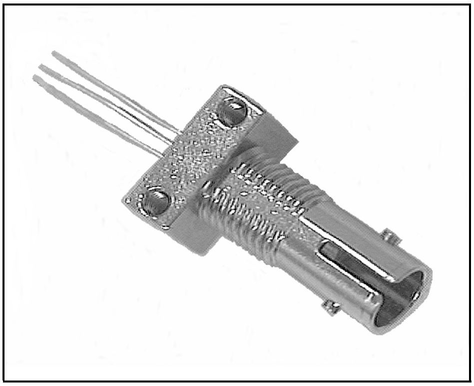
Honeywell

HFD8000-002/XBA

1300 nm PIN Diode

FEATURES

- InGaAs PIN Diode
- 400 MHz operating bandwidth
- Mounted in industry standard ST*-LP fibre connector



OPHO_229.doc

DESCRIPTION

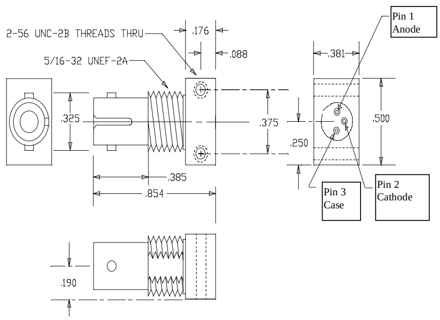
The HFD8000-002/XBA is a high-performance InGaAs PIN photodiode designed for use in 1300 nm fiber optic transmission applications. The PIN diode is mounted in an industry standard low profile ST connector receptacle, optimized for low cost multimode systems where high bandwidth and long distance links are required.

APPLICATION

The HFD8000-002/XBA employs a high speed 1300 nm PIN diode packaged in a TO-18 metal can and mounted within a low profile ST connector receptacle. Data rates can vary from DC to 400 MHz depending upon component application. The PIN is designed to convert optical energy into electrical output power that can be used in fiber optic communications and other applications. As the level of incident optical power varies the component's reverse bias current varies proportionally.

The HFD8000-002/XBA is designed to be used within 1300 nm multimode systems but has excelent response from 900 nm to 1700 nm allowing usage in various other applications including singlemode.

OUTLINE DIMENSIONS in inches (mm)



ODIM_231.doc

Pin 1 identified by black sleeve

ST is a registered trademark of AT & T.

Honeywell

HFD8000-002/XBA

1300 nm PIN Diode

ELECTRO-OPTICAL CHARACTERISTICS (Tests made at 25°C unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Flux Responsivity	R		0.9		A/W	λ = 1300 nm [1]
Active Area	A		0.3		mm^2	
Dark Current	I_D		0.3	3	nA	V_R = 5 V
Response Time						
10-90%	t_R		1.3		ns	
90-10%	t_F		1.3		ns	
Cut Off Frequency	F_C			400	MHz	V_R = 5 V, R_L = 50 Ω
Capacitance	C		5		pF	V_R = 5 V, f = 1 MHz

Notes

1. This product is tested with a 50/125 micron fiber.

ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 to +100°C
Case operating temperature	-40 to +85°C
Lead solder temperature	260°C, 10 sec.
Reverse voltage	20 V

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

HFD8000-002/XBA

1300 nm PIN Diode

ORDER GUIDE

Description	Catalog Listing
1300 nm PIN diode	HFD8000-002/XBA

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

Honeywell

Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

HFE4020-313/XXX

Fiber Optic LED

FEATURES

- Power out designed for drive currents between 10 and 100 mA
- Wave solderable
- Optimized for linear optical output with drive currents between 10 mA and 100 mA
- High speed: 85 MHz
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFE4020-313/XXX is a high radiance GaAlAs 850 nanometer LED optimized for coupling into small fiber core diameters at a forward current of 10 to 100 mA. The patented "Caprock"™ LED chip combines high power coupling with wide bandwidth. The peak wavelength is matched for use with Honeywell silicon fiber optic detectors and receivers. When the HFE4020-313/XXX is used at elevated temperatures, thermal resistance must be taken into consideration.

APPLICATION

The HFE4020-313/XXX is a high radiance LED packaged in a fiber optic connector that aligns the optical axis of the base component to the axis of the optical fiber. Data rates can vary from DC to above 85 MHz depending upon component application. The LED converts electrical current into optical power that can be used in fiber optic communications. As the current varies (typically from 10 to 100 mA), the light intensity increases proportionally.

The HFE4020-313/XXX LED is designed to give high fiber coupled power (high radiance into a standard fiber optic cable). In order to enhance the light being sent into a fiber optic cable, a 0.30 mm diameter glass microlens is placed over the "Caprock"™ junction. The microlens collimates the light, increasing the intensity directed toward a fiber optic cable. This creates a "SWEET SPOT" of power, allowing greater power to be launched into standard fiber optic cables.

HFE4020-313/XXX

Fiber Optic LED

ELECTRO-OPTICAL CHARACTERISTICS (-40°C < T_C < 100°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Fiber Coupled Power	P_{OC}	30 -15.2	60 -12.2		μW dBm	I_F = 50 mA, 100/140 micron, 0.29 NA fiber, T = 25°C (1)
Forward Voltage	V_F		1.70	2.00	V	I_F = 100 mA
Reverse Voltage	B_{VR}	1.0	5.0		V	I_R = 10 μA
Peak Wavelength	λ_P		850		nm	I_F = 100 mA DC
Spectral Bandwidth	$\Delta\lambda$		50		nm	I_F = 100 mA DC
Response Time					ns	1 V Prebias, 100 mA peak
T = 25°C, 10-90%	t_R		6	8		
T = 25°C, 90-10%	t_F		8	10		
-40 < T < +100°C, 10-90%	t_R		6	9		
-40 < T < +100°C, 90-10%	t_F		8	11		
Analog Bandwidth	BWE		85		MHz	I_F = 100 mA DC, small signal sinusoidal modulation
P_O Temperature Coefficient	$\Delta P_O/\Delta T$		-0.019		dB/°C	I_F = 100 mA
Series Resistance	r_S		4.0		Ω	DC
Capacitance	C		70		pF	V_R = 0 V, f = 1 MHz
Thermal Resistance			250		°C/W	Heat sinked

Notes

1. HFE4020-313/XXX is tested using a 100/140 micron fiber cable. Actual coupled power values may vary due to mechanical alignment procedures and/or receptacle and fiber tolerances.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Storage temperature	-40 to +100°C
Case operating temperature	-40 to +100°C
Lead solder temperature	260°C, 10 s
Continuous forward current (heat sinked)	100 mA
Reverse voltage	1 V @ 10 μA

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

FIBER INTERFACE

Honeywell LEDs are designed to interface with multimode fiber with sizes ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 50/125 micron core fiber. All multimode fiber optic cables between 50/125 and 200/230 should operate with similar excellent performance. See table for typical powers.

TYPICAL COUPLED POWER (μW/dBm) @ I_F=50 mA

Dia.	Index	N.A.	-313
50/125	Graded	0.20	10/-19.9
62.5/125	Graded	0.28	19/-17.1
100/140	Graded	0.29	60/-12.2

HFE4020-313/XXX

Fiber Optic LED

ORDER GUIDE

Description	Catalog Listing
Standard screening, typical power out 60 µW	HFE4020-313/XXX

MOUNTING OPTIONS

substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 203

WARNING

Under certain application conditions, the infrared optical output of this device may exceed Class 1 eye safety limits, as defined by IEC 825-1 (1993-11). Do not use magnification (such as a microscope or other focusing equipment) when viewing the device's output.

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

Fig. 1 Typical Optical Power Output vs Forward Current

FIBER001.GRA

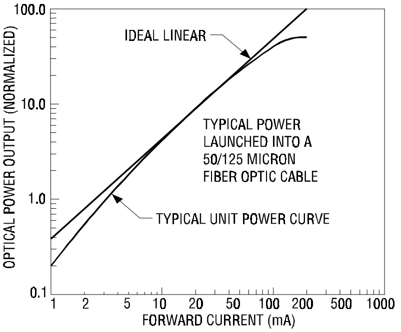


Fig. 2 Typical Spectral Output vs Wavelength

FIBER103.GRA

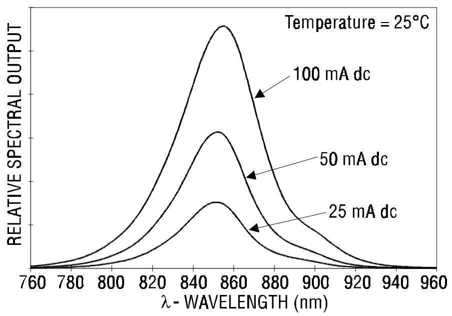
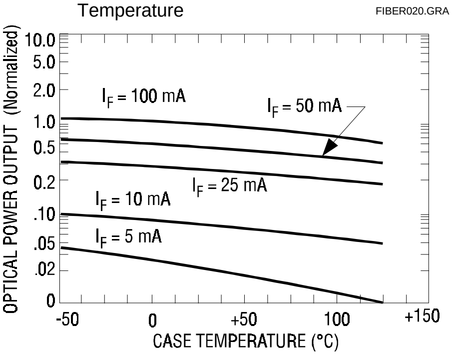


Fig. 3 Typical Optical Power Output vs Case Temperature

FIBER020.GRA



All Performance Curves Show Typical Values

HFE4020-313/XXX

Fiber Optic LED

HFE4023-323/XXX

High Speed Fiber Optic LED

FEATURES

- High speed: 150 MHz
- Optimized for linear optical output with drive currents between 10 and 50 mA
- Wave solderable
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFE4023-323/XXX is a high radiance GaAlAs 850 nanometer LED optimized for coupling into small fiber core diameters at a forward current of 10 to 100 mA. The patented "Caprock"™ LED chip combines high power coupling with wide bandwidth. The peak wavelength is matched for use with Honeywell silicon fiber optic detectors and receivers. When the HFE4023-323/XXX is used at elevated temperatures, thermal resistance must be taken into consideration.

APPLICATION

The HFE4023-323/XXX is a high radiance LED packaged in a fiber optic connector that aligns the optical axis of the base component to the axis of the optical fiber. Data rates can vary from DC to 150 MHz depending upon component application. The LED converts electrical current into optical power that can be used in fiber optic communications. As the current varies (typically from 10 to 100 mA), the light intensity increases proportionally.

The HFE4023-323/XXX LED provides high fiber coupled power (high radiance into a standard fiber optic cable). A 0.30 mm diameter glass microlens is placed over the "Caprock"™ junction. The microlens collimates the light, increasing the intensity directed toward a fiber optic cable. The "SWEET SPOT" of power sends greater power into standard fiber optic cables.

HFE4023-323/XXX

High Speed Fiber Optic LED

ELECTRO-OPTICAL CHARACTERISTICS (-40°C < T_C < 100°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Fiber Coupled Power	P_{OC}	30 -15.2	60 -12.2		µW dBm	I_F = 50 mA, 100/140 micron, 0.29 NA fiber, T = 25°C (1)
Forward Voltage	V_F		1.70	2.00	V	I_F = 100 mA
Reverse Voltage	B_{VR}	1.0	5.0		V	I_R = 10 µA
Peak Wavelength	λ_P		850		nm	I_F = 100 mA DC
Spectral Bandwidth	$\Delta\lambda$		50		nm	I_F = 100 mA DC
Response Time					ns	1 V Prebias, 100 mA peak
T = 25°C, 10-90%	t_R		3	6		
T = 25°C, 90-10%	t_F		4	6		
-40 < T < +100°C, 10-90%	t_R		3	7		
-40 < T < +100°C, 90-10%	t_F		4	7		
Analog Bandwidth	BWE		150		MHz	I_F = 100 mA DC, small signal sinusoidal modulation
P_O Temperature Coefficient	$\Delta P_O/\Delta T$		-0.019		dB/°C	I_F = 100 mA
Series Resistance	r_S		4.0		Ω	DC
Capacitance	C		70		pF	V_R = 0 V, f = 1 MHz
Thermal Resistance			250		°C/W	Heat sinked

Notes

1. HFE4023-323/XXX is tested using a 100/140 micron fiber cable. Actual coupled power values may vary due to mechanical alignment procedures and/or receptacle and fiber tolerances.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Storage temperature	-40 to +100°C
Case operating temperature	-40 to +100°C
Lead solder temperature	260°C, 10 s
Continuous forward current (heat sinked)	100 mA
Reverse voltage	1 V @ 10 µA

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

FIBER INTERFACE

Honeywell LEDs are designed to interface with multimode fiber with sizes ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 50/125 micron core fiber. All multimode fiber optic cables between 50/125 and 200/230 should operate with similar excellent performance. See table for typical powers.

TYPICAL COUPLED POWER (µW/dBm) @ I = 50 mA

Dia.	Index	N.A.	-323
50/125	Graded	0.20	10/-19.9
62.5/125	Graded	0.28	19/-17.1
100/140	Graded	0.29	60/-12.2

HFE4023-323/XXX

High Speed Fiber Optic LED

ORDER GUIDE	
Description	Catalog Listing
Standard screening, typical power out 60 μW	HFE4023-323/XXX

MOUNTING OPTIONS

substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 203

WARNING

Under certain application conditions, the infrared optical output of this device may exceed Class 1 eye safety limits, as defined by IEC 825-1 (1993-11). Do not use magnification (such as a microscope or other focusing equipment) when viewing the device's output.

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

Fig. 1 Typical Optical Power Output vs Forward Current FIBER001.GRA

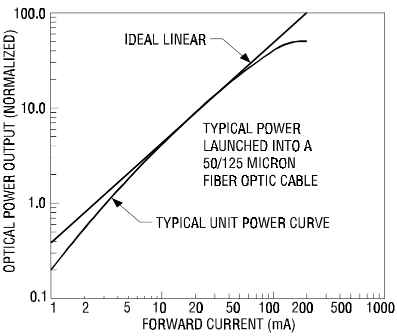


Fig. 2 Typical Spectral Output vs Wavelength FIBER103.GRA

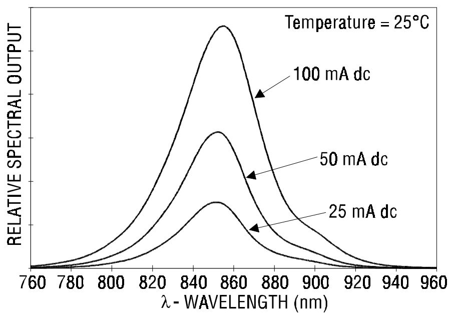
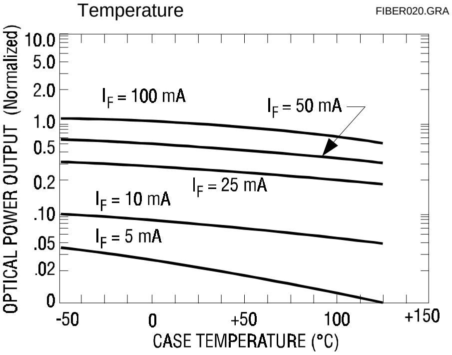


Fig. 3 Typical Optical Power Output vs Case Temperature FIBER020.GRA



All Performance Curves Show Typical Values

HFE4023-323/XXX

High Speed Fiber Optic LED

HFE4026-313/XXX

Low Drive Current Fiber Optic LED

FEATURES

- Power out designed for drive currents between 5 and 50 mA
- SMA small hole mounting fiber optic connector
- Optimized for linear optical output with drive currents between 5 and 50 mA
- High speed: 85 MHz
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFE4026-313/XXX is a high radiance GaAlAs 850 nanometer LED optimized for coupling into small fiber core diameters at a forward current of 5 to 50 mA. The patented "Caprock"™ LED chip combines high power coupling with wide bandwidth. The peak wavelength is matched for use with Honeywell silicon fiber optic detectors and receivers. When the HFE4026-313/XXX is used at elevated temperatures, thermal resistance must be taken into consideration.

APPLICATION

The HFE4026-313/XXX is a high radiance LED packaged in a fiber optic connector that aligns the optical axis of the base component to the axis of the optical fiber. Data rates can vary from DC to above 85 MHz depending upon component application. The LED converts electrical current into optical power that can be used in fiber optic communications. As the current varies (typically from 5 to 50 mA), the light intensity increases proportionally.

The HFE4026-313/XXX LED is designed to give high fiber coupled power (high radiance into a standard fiber optic cable). In order to enhance the light being sent into a fiber optic cable, a 0.30 mm diameter glass microlens is placed over the "Caprock"™ junction. The microlens collimates the light, increasing the intensity directed toward a fiber optic cable. This creates a "SWEET SPOT" of power, allowing greater power to be launched into standard fiber optic cables.

HFE4026-313/XXX

Low Drive Current Fiber Optic LED

ELECTRO-OPTICAL CHARACTERISTICS (-40°C < T_C < 100°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Fiber Coupled Power	P_{OC}	10.0 -20.0	12.0 -19.0		μW dBm	I_F = 6 mA, 100/140 micron, 0.29 NA fiber, T = 25°C [1]
Forward Voltage	V_F		1.70	2.00	V	I_F = 50 mA
Reverse Voltage	B_{VR}	1.0	5.0		V	I_R = 10 μA
Peak Wavelength	λ_P		850		nm	I_F = 25 mA DC
Spectral Bandwidth	$\Delta\lambda$		50		nm	I_F = 25 mA DC
Response Time					ns	1 V Prebias, 50 mA peak
T = 25°C, 10-90%	t_R		12	20		
T = 25°C, 90-10%	t_F		12	20		
Analog Bandwidth	BWE		85		MHz	I_F = 50 mA DC, small signal sinusoidal modulation
P_O Temperature Coefficient	$\Delta P_O/\Delta T_O$		-0.019		mV/°C	I_F = 50 mA
Series Resistance	r_S		4.0		Ω	DC
Capacitance	C		70		pF	V_R = 0 V, f = 1 MHz
Thermal Resistance			250		°C/W	Heat sinked

Notes

1. HFE4026-313/XXX is tested using a 100/140 micron fiber cable. Actual coupled power values may vary due to mechanical alignment procedures and/or receptacle and fiber tolerances.

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Storage temperature	-40 to +100°C
Case operating temperature	-40 to +100°C
Lead solder temperature	260°C, 10 s
Continuous forward current (heat sinked)	50 mA

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

FIBER INTERFACE

Honeywell LEDs are designed to interface with multimode fiber with sizes ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 50/125 micron core fiber. All multimode fiber optic cables between 50/125 and 200/230 should operate with similar excellent performance. See table for typical powers.

TYPICAL COUPLED POWER (μW/dBm) @ I_F=50 mA

Dia.	Index	N.A.	-013
50/125	Graded	0.20	14.0/-18.5
62.5/125	Graded	0.28	30.2/-15.1
100/140	Graded	0.29	125.0/-9.0

HFE4026-313/XXX

Low Drive Current Fiber Optic LED

ORDER GUIDE

Description	Catalog Listing
Standard screening, typical power out 12 μW	HFE4026-313/XXX

MOUNTING OPTIONS

substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 203

WARNING

Under certain application conditions, the infrared optical output of this device may exceed Class 1 eye safety limits, as defined by IEC 825-1 (1993-11). Do not use magnification (such as a microscope or other focusing equipment) when viewing the device's output.

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

Fig. 1 Typical Optical Power Output vs Forward Current FIBER001.GRA

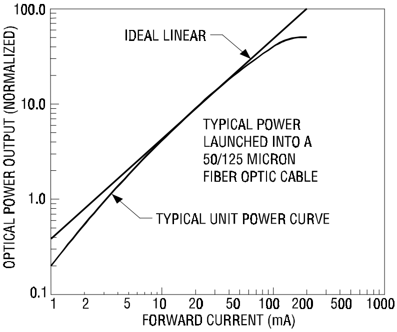


Fig. 2 Typical Spectral Output vs Wavelength FIBER104.GRA

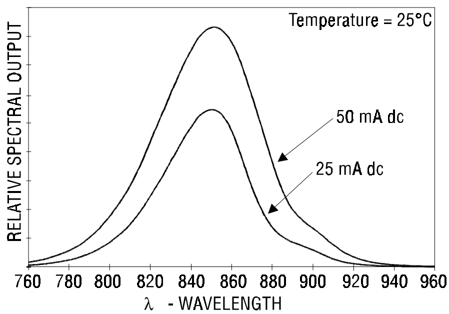
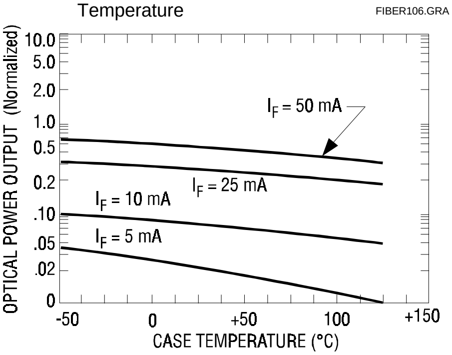


Fig. 3 Typical Optical Power Output vs Case Temperature FIBER106.GRA



All Performance Curves Show Typical Values

HFE4026-313/XXX

Low Drive Current Fiber Optic LED

HFE4050-01X/XXX

High Power Fiber Optic LED

FEATURES

- High power LED sends 410 µW into 100/140 micron fiber
- High speed: 85 MHz
- Rated to 100 mA forward current operation
- Wave solderable
- Designed to operate with Honeywell fiber optic receivers
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFE4050-01X/XXX is a high radiance GaAlAs 850 nanometer LED optimized for coupling into small fiber core diameters at a forward current up to 100 mA. The patented "Caprock"™ LED chip combines high power coupling with wide bandwidth. The peak wavelength is matched for use with Honeywell silicon fiber optic detectors and receivers.

APPLICATION

The HFE4050-01X/XXX is a high radiance LED packaged in a fiber optic connector that aligns the optical axis of the base component to the axis of the optical fiber. Data rates can vary from DC to above 85 MHz depending upon component application. The LED converts electrical current into optical power that can be used in fiber optic communications. As the current varies (typically from 10 to 100 mA), the light intensity increases proportionally.

The HFE4050-01X/XXX LED provides the maximum amount of radiance for the amount of forward current in the industry. A 0.25 mm diameter glass microlens over the "Caprock"™ junction collimates the light, increasing the intensity. Thus, greater power is directed toward standard fiber optic cables.

HFE4050-01X/XXX

High Power Fiber Optic LED

ELECTRO-OPTICAL CHARACTERISTICS (T_C = -40°C to +100°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Fiber Coupled Power [1]	P_{OC}					I_F = 100 mA, 50/125 micron, [2] 0.20 NA fiber, T = 25°C [3]
HFE4050-013/XXX		30	40		µW	
		-15.2	-14.0		dBm	
Over Temp. Range		20			µW	
		-17.0			dBm	
HFE4050-014/XXX		50	70		µW	
		-13.0	-11.5		dBm	
Over Temp. Range		33			µW	
		-14.8			dBm	
Forward Voltage	V_F	1.50	1.85	2.25	V	I_F = 100 mA
Reverse Voltage	B_{VR}	1.0	5.0		V	I_R = 10 µA
Peak Wavelength	λ_P	810	850	885	nm	I_F = 50 mA DC
Spectral Bandwidth (FWHM)	$\Delta\lambda$		50		nm	I_F = 50 mA DC
Response Time					ns	1 V Prebias, 100 mA peak [3]
T = 25°C, 10-90%	t_R		6	10		
T = 25°C, 90-10%	t_F		6	10		
Analog Bandwidth	BWE		85		MHz	I_F = 100 mA DC, sinusoidal modulation [3]
P_O Temperature Coefficient	$\Delta P_O/\Delta T$		-0.02		dB/°C	I_F = 100 mA (over 25 to 125°C)
Series Resistance	r_S		4.0		Ω	DC
Capacitance	C		70		pF	V_R = 0 V, f = 1 MHz
Thermal Resistance			150		°C/W	Heat sinked [3]
			300		°C/W	Not heat sinked

Notes
1. Dash numbers indicate power output. See ORDER GUIDE.
2. HFE4050-01X/XXX is tested using a 10 meter length of 50/125 µm dia. fiber cable, terminated in a precision ST ferrule. Actual coupled power values may vary due to alignment procedures and/or receptacle and fiber tolerances.
3. HFE4050-01X/XXX must be heat sinked for continuous I_F > 100 mA operation for maximum reliability (i.e. mounted in a metal connector with thermally conductive epoxy).

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Storage temperature	-65 to + 150°C
Case operating temperature	-55 to + 125°C
Lead solder temperature	260°C , 10 s
Continuous forward current (heat sinked)	100 mA
Reverse voltage	1 V @ 10 µA

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

FIBER INTERFACE

Honeywell LEDs are designed to interface with multimode fiber with sizes ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 50/125 micron core fiber. All multimode fiber optic cables between 50/125 and 200/230 should operate with similar excellent performance. See table for typical powers.

TYPICAL COUPLED POWER (µW/dBm) @ I_F= 100 mA

Dia.	Index	N.A.	-013	-014
8/125	Step	---	1.0/-30.0	1.8/-27.5
50/125	Graded	0.20	40/-14.0	70/-11.5
62.5/125	Graded	0.28	88/-10.6	153/-8.1
100/140	Graded	0.29	232/-6.4	406/-3.9

HFE4050-01X/XXX

High Power Fiber Optic LED

ORDER GUIDE

Description	Catalog Listing
Standard screening, typical power out 25 µW	HFE4050-013/XXX
Standard screening, typical power out 33 µW	HFE4050-014/XXX

MOUNTING OPTIONS

substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 203

WARNING

Under certain application conditions, the infrared optical output of this device may exceed Class 1 eye safety limits, as defined by IEC 825-1 (1993-11). Do not use magnification (such as a microscope or other focusing equipment) when viewing the device's output.

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

Fig. 1 Typical Optical Power Output vs Forward Current

FIBER021.GRA

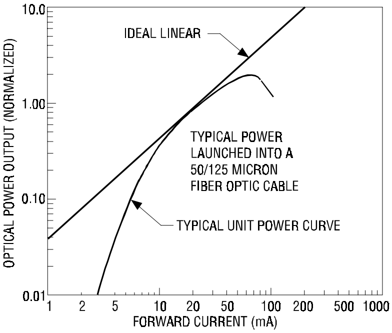
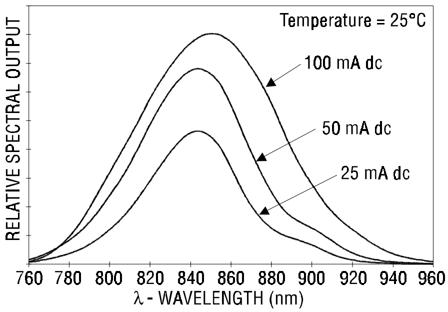


Fig. 2 Typical Spectral Output vs Wavelength

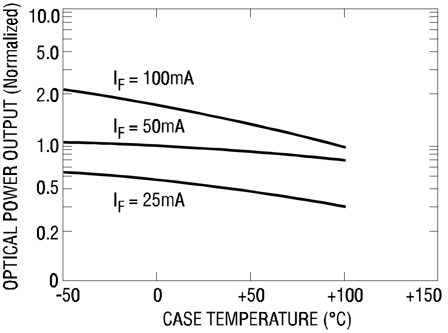
FIBER105.GRA



HFE4050-01X/XXX

High Power Fiber Optic LED

Fig. 3 Typical Optical Power Output vs Case Temperature



All Performance Curves Show Typical Values

HFE4070-313/XXX

High Power Fiber Optic LED

FEATURES

- High power LED sends 115 μW into 100/140 micron fiber
- High speed: 85 MHz
- Optimized for 50 mA operation
- Wave solderable
- Designed to operate with Honeywell fiber optic receivers
- Mounting options
  - SMA single hole
  - ST single hole
  - SMA PCB
  - ST PCB
  - SMA 4 hole

DESCRIPTION

The HFE4070-313/XXX is a high radiance GaAlAs 850 nanometer LED optimized for coupling into small fiber core diameters at a forward current of upto 50 mA. The patented "Caprock"™ LED chip combines high power coupling with wide bandwidth. The peak wavelength is matched for use with Honeywell silicon fiber optic detectors and receivers.

APPLICATION

The HFE4070-313/XXX is a high radiance LED packaged in a fiber optic connector that aligns the optical axis of the base component to the axis of the optical fiber. Data rates can vary from DC to above 85 MHz depending upon component application. The LED converts electrical current into optical power that can be used in fiber optic communications. As the current varies (typically from 10 to 100 mA), the light intensity increases proportionally.

The HFE4070-313/XXX LED provides the maximum amount of radiance for the amount of forward current in the industry. A 0.25 mm diameter glass microlens over the "Caprock"™ junction collimates the light, increasing the intensity. Thus, greater power is directed toward standard fiber optic cables.

HFE4070-313/XXX

High Power Fiber Optic LED

ELECTRO-OPTICAL CHARACTERISTICS (T_C = -40°C to +100°C unless otherwise stated)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Fiber Coupled Power	P_{OC}					I_F = 50 mA, 50/125 micron, (1) 0.20 NA fiber (2)
HFE4070-313/XXX		10	20		µW	
		-20.0	-17.0		dBm	
Over Temp. Range		7			µW	
		-21.5			dBm	
Forward Voltage	V_F	1.50	1.70	2.1	V	I_F = 50 mA
Reverse Voltage	B_{VR}	1.0	5.0		V	I_R = 10 µA
Peak Wavelength	λ_P	810	850	885	nm	I_F = 50 mA DC
Spectral Bandwidth	$\Delta\lambda$		50		nm	I_F = 50 mA DC
Response Time					ns	1 V Prebias, 100 mA peak
T = 25°C, 10-90%	t_R		6	10		
T = 25°C, 90-10%	t_F		8	10		
Analog Bandwidth	BWE		85		MHz	I_F = 100 mA DC, sinusoidal modulation (2)
P_O Temperature Coefficient	$\Delta P_O/\Delta T$		-0.02		dB/°C	I_F = 50 mA, +40°C < T_A < +100°C
Series Resistance	r_S		4.0		Ω	DC
Capacitance	C		70		pF	V_R = 0 V, f = 1 MHz
Thermal Resistance			250		°C/W	Heat sinked (2)
			500		°C/W	Not heat sinked

Notes

1. HFE4070-313/XXX is tested using a 10 meter length of 100/140 µm dia. fiber cable, terminated in a precision ST ferrule. Actual coupled power values may vary due to alignment procedures and/or receptacle and fiber tolerances.
2. HFE4070-313/XXX must be heat sinked for continuous I_F > 50 mA operation for maximum reliability (i.e. mounted in a metal connector with thermally conductive epoxy).

ABSOLUTE MAXIMUM RATINGS

(25°C Free-Air Temperature unless otherwise noted)

Storage temperature	-40 to +100°C
Case operating temperature	-40 to +100°C
Lead solder temperature	260°C, 10 s
Continuous forward current	50 mA
Continuous forward current (heat sinked)	100 mA
Reverse voltage	1 V @ 10 µA

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

FIBER INTERFACE

Honeywell LEDs are designed to interface with multimode fiber with sizes ranging from 50/125 to 200/230 microns. Honeywell performs final tests using 50/125 micron core fiber. All multimode fiber optic cables between 50/125 and 200/230 should operate with similar excellent performance. See table for typical powers.

TYPICAL COUPLED POWER (µW/dBm) @ I_F=50 mA

Dia.	Index	N.A.	-313
8/125	Step	---	0.6/-32.0
50/125	Graded	0.20	20/-17.0
62.5/125	Graded	0.28	44/-13.6
100/140	Graded	0.29	116/-9.4

HFE4070-313/XXX

High Power Fiber Optic LED

ORDER GUIDE

Description	Catalog Listing
Standard screening, typical power out 20 μW	HFE4070-313/XXX

MOUNTING OPTIONS

substitute XXX with one of the following 3 letter combinations

SMA single hole	- AAA
ST single hole	- BAA
SMA PCB	- ABA
ST PCB	- BBA
SMA 4 hole	- ADA

Dimensions on page 203

WARNING

Under certain application conditions, the infrared optical output of this device may exceed Class 1 eye safety limits, as defined by IEC 825-1 (1993-11). Do not use magnification (such as a microscope or other focusing equipment) when viewing the device's output.

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

Fig. 1 Typical Optical Power Output vs Forward Current

FIBER021.GRA

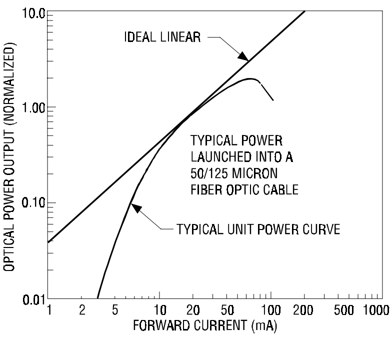


Fig. 2 Typical Spectral Output vs Wavelength

FIBER105.GRA

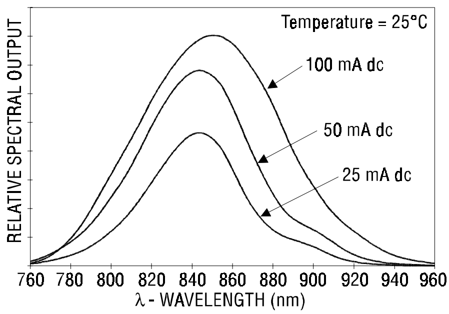
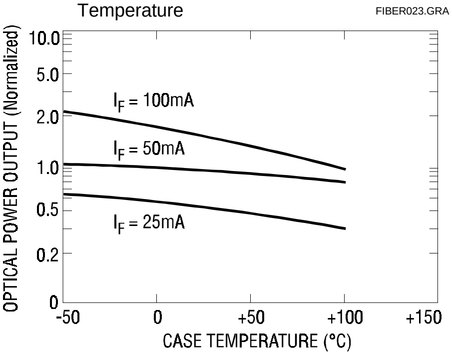


Fig. 3 Typical Optical Power Output vs Case Temperature

FIBER023.GRA



All Performance Curves Show Typical Values

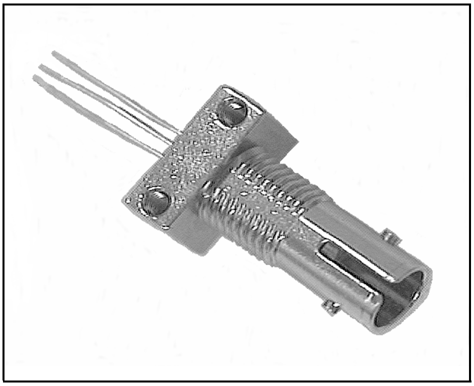
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

HFE8500-022/XBA

1300 nm SLED

FEATURES

- InGaAsP Surface Emitting LED
- 115 MHz operating bandwidth
- Mounted in industry standard ST*-LP fibre connector



OPHO_229.doc

DESCRIPTION

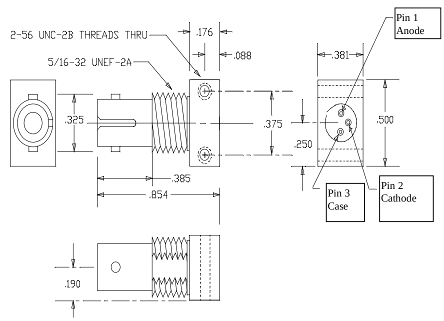
The HFE8500-022/XBA is a high-performance InGaAsP surface emitting LED that offers high coupling powers in 1300 nm fiber optic transmission applications. The LED is mounted in an industry standard low profile ST connector receptacle, optimized for low cost multimode systems where high bandwidth and long distance links are required.

APPLICATION

The HFE8500-022/XBA employs a high speed 1300 nm SLED packaged in a TO-18 metal can and opticaly aligned within a low profile ST connector receptacle. Data rates can vary from DC to 115 MHz depending upon component application. The LED is designed to convert electrical energy into optical output power that can be used in fiber optic communications and other applications. As the drive current varies above the component's threshold the optical output increases proportionally.

The HFE8500-022/XBA is designed to be used with inexpensive silicon or gallium arsenide detectors in 1300 nm multimode applications but can also be used in some singlemode systems.

OUTLINE DIMENSIONS in inches (mm)



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Pin 1 identified by red sleeve

ST is a registered trademark of AT & T.

HFE8500-022/XBA

1300 nm SLED

ELECTRO-OPTICAL CHARACTERISTICS (Tests made at 25°C unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Fiber Coupled Power	P_{OC}	20 -17	30 -15		dBM	I_F = 100 mA [1] 50/125 µm fibre
Forward Voltage	V_F		1.4	1.7	V	I_F = 100 mA
Peak Wavelength	λ_P	1290	1300	1350	nm	
Spectral Bandwidth	$\Delta\lambda$			170	nm	
Response Time -40 < T < +100°C, 10-90% -40 < T < +100°C, 90-10%	 t_R t_F		 2.5 2.5	 4.0 4.0	 ns ns	 I_F = 100 mA, 50% duty cycle, f = 12.5 MHz
Analog Bandwidth	BWE		115		MHz	
P_O Temperature Coefficient	$\Delta P_O/\Delta T$		-0.03		dBm/°C	-40°C to +85°C
Capacitance	C		15	50	pF	f = 100 MHz, V_F = 0 V

Notes

1. This product is tested with a 50/125 micron fiber.

ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 to +100°C
Case operating temperature	-40 to +70°C
Lead solder temperature	260°C, 10 sec.
Forward current	150 mA
Reverse voltage	2 V

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

Honeywell

HFE8500-022/XBA

1300 nm SLED

ORDER GUIDE

Description	Catalog Listing
1300 nm LED	HFE8500-022/XBA

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.