



Automotive Solid State Sensors

1.5M Gear Tooth Sensor

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FEATURES

- Senses ferrous metal target, single or complementary
- Digital current sinking output
- Better signal-to-noise ratio than variable reluctance and Hall sensors
- Excellent low speed and zero speed performance
- Output amplitude not dependent upon RPM
- Power-up recognition with a complementary target
- Fast operating speed (up to 30 kHz)
- EMI resistant
- Wide continuous operating temperature range (-40 °C to 150 °C)
- Reverse voltage and overvoltage protection

TYPICAL APPLICATIONS

- Camshaft position sensing
- Crankshaft position sensing
- Transmission speed sensing



The 1.5M building block is a magnetoresistive gear tooth sensor that accurately senses movement of ferrous metal targets, both single or complementary. It employs a specially-designed integrated circuit and a magnet that are sealed into a probe-type package for physical protection and cost-effective installation into various applications.

Units will function from a 4.5 Vdc to 24 Vdc power supply. Output is digital, current sinking. Reverse polarity protection is standard. If power is inadvertently wired backwards, the sensor will not be damaged. Built-in protection against pulsed transients to +60 V, -40 V is also included.

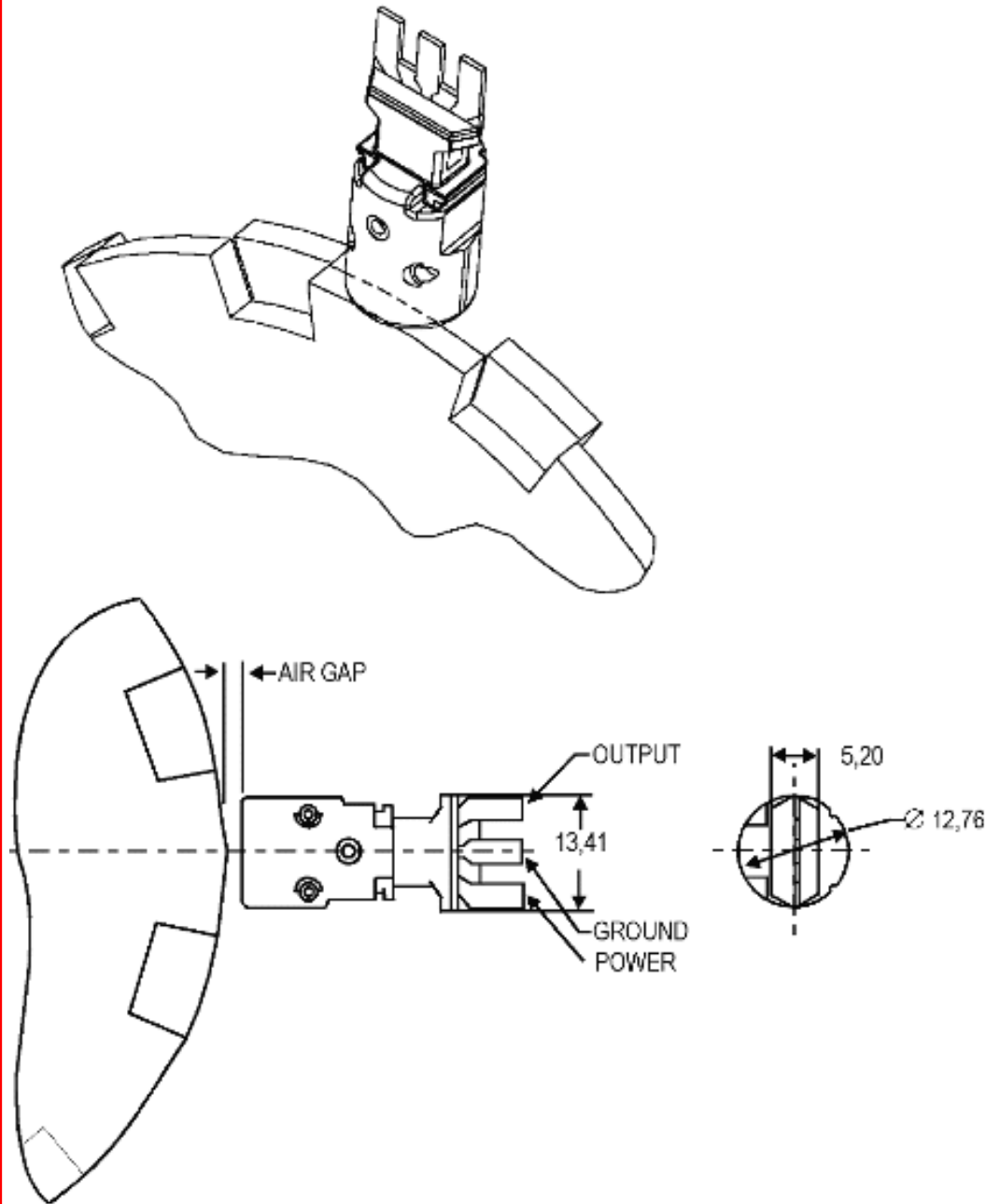
Optimum sensor performance is dependent upon the following variables that must be considered in combination:

- Target material, geometry, and speed
- Sensor/target gap
- Ambient temperature
- Magnetic material in close proximity

SENSOR SPECIFICATIONS

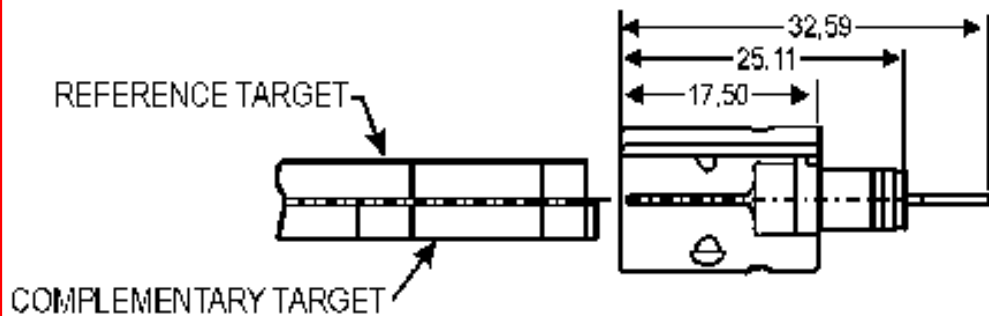
Electrical Characteristics	Supply Voltage	4.5 Vdc to 24 Vdc
	Supply Current	10 mA typ., 20 mA max.
	Output Voltage (output low)	0.4 Vdc max.
	Output Current (output high)	10 mA max. leakage into sensor
	Switching Time Rise (10% - 90%)	15 ms max.
	Switching Time Fall (90% - 10%)	1.0 ms max.
Absolute Maximum Ratings	Supply Voltage (Vs)	± 30 Vdc continuous
	Voltage Externally Applied to Output (output high)	-0.5 Vdc to +30 Vdc
	Output Current	40 mA sinking
	Temperature Range (Storage)	-40 °C to 150 °C [-40 °F to 302 °F]
	Temperature Range (Operating)	-40 °C to 150 °C [-40 °F to 302 °F]
Switching Characteristics	Operate Point	0° ± 0.5°
	Release Point	0° ± 0.5°

MOUNTING DIAGRAM



Note: Digital output is high when the sensor is positioned over a tooth on the reference target.

BLOCK DIAGRAM



Honeywell

Sensing and Control

Automotive Solid State Sensors Beta 1.5P Gear Tooth Sensor

FEATURES

- Environmentally-protected building block
- Senses ferrous metal targets
- Digital current-sinking output
- Optional inverted output
- Better signal-to-noise ratio than variable reluctance sensors
- Excellent low speed performance - output amplitude is not dependent on target speed
- Fast operating speed (up to 100kHz)
- Reverse voltage and transient protected
- EMI resistant
- Wide operating temperature (-40°C to 150°C)
- Twist insensitive



The Beta 1.5P building block is a Hall effect gear tooth sensor that accurately senses the movement of ferrous metal targets. It employs a specially designed Integrated Circuit, discrete components and a magnet that are enclosed in an environmentally sealed stainless steel can. This package has been carefully designed for cost-effective 2.0 level packaging.

Units will function from a 4.5 to 24 VDC power supply. Output is digital, current sinking or inverted as an option. Reverse polarity protection is standard. Built-in protection against pulsed transients (ISO 7637/1) is also included.

Optimum sensor performance is dependent upon the following variables that must be considered in combination:

- Target material, geometry and speed
- Sensor to target airspace
- Ambient temperature

TYPICAL APPLICATIONS

- Camshaft and crankshaft speed and position sensing
- Transmission speed sensing
- Tachometer

TARGETS

- Target symmetry not required
- Senses targets with small teeth and slots
- Can sense irregular shaped targets
- Can sense European 60-2 crank target

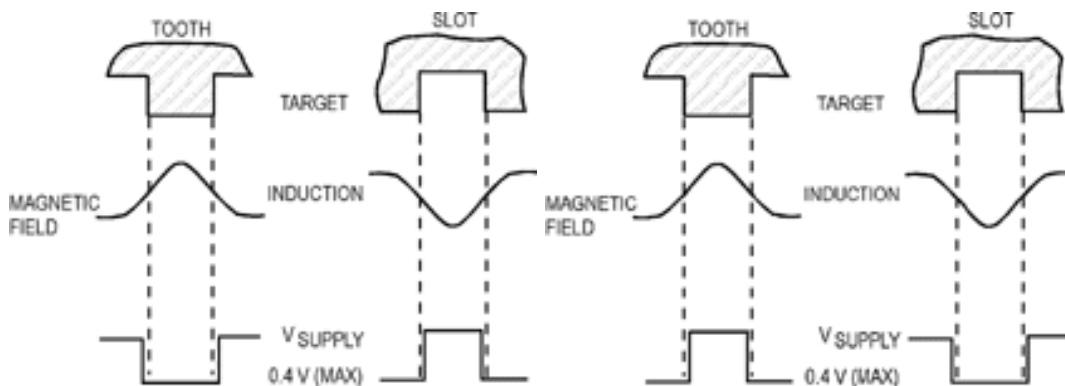
SENSOR SPECIFICATIONS

(All values were measured using a 1K pull-up resistor)

Electrical	Supply Voltage	4.5 to 24 VDC
Characteristics	Supply Current	10 mA
	Output Voltage (output low)	0.4V max.
	Output Current (output high)	10 μ A max. leakage into sensor
	Rise Time (10-90%)	15 μ sec max
	Fall Time (90 - 10%)	1.0 μ sec max.
Absolute	Supply Voltage	30 VDC
Maximum	Voltage Externally Applied	
Ratings	to Output (output high)	-0.5 to +30 volts
	Output Current	40 mA
	Temp. Range (Storage)	-40° to 150°C
	Temp. Range (Operating)	-40° to 150°C
*Switching	Operate Point	2.15 \pm 1.25 deg.
Characteristics	Release Point	1.50 \pm 1.25 deg.

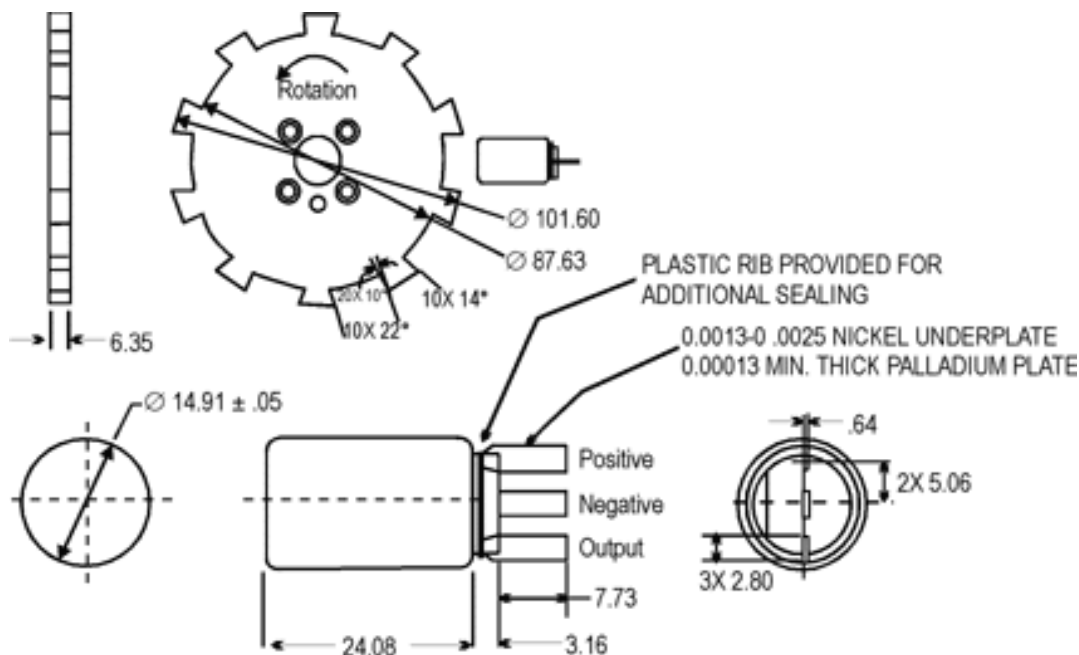
*Operate and release units and accuracy will vary slightly with target geometry. Above are based on a ten(10) tooth, 4 inch diameter target.

SENSOR OUTPUT (with pull-up resistor added to the output circuit)



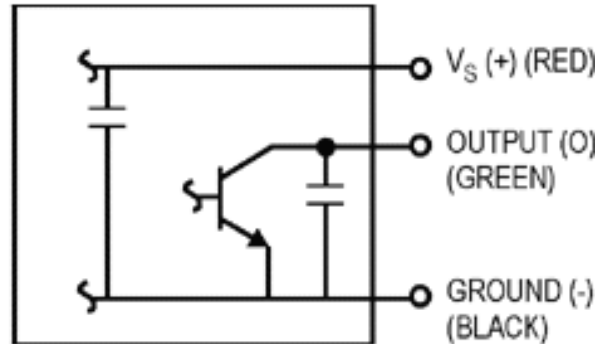
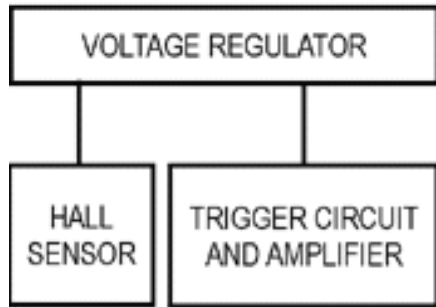
Please note: The Beta 1.5P can sense targets with small teeth and slots, irregular shapes and can sense the European 60-2 crank target.

DIAGRAMS/DIMENSIONS



BLOCK DIAGRAM

Beta 1.5P Gear Tooth Sensor - Automotive Solid State Sensors





Automotive Solid State Sensors

1.5P Gear Tooth Sensor

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FEATURES

- Environmentally-protected building block
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- Digital current-sinking output
- Optional inverted output
- Better signal-to-noise ratio than variable reluctance sensors
- Excellent low speed performance - output amplitude is not dependent on target speed
- Fast operating speed (up to 100kHz)
- Reverse voltage and transient protected
- EMI resistant
- Wide operating temperature (-40°C to 150°C)
- Twist insensitive

TYPICAL APPLICATIONS

- Camshaft and crankshaft speed and position sensing
- Transmission speed sensing
- Tachometer



The 1.5P building block is a Hall effect gear tooth sensor that accurately senses the movement of ferrous metal targets. It employs a specially designed Integrated Circuit, discrete components and a magnet that are enclosed in an environmentally sealed stainless steel can. This package has been carefully designed for cost-effective final packaging.

Units will function from a 4.5 to 24 VDC power supply. Output is digital, current sinking or inverted as an option. Reverse polarity protection is standard. Built-in protection against pulsed transients (ISO 7637/1) is also included.

Optimum sensor performance is dependent upon the following variables that must be considered in combination:

- Target material, geometry and speed
- Sensor to target airspace
- Ambient temperature

SENSOR SPECIFICATIONS

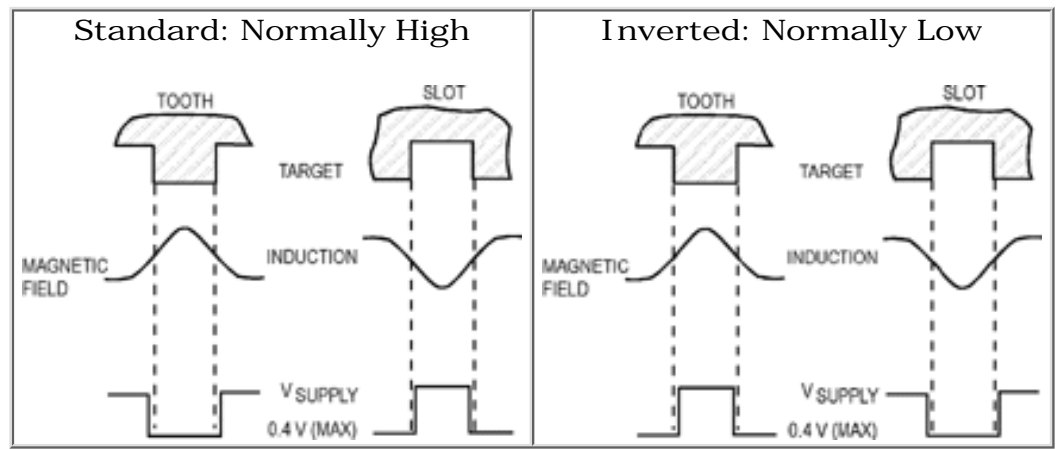
(All values were measured using a 1K pull-up resistor)

Electrical Characteristics	Supply Voltage	4.5 to 24 VDC
	Supply Current	10 mA
	Output Voltage (output low)	0.4V max.
	Output Current (output high)	10 μ A max. leakage into sensor
	Rise Time (10-90%)	15 μ sec max
	Fall Time (90 - 10%)	10 μ sec max.
Absolute Maximum Ratings	Supply Voltage (Vs)	30 VDC
	Voltage Externally Applied to Output (output high)	-0.5 to +30 volts
	Output Current	40 mA
	Temperature Range (Storage)	-40° to 150°C (-40 to 302°F)
	Temperature Range (Operating)	-40° to 150°C (-40 to 302°F)
*Switching Characteristics	Operate Point	3.0 \pm 1.25°
	Release Point	3.0 \pm 2.5°

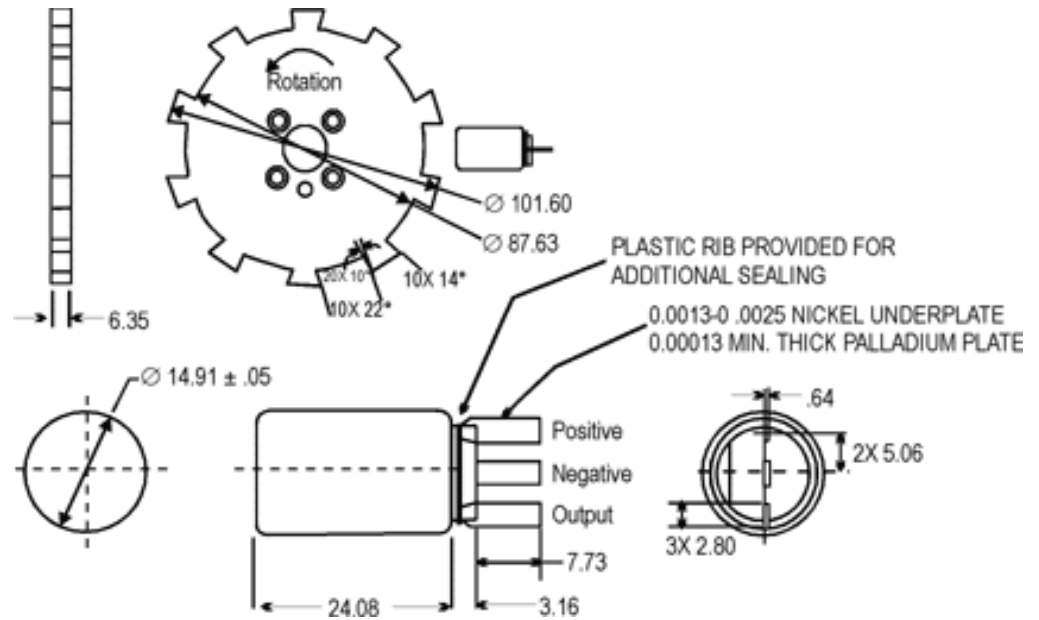
*Operate and release units and accuracy will vary slightly with target geometry. Above are based on a ten(10) tooth, 4 inch diameter target.

SENSOR OUTPUT

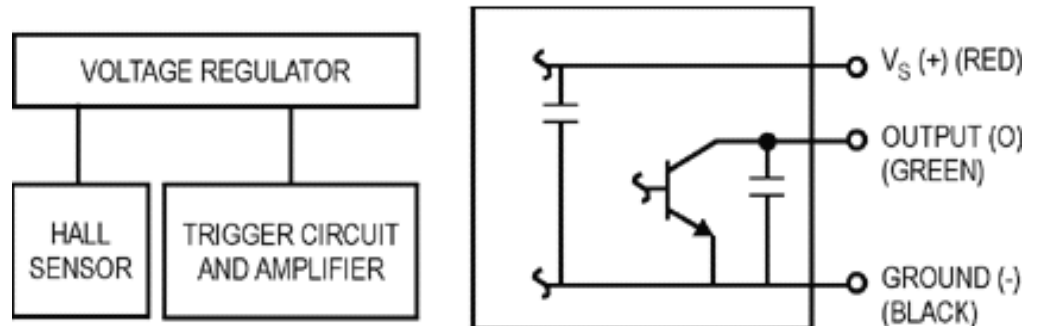
(with pull-up resistor added to the output circuit)



DIAGRAMS/DIMENSIONS



BLOCK DIAGRAM





Sensing and Control

Automotive Solid State Sensors VF431PP Wheel Speed Sensor

FEATURES

- Senses multi-pole ring magnet targets
- Two wire current output interfaces with typical ECU modules for ABS systems (Typical I ratio OP/REL 2.5:1)
- Quad-hall design virtually eliminates mechanical stress defects
- Temperature compensated magnetics
- Operate/release points symmetrical around zero gauss (bi-polar)
- Operating temperature range of -40° to 150°C (-40° to 302°F)
- Package material: Plaskon 3300H



The VF431PP is a two-wire current output digital Hall Effect position sensor. It has been designed to sense multi-pole ring magnets - specifically those found in smart bearings for wheel speed sensing.

Negative compensated magnetic characteristics are included to match the negative temperature coefficients of lower cost magnets.

TYPICAL APPLICATIONS

- Wheel speed sensing in smart bearings

SENSOR SPECIFICATIONS

	Magnetic Type	Bi-polar
Electrical	Supply Voltage	3.8 to 24 VDC
Characteristics	Output Current (Operate)	11 - 18 mA/15 mA typical
	Output Current (Release)	4 - 8 mA/6 mA typical
	Output Current Ratio (OP/REL)	2.5 typical
Output	Rise Time (10-90%)	1.5 µsec max
Switching Time	Fall Time (90 - 10%)	1.5 µsec max.

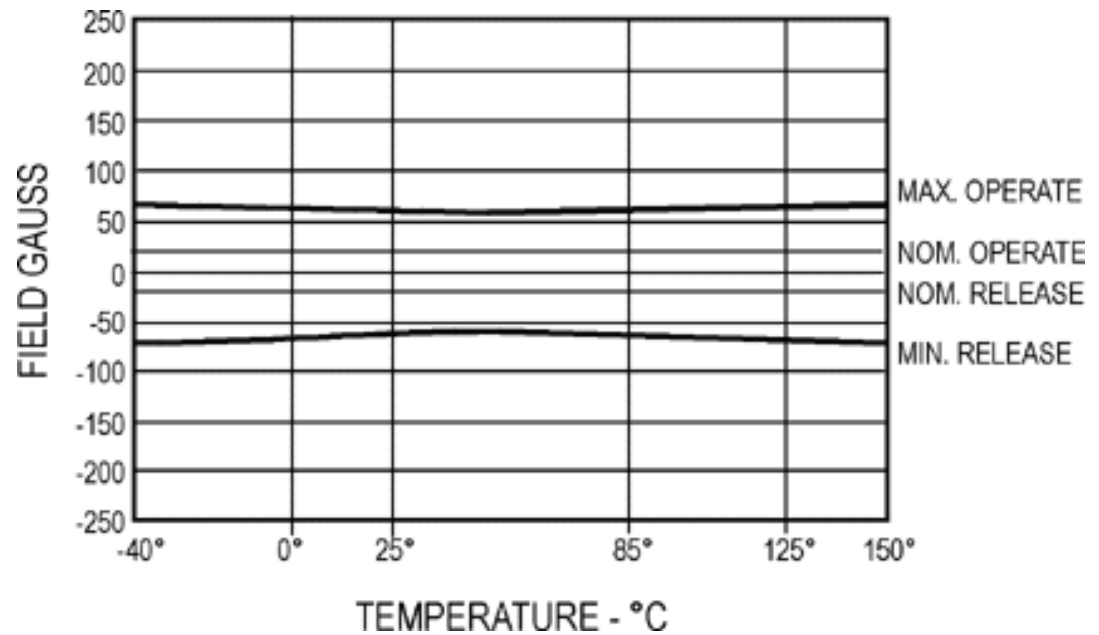
MAGNETIC CHARACTERISTICS

		G	mT
-40°C	Max. Op.	70	7.0
	Min. Rel.	-70	-7.0
	Min. Dif.	15	1.5
0°C	Max. Op.	65	6.5
	Min. Rel.	-65	-6.5
	Min. Dif.	15	1.5
25°C	Max. Op.	60	6.0
	Min. Rel.	-60	-6.0
	Min. Dif.	15	1.5
85°C	Max. Op.	60	6.0
	Min. Rel.	-60	-6.0

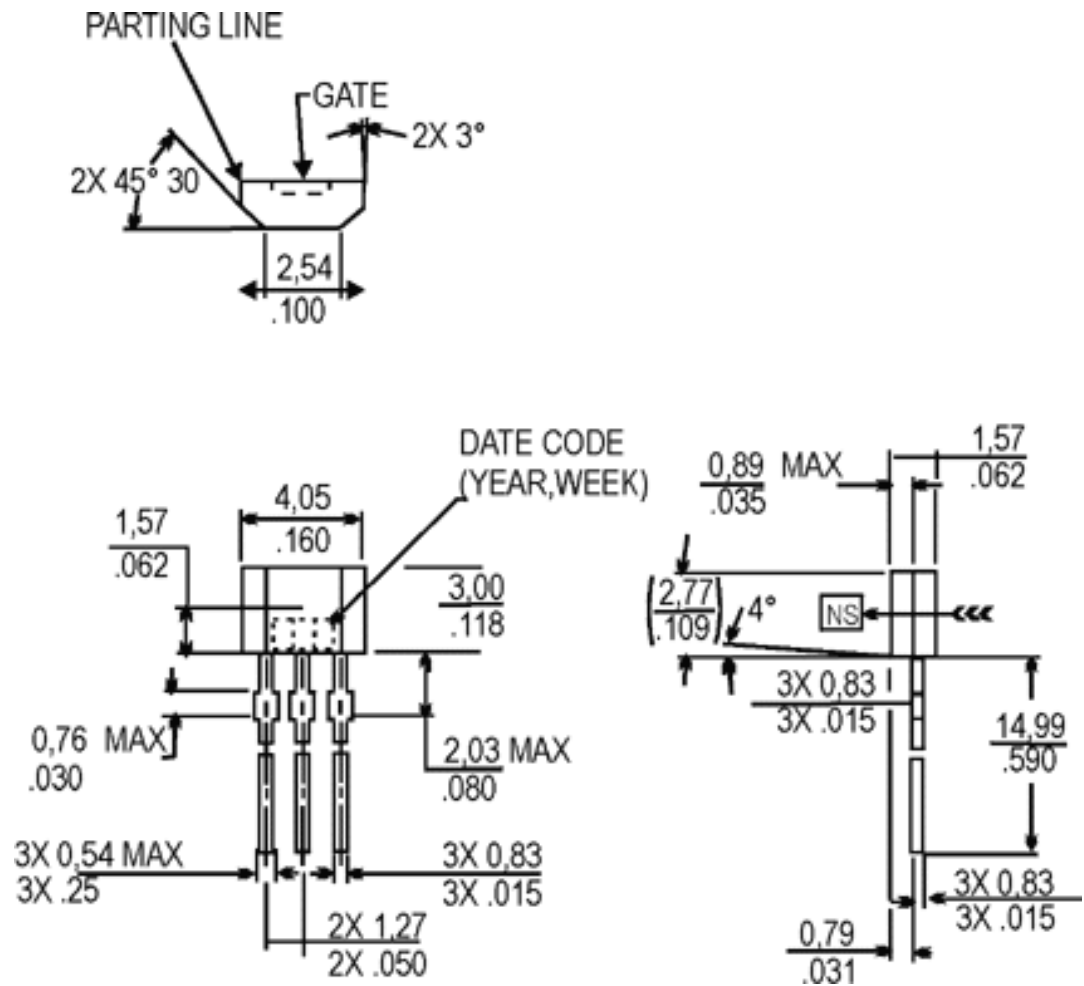
	Min. Dif.	12	1.2
125°C	Max. Op.	65	6.5
	Min. Rel.	-65	-6.5
	Min. Dif.	12	1.2
150°C	Max. Op.	70	7.0
	Min. Rel.	-70	-7.0
	Min. Dif.	10	1.0

** G = Gauss, mT = milliTesla

OPERATE AND RELEASE POINTS



MOUNTING DIMENSIONS



BLOCK DIAGRAM

