

ABL Sensors

Single/Double Bridge Gear Tooth And Encoder Sensors

Features:

- ⇒ Large Airgap
- ⇒ Direct Analog Output
- ⇒ DC (Zero Speed) Operation
- ⇒ Sine / Cosine Outputs
- ⇒ Precise Spacing and Phase Shifting Between Sensor Elements
- ⇒ Excellent Temperature and Voltage Performance
- ⇒ Small, Low Profile Surface Mount Packages

Applications:

- ⇒ Linear and Angular Speed Sensing
- ⇒ Linear and Angular Position Sensing
- ⇒ Direction Detection

Description:

The ABL Series GT Sensors are differential sensor elements that provide an analog sinusoidal output signal when used with a bias magnet and gear tooth or a magnetic encoder. These chips use NVE's proprietary GMR sensor elements, featuring an extremely large output signal from the raw sensor element, which is stable over the rated temperature and voltage range. As a result, ABL Series GT Sensors feature excellent airgap performance and an extremely stable operating envelope, as well as the robust reliability characteristics that NVE sensors are known for.

Three different standard spacings are available, for use with fine and coarse pitch encoders and gear teeth. Both single bridge and double bridge configurations are also available; double bridges are used to generate sine/cosine outputs. In addition to the standard spacings, NVE can provide custom spacings and multiple sensor elements tailored to the individual customer's application for a nominal design and tooling charge. Contact NVE for further details.

For digital output applications, these sensors can be used with NVE's DD001-12 signal processing IC, which converts their output into a 50% duty cycle modulated current signal. This IC allows placement of the ABL sensor in a very small housing, with wires running from the sensor to the signal processing IC in a remote location. In this fashion ABL series sensors can be used in M8 and smaller housings.

Specifications:

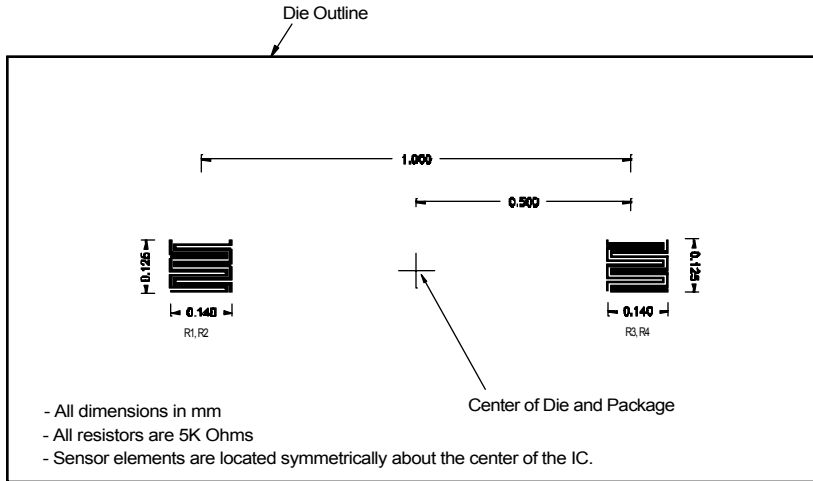
Property	Min	Typ	Max	Unit
Single Bridge Resistance	4K	5K	7K	Ohms
Input Voltage	<1 ¹		30 ¹	Volts
Operating Temperature Range	-50		+170	°C
Offset Voltage	-4		+4	mV/V
Linear Range	+/-5		+/-100	Oe
Linearity of Output	98			% ²
Hysteresis			2	% ²
Saturation of GMR Sensor Elements	-180		+180	Oe ³
Single Resistor Sensitivity		.04		%ΔR/Oe ⁴
Max Output		80		mV/V
Temperature Coefficient of Resistance		+0.3		%/°C
ESD		400		V ⁵

Notes:

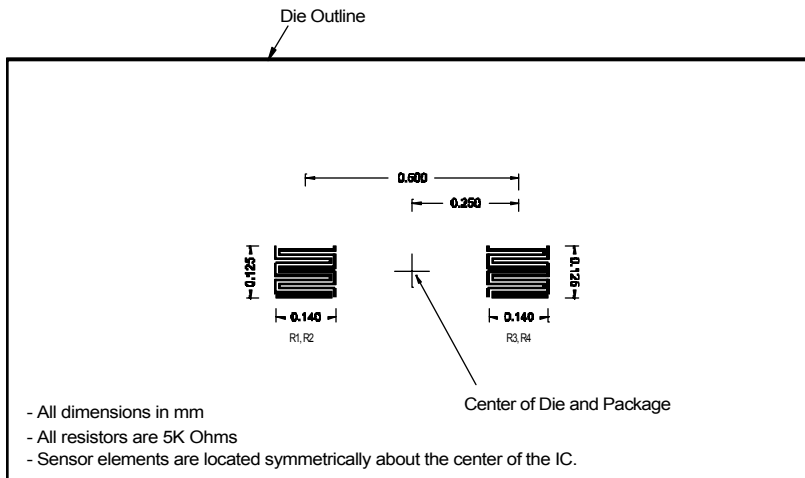
1. ABL Series sensors have a purely ratiometric output. They will operate with input voltages of 0.1V or lower. The output signal will scale proportionally with the input voltage. Maximum voltage will be limited by the power dissipation allowable in the package and user installation. See the package section for more details.
2. Linearity and Hysteresis measured across linear operating range, unipolar operation.
3. Application of a magnetic field in excess of this value will saturate the GMR sensor elements, and no further output will be obtained. No damage occurs to the sensor elements when saturated; *NVE GMR sensors will not be damaged by any large magnetic field.*
4. Percent change in resistance with application of 1 Oersted of magnetic field; corresponds to an 8% change in resistance with 200 Oersteds of applied magnetic field (1 Oersted = 1 Gauss in air, or 0.1 milli-Tesla).
5. Pin to pin voltage, Human Body Model for ESD

IC Drawings:

ABL004 Sensor Element Size and Spacing



ABL005 Sensor Element Size and Spacing



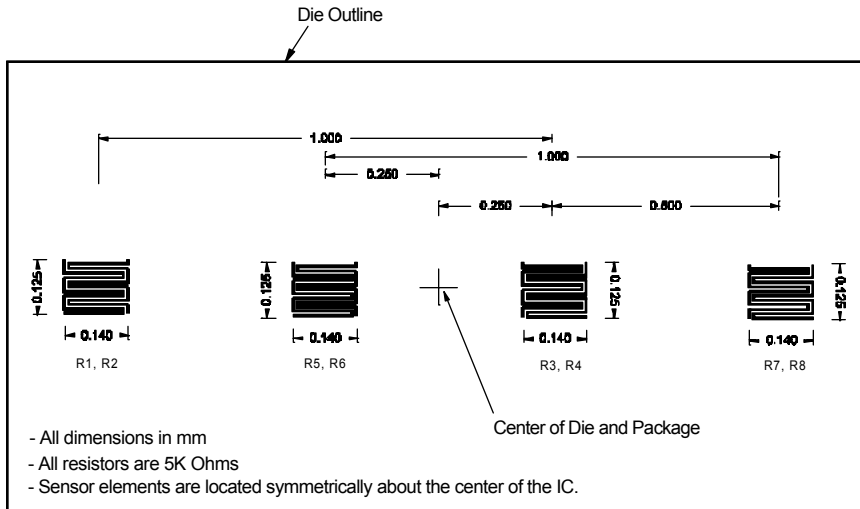
Note: ABL006 Sensor Element Size and Spacing Not Shown

RHOPOINT COMPONENTS

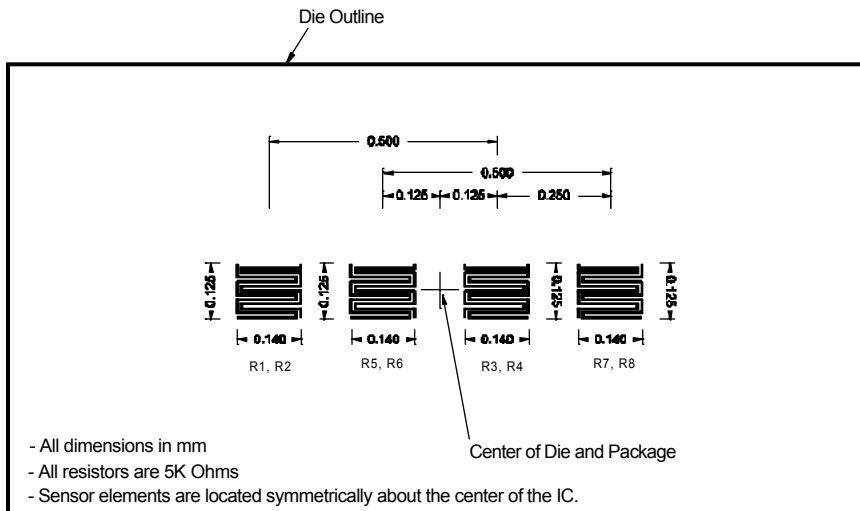
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ABL014 Sensor Element Size and Spacing



ABL015 Sensor Element Size and Spacing



Note: ABL016 Sensor Element Size and Spacing Not Shown

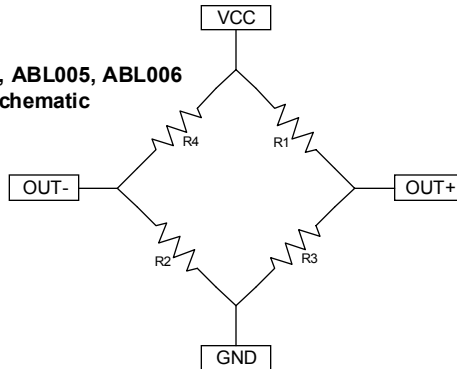
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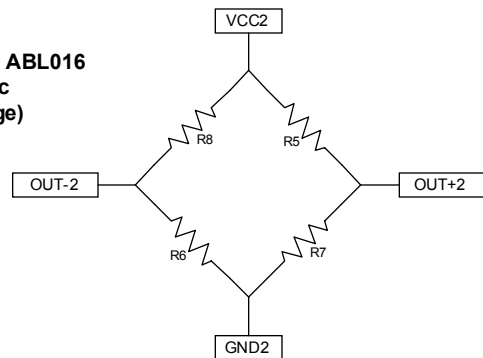
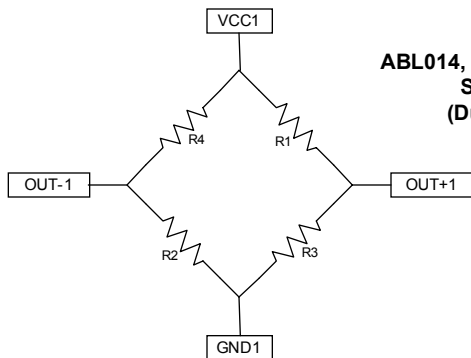
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Schematics:

**ABL004, ABL005, ABL006
Schematic**



**ABL014, ABL015, ABL016
Schematic
(Dual Bridge)**



Part Numbers and Configurations:

Part Number	Single or Dual Bridge	Element Spacing (Microns)	Phase Shift Between Bridges (Microns)	Package Marking
ABL004-00	Single	1000	NA	FDB
ABL005-00	Single	500	NA	FDC
ABL006-00	Single	300	NA	FDL
ABL014-00	Dual	1000	500	FDD
ABL015-00	Dual	500	250	FDF
ABL016-00	Dual	300	150	FDM
ABL004-10	Single	1000	NA	FDG
ABL005-10	Single	500	NA	FDH
ABL006-10	Single	300	NA	FDN
ABL014-10	Dual	1000	500	FDJ
ABL015-10	Dual	500	250	FDK
ABL016-10	Dual	300	150	FDP

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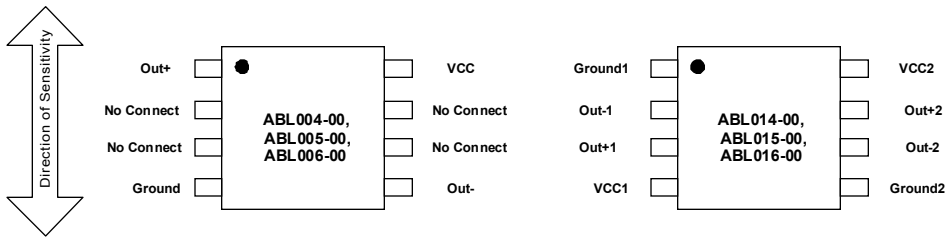
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Packages:

The ABL series parts are available in MSOP8 and TDFN6 packages. Please see the package drawing section in the Appendix for dimensions. Please note that for dual differential sensors in the TDFN package, the power and ground connections for both bridges are common.

Pin Configuration:

MSOP8 Package



TDFN6 Package

