

## AB Sensors

### Features:

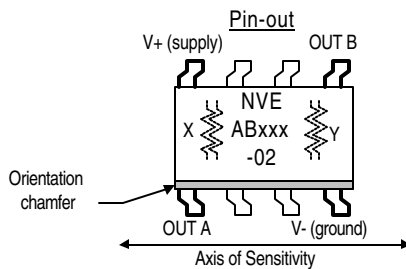
- ⇒ Excellent Sensitivity to Applied Magnetic Fields
- ⇒ Wheatstone Bridge Analog Output
- ⇒ Temperature Tolerance to 125°C Continuous
- ⇒ Wide Linear Range of Operation
- ⇒ Near-Zero Voltage Operation
- ⇒ DC to >1MHz Frequency Response
- ⇒ Small, Low Profile Surface Mount Packages

### Applications:

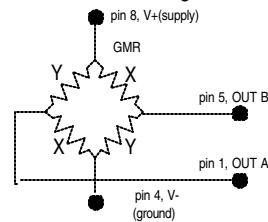
- ⇒ General Differential Field Sensing
- ⇒ Gear Tooth and Encoder Speed and Position Sensing
- ⇒ Low Power, Low Voltage Applications

### Description:

The AB series GMR sensors are general purpose gradiometers for use in a wide variety of applications. Two pairs of unshielded GMR sensor elements provide for directional sensing of small gradients in large and small magnetic fields. The ability to detect only magnetic gradients allows low sensitivity to external sources of uniform magnetic field, allowing these sensors to work successfully in high magnetic noise environments, such as near electric motors or current carrying wires.



Functional Block diagram



### Magnetic Characteristics:

Part Number	Saturation Field (Oe <sup>1</sup> )	Linear Range ( Oe <sup>1</sup>  )		Resistor Sensitivity (%R / Oe <sup>1</sup> )		Resistance (Ohms)	Package <sup>2</sup>	Die Size <sup>3</sup> (mm)
		Min	Max	Min	Max			
AB001-02	250	20	200	0.02	0.03	2.5K+/-20%	SOIC8	651x1231
AB001-00	250	20	200	0.02	0.03	2.5K+/-20%	MSOP8	651x1231

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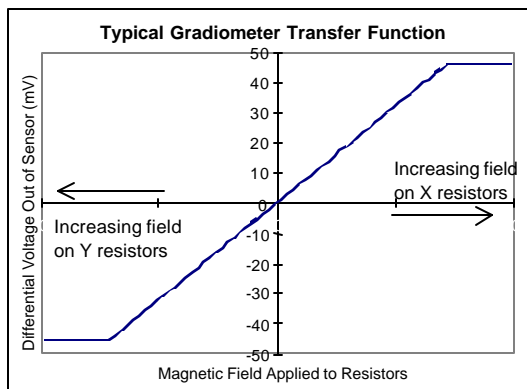
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## General Characteristics:

Property	Min	Typical	Max	Unit
Input Voltage Range	<1 <sup>4</sup>		±12.5 <sup>4</sup>	Volts
Operating Frequency	DC		> 1	MHz
Operating Temperature Range	-50		125	°C
Bridge Electrical Offset	-4		+4	mV/V
Signal Output at Max. Field		120		mV/V
Nonlinearity			2	% (unipolar) <sup>5</sup>
Hysteresis			4	% (unipolar) <sup>5</sup>
TCR		+0.14		% / °C <sup>6</sup>
TCOI		+0.03		% / °C <sup>6</sup>
TCOV		-0.1		% / °C <sup>6</sup>
Off Axis Characteristic		Cos β <sup>7</sup>		
ESD Tolerance		400		V pin to pin HBM

### Notes:

- 1 Oersted (Oe) = 1 Gauss in air.
- 2 See the Appendix for package dimensions and tolerances.
- 3 Sensors can be provided in die form by special request.
- 4 GMR AB Series sensors are pure ratiometric devices, meaning that they will operate properly at extremely low supply voltages. The output signal will be proportional to the supply voltage. Maximum voltage range is limited by the power dissipation in the package and the maximum operating temperature of the sensor.
- 5 Unipolar operation means exposure to magnetic fields of one polarity, e.g. 0 to 30 Gauss, or -2 to -50 Gauss, but not -20 to +30 Gauss (bipolar operation). Bipolar operation will increase nonlinearity and hysteresis.
- 6 TCR is resistance change with temperature with no applied field. TCOI is the output change with temperature using a constant current source to power the sensor. TCOV is the output change with temperature using a constant voltage source to power the sensor.
- 7 Beta (β) is any angle from the sensitive axis.



The Figure to the left is a simulated output from an NVE Gradiometer. The output / gradient correlation shown assumes one pair of resistors is held at zero field. Note the bipolar output.

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## ABH Sensors

### Features:

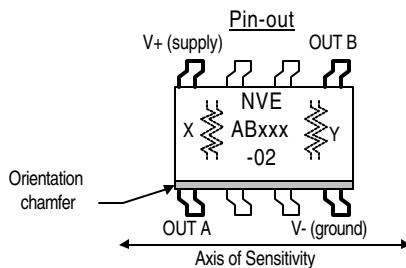
- ⇒ Extremely High Sensitivity to Applied Magnetic Fields
- ⇒ Wheatstone Bridge Analog Output
- ⇒ Temperature Tolerance to 150°C Continuous
- ⇒ Wide Linear Range of Operation
- ⇒ Near-Zero Voltage Operation
- ⇒ DC to >1MHz Frequency Response
- ⇒ Small, Low Profile Surface Mount Packages

### Applications:

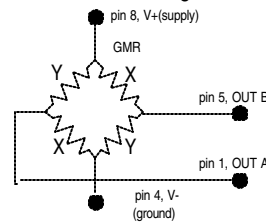
- ⇒ General Differential Field Sensing
- ⇒ Gear Tooth and Encoder Speed and Position Sensing
- ⇒ Low Voltage, High Temperature Applications

### Description:

The ABH series GMR sensors are low field, high temperature gradiometers for use in a wide variety of applications. Two pairs of unshielded GMR sensor elements provide for directional sensing of small gradients in large and small magnetic fields. The ability to detect only magnetic gradients allows low sensitivity to external sources of uniform magnetic field, allowing these sensors to work successfully in high magnetic noise environments, such as near electric motors or current carrying wires.



Functional Block diagram



### Magnetic Characteristics:

Part Number	Saturation Field (Oe <sup>1</sup> )	Linear Range (lOe <sup>1</sup> )		Resistor Sensitivity (%R / Oe <sup>1</sup> )		Resistance (Ohms)	Package <sup>2</sup>	Die Size <sup>3</sup> (mm)
		Min	Max	Min	Max			
ABH001-02	70	5	40	0.06	0.12	1.2K+/-20%	SOIC8	651x1231
ABH001-00	70	5	40	0.06	0.12	1.2K+/-20%	MSOP8	651x1231

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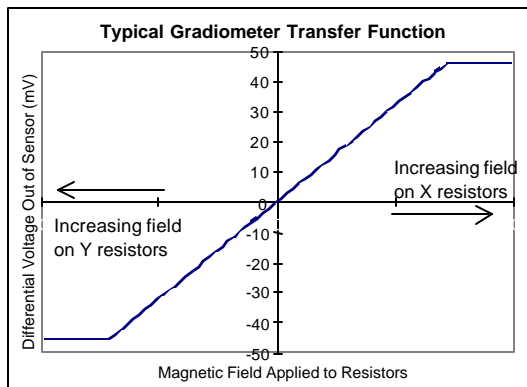
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## General Characteristics:

Property	Min	Typical	Max	Unit
Input Voltage Range	<1 <sup>4</sup>		± 12.5 <sup>4</sup>	Volts
Operating Frequency	DC		> 1	MHz
Operating Temperature Range	-50		150	°C
Bridge Electrical Offset	-4		+4	mV/V
Signal Output at Max. Field		80		mV/V
Nonlinearity			4	% (unipolar) <sup>5</sup>
Hysteresis			15	% (unipolar) <sup>5</sup>
TCR		+0.30		% / °C <sup>6</sup>
TCOI		-0.28		% / °C <sup>6</sup>
TCOV		-0.40		% / °C <sup>6</sup>
Off Axis Characteristic		Cos β <sup>7</sup>		
ESD Tolerance		400		V pin to pin HBM

### Notes:

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2. See the Appendix for package dimensions and tolerances.
3. Sensors can be provided in die form by special request.
4. GMR AB Series sensors are pure ratiometric devices, meaning that they will operate properly at extremely low supply voltages. The output signal will be proportional to the supply voltage. Maximum voltage range is limited by the power dissipation in the package and the maximum operating temperature of the sensor.
5. Unipolar operation means exposure to magnetic fields of one polarity, e.g. 0 to 30 Gauss, or -2 to -50 Gauss, but not -20 to +30 Gauss (bipolar operation). Bipolar operation will increase nonlinearity and hysteresis.
6. TCR is resistance change with temperature with no applied field. TCOI is the output change with temperature, using a constant current source to run the sensor. TCOV is the output change with temperature, using a constant voltage source to run the sensor.
7. Beta (β) is any angle from the sensitive axis.



The Figure to the left is a simulated output from an NVE Gradiometer. The output / gradient correlation shown assumes one pair of resistors is held at zero field. Note the bipolar output.

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