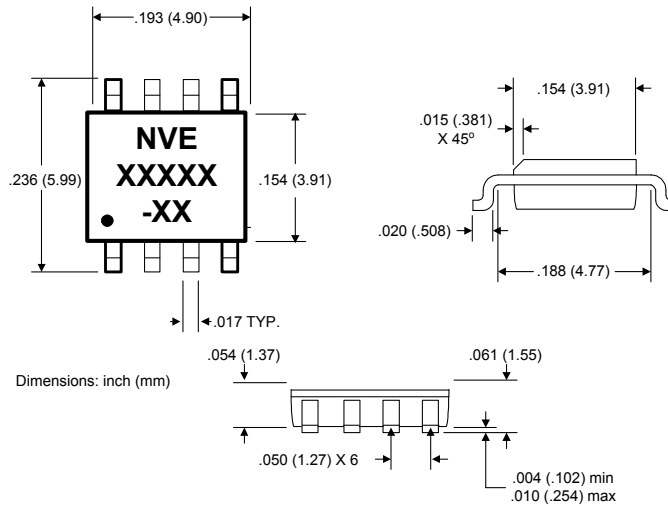


Appendix

Package Drawings and Specifications

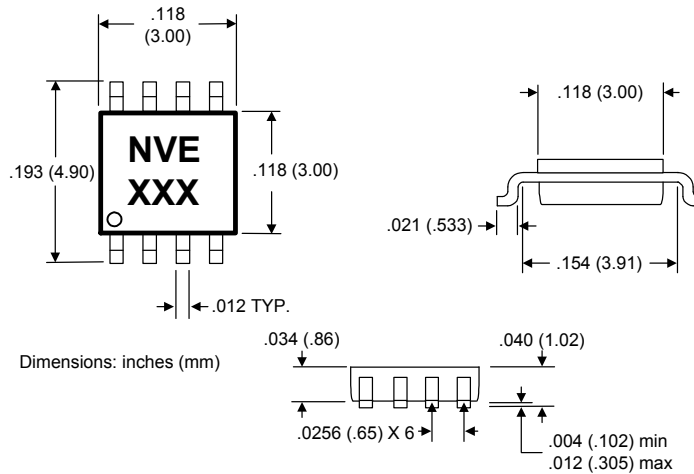
Package Drawing – SOIC8

Note: SOIC8 Package has thermal power dissipation of 240°C/Watt in free air. Attaching the package to a circuit board improves thermal performance.



Package Drawing – MSOP8

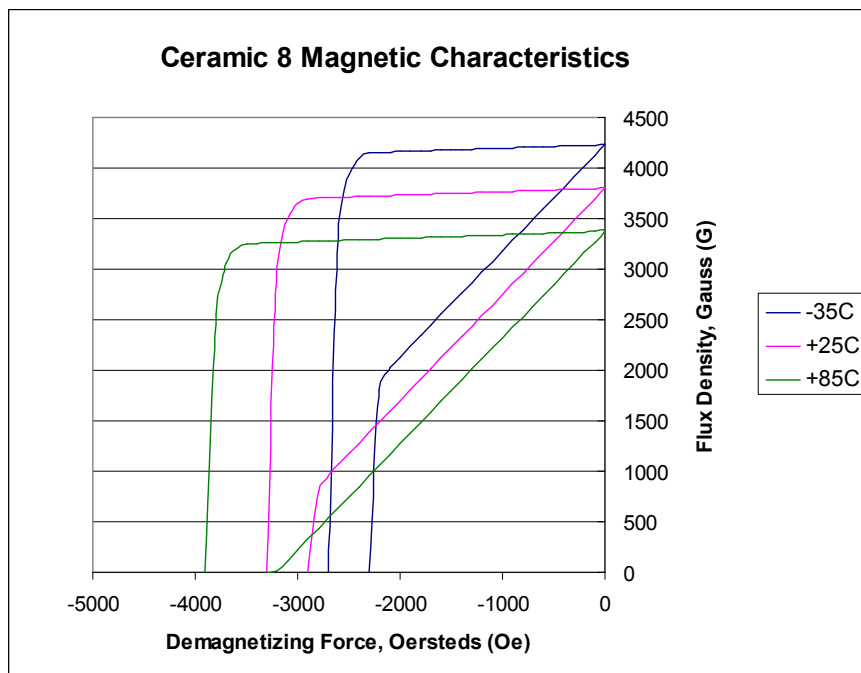
Note: MSOP8 Package has thermal power dissipation of 320°C/Watt in free air. Attaching the package to a circuit board improves thermal performance.



Magnet Data

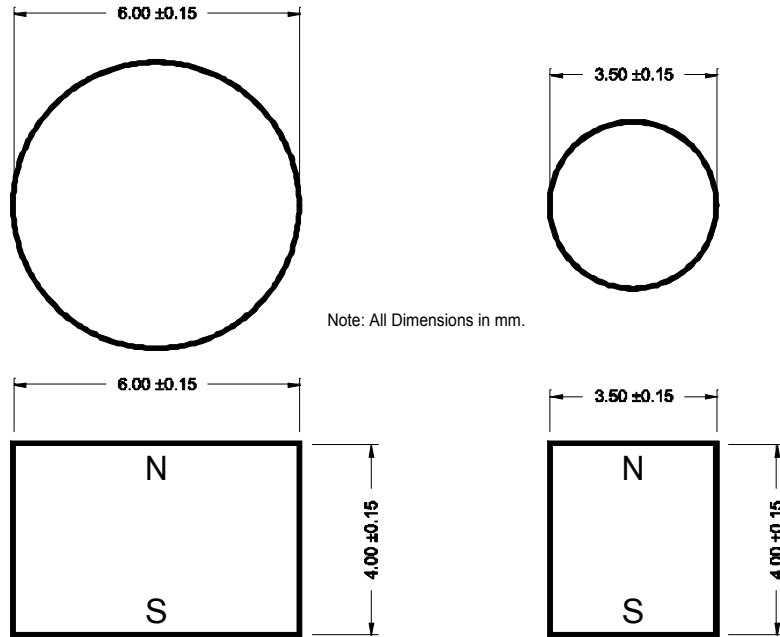
NVE supplies Ceramic 8 magnets in some of our GMR sensor evaluation kits. The characteristics for these magnets are given below:

| | |
|---|----------------|
| Material Type | Ceramic 8 (C8) |
| Maximum Operating Temperature | 300 °C |
| Curie Temperature | 450 °C |
| Temperature Coefficient of Flux Density | -0.20 %/°C |
| Maximum Energy Product | 3.5 MGOe |
| Residual Induction | 3850 Gauss |
| Coercive Force | 2950 Oersteds |



Magnet drawings for the two round disc magnets included in the GT Sensor evaluation kits are given below. These magnets are available from NVE as production parts; contact NVE for pricing and delivery information. In addition, NVE can have custom magnets built for specific applications, in Ceramic 8 or Alnico 8 materials. Please contact NVE for more details.

Ceramic 8 Disc Magnets



Note: All Dimensions in mm.

Part Numbers and Marking Codes

Some of NVE’s products are delivered in packages that are too small to be marked with the complete part number. In these cases, a 3 letter code is used to identify the part. The following table provides a cross-reference:

| NVE Part Number | Code |
|-----------------|------|
| AA004-00 | CDB |
| AA006-00 | CBC |
| AAH004-00 | CBF |
| AB001-00 | CBG |
| ABH001-00 | CBH |
| ABL004-00 | FDB |
| ABL005-00 | FDC |
| ABL014-00 | FDD |
| ABL015-00 | FDG |
| ABL004-10 | FDG |
| ABL005-10 | FDH |
| ABL014-10 | FDJ |
| ABL015-10 | FDK |
| AD004-00 | BBH |
| AD005-00 | BBG |
| AD006-00 | BBJ |
| AD020-00 | BBK |
| AD021-00 | BBB |
| AD022-00 | BBC |
| AD023-00 | BBD |
| AD024-00 | BBF |
| AD104-00 | DBH |
| AD105-00 | DBG |
| AD106-00 | DBJ |
| AD120-00 | DBK |
| AD121-00 | DBB |
| AD122-00 | DBC |
| AD123-00 | DBD |
| AD124-00 | DBF |
| AD204-00 | FBH |
| AD205-00 | FBG |
| AD206-00 | FBJ |
| AD220-00 | FBK |
| AD221-00 | FBB |
| AD222-00 | FBC |
| AD223-00 | FBD |
| AD224-00 | FBF |
| AD304-00 | GBH |
| AD305-00 | GBG |
| AD306-00 | GBJ |
| AD320-00 | GBK |
| AD321-00 | GBB |
| AD322-00 | GBC |
| AD323-00 | GBD |
| AD324-00 | GBF |
| AD404-00 | HBH |
| AD405-00 | HBG |
| AD406-00 | HBJ |

| NVE Part Number | Code |
|-----------------|------|
| AD420-00 | HBK |
| AD421-00 | HBB |
| AD422-00 | HBC |
| AD423-00 | HBD |
| AD424-00 | HBF |
| AD504-00 | JBH |
| AD505-00 | JBG |
| AD506-00 | JBJ |
| AD520-00 | JBK |
| AD521-00 | JBB |
| AD522-00 | JBC |
| AD523-00 | JBD |
| AD524-00 | JBF |
| AD604-00 | KBH |
| AD605-00 | KBG |
| AD606-00 | KBJ |
| AD620-00 | KBK |
| AD621-00 | KBB |
| AD622-00 | KBC |
| AD623-00 | KBD |
| AD624-00 | KBF |
| AD704-00 | LBH |
| AD705-00 | LBG |
| AD706-00 | LBJ |
| AD720-00 | LBK |
| AD721-00 | LBB |
| AD722-00 | LBC |
| AD723-00 | LBD |
| AD724-00 | LBF |
| AD081-00 | BDB |
| AD082-00 | BDC |
| AD083-00 | BDD |
| AD084-00 | BDF |
| AD821-00 | MBB |
| AD822-00 | MBC |
| AD823-00 | MBD |
| AD824-00 | MBF |
| AD921-00 | NBB |
| AD922-00 | NBC |
| AD923-00 | NBD |
| AD924-00 | NBF |
| ADH025-00 | MBL |
| DB001-00 | FFD |
| DC001-10 | FFB |
| DC002-10 | FFC |
| BD012-00 | ZBF |

Definitions and Conversion Factors

Definitions:

CSK or Sink: Current sinking output, also referred to as Open Collector output.

Differential: The field difference between the Operate Point and the Release Point.

Electrical Offset: The inherent imbalance of the bridge expressed in differential voltage output.

HBM: Human Body Model for ESD specifications.

Hysteresis: The maximum deviation in volts between the output with increasing field and the output with decreasing field, where the applied field is unipolar (applied in either a positive or negative direction, without crossing the zero field point), divided by Voltage Span. Expressed as a percentage.

Input Voltage Range: The voltage range that can be applied across the bridge.

IOL (Current Output Low): The output current in the low (logic 0) state (output stage switched on).

Max Output: A specification given in millivolts per applied voltage. This is the maximum output voltage possible. This output condition is achieved when one set of resistors is in magnetic saturation (have achieved the maximum resistance change possible) while the other pair are at zero applied magnetic field.

Nonlinearity: The maximum deviation from a linear fit taken over the Field Range divided by the Voltage Span. Expressed as a percentage.

Off-axis Characteristic: A specification that describes the variation in sensor output versus the angle between the applied field direction and the sensitive axis of the GMR sensor with constant electrical and magnetic inputs applied. Applicable to non-integrated bridge sensors. The output will vary as the cosine of the angle rotated.

Operate Point: The field level which produces a logical change in state from “0” to “1” in NVE’s digital magnetic field sensors ADXXX-XX.

Operating Frequency: Frequency range which will produce a responsive output.

Output Leakage Current (Current Output High): The output current in the high (logic 1) state (output stage switched off).

Output Saturation Voltage (Voltage Output Low): The output voltage in the low (logic 0) state (output stage switched on).

RBP: Reverse Battery Protection.

Release Point: The field level which produces a logical change in state from “1” to “0” in NVE’s digital magnetic field sensors ADXXX-XX.

Resistor Separation: This is the mean separation between the two pairs of resistors, in a Gradiometer or Differential sensor.

Sensitivity: A measure of the output magnitude based on electrical and magnetic input conditions. Expressed in millivolts of differential output per applied voltage per oersted.

Specified Linear Range: Typically 70% of the field it takes to saturate the part. Field dependent specifications are based upon this range.

TCOI (Temperature Coefficient of Output at Constant Input Current): The variation of the output voltage over temperature with a constant input current applied. Expressed as a percentage per unit temperature change.

TCOV (Temperature Coefficient of Output at Constant Input Voltage): The variation of the output voltage over temperature with a constant input voltage applied. Expressed as a percentage per unit temperature change.

TCR (Temperature Coefficient of Resistance): The variation of the GMR resistors over temperature. Expressed as a percentage per unit temperature change.

Voltage Span: The differential output voltage taken from zero to 70% of the saturation field level.

Conversion Factors

| To Convert | Into | Multiply by |
|-------------------|--------------------|------------------------|
| μWb | maxwell | 10^2 |
| A/cm | Oe | 1.256 |
| A/m | Oe | 1.256×10^{-2} |
| At | Gb | 1.256 |
| G | Oe | 1 (when $\mu_o=1$) |
| G | T | 10^{-4} |
| G | mT | 10^{-1} |
| G | nT | 10^5 |
| G | Wb/cm^2 | 10^{-8} |
| G | Wb/in^2 | 6.452×10^{-8} |
| G | Wb/m^2 | 10^{-4} |
| Gb | At | 0.796 |
| kA/m | Oe | 1.256×10^1 |
| maxwell | Wb | 10^{-8} |
| maxwell | μWb | 10^{-2} |
| mT | G | 10 |
| maxwell | volt second | 10^{-8} |
| nT | G | 10^{-5} |
| nT | gamma (γ) | 1 |
| Oe | A/cm | 7.962×10^{-1} |
| Oe | A/m | 7.962×10^1 |
| Oe | kA/m | 7.962×10^{-2} |
| T | G | 10^4 |
| T | Wb/m^2 | 1 |
| volt second | maxwell | 10^8 |
| volt second | Wb | 1 |
| Wb | maxwell | 10^8 |
| Wb/cm^2 | G | 10^8 |
| Wb/m^2 | G | 10^4 |

NVE Company Profile

NVE Corporation is a high technology components manufacturer having the unique capability to combine leading edge Giant Magnetoresistive (GMR) materials with integrated circuits to make novel electronic components. Starting as a research and development only company in 1989, NVE has consistently discovered, developed, and patented manufacturable GMR materials and products over the last 13 years. NVE is now recognized as the world leader in GMR technology, and investments in NVE from companies such as Motorola and Cypress Semiconductor underscore this leadership.

In 1995, NVE's sensors business unit sprung from the results of the company's early efforts, and NVE became the first company in the world to offer a production magnetic sensor product based on GMR technology. Since that first product introduction, NVE's GMR sensor line has grown to encompass a wide variety of analog and digital sensor ICs, related signal processing ICs, and printed circuit board assemblies for specific sensor applications. These products place NVE at the forefront of the magnetic sensors market in a variety of application areas, including industrial speed and position sensing, magnetic media detection, field sensing in medical applications, and current sensing.

NVE's research into basic GMR materials continues unabated, resulting in a steady stream of new, high performance GMR materials and designs that can be incorporated into commercial sensor products. This wellspring of cutting edge technology ensures that NVE's products will be the market leaders for years to come.

NVE is located in Eden Prairie, Minnesota, USA, a suburb of Minneapolis. Please visit our web site or call our toll free number for information on products, sales, or distribution.

NVE Corporation
11409 Valley View Road
Eden Prairie, MN 55344
USA
Telephone: 800-467-7141
Fax: 952-829-9189
Internet: www.nve.com
e-mail: info@nve.com

HY-LINE Sensor-Tec Vertriebs GmbH
Inselkammerstraße 10
D-82008 Unterhaching
Deutschland
Tel.: xx49 89 614 503 30
Fax.: xx40 89 614 503 34
Internet: www.hy-line.de/sensor
e-mail: sensortec@hy-line.com

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