

Installation Instructions for the VF401 2-Wire MR Fine Pitch Ring Magnet Sensor

ISSUE 1
50046457

GENERAL INFORMATION

The VF401 is a high performance, digital, 2-wire, MR (magnetoresistive) sensor in a miniature plastic package with a current output, designed for sensing fine pitch ring magnets.

A customer-supplied sense resistor is required for negative reverse voltage

CAUTION

ELECTROSTATIC DISCHARGE DAMAGE

This component is sensitive to electrostatic discharge (ESD). Take normal ESD precautions in handling this product to prevent ESD-induced damage and/or degradation.

Failure to comply with these instructions may result in product damage.



SOLDERING/ASSEMBLY

CAUTION

IMPROPER SOLDERING

- Ensure leads are adequately supported during any forming/shearing operation so that they are not stressed inside the plastic case.
- Limit exposure to high temperatures.

Failure to comply with these instructions may result in product damage.

Soldering Temperature

Recommended PC board wave soldering temperature is 250 °C to 260 °C (482 °F to 500 °F) for 3 s, max.

CLEANING

CAUTION

IMPROPER CLEANING

Do not use pressure wash. The high-pressure stream could force contaminants into the package.

Failure to comply with these instructions may result in product damage.

Use agitated rinse to clean the sensor.

Table 1. Absolute Maximum Ratings¹

| Characteristic | Min. | Max. | Unit |
|-----------------------------|----------|---|---------|
| Supply voltage ² | -18 | +18 | V |
| Magnetic flux gauss | no limit | | |
| Temperature | - | 175 [347] for 10 min at 10 cycles | °C [°F] |
| Frequency | - | 3000 | Hz |

Note 1: Absolute maximum ratings are the extreme limits that the device will withstand without damage to the device. However, the electrical and mechanical characteristics are not guaranteed as the maximum limits (above recommended operating conditions) are approached, nor will the device necessarily operate at absolute maximum ratings.

Figure 1. Block Diagram

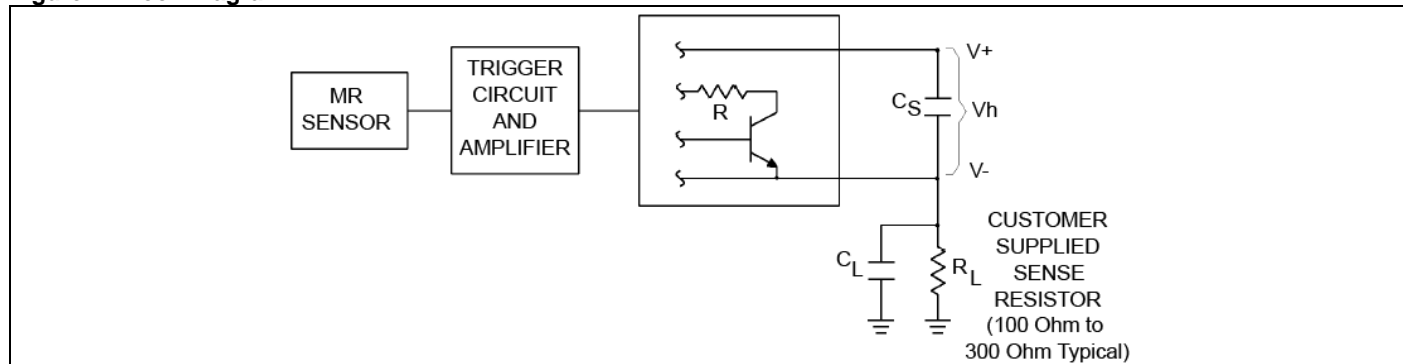


Table 2. Specifications (Established using a 65,00 mm [2.559 in] diameter, 48-pole pair ring magnet.)

| Characteristic | Condition | Min. | Typ. | Max. | Unit |
|---|---|--------------|----------|-------------|---------|
| V _{cc} ¹ | – | – | – | – | V |
| V _h (V+ to V-) | – | 4.5 | – | 16 | V |
| I _{cc} operate | – | 11.8 | 14 | 16.80 | mA |
| I _{cc} released | – | 5.9 | 7 | 8.40 | mA |
| I _{cc} ratio (op/rel) | – | 1.9 | 2.0 | 2.3 | – |
| Rise time, 10% to 90% | V _{cc} = 12 V, R _L : = 150 Ohm, C _L = 1000 pF 25 °C [77 °F] | – | 1.5 | – | µs |
| Fall time, 10% to 90% | V _{cc} = 12 V, R _L : = 150 Ohm, C _L = 1000 pF 25 °C [77 °F] | – | 1.5 | – | µs |
| Operating temperature | – | -40 [-40] | – | 150 [302] | °C [°F] |
| Differential magnetic field over entire MR bridge area: operate release | – | – | +7 -7 | – | Gauss |
| Air gap ² | – | 0.75 [0.030] | – | 2.5 [0.098] | mm [in] |
| Duty cycle | – | 30 | 50 | 70 | % |

Notes:

1. V_{cc} is limited by V_h and the value chosen for the sense resistor.
2. Sensor operation at limits for air gap is dependent on ring magnet.

Table 3. ESD and EMC Performance

| Test | Specification | Condition | Results |
|-----------------------------------|---------------|---|---------------------------------|
| ESD (Electrostatic Discharge) | GMW3100GS | – | Class 3 (low sensitivity) |
| Electrical transient transmission | ISO 7637-3 | electrical capacitance and inductive coupling | Class B ¹ |
| Radiated immunity | ISO 11452-3 | 0.1 MHz to 12 GHz, 80% AM at 1 kHz | Class A ² at 100 V/m |

Notes:

1. Class B: One or more functions may be out of specification during disturbance, but will automatically return to normal after exposure is removed.
2. Class A: All functions remain within specification during and after exposure to disturbance.

Figure 2. Electrical Specification Test Condition

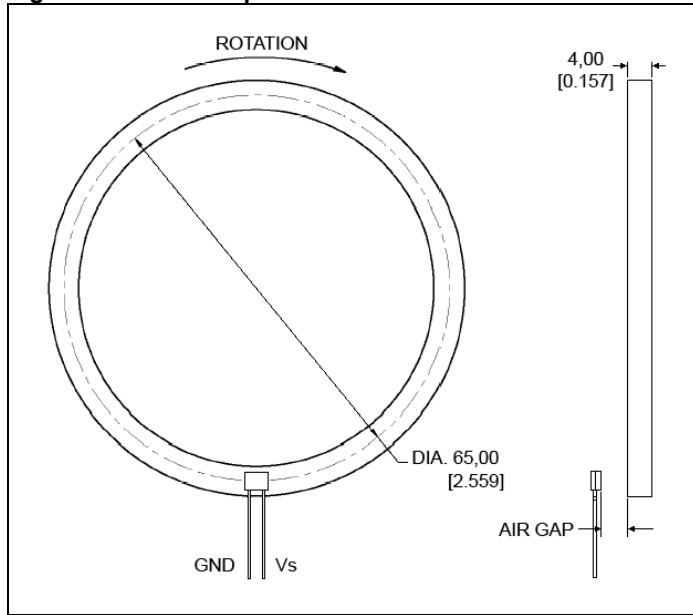


Figure 3. Sensor Output

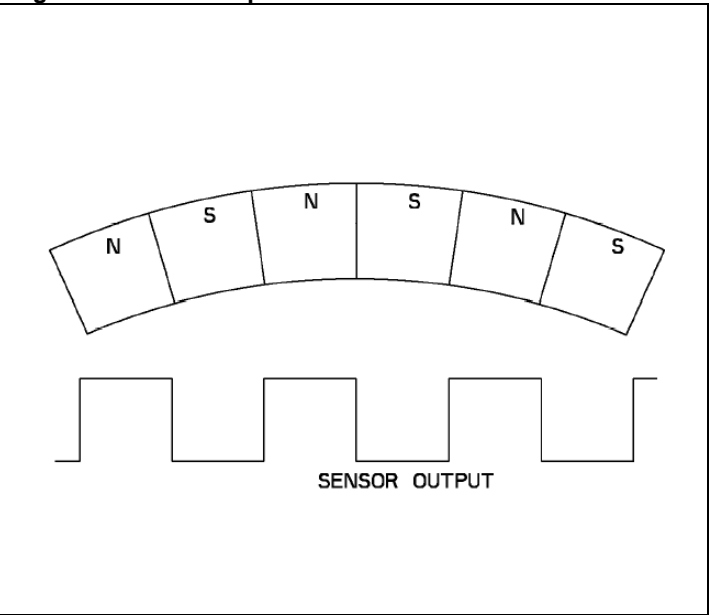
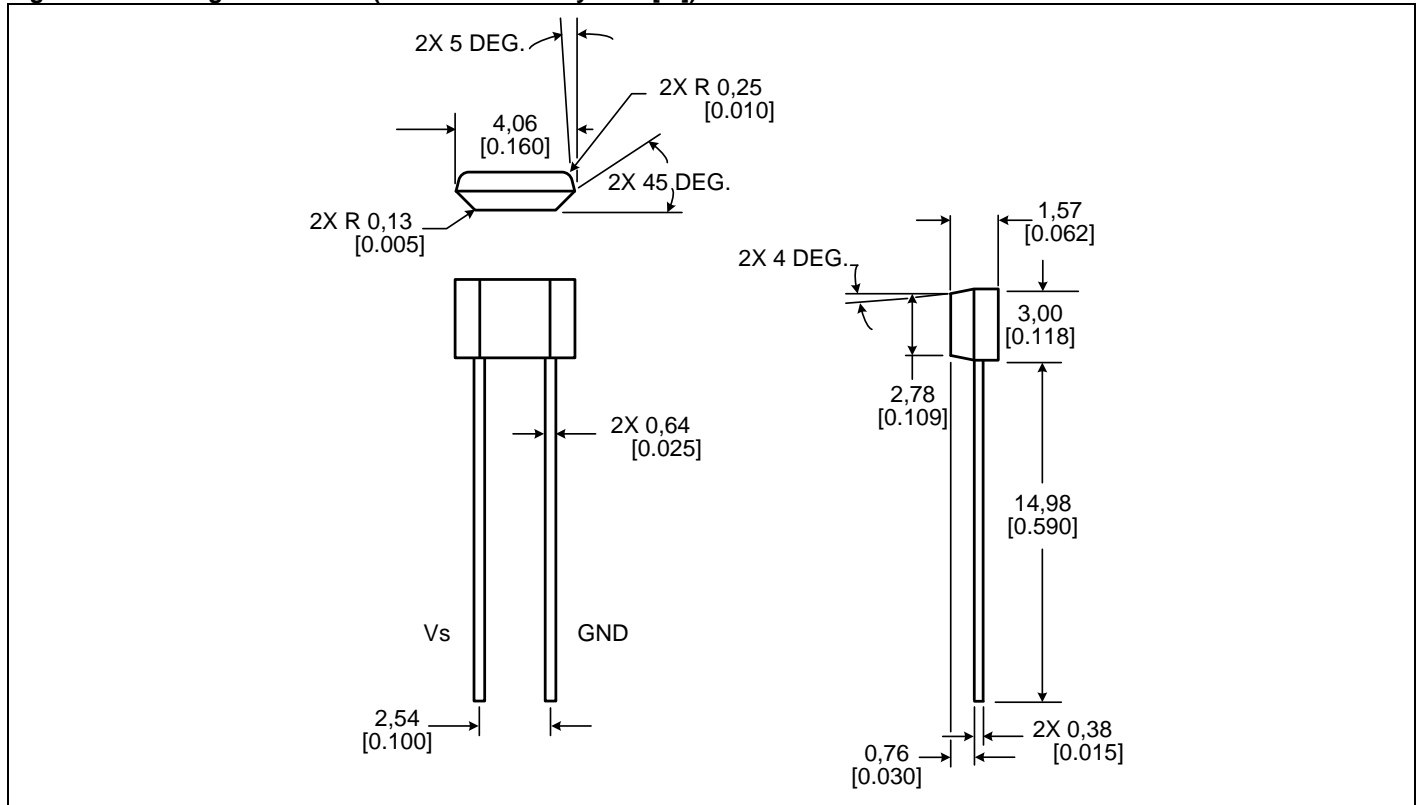


Figure 4. Mounting Dimensions (For reference only. mm/[in])



WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

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