

# MRMS311H

## High accuracy type MR sensor

MRMS311 is optimal magnetic sensor for applications which require precise control of the detection range. NEC's original thin film control technology contributed to highly improved magnetic field sensitivity range as well as temperature characteristics.

### [Application Examples]

- Mobile phones, notebook PCs and PDAs requiring high accuracy detection angle
- Slider phones requiring high accuracy position detection
- Applications requiring minimization of temperature dependence

## FEATURES

MRMS311 is narrow sensitivity type MR sensor which features Min-Max 0.6mT sensitivity range (includes hysteresis) at ambient temperature.

Operating magnetic field ranges are available in 3 sensitivity level(H, M, L) as shown in the table below.

Unit: mT

| Series Name | Sensitivity | Hoff Min | Hon Max |
|-------------|-------------|----------|---------|
| MRMS311     | H           | 0.8      | 1.4     |
|             | M           | 1.2      | 1.8     |
|             | L           | 1.6      | 2.2     |

Improved temperature characteristics with built-in temperature-compensated circuit.

$$H_{on} = \pm 0.20\text{mT at } T_a = -40 \text{ to } +85[^\circ\text{C}]$$

Realized low voltage of operating(1.6 to 3.5V), low power consumption(Typ 6 $\mu$ W (Vcc=1.8V))

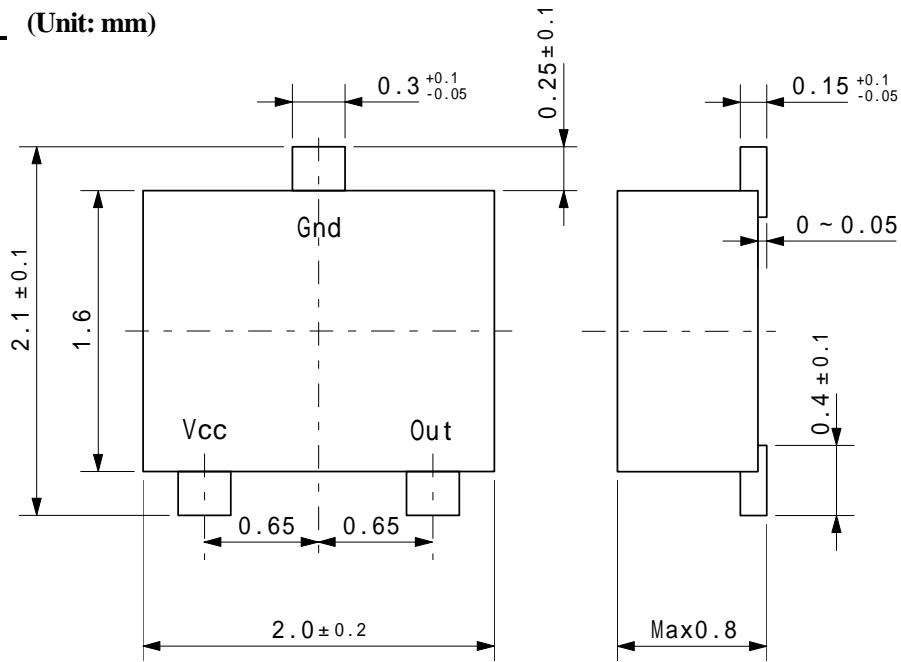
Detecting horizontal magnetic flux density. No dependence on Magnetic field polarity.

Operating temperature - 40 to +85

RoHS Compliant, Halogen Free

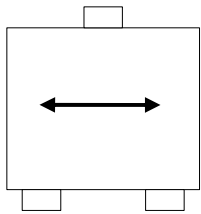


## DIMENSIONS (Unit: mm)

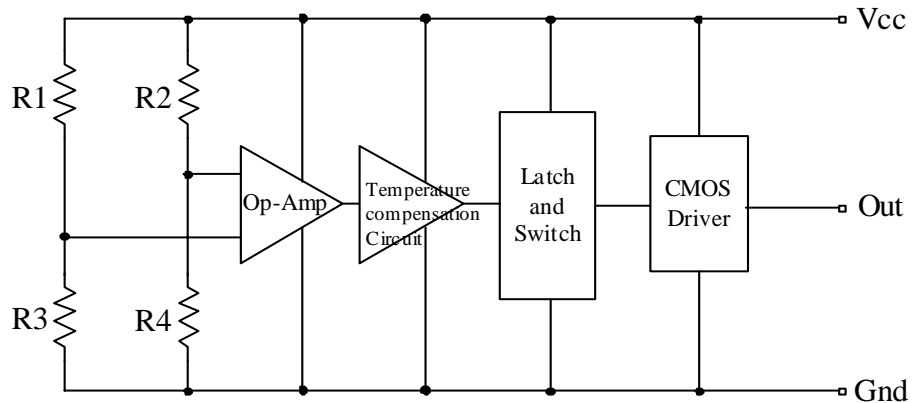


## FUNDEMENTAL OPERATION

Direction of Magnetic Field



Circuit Block



The intermittent switch circuit inside  
R1-R4:MR Elements

## PERFORMANCE

Performance Characteristics ( $T_a=25\pm 3^\circ\text{C}$ )

|                                | Operating require Condition  | Output Voltage  |
|--------------------------------|--|-----------------|
| When power switch is ON        | H = <b>0mT(Magnetic Flux Density)</b><br><b>{0 A/m (Magnetic Field Strength)}</b>    | <b>Hi-level</b> |
| When magnetic field is applied | H <b>1.4mT (Magnetic Flux Density)</b><br><b>{1.1kA/m (Magnetic Field Strength)}</b> | <b>Lo-level</b> |
| When magnetic field is applied | H <b>0.8mT(Magnetic Flux Density)</b><br><b>{0.6kA/m (Magnetic Field Strength)}</b>  | <b>Hi-level</b> |

## Operating Conditions Recommended

(Ta = 25±3°C unless otherwise specified)

| Item                     | Symbol | Condition             | Min | Std | Max | Unit               |
|--------------------------|--------|-----------------------|-----|-----|-----|--------------------|
| Supply Voltage           | -      | -                     | 1.6 | 1.8 | 3.5 | V                  |
| Supply Current           | (AVG)  | Vcc=1.8V              | -   | 3.0 | -   | μA                 |
| Ambient Temperature      | -      | -                     | -40 | 25  | 85  | °C                 |
| Output Voltage           | VOH    | Vcc=1.8V<br>Iout=1mA  | 1.6 | -   | -   | V                  |
|                          | VOL    | VCC=1.8V<br>Iout=-1mA | -   | -   | 0.2 | V                  |
| Operating Magnetic Field | Hon    | 25±3°C                | -   | -   | 1.4 | mT <sup>(*1)</sup> |
|                          |        | -40 ~ +85°C           | -   | -   | 1.6 |                    |
|                          | Hoff   | 25±3°C                | 0.8 | -   | -   |                    |
|                          |        | -40 ~ +85°C           | 0.6 | -   | -   |                    |

\*1) 1 [mT](SI) = 10 [G] (CGS)

## ABSOLUTE MAXIMUM RATINGS

(Ta=25±3°C unless otherwise specified)

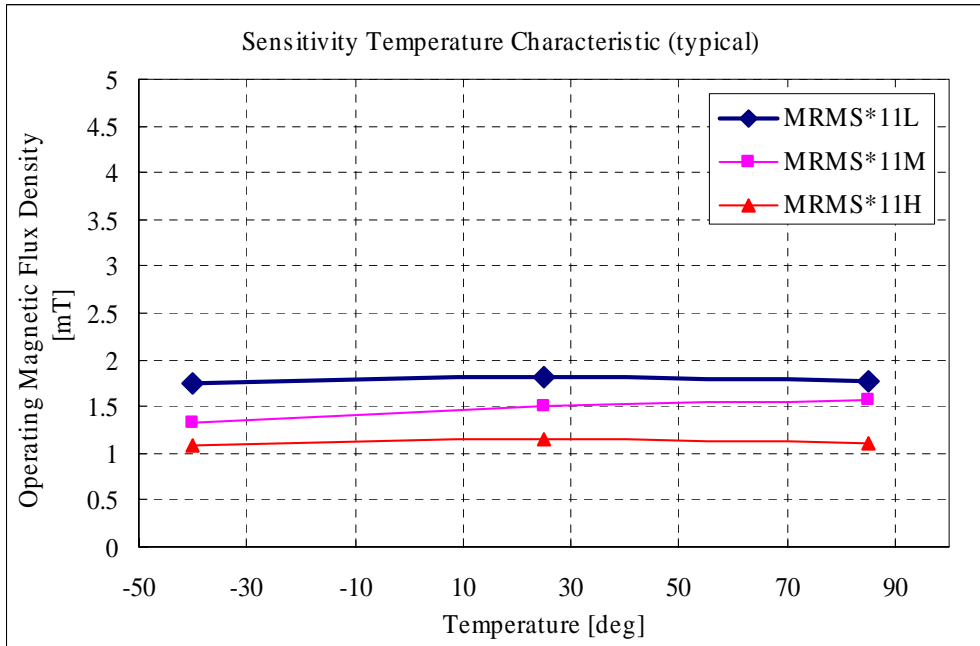
| Item                | Condition | Specifications | Unit |
|---------------------|-----------|----------------|------|
| Supply Voltage      | -         | 6.0            | V    |
| Storage Temperature | -         | -40 ~ +125     | °C   |

## ESD PROTECTION

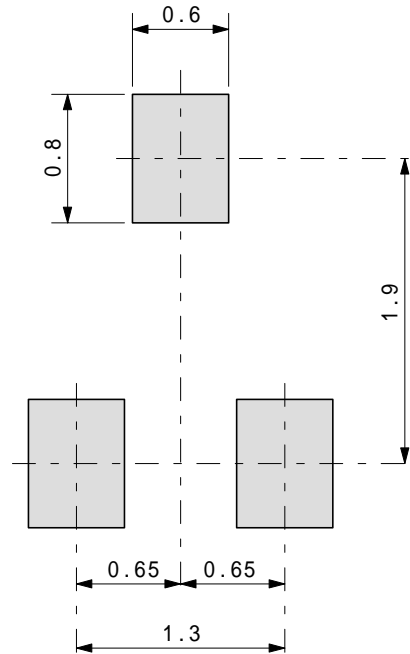
Human Body Model (HBM) tests according to: MIL-STD-883D Method: 3015.7

| Parameter   | Symbol | Limited Values |     | Unit | Notes                     |
|-------------|--------|----------------|-----|------|---------------------------|
|             |        | Min            | Max |      |                           |
| ESD Voltage | VESD   | ± 4.0          |     | kV   | R=1.5k<br>C=100pF<br>T=25 |

## Temperature Characteristics



## RECOMMENDED MOUNT PAD (Unit: mm)



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