

MH251 Hall-effect sensor is a temperature stable, stress-resistant, Low Tolerance of Sensitivity micro-power switch. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. This method reduces the offset voltage normally caused by device over molding, temperature dependencies, and thermal stress.

MH251 is special made for low operation voltage, 1.65V, to active the chip which includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, CMOS output driver. Advanced CMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low input-offset errors, and small component geometries. This device requires the presence of omni-polar magnetic fields for operation.

The package type is in a Halogen Free version has been verified by third party Lab.

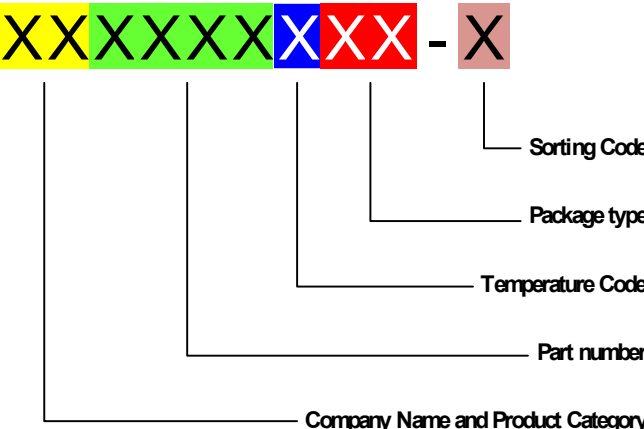
Features and Benefits

- CMOS Hall IC Technology
- Strong RF noise protection
- 1.65 to 3.5V for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 1.65V, Micro power consumption
- High Sensitivity for reed switch replacement applications
- Multi Small Size option
- Low sensitivity drift in crossing of Temp. range
- Ultra Low power consumption at 5uA (Avg)
- High ESD Protection, HMB > $\pm 4KV$ (min)
- Totem-pole output

Applications

- Solid state switch
- Handheld Wireless Handset Awake Switch (Flip Cell/PHS Phone/Note Book/Flip Video Set)
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications
- Water Meter
- Floating Meter
- PDVD
- NB

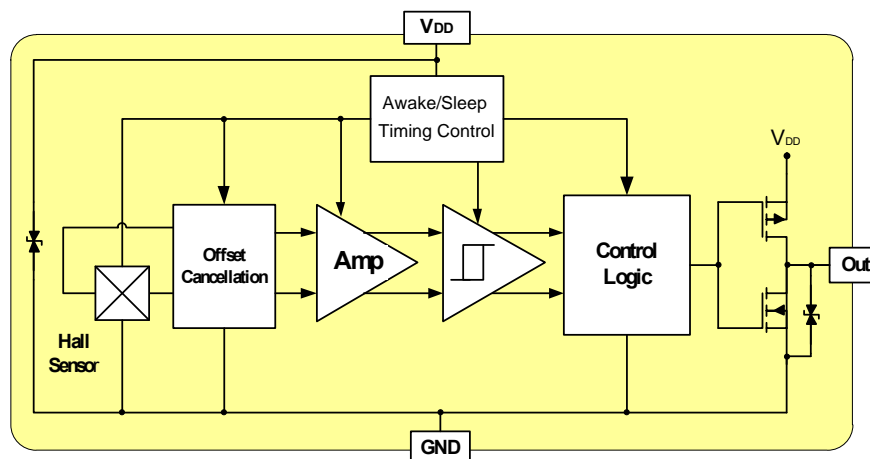
Ordering Information

| | |
|---|--|
|  | <p>Company Name and Product Category MH:MST Hall Effect/MP:MST Power MOSFET</p> <p>Part number 181,182,183,184,185,248,249,276,477,381,381F,381R,382..... If part # is just 3 digits, the forth digit will be omitted.</p> <p>Temperature range E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C</p> <p>Package type UA:TO-92S,VK:TO-92S(4pin),VF:TO-92S(5pin),SO:SOT-23, SQ:QFN-3,ST:TSOT-23,SN:SOT-553,SF:SOT-89(5pin)</p> <p>Sorting α,β,Blank.....</p> |
|---|--|

| Part No. | Temperature Suffix | Package Type |
|----------|---------------------|----------------|
| MH251EST | E (-40°C to + 85°C) | ST (TSOT-23) |
| MH251ESN | E (-40°C to + 85°C) | SN (SOT-553) |
| MH251ESQ | E (-40°C to + 85°C) | SQ (QFN2020-3) |
| MH251EUA | E (-40°C to + 85°C) | UA (TO-92S) |

Custom sensitivity selection is available by MST sorting technology

Functional Diagram



Note: Static sensitive device; please observe ESD precautions. Reverse V_{DD} protection is not included. For reverse voltage protection, a 100Ω resistor in series with V_{DD} is recommended.

MH 251, HBM > ±4KV which is verified by third party lab.

Absolute Maximum Ratings At($T_a=25^\circ\text{C}$)

| Characteristics | | Values | Unit |
|--|-------------------------------------|-----------------------|--------------------|
| Supply voltage, (V_{DD}) | | 4.5 | V |
| Output Voltage, (V_{out}) | | 4.5 | V |
| Reverse Voltage , (V_{DD}) (V_{out}) | | -0.3 | V |
| Magnetic flux density | | Unlimited | Gauss |
| Output current, (I_{out}) | | 1 | mA |
| Operating temperature range, (T_a) | | -40 to +85 | $^\circ\text{C}$ |
| Storage temperature range, (T_s) | | -65 to +150 | $^\circ\text{C}$ |
| Maximum Junction Temp, (T_j) | | 150 | $^\circ\text{C}$ |
| Thermal Resistance | (θ_{JA}) ST / SN / UA / SQ | 310 / 540 / 206 / 543 | $^\circ\text{C/W}$ |
| | (θ_{JC}) ST / SN / UA / SQ | 223 / 390 / 148 / 410 | $^\circ\text{C/W}$ |
| Package Power Dissipation, (P_D) ST / SN / UA / SQ | | 400 / 230 / 606 / 230 | mW |

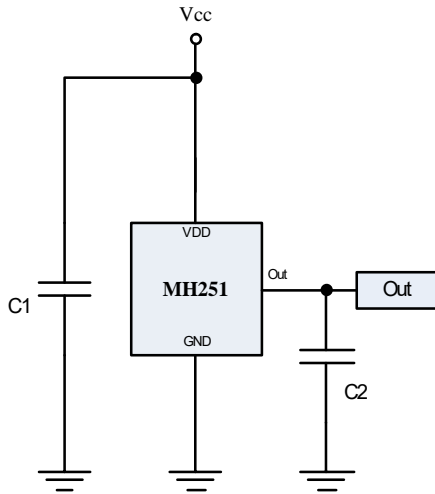
Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

Electrical Specifications

DC Operating Parameters : $T_a=25^\circ\text{C}$, $V_{DD}=1.8\text{V}$

| Parameters | Test Conditions | Min | Typ | Max | Units |
|---------------------------------------|---|--------------|-----|-----|---------------|
| Supply Voltage, (V_{DD}) | Operating | 1.65 | | 3.5 | V |
| Supply Current, (I_{DD}) | Awake State | | 1.4 | 3 | mA |
| | Sleep State | | 3.6 | 7 | μA |
| | Average | | 5 | 10 | μA |
| Output Leakage Current, (I_{off}) | Output off | | | 1 | μA |
| Output High Voltage, (V_{OH}) | $I_{OUT}=0.5\text{mA}$ (Source) | $V_{DD}-0.2$ | | | V |
| Output Low Voltage, (V_{OL}) | $I_{OUT}=0.5\text{mA}$ (Sink) | | | 0.2 | V |
| Awake mode time, (T_{aw}) | Operating | | 40 | 80 | μs |
| Sleep mode time, (T_{SL}) | Operating | | 40 | 80 | mS |
| Duty Cycle, (D, C) | | | 0.1 | | % |
| Electro-Static Discharge | HBM | 4 | | | KV |
| Operate Point, (B_{OPS}) | S pole to branded side, $B > BOP$, V_{out} On | | 30 | 55 | Gauss |
| | N pole to branded side, $B > BOP$, V_{out} On | -55 | -30 | | |
| Release Point (B_{RPS}) | S pole to branded side, $B < BRP$, V_{out} Off | 10 | 20 | | Gauss |
| | N pole to branded side, $B < BRP$, V_{out} Off | | -20 | -10 | |
| Hysteresis, (B_{HYS}) | $ BOP_x - BRP_x $ | | 10 | | Gauss |

Typical Application circuit



C1 : 10nF

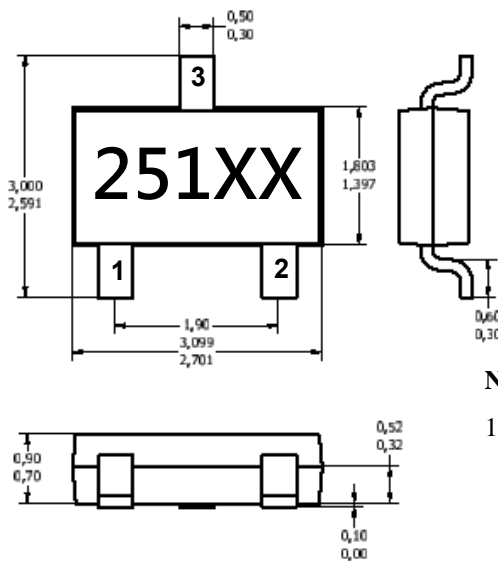
C2 : 100pF

Sensor Location, package dimension and marking

MH251 Package

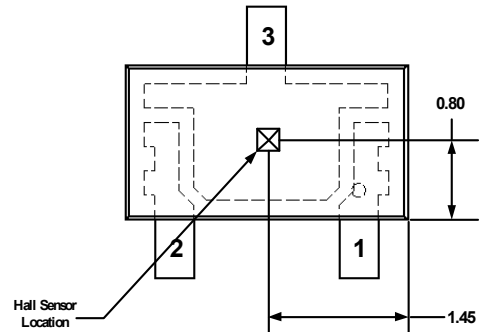
ST Package(TSOT-23)

(Top View)



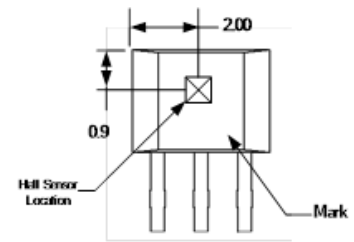
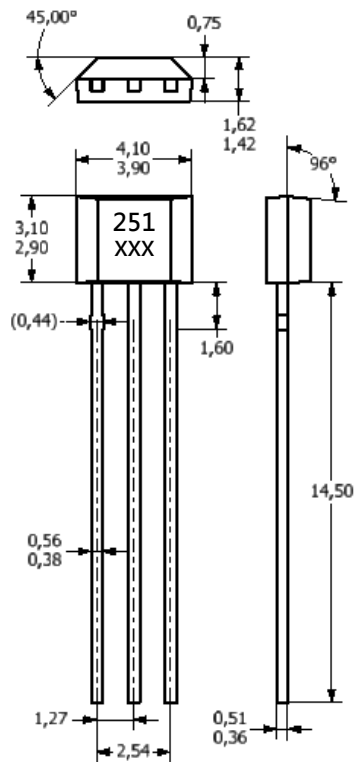
Hall Plate Chip Location

(Bottom view)

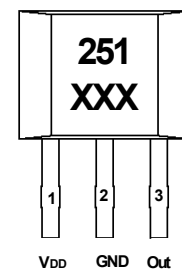


NOTES:

1. PINOUT (See Top View at left:)
 Pin 1 VDD
 Pin 2 Output
 Pin 3 GND
2. Controlling dimension: mm;



Output Pin Assignment
(Top view)



NOTES:

- 1).Controlling dimension: mm
- 2).Leads must be free of flash and plating voids
- 3).Do not bend leads within 1 mm of lead to package interface.

4).PINOUT:

| | |
|-------|--------|
| Pin 1 | VDD |
| Pin 2 | GND |
| Pin 3 | Output |

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