

General Description

The TMR6209 is a type of 9 channels magnetic pattern recognition sensor with high consistency, high sensitivity and high signal-to-noise ratio performance, stable magnetization and detection for high coercive force magnetic materials, it is used for detecting full-scale paper bills, bank notes and security documents with magnetic anti-counterfeiting consists. The TMR6209 consists of TMR magneto-resistance sensor, high-quality magnet, high-strength plastic base and durable non-magnetic stainless steel cover.

Features and Benefits

- High sensitivity and excellent gap performances
- Sensitivity matching of each channel
- Output voltage is independent of scanning speed
- Differential output, high CMRR performance
- Durable metal case, suitable for long time and heavy load situations
- 10mm x 9ch detection width, no non-detection area

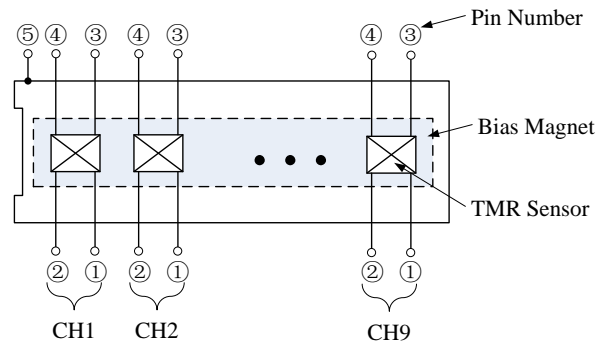
Applications

- ATM
- Bill counter and validator
- Bill sorter
- Magnetic detection of the paper bills

Appearance



Pin Configuration



Top View

| Pin No. | Symbol | Description |
|---------|-------------|--|
| 1 | $V_{O+}(n)$ | Differential positive output of channel n |
| 2 | $V_{CC}(n)$ | Power supply of channel n |
| 3 | $V_{O-}(n)$ | Differential negative output of channel n |
| 4 | GND (n) | Ground of channel n |
| 5 | Shell GND | Shell GND, connected to the shielding ground |

Absolute Maximum Ratings

| Parameter | Symbol | Limit | Unit |
|------------------------|-----------|------------------|------|
| Maximum Supply Voltage | V_{CC} | 5.5 | V |
| Operating Temperature | T_A | -20 ~ 65 | °C |
| Storage Temperature | T_{stg} | -30 ~ 85 | °C |
| Operating Humidity | HMD | 10 ~ 90 (no dew) | %RH |
| ESD (HBM) | V_{HBM} | 2000 | V |

Electrical Characteristics ($V_{CC}=5V$, $T_A=25^{\circ}C$)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|-----------------------------|-------------|----------------------------|------|------|------|--------------|
| Sensitivity | $S^{(1)}$ | | | TBD | | V_{PP} |
| Resistance | R | No external magnetic field | 0.5 | | 3 | kOhm |
| Output Offset Voltage | V_{OS} | No external magnetic field | -75 | | 75 | mV/V |
| Noise | $V_N^{(2)}$ | | | 50 | | μV_{PP} |
| Surface Magnetic Field | B | | | 800 | | G |
| Sensitivity Deviation | ΔS | S_{MAX} / S_{MIN} | 1 | | 2 | V/V |
| Number of Channels | C | | | 9 | | |
| Detection Width per Channel | W | | | 10 | | mm |

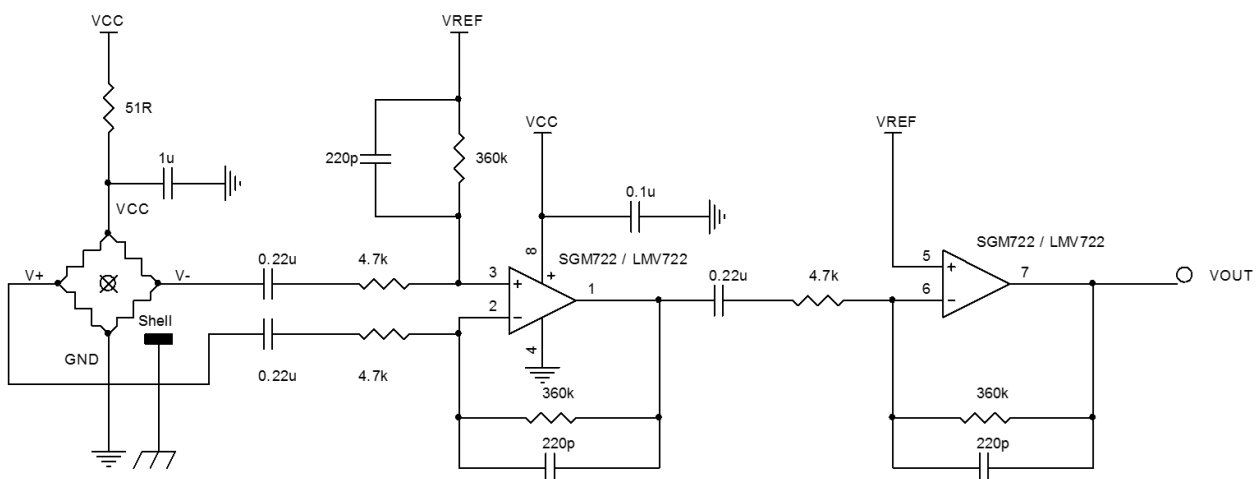
Note:

- (1) According to the MultiDimension sensitivity measurement.
- (2) The amplifier's gain is 10000V/V@1kHz, no external magnetic field applied, measure the peak-to-peak voltage V_{PP} , then noise $V_N = V_{PP}/10000$.

Caution for Use

- The sensor contains a permanent magnet, it will cause the recordable magnetic media damaged, such as cassette tapes, floppy disks, credit cards, hard drives, keep it away from such types of magnetic media.
- To avoid the ferromagnetic particles being collected from a dirty environment.
- Magnets tend to snap to each other or the magnetic metals, be careful when handling the sensor not to apply mechanical shock, otherwise the sensors might be abnormal or break.
- Do not place the sensor near the person who has an electronic medical device. It is very dangerous and may cause malfunction of an electronic medical device.
- Magnetic devices may be subject to special transport regulations.
- To avoid the abrasion of the sensor's metal case or stuck the banknote, about 0.1mm gap between the sensor and the opposite side such as rollers is recommended to reduce the pressure of the sensor's metal case.
- To avoid excessive force on terminals, please mount the sensor's base firmly on the PCB and solder all the terminals.
- Hand soldering should be applied, the soldering temperature should be $350\pm 10^{\circ}\text{C}$ less than 3 seconds or $260\pm 5^{\circ}\text{C}$ less than 10 seconds.

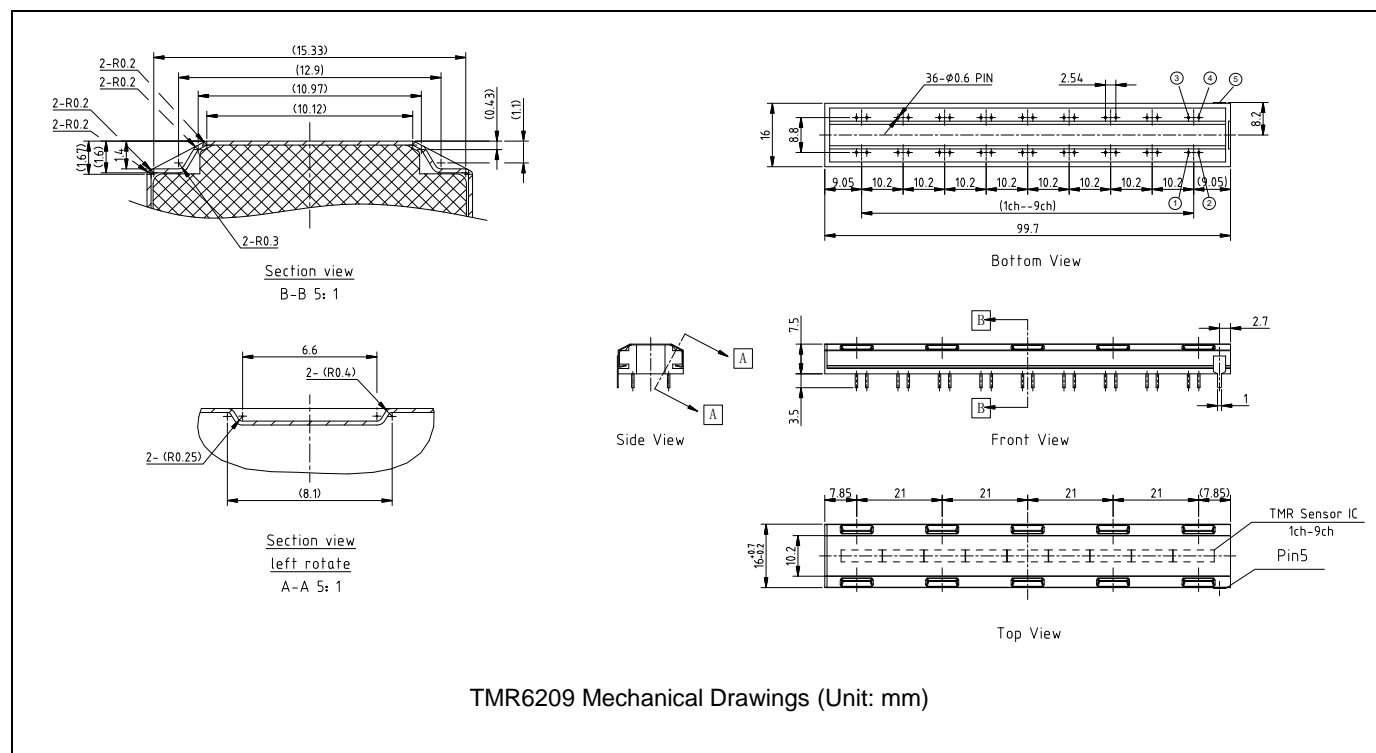
Recommended Application Circuit



Notes:

Shell GND pin should be connected to the shielding ground.

■ Mechanical Drawing & Dimensions





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