

## Application Note

### Magnetoresistive Sensor ICs

#### Standard Power Series: SM351RT, SM451R, SM353RT, SM453R

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#### Background

Honeywell's Magnetoresistive Sensor ICs (integrated circuits), Standard Power Series, are ultra-sensitive devices designed for manufacturers who need a durable and reliable speed or position sensor for large air gaps or small magnetic fields in standard power (typically 3 Vdc to 24 Vdc) applications. Unlike reed switches and other magnetic sensors, Honeywell's solid state design offers ultra-high sensitivity of 11 G max., making it the highest sensitivity sensor in its class for standard powered applications. The Magnetoresistive Sensor ICs, Standard Power Series, respond to either a North or South pole applied in a direction parallel to the sensor. They do not require the magnet polarity to be identified, simplifying installation and potentially reducing system cost.

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#### Value to Customers

- Durable and reliable due to magnetic solid state, non-contact, no-glass design which enhance switching capability.
- Cost-effective and flexible due to the sensor IC's ultra-high sensitivity—the highest sensitivity sensor in its class for standard powered applications—which lowers the customer's cost of magnets and simplifies design-in.
- Simplifies design-in for wired applications due to its supply voltage range, omnipolar operation, SOT-23 and flat TO-92-style package options and wide operating temperature range.
- Ultra-high sensitivity (SM351RT and SM451R) allows for potential use in applications requiring ultra-high magnetic sensitivity (7 G typical operate, 11 G maximum operate).

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#### Solutions

##### INDUSTRIAL

**High frequency flow sensing in HVAC, water, fuel meters, and gas utility meters:** May be used as a counter in the water and gas meter to determine water or gas use. For low power applications, external power cycling can be utilized to reduce the current consumption in lower power applications.

**Anti-tamper detection in water, electric and gas utility meters:** May be used to detect the presence of a magnetic field applied to the utility meter with a large external magnet in an attempt to tamper with, slow down or stop the meter counting function.

**Liquid level detection:** May be used to detect the position of a magnetic float in liquid level sensors.

**Motor RPM sensing:** May be used with a magnet to count rotation for RPM sensing in motors.

**In-cylinder position sensing:** May be used to sense a magnetic target on a piston to determine the position in a cylinder.

##### MEDICAL

**RPM sensing:** May be used as a counter for RPM in medical equipment motors such as sleep apnea, treadmill, and exercise bikes.

**Magnetic interrupt in exercise and rehabilitation equipment:** May be used as the stop switch for treadmills and elliptical machines.

**Absence/presence detection in infusion pumps:** May be used to provide position sensing of the infusion cartridge.

**Position sensing of medication dispensing cabinet drawers:** May be used to enable remote locking and unlocking of medication dispensing cabinet drawers, providing enhanced security and minimizing medication dispensing errors.

**Incline position sensing in hospital beds:** May be used to determine minimum/maximum position of electrically adjustable hospital beds.

##### WHITE GOODS

**Lid, door and drawer position detection:** May be used in dish washers, microwaves, washing machines, refrigerators, etc.

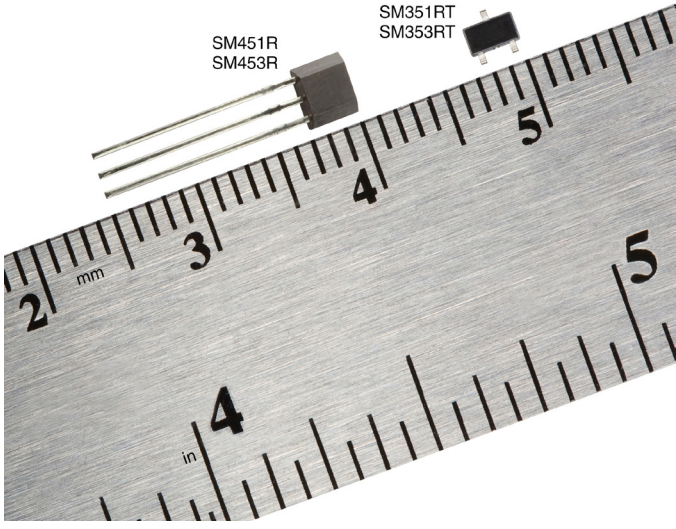
**Fluid flow:** May be used as a counting mechanism to measure flow in premium coffee machines.

**Liquid level:** May be used to detect the position of a magnetic float in liquid level sensors.

# Application Note

## Magnetoresistive Sensor ICs

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Standard Power Series	Features
 <p>The photograph shows four magnetoresistive sensor ICs placed on a ruler for scale. The ruler has markings in millimeters (mm) and inches (in). The ICs are labeled as follows: SM451R and SM453R (flat TO-92-style) and SM351RT and SM353RT (SOT-23 style). The ruler shows the ICs are approximately 2-3 mm long.</p>	<ul style="list-style-type: none"><li>• Magnetic sensitivities:<ul style="list-style-type: none"><li>- Ultra-high sensitivity (SM351RT and SM451R): For applications requiring ultra-high magnetic sensitivity (7 G typical operate, 11 G maximum operate)</li><li>- Very high sensitivity (SM353RT and SM453R): For applications requiring very high magnetic sensitivity (14 G typical operate, 20 G maximum operate)</li></ul></li><li>• Package styles:<ul style="list-style-type: none"><li>- SOT-23 (SM351RT, SM353RT)</li><li>- Flat TO-92-style (SM451R, SM453R)</li></ul></li><li>• Supply voltage range 3 Vdc to 24 Vdc</li><li>• Omnipolar sensing activates with either pole from a magnet</li><li>• Temperature range -40 °C to 85 °C [-40 °F to 185 °F]</li><li>• SOT-23 supplied on tape and reel (3000 units per reel)</li><li>• RoHS-compliant materials meet Directive 2002/95/EC</li></ul>

### Find out more

To learn more about Honeywell Sensing and Productivity Solutions' products, call **+1-815-235-6847** or **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

Sensing and Productivity Solutions  
Honeywell  
1985 Douglas Drive North  
Golden Valley, MN 55422  
**honeywell.com**

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