

## Application Note

### Magnetoresistive Sensor ICs

### Nanopower Series

#### Background

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Honeywell's Magnetoresistive Sensor ICs, Nanopower Series, are ultra-sensitive devices designed to accommodate a wide range of applications with large air gaps, small magnetic fields and low power requirements.

The Nanopower 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.

These sensor ICs use a very low average current consumption and a push-pull output which does not require a pull-up resistor. The sensor ICs can operate from a supply voltage as low as 1.65 V, promoting energy efficiency.

The Nanopower Series is available in two magnetic sensitivities to accommodate a variety of application needs:

- **SM351LT:** For applications requiring ultra high magnetic sensitivity (7 G typical operate, 11 G maximum operate) and a very low current draw (360 nA typical).
- **SM353LT:** For applications requiring very high magnetic sensitivity (14 G typical operate, 20 G maximum operate) and a very low current draw (310 nA typical).

These sensor ICs are supplied in the subminiature SOT-23 surface mount package on tape and reel (3000 units per reel), for use in automated pick-and-place component installation.

#### Solutions

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##### INDUSTRIAL

**Mobile equipment (i.e., handheld computing equipment, scanners):** May be used to detect if the lid of the battery-operated equipment is open or closed.

**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.

**Water and gas utility meters:** Used as a counter in the water and gas meter to determine water or gas use. Today, often reed switches can be used. Honeywell's device is the only sensor

currently available that can be used instead of a reed switch in this application because the low power of less than 500 nanoamps will allow the application to meet battery life needs.

**Building access control; reed switch replacement for battery operated security systems:** May be used to detect if the door or window is open or closed and sends a signal to a wireless module that transmits the signal to the central control unit for processing.

**Industrial smoke detectors:** May be used as an alarm test sensor. Through the use of a magnet, the smoke detector can be tested to determine that the alarm is working properly.

##### MEDICAL

**Exercise equipment:** May be used as the emergency stop switch, to sense RPM, and to sense incline position.

**Infusion pumps:** May be used to provide position sensing of the infusion cartridge.

**Drawer position sensing (e.g., medical cabinets):** May be used to enable remote locking and unlocking of medication dispensing cabinet drawers, providing enhanced security and minimizing medication dispensing errors.

**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 white goods such as dish washers, microwaves, washing machines, refrigerators, etc.

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

##### MEDIUM-SIZED CONSUMER ELECTRONICS

**Battery-optimization position sensor:** May be used to detect the presence of a magnet to turn off consumer electronics (such as notebook computers, tablets, cordless speakers, etc.) to maximize battery life.

# Application Note

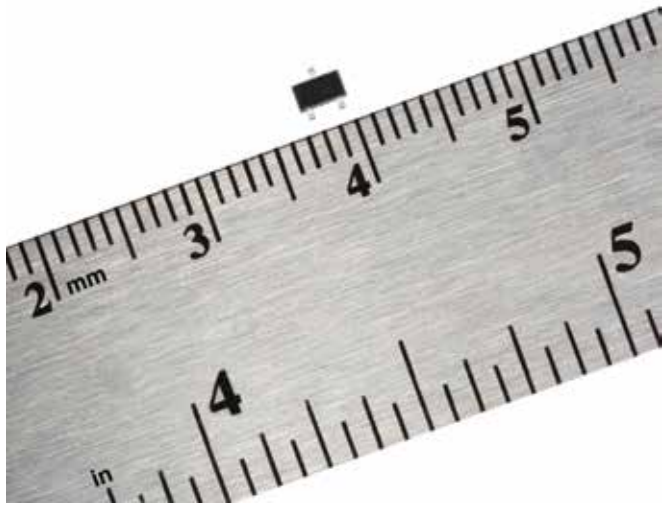
## Magnetoresistive Sensor ICs

### Nanopower Series

#### Customer Benefits

- Ultra-high sensitivity allows for the use of very small, low-cost magnets, or an extended detection range
- Very low power (360 nA typ at 1.65 V, 25 °C) provides extended battery life

- Omnipolar magnetic type can be activated by north or south pole and does not require the magnet polarity to be identified
- Push-pull (CMOS) output does not require any external resistors, making it easier and more cost-effective to operate when compared to a device with an open drain output

Nanopower Series	Key Features
	<ul style="list-style-type: none"><li>• <b>High sensitivity:</b> 7 Gauss typ., 11 Gauss max. (SM351LT); 14 G typ., 20 Gauss max. (SM353LT)</li><li>• <b>Nanopower:</b> Average current of 360 nA typ. (SM351LT) and 310 nA typ. (SM353LT)</li><li>• <b>Supply voltage range:</b> 1.65 Vdc to 5.5 Vdc; simplifies design-in</li><li>• <b>Omnipolar sensing:</b> Activates with either pole from a magnet</li><li>• <b>Temperature range:</b> -40 °C to 85 °C [-40 °F to 185 °F]</li><li>• <b>Push-pull output:</b> Does not require external pull-up resistor</li><li>• <b>Non-chopper stabilized design</b></li><li>• <b>RoHS-compliant materials:</b> Meets Directive 2002/95/EC</li><li>• <b>Package:</b> SOT-23</li></ul>

#### Find out more

To learn more about Honeywell's sensing and control products, call **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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005967-1-EN IL50  
April 2014  
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