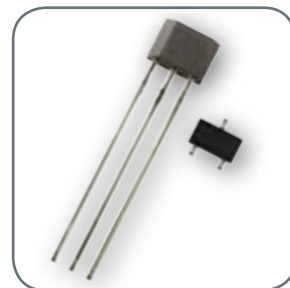




# Unipolar Digital Hall-Effect Sensor ICs

## SS340RT/SS440R Series



# Unipolar Digital Hall-Effect Sensor ICs

The SS340RT/SS440R sensor ICs are small, versatile digital Hall-effect devices that are operated by the magnetic field from a permanent magnet or an electromagnet. They are designed to respond to a single pole: North (SS340RT) or South (SS440R).

These unipolar Hall ICs are supplied in three different magnetic sensitivities to meet a wide range of potential applications:

- SS341RT and SS441R offer the highest sensitivity, with a typical operating point of 75 G at 25 °C [77 °F].
- SS343RT and SS443R offer medium sensitivity, with a typical operating point of 135 G at 25 °C [77 °F].
- SS349RT and SS449R offer the lowest sensitivity, with a typical operating point of 305 G at 25 °C [77 °F].

These sensors are available in two package styles:

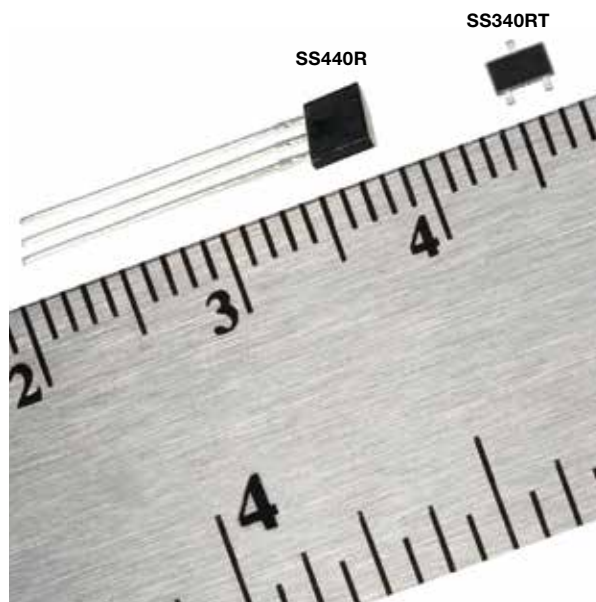
- The SS340RT is available in the miniature SOT-23 surface mount package.
- SS440R is available in the leaded, flat TO-92-style package.

The SS340RT's small size requires less PC board space, allowing it to be used in smaller assemblies. Its 3 Vdc capability allows for use in low voltage applications, promoting energy efficiency.

The SS340RT Series is available on tape and reel (3000 units per reel); the SS440R Series is available in a bulk package (1000 units per bag).

## ***What makes our sensors better:***

- Robust IC design with ESD Class 2, reverse polarity protection and 150 °C [302 °F] capability
- Package and sensitivity options to better match application needs
- Dependable performance – similar Honeywell sensor ICs have been tested to over 100 million operations
- Honeywell legacy and expertise – 45 years of engineering excellence and Hall effect technology experience



SMALL • VERSATILE

## Features and Benefits

### **SUBMINIATURE PACKAGE SIZE (SS340RT) SUPPLIED ON TAPE AND REEL**

Allows for a compact design with automated component placement, helping to reduce manufacturing costs

### **SIMPLE ACTIVATION FROM A SINGLE POLE AND MULTIPLE MAGNETIC SENSITIVITIES (HIGH, MEDIUM AND LOW)**

Make this product suitable in a variety of potential motion control, lid closure detection, and displacement sensing applications

*High, medium and low magnetic sensitivities.*

### **LOW VOLTAGE 3 V CAPABILITY**

Helps reduce power consumption

### **BUILT-IN REVERSE POLARITY PROTECTION**

Protects the device from potential damage during installation

### **THERMALLY BALANCED INTEGRATED CIRCUIT**

Provides for stable operation over a wide temperature range of -40 °C to 150 °C  
[-40 °F to 302 °F]

*Enhances application flexibility.*

### **ROHS-COMPLIANT MATERIALS**

Meet Directive 2002/95/EC

# Potential Applications



## INDUSTRIAL

### DOOR OR LID CLOSURE DETECTION IN APPLIANCES OR ELECTRONICALLY CONTROLLED CONTAINERS

May be used recessed in the door frame with a magnet embedded in the door. The magnet activates the sensor to indicate door open or close.

### SIMPLE SPEED AND RPM (REVOLUTIONS PER MINUTE) SENSING IN FITNESS AND INDUSTRIAL EQUIPMENT

May be mounted on the motor shaft of a treadmill such that the rotating magnet pole, which rotates with the motor, activates the sensor with each revolution, producing a single digital pulse for each revolution.

### FLOW RATE SENSING IN WATER SOFTENERS, INDUSTRIAL PROCESSES, AND APPLIANCES

May be used with one or more magnets mounted on a paddle to measure the flow rate.

### DAMPER OR VALVE POSITION CONTROL IN INDUSTRIAL, HVAC AND RESIDENTIAL OR COMMERCIAL APPLICATIONS

May be used to determine if a valve or damper is fully open or fully closed.

### ROBOTIC CONTROL (CYLINDER POSITION MONITORING)

May be used to detect the piston's position by detecting a magnet mounted on the piston ring located inside a non-ferromagnetic cylinder.

### LEVEL/TILT MEASUREMENT

May be installed in the base of a machine with a magnet mounted pendulum fashion over the sensor. A change in state of the output as the magnet swings away from the sensor indicates that the machine is not level.

### REMOTE CONVEYOR SENSING

May be mounted to the frame of the conveyor, with a magnet mounted on the tail pulley. When the magnet revolves past the sensor, it produces one output per revolution, providing an intermittent visual or audible signal at a remote location to assure stability. Any interruption of the conveyor motion will interfere with the normal signal and alert the operators.

### PUSH BUTTON CONTROLS



## MEDICAL

### POSITION SENSOR IN HOSPITAL BEDS AND MEDICAL EQUIPMENT

May be used with a magnet mounted on the activator arm to determine the home or end-of-travel position of the equipment.

### MEDICATION BIN MONITOR ON PORTABLE DRUG CARTS

May be used to detect if a drug dispensing drawer is open or closed.

# Unipolar Digital Hall-Effect Sensor ICs

**Table 1. SS340RT/SS440R Performance Specifications** ( $V_{\text{supply}} = 3 \text{ Vdc to } 24 \text{ Vdc}$ , 20 mA load,  $T_A = -40^\circ\text{C to } 150^\circ\text{C}$  [-40 °F to 302 °F] except where otherwise specified.)

| Characteristic                                                       | Condition                                                                                                                             | Min.        | Typ.          | Max.           | Unit    |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|----------------|---------|
| Supply voltage:<br>SS340RT<br>SS340RT<br>SS440R                      | 150 °C [302 °F]<br>-40 °C to 125 °C [-40 °F to 257 °F]<br>-40 °C to 150 °C [-40 °F to 302 °F]                                         | 3<br>3<br>3 | —<br>—<br>—   | 12<br>24<br>24 | Vdc     |
| Supply current                                                       | $V_{\text{supply}} = 5 \text{ V at } 25^\circ\text{C [77 °F]}$<br>$V_{\text{supply}} = 3 \text{ V at } 25^\circ\text{C [77 °F]}$<br>— | —<br>—<br>— | 4<br>3.5<br>— | 6<br>5<br>8    | mA      |
| Vsat                                                                 | 20 mA, Gauss >Bop                                                                                                                     | —           | —             | 0.4            | Vdc     |
| Output leakage current                                               | Gauss >Bop                                                                                                                            | —           | —             | 10             | µA      |
| Output switching time:<br>rise<br>fall                               | $V_{\text{supply}} = 12 \text{ V at } 25^\circ\text{C [77 °F]}$ ,<br>$R_L = 1.6 \text{ k}\Omega$ , $C_L = 20 \text{ pF}$              | —<br>—      | —             | 1.5<br>1.5     | µs      |
| Thermal resistance:<br>SS340RT (SOT-23)<br>SS440R (flat TO-92-style) | —<br>—                                                                                                                                | —<br>—      | 303<br>233    | —<br>—         | °C/W    |
| Operating temperature                                                | —                                                                                                                                     | -40 [-40]   | —             | 150 [302]      | °C [°F] |
| Storage temperature                                                  | —                                                                                                                                     | -40 [-40]   | —             | 165 [302]      | °C [°F] |

**Table 2. SS340RT/SS440R Magnetic Specifications** ( $V_{\text{supply}} = 3 \text{ Vdc to } 24 \text{ Vdc}$ , 20 mA load,  $T_A = -40^\circ\text{C to } 150^\circ\text{C}$  [-40 °F to 302 °F].)

| Characteristic                                                    | Min.            | Typ.             | Max.              | Unit  |
|-------------------------------------------------------------------|-----------------|------------------|-------------------|-------|
| Operate:<br>SS341RT/SS441R<br>SS343RT/SS443R<br>SS349RT/SS449R    | 35<br>45<br>240 | 75<br>135<br>305 | 135<br>205<br>460 | Gauss |
| Release:<br>SS341RT/SS441R<br>SS343RT/SS443R<br>SS349RT/SS449R    | 10<br>40<br>135 | 35<br>85<br>225  | 120<br>180<br>370 | Gauss |
| Hysteresis:<br>SS341RT/SS441R<br>SS343RT/SS443R<br>SS349RT/SS449R | 5<br>5<br>30    | 40<br>50<br>80   | 80<br>120<br>170  | Gauss |

## NOTICE

The magnetic field strength (Gauss) required to cause the switch to change state (operate and release) will be as specified in the magnetic characteristics. To test the switch against the specified magnetic characteristics, the switch must be placed in a uniform magnetic field.



**Table 3. SS340RT/SS440R Absolute Maximum Ratings**

| Characteristic         | Min.  | Typ. | Max.     | Unit  |
|------------------------|-------|------|----------|-------|
| Supply voltage         | -28.0 | —    | 28.0     | V     |
| Applied output voltage | -0.5  | —    | 28.0     | V     |
| Output current         | —     | —    | 20       | mA    |
| Magnetic flux          | —     | —    | no limit | Gauss |

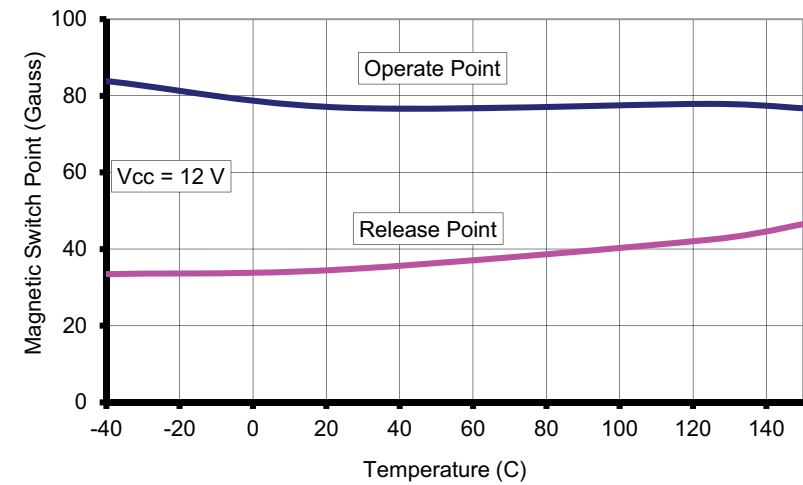
## NOTICE

Absolute maximum ratings are the extreme limits that the device will withstand without damage to the device. However, the electrical and mechanical characteristics are not guaranteed as the maximum limits (above recommended operating conditions) are approached, nor will the device necessarily operate at absolute maximum ratings.

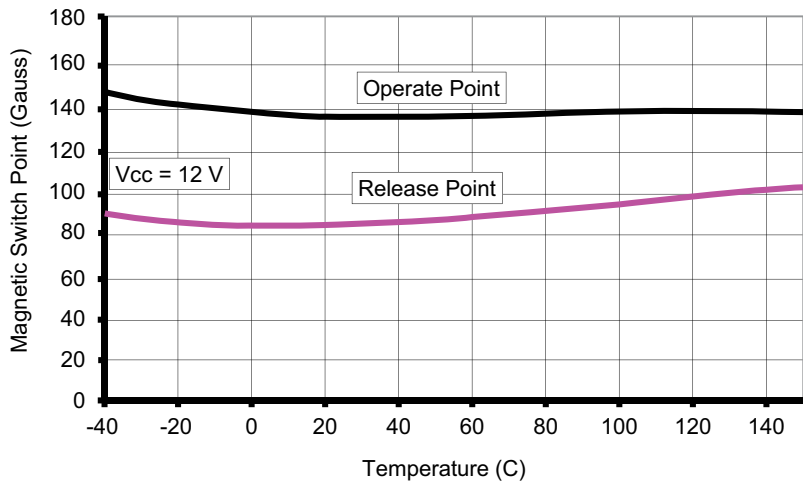
# SS340RT/SS440R Series

Figure 1. Typical Magnetic vs Temperature Performance Curves

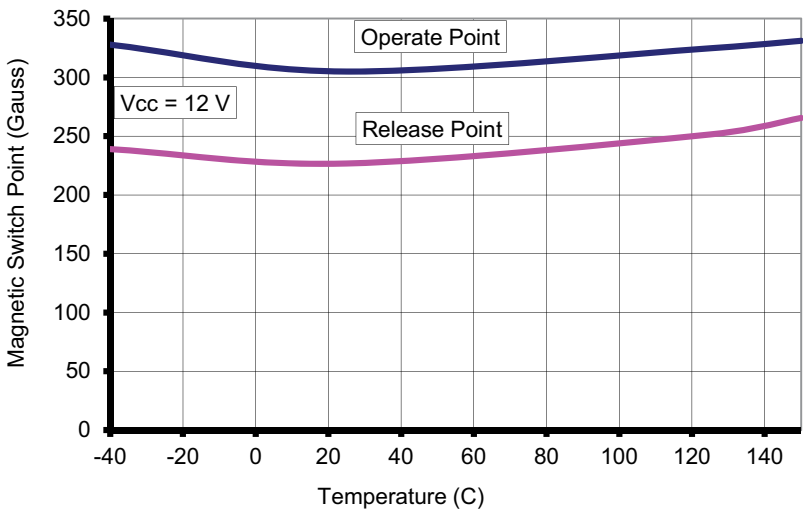
## SS341RT/SS441R



## SS343RT/SS443R



## SS349RT/SS449R



# Unipolar Digital Hall-Effect Sensor ICs

Figure 2. SS340RT Series Maximum Rated Supply Voltage vs Temperature

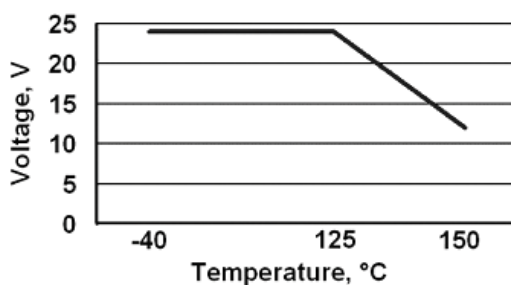


Figure 3. Current Sinking Output Block Diagram

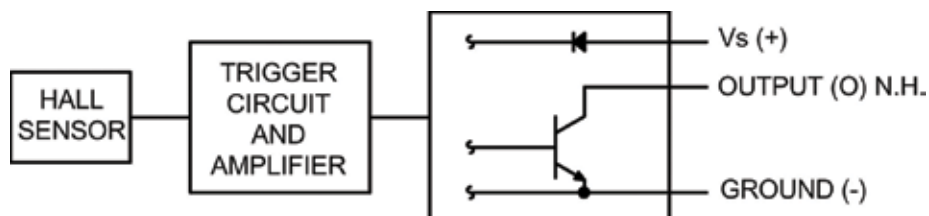
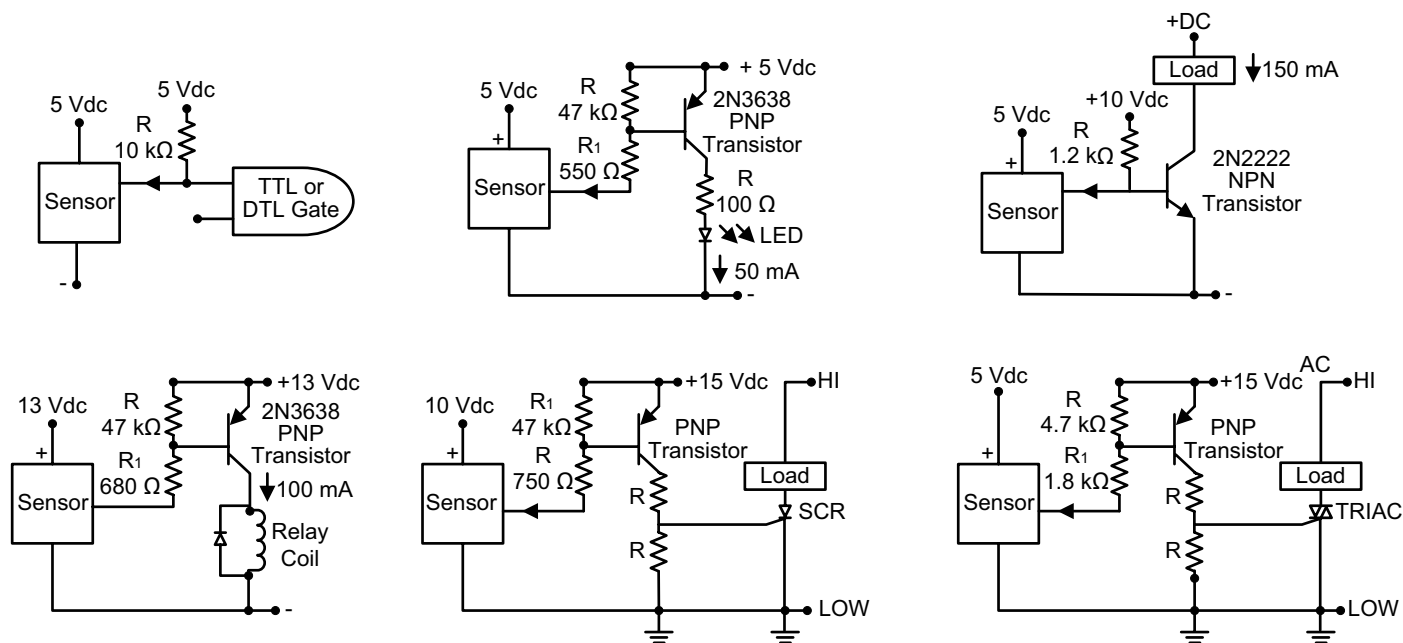
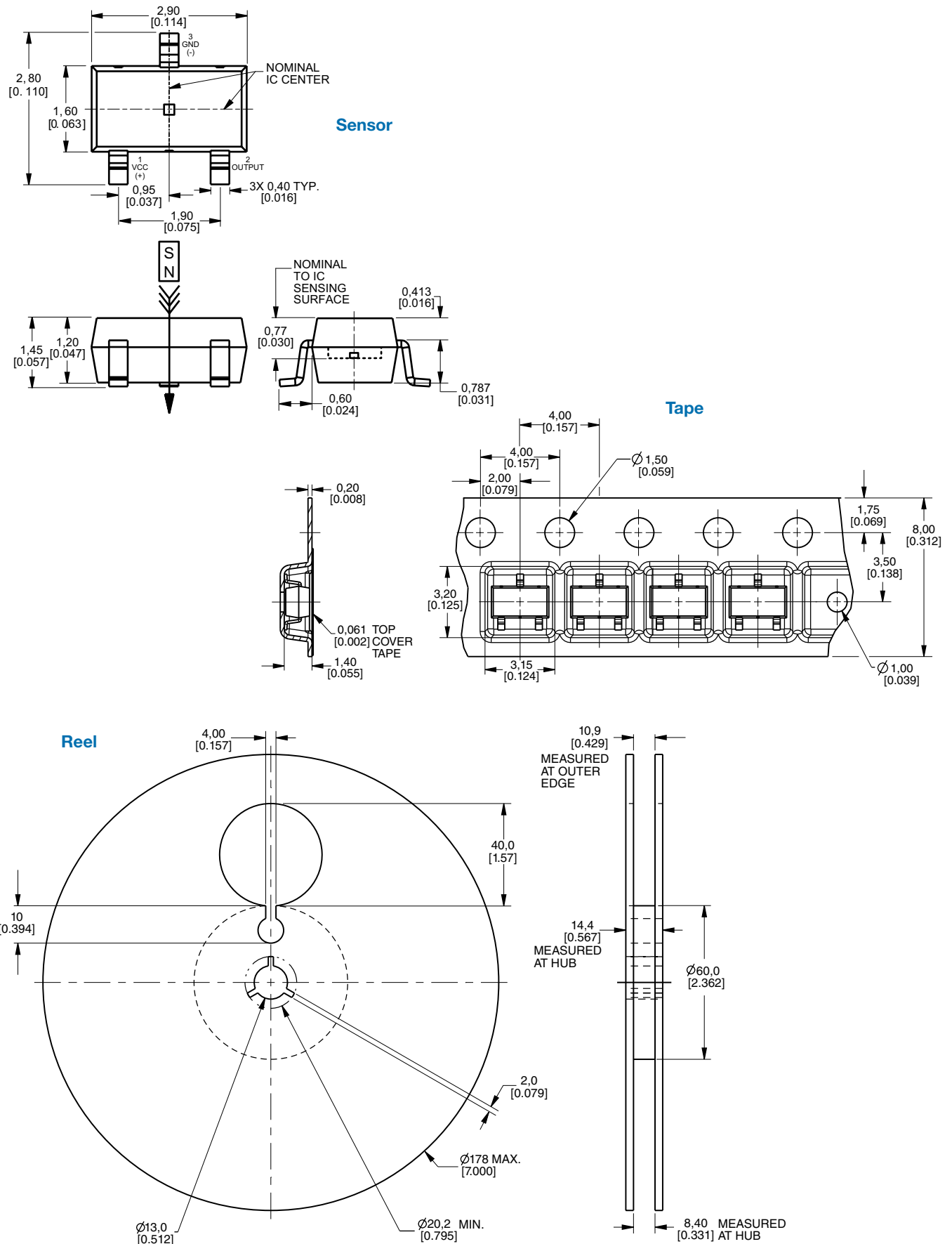


Figure 4. Wiring Diagrams



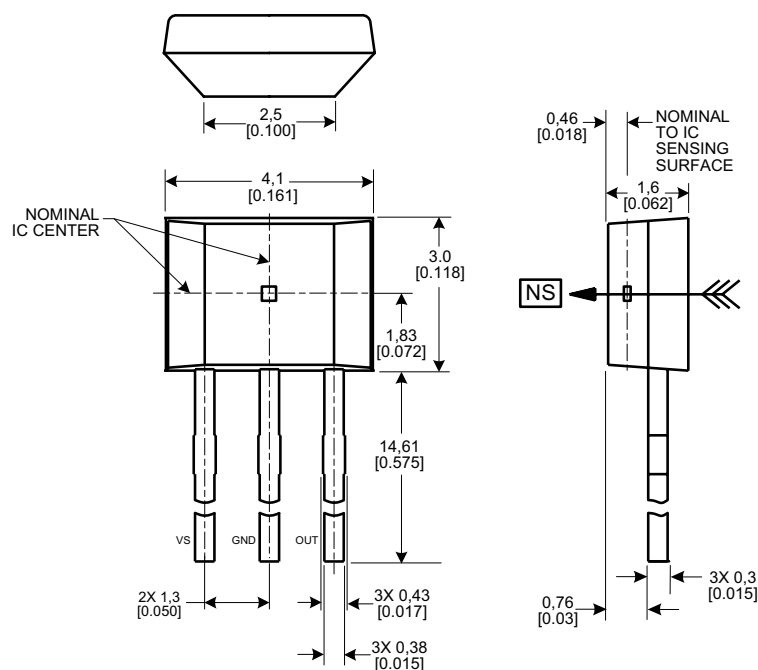
# SS340RT/SS440R Series

Figure 5. SS340RT Mounting and Tape/Reel Dimensions (For reference only. mm/[in].)



# Unipolar Digital Hall-Effect Sensor ICs

Figure 6. SS440R Mounting Dimensions (For reference only. mm/[in].)



## Order Guide

| Catalog Listing | Description                                                                                                                |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|
| SS341RT         | Unipolar, digital Hall-effect sensor IC, high sensitivity, SOT-23 package, tape and reel packaging (3000 units per reel)   |
| SS343RT         | Unipolar, digital Hall-effect sensor IC, medium sensitivity, SOT-23 package, tape and reel packaging (3000 units per reel) |
| SS349RT         | Unipolar, digital Hall-effect sensor IC, low sensitivity, SOT-23 package, tape and reel packaging (3000 units per reel)    |
| SS441R          | Unipolar, digital Hall-effect sensor IC, high sensitivity, flat TO-92-style package, bulk packaging (1000 units per bag)   |
| SS443R          | Unipolar, digital Hall-effect sensor IC, medium sensitivity, flat TO-92-style package, bulk packaging (1000 units per bag) |
| SS449R          | Unipolar, digital Hall-effect sensor IC, low sensitivity, flat TO-92-style package, bulk packaging (1000 units per bag)    |

## ADDITIONAL INFORMATION

The following associated literature is available at [sensing.honeywell.com](http://sensing.honeywell.com):

- Product line guide
- Product range guide: Position Sensors
- Product range guide: Speed Sensors
- Product range guide: Sensors and Switches for Potential Medical Applications
- Product installation instructions

### **⚠ WARNING**

#### **PERSONAL INJURY**

**DO NOT USE** these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### **⚠ WARNING**

#### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

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Sensing and Control  
Honeywell  
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Golden Valley, MN 55422  
**[honeywell.com](http://honeywell.com)**

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