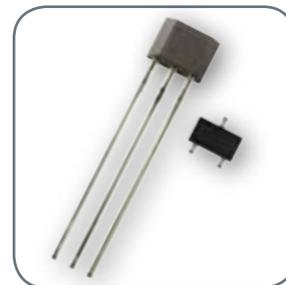




## Unipolar Digital Hall-Effect Sensor ICs SS340RT/SS440R Series



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# 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:

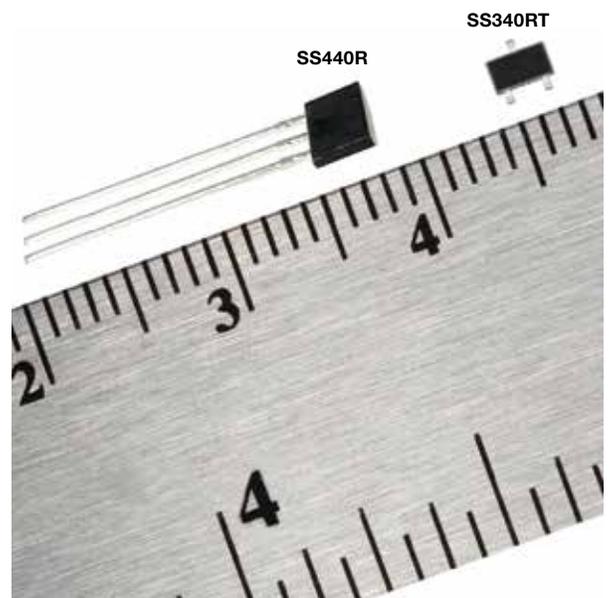
- The SS340RT is available in the miniature SOT-23 surface mount package.
- SS440R is available in the leaded, flat TO-92-style package.

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

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#### **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

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#### **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.

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

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

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

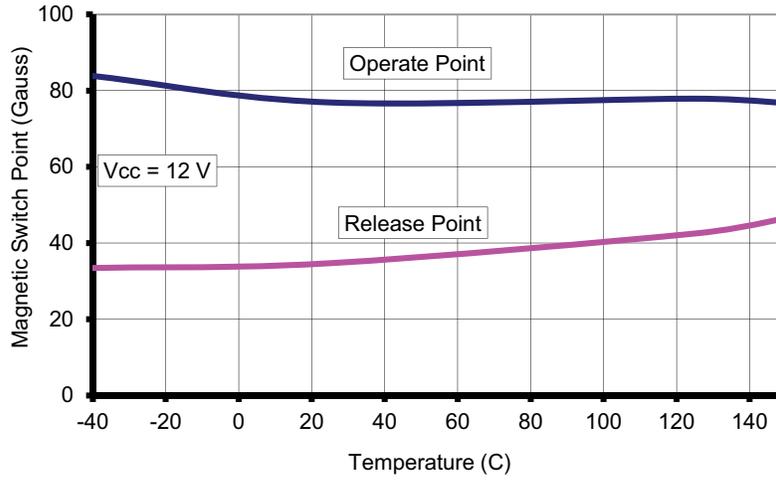
Characteristic	Min.	Typ.	Max.	Unit
Supply voltage	-28.0	—	28.0	V
Applied output voltage	-0.5	—	28.0	V
Output current	—	—	20	mA
Magnetic flux	—	—	no limit	Gauss

## NOTICE

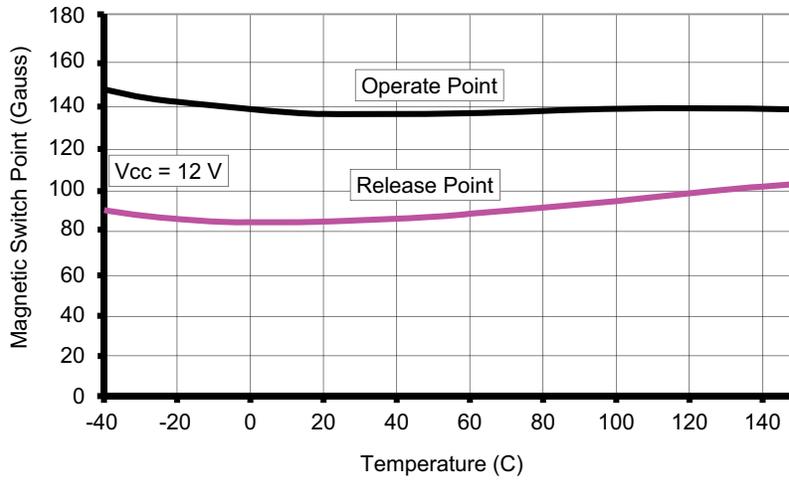
Absolute maximum ratings are the extreme limits that the device will withstand without damage to the device. However, the electrical and mechanical characteristics are not guaranteed as the maximum limits (above recommended operating conditions) are approached, nor will the device necessarily operate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

Figure 1. Typical Magnetic vs Temperature Performance Curves

SS341RT/SS441R



SS343RT/SS443R



SS349RT/SS449R

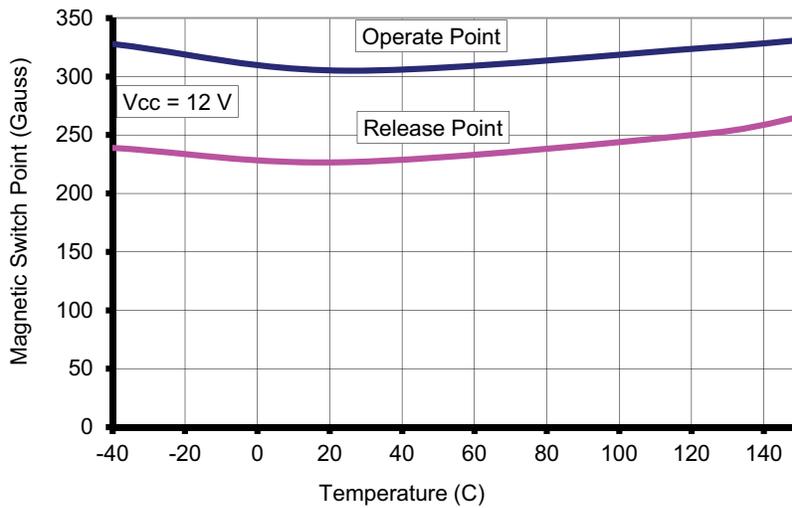


Figure 2. SS340RT Series Maximum Rated Supply Voltage vs Temperature

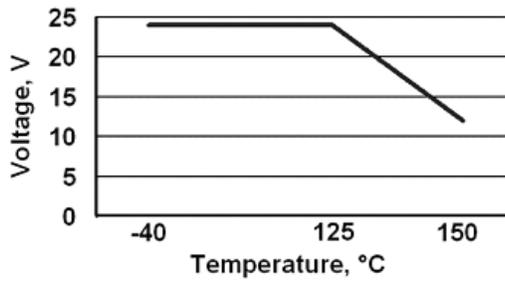


Figure 3. Current Sinking Output Block Diagram

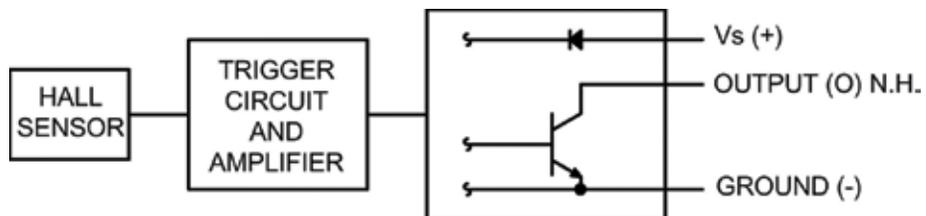


Figure 4. Wiring Diagrams

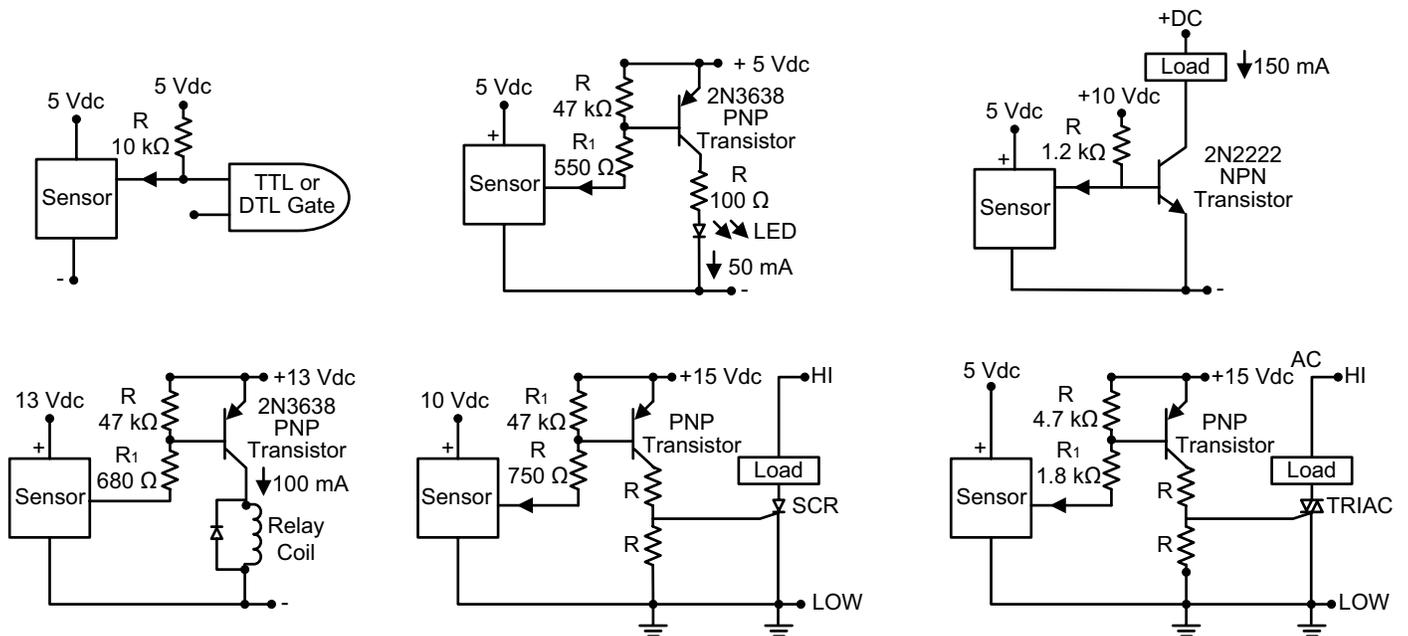


Figure 5. SS340RT Mounting and Tape/Reel Dimensions (For reference only. mm/[in].)

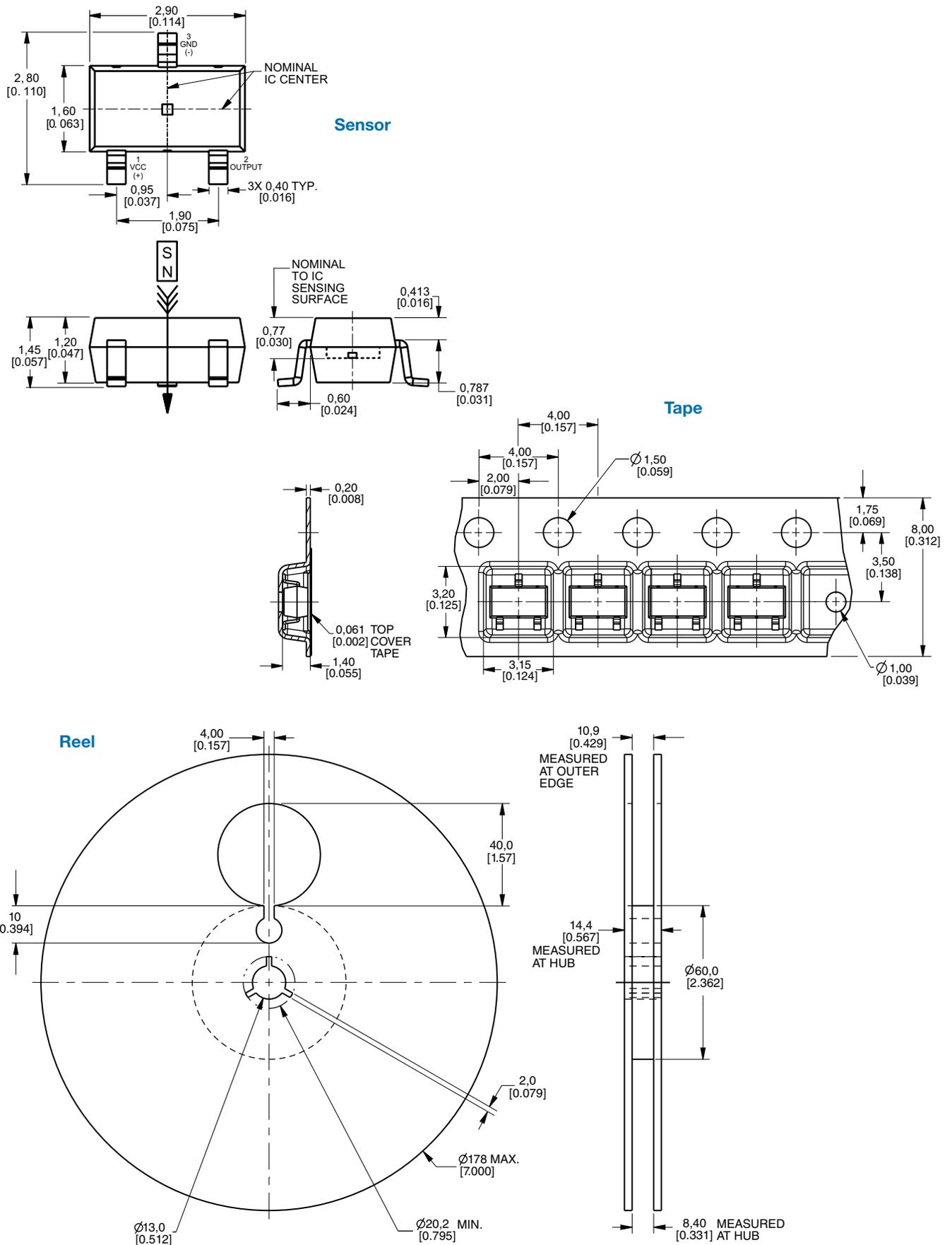
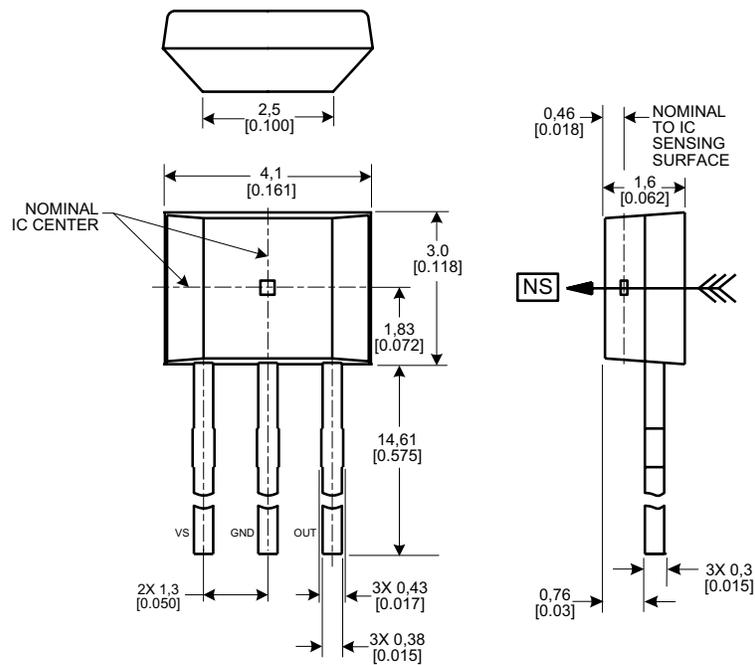


Figure 6. SS440R Mounting Dimensions (For reference only. mm/[in].)



#### 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)

## **⚠ 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.**

## **WARRANTY/REMEDY**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell website, 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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