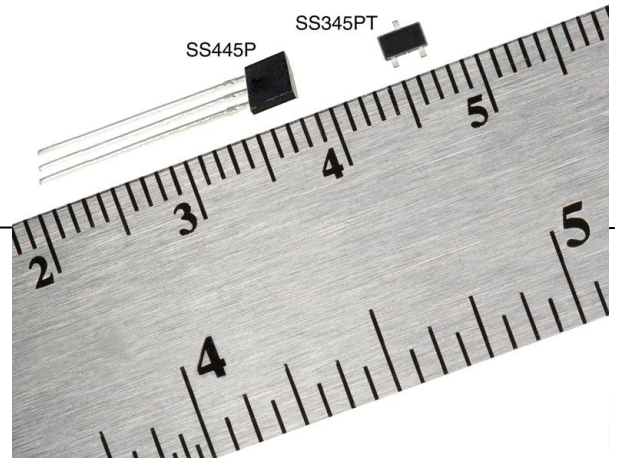


## SS345PT/SS445P

### Unipolar Hall-Effect Digital Position Sensors with Built-in Pull-up Resistor



#### DESCRIPTION

The SS345PT/SS445P sensors are small, versatile digital Hall-effect devices that are operated by the magnetic field from a permanent magnet or an electromagnet, designed to respond to a single North pole (SS345PT) or South pole (SS445P).

These unipolar sensors are designed to meet the requirements of a wide range of potential applications. The internal pull-up resistor often eliminates the need for external components, further helping to reduce the system cost. These economical unipolar sensors are well suited for simple, high-volume, cost-sensitive position and motion sensing applications.

#### FEATURES

- Subminiature package size (SS345PT) uses less space on the PCB than standard Hall-effect sensor packages such as TO-92 or SOT-89, allowing for use in smaller assemblies
- Tape and reel packaging (SS345PT) allows for automated component placement, helping to reduce manufacturing costs
- Small, flat TO-92-style package (SS445P) is also available
- Simple activation from a North pole (SS345PT) or a South pole (SS445P) makes these products suitable in a variety of potential applications such as motion control, lid closure detection, and displacement sensing
- Built-in pull-up resistor can easily interface with common electronic circuits without adding external components, helping to reduce total system cost
- RoHS-compliant materials meet Directive 2002/95/EC

The 2.7 Vdc to 7 Vdc supply voltage range allows this device to be used in low voltage applications. The SS345PT's very small size requires less PCB (printed circuit board) space, allowing it to be used in smaller assemblies.

These sensors are available in two package styles: the SS345PT in the subminiature SOT-23 surface mount package; the SS445P is available in the leaded, flat TO-92-style package.

The SS345PT is available on tape and reel (3000 units per reel); the SS445P is available in a bulk package (1000 units per bag).

#### POTENTIAL APPLICATIONS

##### Commercial:

- Door or lid closure detection in appliances
- Speed and RPM sensing in fitness equipment
- Flow rate sensing in appliances and water softeners
- Damper or valve position control in HVAC equipment
- Printer head position sensing

##### Industrial

- Flow rate sensing in industrial processes
- Robotic control (cylinder position monitoring)
- Float-based fluid level sensing

##### Medical

- Displacement sensor in hospital beds and medical equipment
- Medication bin monitor on portable drug carts

# SS345PT/SS445P

**Table 1. SS345PT/SS445P Specifications (At 2.7 to 7 Vdc supply, 4 mA load, T<sub>A</sub> = -40 °C to 150 °C [-40 °F to 302 °F])**

| Characteristic                           | Condition                                                                          | Minimum   | Typical    | Maximum   | Unit    |
|------------------------------------------|------------------------------------------------------------------------------------|-----------|------------|-----------|---------|
| Supply voltage                           | -40 °C to 150 °C [-40 °F to 302 °F]                                                | 2.7       | 5.0        | 7.0       | Vdc     |
| Supply current                           | G < 25 , V <sub>s</sub> = 5 V, 25 °C [77°F]<br>-40 °C to 150 °C [-40 °F to 302 °F] | —<br>—    | 5.5<br>—   | —<br>14   | mA      |
| Output current                           | —                                                                                  | —         | —          | 4.0       | mA      |
| V <sub>sat</sub>                         | G > 260                                                                            | —         | —          | 0.4       | Vdc     |
| Output leakage current                   | G < 25                                                                             | —         | —          | 10        | μA      |
| Output rise time                         | 25 °C [77 °F]                                                                      | —         | —          | 1.5       | μs      |
| Output fall time                         | 25 °C [77 °F]                                                                      | —         | —          | 1.5       | μs      |
| Thermal resistance:<br>SS345PT<br>SS445P | —                                                                                  | —<br>—    | 303<br>233 | —<br>—    | °C/W    |
| Operate                                  | -40 °C to 150 °C [-40 °F to 302 °F]                                                | 55        | 180        | 280       | G       |
| Release                                  | -40 °C to 150 °C [-40 °F to 302 °F]                                                | 25        | 105        | 240       | G       |
| Differential                             | -40 °C to 150 °C [-40 °F to 302 °F]                                                | 10        | 75         | 140       | G       |
| Operating temperature                    | —                                                                                  | -40 [-40] | —          | 150 [302] | °C [°F] |
| Storage temperature                      | —                                                                                  | -55 [-67] | —          | 165 [329] | °C [°F] |

## NOTICE

The magnetic field strength 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.

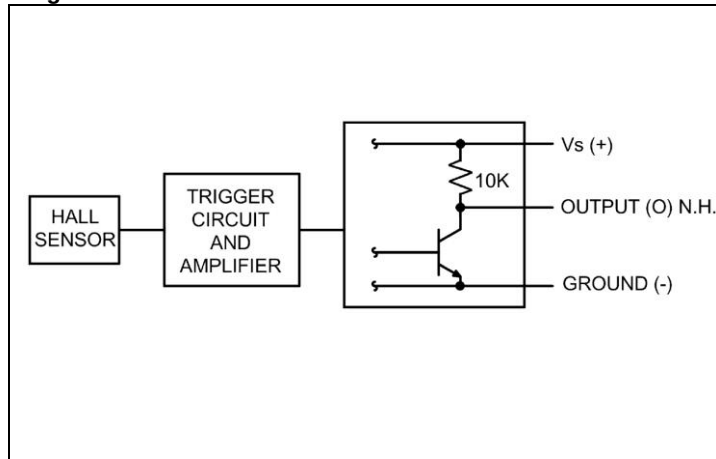


**Table 2. SS345PT/SS445P Absolute Maximum Ratings<sup>1</sup>**

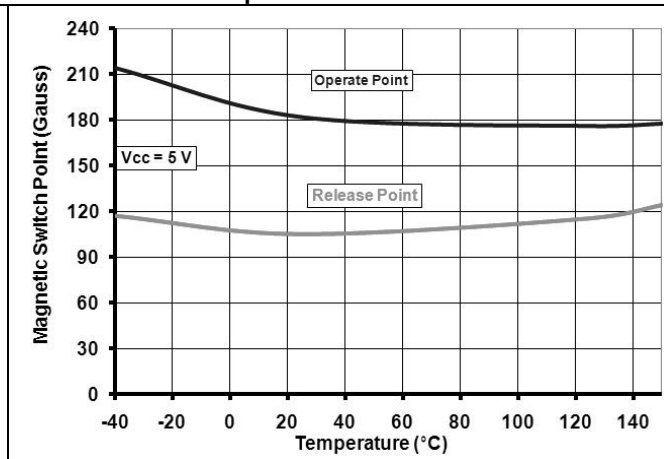
| Characteristic         | Minimum | Typical | Maximum  | Unit |
|------------------------|---------|---------|----------|------|
| Supply voltage         | -0.5    | —       | 7.0      | V    |
| Applied output voltage | -0.5    | —       | 7.0      | V    |
| Output current         | —       | —       | 8.0      | mA   |
| Magnetic flux          | —       | —       | no limit | G    |

**Note 1:** 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. SS345PT/SS445P Current Sinking Output Block Diagram**

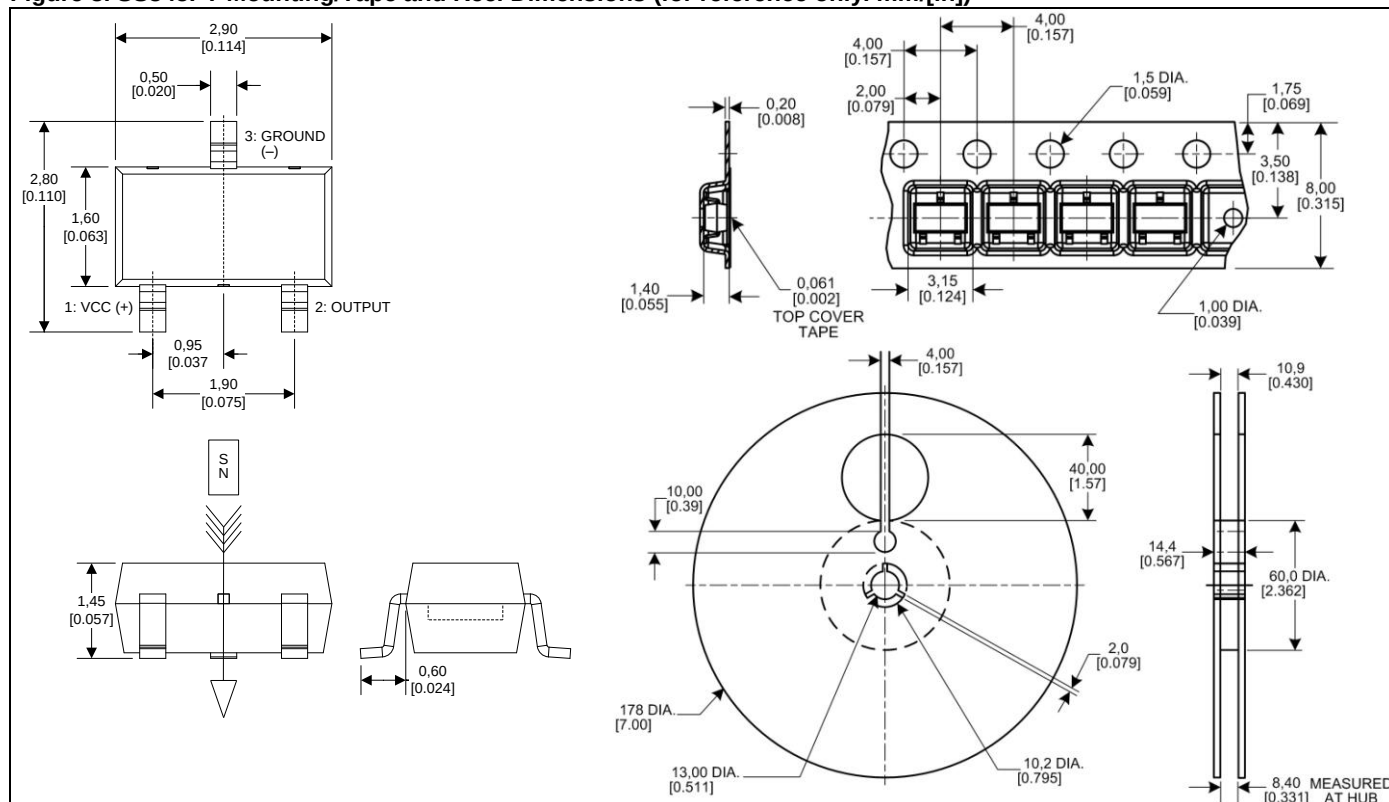


**Figure 2. Typical SS345PT/SS445P Magnetic Performance vs Temperature**

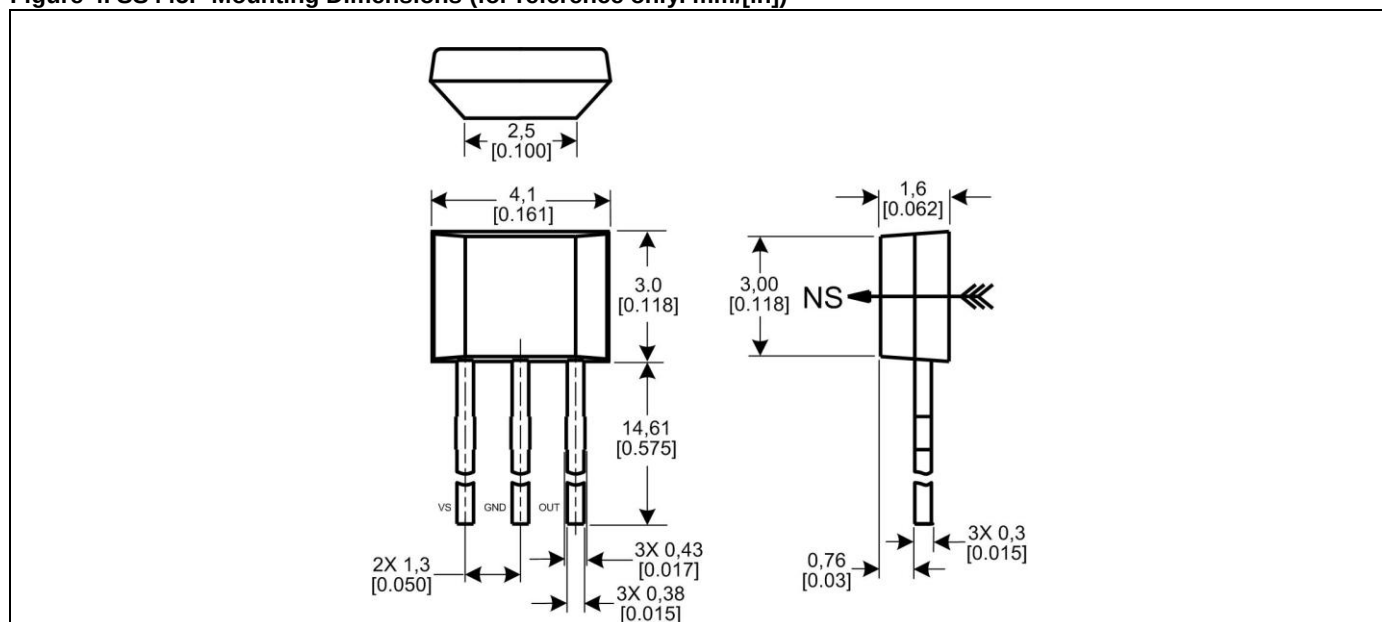


# Unipolar Hall-Effect Digital Position Sensors

**Figure 3. SS345PT Mounting/Tape and Reel Dimensions (for reference only. mm/[in])**



**Figure 4. SS445P Mounting Dimensions (for reference only. mm/[in])**



## Order Guide

| Catalog Listing | Description                                                                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| SS345PT         | Unipolar, Hall-effect digital position sensor with built-in pull-up resistor, SOT-23 package, tape and reel packaging (3000 units per reel) |
| SS445P          | Unipolar, Hall-effect digital position sensor with built-in pull-up resistor, flat TO-92 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.

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### 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.**

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Sensing and Control  
Honeywell  
1985 Douglas Drive North  
Golden Valley, MN 55422  
[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

005921-2-EN  
November 2011  
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