

## Installation Instructions for the SS400 Series Temperature Compensated Digital Hall-Effect Sensor ICs

ISSUE 6  
PK 88700

### GENERAL INFORMATION

#### CAUTION

##### ELECTROSTATIC DISCHARGE DAMAGE

This component is sensitive to electrostatic discharge (ESD). Take normal ESD precautions in handling this product to prevent ESD-induced damage and/or degradation.

**Failure to comply with these instructions may result in product damage.**



### SOLDERING/ASSEMBLY

#### CAUTION

##### IMPROPER SOLDERING

- Ensure leads are supported during any forming/ shearing operation so that they are not stressed inside the plastic case.
- Limit exposure to high temperatures.

**Failure to comply with these instructions may result in product damage.**

PC board wave soldering temperature is 250 °C to 260 °C [482 °F to 500 °F] peak for 3 s max.

### CLEANING

#### CAUTION

##### IMPROPER CLEANING

Do not use pressure wash. High-pressure stream could force contaminants into the package.

**Failure to comply with these instructions may result in product damage.**

Use agitated rinse to clean the sensor.

**Table 1. Absolute Maximum Ratings**

| Characteristic                       | Parameter                                                 |
|--------------------------------------|-----------------------------------------------------------|
| Supply voltage                       | -1 Vdc to +30 Vdc                                         |
| Voltage externally applied to output | +30 Vdc max. (OFF only)<br>-0.5 Vdc min. (OFF or ON)      |
| Output ON current                    | see Table 2                                               |
| Operating temperature                | -40 °C to 150 °C [-40 °F to 302 °F]                       |
| Storage temperature                  | -50 °C to 150 °C [-58 °F to 302 °F]                       |
| Magnetic flux                        | no limit; circuit cannot be damaged by magnetic overdrive |

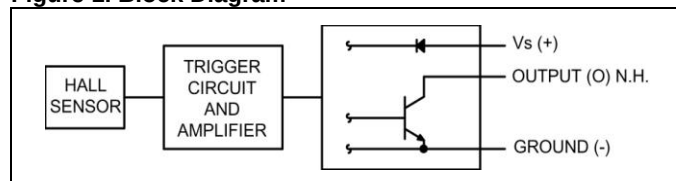
#### NOTICE

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.

**Table 2. Output Current Absolute Limits**

| Supply Voltage   | Output Current |
|------------------|----------------|
| -1 Vdc to 24 Vdc | 50 mA max.     |
| 24 Vdc to 25 Vdc | 37 mA max.     |
| 25 Vdc to 26 Vdc | 33 mA max.     |
| 26 Vdc to 27 Vdc | 28 mA max.     |
| 27 Vdc to 28 Vdc | 24 mA max.     |
| 28 Vdc to 29 Vdc | 19 mA max.     |
| 29 Vdc to 30 Vdc | 15 mA max.     |

**Figure 1. Block Diagram**



**Table 3. Operating Characteristics (over operating voltage and temperature, unless otherwise noted)**

| Characteristic                               | Min.    | Typ.    | Max.     | Note                                                  |
|----------------------------------------------|---------|---------|----------|-------------------------------------------------------|
| Supply voltage                               | 3.8 Vdc | —       | 30 Vdc   | —                                                     |
| Current consumption                          | —       | —       | 10 mA    | —                                                     |
| Supply current (operated at 25 °C, Vs = 5 V) | —       | 6.5 mA  | —        | —                                                     |
| Output voltage (operated)                    | —       | —       | 0.40 Vdc | sinking, 20 mA max.                                   |
| Output current (operated)                    | —       | —       | 20 mA    | —                                                     |
| Output leakage current (released)            | —       | —       | 10 µA    | —                                                     |
| Output switching time:                       |         |         |          | V <sub>CC</sub> = 12 V,<br>RL = 1.6 kΩ,<br>CL = 20 pF |
| rise, 10% to 90%                             | —       | 0.05 µs | 1.5 µs   |                                                       |
| fall, 90% to 10%                             | —       | 0.15 µs | 1.5 µs   |                                                       |

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Table 4. Magnetic Characteristics

| Temperature        | Operating Characteristic | Catalog Listing |           |           |           |           |           |           |
|--------------------|--------------------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                    |                          | SS411A          | SS413A    | SS441A    | SS443A    | SS449A    | SS461A    | SS466A    |
|                    |                          | SS411A-L        | SS413A-L  | SS441A-L  | SS443A-L  | SS449A-L  | SS461A-L  | SS466A-L  |
|                    |                          | SS411A-T2       | SS413A-T2 | SS441A-T2 | SS443A-T2 | SS449A-T2 | SS461A-T2 | SS466A-T2 |
|                    |                          | SS411A-T3       | SS413A-T3 | SS441A-T3 | SS443A-T3 | SS449A-T3 | SS461A-T3 | SS466A-T3 |
|                    |                          | Bipolar         | Bipolar   | Unipolar  | Unipolar  | Unipolar  | Latching  | Latching  |
| -40 °C<br>[-40 °F] | min. op.                 | NS              | NS        | 50 G      | 110 G     | 285 G     | 5 G       | 100 G     |
|                    | max. op.                 | 70 G            | 140 G     | 135 G     | 215 G     | 435 G     | 110 G     | 200 G     |
|                    | min. rel.                | -70 G           | -140 G    | 20 G      | 80 G      | 210 G     | -110 G    | -200 G    |
|                    | max. rel.                | NS              | NS        | 120 G     | 190 G     | 360 G     | -5 G      | -100 G    |
|                    | min. dif.                | 15 G            | 20 G      | 15 G      | 25 G      | 30 G      | 50 G      | 200 G     |
| 0 °C<br>[32 °F]    | min. op.                 | NS              | NS        | 53 G      | 110 G     | 305 G     | 5 G       | 100 G     |
|                    | max. op.                 | 65 G            | 140 G     | 117 G     | 190 G     | 400 G     | 90 G      | 185 G     |
|                    | min. rel.                | -65 G           | -140 G    | 20 G      | 80 G      | 230 G     | -90 G     | -185 G    |
|                    | max. rel.                | NS              | NS        | 99 G      | 165 G     | 325 G     | -5 G      | -100 G    |
|                    | min. dif.                | 15 G            | 20 G      | 15 G      | 25 G      | 30 G      | 50 G      | 200 G     |
| 25 °C<br>[77 °F]   | min. op.                 | NS              | NS        | 55 G      | 110 G     | 310 G     | 10 G      | 100 G     |
|                    | max. op.                 | 60 G            | 140 G     | 115 G     | 180 G     | 390 G     | 85 G      | 180 G     |
|                    | min. rel.                | -60 G           | -140 G    | 20 G      | 75 G      | 235 G     | -85 G     | -180 G    |
|                    | max. rel.                | NS              | NS        | 95 G      | 155 G     | 31 G5     | -10 G     | -100 G    |
|                    | min. dif.                | 15 G            | 20 G      | 20 G      | 25 G      | 30 G      | 50 G      | 200 G     |
| 85 °C<br>[185 °F]  | min. op.                 | NS              | NS        | 45 G      | 90 G      | 290 G     | 110 G     | 95 G      |
|                    | max. op.                 | 60 G            | 140 G     | 120 G     | 180 G     | 400 G     | 85 G      | 180 G     |
|                    | min. rel.                | -60 G           | -140 G    | 15 G      | 70 G      | 215 G     | -85 G     | -180 G    |
|                    | max. rel.                | NS              | NS        | 105 G     | 165 G     | 325 G     | -10 G     | -95 G     |
|                    | min. dif.                | 12 G            | 20 G      | 15 G      | 15 G      | 30 G      | 50 G      | 190 G     |
| 125 °C<br>[257 °F] | min. op.                 | NS              | NS        | 40 G      | 80 G      | 270 G     | 5 G       | 80 G      |
|                    | max. op.                 | 65 G            | 140 G     | 123 G     | 190 G     | 410 G     | 100 G     | 180 G     |
|                    | min. rel.                | -65 G           | -140 G    | 15 G      | 60 G      | 200 G     | -100 G    | -180 G    |
|                    | max. rel.                | NS              | NS        | 115 G     | 180 G     | 340 G     | -5 G      | -80 G     |
|                    | min. dif.                | 12 G            | 20 G      | 8 G       | 10 G      | 30 G      | 50 G      | 160 G     |
| 150 °C<br>[302 °F] | min. op.                 | NS              | NS        | 35 G      | 65 G      | 260 G     | 5 G       | 70 G      |
|                    | max. op.                 | 70 G            | 140 G     | 125 G     | 200 G     | 420 G     | 110 G     | 185 G     |
|                    | min. rel.                | -70 G           | -140 G    | 10 G      | 55 G      | 185 G     | -110 G    | -185 G    |
|                    | max. rel.                | NS              | NS        | 120 G     | 195 G     | 345 G     | -5 G      | -70 G     |
|                    | min. dif.                | 10 G            | 20 G      | 5 G       | 5 G       | 30 G      | 50 G      | 140 G     |

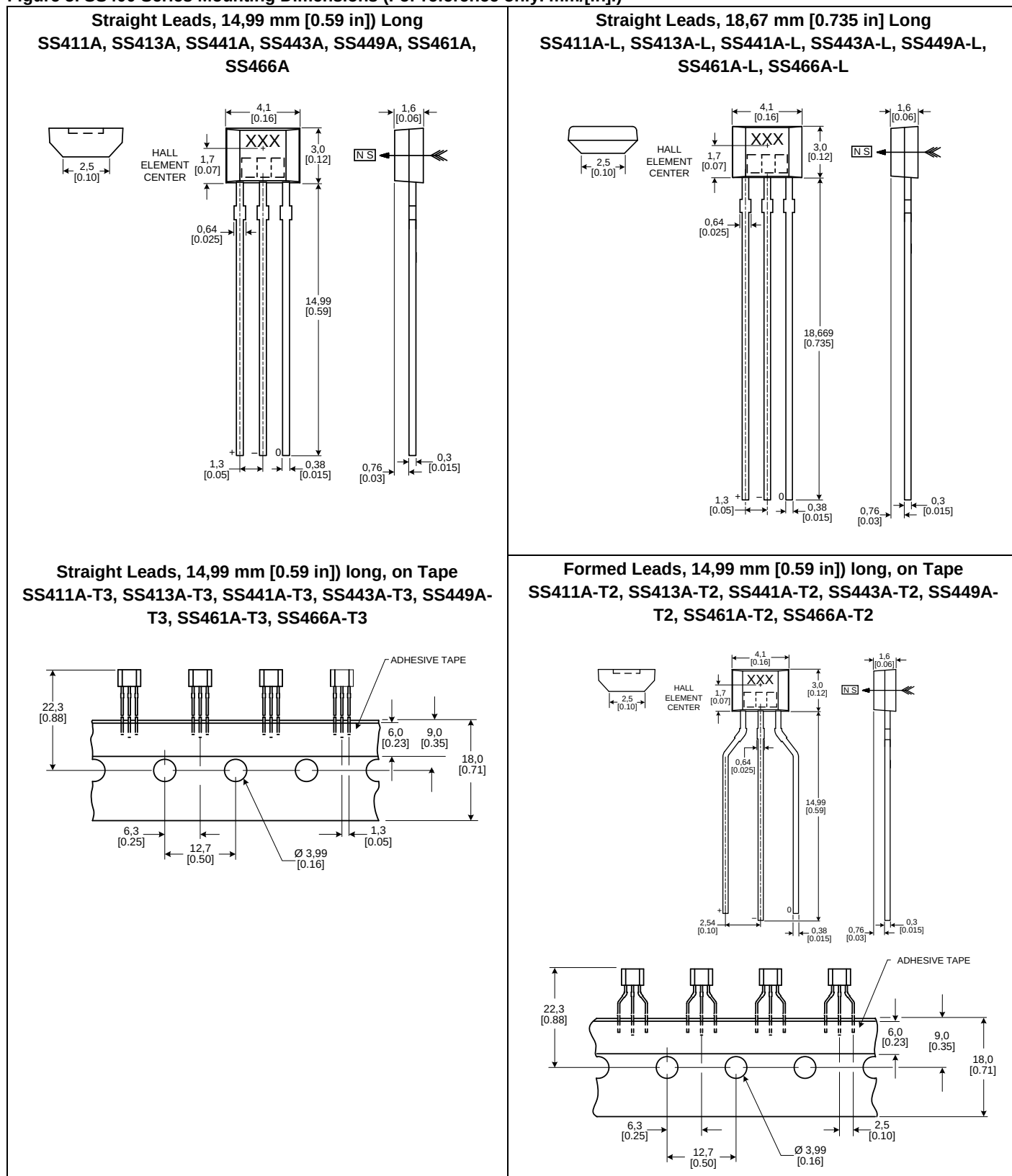
## NOTICE

Bipolar Hall-effect sensors may have an initial output in either the ON or OFF state if powered up with an applied magnetic field in the differential zone (applied magnetic field >Brp and <Bop). Honeywell recommends allowing 10 µs for output voltage to stabilize after supply voltage has reached 5 V.

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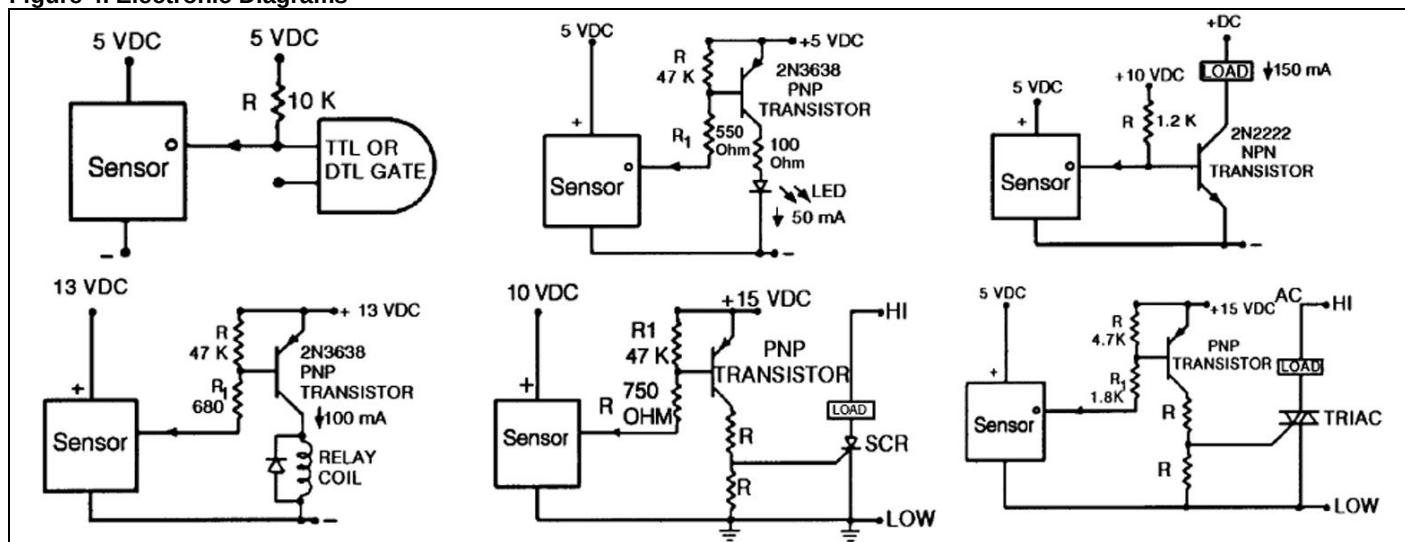
Figure 5. SS400 Series Mounting Dimensions (For reference only. mm/[in].)



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Figure 4. Electronic Diagrams



## ⚠ 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.**

### 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 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.

## ⚠ WARNING

### MISUSE OF DOCUMENTATION

- The information presented in this application note 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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