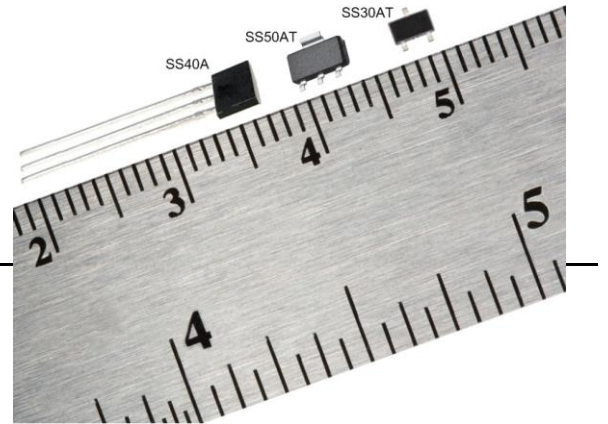


SS30AT/SS40A/SS50AT

Bipolar Hall-effect Magnetic Position Sensors



DESCRIPTION

The SS30AT/SS40A/SS50AT Series sensors are versatile, bipolar, Hall-effect sensors. These sensitive magnetic sensors offer reverse polarity protection and deliver stable output over a -40 °C to 125 °C [-40 °F to 257 °F] temperature range. Operation from any dc supply voltage from 4.5 Vdc to 24.0 Vdc is acceptable.

The SS30AT/SS40A/SS50AT Series sensors build upon Honeywell's popular magnetic position sensors and offer several advantages. These sensors have been designed with the latest technologies to provide reliable, cost-effective solutions to many commercial, computer, medical, and/or consumer applications requiring motor control and RPM sensing.

FEATURES/BENEFITS

- Subminiature package size (SS30AT) often allows for use in applications with tight PCB space where a compact design is needed
- Small package size (SS40A, SS40AT) allows for more space on PCB
- Sensitive bipolar magnetics respond to alternating north and south poles, often making these products well-suited for speed sensing and RPM measurement
- Robust design with built-in reverse voltage protection simplifies installation and protects device from damage when mounted on PCB
- Thermally balanced integrated circuit provides for stable operation over a full temperature range
- RoHS-compliant materials meet Directive 2002/95/EC

These products are available in three package styles to suit a variety of applications. The SS40A in the leaded, flat TO-92 style package can be supplied in bulk (1000 pieces per bag) or on tape in an "Ammopack" (fan-fold) format. The SS30AT in the subminiature SOT-23 surface-mount package, and the SS50AT in the small SOT-89B surface-mount package, are both supplied on tape and reel for use in automated pick-and-place equipment.

The surface mount versions are mounted directly on the electrical traces on a printed circuit board (PCB). They are attached by an automatic solder reflow operation which requires no hole, so it may help reduce the cost of the PCB.

POTENTIAL APPLICATIONS

Transportation:

- Speed and RPM (revolutions per minute) sensing
- Tachometer, counter pickup
- Motor and fan control
- Electric vehicle control
- Convertible roof position

Industrial:

- Speed and RPM (revolutions per minute) sensing
- Tachometer, counter pickup
- Flow-rate sensing
- Brushless dc (direct current) motor commutation
- Motor and fan control
- Robotics control



SS30AT/SS40A/SS50AT

ABSOLUTE MAXIMUM RATINGS*

| Parameter | Min. | Typ. | Max. | Unit |
|------------------------|------|------|----------|-------|
| Supply voltage | -28 | – | 28 | V |
| Applied output voltage | -0.5 | – | 28 | V |
| Output current | – | – | 20 | mA |
| Magnetic flux | – | – | No limit | Gauss |

*Absolute maximum ratings are the extreme limits 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.



ELECTRICAL CHARACTERISTICS

At $V_s = 4.5\text{ V}$ to 24 V with 20 mA load with $T_a = -40\text{ °C}$ to 125 °C [-40 °F to 257 °F] unless otherwise noted.

| Parameter | Cond. | Min. | Typ. | Max. | Unit |
|----------------------------|---|------|------|------|---------------|
| Supply voltage | – | 4.5 | – | 24.0 | V |
| Supply current | 25 °C [77 °F] | – | 6.8 | 10.0 | mA |
| Supply current | 25 °C [77 °F], $V_s = 4.5\text{ V}$ | – | 4.4 | 7.06 | mA |
| Supply current | – | – | – | 11.3 | mA |
| Output current | – | – | – | 20.0 | mA |
| V_{sat} @ 15 mA | Gauss >170 | – | – | 0.4 | V |
| Output leakage | Gauss <-170 | – | – | 10.0 | μA |
| Rise time | 25 °C [77 °F] | – | 0.5 | 1.5 | μs |
| Fall time | 25 °C [77 °F] | – | 0.2 | 1.5 | μs |
| Response time | 25 °C [77 °F] | – | 4.0 | 5.0 | μs |
| Operate | 25 °C [77 °F] | – | 45 | 110 | Gauss |
| Operate | 0 °C to 85 °C [32 °F to 185 °F] | – | 50 | 130 | Gauss |
| Operate | – | – | 55 | 170 | Gauss |
| Release | 25 °C [77 °F] | -110 | -45 | – | Gauss |
| Release | -40 °C to 85 °C [-40 °F to 185 °F] | -130 | -50 | – | Gauss |
| Release | – | -170 | -55 | – | Gauss |
| Differential | – | 50 | – | – | Gauss |
| Operating temperature | -40 °C to 125 °C [-40 °F to 257 °F] | | | | |
| Storage temperature | -55 °C to 165 °C [-67 °F to 329 °F] | | | | |

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

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 $10\ \mu\text{s}$ for output voltage to stabilize after supply voltage has reached 5 V .

Bipolar Hall-Effect Magnetic Position Sensors

WIRING DIAGRAMS

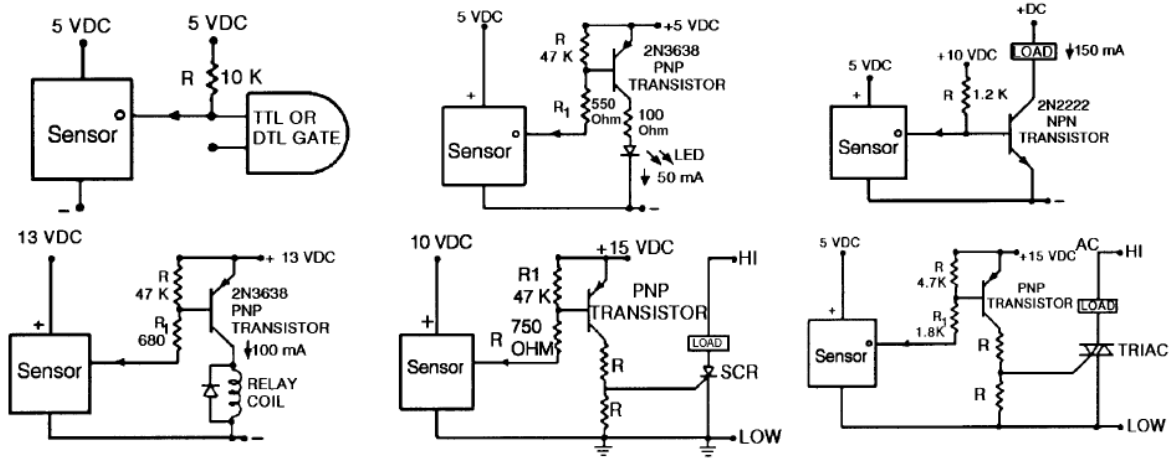


FIGURE 1: SS30AT/SS40A/SS50AT OPERATE AND RELEASE POINTS

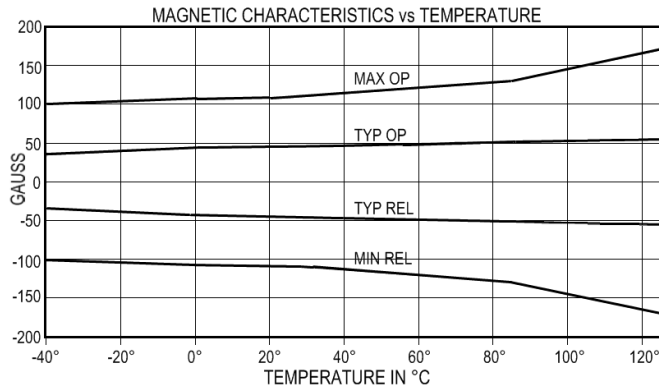
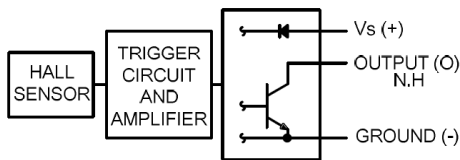
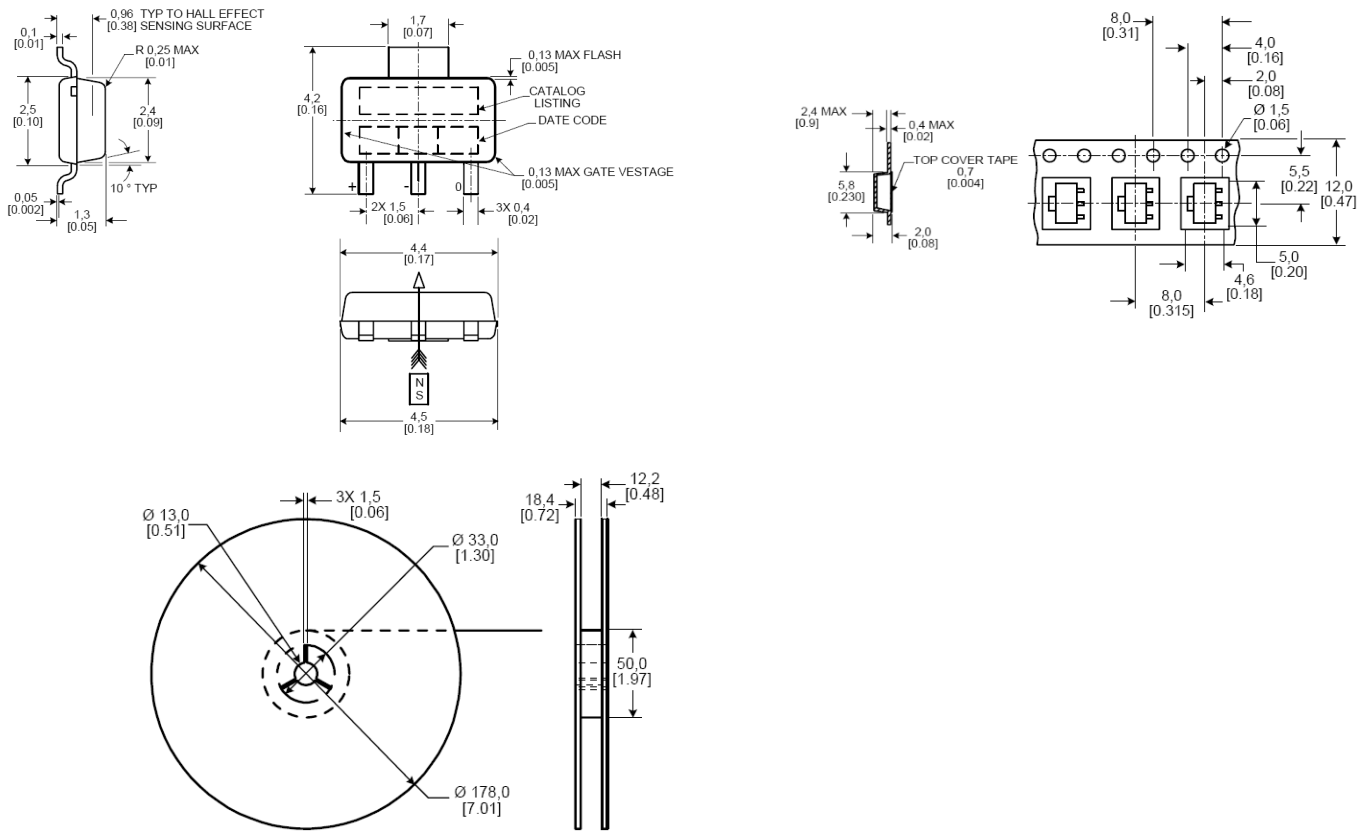


FIGURE 2. CURRENT SINKING OUTPUT BLOCK DIAGRAM



Bipolar Hall-Effect Magnetic Position Sensors

SS50AT SERIES MOUNTING DIMENSIONS (for reference only) mm/[in]



Order Guide.

| | |
|----------|--|
| SS40A | Bipolar, Hall-effect sensor, radial lead IC package |
| SS40A-F | Bipolar, Hall-effect sensor, radial lead IC package with formed leads on 2,54 mm [0.100 in] centers |
| SS40A-T2 | Bipolar, Hall-effect sensor, radial lead IC package tape-in-box (ammopack) version with formed leads |
| SS40A-T3 | Bipolar, Hall-effect sensor, radial lead IC package tape-in-box (ammopack) version with straight leads |
| SS30AT | Bipolar, Hall-effect sensor, SOT-23 style surface-mount package, on tape and reel |
| SS50AT | Bipolar, Hall-effect sensor, SOT-89B style surface-mount package, on tape and reel |

⚠ 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 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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