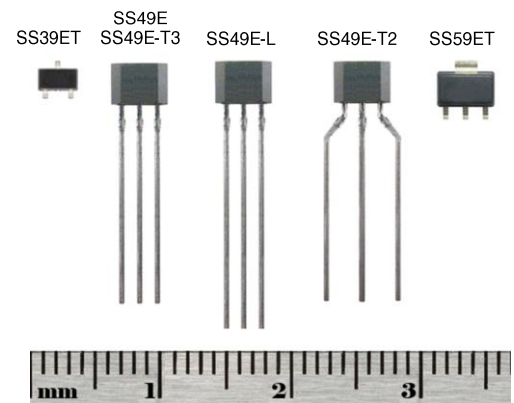


SS39ET/SS49E/SS59ET Series

Linear Hall-Effect Sensor ICs



DESCRIPTION

The SS39ET/SS49E/SS59ET Series Low-cost Linear Hall-effect sensors are small, versatile devices that are operated by the magnetic field from a permanent magnet or an electromagnet.

The linear sourcing output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. Low voltage capability as low as 2.7 Vdc and reduced current consumption of only 6 mA typically at 5 Vdc help make this product energy efficient.

VALUE PROPOSITION

- Designed and manufactured for cost competitiveness
- All packages can be supplied on tape for automated, lower-cost assembly
- SS39ET's small footprint takes up less space on the PC board, typically allowing for more components

FEATURES AND BENEFITS

- **Miniature and subminiature construction:** Designed for compact designs with tight space requirements
- **Energy efficient:** Low current consumption of 6 mA at 5 Vdc
- **Easy PC board interface:** Single current sourcing output for common electronic circuits
- **Circuit design flexibility:** Voltage range of 2.7 Vdc to 6.5 Vdc
- **Low noise output:** Virtually eliminates the need for filtering
- **Stable output:** Thin film resistors improve accuracy
- **Wide range of environments:** Temperature range of -40 °C to 100 °C [-40 °F to 212 °F]
- **Application flexibility:** Responds to either positive or negative Gauss

The integrated circuitry features low noise output, which makes it unnecessary to use external filtering. It also includes thin film resistors to provide increased temperature stability and accuracy. These linear Hall-effect sensors have an operating temperature range of -40 °C to 100 °C [-40 °F to 212 °F], appropriate for commercial, consumer, and industrial environments.

- Interfaces with many electrical components without buffering
- Thermally balanced integrated circuit for stable operation over a full temperature range

POTENTIAL APPLICATIONS

Industrial:

- Basic current sensing for motor load monitoring, detection
- Anti-tampering magnetic field sensor in smart remote utility meters
- Pump control in heavy-duty equipment and household appliances
- Simple linear or angular displacement sensing
- Handlebar/throttle position sensing in e-bikes and scooters
- Current sensing in appliances
- Speed adjustment trigger in tools and appliances
- Magnetic code reading in safes, security and building access control systems

Medical:

- Position sensing in infusion pumps

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Table 1. Operating Characteristics ($V_s = 5.0\text{ V}$, $T_A = -40\text{ }^{\circ}\text{C}$ to $85\text{ }^{\circ}\text{C}$ [$-40\text{ }^{\circ}\text{F}$ to $185\text{ }^{\circ}\text{F}$], except where noted)

Characteristic	Condition	Min.	Typ.	Max.	Unit
Output type	—	linear, sourcing			—
Magnetics type	—	analog			—
Supply voltage	—	2.7	—	6.5	Vdc
Supply current	25 °C [77 °F]	—	6	10	mA
Output voltage	—	1.0	1.4	1.75	mV/Gauss
Output current	$V_s > 3.0\text{ V}$	1.0	1.5	—	mA
Null	0 Gauss, 25 °C	2.25	2.50	2.75	Vdc
Output voltage span	—	1.05 to ($V_s - 1.05$)	0.95 to ($V_s - 0.95$)	—	Vdc
Magnetic range	—	± 650	± 1000	—	Gauss
Sensitivity	25 °C	1.0	1.4	1.75	mV/Gauss
Operating temperature	—	-40 [-40]	—	100 [212]	°C [°F]
Temperature error	—	—	—	—	—
Null drift	—	-0.10	—	0.10	% / °C
Sensitivity drift	$\geq 25\text{ }^{\circ}\text{C}$ $< 25\text{ }^{\circ}\text{C}$	-0.15 -0.04	— —	0.05 0.185	
Linearity	—	—	-0.7	—	% of span
Response time	—	—	3	—	μs

Table 2. Absolute Maximum Ratings

Characteristic	Parameter
Supply voltage (V_s)	-0.5 Vdc to 8.0 Vdc
Output current	10 mA
Storage temperature	-55 °C to 165 °C [-67 °F to 329 °F]

Figure 1. Current Sourcing Output Block Diagram

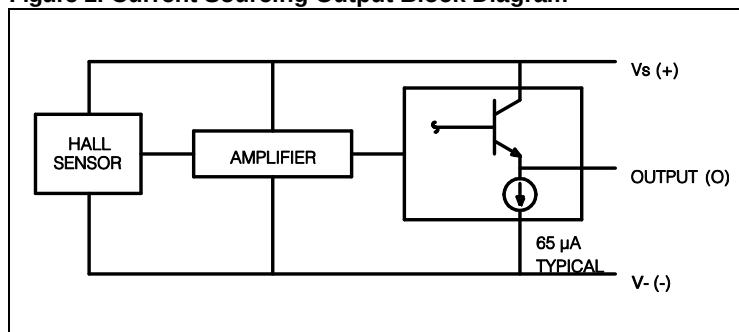
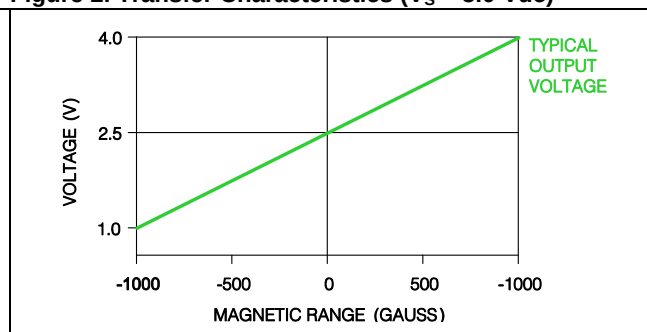


Figure 2. Transfer Characteristics ($V_s = 5.0\text{ Vdc}$)



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.



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Figure 3. Null Shift versus Temperature

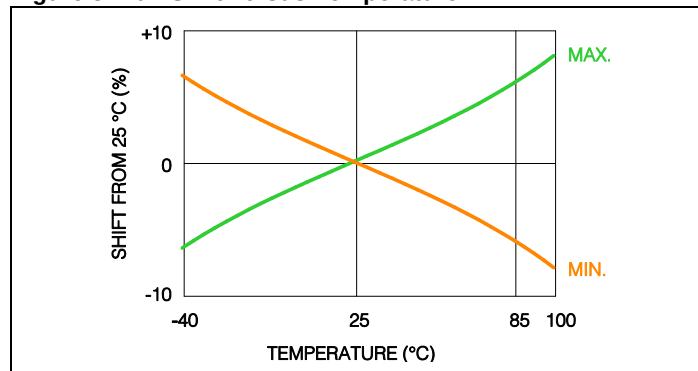


Figure 4. Sensitivity Shift versus Temperature

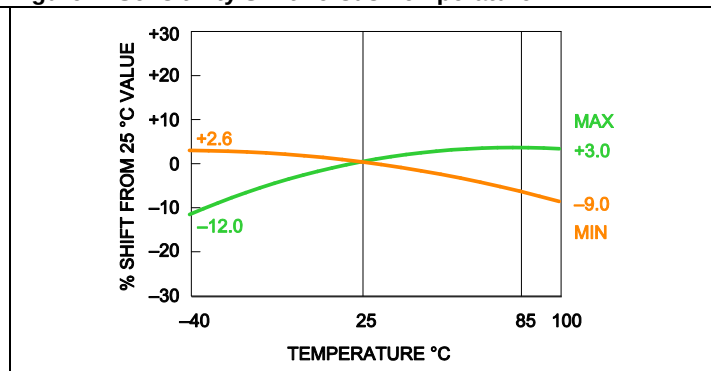


Figure 5. Typical Frequency Response

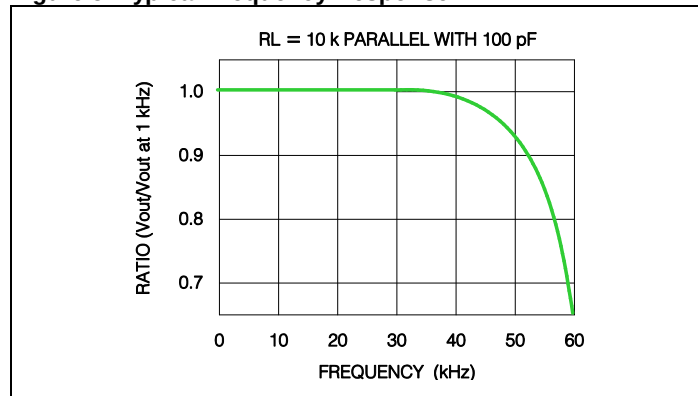
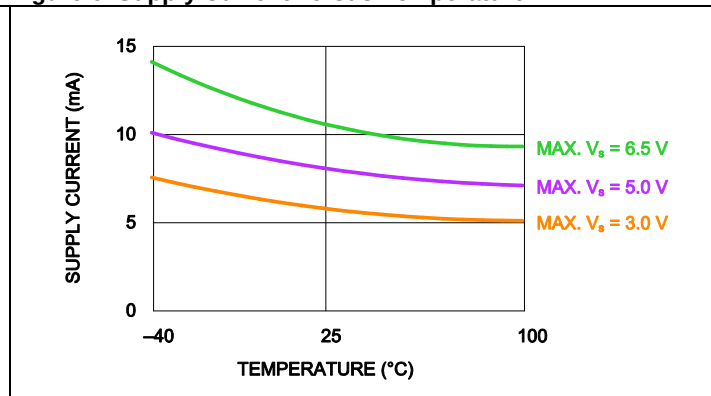
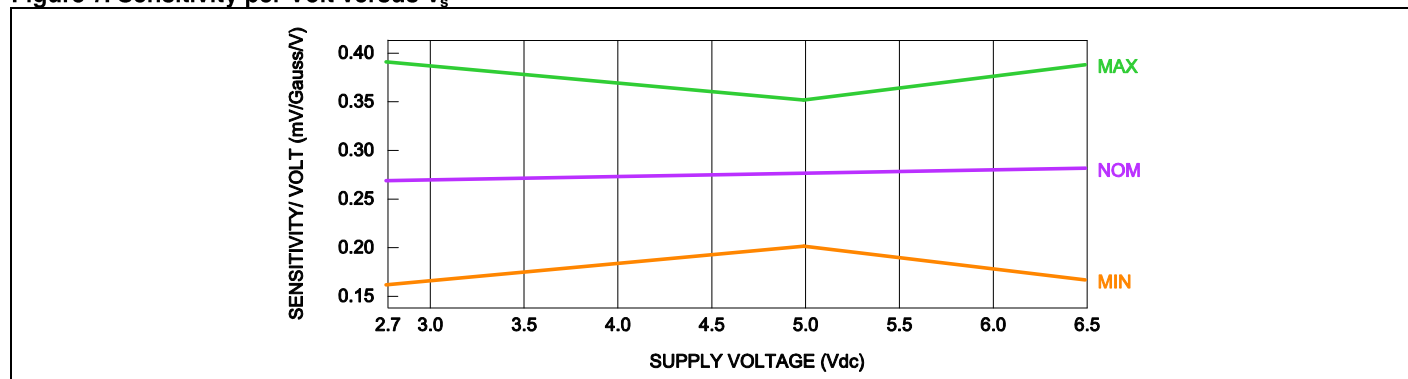


Figure 6. Supply Current versus Temperature

Figure 7. Sensitivity per Volt versus V_s 

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Figure 8. SS39ET Mounting Dimensions (for reference only, mm/[in])

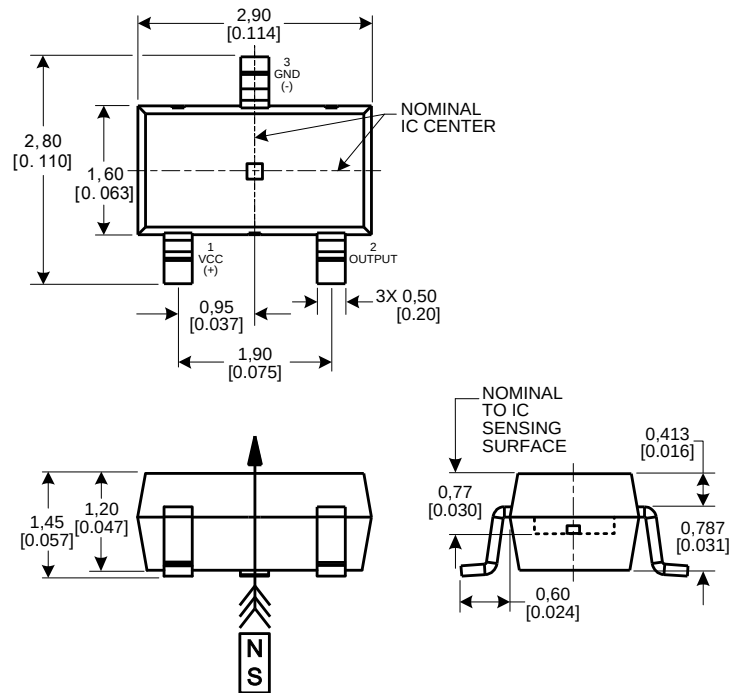
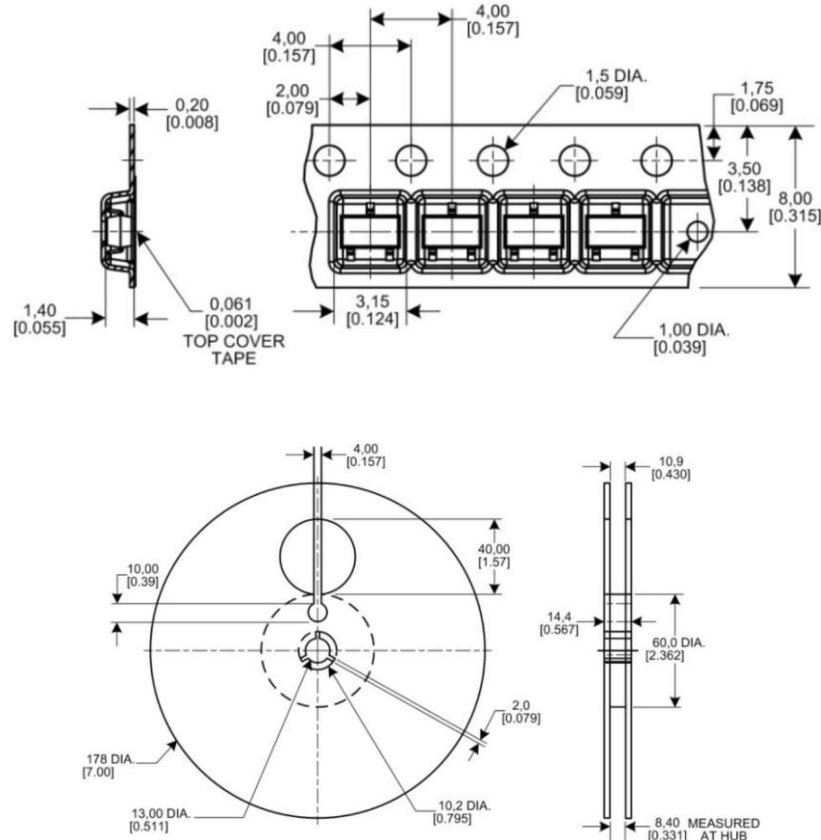
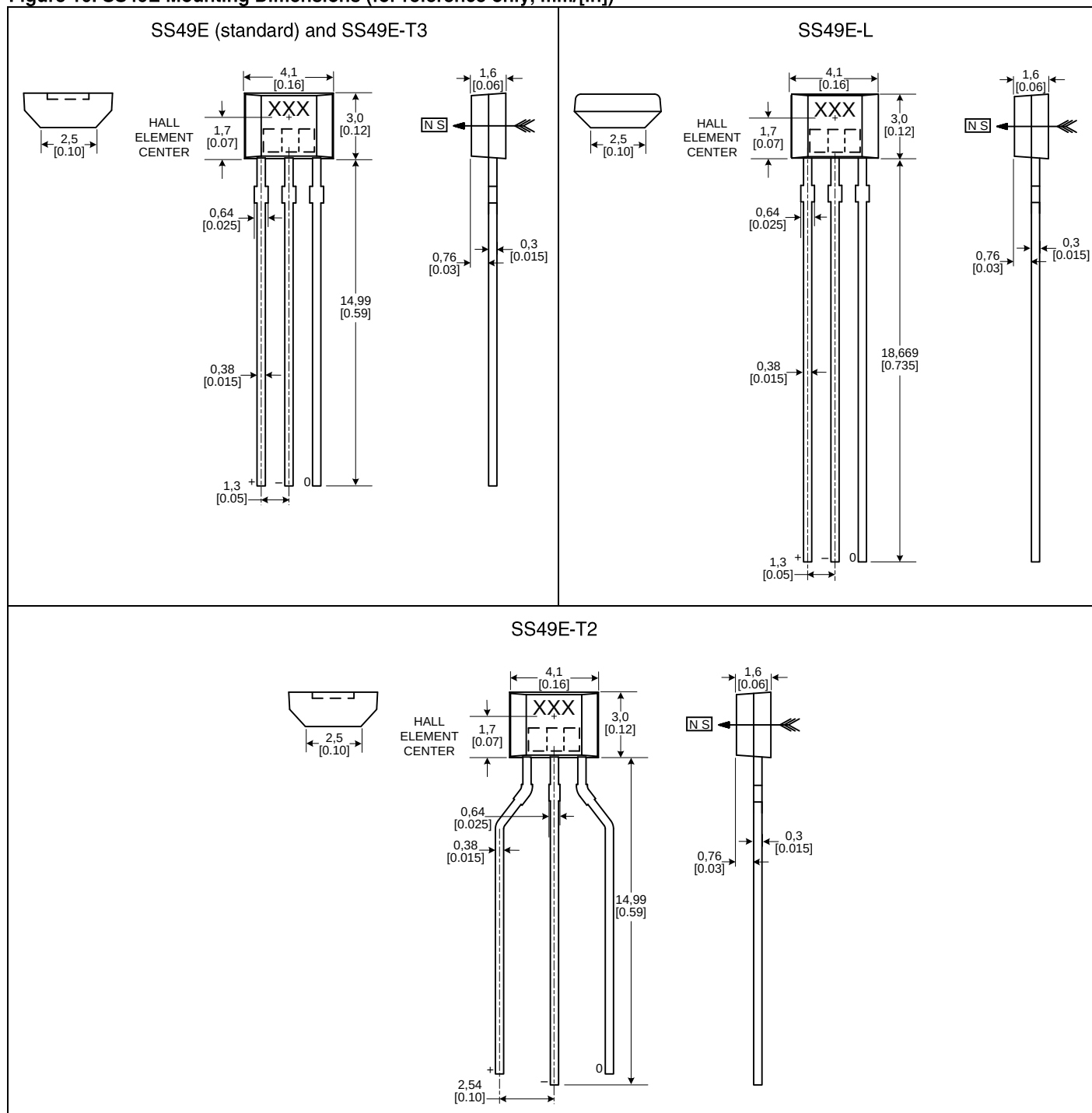


Figure 9. SS39ET Tape and Reel Dimensions (for reference only, mm/[in])



Linear Hall-Effect Sensor ICs

Figure 10. SS49E Mounting Dimensions (for reference only, mm/[in])



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Figure 11. Tape Style T2

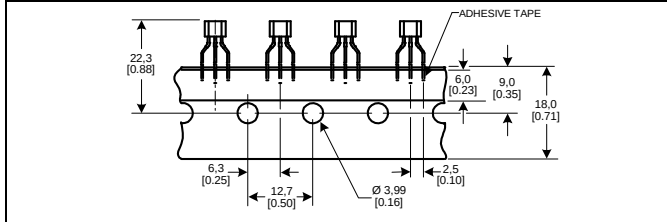


Figure 12. Tape Style T3

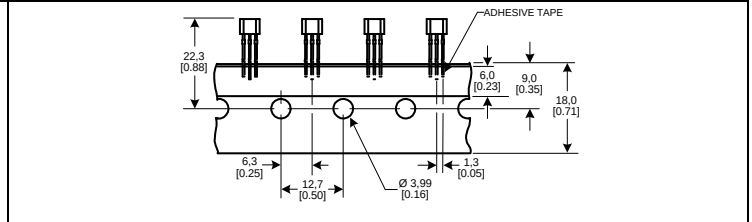


Figure 13. SS59ET Mounting Dimensions (for reference only, mm/[in])

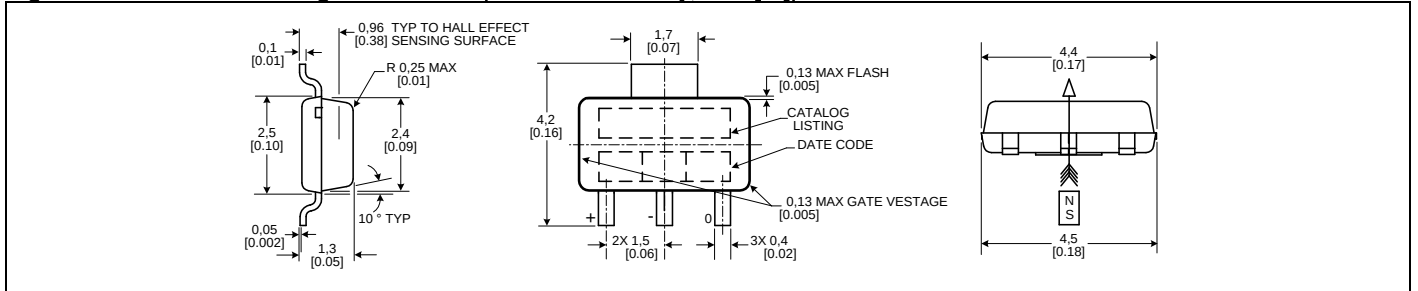
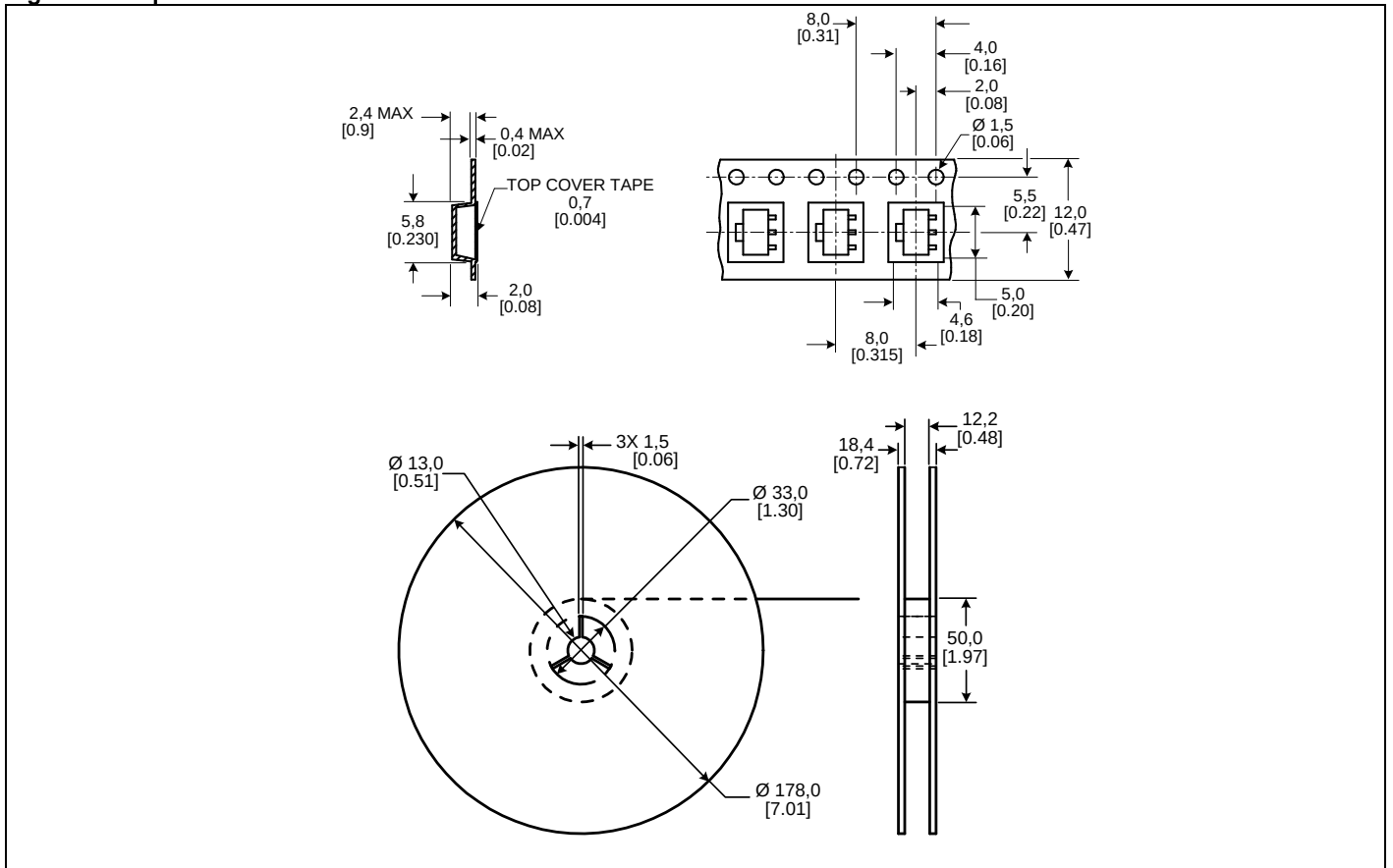


Figure 14. Tape and Reel Dimensions



Order Guide

Catalog Listing	Description
SS39ET	Linear Hall-effect sensor IC, SOT-23 tape and reel packaging (1000 units per reel)
SS49E	Linear Hall-effect sensor IC, straight leads, 14,99 mm [0.59 in] lead length, 1,30 mm [0.05 in] spacing, flat TO-92-style, bulk packaging (1000 units per bag)
SS49E-F	Linear Hall-effect sensor IC, formed leads, 14,99 mm [0.59 in] lead length, 2,54 mm [0.10 in] spacing, flat TO-92-style, bulk packaging (1000 units per bag)
SS49E-L	Linear Hall-effect sensor IC, straight leads, 18,67 mm [0.75 in] lead length, 1,30 mm [0.05 in] spacing, flat TO-92-style, bulk packaging (1000 units per bag)
SS49E-T2	Linear Hall-effect sensor IC, flat TO-92-style tape-in-box (ammopack) version with formed leads (5000 units per box)
SS49E-T3	Linear Hall-effect sensor IC, flat TO-92-style tape-in-box (ammopack) version with straight leads (5000 units per box)
SS59ET	Linear Hall-effect sensor IC, SOT-89 package, tape and reel packaging (1000 units per reel)

NOTE: Products ordered in bulk packaging (plastic bags) may not have perfectly straight leads as a result of normal handling and shipping operations. Please order a tape packaging option for applications with critical requirements for straight leads.



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 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.

SALES AND SERVICE

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 or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828 +65 6445-3033 Fax
Europe	+44 (0) 1698 481481 +44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188 +1-305-883-8257 Fax
USA/Canada	+1-800-537-6945 +1-815-235-6847 +1-815-235-6545 Fax

Sensing and Control

Honeywell

1985 Douglas Drive North

Golden Valley, MN 55422

www.honeywell.com/sensing

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