Honeywell

SS39ET/SS49E/SS59ET Series

Linear Hall-effect Sensor ICs

Datasheet

Magnetoresistive Sensor ICs

The SS39ET/SS49E/SS59ET Series low-cost linear Hall-effect sensor ICs are small, versatile devices that are operated by the magnetic field from a permanent magnet or an electromagnet. They are designed and manufactured for cost competitiveness.

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.

The integrated circuitry features low noise output, which makes it unnecessary to use external filtering. These sensor ICs Interface with many electrical components without buffering. They also include thin film resistors to provide increased temperature stability and accuracy.

These linear Hall-effect sensor ICs have an operating temperature range of -40 °C to 100°C [-40 °F to 212 °F], appropriate for industrial and medical environments. Thermal balancing allows for stable operation over the full temperature range.

They are available in three package styles, all of which may be supplied on tape for automated, lower-cost assembly:

- **SOT-23:** SS39ET. This small footprint takes up less space on the PC board, typically allowing for more components.
- **Flat TO-92-style, with different lead configurations:** SS49E, SS49E-L, SS49E-F.
- **SOT-89B:** SS59ET.

Key Features

- **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

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

COST COMPETITIVE • ENERGY EFFICIENT

SS39ET/SS49E/SS59ET Series

Table 1. Operating Characteristics (Vs = 5.0 V, TA = -40 °C to 85 °C [-40 °F to 185 °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	Vs > 3.0 V	1.0	1.5	1.5	mA
Null	0 Gauss, 25 °C	2.25	2.50	2.75	Vdc
Output voltage span	—	1.05 to (Vs - 1.05)	0.95 to (Vs - 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 Sensitivity drift	 — ≥25 °C ≤25 °C	 -0.10 -0.15 -0.04	 — — —	 0.10 0.05 0.185	%/°C
Linearity	—	—	-0.7	—	% of span
Response time	—	—	3	—	µs

Table 2. Absolute Maximum Ratings

Characteristic	Parameter
Supply voltage (Vs)	-5.0 Vdc to 8.0 Vdc
Output current	10 mA
Storage temperature	-55 °C to 165 °C [-67 °F to 329 F°]

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.

CAUTION
ELECTROSTATIC SENSITIVE DEVICES
DO NOT OPEN OR HANDLE EXCEPT AT A STATIC FREE WORKSTATION
ESD SENSITIVITY: CLASS 3

Figure 1. Current Sourcing Output Block Diagram

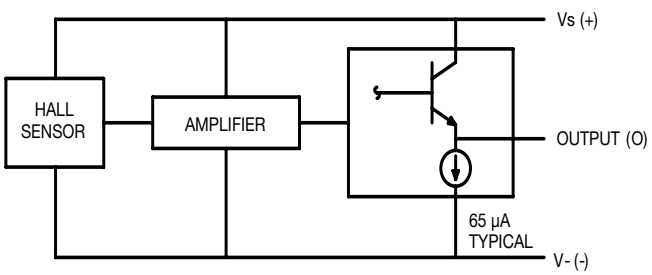
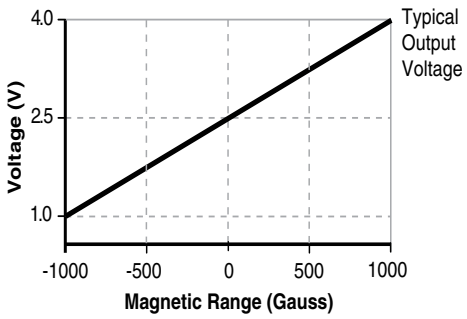


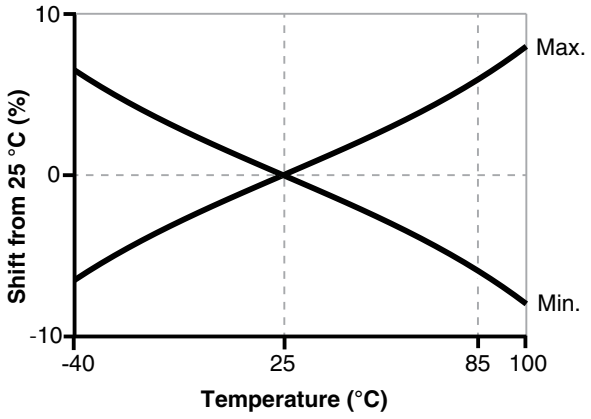
Figure 2. Transfer Characteristics (Vs = 5.0 Vdc)



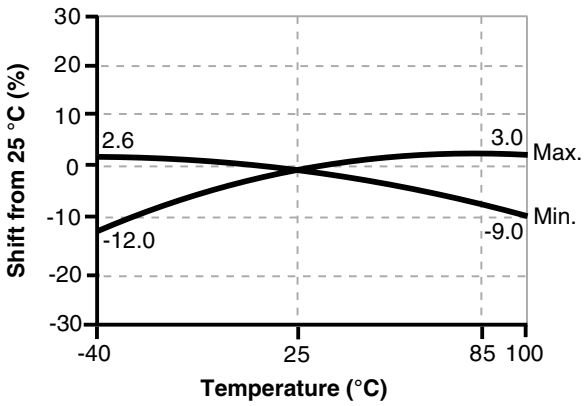
Linear Hall-effect Sensor ICs

Figure 3. Peformance Graphics

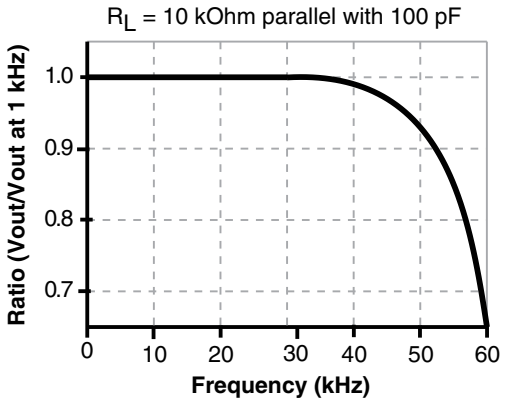
Null Shift vs Temperature



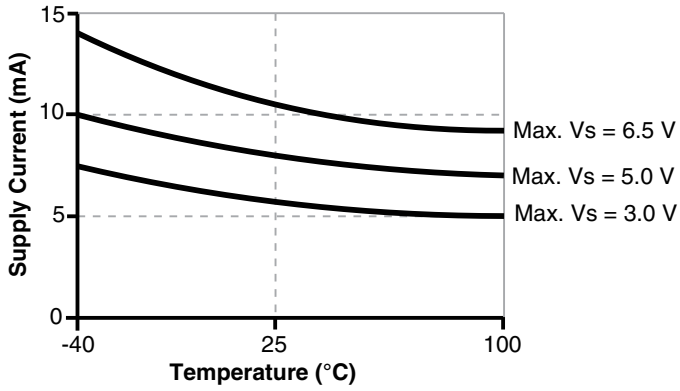
Sensitivity Shift vs Temperature



Typical Frequency Response



Supply Current vs Temperature



Sensitvity per Volt vs Vsupply

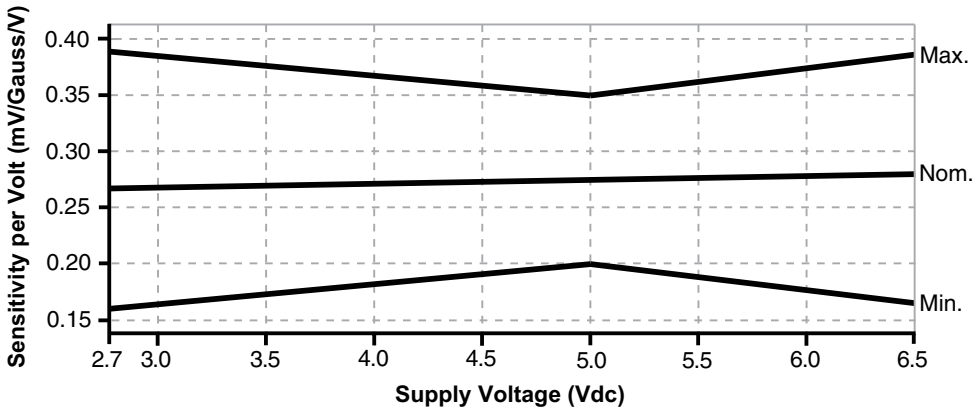
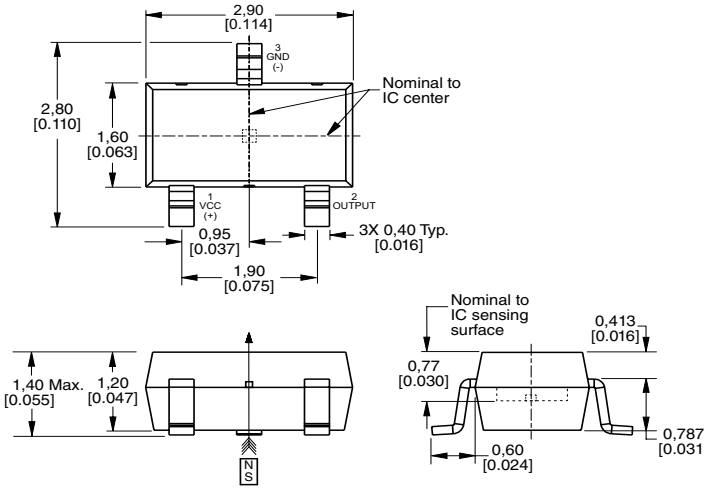
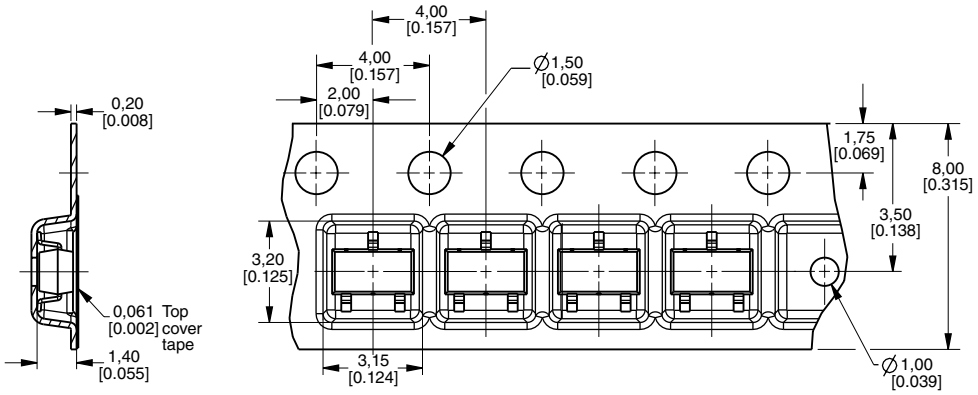


Figure 4. Mounting Dimensions (For reference only. mm/[in].)

SS39ET



Tape



Reel

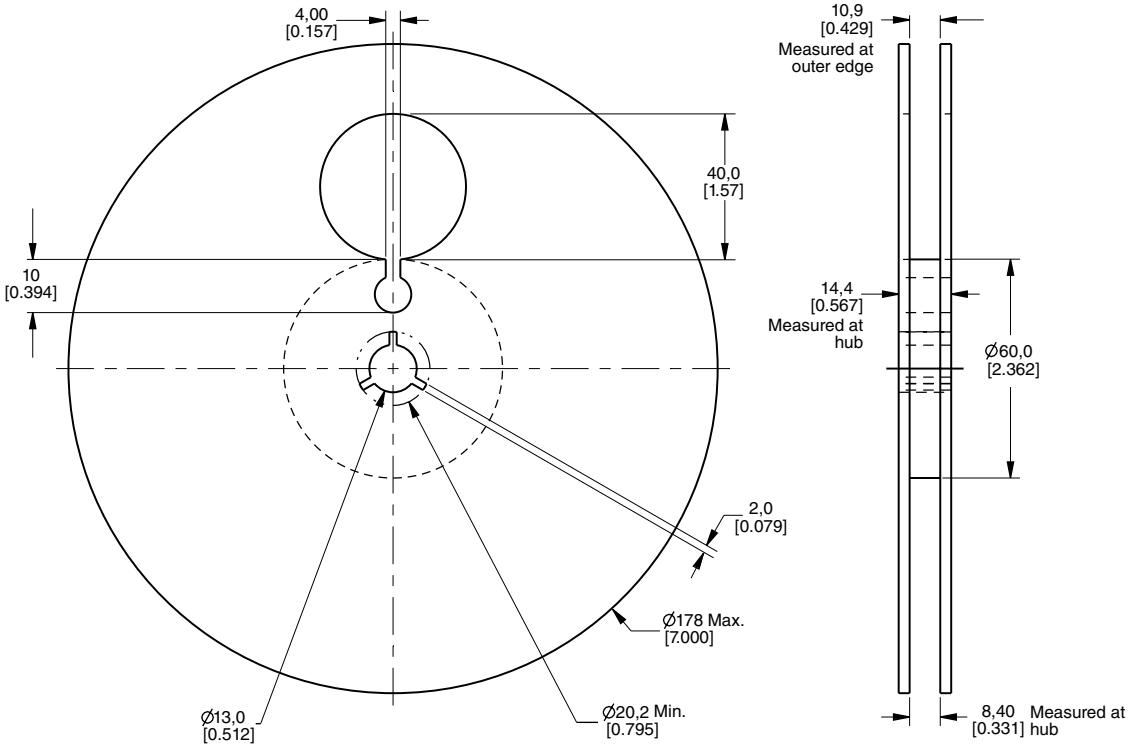


Figure 4. Mounting Dimensions (continued)

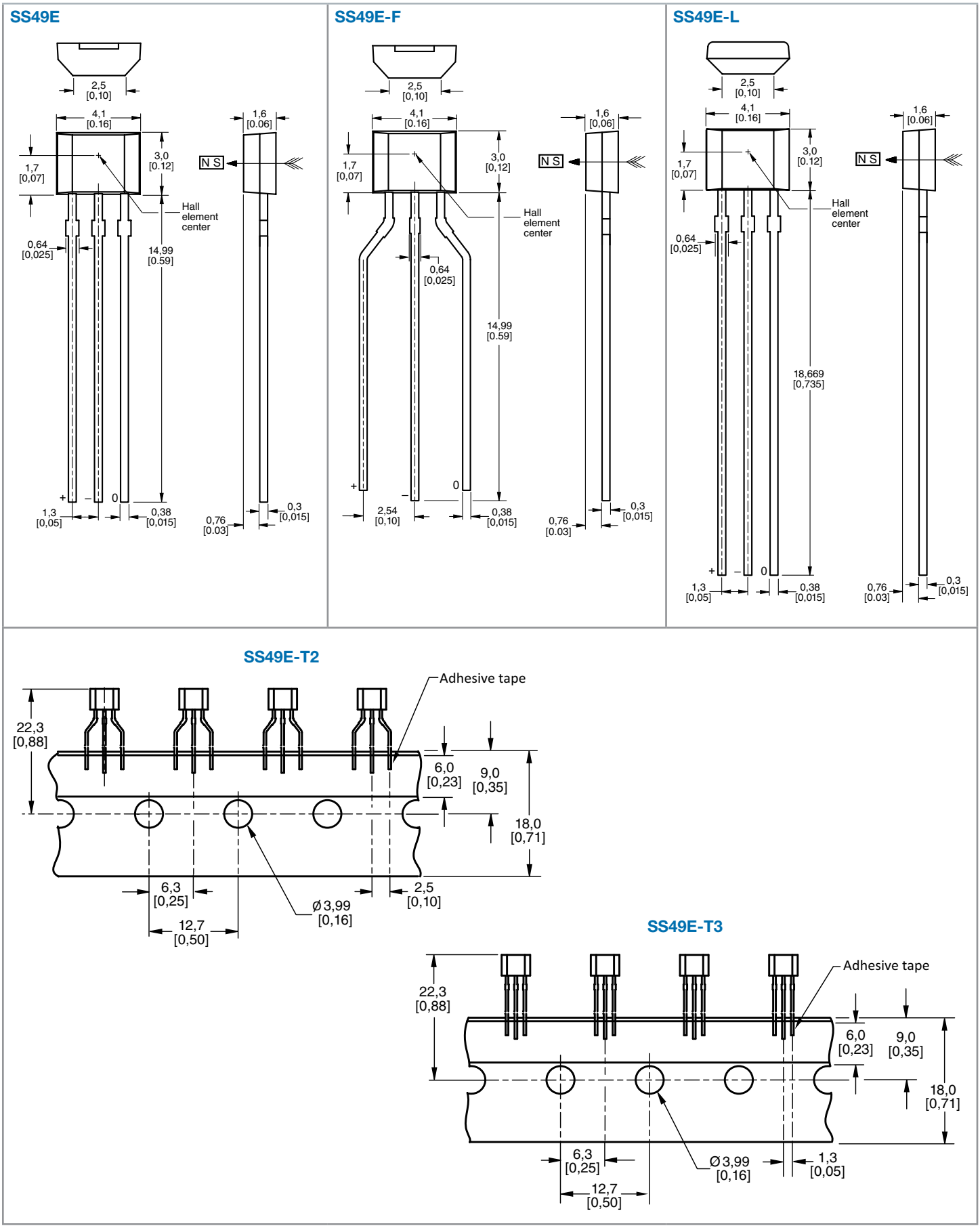
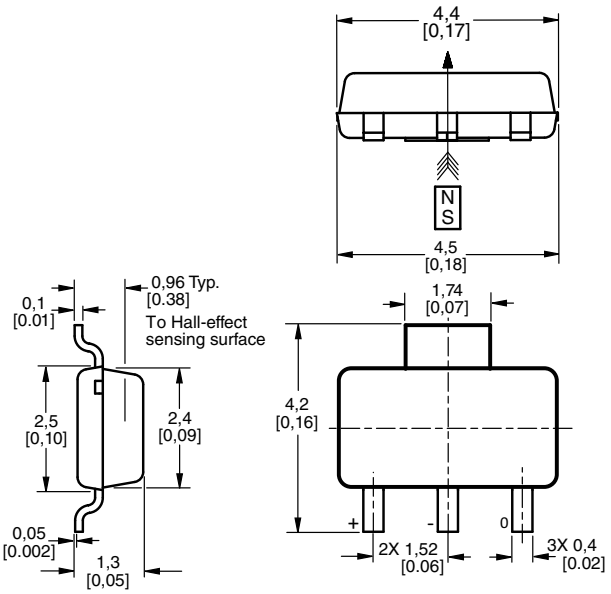
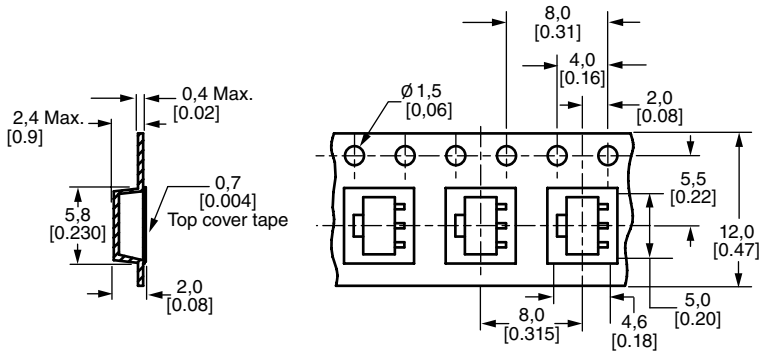


Figure 4. Mounting Dimensions (continued)

SS59ET



Tape



Reel