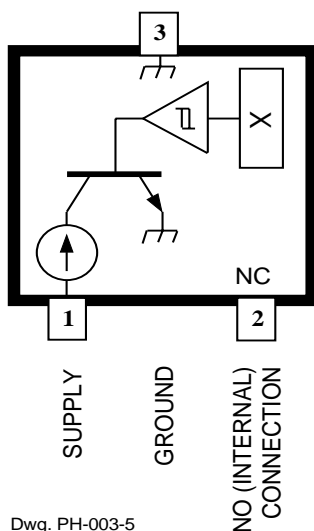


# 3260

## 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

### Suffix Code 'LH' Pinning (SOT23W)



Pinning is shown viewed from branded side.

### ABSOLUTE MAXIMUM RATINGS at $T_A=+25^\circ\text{C}$

|  |                 |
|--|-----------------|
| Supply Voltage, $V_{CC}$ .....               | 27 V            |
| Reverse Battery Voltage, $V_{RCC}$ .....     | -16 V           |
| Magnetic Flux Density, B .....               | Unlimited       |
| Package Power Dissipation, $P_D$ . See Graph |                 |
| Junction Temperature, $T_J$ .....            | +170°C          |
| Operating Temperature Range, $T_A$           |                 |
| Suffix 'E-' .....                            | -40°C to +85°C  |
| Suffix 'L-' .....                            | -40°C to +150°C |
| Storage Temperature Range,                   |                 |
| $T_S$ .....                                  | -65°C to +170°C |

The A3260-- Hall-effect bipolar switch is an extremely temperature-stable and stress-resistant sensor especially suited for operation over extended temperature ranges to +150°C. Superior high-temperature performance is made possible through dynamic offset cancellation, which reduces the residual offset voltage normally caused by device overmolding, temperature dependencies, and thermal stress.

The device includes on a single silicon chip a voltage regulator, Hall-voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, and a constant-current open-collector output. A south pole of sufficient strength will turn the output OFF. An on-board regulator permits operation with supply voltages of 3.5 to 24 volts. Noise radiation is limited by control of the output current slew rate.

The first character of the part number suffix determines the device operating temperature range; suffix 'E-' is -40°C to +85°C and 'L-' is -40°C to +150°C. Three package styles provide a magnetically optimized package for most applications. Suffix '-LH' is a miniature SOT23W low-profile surface-mount package, '-LT' is a miniature SOT89/TO-243AA transistor package for surface-mount applications; while suffix '-UA' is a three-lead ultra-mini-SIP for through-hole mounting.

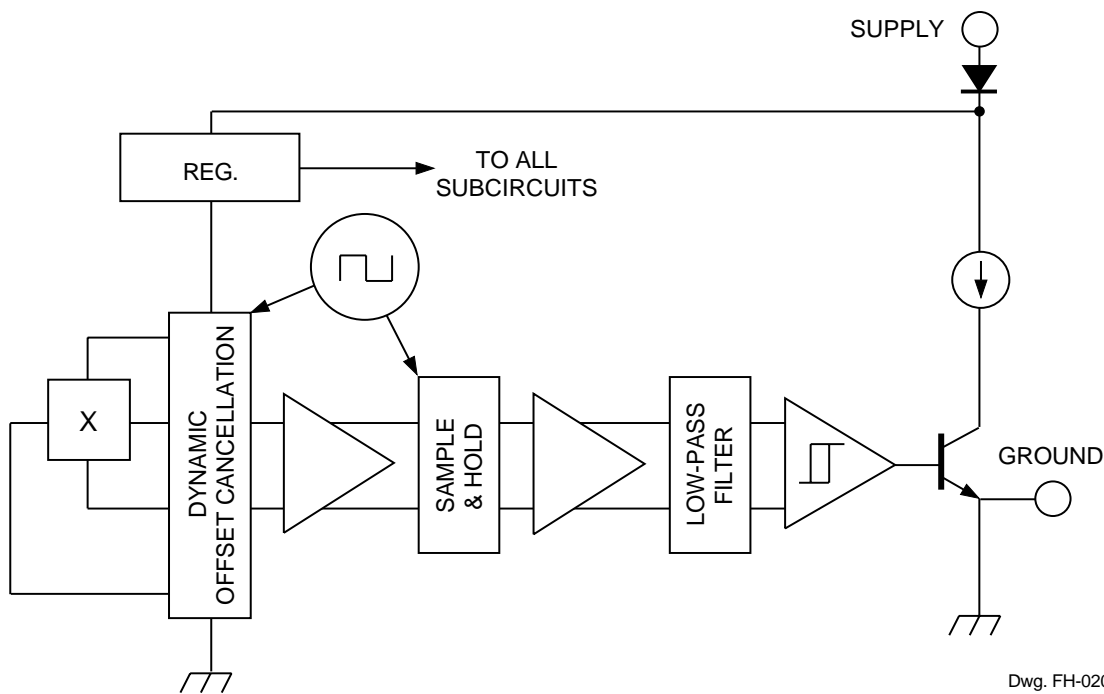
### FEATURES

- Internal Current Regulator for 2-Wire Operation
- Output Slew Rate Controlled
- Resistant to Physical Stress
- Superior Temperature Stability
- Operation From Unregulated Supply
- Reverse Battery Protection
- Solid-State Reliability
- Small Size

Always order by complete part number: the prefix 'A' + the basic four-digit part number + a suffix to indicate operating temperature range + a suffix to indicate package style, e.g., **A3260ELH**.

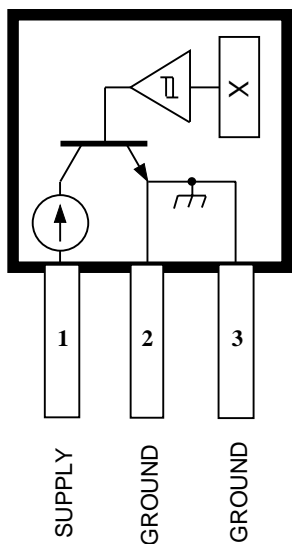
**3260**  
**2-WIRE, CHOPPER-STABILIZED,**  
**PRECISION HALL-EFFECT**  
**BIPOLAR SWITCH**

**FUNCTIONAL BLOCK DIAGRAM**



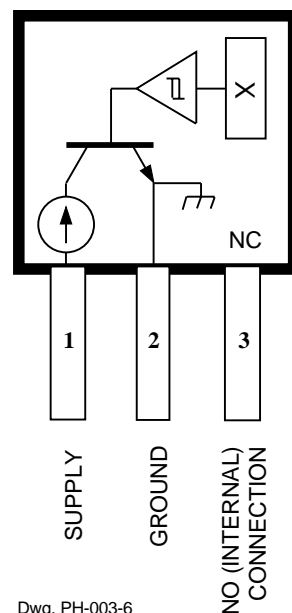
Dwg. FH-020-4

**Suffix Code 'UA' Pinning**  
 (ultra-mini SIP)



Dwg. PH-003-7A

**Suffix Code 'LT' Pinning**  
 (SOT89/TO-243AA)



Dwg. PH-003-6

Pinning is shown viewed from branded side.

**3260**  
**2-WIRE, CHOPPER-STABILIZED,**  
**PRECISION HALL-EFFECT**  
**BIPOLAR SWITCH**

**ELECTRICAL CHARACTERISTICS over operating temperature range.**

| Characteristic          | Symbol       | Test Conditions   | Limits |       |      | Units |
|-------------------------|--------------|-------------------|--------|-------|------|-------|
|                         |              |                   | Min.   | Typ.  | Max. |       |
| Supply Voltage          | $V_{CC}$     | Operating         | 3.5    | 12    | 24   | V     |
| Output Current          | $I_{GND(L)}$ | $B > B_{OP}$      | -4.0   | -6.5  | -8.0 | mA    |
|                         | $I_{GND(H)}$ | $B < B_{RP}$      | -11    | -14.5 | -18  | mA    |
| Chopping Frequency      | $f_C$        |                   | –      | 340   | –    | kHz   |
| Output Slew Rate        | di/dt        | $C_L = 20$ pF     | 0.5    | —     | 2.0  | mA/μs |
| Output Settling Time    | $t_{sd}$     | $C_L = 20$ pF     | —      | —     | 20   | μs    |
| Reverse Battery Current | $I_{CC}$     | $V_{RCC} = -16$ V | –      | –     | -15  | mA    |

NOTES: 1.  $B_{OP}$  = operate point (output turns OFF);  $B_{RP}$  = release point (output turns ON).  
2. Typical Data is at  $T_A = +25^\circ\text{C}$  and  $V_{CC} = 12$  V and is for design information only.

**MAGNETIC CHARACTERISTICS over operating supply voltage and temperature ranges.**

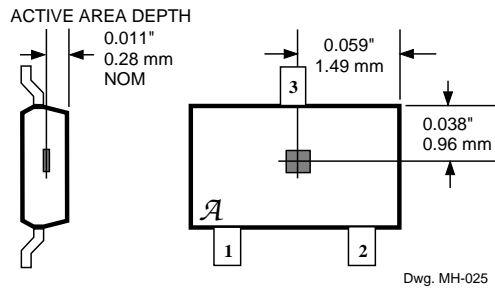
| Characteristic | Symbol    | Test Conditions   | Limits |      |      | Units |
|----------------|-----------|-------------------|--------|------|------|-------|
|                |           |                   | Min.   | Typ. | Max. |       |
| Operate Point  | $B_{OP}$  |                   | –      | 10   | 40   | G     |
| Release Point  | $B_{RP}$  |                   | -40    | -10  | –    | G     |
| Hysteresis     | $B_{hys}$ | $B_{OP} - B_{RP}$ | 2.0    | 20   | –    | G     |

NOTES: 1. Typical Data is at  $T_A = +25^\circ\text{C}$  and  $V_{CC} = 12$  V and is for design information only.  
2. 1 gauss (G) is exactly equal to 0.1 millitesla (mT).

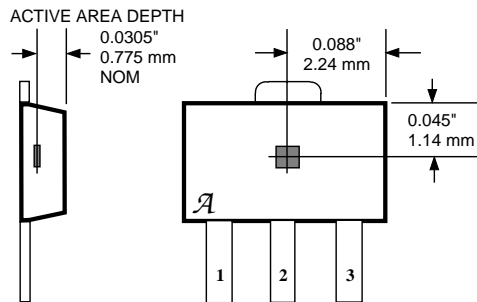
# 3260 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

## SENSOR LOCATIONS

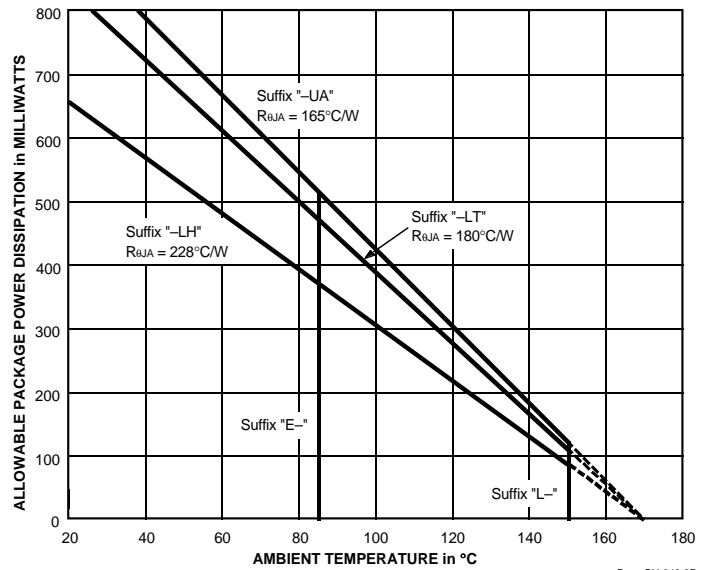
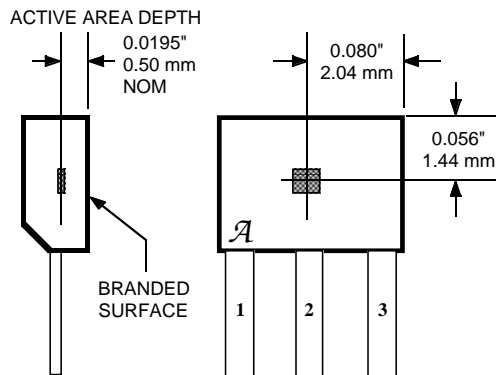
### Package Designator "LH"



### Package Designator "LT"



### Package Designators "UA" and "UA-TL"



Although sensor location is accurate to three sigma for a particular design, product improvements may result in small changes to sensor location.

# 3260 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

## FUNCTIONAL DESCRIPTION

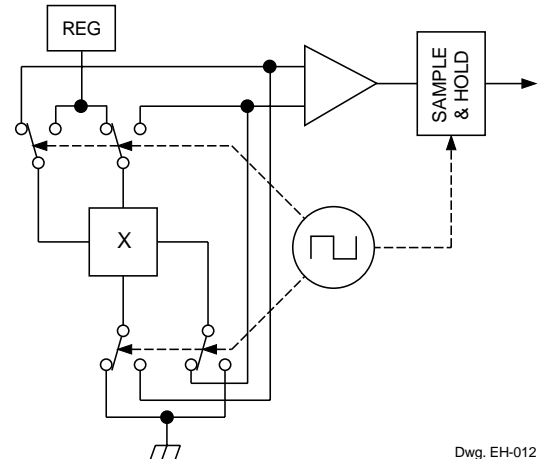
**Chopper-Stabilized Technique.** These devices use a proprietary dynamic offset cancellation technique, with an internal high-frequency clock to reduce the residual offset voltage of the Hall element that is normally caused by device overmolding, temperature dependencies, and thermal stress. This technique produces devices that have an extremely stable quiescent Hall output voltage, are immune to thermal stress, and have precise recoverability after temperature cycling. This technique will also slightly degrade the device output repeatability.

The Hall element can be considered as a resistor array similar to a Wheatstone bridge. A large portion of the offset is a result of the mismatching of these resistors. The chopper-stabilizing technique cancels the mismatching of the resistors by changing the direction of the current flowing through the Hall plate and Hall voltage measurement taps, while maintaining the Hall-voltage signal that is induced by the external magnetic flux. The signal is, then, captured by a sample-and-hold circuit.

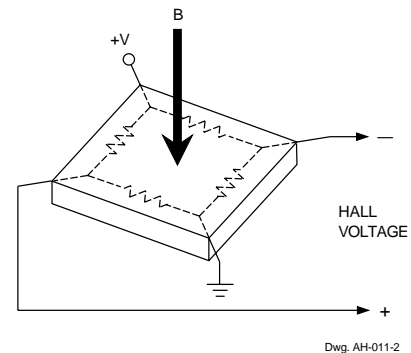
**Operation.** The output of these devices turns ON when a magnetic field (north pole) perpendicular to the Hall sensor exceeds the release point threshold ( $B_{RP}$ ). After turn-ON, the output will source current equal to the device operating current plus a current source ( $I_{GND(H)}$ ). When the magnetic field is increased (south pole) above the operate point ( $B_{OP}$ ), the output will source current equal to the Hall-effect sensor operating current with the current source turned OFF ( $I_{GND(L)}$ ). Note especially that release can occur when the magnetic field is removed but to ensure release, a field reversal is required. The difference in the magnetic operate and release points is the hysteresis ( $B_{HYS}$ ) of the device. The hysteresis allows clean switching of the output even in the presence of external mechanical vibration or electrical noise.

Powering up in the absence of a magnetic field (less than  $B_{OP}$  and higher than  $B_{RP}$ ) will allow an indeterminate output state. The correct state is warranted after the first excursion beyond  $B_{OP}$  or  $B_{RP}$ .

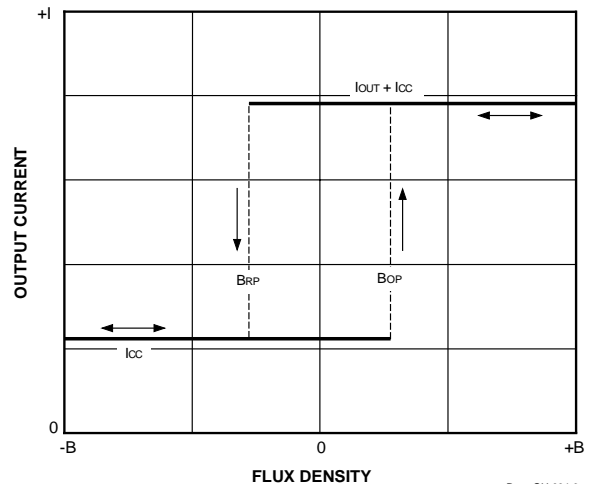
Bipolar switches may switch on removal of field but require field reversal for reliable operation over temperature range; latches will not switch on removal of magnetic field.



Dwg. EH-012



Dwg. AH-011-2

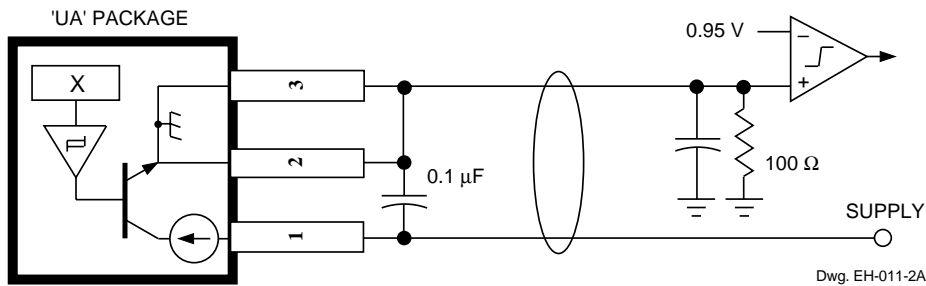


Dwg. GH-034-6

# 3260 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

## APPLICATIONS INFORMATION

It is strongly recommended that an external bypass capacitor be connected (in close proximity to the Hall sensor) between the supply and ground of the device to reduce both external noise and noise generated by the chopper-stabilization technique.



Extensive applications information for Hall-effect sensors is available in:

- *Hall-Effect IC Applications Guide*, Application Note 27701;
- *Hall-Effect Devices: Soldering, Gluing, Potting, Encapsulating, and Lead Forming*, Application Note 27703.1;
- *Soldering of Through-Hole Hall-Sensor Devices*, Application Note 27703; and
- *Soldering of Surface-Mount Hall-Sensor Devices*, Application Note 27703.2.

More detailed descriptions of the chopper-stabilized circuit operation can be found in:

- *Monolithic Magnetic Hall Sensor Using Dynamic Quadrature Offset Cancellation*, Technical Paper STP 97-10; and
- *Chopper-Stabilized Amplifiers With A Track-and-Hold Signal Demodulator*, Technical Paper STP 99-1.

All are provided at

[www.allegromicro.com](http://www.allegromicro.com)

# 3260

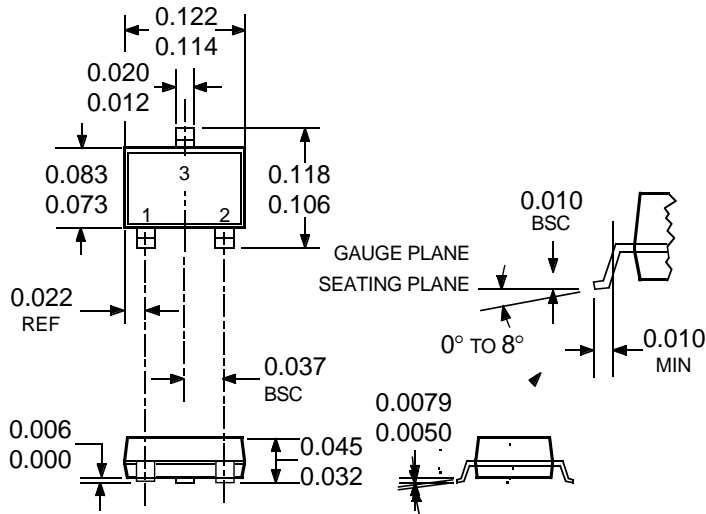
## 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

### PACKAGE DESIGNATOR 'LH'

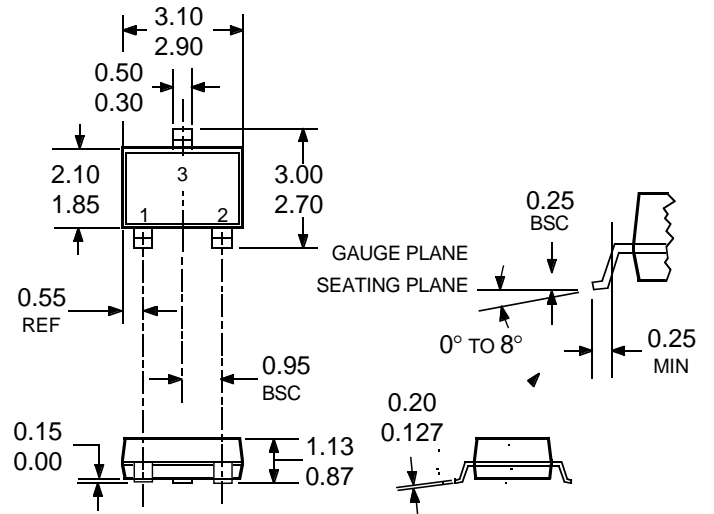
(fits SC-59A solder-pad layout)

**Dimensions in Inches**  
(for reference only)

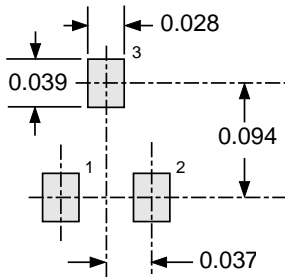
**Dimensions in Millimeters**  
(controlling dimensions)



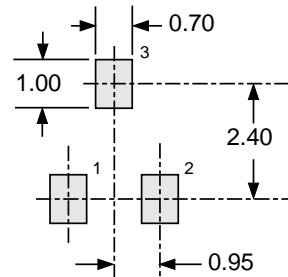
Dwg. MA-010-3D in



Dwg. MA-010-3D mm



Dwg. MA-011-3 in



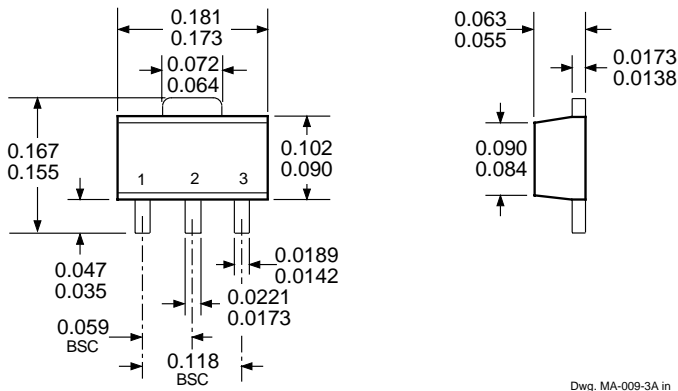
Dwg. MA-011-3 mm

- NOTES:
1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
  2. Exact body and lead configuration at vendor's option within limits shown.
  3. Height does not include mold gate flash.
  4. Where no tolerance is specified, dimension is nominal.
  5. Add "LT" to part number for tape and reel.

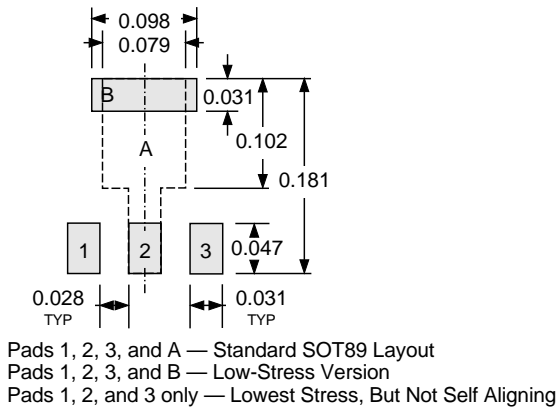
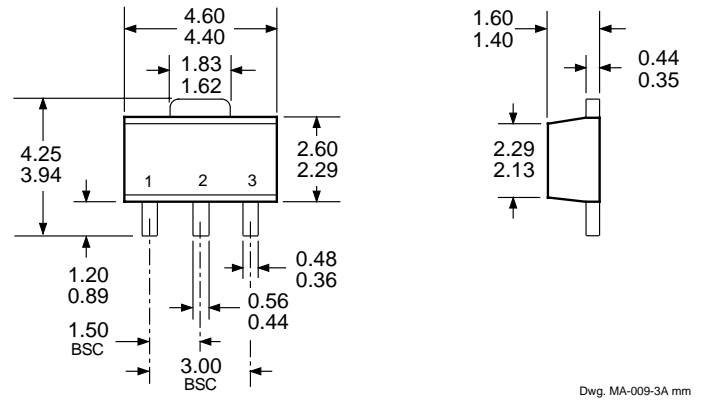
# 3260 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

## PACKAGE DESIGNATOR 'LT' (SOT89/TO-243AA)

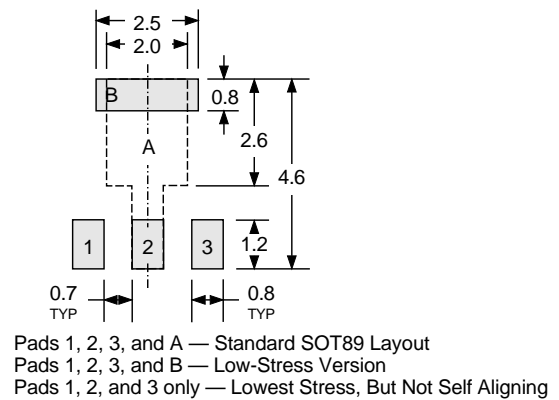
**Dimensions in Inches**  
(for reference only)



**Dimensions in Millimeters**  
(controlling dimensions)



Dwg. MA-012-3 in



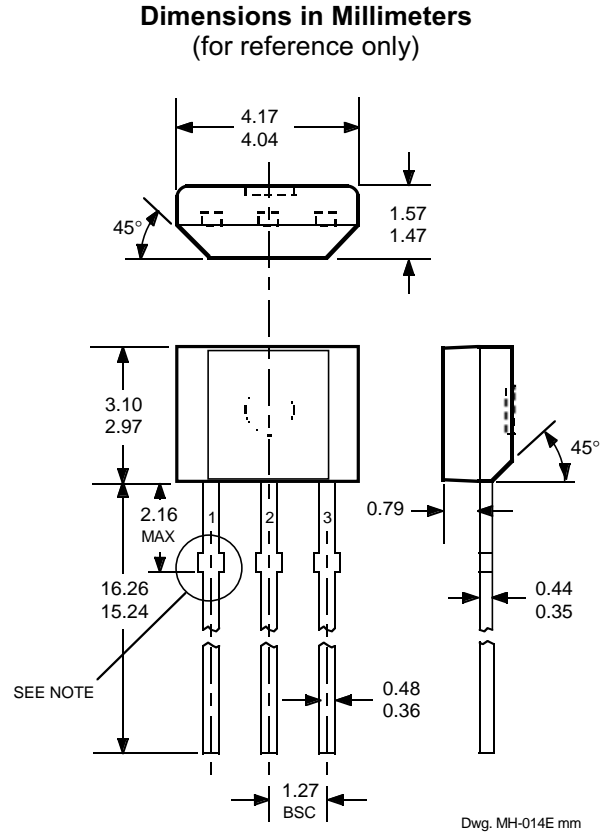
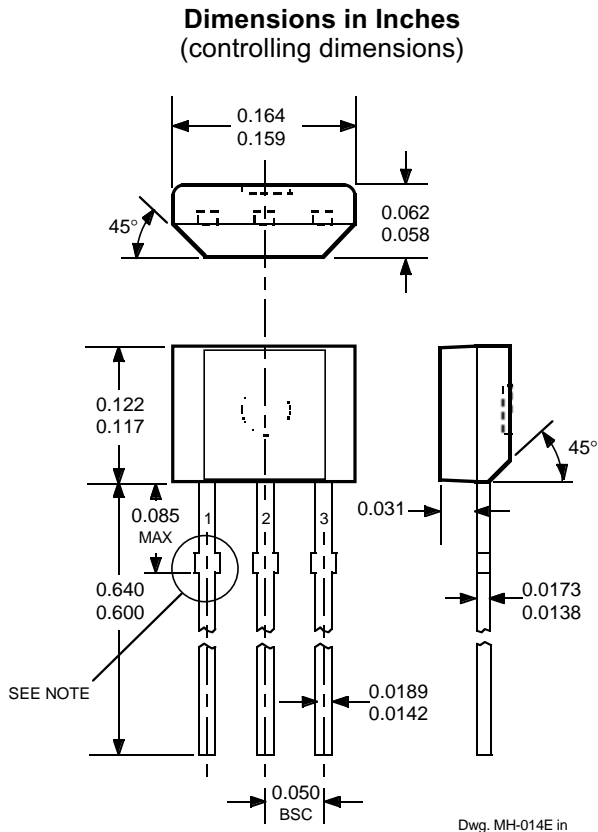
Dwg. MA-012-3 mm

- NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.  
2. Supplied in bulk pack (500 pieces per bag) or add "TR" to part number for tape and reel.  
3. Only low-temperature ( $\leq 240^{\circ}\text{C}$ ) reflow-soldering techniques are recommended for SOT89 devices.



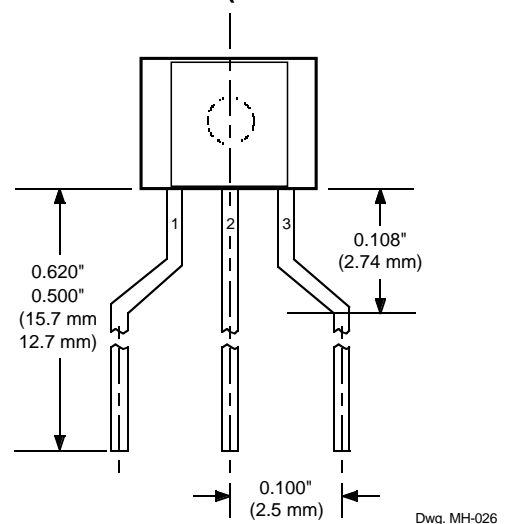
# 3260 2-WIRE, CHOPPER-STABILIZED, PRECISION HALL-EFFECT BIPOLAR SWITCH

## PACKAGE DESIGNATOR 'UA'



- NOTES: 1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
2. Exact body and lead configuration at vendor's option within limits shown.
3. Height does not include mold gate flash.
4. Recommended minimum PWB hole diameter to clear transition area is 0.035" (0.89 mm).
5. Where no tolerance is specified, dimension is nominal.
6. Supplied in bulk pack (500 pieces per bag).

### Radial Lead Form (order A3260xUA-LC)



NOTE: Lead-form dimensions are the nominals produced on the forming equipment. No dimensional tolerance is implied or guaranteed for bulk packaging (500 pieces per bag).

**3260**  
**2-WIRE, CHOPPER-STABILIZED,**  
**PRECISION HALL-EFFECT**  
**BIPOLAR SWITCH**

*The products described herein are manufactured under one or more of the following U.S. patents: 5,045,920; 5,264,783; 5,442,283; 5,389,889; 5,581,179; 5,517,112; 5,619,137; 5,621,319; 5,650,719; 5,686,894; 5,694,038; 5,729,130; 5,917,320; and other patents pending.*

*Allegro MicroSystems, Inc. reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the performance, reliability, or manufacturability of its products. Before placing an order, the user is cautioned to verify that the information being relied upon is current.*

*Allegro products are not authorized for use as critical components in life-support appliances, devices, or systems without express written approval.*

*The information included herein is believed to be accurate and reliable. However, Allegro MicroSystems, Inc. assumes no responsibility for its use; nor for any infringements of patents or other rights of third parties that may result from its use.*

This datasheet has been download from:

[www.datasheetcatalog.com](http://www.datasheetcatalog.com)

Datasheets for electronics components.