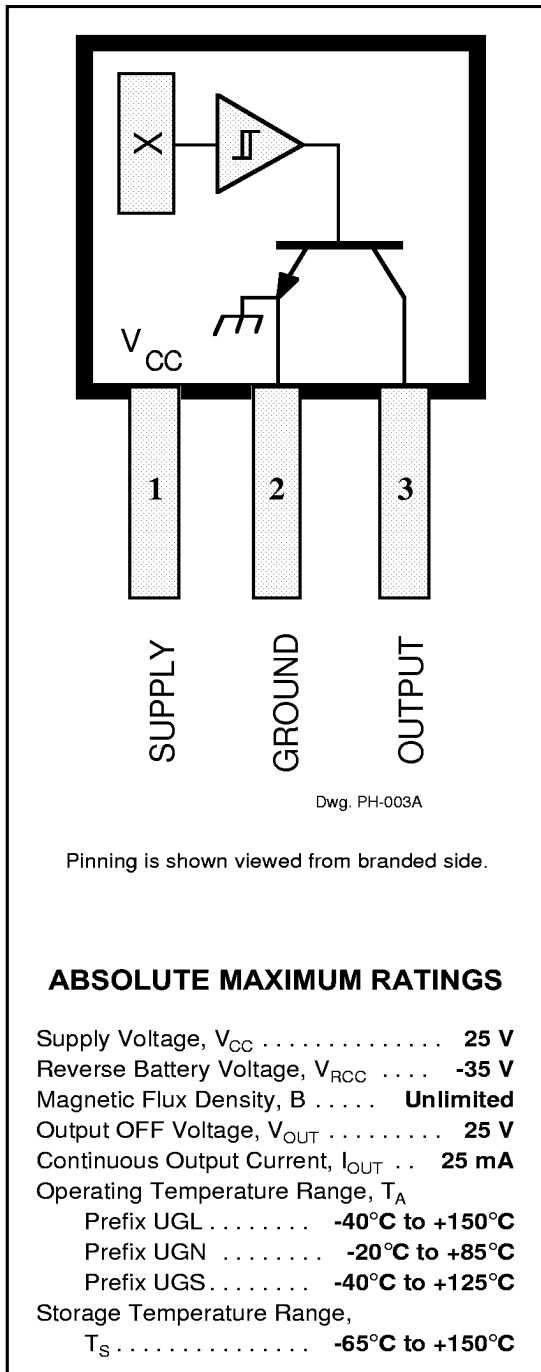


# 3132 AND 3133

## ULTRA-SENSITIVE BIPOLAR HALL-EFFECT SWITCHES



These Hall-effect switches are designed for magnetic actuation using a bipolar magnetic field, i.e., a north-south alternating field. They combine extreme magnetic sensitivity with excellent stability over varying temperature and supply voltage. The high sensitivity permits their use with multi-pole ring magnets over relatively large distances.

Each device includes a voltage regulator, quadratic Hall voltage generator, temperature stability circuit, signal amplifier, Schmitt trigger, and open-collector output on a single silicon chip. The on-board regulator permits operation with supply voltages of 4.5 to 24 volts. The switch output can sink up to 25 mA. With suitable output pull up, they can be used directly with bipolar or MOS logic circuits.

The four package styles available provide a magnetically optimized package for most applications. Suffix 'LT' is a surface-mount SOT-89 (TO-243AA) package; suffixes 'LL', 'U', and 'UA' feature wire leads for through-hole mounting. Prefix 'UGN' devices are rated for continuous operation over the temperature range of -20°C to +85°C; prefix 'UGS' devices over an extended range of -40°C to +125°C; prefix 'UGL' devices over the range of -40°C to +150°C.

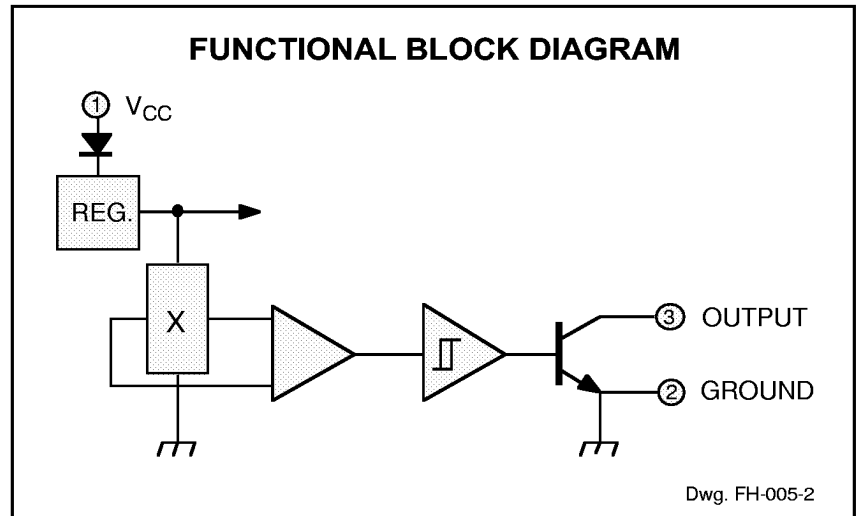
### FEATURES

- 4.5 V to 24 V Operation
- Reverse Battery Protection
- Superior Temperature Stability
- Superior Supply Voltage Stability
- Activate with Multi-Pole Ring Magnets
- Solid-State Reliability
- Small Size
- Constant Output Amplitude
- Resistant to Physical Stress

Always order by complete part number including prefix and suffix, e.g., **UGN3132LL** .



# 3132 AND 3133 BIPOLAR HALL-EFFECT SWITCHES



## ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$

Characteristic	Symbol	Test Conditions	Limits			Units
			Min.	Typ.	Max.	
Supply Voltage	$V_{CC}$	Operating	4.5	—	24	V
Output Saturation Voltage	$V_{OUT(SAT)}$	$I_{OUT} = 20 \text{ mA}$ , $B \geq B_{OP}$	—	145	400	mV
Output Leakage Current	$I_{OFF}$	$V_{OUT} = 24 \text{ V}$ , $B \leq B_{RP}$	—	<1.0	10	$\mu\text{A}$
Supply Current	$I_{CC}$	$V_{CC} = 24 \text{ V}$ , $B \leq B_{RP}$	—	4.3	9.0	mA
Output Rise Time	$t_r$	$V_{CC} = 12 \text{ V}$ , $R_L = 820 \Omega$ , $C_L = 20 \text{ pF}$	—	0.04	2.0	$\mu\text{s}$
Output Fall Time	$t_f$	$V_{CC} = 12 \text{ V}$ , $R_L = 820 \Omega$ , $C_L = 20 \text{ pF}$	—	0.18	2.0	$\mu\text{s}$

## MAGNETIC CHARACTERISTICS over operating temperature and voltage range.

Characteristic	Symbol	Device Type*	Limits			Units
			Min.	Typ.	Max.	
Operate Point	$B_{OP}$	3132	—	32	95	G
		3133	—	32	75	G
Release Point	$B_{RP}$	3132	-95	-20	—	G
		3133	-75	-20	—	G
Hysteresis	$B_{hys}$	Both	30	52	—	G

NOTE: As used here, negative flux densities are defined as less than zero (algebraic convention.)  
Typical values are at  $T_A = +25^\circ\text{C}$  and  $V_{CC} = 12 \text{ V}$ .

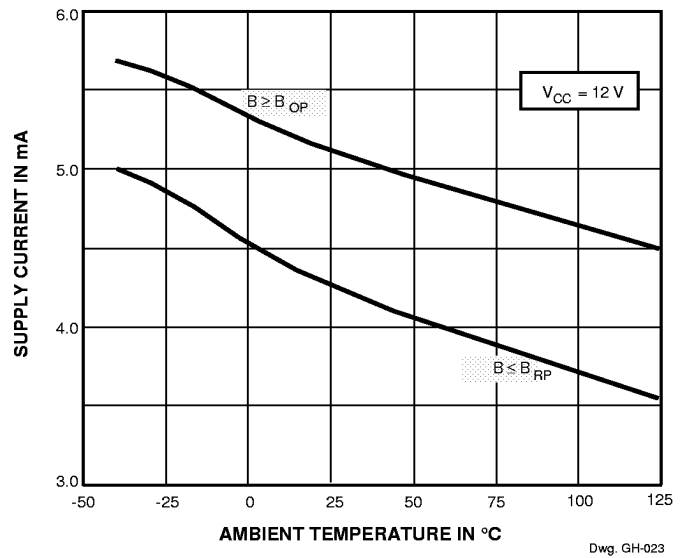
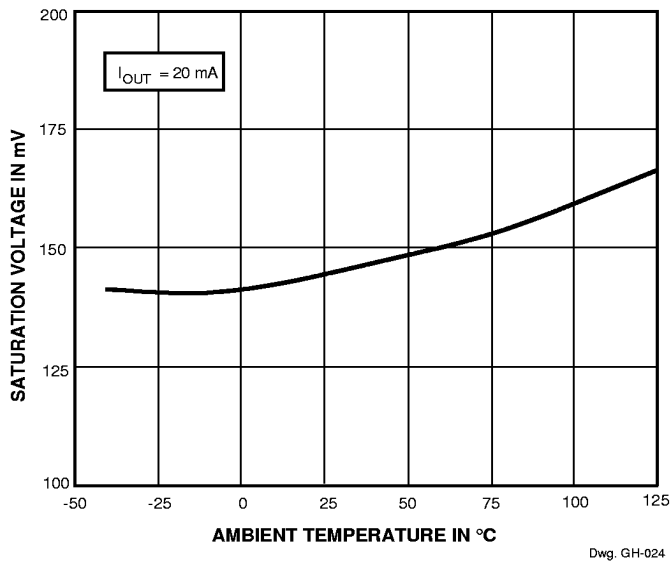
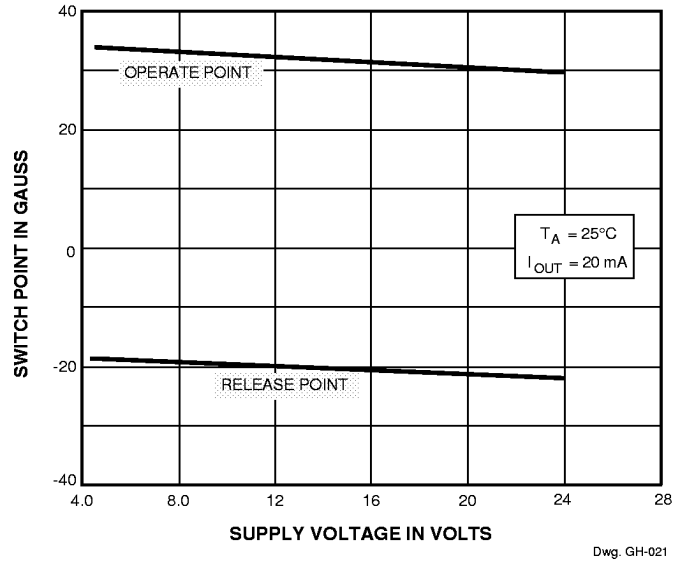
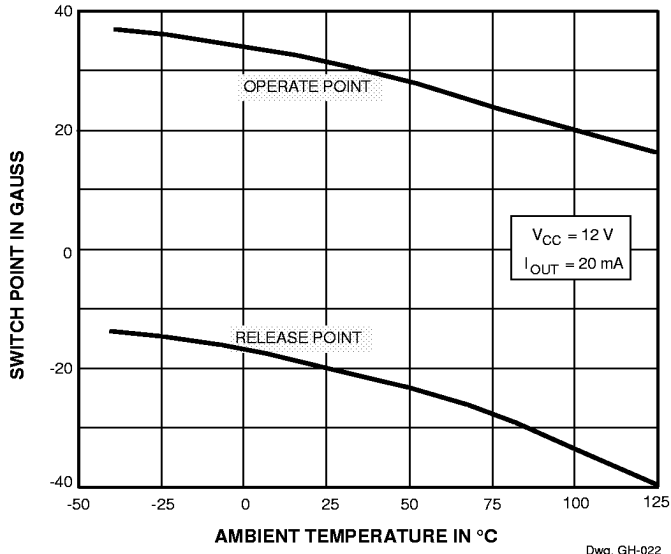
\* Complete part number includes a prefix denoting operating temperature range (UGL, UGN, or UGS) and a suffix denoting package type (LL, LT, U, or UA).



115 Northeast Cutoff, Box 15036  
Worcester, Massachusetts 01615-0036 (508) 853-5000  
Copyright © 1996, Allegro MicroSystems, Inc.

# 3132 AND 3133 BIPOLAR HALL-EFFECT SWITCHES

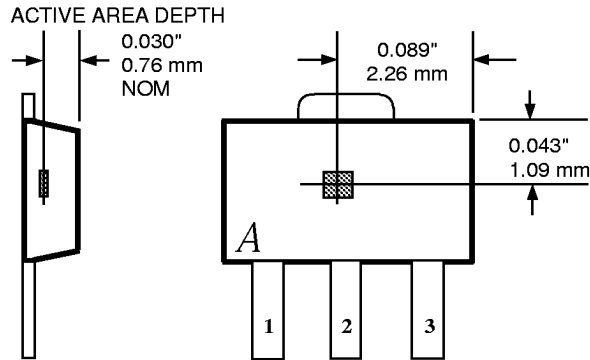
## TYPICAL CHARACTERISTICS



**3132 AND 3133**  
**BIPOLAR**  
**HALL-EFFECT SWITCHES**

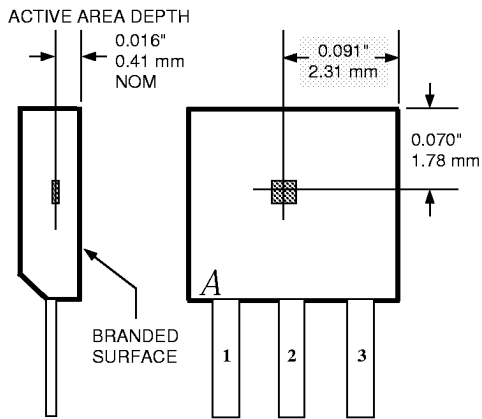
**SENSOR LOCATIONS**  
 ( $\pm 0.005$ " [0.13mm] die placement)

**SUFFIX "LL" & SUFFIX "LT"**



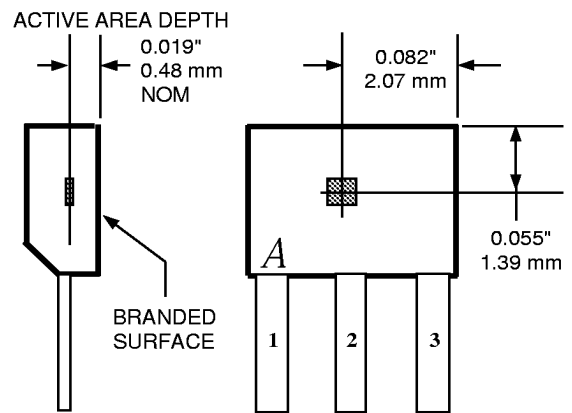
Dwg. MH-008-2C

**SUFFIX "U"**



Dwg. MH-002-2B

**SUFFIX "UA"**



Dwg. MH-011-10

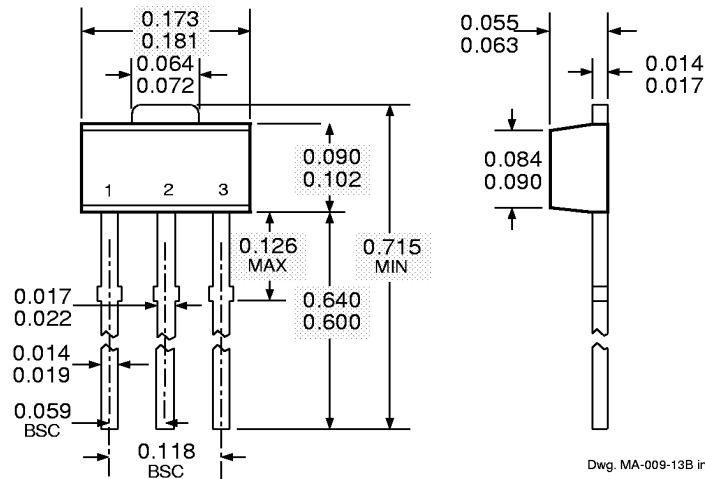


115 Northeast Cutoff, Box 15036  
 Worcester, Massachusetts 01615-0036 (508) 853-5000

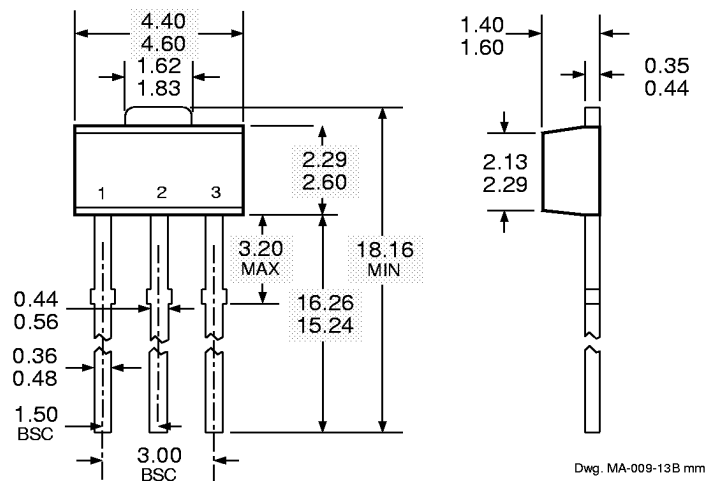
**3132 AND 3133**  
**BIPOLAR**  
**HALL-EFFECT SWITCHES**

**PACKAGE DESIGNATOR 'LL,**  
 (Package 'LT' with long leads)

Dimensions in Inches  
 (for reference only)



Dimensions in Millimeters  
 (controlling dimensions)

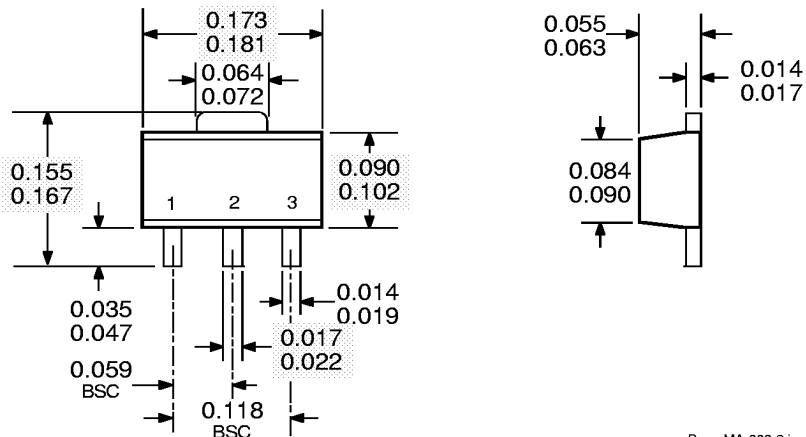


- NOTES: 1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
2. Exact body and lead configuration at vendor's option within limits shown.
3. Height does not include mold gate flash.

3132 AND 3133  
 BIPOLAR  
 HALL-EFFECT SWITCHES

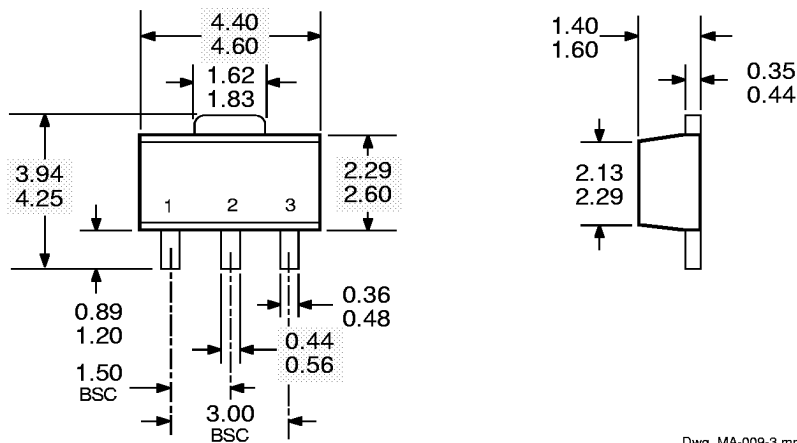
**PACKAGE DESIGNATOR 'LT,**  
 (SOT-89/TO-243AA)

Dimensions in Inches  
 (for reference only)



Dwg. MA-009-3 in

Dimensions in Millimeters  
 (controlling dimensions)



Dwg. MA-009-3 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.



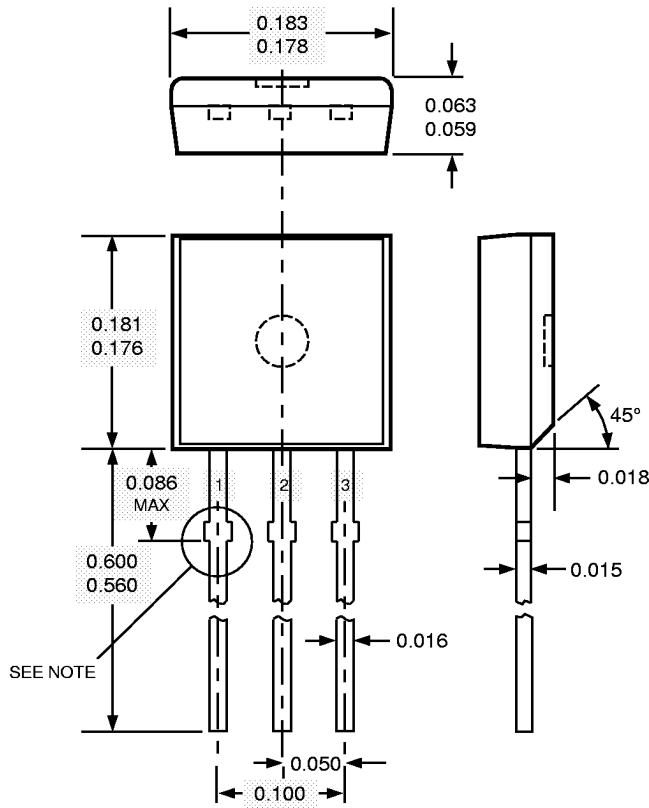
115 Northeast Cutoff, Box 15036  
 Worcester, Massachusetts 01615-0036 (508) 853-5000

**3132 AND 3133**  
**BIPOLAR**  
**HALL-EFFECT SWITCHES**

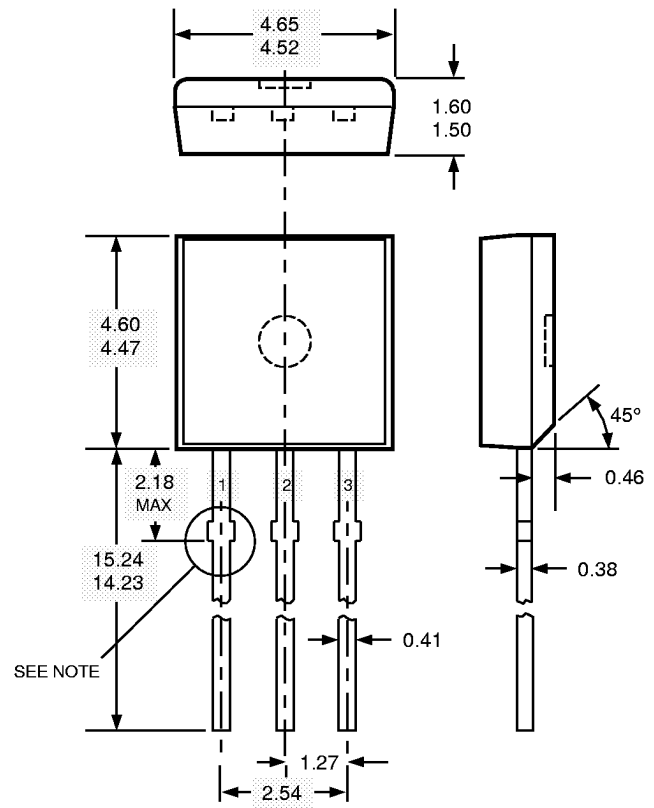
**PACKAGE DESIGNATOR 'U,**

Dimensions in Inches  
 (controlling dimensions)

Dimensions in Millimeters  
 (for reference only)



Dwg. MH-003D in



Dwg. MH-003D mm

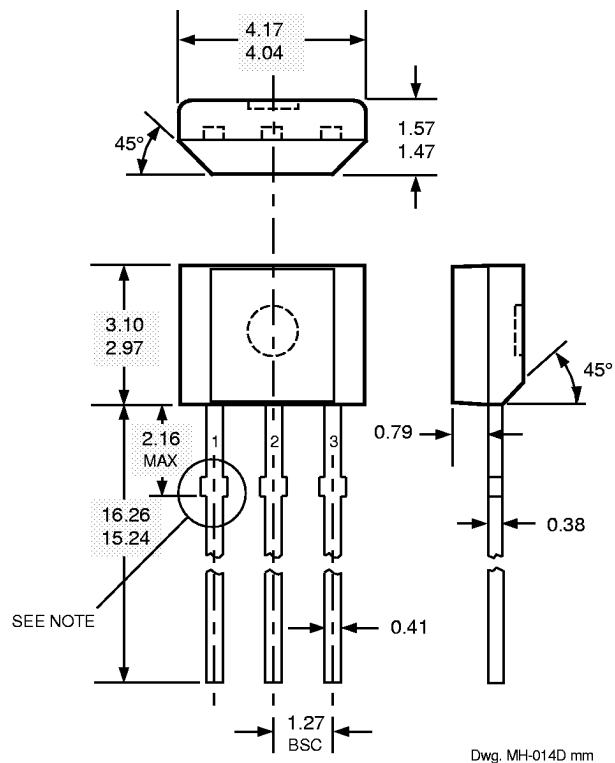
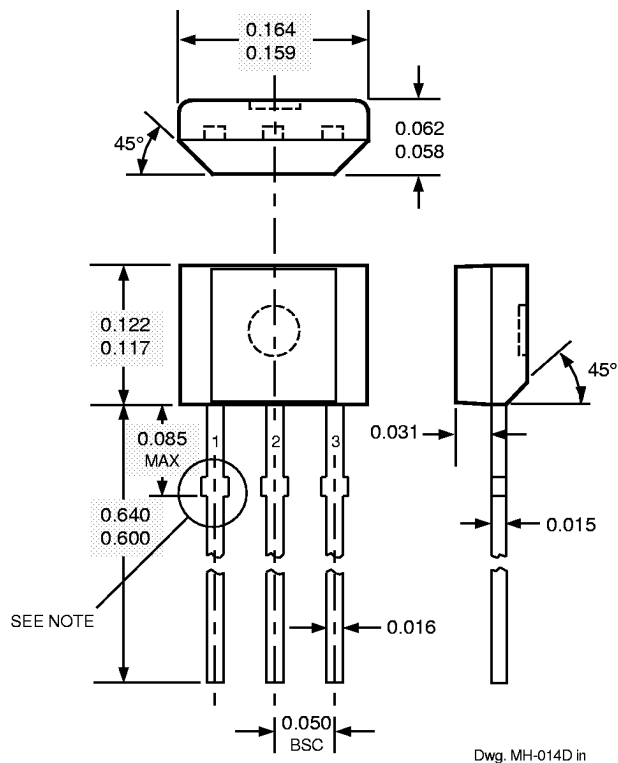
- NOTES: 1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
2. Exact body and lead configuration at vendor's option within limits shown.
3. Height does not include mold gate flash.
4. Recommended minimum PWB hole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

**3132 AND 3133**  
**BIPOLAR**  
**HALL-EFFECT SWITCHES**

**PACKAGE DESIGNATOR 'UA,**

Dimensions in Inches  
 (controlling dimensions)

Dimensions in Millimeters  
 (for reference only)



- 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.

*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 design of its products.*

*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 which may result from its use.*



115 Northeast Cutoff, Box 15036  
 Worcester, Massachusetts 01615-0036 (508) 853-5000