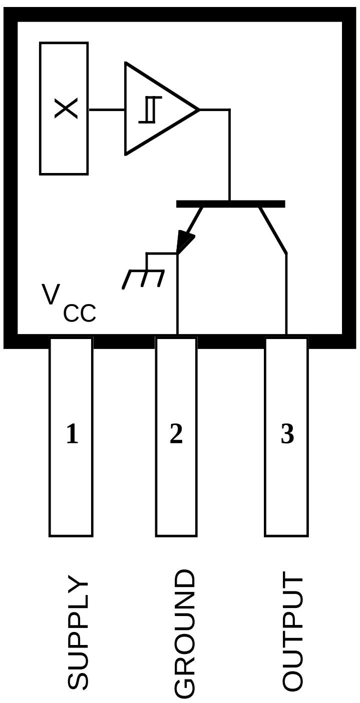
3134

Data Sheet
27631.4B*

BIPOLAR HALL-EFFECT SWITCH FOR HIGH-TEMPERATURE OPERATION



Pinning is shown viewed from branded side.

ABSOLUTE MAXIMUM RATINGS at T_A = +25°C

Supply Voltage, V_{CC} .... **30 V**
Reverse Battery Voltage, V_{RCC} .... **-30 V**
Magnetic Flux Density, B .... **Unlimited**
Output OFF Voltage, V_{OUT} .... **30 V**
Reverse Output Voltage, V_{OUT} .... **-0.5 V**
Continuous Output Current,
I_{OUT} .... **25 mA**
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**

This low-hysteresis bipolar Hall-effect 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 a novel Schmitt trigger circuit that maintains operate and release point stability by compensating for temperature changes in the Hall element. Additionally, internal compensation provides magnetic switch points that become more sensitive with temperature, hence offsetting the usual degradation of the magnetic field with temperature. Its low hysteresis makes this device ideal for detecting small changes in magnetic field strength or for use with inexpensive magnets.

The device includes on a single silicon chip a voltage regulator, quadratic Hall-voltage generator, temperature compensation circuit, signal amplifier, Schmitt trigger, and a buffered open-collector output to sink up to 25 mA. The on-board regulator permits operation with supply voltages of 3.8 volts to 24 volts.

The first character of the part number suffix determines the device operating temperature range. Suffix 'E–' is for -40°C to +85°C, and suffix 'L–' is -40°C to +150°C. Three package styles provide a magnetically optimized package for most applications. Suffix '–LT' is a miniature SOT-89/TO-243AA transistor package for surface-mount applications; suffix '–U' is a three-lead plastic mini-SIP while suffix '–UA' is a three-lead ultra-mini-SIP.

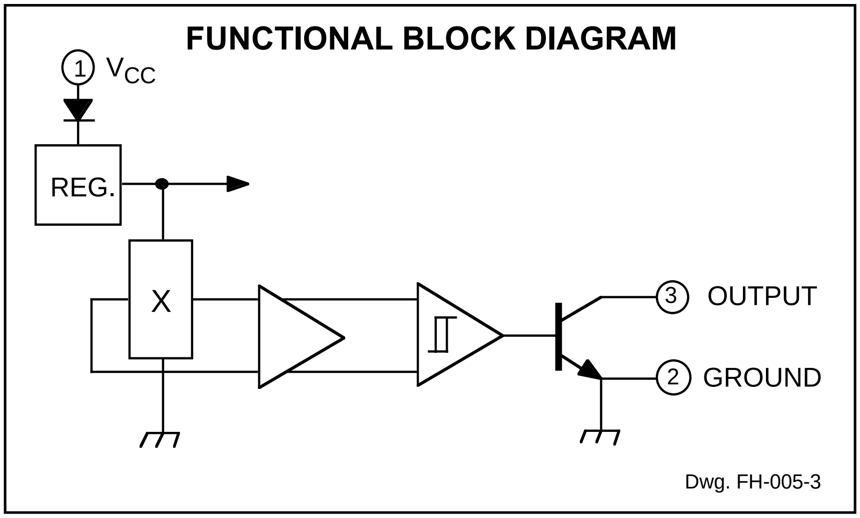
Devices in the 'U' package are LAST-TIME BUY
Orders accepted only until April 18, 2002

FEATURES

- Superior Temperature Stability
- Operation From Unregulated Supply
- Open-Collector 25 mA Output
- Reverse Battery Protection
- Activate With Small, Commercially Available Permanent Magnets
- Solid-State Reliability
- Small Size
- Resistant to Physical Stress

Always order by complete part number, e.g., **A3134ELT** .

3134
LOW-HYSTERESIS BIPOLAR HALL-EFFECT SWITCH FOR HIGH-TEMP. OPERATION



ELECTRICAL CHARACTERISTICS over operating temperature range, at V_{CC} = 12 V.

Characteristic	Symbol	Test Conditions	Limits Min.	Limits Typ.	Limits Max.	Units
Supply Voltage	V_{CC}	Operating	3.8	—	24	V
Output Saturation Voltage	$V_{OUT(SAT)}$	I_{OUT} = 20 mA, B > B_{OP}	—	175	400	mV
Output Leakage Current	I_{OFF}	V_{OUT} = 24 V, B < B_{RP}	—	0.05	1.0	µA
Supply Current	I_{CC}	B < B_{RP} (Output OFF)	—	3.2	9.0	mA
		B > B_{OP} (Output ON)	—	5.0	—	mA
Output Rise Time	t_r	R_L = 820 Ω, C_L = 20 pF	—	100	—	ns
Output Fall Time	t_f	R_L = 820 Ω, C_L = 20 pF	—	100	—	ns

MAGNETIC CHARACTERISTICS over operating supply voltage range.

Characteristic	Symbol	Test Conditions	Limits Min.	Limits Typ.	Limits Max.	Units
Operate Point	B_{OP}	at T_A = +25°C	-40	8.5	50	G
		Over Oper. Temp. Range	-40	–	50	G
Release Point	B_{RP}	at T_A = +25°C	-50	-19	40	G
		Over Oper. Temp. Range	-50	–	40	G
Hysteresis	B_{hys}	at T_A = +25°C	10	27	50	G
		Over Oper. Temp. Range	5.0	–	55	G

NOTES: B_{OP} = operate point (output turns ON); B_{RP} = release point (output turns OFF); B_{hys} = hysteresis (B_{OP} - B_{RP}).
As used here, negative flux densities are defined as less than zero (algebraic convention).
Typical values are at T_A = +25°C and V_{CC} = 12 V.

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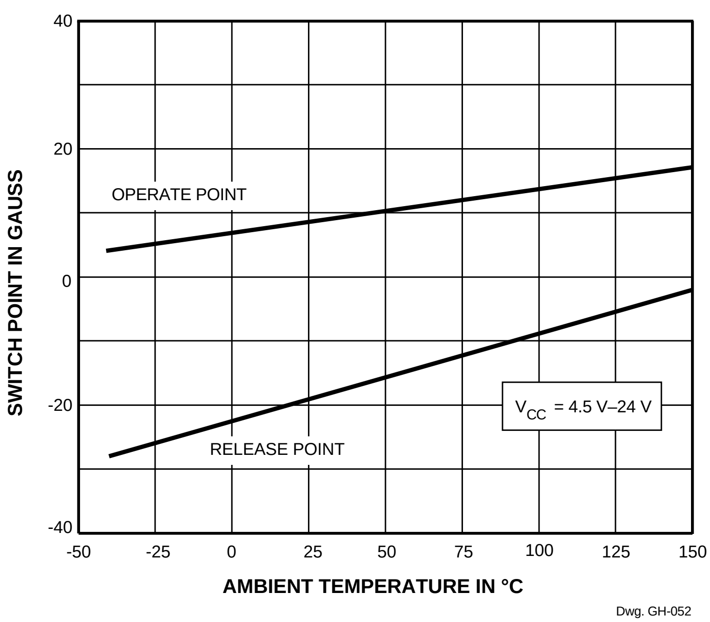
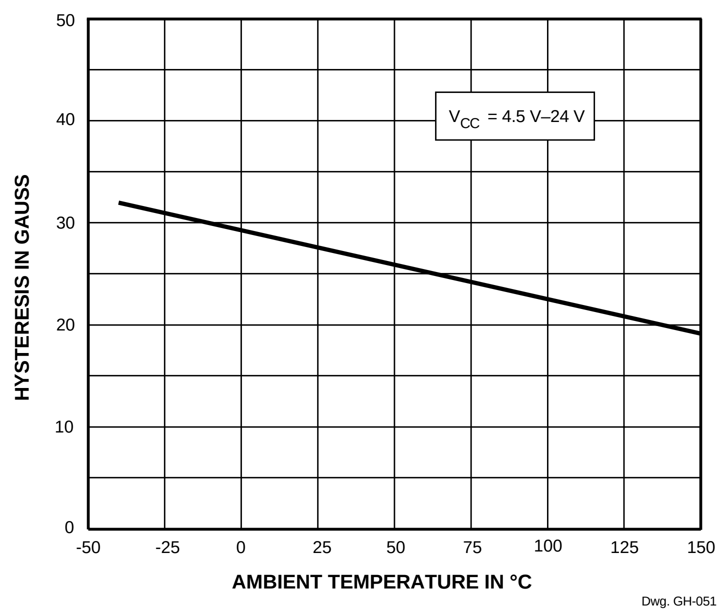
TYPICAL OPERATING CHARACTERISTICS

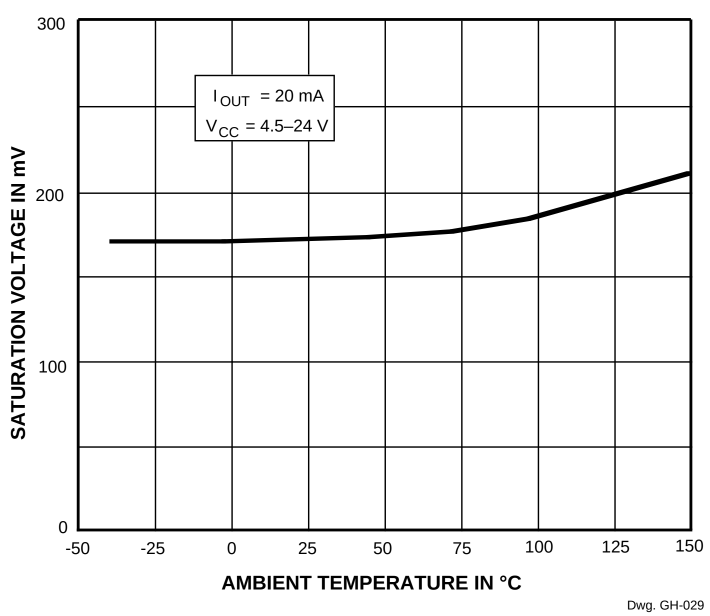
SWITCH POINTS



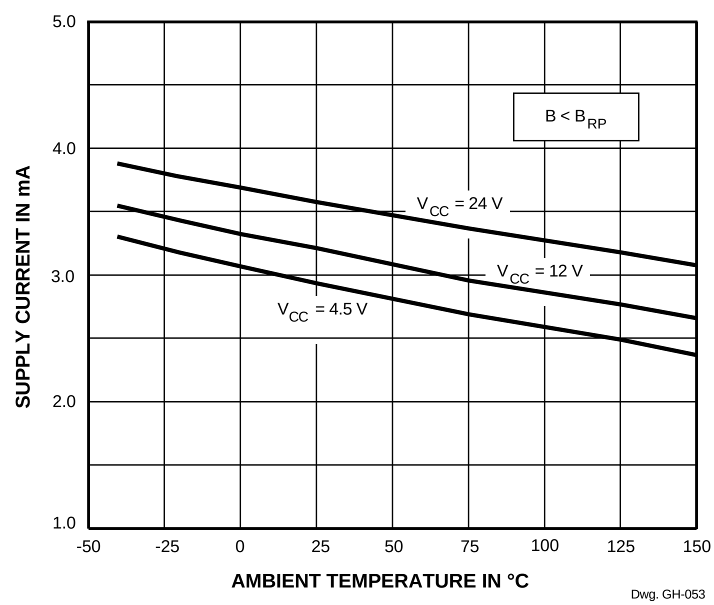
HYSTERESIS



OUTPUT SATURATION VOLTAGE



SUPPLY CURRENT



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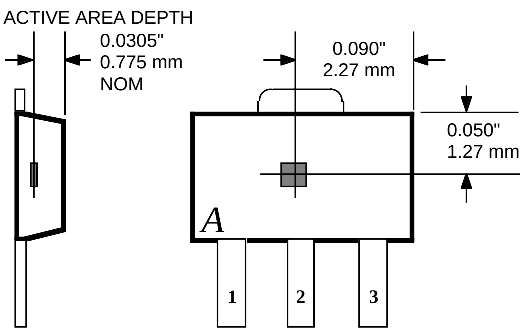
LOW-HYSTERESIS BIPOLAR HALL-EFFECT SWITCH FOR HIGH-TEMP. OPERATION

SENSOR LOCATIONS

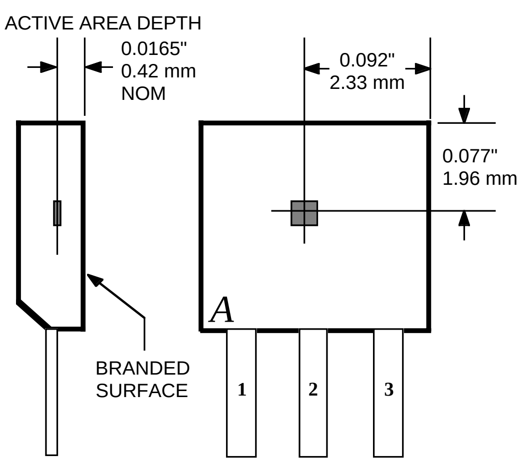
(±0.005" [0.13 mm] die placement)

Suffix "LT"



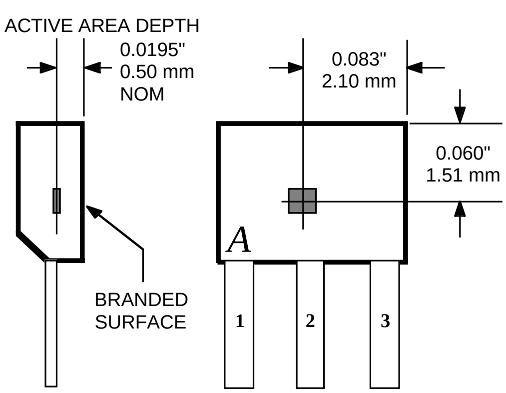
Dwg. MH-008-4C

Suffix "U"



Dwg. MH-002-7C

Suffix "UA"



Dwg. MH-011-4C

APPLICATIONS INFORMATION

Hall effect applications information is available in the "Hall-Effect IC Applications Guide" (AN 27701), which can be found in the latest issue of *Allegro MicroSystems Electronic Data Book*, AMS-702, or at

www.allegromicro.com

OPERATION

The output of these devices (pin 3) switches low when the magnetic field at the Hall sensor exceeds the operate point threshold (B_{OP}). At this point, the output voltage is $V_{OUT(SAT)}$. When the magnetic field is reduced to below the release point (B_{RP}) the device output goes high. 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 called the hysteresis (B_{hys}) of the device. This built-in hysteresis allows clean switching of the output even in the presence of external mechanical vibration and electrical noise.

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.

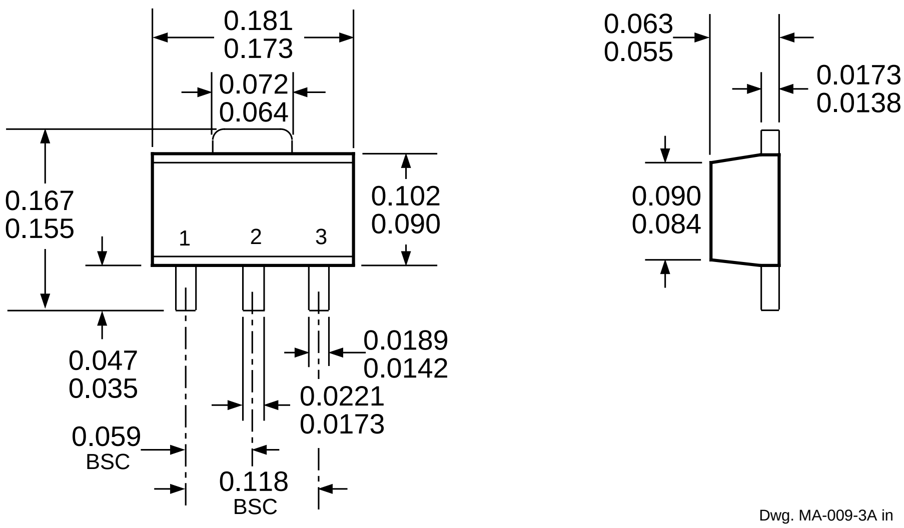
Allegro products are not authorized for use as critical components in life-support appliances, devices, or systems without express written approval.

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.

PACKAGE DESIGNATOR ‘LT’

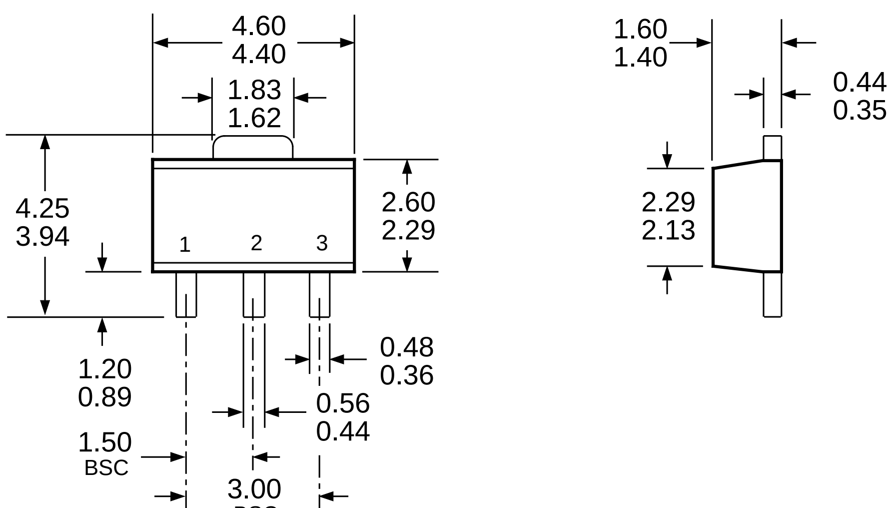
(SOT-89/TO-243AA)

Dimensions in Inches
(for reference only)



Dwg. MA-009-3A in

Dimensions in Millimeters
(controlling dimensions)



Dwg. MA-009-3A 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.

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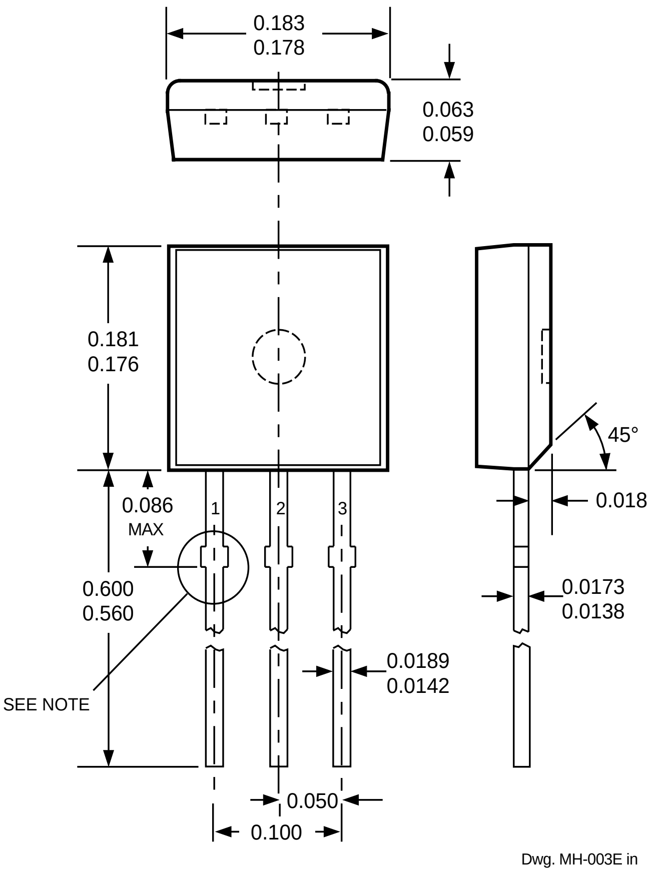
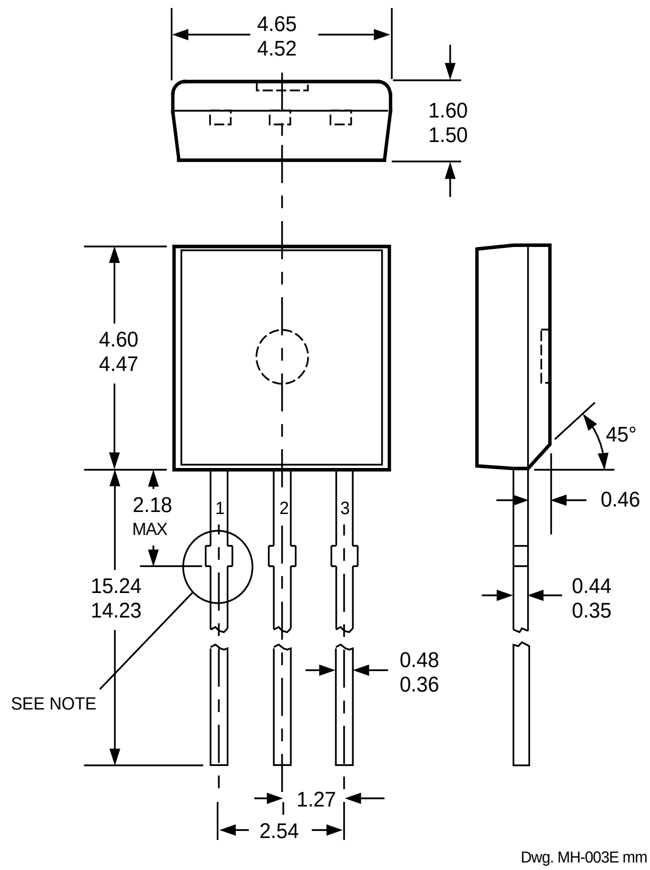
PACKAGE DESIGNATOR 'U'

Dimensions in Inches
(controlling dimensions)



Dimensions in Millimeters
(for reference only)



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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.

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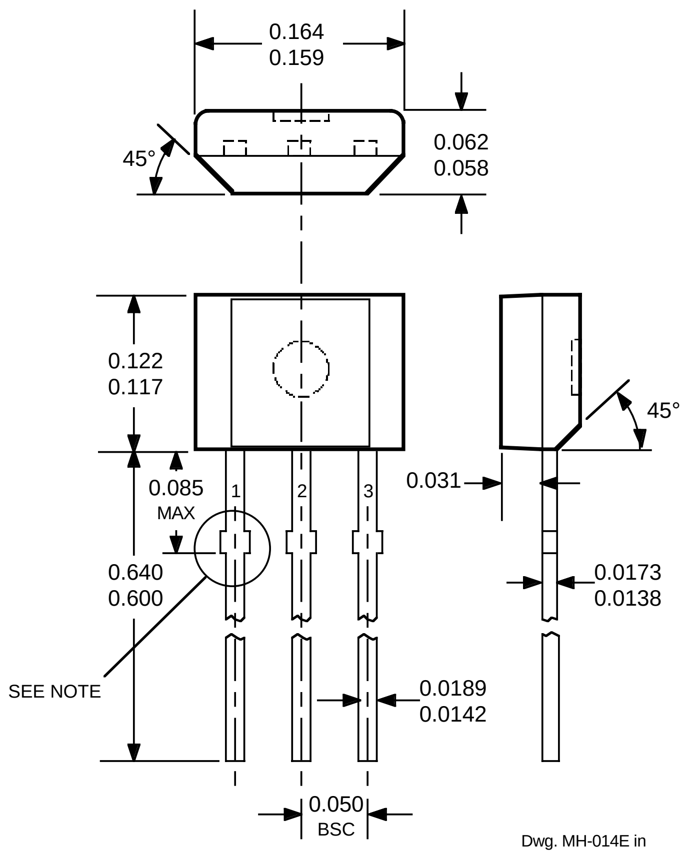
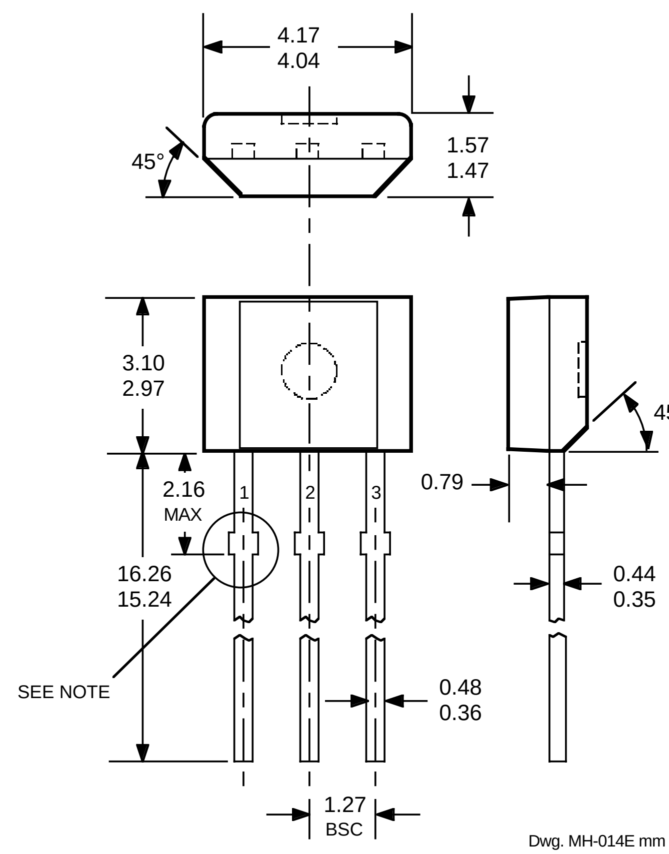
PACKAGE DESIGNATOR 'UA'

Dimensions in Inches
(controlling dimensions)



Dimensions in Millimeters
(for reference only)



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LOW-HYSTERESIS BIPOLAR HALL-EFFECT SWITCH FOR HIGH-TEMP. OPERATION

HALL-EFFECT SENSORS

BIPOLAR HALL-EFFECT DIGITAL SWITCHES

Partial Part Number	Operate Point (G)	Release Point (G)	Hysteresis (G)	Oper. Temp.	Packages	Replaces and Comments
	Over Oper. Voltage & Temp. Range					
UGx3132	<95 (Typ 32)	>-95 (Typ -20)	>30 (Typ 52)	K, L, S	LT, UA	3030, 3130, 3131
UGx3133	<75 (Typ 32)	>-75 (Typ -20)	>30 (Typ 52)	K, L, S	LT, UA	
UGx3134	-40 to 50	-50 to 40	5 to 55	E, L	LT, UA	
A3260x	<30 (Typ 10)	>-30 (Typ -10)	Typ 20	E, L	LH, LT, UA	2 wire, chopper stabilized

LATCHING HALL-EFFECT DIGITAL SWITCHES

Partial Part Number	Operate Point (G)	Release Point (G)	Hysteresis (G)	Oper. Temp.	Packages	Replaces and Comments
	Over Oper. Voltage & Temp. Range					
UGN3175	15 to 180	-180 to -15	>80 (Typ 180)	S	LT, UA	
UGN3177	25 to 150	-150 to -25	>50 (Typ 180)	S	LT, UA	
A3185x	140 to 300	-300 to -140	280 to 600	E/L	LT, UA	
A3187x	50 to 175	-175 to -50	100 to 350	E/L	LT, UA	3077, 3175, 3177
A3188x	80 to 200	-200 to -80	160 to 400	E/L	LT, UA	
A3189x	50 to 250	-250 to -50	100 to 500	E/L	LT, UA	3075, 3076
A3280x	5 to 40	-40 to -5	10 to 80	E/L	LH, LT, UA	chopper stabilized
A3281x	15 to 90	-90 to -15	30 to 180	E/L	LH, LT, UA	chopper stabilized
A3283x	100 to 180	-180 to -100	<400 (Typ 300)	E/L	LH, LT, UA	chopper stabilized

"PROTECTED" LATCHING HALL-EFFECT DIGITAL SWITCHES

Partial Part Number	Operate Point (G)	Release Point (G)	Hysteresis (G)	Oper. Temp.	Packages	Comments
	Over Oper. Voltage & Temp. Range					
A3195x	40 to 200	-200 to -40	>110 (Typ 220)	E, L	U, LT	active pulldown
A3197x	40 to 200	-200 to -40	>110 (Typ 230)	E, L	U, LT	open-collector output

Notes: 1) Typical data is at T_A = +25°C and nominal operating voltage.
2) "x" = Operating Temperature Range [suffix letter or (prefix)]: S (UGN) = -20°C to +85°C, E = -40°C to +85°C, J = -40°C to +115°C, K (UGS) = -40°C to +125°C, L (UGL) = -40°C to +150°C.

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