

A3132 and A3133

Ultrasensitive Bipolar Hall Effect Switches

Discontinued Product

These parts are no longer in production. The device should not be purchased for new design applications. Samples are no longer available.

Date of status change: October 31, 2005

Recommended Substitutions:

For new customers and applications:

- for the A3132 refer to the [A1203](#)
- for the A3133 refer to the [A1202](#)

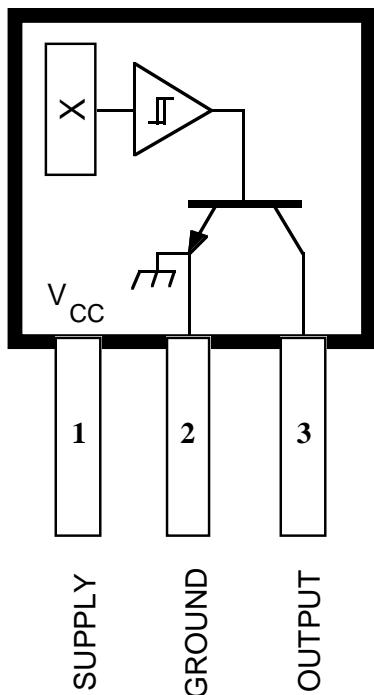
NOTE: For detailed information on purchasing options, contact your local Allegro field applications engineer or sales representative.

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3132 AND 3133

ULTRA-SENSITIVE BIPOLAR HALL-EFFECT SWITCHES



Pinning is shown viewed from branded side.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC}	25 V
Reverse Battery Voltage, V_{RCC}	-35 V
Magnetic Flux Density, B	Unlimited
Output OFF Voltage, V_{OUT}	25 V
Continuous Output Current, I_{OUT}	25 mA
Operating Temperature Range, T_A	
Prefix UGL	-40°C to +150°C
Prefix UGN	-20°C to +85°C
Prefix UGS	-40°C to +125°C
Storage Temperature Range,	
T_S	-65°C to +150°C

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 V. 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 three package styles available provide a magnetically optimized package for most applications. Suffix 'LT' is a miniature SOT89/TO-243AA transistor package for surface-mount applications; suffix 'UA' features 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, and prefix 'UGL' devices over the range of -40°C to +150°C.

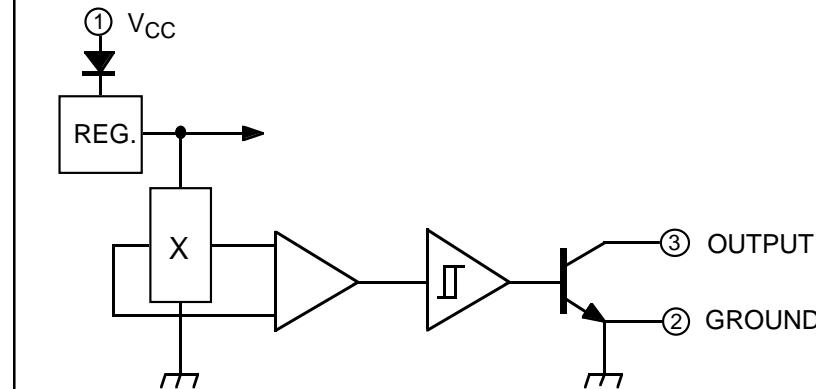
FEATURES

- 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., **UGN3132LT**.

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BIPOLAR
HALL-EFFECT SWITCHES

FUNCTIONAL BLOCK DIAGRAM



Dwg. FH-005-2

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

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
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	μA
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	μs
Output Fall Time	t_f	$V_{CC} = 12 \text{ V}, R_L = 820 \Omega, C_L = 20 \text{ pF}$	—	0.18	2.0	μs

MAGNETIC CHARACTERISTICS over operating temperature and voltage range.

Characteristic	Symbol	Device Type*	Limits			
			Min.	Typ.	Max.	Units
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 $V_{CC} = 12 \text{ V}$.

1 gauss (G) is exactly equal to 0.1 millitesla (mT).

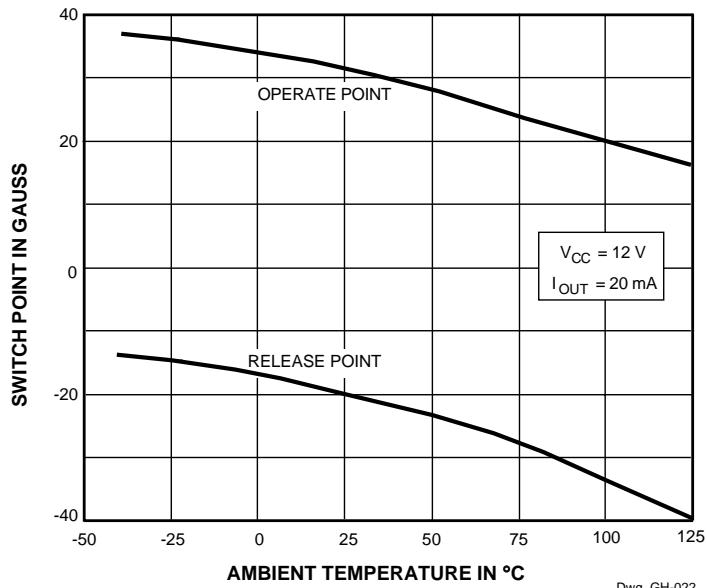
* Complete part number includes a prefix denoting operating temperature range (UGL, UGN, or UGS) and a suffix denoting package type (LT or UA).



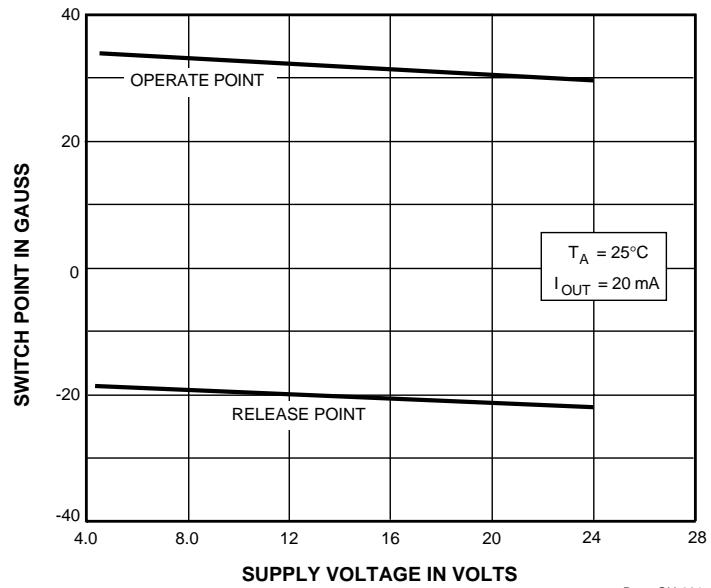
115 Northeast Cutoff, Box 15036
Worcester, Massachusetts 01615-0036 (508) 853-5000
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**3132 AND 3133
BIPOLEAR
HALL-EFFECT SWITCHES**

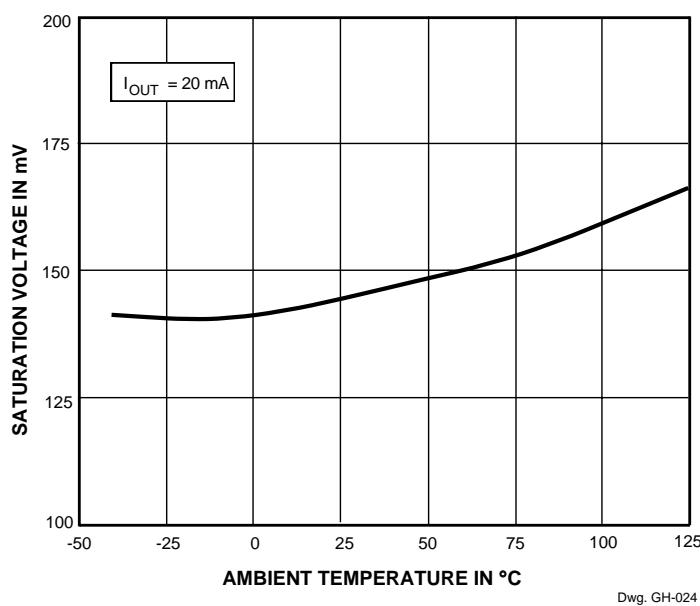
TYPICAL CHARACTERISTICS



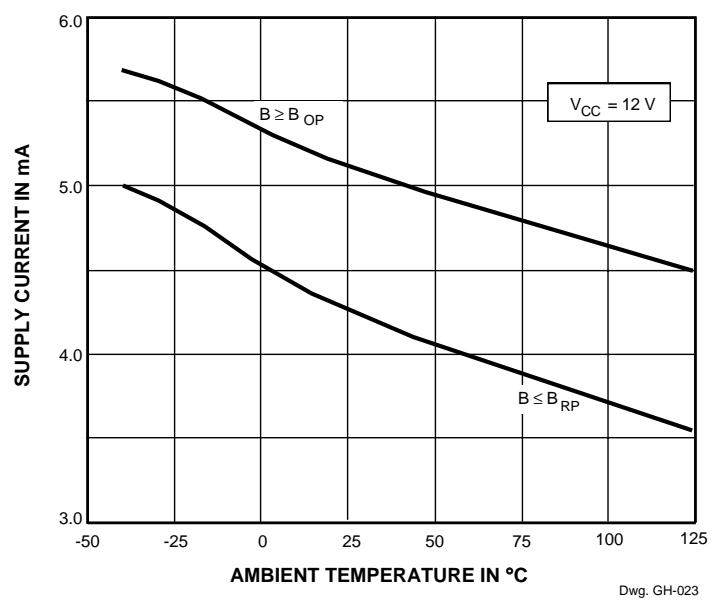
Dwg. GH-022



Dwg. GH-021



Dwg. GH-024



Dwg. GH-023

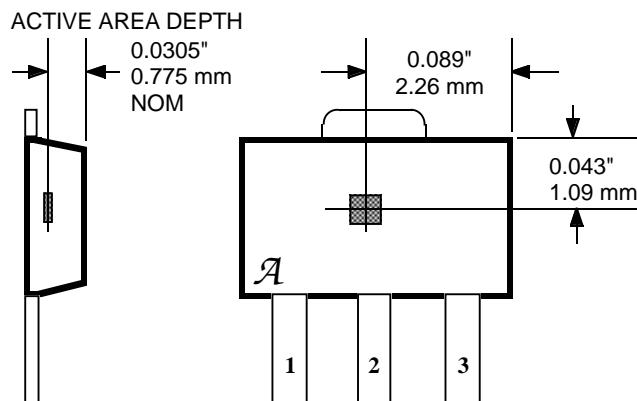
Powering up in the absence of a magnetic field (less than B_{OP} and higher than B_{RP}) will allow an indeterminate output state. The correct state is warranted after the first excursion beyond B_{OP} or B_{RP} .

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.

3132 AND 3133 BIPOLEAR HALL-EFFECT SWITCHES

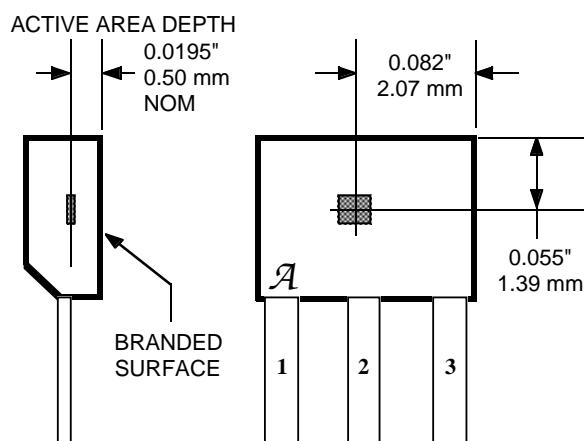
SENSOR LOCATIONS ($\pm 0.005"$ [0.13mm] die placement)

SUFFIX "LT"



Dwg. MH-008-2D

SUFFIX "UA"



Dwg. MH-011-10A

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.

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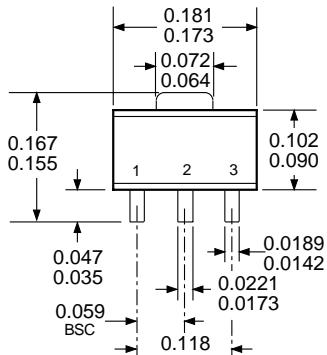
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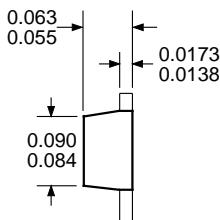
3132 AND 3133 *BIPOLEAR* *HALL-EFFECT SWITCHES*

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

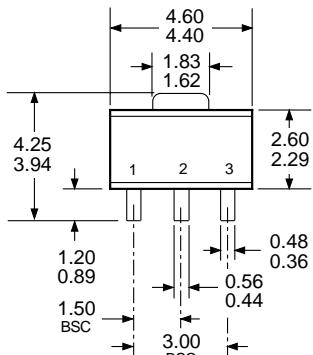
Dimensions in Inches (for reference only)



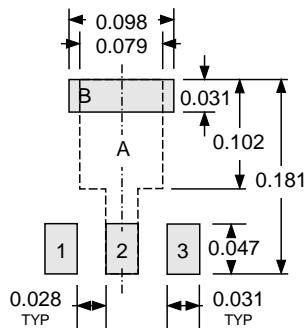
Dwg. MA-009-3A in



Dimensions in Millimeters (controlling dimensions)

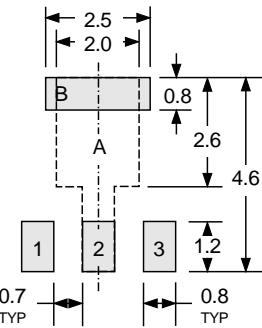


Dwg. MA-009-3A mm



Pads 1, 2, 3, and A — Standard SOT89 Layout
Pads 1, 2, 3, and B — Low-Stress Version
Pads 1, 2, and 3 only — Lowest Stress, But Not Self Aligning

Dwg. MA-012-3 in



Pads 1, 2, 3, and A — Standard SOT89 Layout
Pads 1, 2, 3, and B — Low-Stress Version
Pads 1, 2, and 3 only — Lowest Stress, But Not Self Aligning

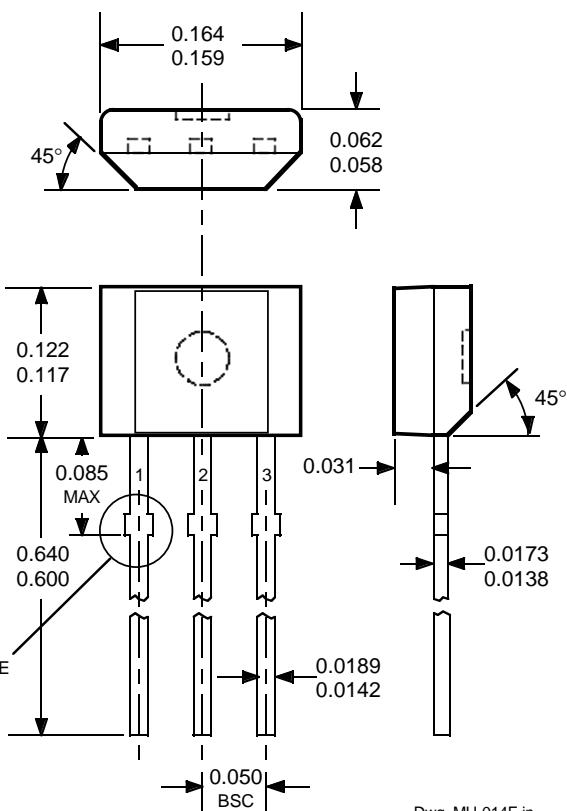
Dwg. MA-012-3 mm

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.

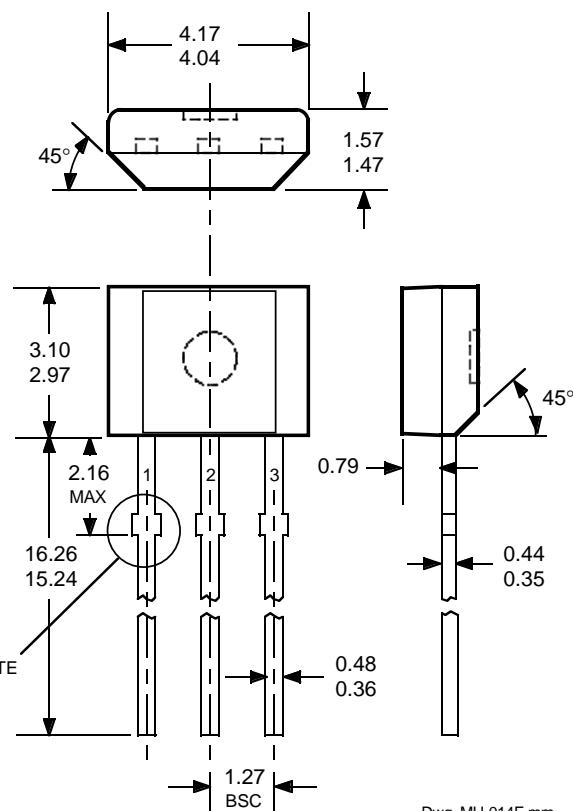
3132 AND 3133 ***BIPOLAR*** ***HALL-EFFECT SWITCHES***

PACKAGE DESIGNATOR 'UA'

Dimensions in Inches
(controlling dimensions)



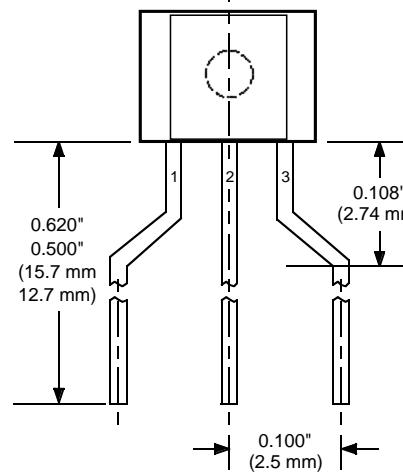
Dimensions in Millimeters
(for reference only)



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.
6. Supplied in bulk pack (500 pieces per bag).

Radial Lead Form (order UGx313xUA-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).



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