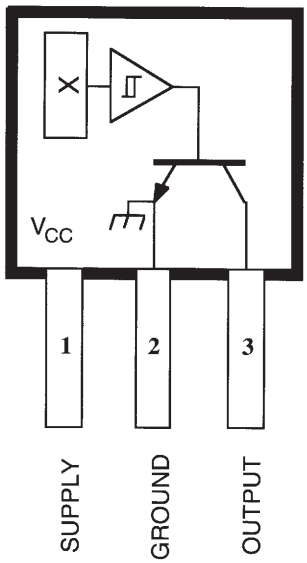
3113, 3120, 3130, AND 3140

Data Sheet 27621A

HALL-EFFECT SWITCHES



Dwg. PH-003A

Pinning is shown viewed from branded side.

These Hall-effect switches are highly temperature stable and stress-resistant devices best utilized in applications that provide steep magnetic slopes and low residual levels of magnetic flux density.

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 20 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.

FEATURES

- 4.5 V to 24 V Operation
- Activate With Small, Commercially Available Permanent Magnets
- Solid-State Reliability... No Moving Parts
- Small Size
- Constant Output Amplitude
- Superior Temperature Stability
- Resistant to Physical Stress
- Directly Replace Series UGN and UGS3000T/U Switches

DISCONTINUED PRODUCT
FOR REFERENCE ONLY

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC} . . . . . **25 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 UGN . . . . . **-20°C to +85°C**
Prefix UGS . . . . . **-40°C to +125°C**
Storage Temperature Range,
T_S . . . . . **-65°C to +150°C***

* Devices can be stored at +200°C for short periods of time.

Always order by complete part number, e.g., **UGN3113UA**.
See Magnetic Characteristics table for differences between devices.

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ELECTRICAL CHARACTERISTICS at T_A + +25°C, V_{CC} = 4.5 V to 24 V (unless otherwise noted).

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 mA, B > B_{OP}	—	150	400	mV
Output Leakage Current	I_{OFF}	V_{OUT} = 24 V, B < B_{RP}	—	<1.0	10	µA
Supply Current	I_{CC}	V_{CC} = 4.5 V, Output Open	—	4.7	8.0	mA
Output Rise Time	t_r	V_{CC} = 12 V, R_L = 820 Ω, C_L = 20 pF	—	0.04	2.0	µs
Output Fall Time	t_f	V_{CC} = 12 V, R_L = 820 Ω, C_L = 20 pF	—	0.18	2.0	µs

MAGNETIC CHARACTERISTICS in gauss

Characteristic	Part Number*	T_A = +25°C		T_A = -20°C to +85°C		T_A = -40°C to +125°C†	
		Min.	Max.	Min.	Max.	Min.	Max.
Operate Point, B_{OP}	3113	—	450	—	510	—	—
	3120	70	350	70	425	35	450
	3130	—	150	—	175	—	200
	3140	70	200	45	260	45	270
Release Point, B_{RP}	3113	30	—	20	—	—	—
	3120	50	330	50	405	25	430
	3130	-150	—	-175	—	-200	—
	3140	50	180	25	240	25	250
Hysteresis, B_{hys}	3113	20	—	10	—	—	—
	3120	20	—	20	—	20	—
	3130	20	—	20	—	20	—
	3140	20	—	20	—	20	—

NOTE: As used here, negative flux densities are defined as less than zero (algebraic convention).

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

† Applicable to prefix UGS devices only (available with all devices except 3113).

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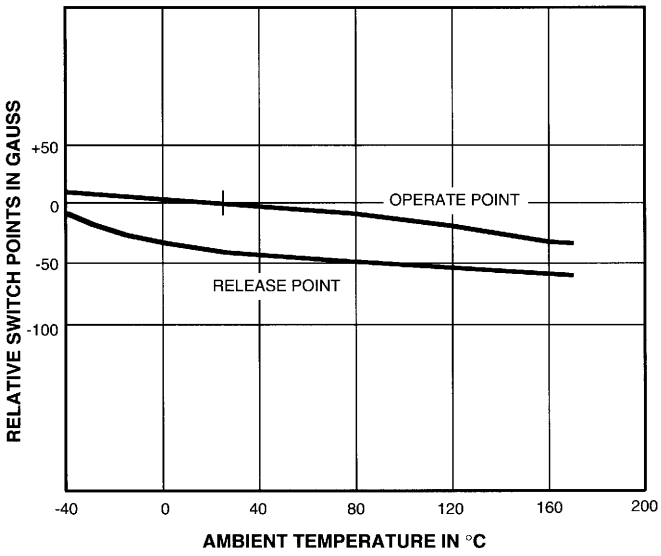
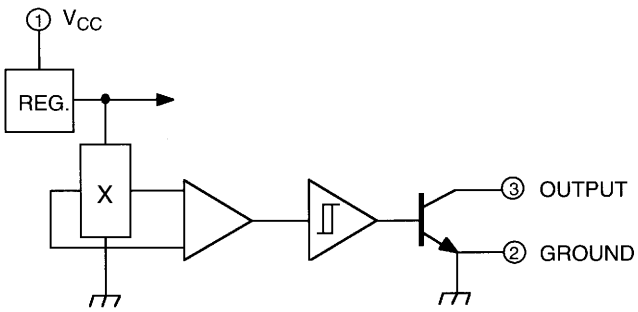
TYPICAL CHARACTERISTICS AS FUNCTIONS OF TEMPERATURE



Dwg. GH-018

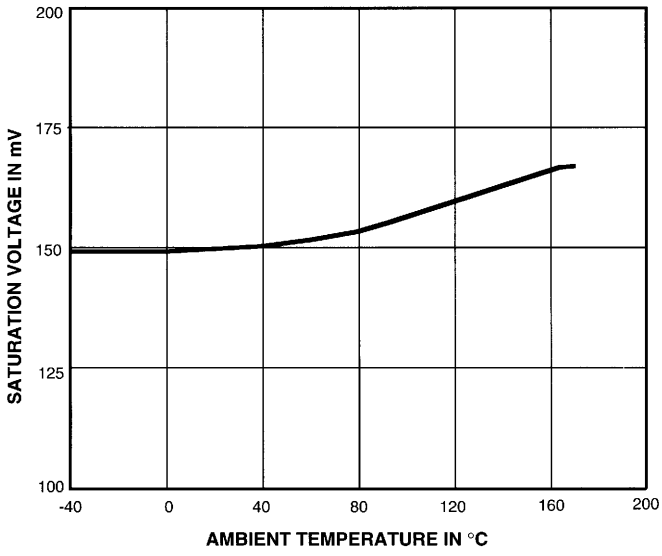
FUNCTIONAL BLOCK DIAGRAM



Dwg. FH-005

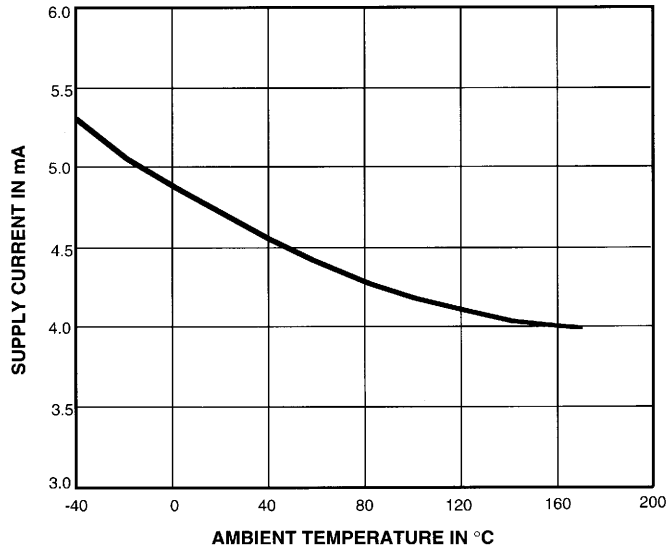
TYPICAL CHARACTERISTICS AS FUNCTIONS OF TEMPERATURE

OUTPUT SATURATION VOLTAGE



Dwg. GH-013

SUPPLY CURRENT

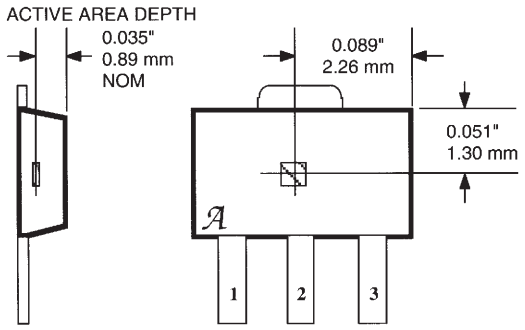


Dwg. GH-014

ELEMENT LOCATIONS

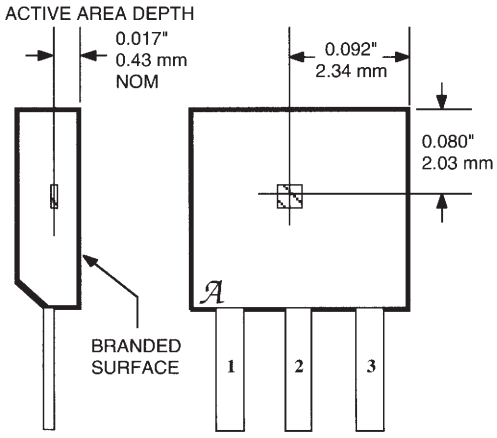
(±0.005" [0.13mm] die placement)

SUFFIX "LL" AND "LT"



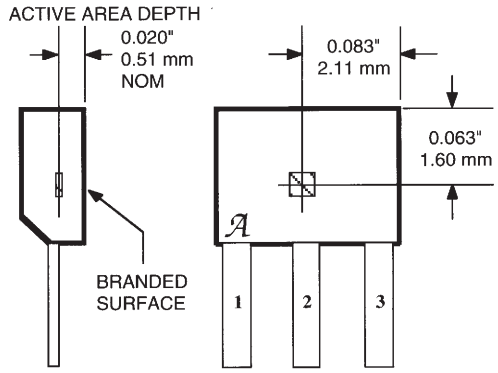
Dwg. MH-008A

SUFFIX "U"



Dwg. MH-002-1A

SUFFIX "UA"



Dwg. MH-011-1A

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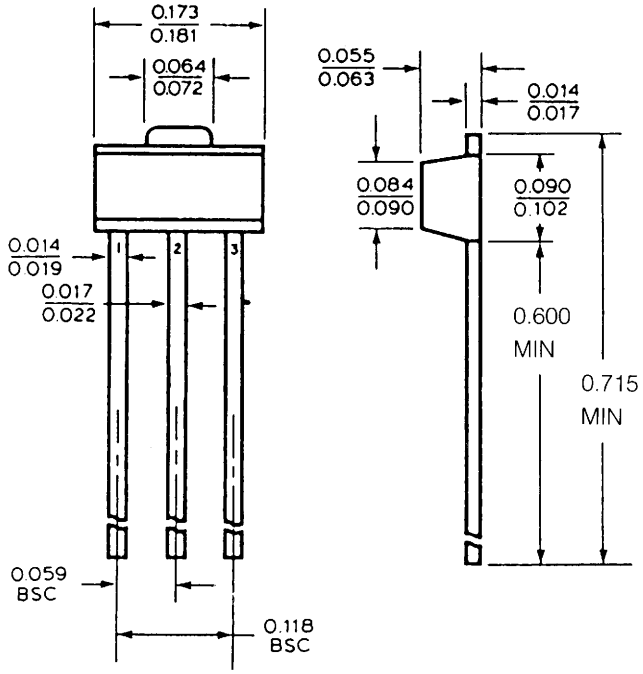
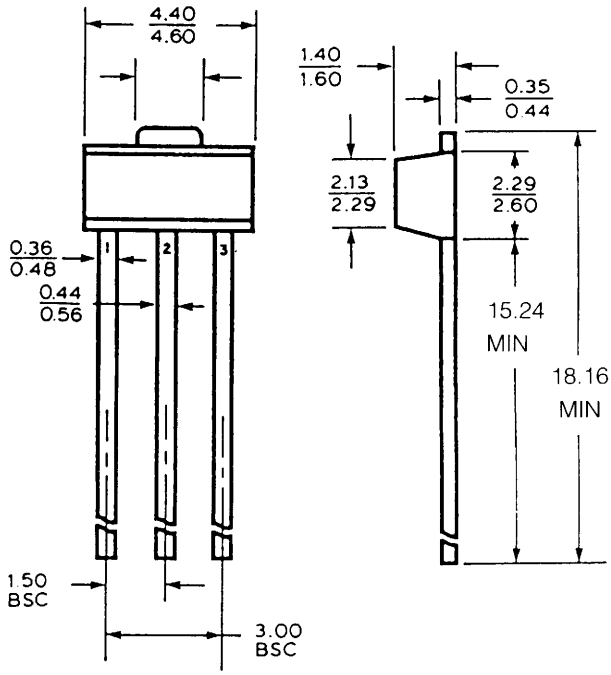
PACKAGE DESIGNATOR LL

Dimensions in Inches
(Based on 1 mm = 0.394")



Dwg. No. A-12,657A in

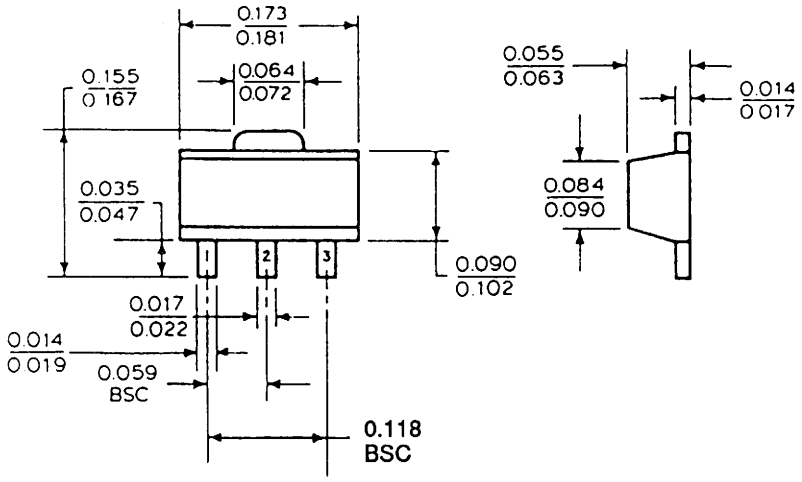
Dimensions in Millimeters



Dwg. No. A-12,657A mm

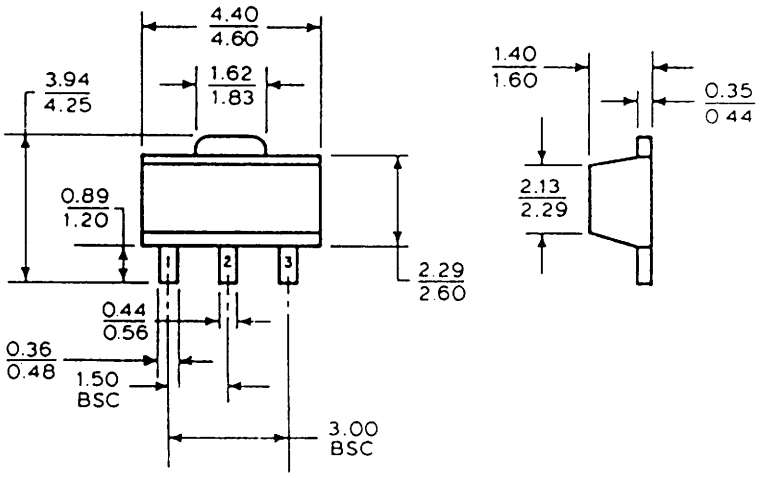
PACKAGE DESIGNATOR LT

Dimensions in Inches
(Based on 1 mm = 0.394")



Dwg. No. A-12,608A in

Dimensions in Millimeters



Dwg. No. A-12,608A mm

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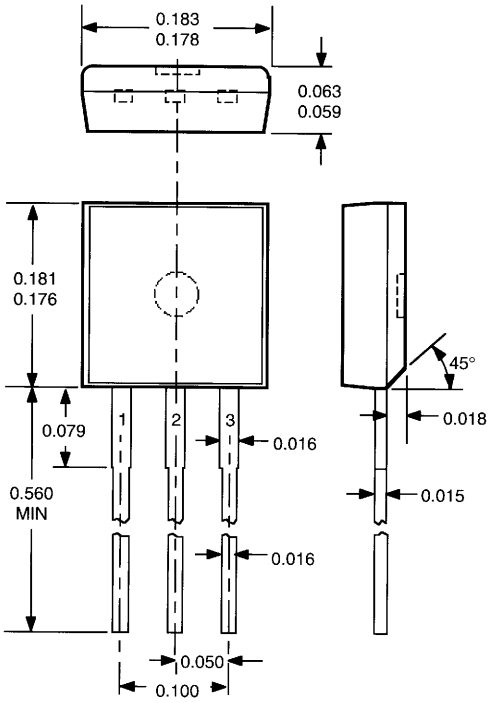
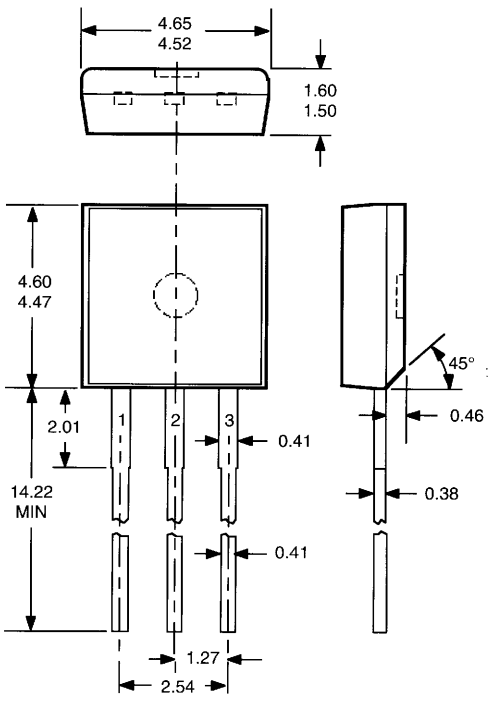
PACKAGE DESIGNATOR U

Dimensions in Inches



Dwg. MH-003A in

Dimensions in Millimeters (Based on 1" = 2.54 mm)

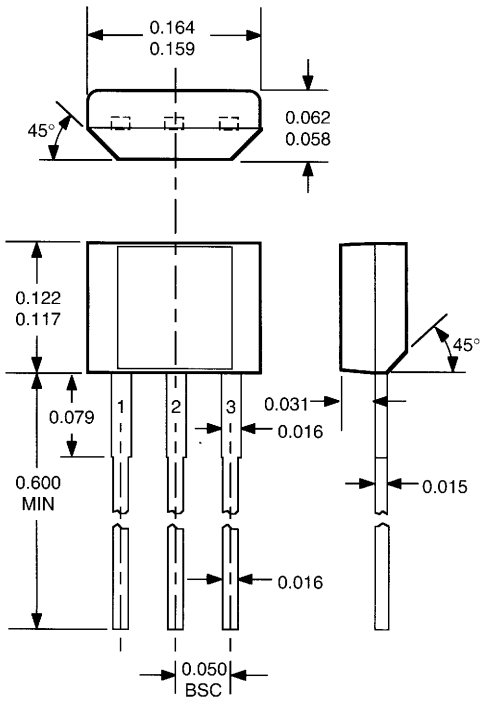


Dwg. MH-003A mm

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 flush.
4. Minimum lead length was 0.500" (12.70 mm). If existing product to the original specifications is not acceptable, contact sales office before ordering.

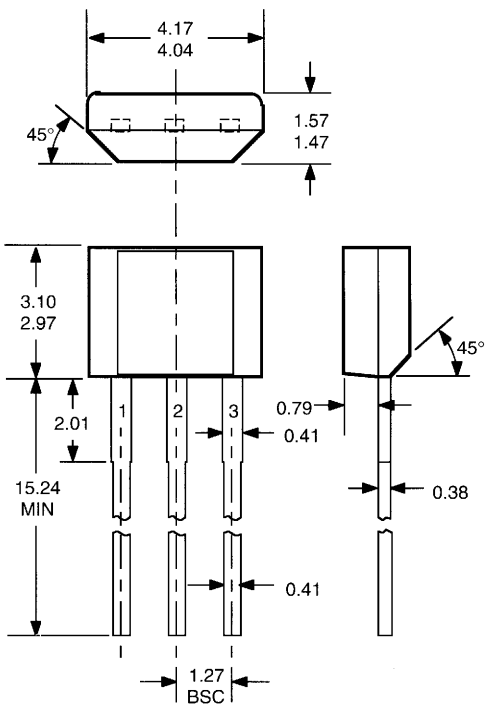
PACKAGE DESIGNATOR UA

Dimensions in Inches



Dwg. MH-014A in

Dimensions in Millimeters (Based on 1" = 2.54 mm)



Dwg. MH-014A mm

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