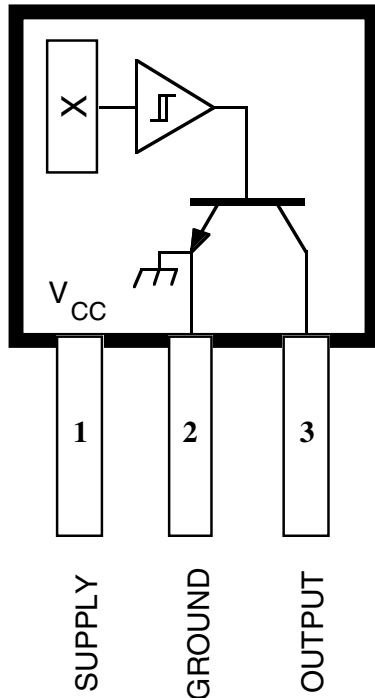


# 3175 AND 3177

## HALL-EFFECT LATCHES



Dwg. PH-003A

Pinning is shown viewed from branded side.

### ABSOLUTE MAXIMUM RATINGS

Supply Voltage, $V_{CC}$ .....	18 V
Reverse Battery Voltage, $V_{RCC}$ .....	-18 V
Magnetic Flux Density, $B$ .....	Unlimited
Output OFF Voltage, $V_{OUT}$ .....	18 V
Continuous Output Current, $I_{OUT}$ ..	15 mA
Operating Temperature Range, $T_A$ .....	-20°C to +85°C
Storage Temperature Range, $T_S$ .....	-65°C to +150°C

These Hall-effect latches are temperature-stable and stress-resistant sensors especially suited for electronic commutation in brushless dc motors using multipole ring magnets. Each device includes a voltage regulator, quadratic Hall voltage generator, temperature compensation circuit, signal amplifier, Schmitt trigger, and an open-collector output on a single silicon chip. The on-board regulator permits operation with supply voltages of 4.5 volts to 18 volts. The switch output can sink 10 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 surface-mount SOT-89/TO-243AA package; suffixes 'U' and 'UA' feature wire leads for through-hole mounting.

### FEATURES

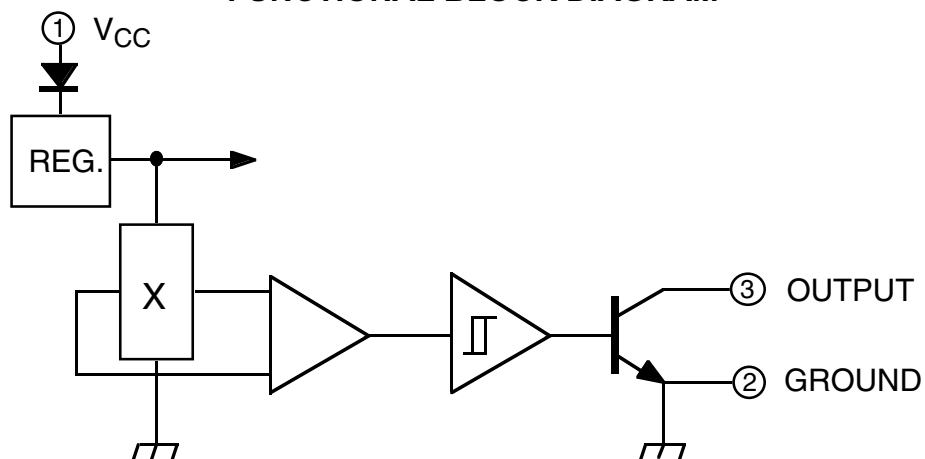
- Symmetrical Response
- 4.5 V to 18 V Operation
- Open-Collector Output
- Reverse Battery Protection
- Activate With Small, Commercially Available Permanent Magnets
- Solid-State Reliability
- Small Size
- Superior Temperature Stability
- Resistant to Physical Stress

Always order by complete part number, e.g., **UGN3175LT**.

See Magnetic Characteristics table for differences between devices.

# 3175 AND 3177 HALL-EFFECT LATCHES

## FUNCTIONAL BLOCK DIAGRAM



Dwg. FH-005-2

### ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$ , $V_{CC} = 4.5\text{ V to }18\text{ V}$ (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Supply Voltage	$V_{CC}$	Operating	4.5	—	18	V
Output Saturation Voltage	$V_{OUT(SAT)}$	$V_{CC} = 18\text{ V}$ , $I_{OUT} = 10\text{ mA}$ , $B > B_{OP}$	—	200	300	mV
Output Leakage Current	$I_{OFF}$	$V_{OUT} = 18\text{ V}$ , $B < B_{RP}$	—	0.05	5.0	$\mu\text{A}$
Supply Current	$I_{CC}$	$V_{CC} = 4.5\text{ V}$ , $B < B_{RP}$ (Output OFF)	—	5.0	10	mA
Output Rise Time	$t_r$	$V_{CC} = 12\text{ V}$ , $R_L = 1.1\text{ k}\Omega$ , $C_L = 20\text{ pF}$	—	0.04	2.0	$\mu\text{s}$
Output Fall Time	$t_f$	$V_{CC} = 12\text{ V}$ , $R_L = 1.1\text{ k}\Omega$ , $C_L = 20\text{ pF}$	—	0.18	2.0	$\mu\text{s}$

### MAGNETIC CHARACTERISTICS in gauss; $V_{CC} = 4.5\text{ V to }18\text{ V}$ .

Characteristic	Part Number*	$T_A = +25^\circ\text{C}$			$T_A = -20^\circ\text{C to }+85^\circ\text{C}$		
		Min.	Typ.	Max.	Min.	Typ.	Max.
Operate Point, $B_{OP}$	UGN3175	25	—	170	15	—	180
	UGN3177	50	—	150	25	—	150
Release Point, $B_{RP}$	UGN3175	-170	—	-25	-180	—	-15
	UGN3177	-150	—	-50	-150	—	-25
Hysteresis, $B_{hys}$	UGN3175	100	200	—	80	180	—
	UGN3177	100	200	—	50	180	—

NOTE: As used here, negative flux densities are defined as less than zero (algebraic convention).  
Complete part number includes a suffix denoting package type (LT, U, or UA).



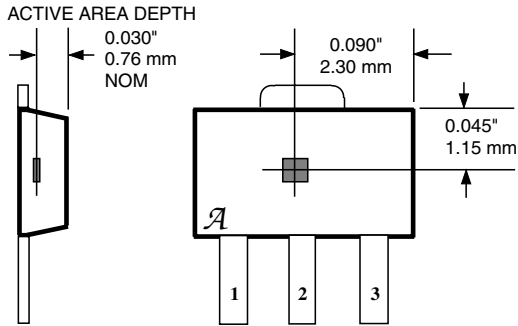
115 Northeast Cutoff, Box 15036  
Worcester, Massachusetts 01615-0036 (508) 853-5000  
Copyright © 1991, 1999, Allegro MicroSystems, Inc.

# 3175 AND 3177 HALL-EFFECT LATCHES

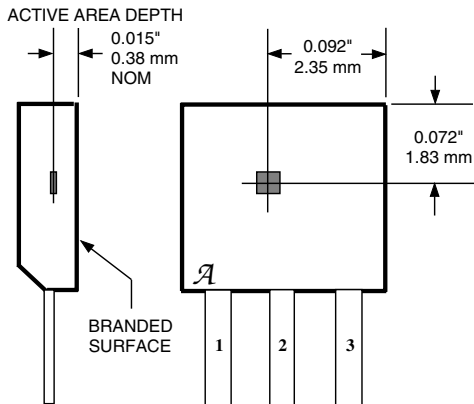
## SENSOR LOCATIONS

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

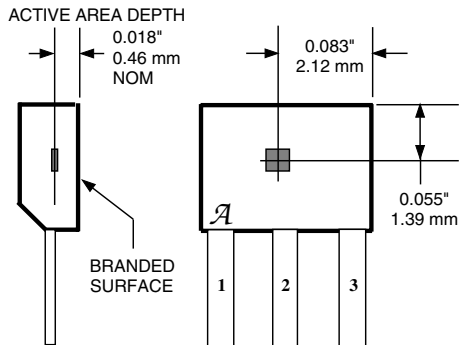
### Suffix "LT"



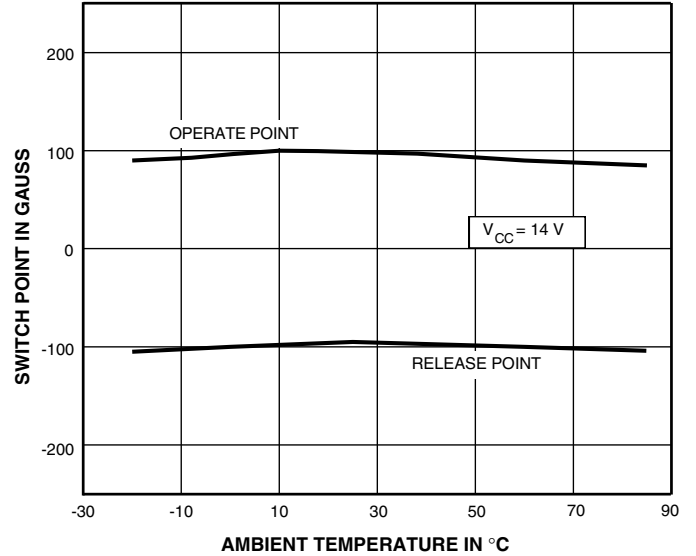
### Suffix "U"



### Suffix "UA"



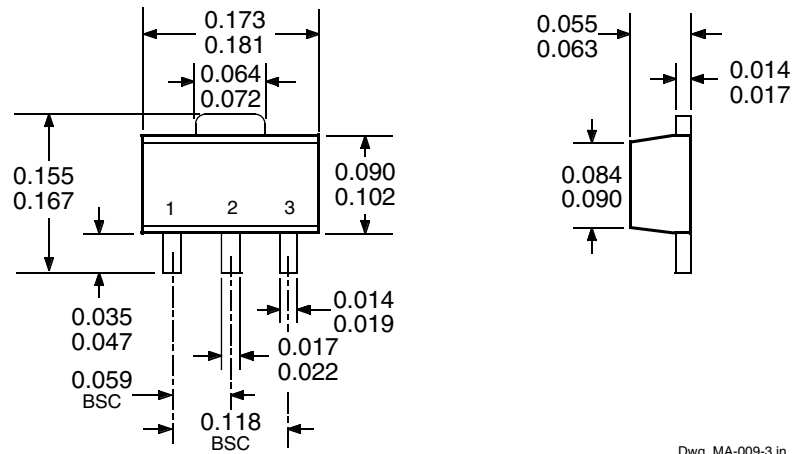
## TYPICAL OPERATING CHARACTERISTICS



# 3175 AND 3177 HALL-EFFECT LATCHES

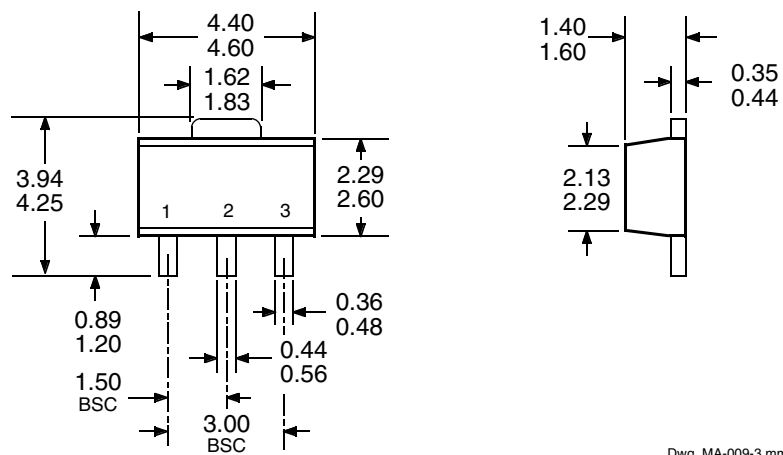
## PACKAGE DESIGNATOR 'LT'

Dimensions in Inches  
(for reference only)



Dwg. MA-009-3 in

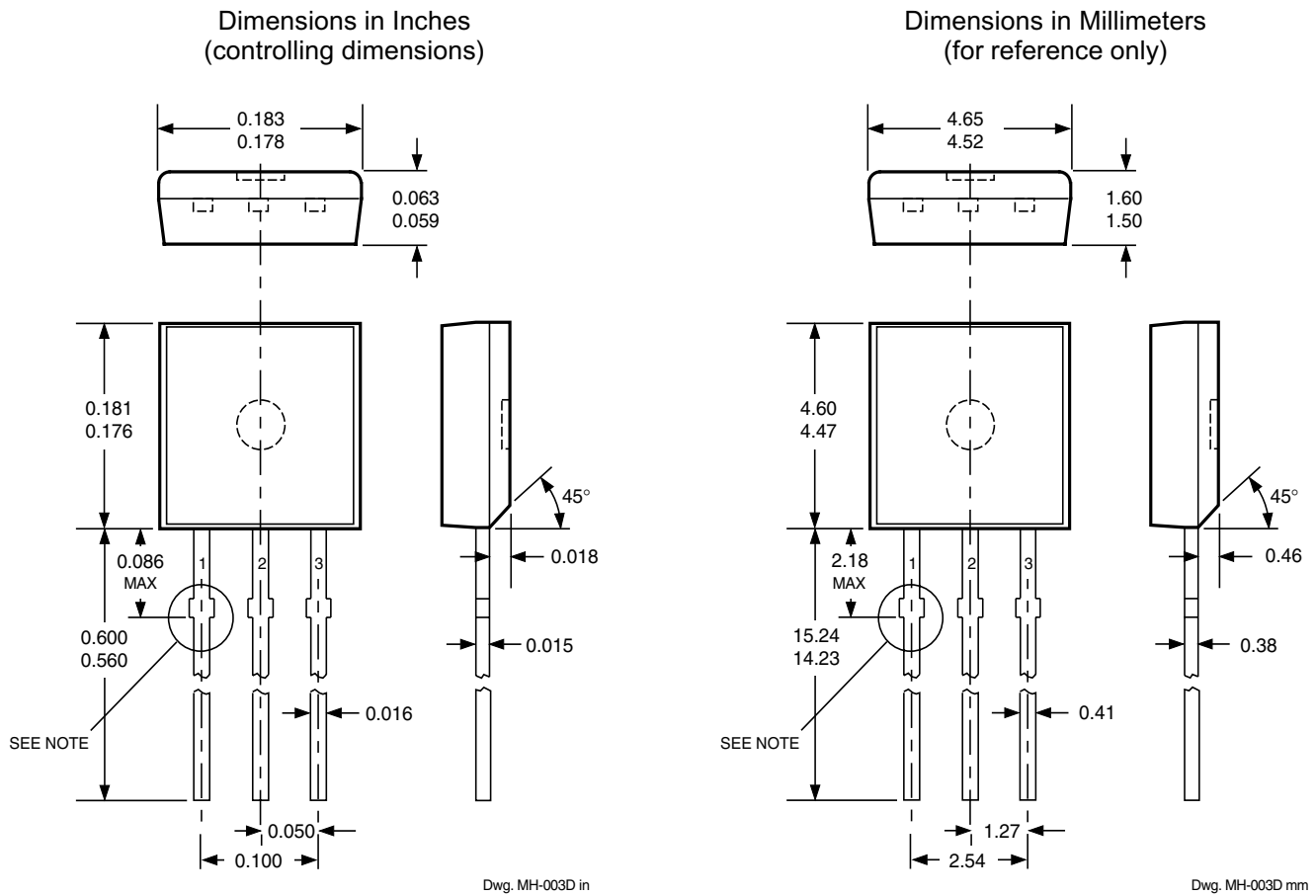
Dimensions in Millimeters  
(controlling dimensions)



Dwg. MA-009-3 mm

# 3175 AND 3177 HALL-EFFECT LATCHES

## PACKAGE DESIGNATOR 'U'



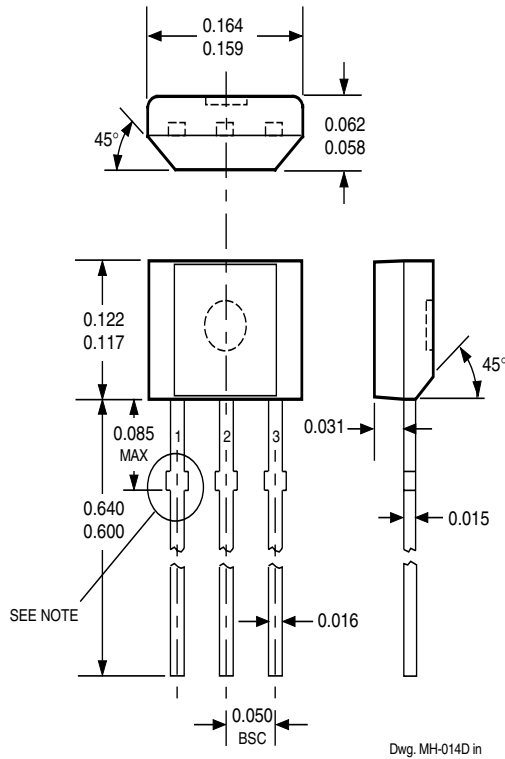
**Devices in the 'U' package are  
NOT RECOMMENDED FOR NEW DESIGN**

- 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).

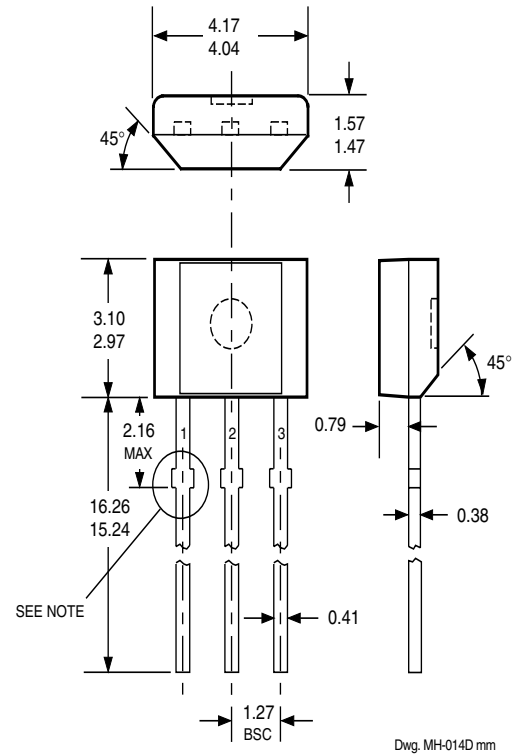
# 3175 AND 3177 HALL-EFFECT LATCHES

## 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.

**3175 AND 3177  
HALL-EFFECT  
LATCHES**

**HALL-EFFECT SENSORS SELECTION GUIDE**

Partial Part Number	Avail. Oper. Temp.	Characteristics at T <sub>A</sub> = +25°C			Features	Notes
		B <sub>OP</sub> (max)	BRP(min)	B <sub>hys</sub> (typ)		
<b>HALL-EFFECT UNIPOLAR SWITCHES in order of B<sub>OP</sub> and B<sub>hys</sub></b>						
3240	E/L	+50	+5.0	10	chopper stabilized	1
3210	E	±70	±5.0	7.7	micropower, chopper stabilized	
3361	E	+120	+50	5.0*	2-wire, chopper stabilized	
3362	E	+120	+50	5.0*	2-wire, chopper stabilized	
3161	E	+160	+30	20	2-wire	
3141	E/L	+160	+10	55		
3235	S	+175	+25	15*	output 1	2
		-25	-175	15*	output 2	2
5140	E	+200	+50	55	300 mA output	1, 3
3142	E/L	+230	+75	55		
3143	E/L	+340	+165	55		
3144	E/L	+350	+50	55		
3122	E/L	+400	+140	105		
3123	E/L	+440	+180	105		
3121	E/L	+450	+125	105		
3150	J	+40 to +850	-	20	programmable, chopper stabilized	1
<b>HALL-EFFECT LATCHES &amp; BIPOLAR SWITCHES<sup>†</sup> in order of B<sub>OP</sub> and B<sub>hys</sub></b>						
3260	E/L	+30	-30	20	bipolar, chopper stabilized	
3280	E/L	+40	-40	45	chopper stabilized	
3134	E/L	+50	-50	27	bipolar switch	
3133	K/L/S	+75	-75	52	bipolar switch	
3281	E/L	+90	-90	100	chopper stabilized	
3132	K/L/S	+95	-95	52	bipolar switch	
3187	E/L	+150	-150	100*		
3177	S	+150	-150	200		
3625	S	+150	-150	200	900 mA outputs	1, 3, 5
3626	S	+150	-150	200	400 mA outputs	1, 3, 5
3195	E/L	+160	-160	220		1, 4
3197	L	+160	-160	230		1
3175	S	+170	-170	200		
3188	E/L	+180	-180	200*		
3283	E/L	+180	-180	300	chopper stabilized	
3189	E/L	+230	-230	100*		
3275	S	+250	-250	100*		5
3185	E/L	+270	-270	340*		

Operating Temperature Ranges:

S = -20°C to +85°C, E = -40°C to +85°C, J = -40°C to +115°C, K = -40°C to +125°C, L = -40°C to +150°C

Notes 1. Protected.

2. Output 1 switches on south pole, output 2 switches on north pole for 2-phase, bifilar-wound, unipolar-driven brushless dc motor control.

3. Power driver output.

4. Active pull down.

5. Complementary outputs for 2-phase bifilar-wound, unipolar-driven brushless dc motor control.

\*Minimum.

† Latches will not switch on removal of magnetic field; bipolar switches may switch on removal of field but require field reversal for reliable operation over operating temperature range.

**3175 AND 3177  
HALL-EFFECT  
LATCHES**

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