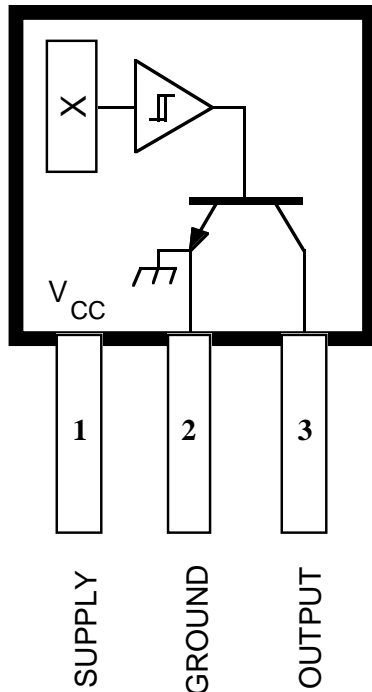


3132 AND 3133

ULTRA-SENSITIVE BIPOLAR HALL-EFFECT SWITCHES



Dwg. PH-003A

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.

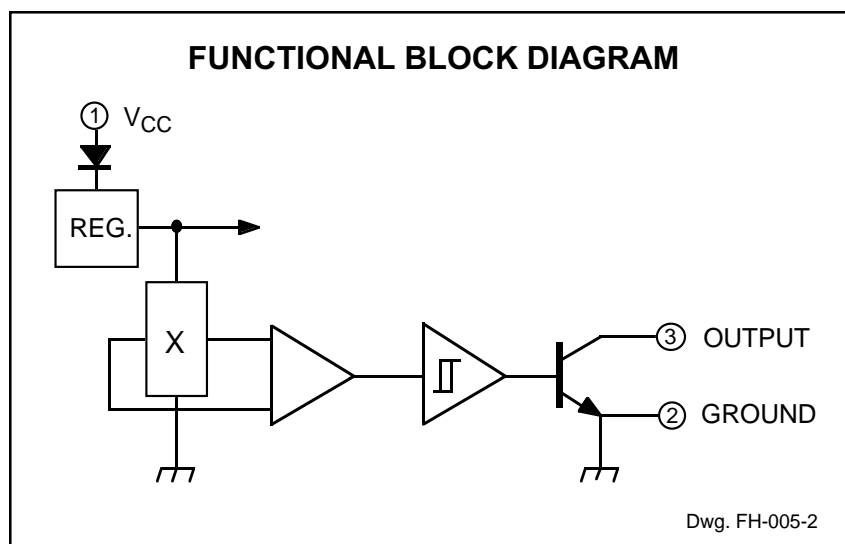
The three package styles available provide a magnetically optimized package for most applications. Suffix 'LT' is a miniature SOT-89/TO-243AA transistor package for surface-mount applications; suffixes 'U', and 'UA' feature wire leads for through-hole mounting. Prefix 'UGN' devices are rated for continuous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

3132 AND 3133 BIPOLAR HALL-EFFECT SWITCHES



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 | $V_{OUT(SAT)}$ | $I_{OUT} = 20 \text{ mA}$, $B \oplus B_{OP}$ | — | 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 $V_{CC} = 12 \text{ V}$.

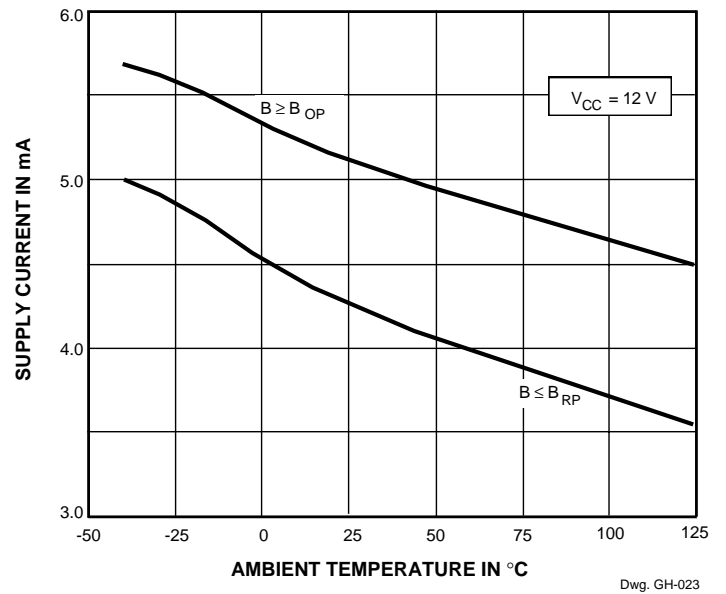
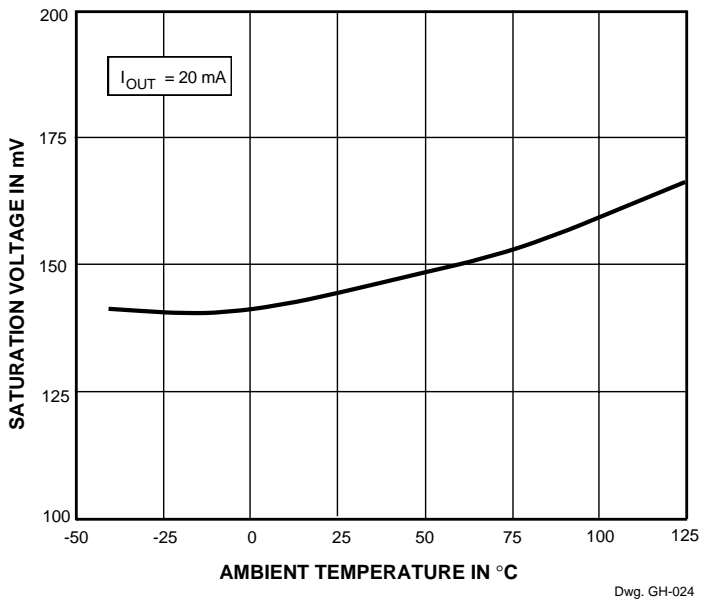
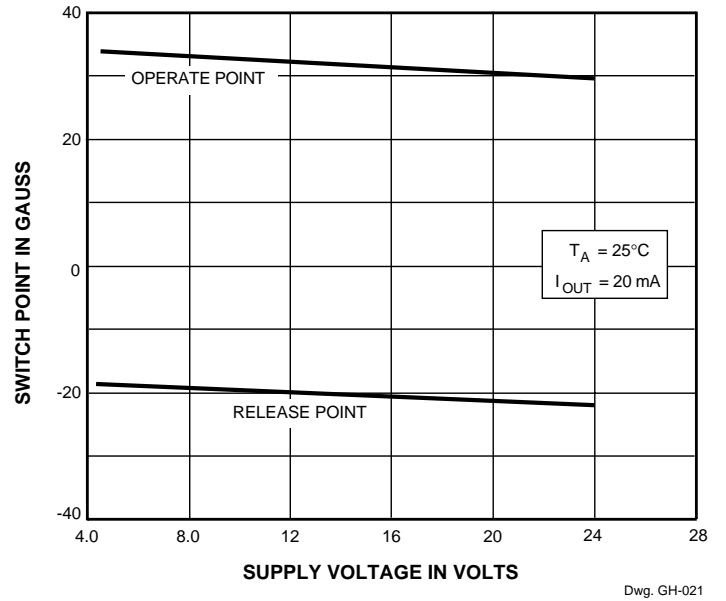
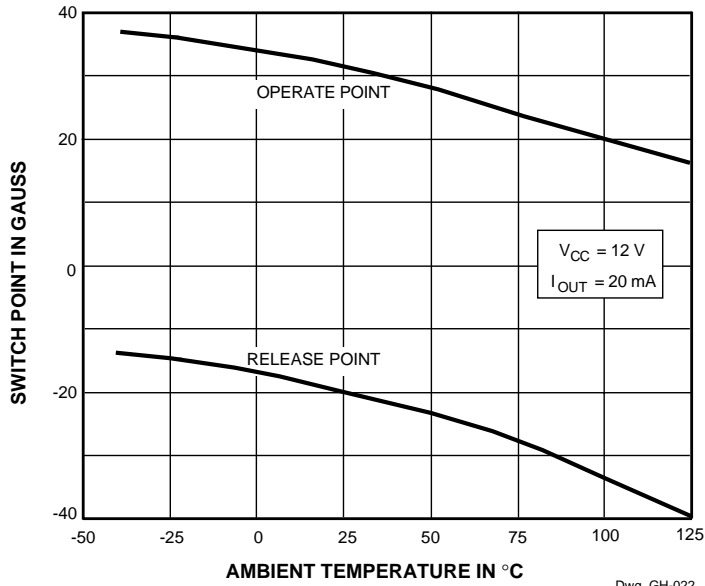
* Complete part number includes a prefix denoting operating temperature range (UGL, UGN, or UGS) and a suffix denoting package type (LT, U, or UA).



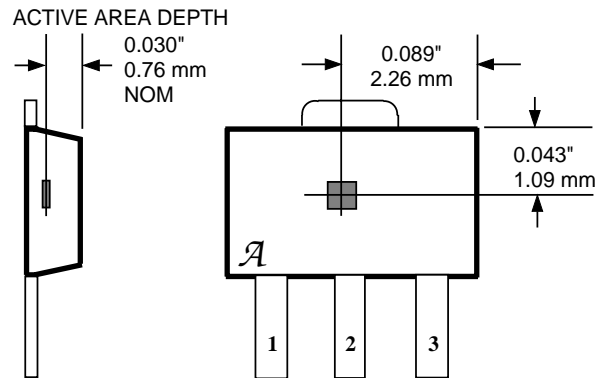
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3132 AND 3133 BIPOLAR HALL-EFFECT SWITCHES

TYPICAL CHARACTERISTICS



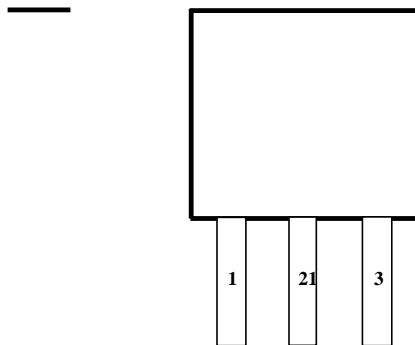
3132 AND 3133
BIPOLAR
HALL-EFFECT SWITCHES



Dwg. MH-008-2C

SUFFIX "U"

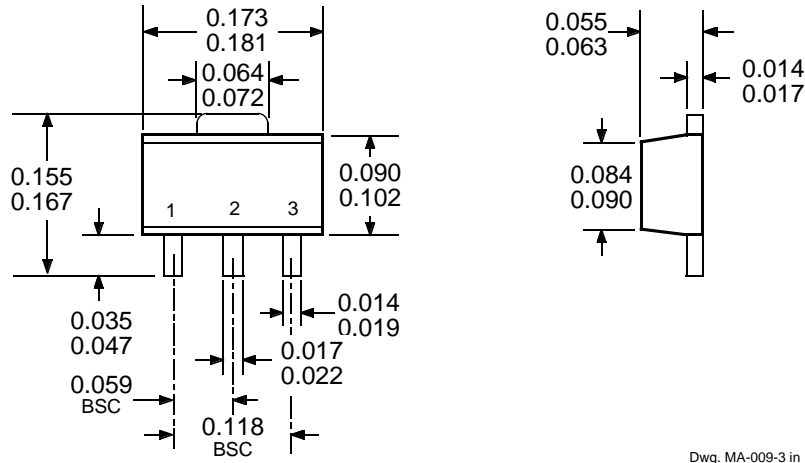
SUFFIX "UA"



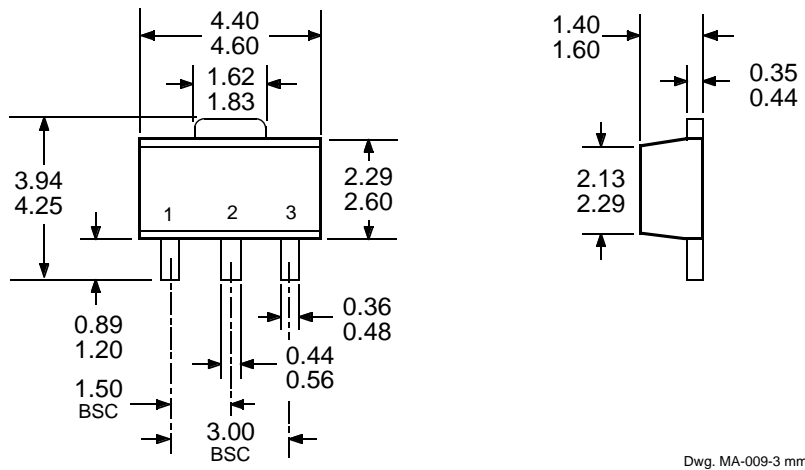
3132 AND 3133 BIPOLAR HALL-EFFECT SWITCHES

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

Dimensions in Inches
(for reference only)



Dimensions in Millimeters
(controlling dimensions)



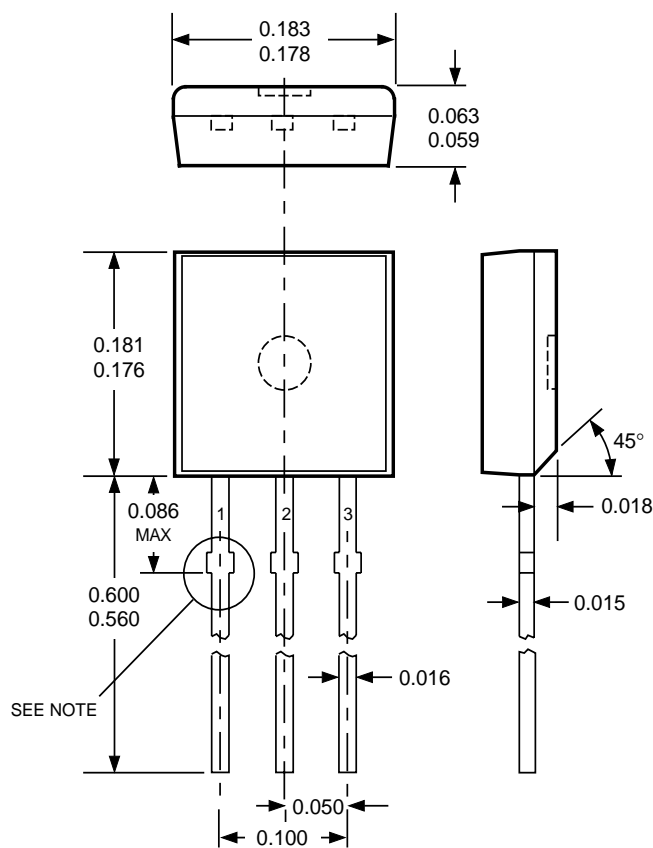
- NOTES: 1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
2. Exact body and lead configuration at vendor's option within limits shown.
3. Height does not include mold gate flash.

3132 AND 3133 BIPOLAR HALL-EFFECT SWITCHES

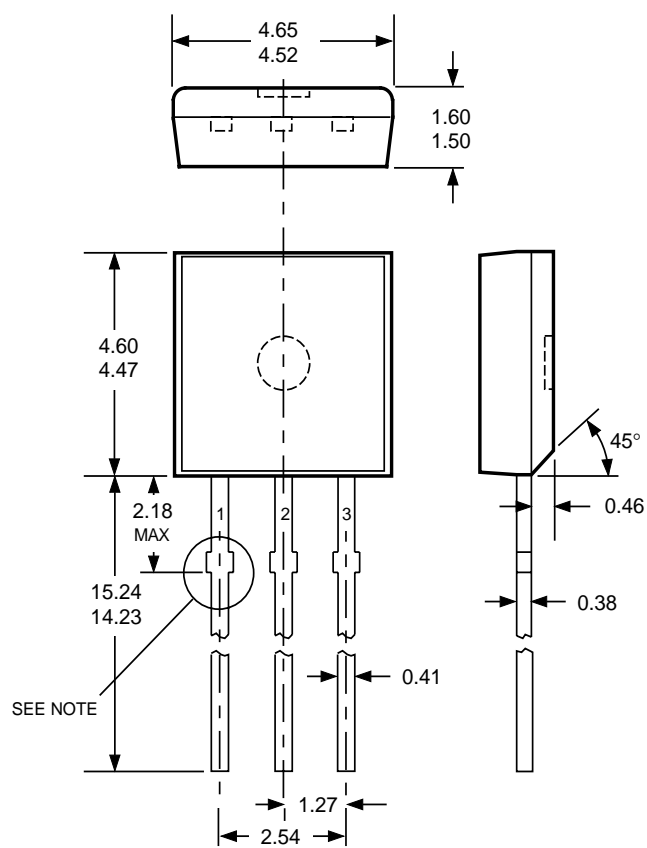
PACKAGE DESIGNATOR 'U'

Dimensions in Inches
(controlling dimensions)

Dimensions in Millimeters
(for reference only)



Dwg. MH-003D in



Dwg. MH-003D mm

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

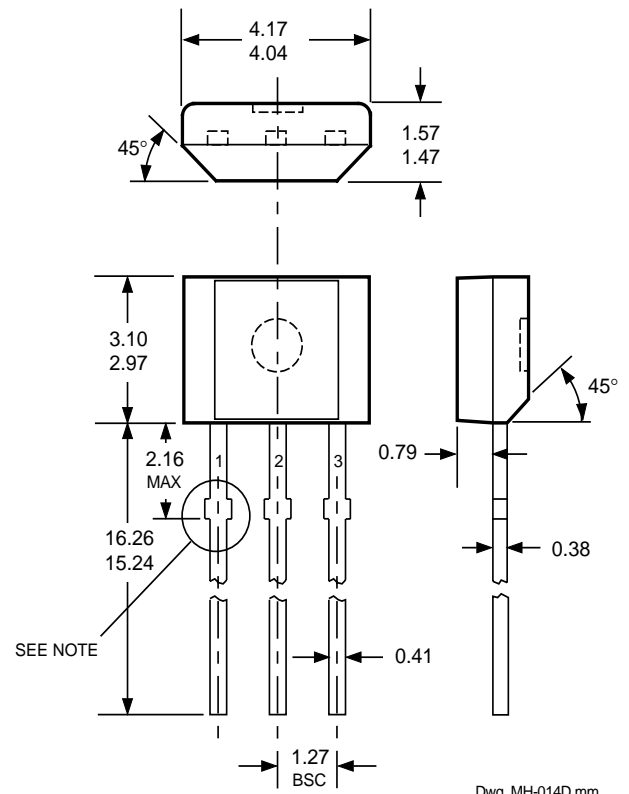
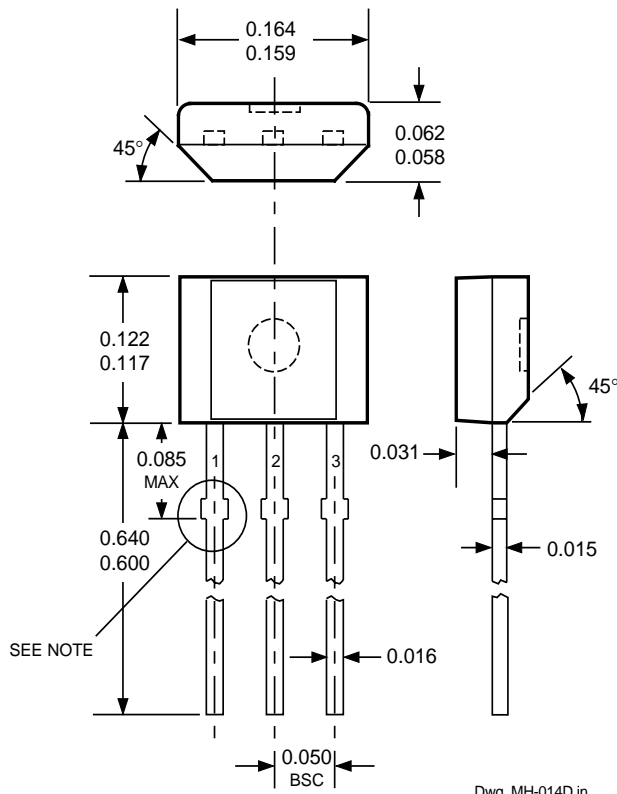
- NOTES: 1. Tolerances on package height and width represent allowable mold offsets. Dimensions given are measured at the widest point (parting line).
2. Exact body and lead configuration at vendor's option within limits shown.
3. Height does not include mold gate flash.
4. Recommended minimum PWB hole diameter to clear transition area is 0.035" (0.89 mm).
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.

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3132 AND 3133
BIPOLAR
HALL-EFFECT SWITCHES

HALL-EFFECT SENSORS SELECTION GUIDE

| Partial Part Number | Avail. Oper. Temp. | Characteristics at T _A = +25°C | | | Features | Notes |
|---|--------------------|---|----------|------------------------|----------------------------------|---------|
| | | BOP(max) | BRP(min) | B _{hys} (typ) | | |
| HALL-EFFECT UNIPOLAR SWITCHES in order of BOP and B_{hys} | | | | | | |
| 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 |
| HALL-EFFECT LATCHES & BIPOLAR SWITCHES[†] in order of BOP and B_{hys} | | | | | | |
| 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.

