

Description

ATS177 is an integrated Hall-Effect latch sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a schmitt trigger to provide switching hysteresis for noise rejection, and open-collector output. An internal bandgap regulator provides a temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

When the magnetic flux density (**B**) is larger than operate point (**Bop**), output is switched on (DO pin is pulled low). The output state is held on until a magnetic flux density reversal falls below Brp. When **B** is less than Brp, the output is switched off.

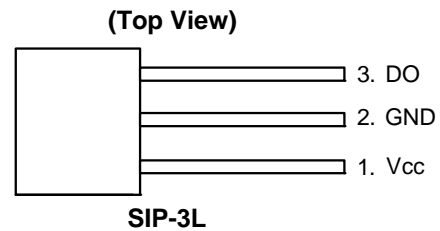
The ATS177 is available in SIP-3L package.

Features

- Bipolar Hall-Effect latch sensor
- 3.5V to 20V DC operating voltage
- Temperature compensation
- Open-collector pre-driver
- 25mA maximum output sink current
- Built-in reverse polarity protection
- Operating temperature: -40°C to +125°C
- SIP-3L package
- Green Molding Compound (No Br, Sb) (Note 1)

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.

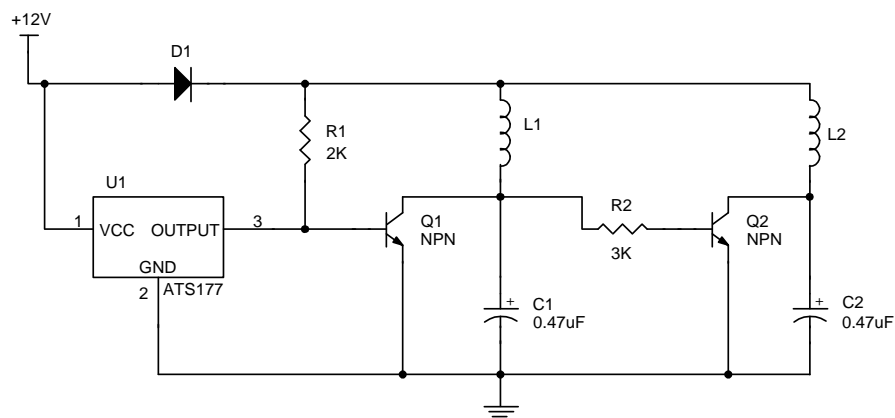
Pin Assignments



Applications

- Brush-less DC Motor
- Brush-less DC Fan
- Revolution counting
- Speed measurement

Typical Application Circuit

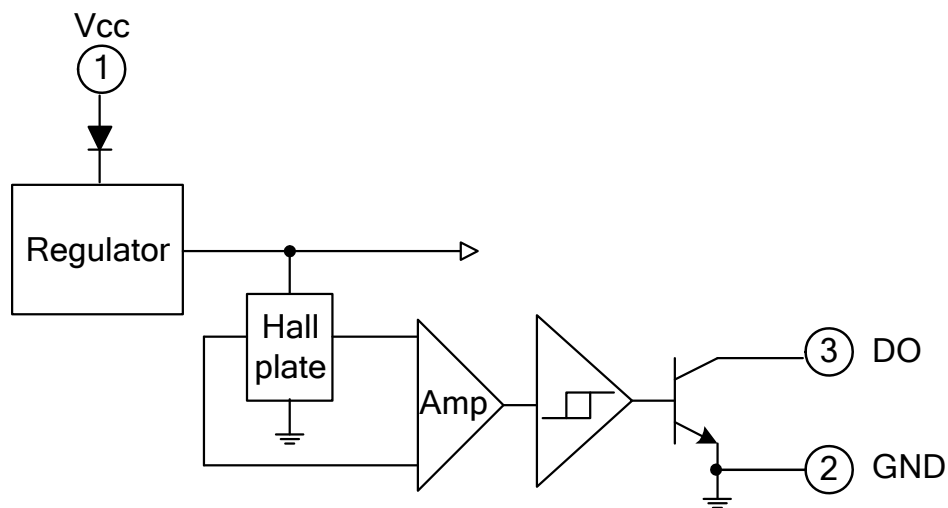


Brush-less DC Fan

Pin Descriptions

| Pin name | P/I/O | Pin # | Description |
|-----------------|-------|-------|-----------------------|
| V _{CC} | P | 1 | Positive power supply |
| GND | P | 2 | Ground |
| DO | O | 3 | Digital output |

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C)

| Symbol | Characteristics | | Rating | Unit |
|---------------------|--|------------|-----------|------|
| V _{CC} | Supply Voltage | | 20 | V |
| V _{RCC} | Reverse V _{CC} Polarity Voltage | | -20 | V |
| B | Magnetic Flux Density | | Unlimited | |
| V _{CE} | Output OFF Voltage | | 30 | V |
| P _D | Package Power Dissipation | SIP-3L | 550 | mW |
| I _C | Output "ON" Current | Continuous | 25 | mA |
| T _{J(MAX)} | Maximum Junction Temperature | | 150 | °C |
| T _S | Storage Temperature Range | | -65~+150 | °C |

Recommended Operating Conditions

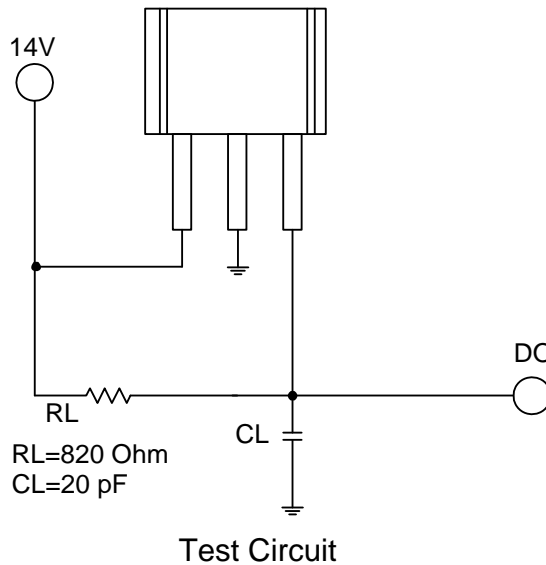
| Symbol | Characteristic | Conditions | Min | Max | Unit |
|-----------------|--|------------|-----|-----|------|
| V _{CC} | Supply Voltage | Operating | 3.5 | 20 | V |
| T _A | Operating Ambient Temperature (Note 2) | Operating | -20 | 85 | °C |

Notes: 2. Shall not exceed P_D and Safety Operation Area.

Electrical Characteristics (T_A = 25°C)

| Symbol | Characteristic | Test Conditions | Min | Typ. | Max | Unit |
|-----------------------|---------------------------|---|-----|------|-----|------|
| V _{CE (sat)} | Output Saturation Voltage | V _{CC} = 14V, I _c = 20mA | - | 300 | 700 | mV |
| I _{cex} | Output Leakage Current | V _{CE} = 14V, V _{CC} = 14V | - | <0.1 | 10 | uA |
| I _{cc} | Supply Current | V _{CC} = 20V, Output Open | - | 5 | 10 | mA |
| t _r | Output Rise Time | V _{CC} = 14V, R _L = 820Ω, C _L = 20pF | - | 0.3 | 1.5 | us |
| t _f | Output Falling Time | V _{CC} = 14V, R _L = 820Ω, C _L = 20pF | - | 0.3 | 1.5 | us |

Test Circuit



Magnetic Characteristics (T_A = 25°C, Note 3)

(1mT=10 Gauss)

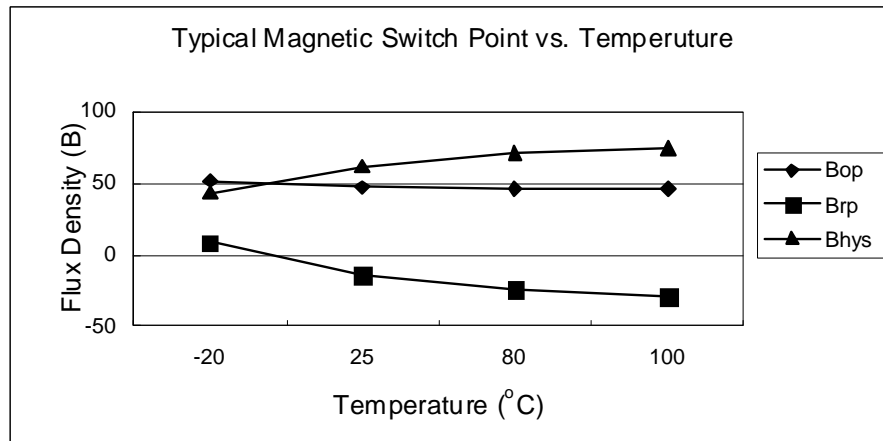
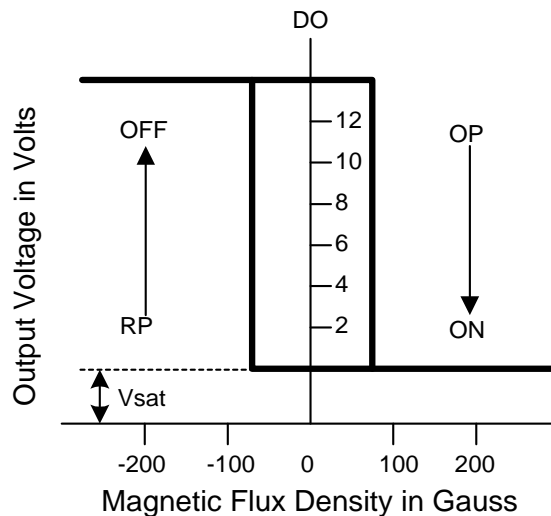
A grade

| Symbol | Parameter | Min | Typ. | Max | Unit |
|--------------------------------|-----------------|-----|------|-----|-------|
| Bops(south pole to brand side) | Operation Point | 5 | - | 70 | Gauss |
| Brps(south pole to brand side) | Release Point | -70 | - | -5 | Gauss |
| Bhy(Bopx - Brpx) | Hysteresis | - | 80 | - | Gauss |

B grade

| Symbol | Parameter | Min | Typ. | Max | Unit |
|--------------------------------|-----------------|------|------|-----|-------|
| Bops(south pole to brand side) | Operation Point | - | - | 100 | Gauss |
| Brps(south pole to brand side) | Release Point | -100 | - | - | Gauss |
| Bhy(Bopx - Brpx) | Hysteresis | - | 80 | - | Gauss |

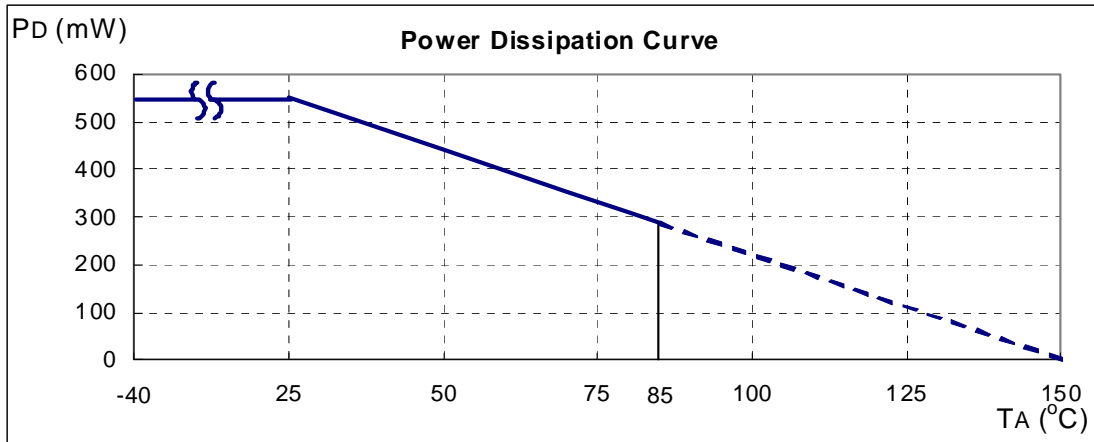
Notes: 3. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



Performance Characteristics

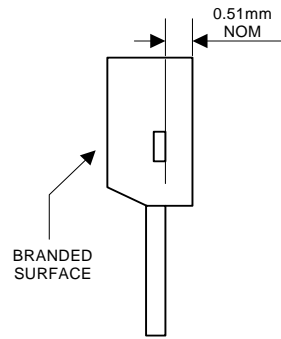
(1) SIP-3L

| | | | | | | | | | |
|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| T_A (°C) | 25 | 50 | 60 | 70 | 80 | 85 | 90 | 95 | 100 |
| P _D (mW) | 550 | 440 | 396 | 352 | 308 | 286 | 264 | 242 | 220 |
| T_A (°C) | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 150 |
| P _D (mW) | 198 | 176 | 154 | 132 | 110 | 88 | 66 | 44 | 0 |

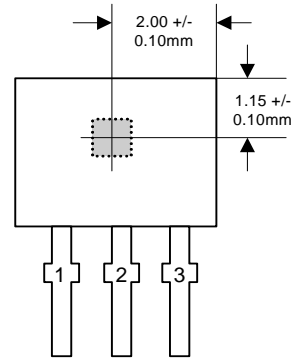


Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SIP-3L for Bulk pack

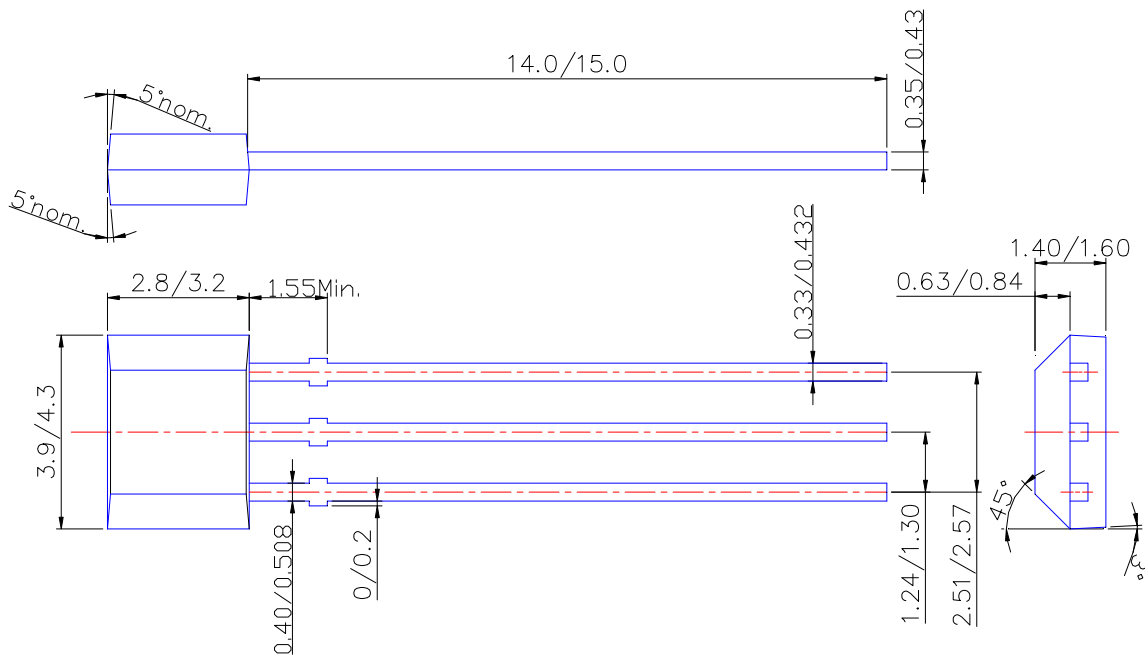


Active Area Depth



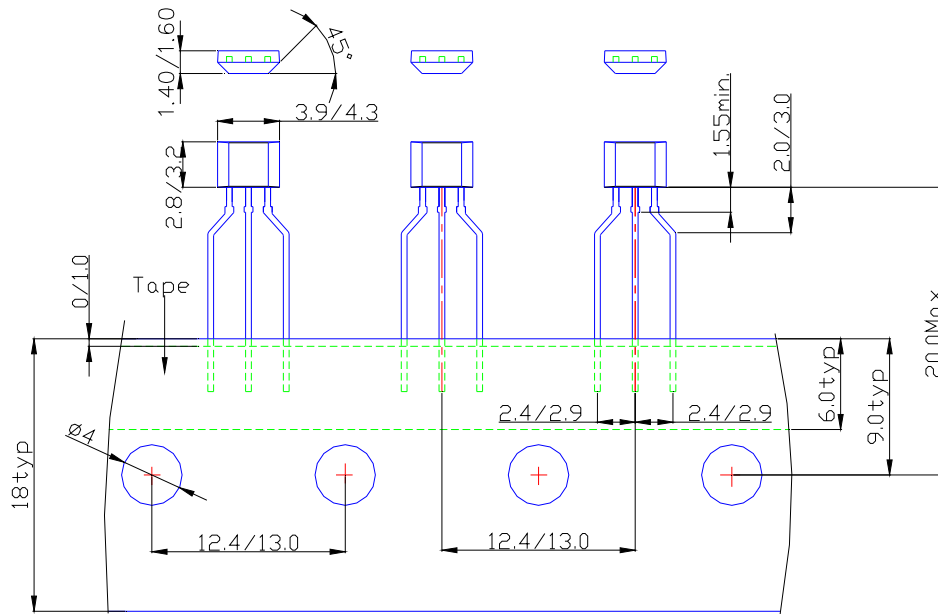
Sensor Location

Package Dimension



Package Outline Dimensions (Continued)

(2) Package Type: SIP-3L for Ammo pack



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