

**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.

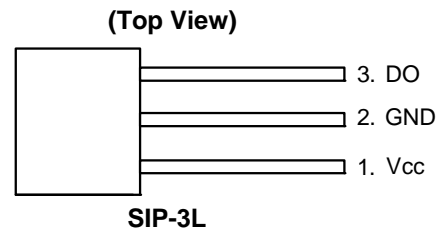
The ATS177 is available in SIP-3L package.

**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](http://www.diodes.com/products/lead_free.html).

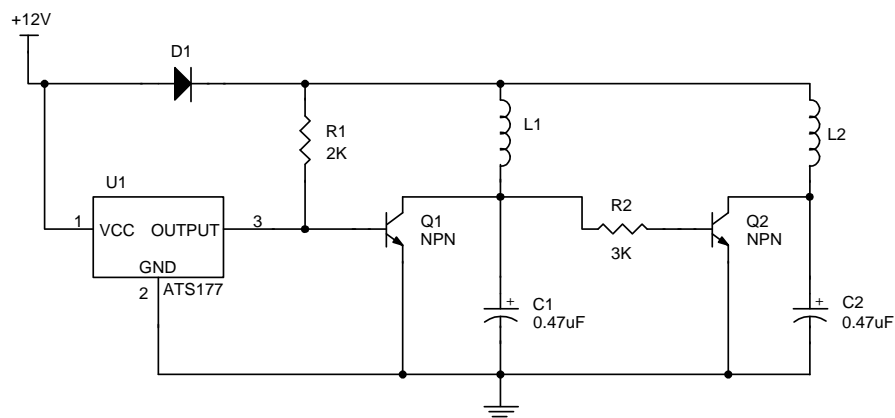
**Pin Assignments**



**Applications**

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

**Typical Application Circuit**

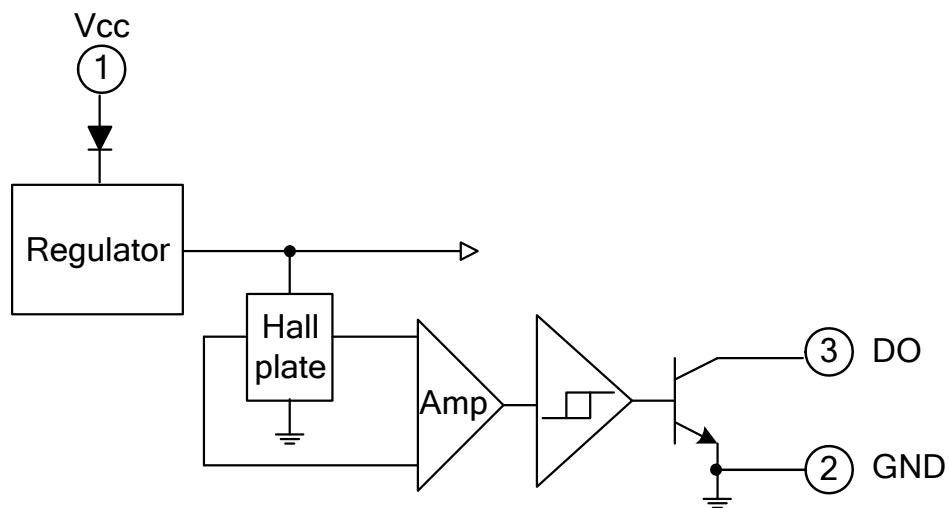


**Brush-less DC Fan**

### Pin Descriptions

Pin name	P/I/O	Pin #	Description
V <sub>CC</sub>	P	1	Positive power supply
GND	P	2	Ground
DO	O	3	Digital output

### Functional Block Diagram



### Absolute Maximum Ratings (T<sub>A</sub> = 25°C)

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

### Recommended Operating Conditions

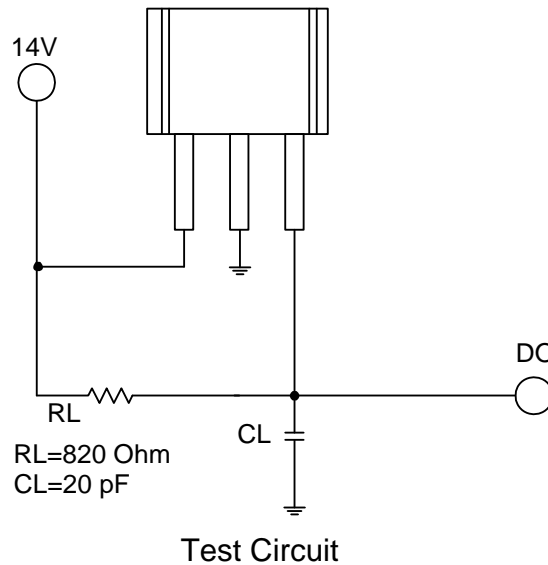
Symbol	Characteristic	Conditions	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage	Operating	3.5	20	V
T <sub>A</sub>	Operating Ambient Temperature (Note 2)	Operating	-20	85	°C

Notes: 2. Shall not exceed P<sub>D</sub> and Safety Operation Area.

**Electrical Characteristics (T<sub>A</sub> = 25°C)**

Symbol	Characteristic	Test Conditions	Min	Typ.	Max	Unit
V <sub>CE (sat)</sub>	Output Saturation Voltage	V <sub>CC</sub> = 14V, I <sub>c</sub> = 20mA	-	300	700	mV
I <sub>cex</sub>	Output Leakage Current	V <sub>CE</sub> = 14V, V <sub>CC</sub> = 14V	-	<0.1	10	uA
I <sub>cc</sub>	Supply Current	V <sub>CC</sub> = 20V, Output Open	-	5	10	mA
t <sub>r</sub>	Output Rise Time	V <sub>CC</sub> = 14V, R <sub>L</sub> = 820Ω, C <sub>L</sub> = 20pF	-	0.3	1.5	us
t <sub>f</sub>	Output Falling Time	V <sub>CC</sub> = 14V, R <sub>L</sub> = 820Ω, C <sub>L</sub> = 20pF	-	0.3	1.5	us

**Test Circuit**



**Magnetic Characteristics (T<sub>A</sub> = 25°C, Note 3)**

(1mT=10 Gauss)

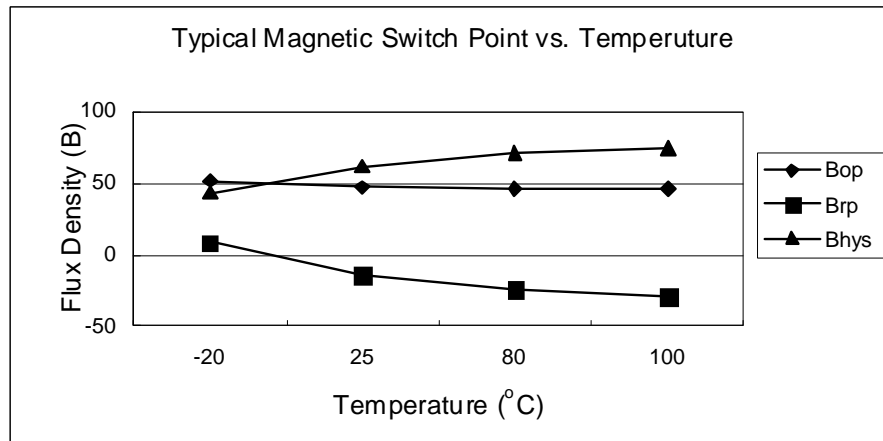
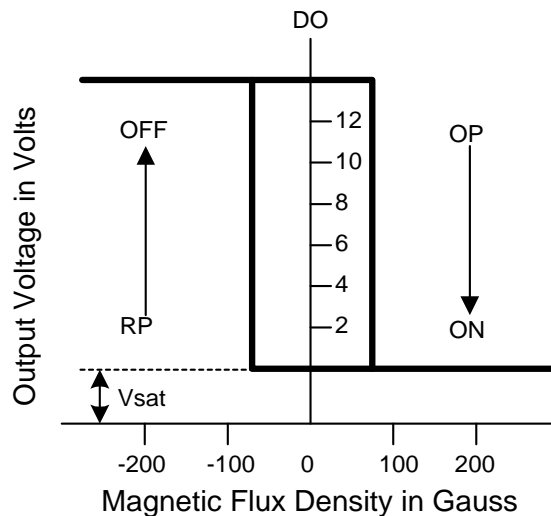
**A grade**

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

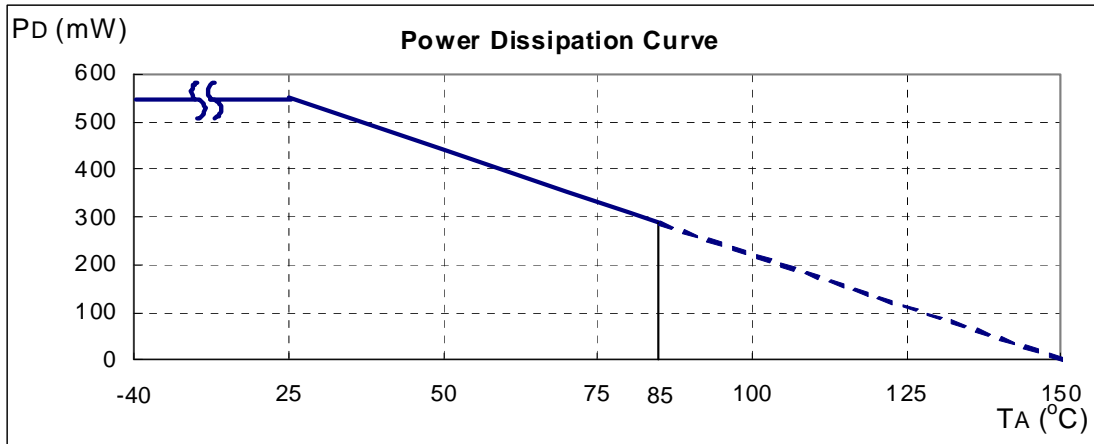
Notes: 3. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



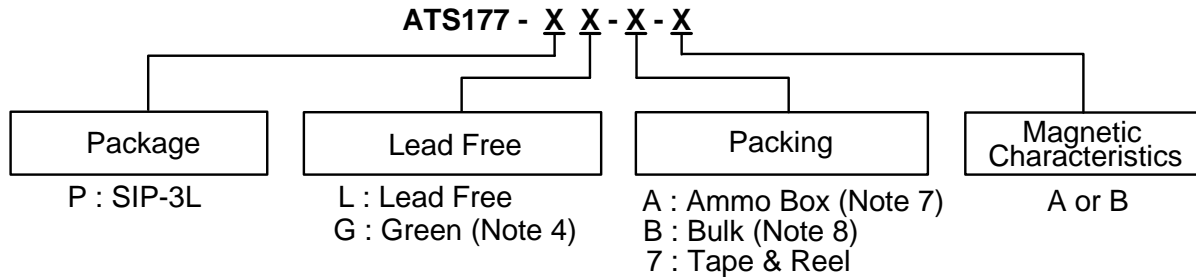
**Performance Characteristics**

**(1) SIP-3L**

<b>T<sub>A</sub> (°C)</b>	<b>25</b>	<b>50</b>	<b>60</b>	<b>70</b>	<b>80</b>	<b>85</b>	<b>90</b>	<b>95</b>	<b>100</b>
P <sub>D</sub> (mW)	550	440	396	352	308	286	264	242	220
<b>T<sub>A</sub> (°C)</b>	<b>105</b>	<b>110</b>	<b>115</b>	<b>120</b>	<b>125</b>	<b>130</b>	<b>135</b>	<b>140</b>	<b>150</b>
P <sub>D</sub> (mW)	198	176	154	132	110	88	66	44	0



**Ordering Information**

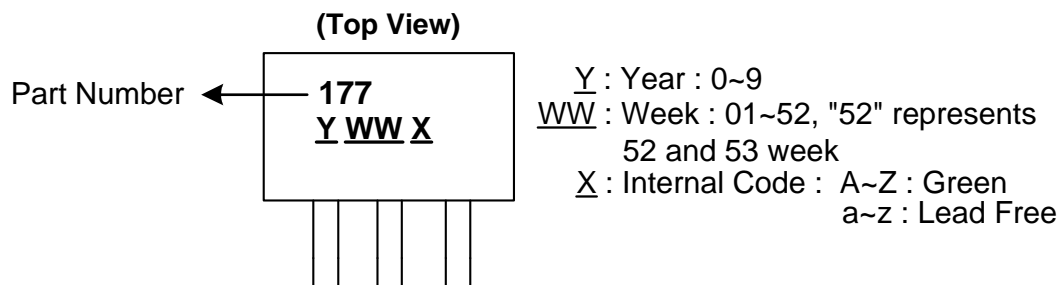


Device	Package Code	Packaging (Note 5, 6)	Tube/Bulk		7" Tape and Reel		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix	
ATS177-PL-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
ATS177-PL-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
ATS177-PG-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
ATS177-PG-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
ATS177-PL-B-A	P	SIP-3L	1000	-B	NA	NA	NA	NA	A
ATS177-PL-B-B	P	SIP-3L	1000	-B	NA	NA	NA	NA	B
ATS177-PG-B-A	P	SIP-3L	1000	-B	NA	NA	NA	NA	A
ATS177-PG-B-B	P	SIP-3L	1000	-B	NA	NA	NA	NA	B

- Notes:
4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).
  5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  6. Reverse taping as shown on Diodes Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website <http://www.diodes.com/datasheets/ap02007.pdf>.
  7. Ammo Box is for SIP-3L Spread Lead.
  8. Bulk is for SIP-3L Straight Lead.

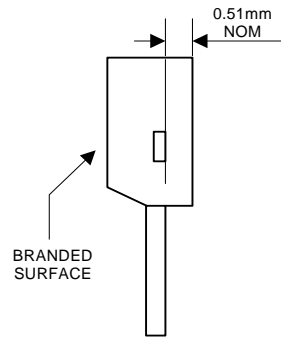
**Marking Information**

**(1) SIP-3L**

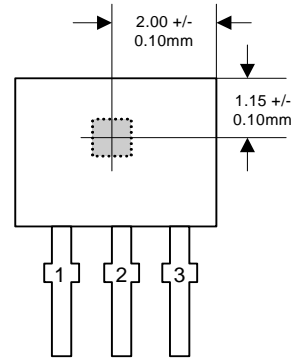


**Package Outline Dimensions (All Dimensions in mm)**

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

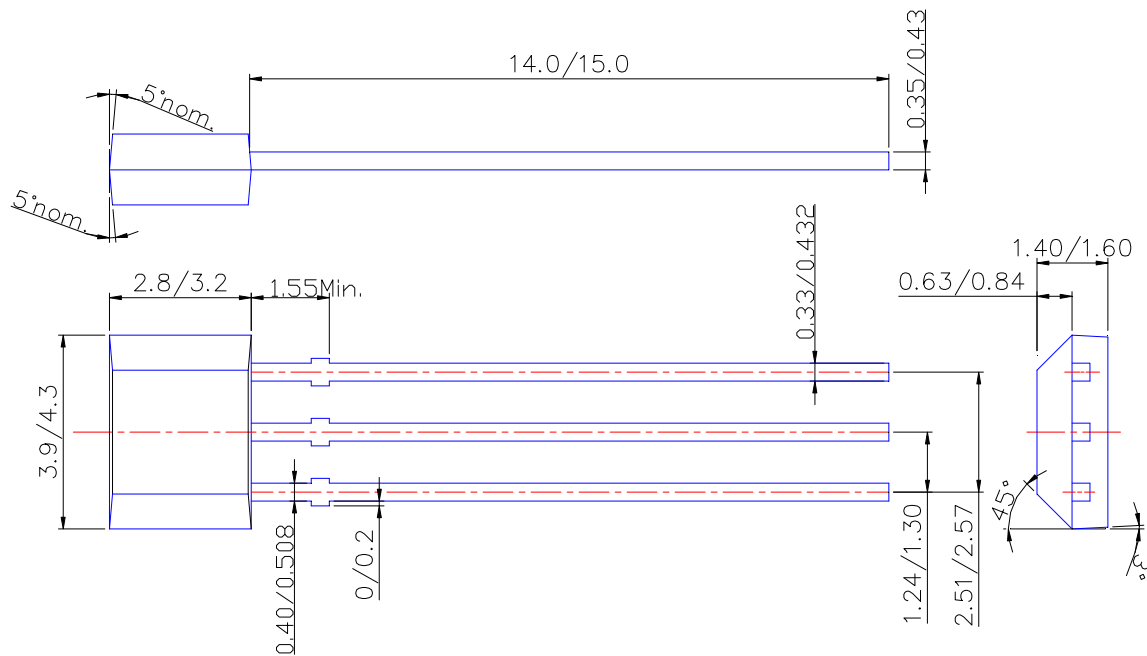


Active Area Depth



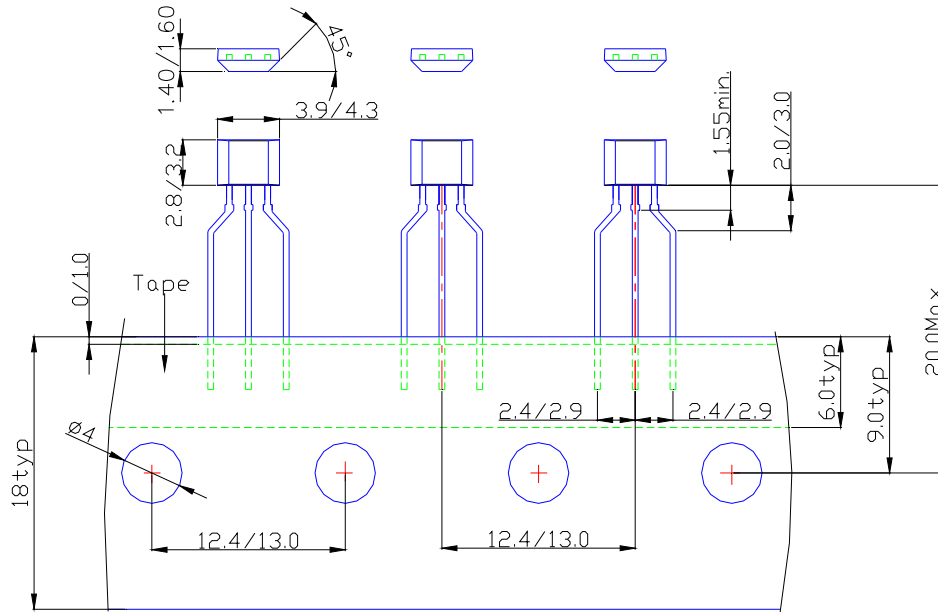
Sensor Location

**Package Dimension**



**Package Outline Dimensions (Continued)**

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





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