

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.

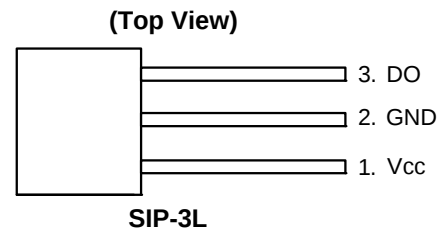
The ATS177 is available in SIP-3L package.

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.

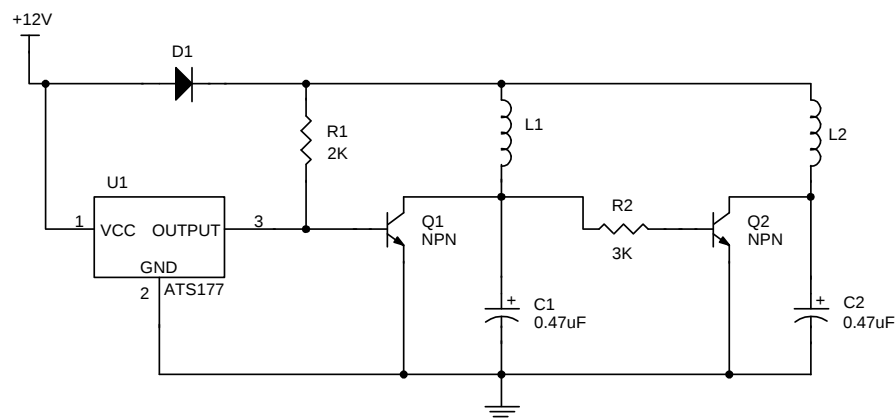
Pin Assignments



Applications

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

Typical Application Circuit

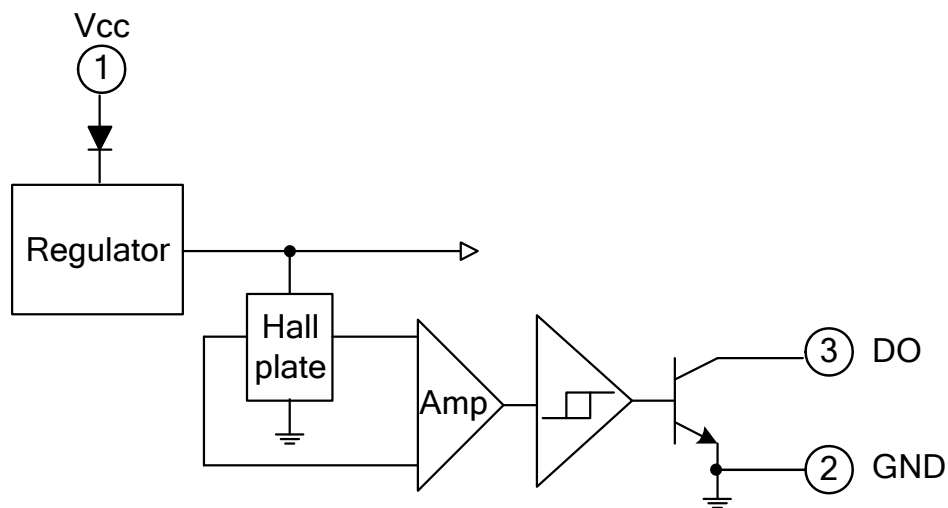


Brush-less DC Fan

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

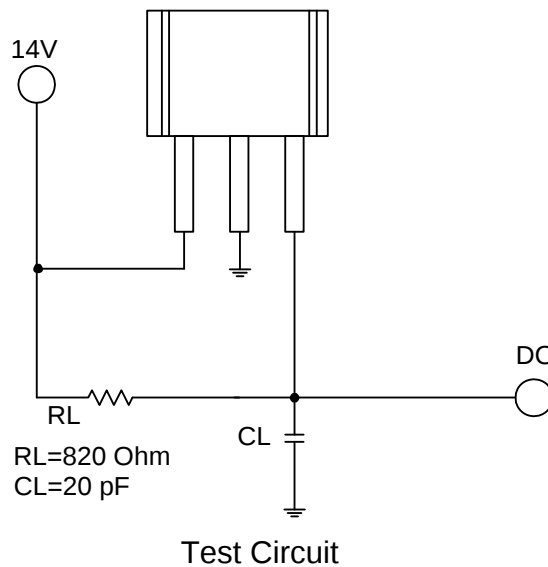
Symbol	Characteristic	Conditions	Min	Max	Unit
V _{CC}	Supply Voltage	Operating	3.5	20	V
T _A	Operating Ambient Temperature (Note 2)	Operating	-20	85	°C

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

Electrical Characteristics ($T_A = 25^\circ\text{C}$)

Symbol	Characteristic	Test Conditions	Min	Typ.	Max	Unit
$V_{CE}(\text{sat})$	Output Saturation Voltage	$V_{CC} = 14\text{V}$, $I_C = 20\text{mA}$	-	300	700	mV
I_{Cex}	Output Leakage Current	$V_{CE} = 14\text{V}$, $V_{CC} = 14\text{V}$	-	<0.1	10	μA
I_{CC}	Supply Current	$V_{CC} = 20\text{V}$, Output Open	-	5	10	mA
t_r	Output Rise Time	$V_{CC} = 14\text{V}$, $R_L = 820\Omega$, $C_L = 20\text{pF}$	-	0.3	1.5	μs
t_f	Output Falling Time	$V_{CC} = 14\text{V}$, $R_L = 820\Omega$, $C_L = 20\text{pF}$	-	0.3	1.5	μs

Test Circuit



Magnetic Characteristics ($T_A = 25^\circ\text{C}$, Note 3)

(1mT=10 Gauss)

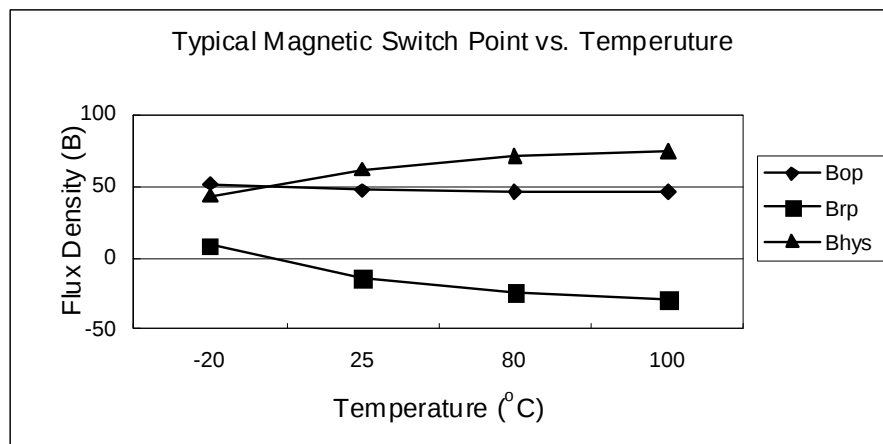
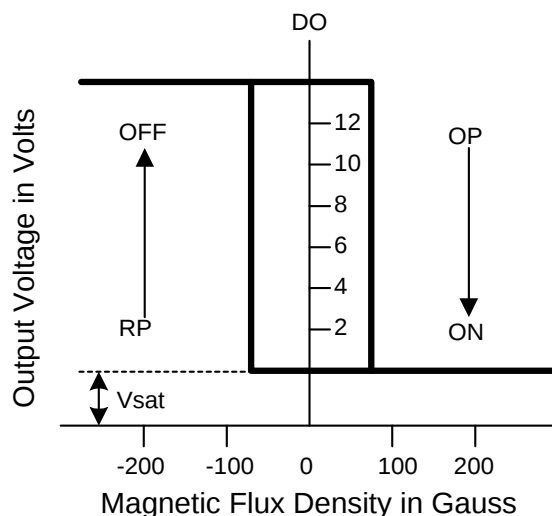
A grade

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

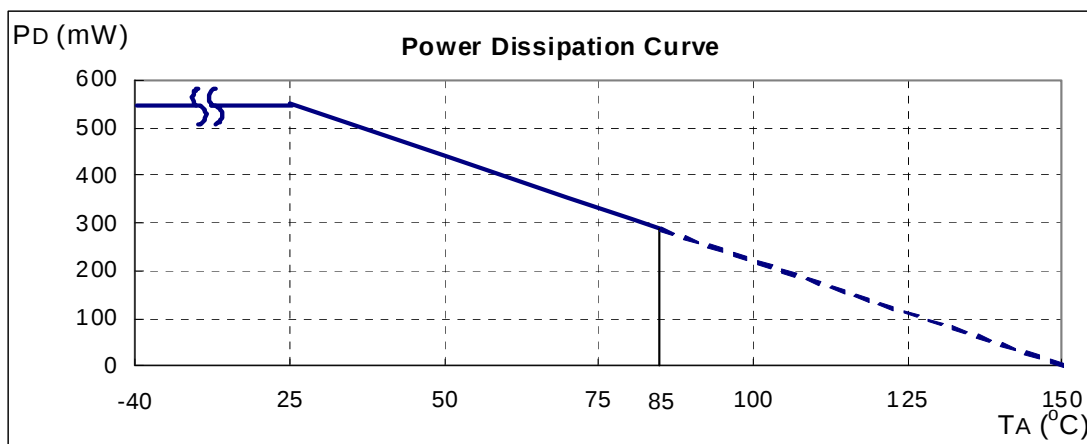
Notes: 3. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



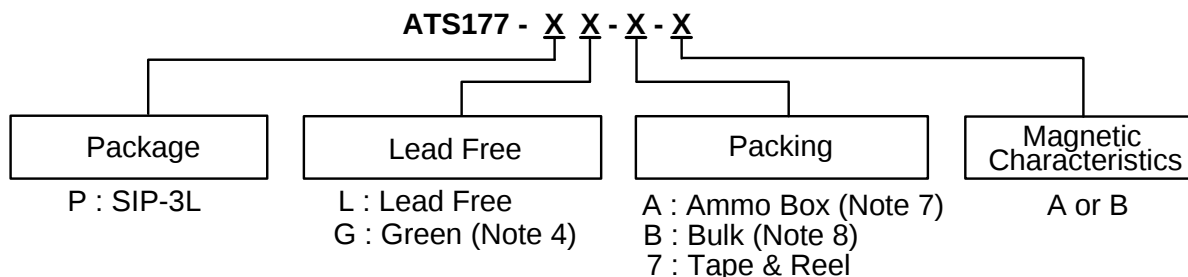
Performance Characteristics

(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



Ordering Information

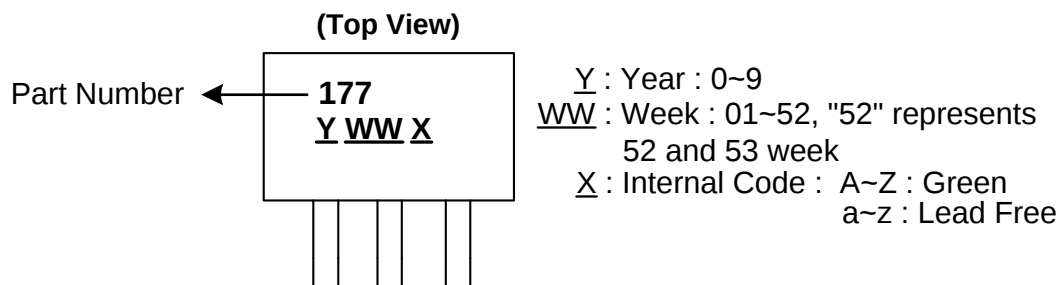


Device	Package Code	Packaging (Note 5, 6)	Tube/Bulk		7" Tape and Reel		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix	
 ATS177-PL-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
 ATS177-PL-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
 ATS177-PG-A-A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

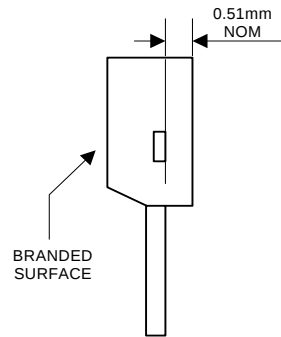
Marking Information

(1) SIP-3L

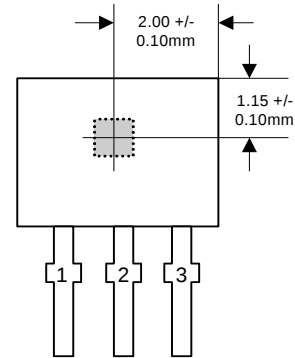


Package Outline Dimensions (All Dimensions in mm)

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

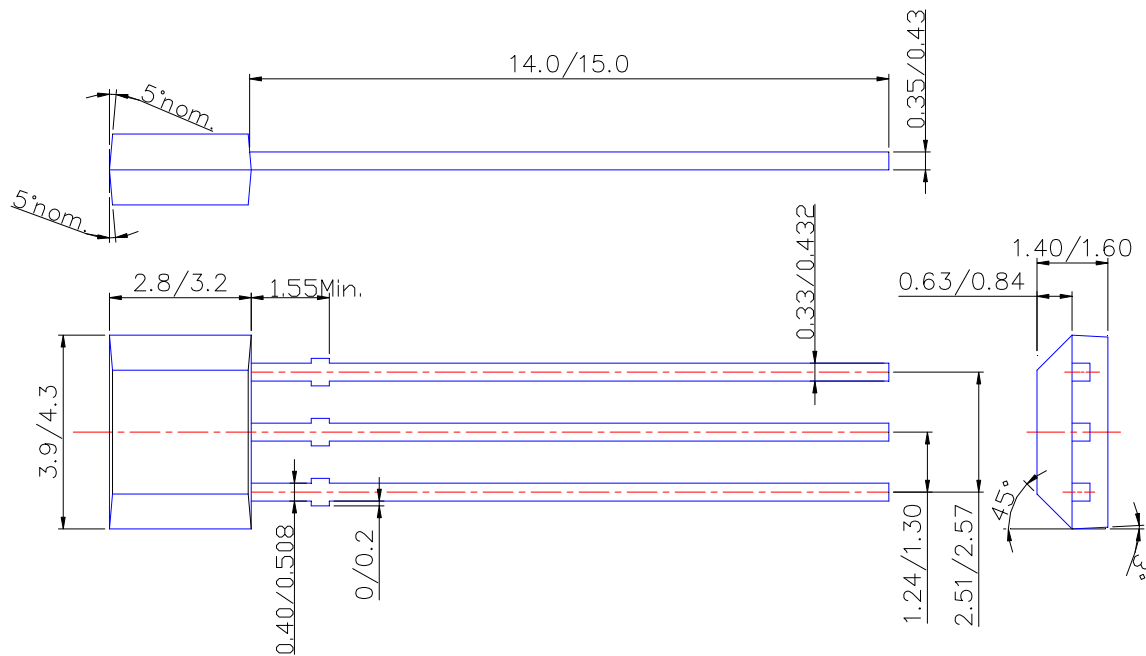


Active Area Depth



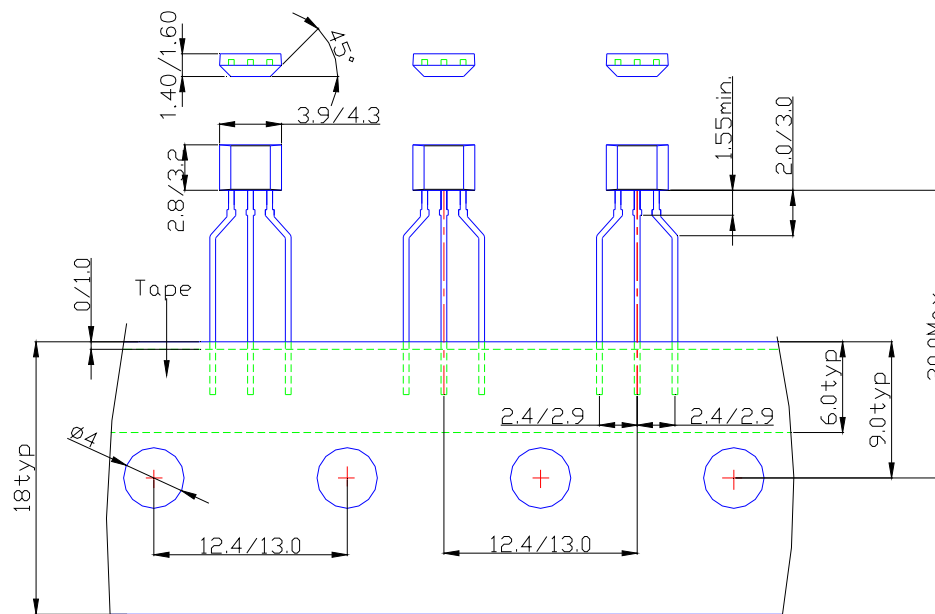
Sensor Location

Package Dimension



Package Outline Dimensions (Continued)

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



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