ATS177

SINGLE OUTPUT HALL EFFECT LATCH

Features

- 3.5V to 20V DC operation voltage
- Temperature compensation
- Wide operating voltage range
- Open-Collector pre-driver
- 25mA maximum sinking output current
- Reverse polarity protection
- Lead Free Package: SIP-3L
- Lead Free Finish/ RoHS Compliant (Note 1)

General Description

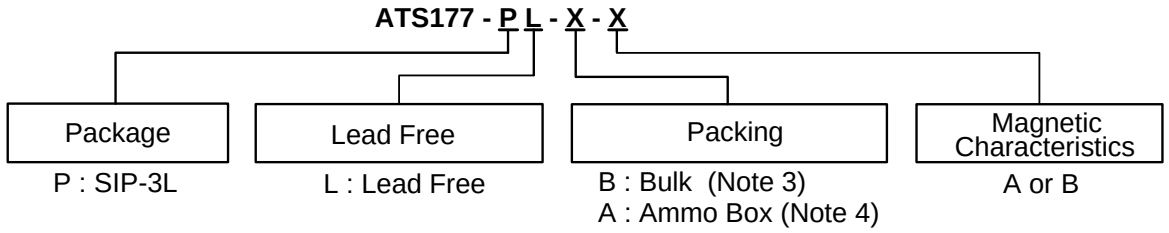
ATS177 is an integrated Hall effect latched sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a schmitt trigger to provide switching hysteresis for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

If a magnetic flux density larger than threshold Bop, DO is turned on (low). The output state is held until a magnetic flux density reversal falls below Brp causing DO to be turned off (high).

Applications

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

Ordering Information

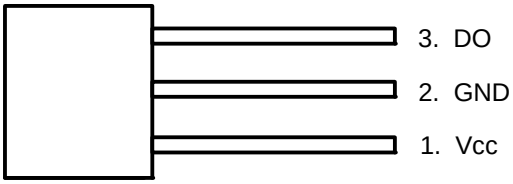


Device	Package Code	Packaging (Note 2)	Bulk		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	
ATS177-PL-A-A	P	SIP-3L	NA	NA	4000/Box	-A	A
ATS177-PL-A-B	P	SIP-3L	NA	NA	4000/Box	-A	B
ATS177-PL-B-A	P	SIP-3L	1000	-B	NA	NA	A
ATS177-PL-B-B	P	SIP-3L	1000	-B	NA	NA	B

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see *EU Directive 2002/95/EC Annex Notes*.
2. 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.
3. Bulk is for SIP-3L Straight Lead.
4. Ammo Box is for SIP-3L Spread Lead.

Pin Assignments

(Top view)

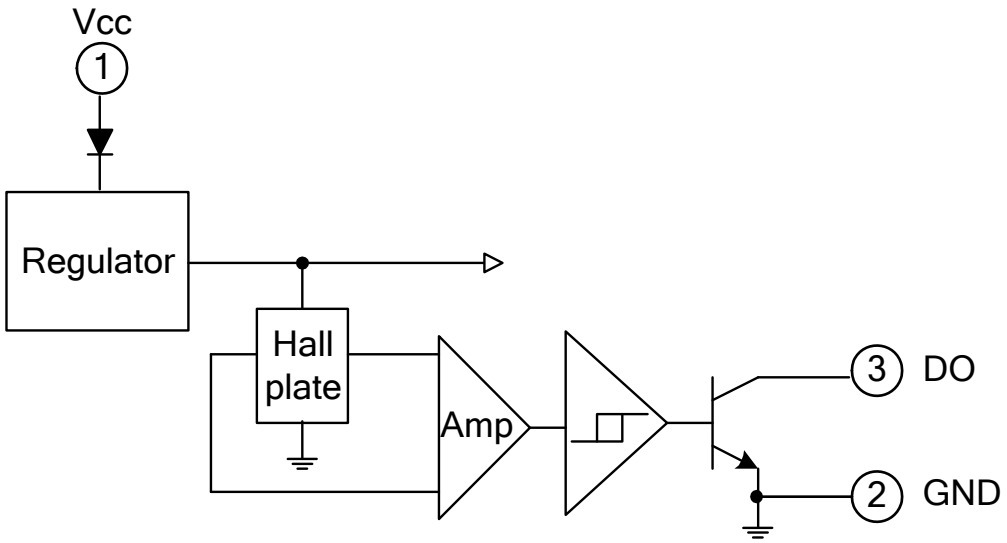


SIP-3L

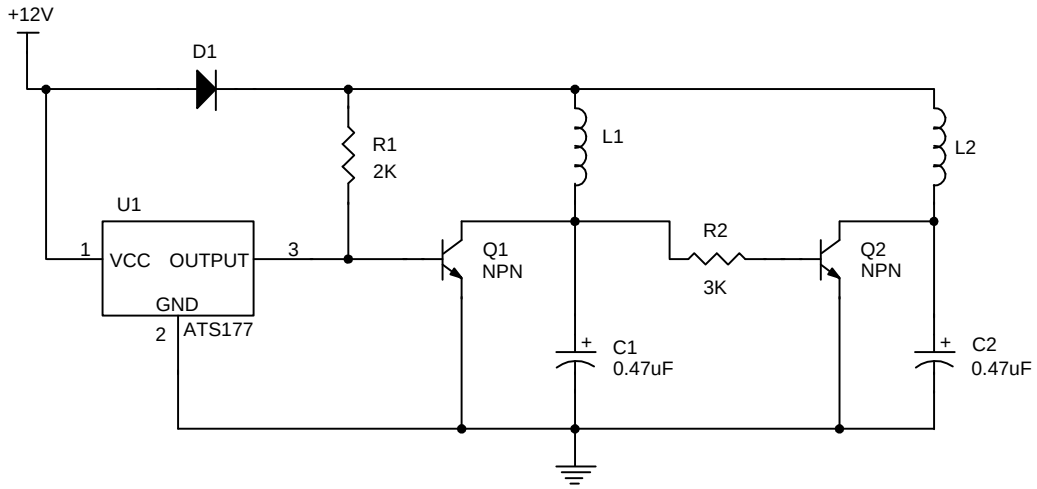
Pin Descriptions

Pin name	P/I/O	Pin #	Description
Vcc	P	1	Positive power supply
GND	P	2	Ground
DO	O	3	Digital output

Functional Block Diagrams



Typical Circuit



Brush-less DC Fan

Absolute Maximum Ratings (at TA = 25°C)

Symbol	Parameter		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_{ST}	Storage Temperature Range		-65~+150	°C

Recommended Operating Conditions

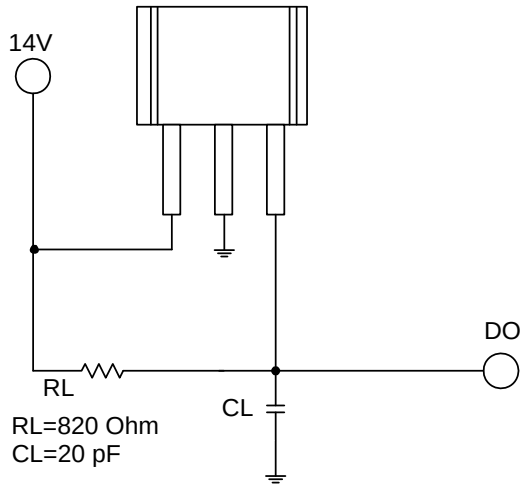
Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage	Operating	3.5	20	V
T_A	Operating Ambient Temperature (Note 5)	Operating	-20	85	°C

Notes: 5. Shall not exceed P_D and Safety Operation Area.

Electrical Characteristics (TA = + 25°C)

Symbol	Characteristic	Test Conditions	Min	Typ.	Max	Unit
V_{CE} (sat)	Output Saturation Voltage	V_{CC} = 14V, Ic = 20mA	-	300	700	mV
Icex	Output Leakage Current	V_{CE} = 14V, V_{CC} = 14V	-	<0.1	10	uA
Icc	Supply Current	V_{CC} = 20V, Output Open	-	5	10	mA
tr	Output Rise Time	V_{CC} = 14V, RL = 820Ω, CL = 20pF	-	0.3	1.5	us
tf	Output Falling Time	V_{CC} = 14V, RL = 820Ω, CL = 20pF	-	0.3	1.5	us

Test Circuit



Test Circuit

Magnetic Characteristics (TA = 25°C)

(1mT=10 Gauss)

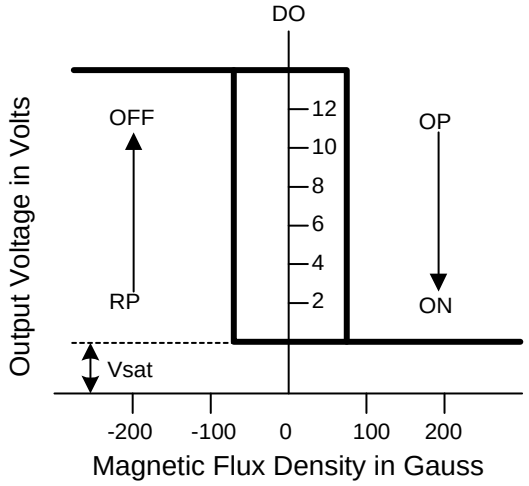
A grade

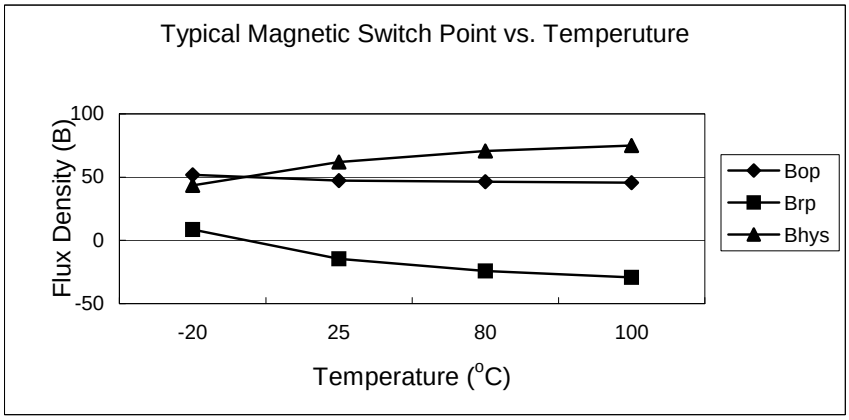
Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operate Point	5	-	70	Gauss
Brps(south pole to brand side)	Release Point	-70	-	-5	Gauss
Bhy(|Bopx – Brpx|)	Hysteresis	-	80	-	Gauss

B grade

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

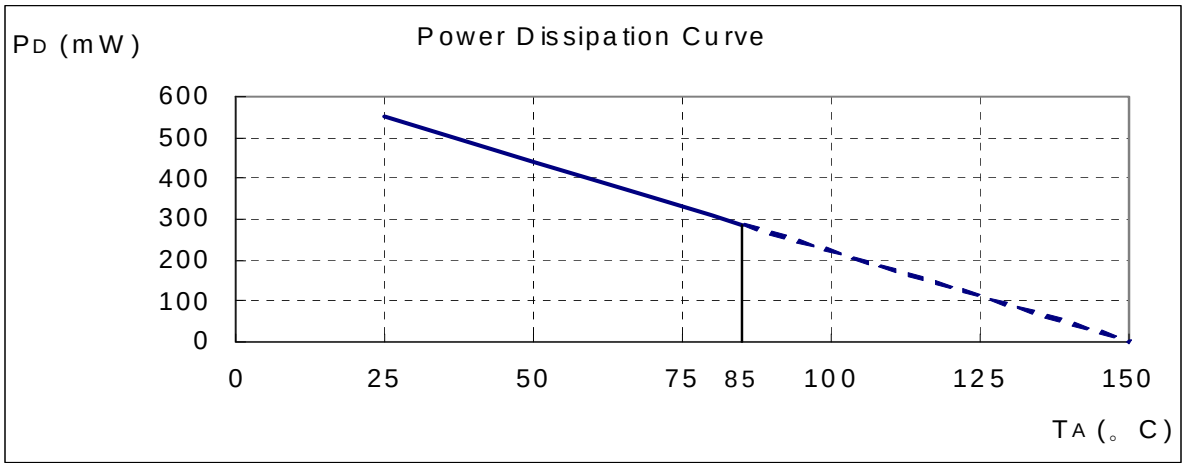
*B grade is for SIP-3L package only.





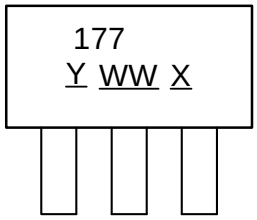
Performance Characteristics

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



Marking Information

(Top View)

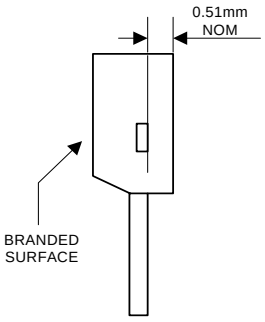


Y : Year : "7" = 2007
"8" = 2008
WW : Nth Week 01~52
X : Internal code
a~z : Lead Free

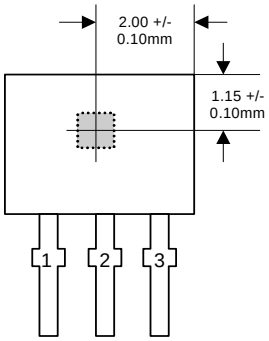
SIP-3L

Package Information (All Dimensions in mm)

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

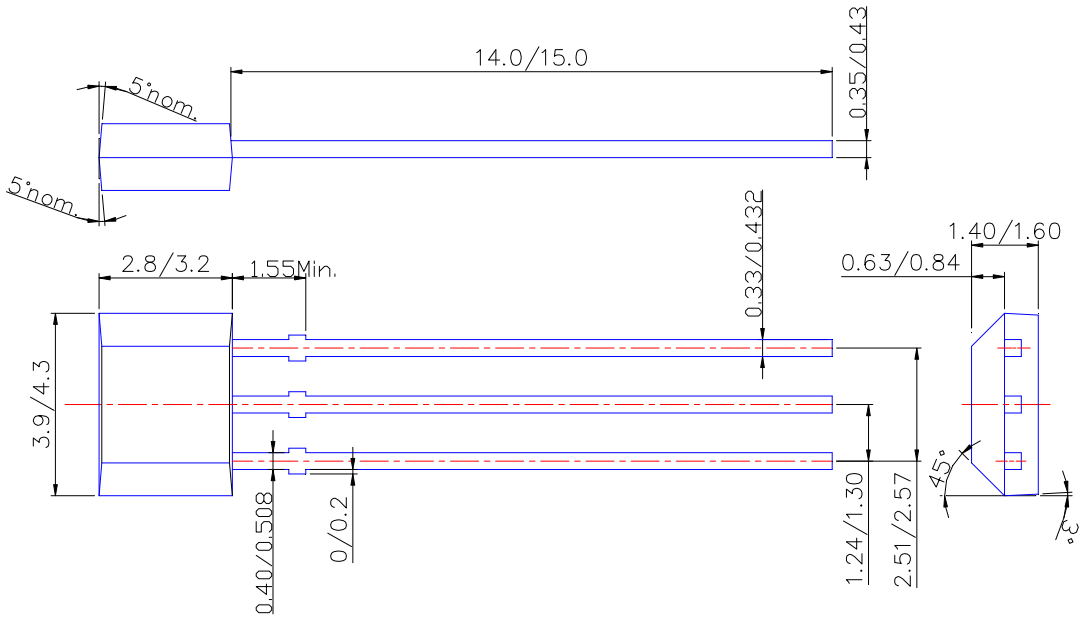


Active Area Depth



Sensor Location

Package Dimension



Package Information (Continued)

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