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

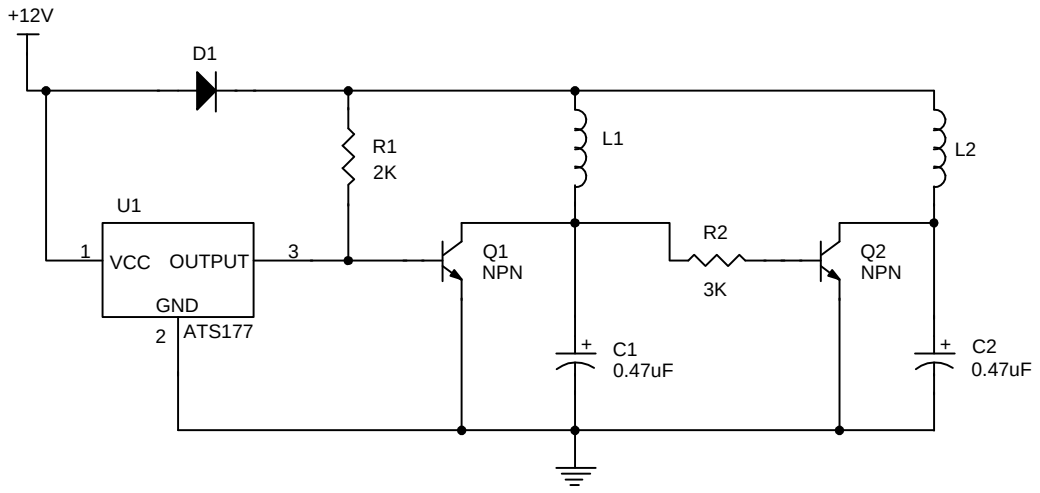
ATS177 is an integrated Hall effect latched sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a schmitt trigger to provide switching hysteresis for 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

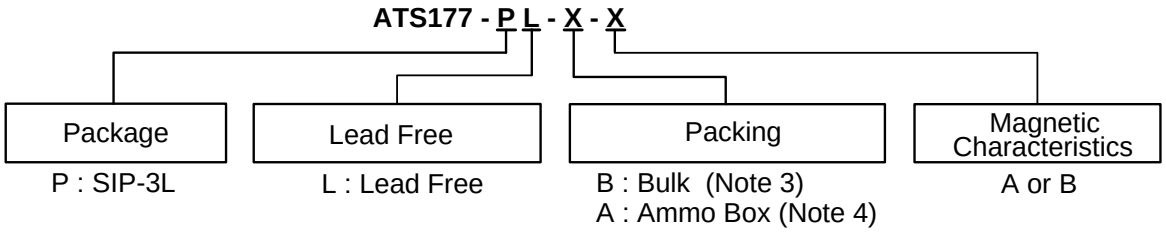
- Brush-less DC Motor
- Brush-less DC Fan
- Revolution counting
- Speed measurement

Typical Circuit



Brush-less DC Fan

Ordering Information

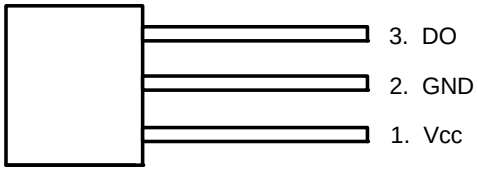


Device	Package Code	Packaging (Note 2)	Bulk		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	
ATS177-PL-A-A	P	SIP-3L	NA	NA	4000/Box	-A	A
ATS177-PL-A-B	P	SIP-3L	NA	NA	4000/Box	-A	B
ATS177-PL-B-A	P	SIP-3L	1000	-B	NA	NA	A
ATS177-PL-B-B	P	SIP-3L	1000	-B	NA	NA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

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

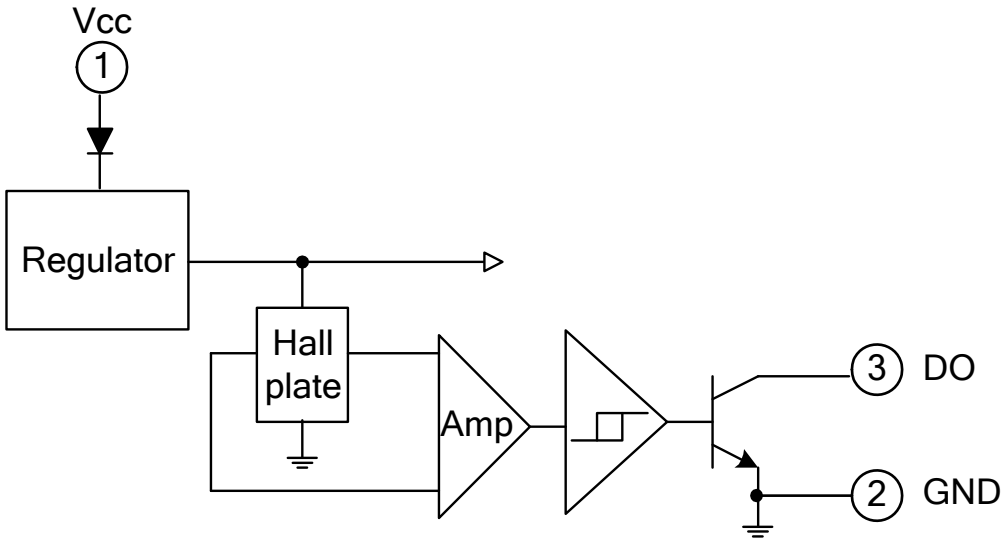


SIP-3L

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



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

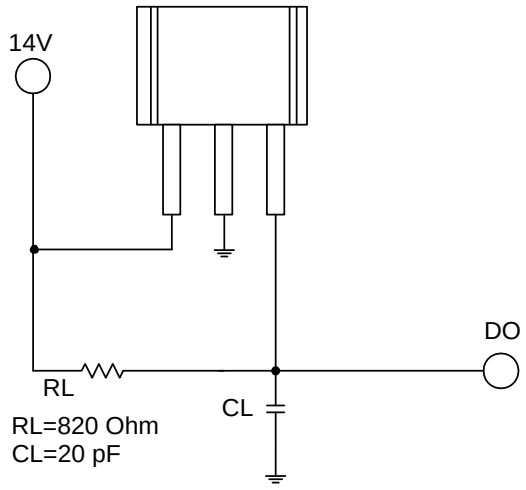
Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage	Operating	3.5	20	V
T_A	Operating Ambient Temperature (Note 5)	Operating	-20	85	°C

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, Note 6)

(1mT=10 Gauss)

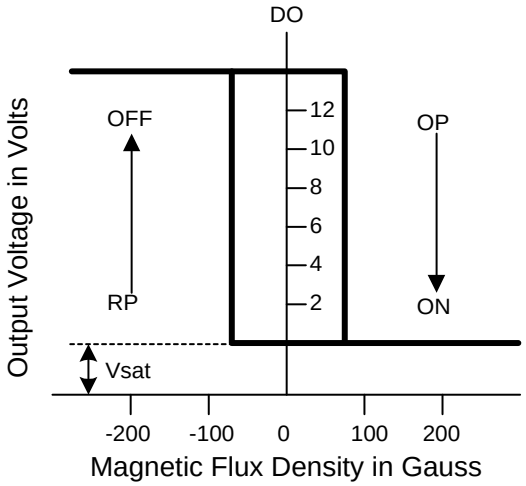
A grade

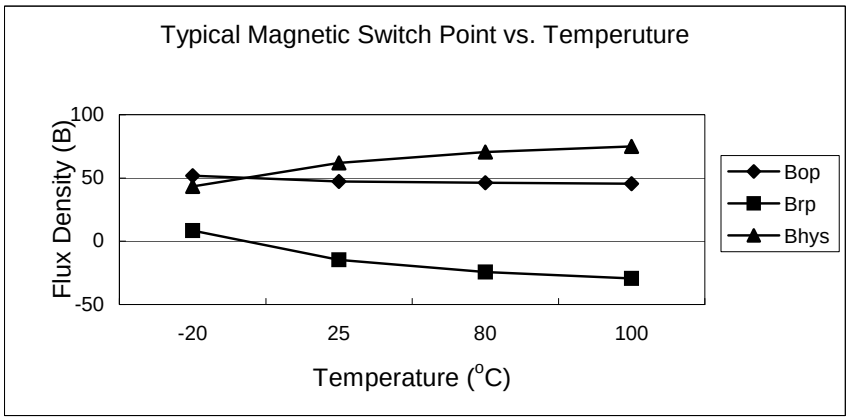
Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	5	-	70	Gauss
Brps(south pole to brand side)	Release Point	-70	-	-5	Gauss
Bhy(|Bopx – Brpx|)	Hysteresis	-	80	-	Gauss

B grade (for SIP-3L only)

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

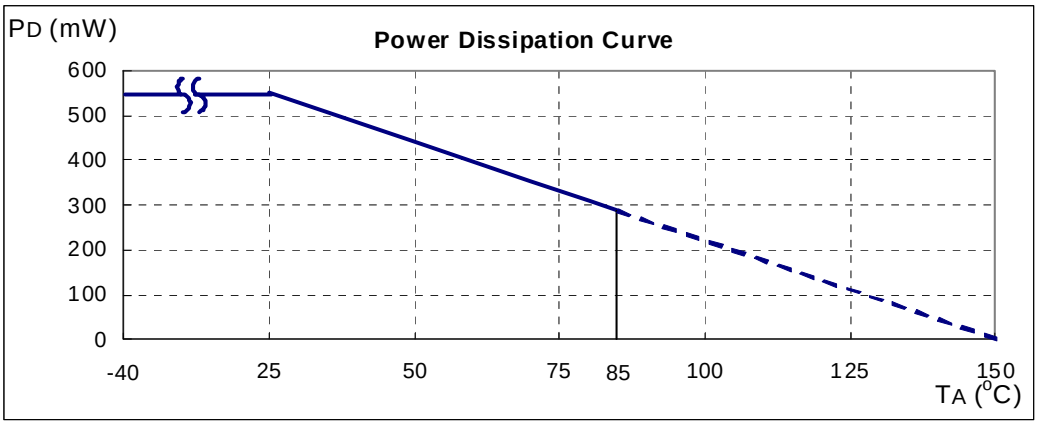
Notes: 6. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.





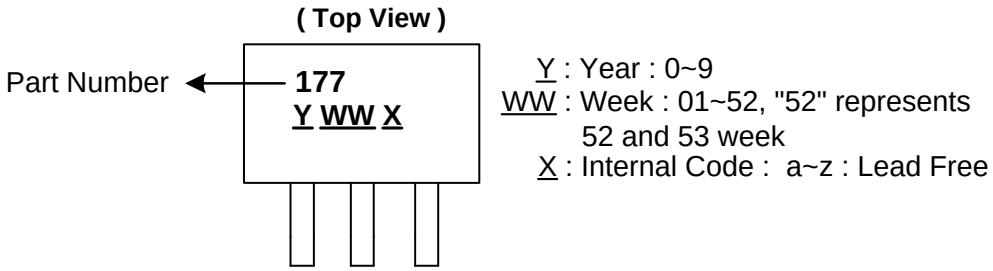
Performance Characteristics

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



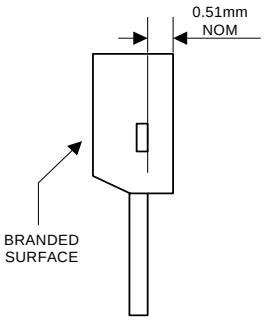
Marking Information

(1) SIP-3L

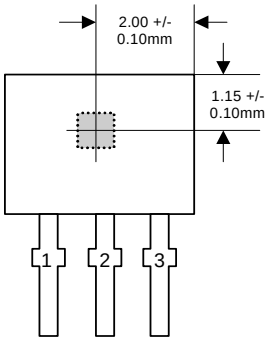


Package Information (All Dimensions in mm)

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

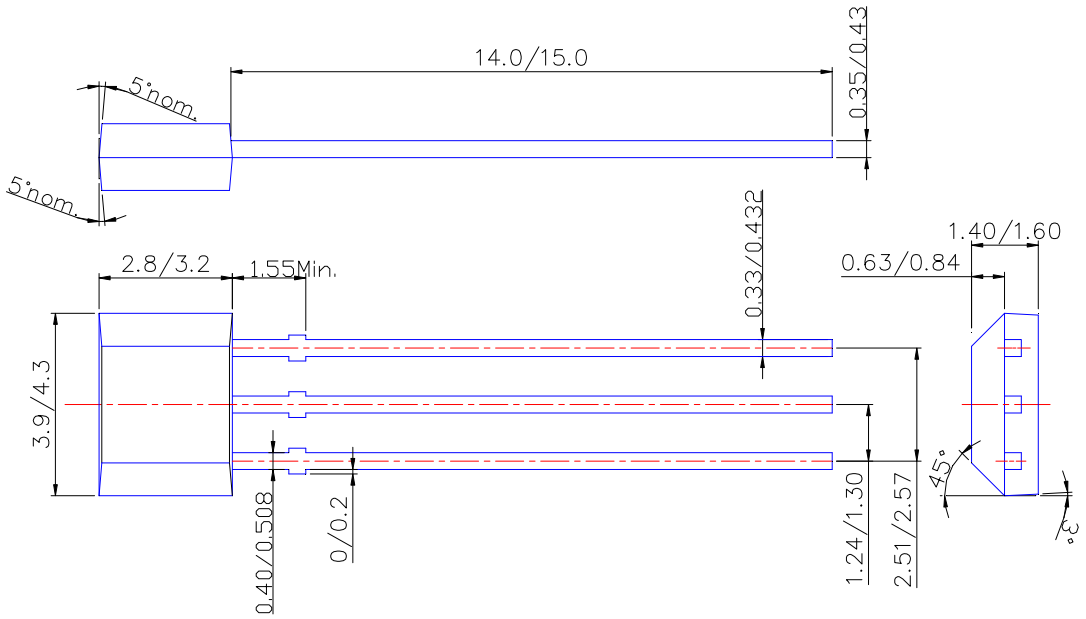


Active Area Depth



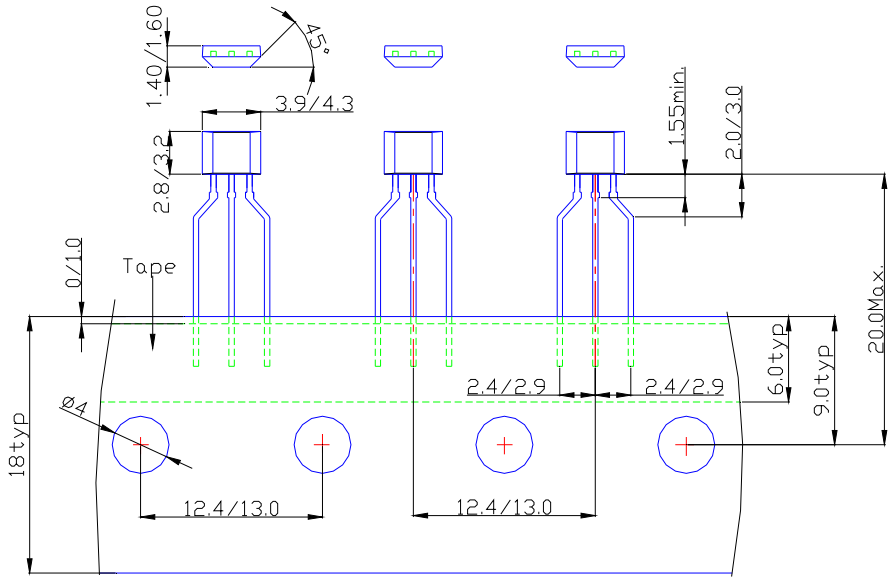
Sensor Location

Package Dimension



Package Information (Continued)

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



IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

www.diodes.com