

Features

- On-Chip Hall Sensor with Two Different Sensitivity and Hysteresis Settings for ATS277H
- 3.5V to 20V Operating Voltage
- 400mA (avg.) Output Sink Current
- Built-in Protecting Diode Only for Chip Reverse Power Connecting
- -20°C to 85°C Operating Temperature
- Low Profile 4 Pin SIP Package
- Lead Free package: SIP-4L
- SIP-4L: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

General Description

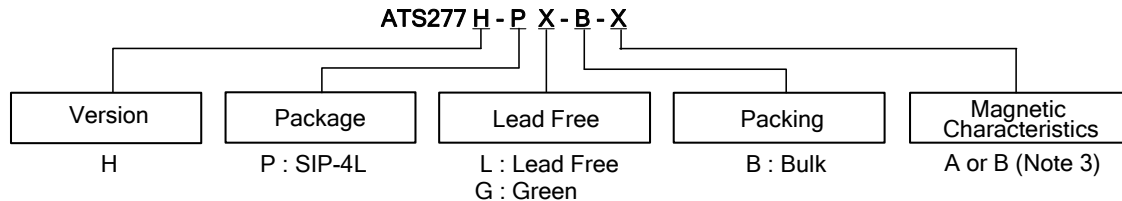
ATS277H are integrated Hall sensors with output drivers, mainly designed for electronic commutation of brush-less DC Fan. This IC internally includes the regulator, protecting diode, Hall plate, amplifier, comparator, and a pair of complementary open-collector outputs (**DO**, **DOB**). While the magnetic flux density (**B**) is larger than operate point (**Bop**), **DO** will turn on (low), and meanwhile **DOB** will turn off (high). Each output is latched until **B** is lower than release point (**Brp**), and then **DO**, **DOB** transfer each state.





For DC fan application, sometimes need to test power reverse connection condition. Internal diode only protects chip-side but not for coil-side. If necessary, add one external diode to block the reverse current from coil-side.

Applications

- Dual-Coil Brush-Less DC Motor
- Dual-Coil Brush-Less DC Fan
- Revolution Counting
- Speed Measurement

Ordering Information

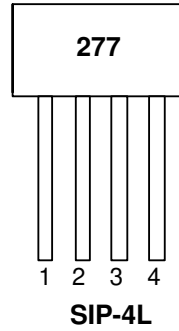


Device	Package Code	Packaging (Note 2)	Bulk		Magnetic Characteristics
			Quantity	Part Number Suffix	
 ATS277H-PL-B-A	P	SIP-4L	1000	-B	A
 ATS277H-PL-B-B	P	SIP-4L	1000	-B	B
 ATS277H-PG-B-A	P	SIP-4L	1000	-B	A
 ATS277H-PG-B-B	P	SIP-4L	1000	-B	B

- 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. Please refer to page 4 (Magnetic Characteristics table).

Pin Assignments

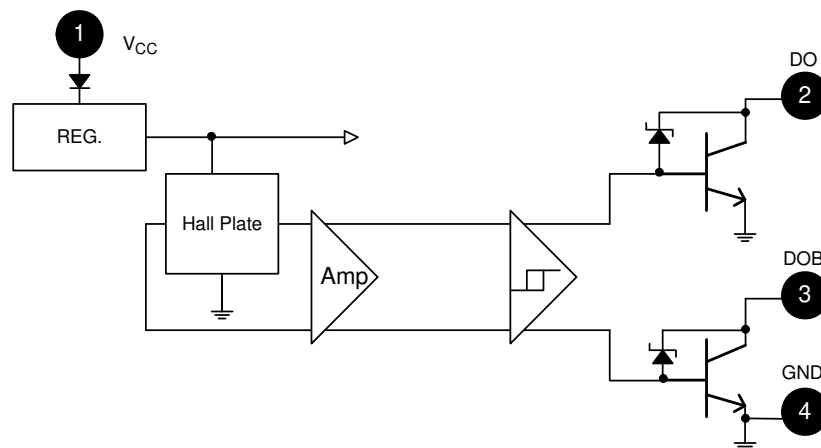
(Top View)



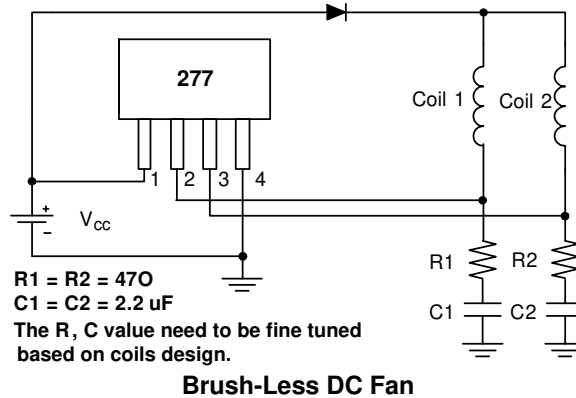
Pin Descriptions

Pin Name	P/I/O	Pin #	Description
V _{CC}	P	1	Power Supply Input
DO	O	2	Output Pin
DOB	O	3	Output Pin
GND	P	4	Ground

Block Diagram



Typical Application Circuit



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)

Symbol	Characteristics	Values	Unit
V_{CC}	Supply Voltage	20	V
V_{RCC}	Reverse V_{CC} Polarity Voltage	-20	V
B	Magnetic Flux Density	Unlimited	
I_c	Output "on" Current	Continuous	0.4
		Hold	0.5
		Peak (Start Up)	0.7
T_S	Storage Temperature Range	-65~+150	$^\circ\text{C}$
P_D	Package Power Dissipation (Note 4)	550	mW
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$

Note: 4. P_D shall be within Safety Operation Area.

Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage (Note 5)	Operating	3.5	20	V
T_A	Operating Ambient Temperature (Note 6)	Operating	-20	85	$^\circ\text{C}$

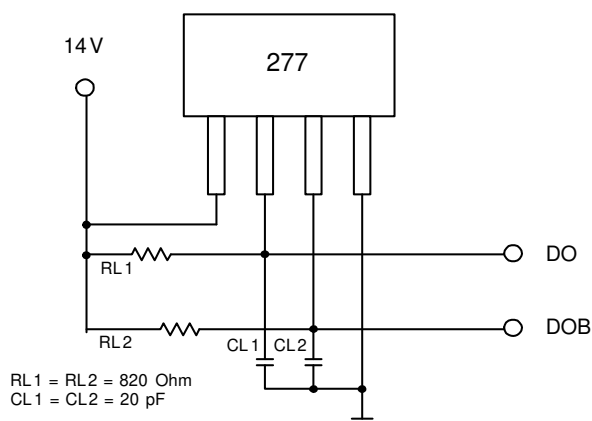
Notes: 5. The output DO/DOB is switching as magnetic field change ($S > 300\text{G}$, $N < -300\text{G}$).
6. Shall not exceed P_D and Safety Operation Area.

Electrical Characteristics (T_A = +25°C V_{CC} = 4.0V to 20V)

Symbol	Characteristic	Conditions	Min	Typ.	Max	Units
V _{ce}	Low Supply Voltage	V _{CC} = 3.5V, I _L = 100mA		0.4		V
V _Z	Output Zener Breakdown	(Note 7)		46		V
V _{ce(SAT)}	Output Saturation Voltage	V _{CC} = 14V, I _L = 300mA		0.3	0.6	V
I _{ceX}	Output Leakage Current	V _{ce} = 14V, V _{CC} = 14V		<0.1	10	μA
I _{CC}	Supply Current	V _{CC} = 20V, Output Open		16	25	mA
t _r	Output Rise Time	V _{CC} = 14V, R _L = 820Ω, C _L = 20pF		3.0	10	μs
t _f	Output Falling Time	V _{CC} = 14V, R _L = 820Ω, C _L = 20pF		0.3	1.5	μs
Δt	Switch Time Differential	V _{CC} = 14V, R _L = 820Ω, C _L = 20pF		3.0	10	μs

Note: 7. The V_Z may vary with the inductance/resistance of DC Fan. In order to reduce the risk of dynamic operation, the capacitor/ resistor is recommended to add below the DO/DOB as Application Circuit (see General Description on page 1).

Test Circuit



Magnetic Characteristics (T_A = +25°C)

(1mT = 10 Gauss)

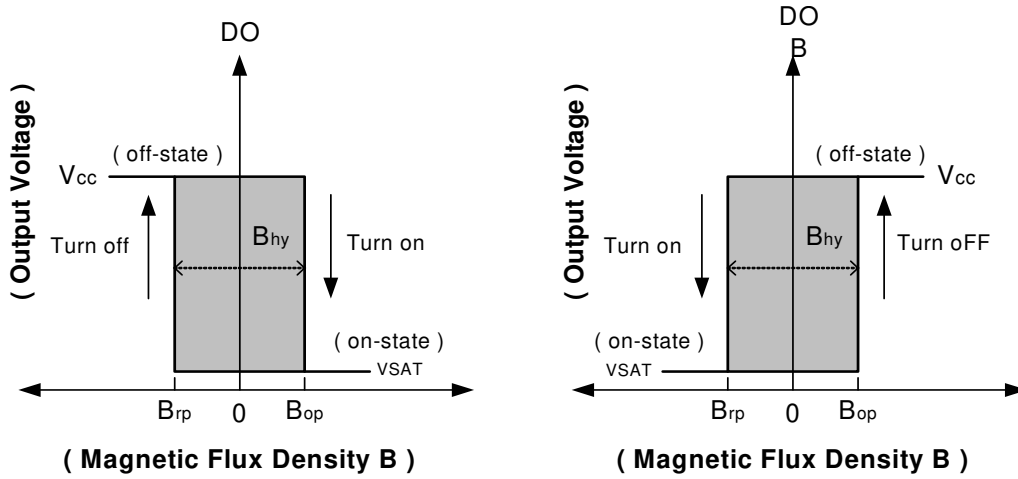
A grade

Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operate Point	10	-	50	Gauss
Brp	Release Point	-50	-	-10	Gauss
Bhy	Hysteresis	-	75	-	Gauss

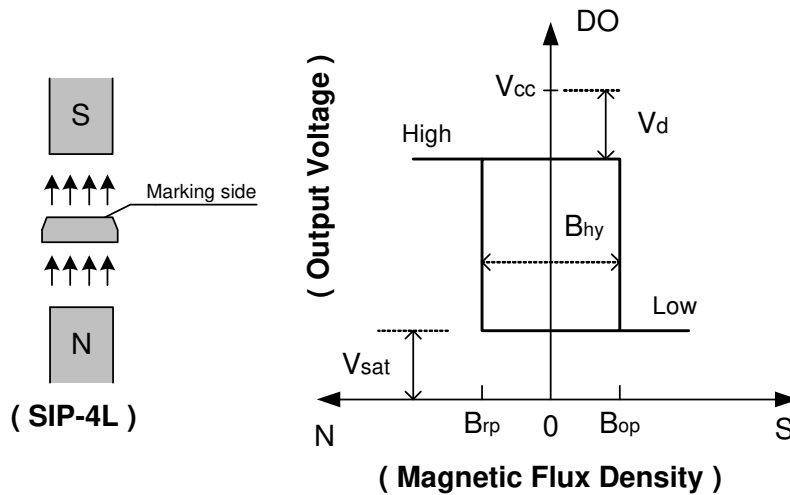
B grade

Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operate Point	5	-	70	Gauss
Brp	Release Point	-70	-	-5	Gauss
Bhy	Hysteresis	-	75	-	Gauss

Magnetic Characteristics (Continued)

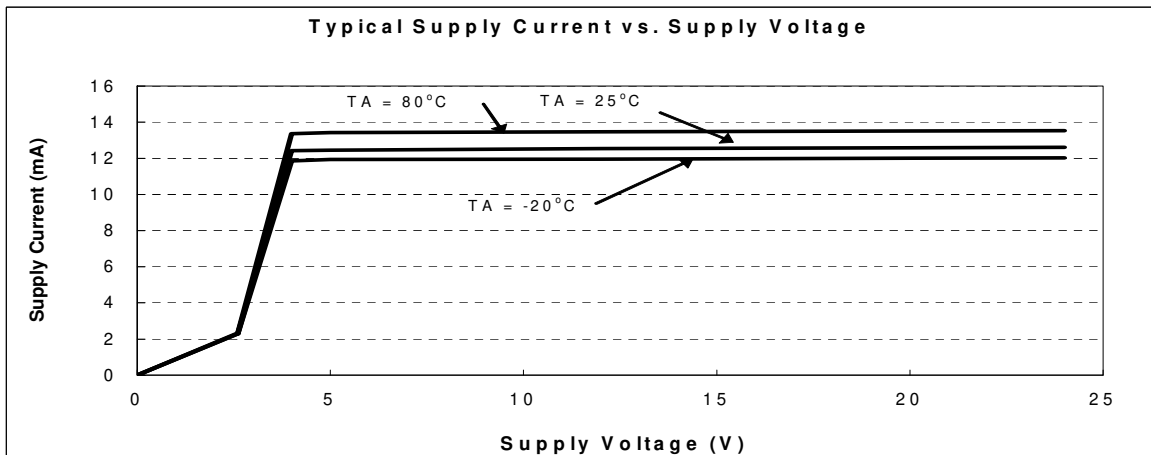
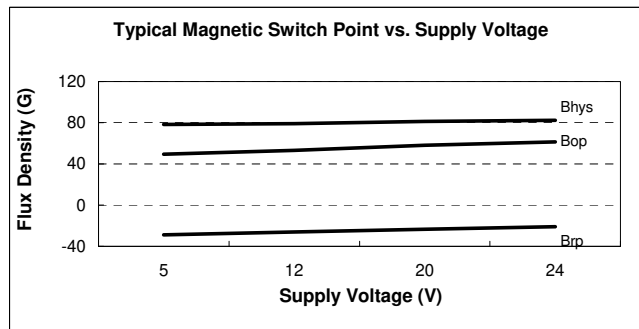
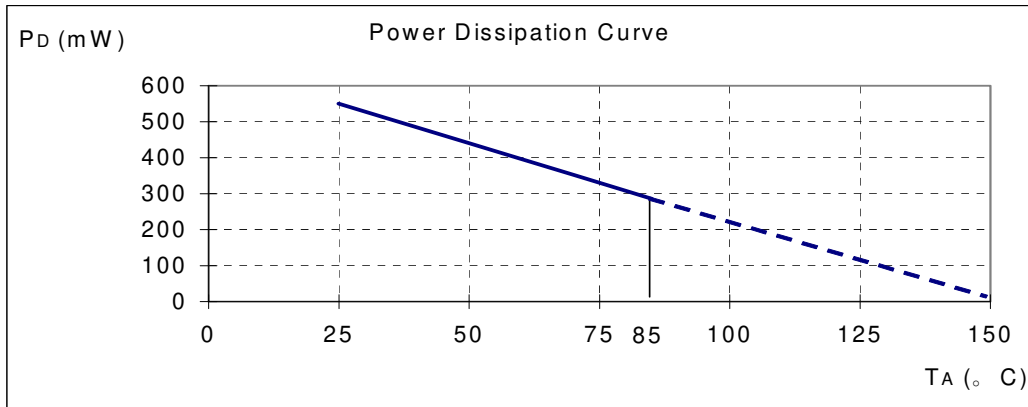


Operating Characteristics

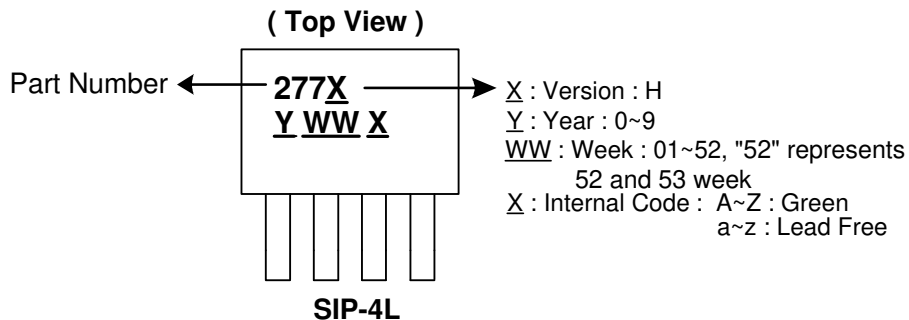


Performance Characteristics

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

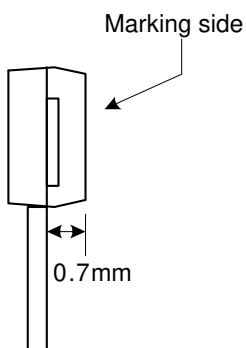


Marking Information

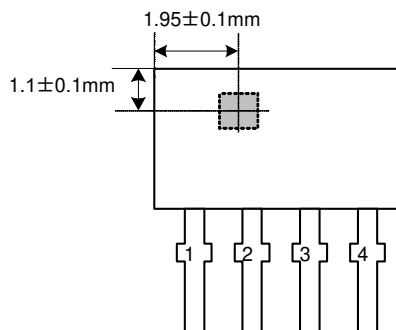


Package Information (All Dimensions in mm)

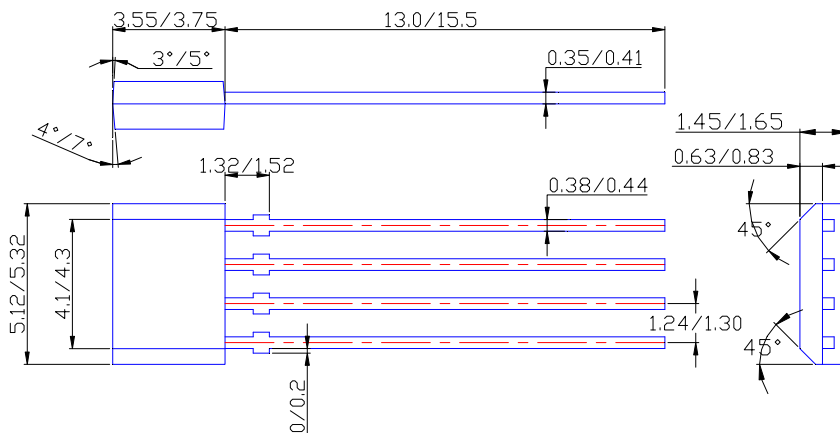
Active Area Depth



Package Sensor Location



Package Dimension



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