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### Features

- On-Chip Hall Sensor with Two Different Sensitivity and Hysteresis Settings for ATS276
- 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

ATS276 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**).

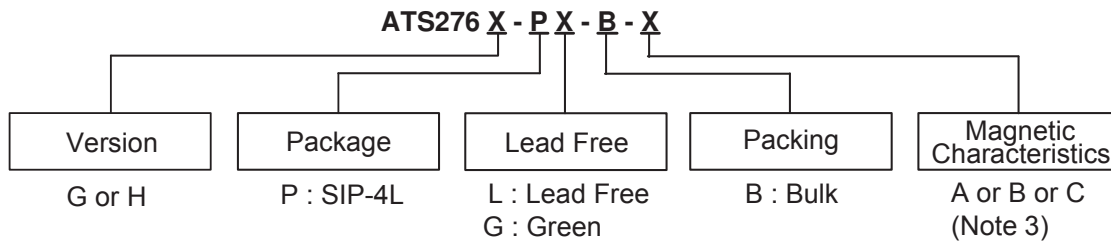
While the magnetic flux density (**B**) is larger than operate point (**Bop**), **DO** will turn on (low), and meanwhile **DOB** will turn off (high). Each output is latched until **B** is lower than release point (**Brp**), and then **DO**, **DOB** transfer each state.

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

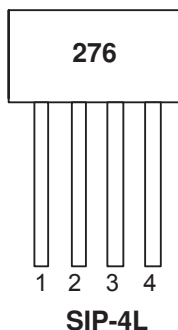


Device	Package Code	Packaging (Note 2)	Bulk		Magnetic Characteristics
			Quantity	Part Number Suffix	
ATS276G-PL-B-A	P	SIP-4L	1000	-B	A
S276G-PL-B-B	P	SIP-4L	1000	-B	B
ATS276G-PL-B-C	P	SIP-4L	1000	-B	C
ATS276H-PL-B-A	P	SIP-4L	1000	-B	A
ATS276H-PL-B-B	P	SIP-4L	1000	-B	B
ATS276H-PG-B-A	P	SIP-4L	1000	-B	A
TS276H-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 5 (Magnetic Characteristics table).

**Pin Assignments**

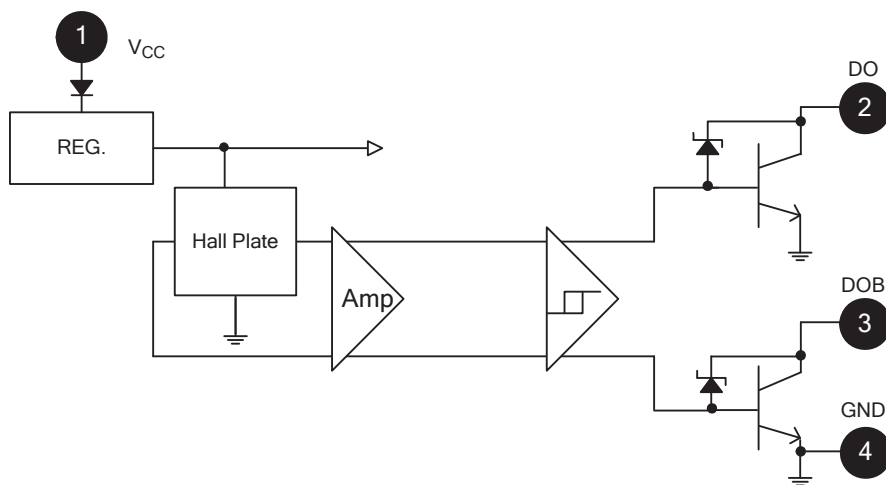
( Top View )



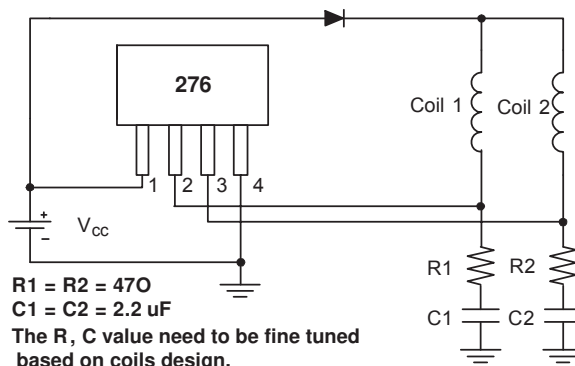
**Pin Descriptions**

Name	P/I/O	Pin #	Description
V <sub>CC</sub>	P	1	Power Supply Input
DO	O	2	Output Pin
DOB	O	3	Output Pin
GND	P	4	Ground

**Block Diagram**



**Typical Application Circuit**



**Brush-Less DC Fan**

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

Symbol	Characteristics	Values	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	
I <sub>c</sub>	Output "on" Current	Continuous	0.4
		Hold	0.5
		Peak (Start Up)	0.7
T <sub>S</sub>	Storage Temperature Range	-65~+150	°C
P <sub>D</sub>	Package Power Dissipation	550	mW
T <sub>J</sub>	Maximum Junction Temperature	150	°C

**Recommended Operating Conditions**

Symbol	Characteristic	Conditions	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage (Note 4)	Operating	3.5	20	V
T <sub>A</sub>	Operating Ambient Temperature (Note 5)	Operating	-20	85	°C

Notes: 4. The output DO/DOB is switching as magnetic field change (S>300G, N<-300G).  
5. Shall not exceed P<sub>D</sub> and Safety Operation Area.

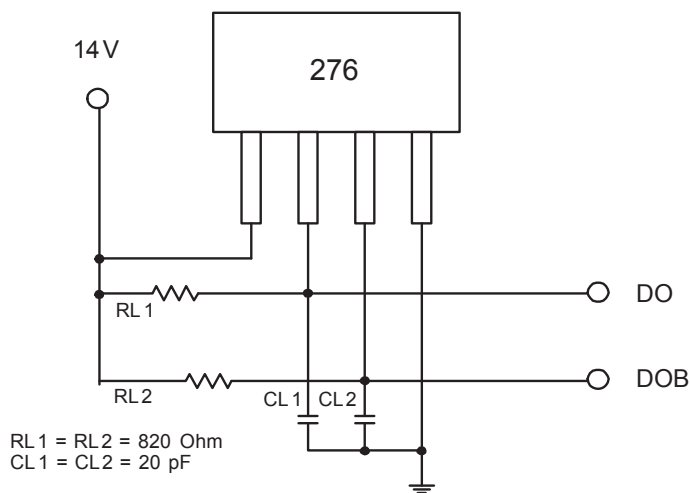


### Electrical Characteristics (T<sub>A</sub> = +25°C, V<sub>CC</sub> = 4.0V to 20V)

Symbol	Characteristic	Conditions	Min	Typ.	Max	Units
V <sub>ce</sub>	Low Supply Voltage	V <sub>CC</sub> = 3.5V, I <sub>L</sub> = 100mA		0.4		V
V <sub>Z</sub>	Output Zener Breakdown	(Note 6)		46		V
V <sub>ce(SAT)</sub>	Output Saturation Voltage	V <sub>CC</sub> = 14V, I <sub>L</sub> = 300mA		0.3	0.6	V
I <sub>ceX</sub>	Output Leakage Current	V <sub>ce</sub> = 14V, V <sub>CC</sub> = 14V		<0.1	10	μA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 20V, Output Open		16	25	mA
t <sub>r</sub>	Output Rise Time	V <sub>CC</sub> = 14V, R <sub>L</sub> = 820Ω, C <sub>L</sub> = 20pF		3.0	10	μs
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	μs
Δt	Switch Time Differential	V <sub>CC</sub> = 14V, R <sub>L</sub> = 820Ω, C <sub>L</sub> = 20pF		3.0	10	μs

Notes: 6. The V<sub>Z</sub> 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** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 14\text{V}$ )

( 1mT = 10 Gauss )

**A grade**

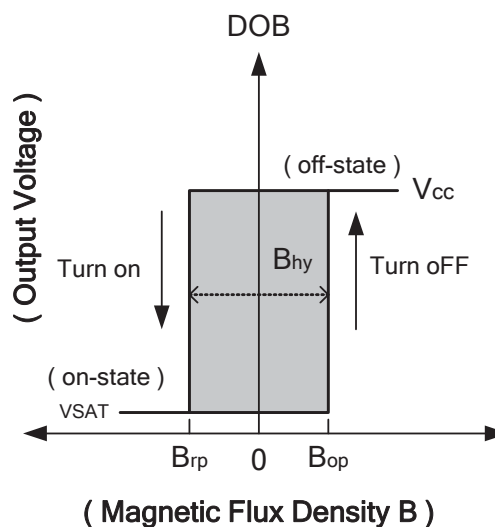
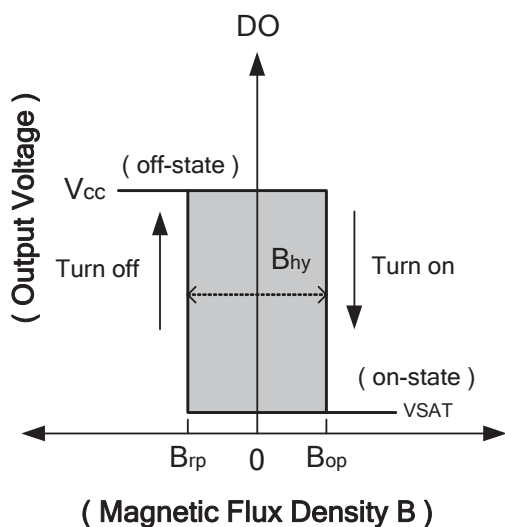
Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operation Point	10	-	50	Gauss
Brp	Release Point	-50	-	-10	Gauss
Bhy	Hysteresis	-	75	-	Gauss

**B grade**

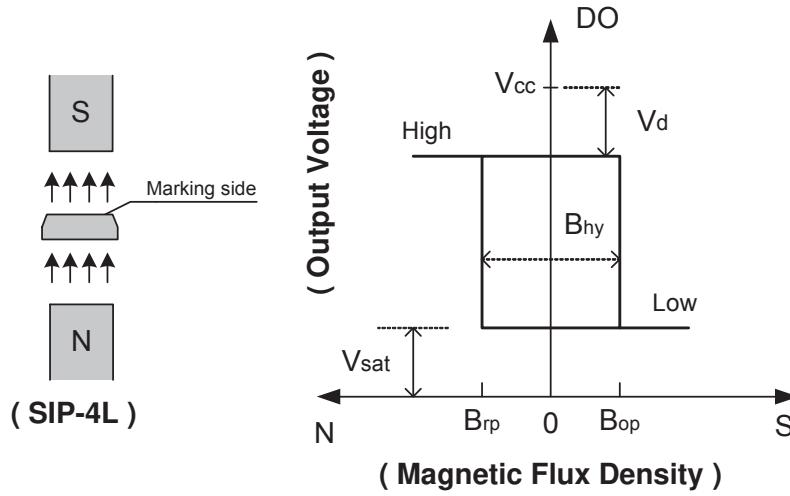
Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operation Point	5	-	70	Gauss
Brp	Release Point	-70	-	-5	Gauss
Bhy	Hysteresis	-	75	-	Gauss

**C grade**

Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operation Point	-	-	100	Gauss
Brp	Release Point	-100	-	-	Gauss
Bhy	Hysteresis	-	75	-	Gauss

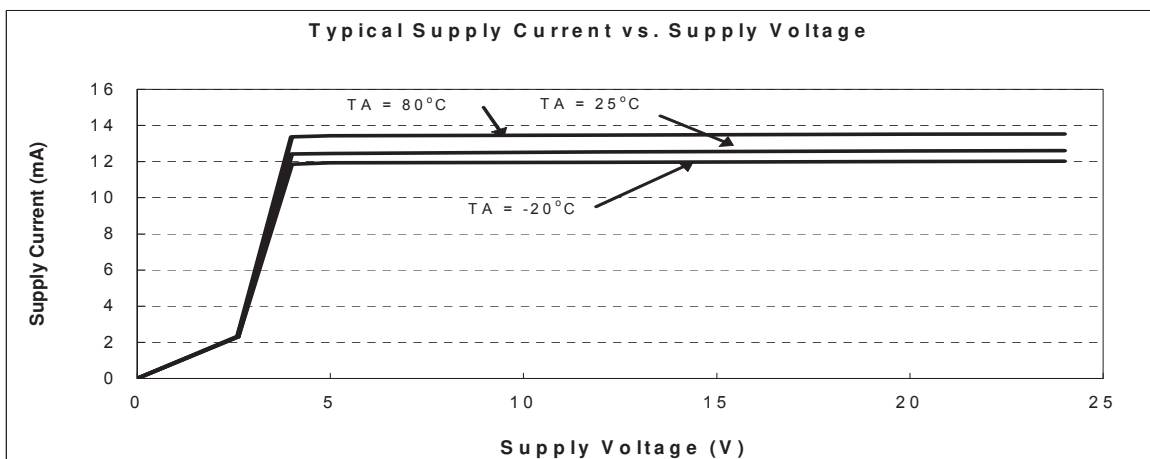
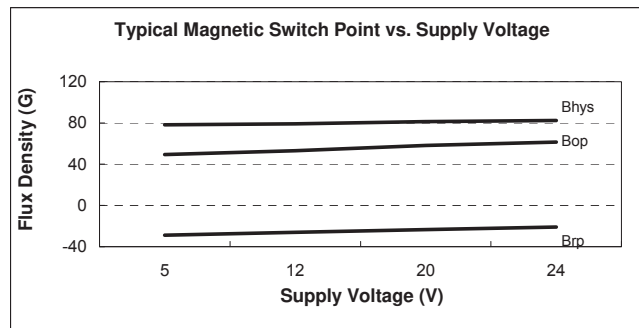
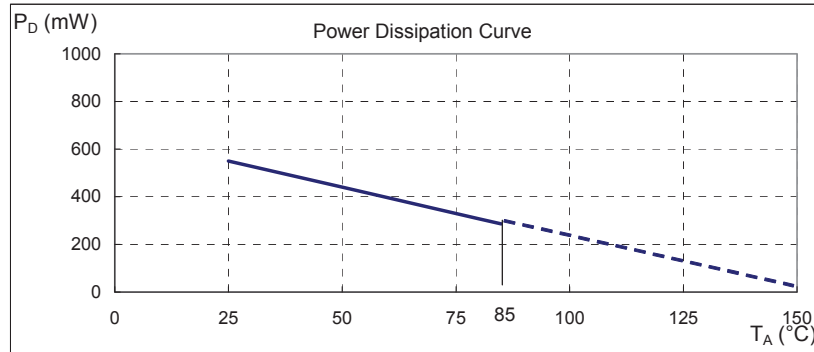


**Operating Characteristics**



**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







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