

General Description

DIODES™ ATS276 are integrated Hall sensors with output drivers, mainly designed for electronic commutation of brushless DC fan. This IC internally includes the regulator, protecting diode, Hall plate, amplifier, comparator, and a pair of complementary open-collector outputs (**DO**, **DOB**).

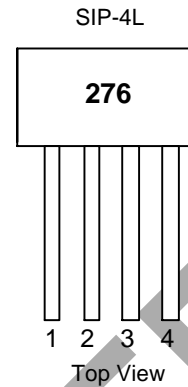
While the magnetic flux density (**B**) is larger than operate point (**Bop**), **DO** will turn on (low), and meanwhile **DOB** will turn off (high). Each output is latched until **B** is lower than release point (**Brp**), and then **DO**, **DOB** transfer each state.

For DC fan application, sometimes it needs 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.

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
- Available in "Green" Package: SIP-4L
 - **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
 - **Halogen and Antimony Free. "Green" Device (Note 3)**
- Lead-Free Package, Available in "Green" Molding Compound: SIP-4L
 - **Totally Lead-Free & Fully RoHS Compliant (Notes 4 & 2)**
 - **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Pin Assignments



Applications

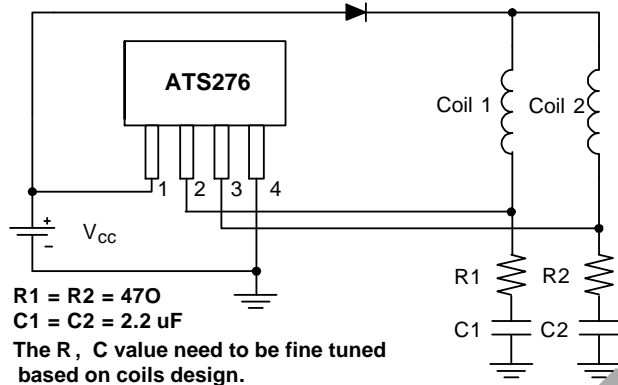
- Dual-coil brushless DC motors
- Dual-coil brushless DC fans
- Revolution counting
- Speed measurements

Notes:

1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.

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Typical Applications Circuit

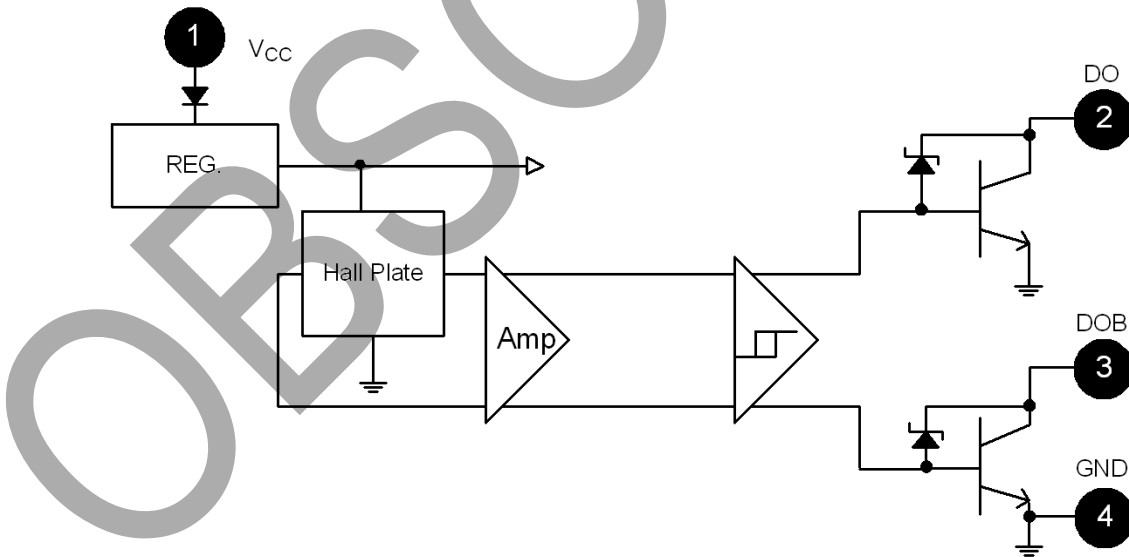


Brushless DC Fan

Pin Descriptions

Pin Name	P/I/O	Pin Number	Description
Vcc	P	1	Power Supply Input
DO	O	2	Output Pin
DOB	O	3	Output Pin
GND	P	4	Ground

Functional Block Diagram



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

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 to +150	°C
P _D	Package Power Dissipation	550	mW
T _J	Maximum Junction Temperature	+150	°C

Recommended Operating Conditions

Symbol	Characteristic	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	°C

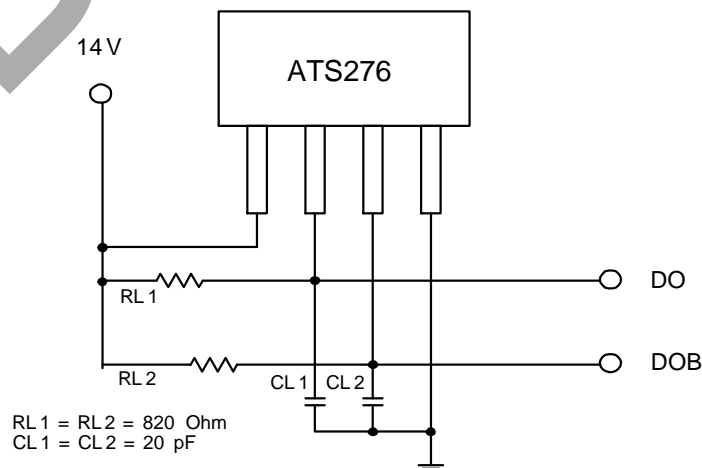
Notes: 5. The output DO/DOB is switching as magnetic field changes (S > 300G, N < -300G).
6. Shall not exceed P_D and safety operation area.

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 ($T_A = +25^\circ\text{C}$, $V_{CC} = 14\text{V}$)

(1mT = 10 Gauss)

A grade

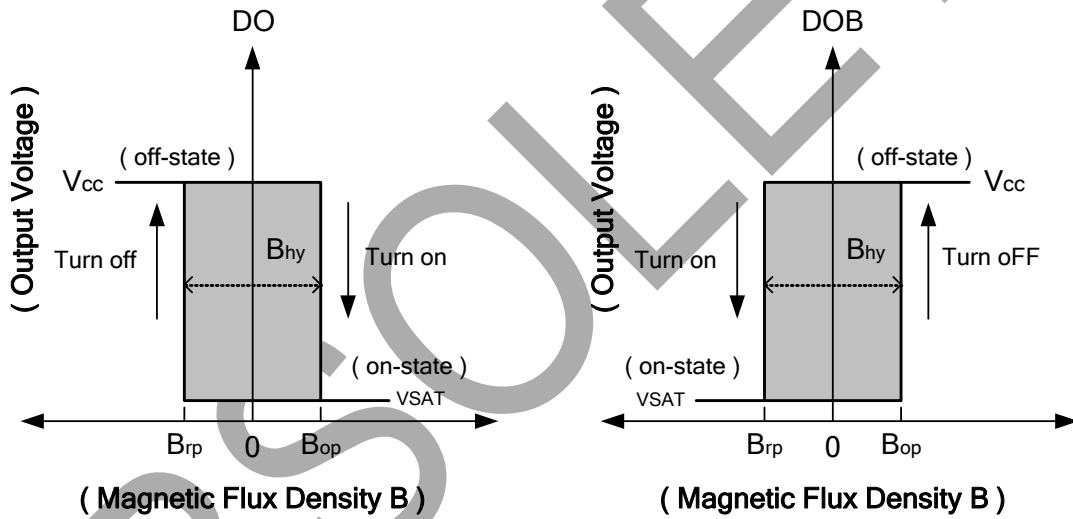
Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operation Point	10	—	50	Gauss
Brp	Release Point	-50	—	-10	Gauss
Bhy	Hysteresis	—	75	—	Gauss

B grade

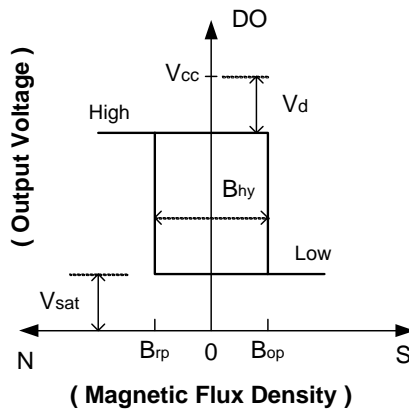
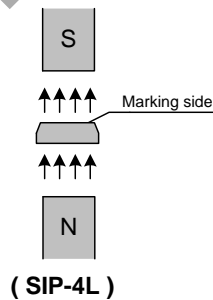
Symbol	Characteristic	Min	Typ.	Max	Unit
Bop	Operation Point	5	—	70	Gauss
Brp	Release Point	-70	—	-5	Gauss
Bhy	Hysteresis	—	75	—	Gauss

C grade

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



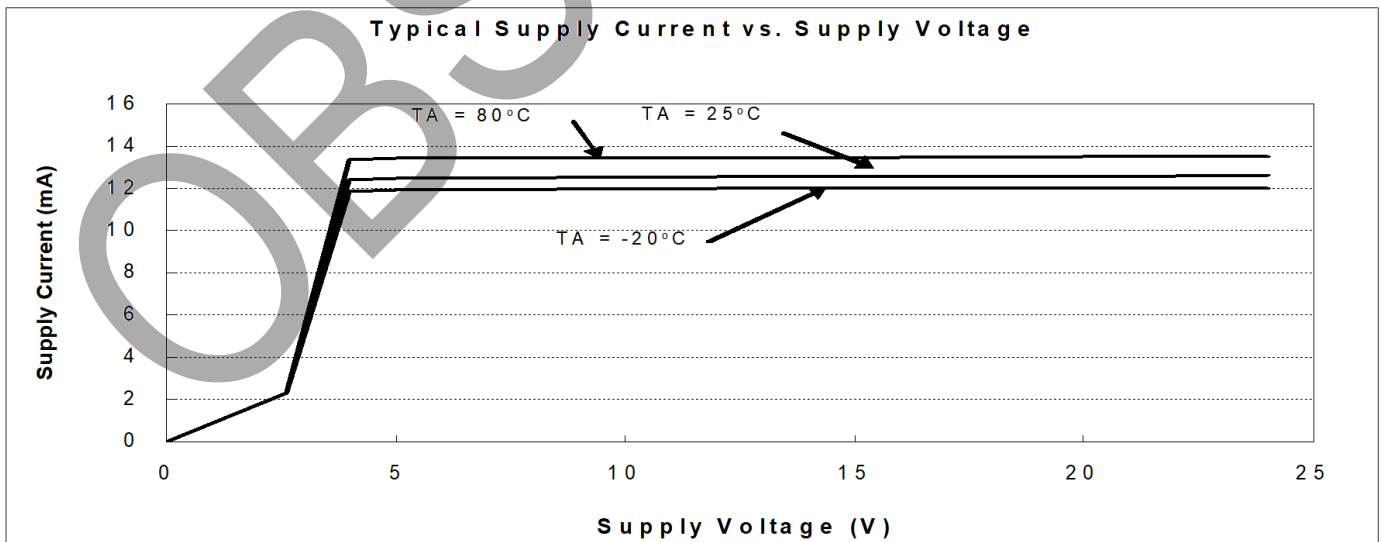
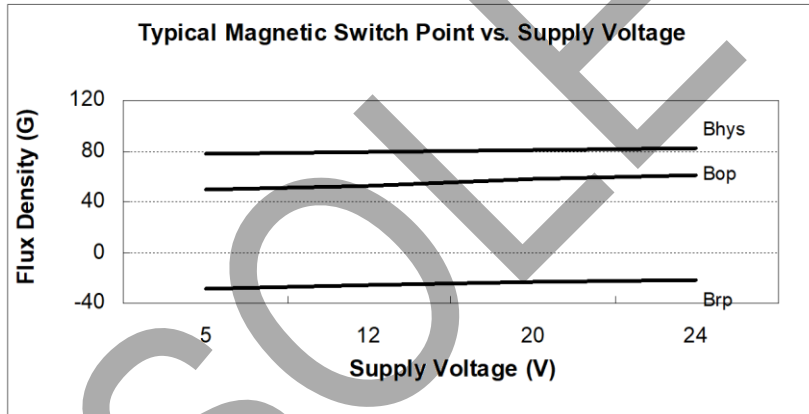
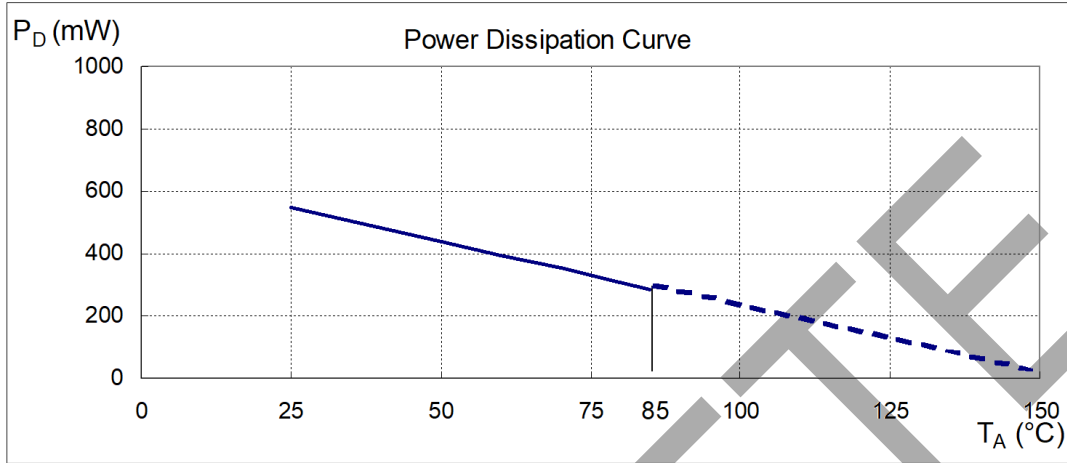
Operating Characteristics



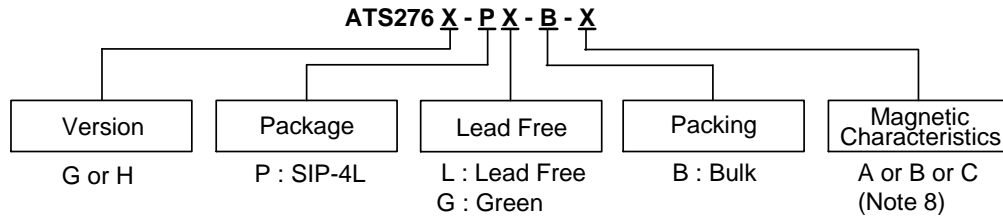
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Performance Characteristics

T _A (°C)	+25	+50	+60	+70	+80	+85	+90	+95	+100	+105	+110	+115	+120	+125	+130	+135	+140	+150
P _D (mW)	550	440	396	352	308	286	264	242	220	198	176	154	132	110	88	66	44	0



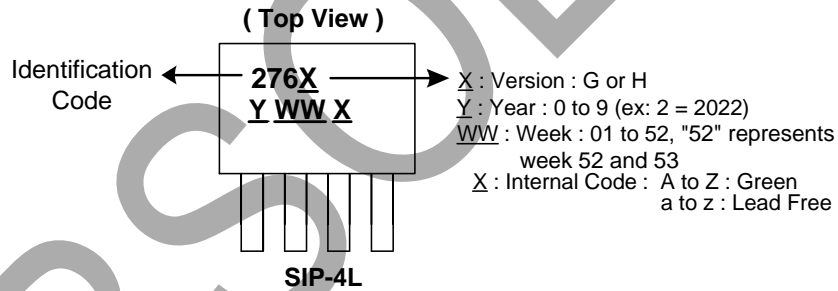
Ordering Information



Part Number	Part Number Suffix	Package Code	Package (Note 9)	Magnetic Characteristics	Packing	
					Qty.	Carrier
ATS276G-PL-B-A	-B	P	SIP-4L	A	1000	Bulk
ATS276G-PL-B-B	-B	P	SIP-4L	B	1000	Bulk
ATS276G-PL-B-C	-B	P	SIP-4L	C	1000	Bulk
ATS276H-PL-B-A	-B	P	SIP-4L	A	1000	Bulk
ATS276H-PL-B-B	-B	P	SIP-4L	B	1000	Bulk
ATS276H-PG-B-A	-B	P	SIP-4L	A	1000	Bulk
ATS276H-PG-B-B	-B	P	SIP-4L	B	1000	Bulk

Notes: 8. Please refer to page 4 (Magnetic Characteristics table).
9. Pad layout as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.

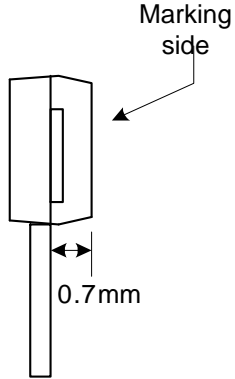
Marking Information



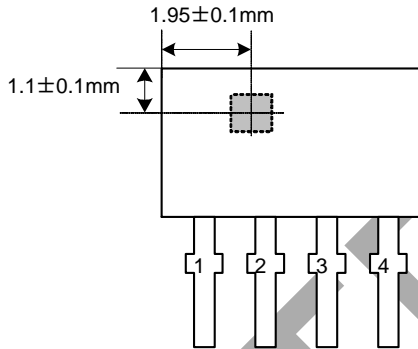
Package Information (All Dimensions in mm)

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

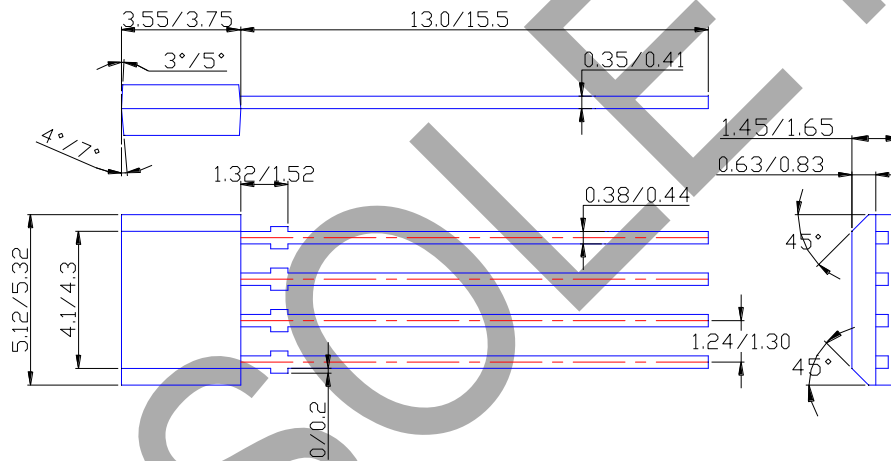
Active Area Depth



Package Sensor Location



Package Dimensions



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