COMPLEMENTARY OUTPUT HALL EFFECT LATCH

Description

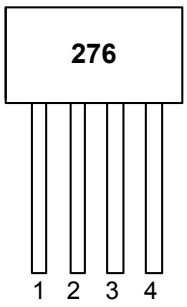
AH276 are integrated Hall sensors with output drivers, mainly designed for electronic commutation of brush-less DC Fan. This IC internally includes the regulator, protecting diode, Hall plate, amplifier, comparator, and a pair of complementary open-collector outputs **(DO, DOB)**.

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.

Pin Assignments

(Top View)



1 : Vcc

2 : DO

3 : DOB

4 : GND

Features

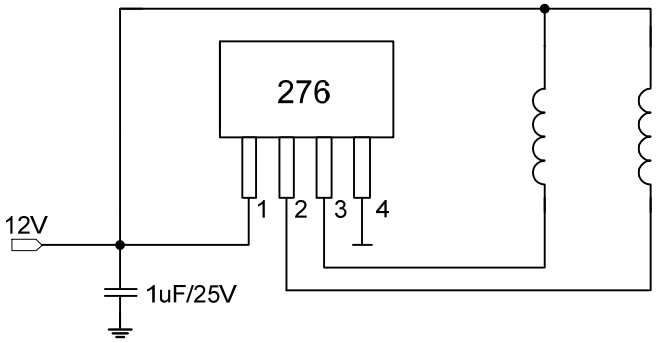
- On-chip Hall sensor with two different sensitivity and hysteresis settings for AH276
- Built-in protecting diode only for chip reverse power connecting
- -20°C to +85°C operating temperature
- Lead Free Package: SIP-4L
- SIP-4L: Available in “Green” Molding Compound (No Br, Sb)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

Applications

- Dual-coil Brush-less DC Motor
- Dual-coil Brush-less DC Fan
- Revolution Counting
- Speed Measurement

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html 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.

Typical Applications Circuit

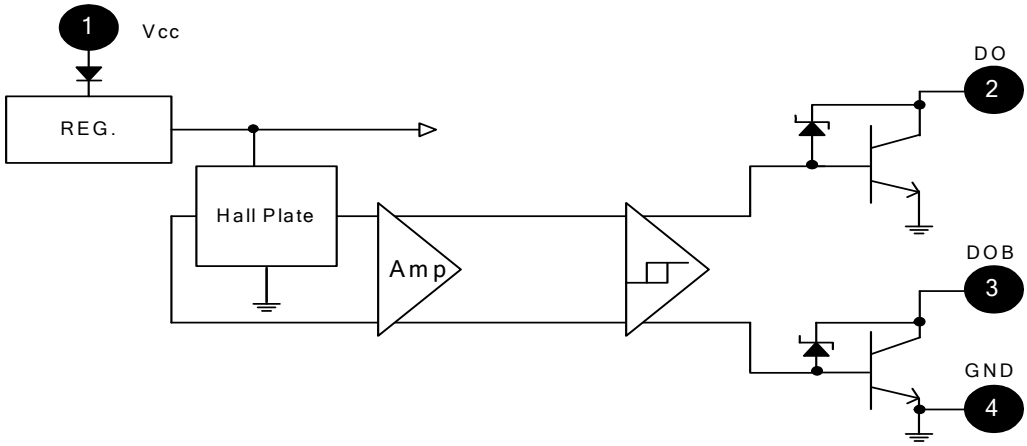


Brush-less DC Fan

Pin Descriptions

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

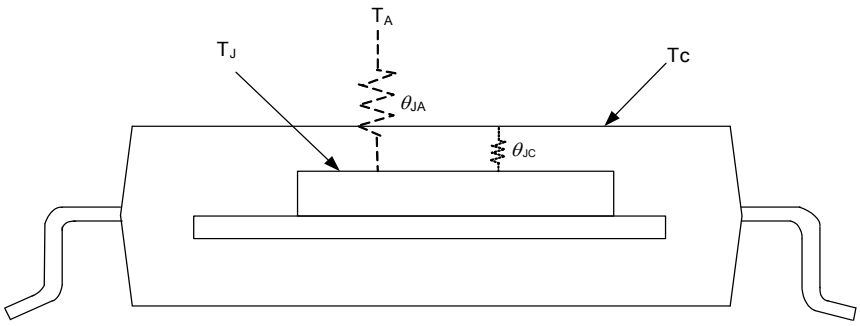
Functional Block Diagram



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

Symbol	Parameter		Rating	Unit
V_{CC}	Supply Voltage		20	V
V_{RCC}	Reverse VCC Polarity Voltage		-20	V
B	Magnetic Flux Density		Unlimited	
Io	Output "on" Current (Note 3)	Continuous	0.4	A
		Hold	0.5	
		Peak (Start Up)	0.7	
Ts	Storage Temperature Range		-65 ~ +150	°C
PD	Package Power Dissipation (SIP-4L)		550	mW
T_J	Maximum Junction Temperature		+150	°C
θ_{JA}	Thermal Resistance Junction-to-Ambient (SIP-4L)		227	°C/W
θ_{JC}	Thermal Resistance Junction-to-Case (SIP-4L)		49	°C/W

Note: 3. P_D shall be within Safety Operation Area.



Recommended Operating Conditions (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage (Note 4)	Operating	3.5	20	V
T_A	Operating Ambient Temperature	Operating	-20	+85	°C

Note: 4. The output DO/DOB is switching as magnetic field change (S>300G, N<-300G).

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_Z	Output Zener Breakdown		—	35	—	V
$V_{CE(SAT)}$	Output Saturation Voltage	V_{CC} = 14V, I_L = 400mA	—	0.6	0.9	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	7	16	25	mA

Magnetic Characteristics (Note 5) (@T_A = +25°C, V_{CC} = 14V, unless otherwise specified.)

A grade

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

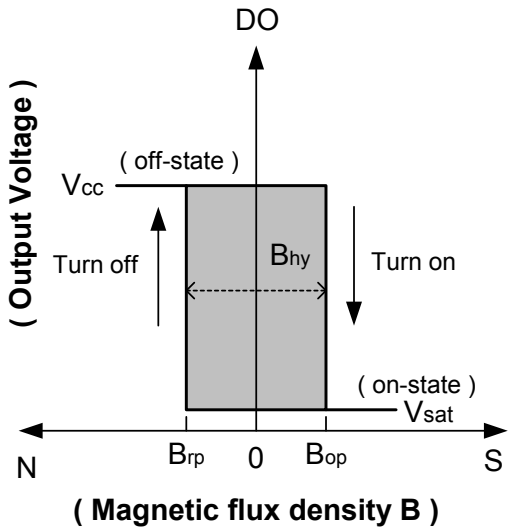
B grade

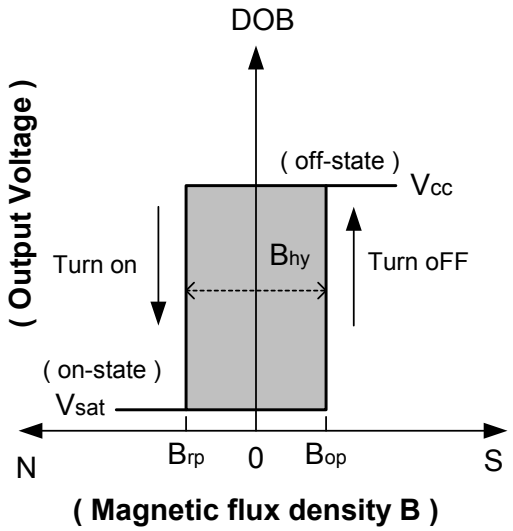
Symbol	Characteristic	Min	Typ	Max	Unit
Bop	Operate Point	5	—	70	Gauss
Brp	Release Point	-70	—	-5	Gauss
Bhy	Hysteresis	—	75	—	Gauss

C grade

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

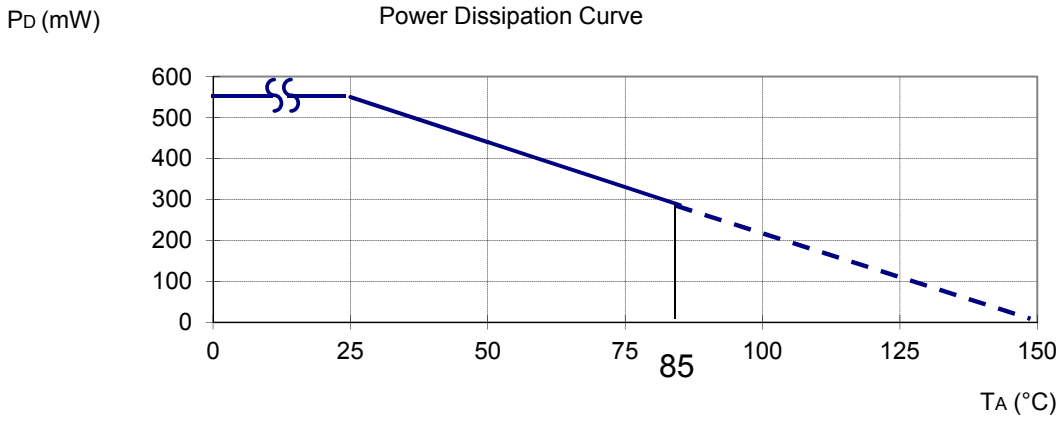
Note: 5. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.



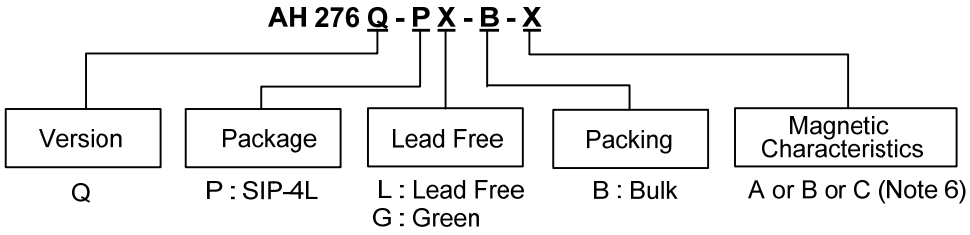


Performance Characteristics

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



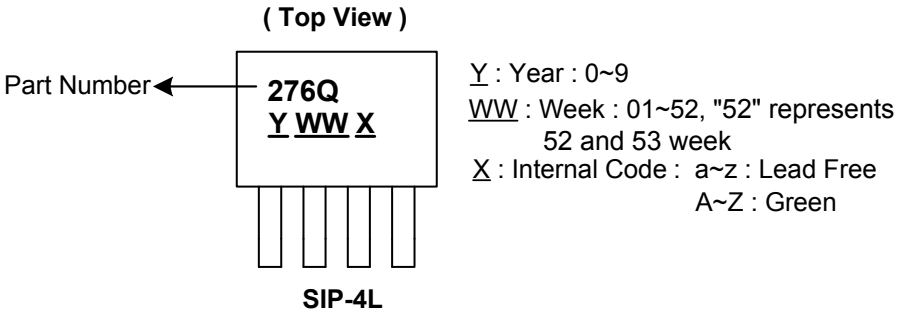
Ordering Information



Part Number	Package Code	Packaging	Bulk		Magnetic Characteristics
			Quantity	Part Number Suffix	
AH276Q-PL-B-A	P	SIP-4L	1000	-B	A
AH276Q-PL-B-B	P	SIP-4L	1000	-B	B
AH276Q-PL-B-C	P	SIP-4L	1000	-B	C
AH276Q-PG-B-A	P	SIP-4L	1000	-B	A
AH276Q-PG-B-B	P	SIP-4L	1000	-B	B
AH276Q-PG-B-C	P	SIP-4L	1000	-B	C

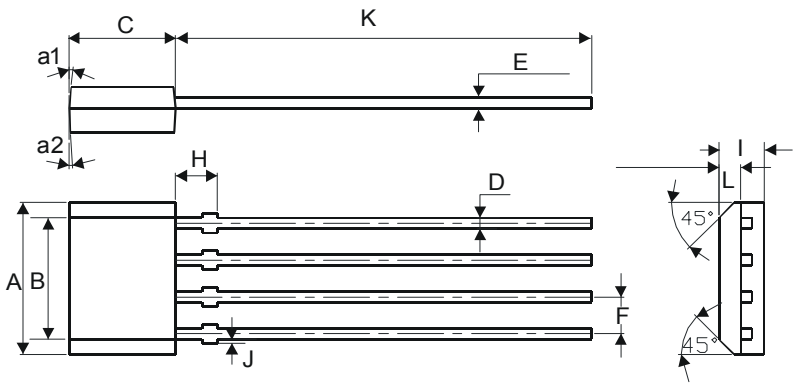
Note: 6. Please refer to page 3 (Magnetic Characteristics table).

Marking Information

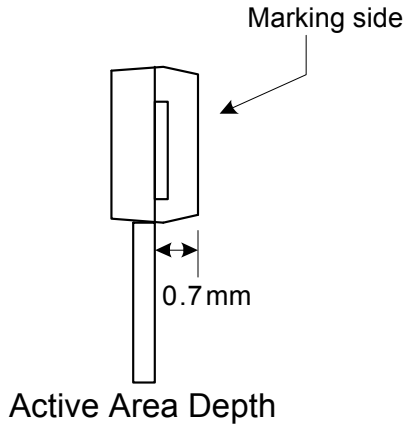


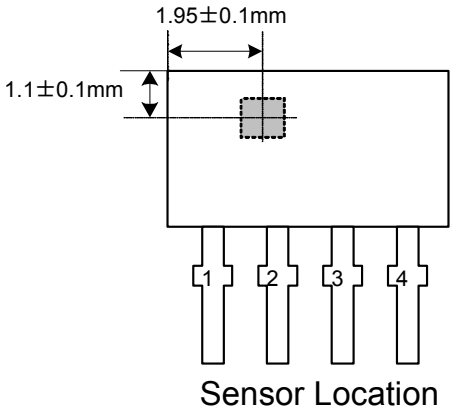
Package Outline Dimensions (All dimensions in mm.)

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SIP-4		
Dim	**Min**	**Max**
A	5.12	5.32
B	4.10	4.30
C	3.55	3.75
D	0.38	0.44
E	0.35	0.41
F	1.24	1.30
H	1.32	1.52
I	1.45	1.65
J	0.00	0.2
K	13.00	15.5
L	0.63	0.83
a1	3°	5°
a2	4°	7°
All Dimensions in mm		





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