

**ATS276** 

#### 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 ATS276 X - P X - B - X Version Package Lead Free Packing Magnetic Characteristics G or H P : SIP-4L L : Lead Free B : Bulk A or B or C (Note 3)

		Package	Packaging		Bulk	Magnetic
	Device	Code	(Note 2)	Quantity	Part Number Suffix	Characteristics
Pb	ATS276G-PL-B-A	Р	SIP-4L	1000	-B	А
<b>Pb</b>	S276G-PL-B-B	Р	SIP-4L	1000	-В	В
Pb	ATS276G-PL-B-C	Р	SIP-4L	1000	-B	С
Pb	ATS276H-PL-B-A	Р	SIP-4L	1000	-B	А
6	ATS276H-PL-B-B	Р	SIP-4L	1000	-B	В
<b>Pb</b> ,	ATS276H-PG-B-A	Р	SIP-4L	1000	-B	А
е,	TS276H-PG-B-B	Р	SIP-4L	1000	-B	В

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see EU Directive 2002/95/EC Annex Notes.
 Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <a href="http://www.diodes.com/datasheets/ap02001.pdf">http://www.diodes.com/datasheets/ap02001.pdf</a>.

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>	Р	1	Power Supply Input
DO	0	2	Output Pin
DOB	0	3	Output Pin
GND	Р	4	Ground

# **Block Diagram**





# **Typical Application Circuit**



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

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	
В	Magnetic Flux Density	Unlimited		
	Output "on" Current	Continuous	0.4	А
lc		Hold	0.5	
		0.7		
Ts	Storage Temperature Range		-65~+150	°C
P <sub>D</sub>	Package Power Dissipation		550	mW
TJ	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



## **Electrical Characteristics** $(T_A = +25^{\circ}C, Vcc = 4.0V \text{ to } 20V)$

Symbol	Characteristic	Conditions	Min	Тур.	Max	Units
V <sub>ce</sub>	Low Supply Voltage	V <sub>cc</sub> = 3.5V, I <sub>L</sub> = 100mA		0.4		V
Vz	Output Zener Breakdown	(Note 6)		46		V
V <sub>ce(SAT)</sub>	Output Saturation Voltage	$V_{cc} = 14V, I_{L} = 300mA$		0.3	0.6	V
Icex	Output Leakage Current	$V_{ce} = 14V, V_{cc} = 14V$		<0.1	10	μA
I <sub>cc</sub>	Supply Current	V <sub>cc</sub> = 20V, Output Open		16	25	mA
tr	Output Rise Time	V <sub>cc</sub> = 14V, R <sub>L</sub> = 820Ω, C <sub>L</sub> = 20pF		3.0	10	μs
tf	Output Falling Time	$V_{cc} = 14V, R_{L} = 820\Omega, C_{L} = 20pF$		0.3	1.5	μs
Δt	Switch Time Differential	$V_{cc} = 14V, R_{L} = 820\Omega, C_{L} = 20pF$		3.0	10	μs

Notes: 6. The Vz 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** $(T_A = +25^{\circ}C, Vcc = 14V)$

#### (1mT = 10 Gauss)

A grade								
Symbol	Characteristic	Min	Тур.	Max	Unit			
Вор	Operation Point	10	-	50	Gauss			
Brp	Release Point	-50	-	-10	Gauss			
Bhy	Hysteresis	-	75	-	Gauss			

#### B grade

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

#### C grade

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





# **Operating Characteristics**





#### **Performance Characteristics**

T <sub>A</sub> (°C)	25	50	60	70	80	85	90	95	100
P <sub>D</sub> (mW)	550	440	396	352	308	286	264	242	220
Т <sub>А</sub> (°С)	105	110	115	120	125	130	135	140	150
P <sub>D</sub> (mW)	198	176	154	132	110	88	66	44	0









# **Marking Information**



# Package Information (All Dimensions in mm)





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