Hall Effect Sensor with Complementary Output

General Description

The GH276 is an integrated Hall sensor with output driver designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall sensor for magnetic sensing, an amplifier that amplifies the Hall voltage, a Schmitt trigger to provide switching hysteresis for noise rejection, a temperature compensation circuit to compensate the temperature drift of Hall sensitivity and two complementary open-collector drivers for sinking large load current. It also includes an internal band-gap regulator which is used to provide bias voltage for internal circuits.

Placing the device in a variable magnetic field, if the magnetic flux density is larger than threshold B_{OP}, the pin DO will be turned low (on) and pin DOB will be turned high (off). This output state is held until the magnetic flux density reverses and falls below B_{RP}, then causes DO to be turned high (off) and DOB turned low (on).

GH276 is available in TO-94 (SIP-4L) package.

Features

- On-Chip Hall Sensor
- 3.5V to 20V Supply Voltage
- 300mA (avg) Output Sink Current
- Reversed Supply Voltage Protection
- Build in Over Temperature Protection Function
- -20°C to 85°C Operating Temperature
- Low Profile TO-94 (SIP-4L) Package

Applications

- Dual-Coil Brushless DC Motor
- Dual-Coil Brushless DC Fan
- Revolution Counting
- Speed Measurement

Typical Applications

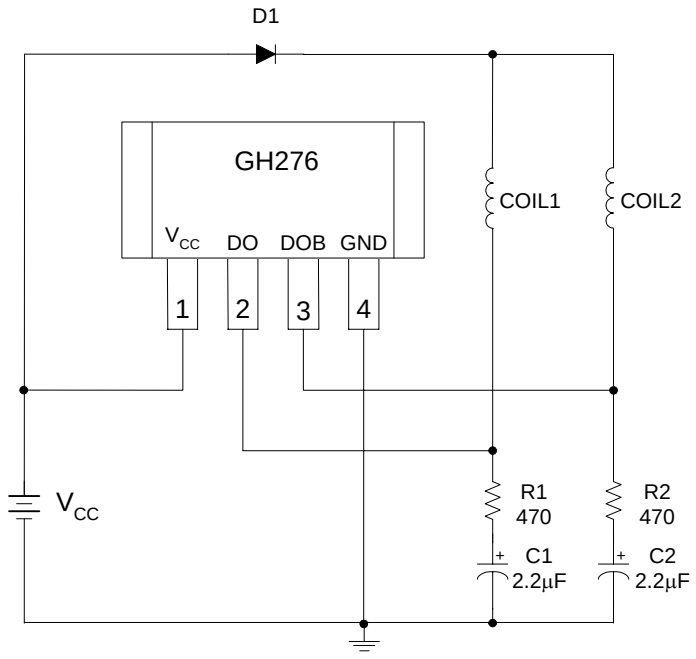
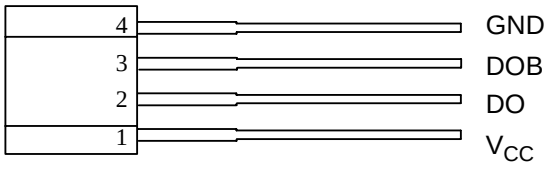


Figure 1. Typical Application Circuit

Pin Configuration

TO-94(SIP-4L)



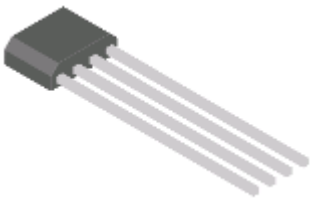


Figure 2. Pin Configuration of GH276 (Front View)

Pin Description

Pin Number	Pin Name	Function
1	V_{CC}	IC Power Supply voltage
2	DO	Coil Driver Output 1,It is Low state during the N magnetic filed
3	DOB	Coil Driver Output 2,It is Low state during the S magnetic filed
4	GND	IC Ground

Functional Block Diagram

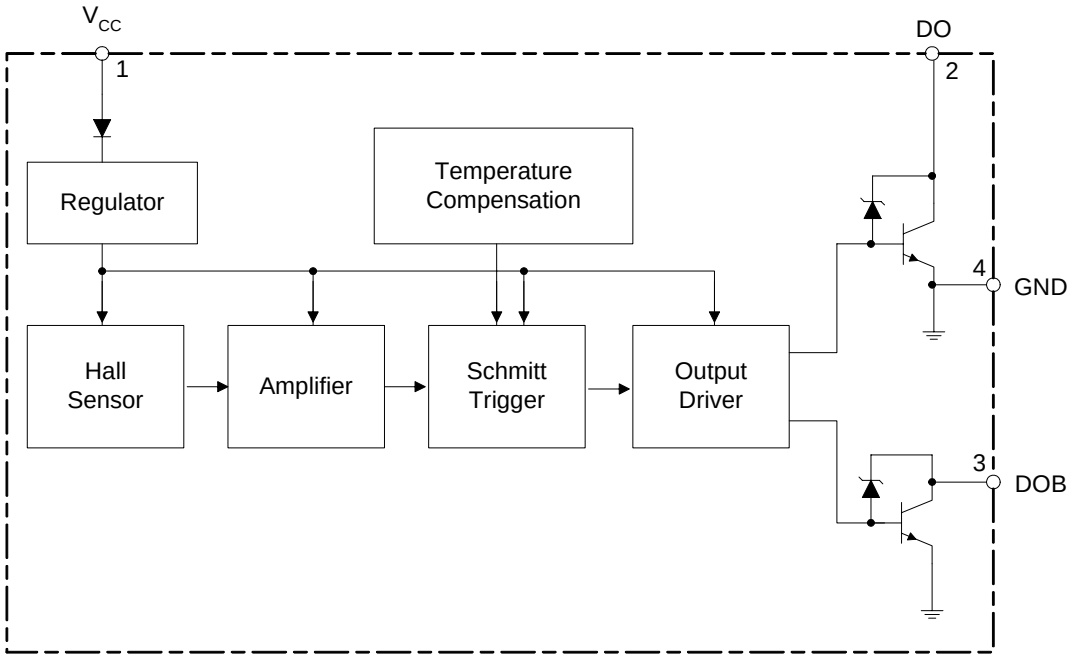


Figure 3. Functional Block Diagram of GH276

Absolute Maximum Ratings (Note 1)

(T_A=25°C)

Parameter		Symbol	Value	Unit
Supply Voltage		V_{CC}	20	V
Reverse Protection Voltage		V_{RCC}	-20	V
Magnetic Flux Density		B	Unlimited	Gauss
Output Current	Continuous	I_O	300	mA
	Hold		400	mA
	Peak (start up)		600	mA
Power Dissipation		P_D	550	mW
Thermal Resistance	Die to atmosphere	θJA	227	°C/W
	Die to package case	θJC	49	°C/W
Storage Temperature		T_{STG}	-50 to 150	°C

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. "Absolute Maximum Ratings" for extended period may affect device reliability.

Recommended Operating Conditions

(T_A=25°C)

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	3.5	20	V
Ambient Temperature	T_A	-20	85	°C

Electrical Characteristics

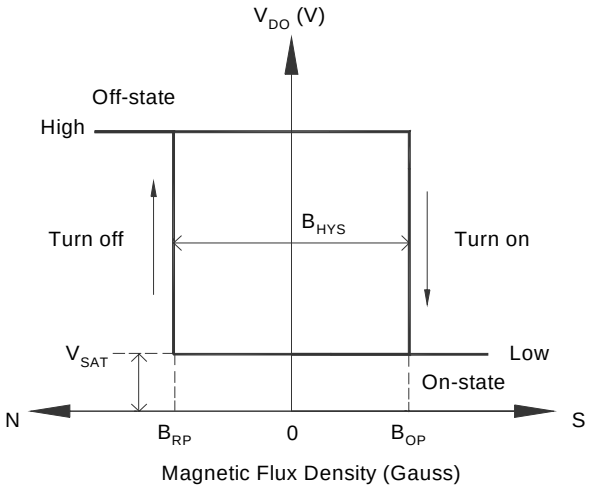
(T_A=25°C, V_{CC}=14V, unless otherwise specified)

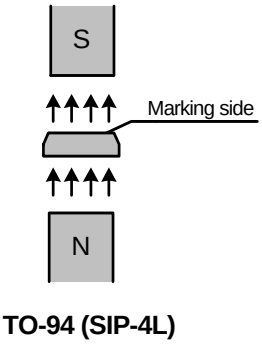
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Output Saturation Voltage	V_{SAT}	V_{CC}=3.5V, I_O=100mA		0.1		V
		I_O=300mA		0.35	0.6	V
Output Leakage Current	I_{OL}	V_{CE}=16V		0.1	10	μA
Supply Current	I_{CC}	V_{CC}=16V, Output Open	6	13	18	mA
Output Rise Time	tr	R_L=820Ω, C_L=20pF		3.0	10	μs
Output Fall Time	tf	R_L=820Ω, C_L=20pF		0.3	1.5	μs
Switch Time Differential	Δt	R_L=820Ω, C_L=20pF		3.0	10	μs
Output Zener Breakdown Voltage	V_Z			55		V

Magnetic Characteristics

(T_A=25°C)

Parameter	Symbol	Grade	Min	Typ	Max	Unit
Operating Point	B_{OP}	A	10		50	Gauss
		B	5		70	Gauss
		C			100	Gauss
Releasing Point	B_{RP}	A	-50		-10	Gauss
		B	-70		-5	Gauss
		C	-100			Gauss
	B_{HYS}			65		Gauss





TO-94 (SIP-4L)

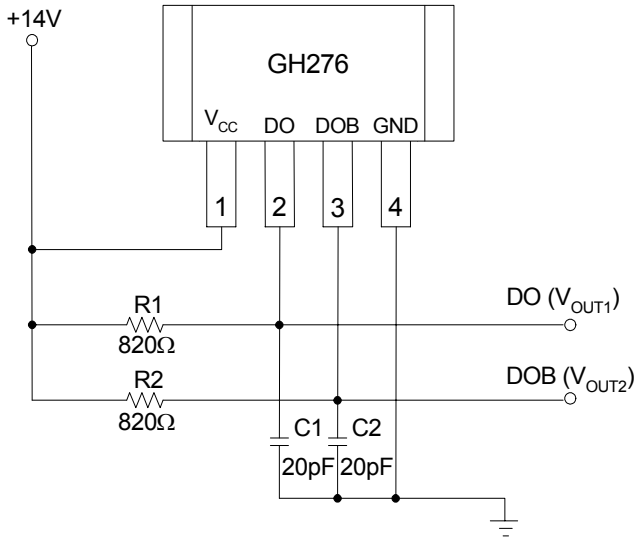


Figure 4. Basic Test Circuit

Magnetic Characteristics (Continued)

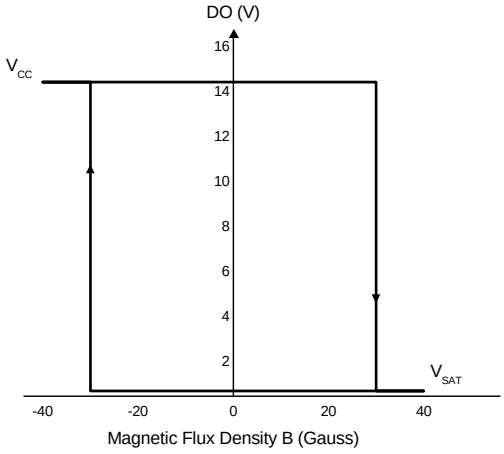


Figure 5. V_{DO} vs. Magnetic Flux Density

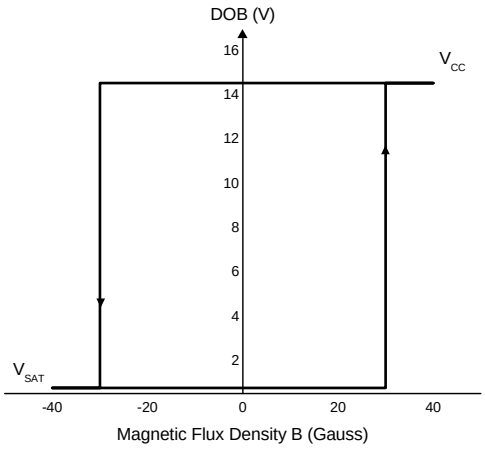
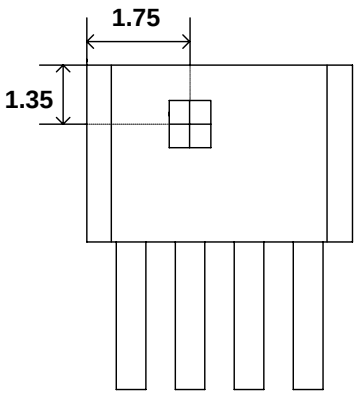


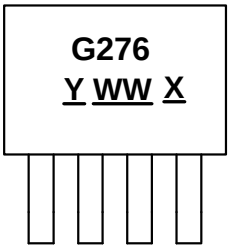
Figure 6. V_{DOB} vs. Magnetic Flux Density

Package Sensor Location (Unit:mm)



Marking Information

(Top View)



Y : Year : 0~9,"1"=2011
WW : Nth Weeks (01~52)
X : Internal Code

Package Information

Unit: mm

TO-94(SIP-4L)