

Hall Effect Switch IC CYD277 with complementary outputs

CYD277 series Hall-effect switch IC is a kind of one-chip semiconductor integrated circuit, which is composed of a reverse voltage protector, a precise voltage regulator, Hall voltage generator, a differential amplifier, Schmitt trigger, a temperature compensator and two open-collector output on a single silicon chip. The main characteristics are wide operating voltage range, high sensitivity to magnetic field, good load-carrying and reverse protection abilities. It is the best component for brushless fan, because its load-carrying ability is up to 400mA with complementary output.

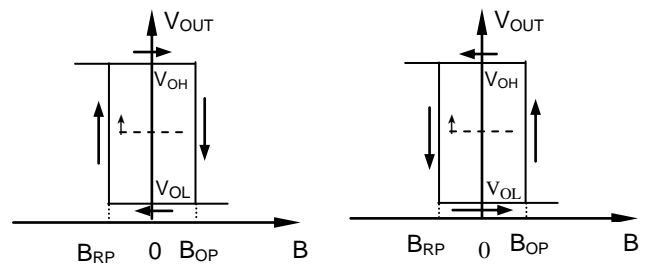
FEATURES

- Smart and Single Chip Integrated
- Temperature Compensation and Wide Operating Temperature Range
- Good Capability of Load
- Reverse Protection
- Open Collector Complementary Outputs
- Low Price , 4 Pin Epoxy Package
- Soldering Temperature can be Lowered Because of Alloy Tin Electroplating
- High Reliability

TYPICAL APPLICATION

- High Sensitive Non-contact Switch
- DC Brushless Motor
- DC Brushless Fan

Magnetic-Electrical Transfer Characteristics

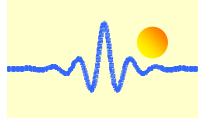


ABSOLUTE MAXIMUM RATINGS

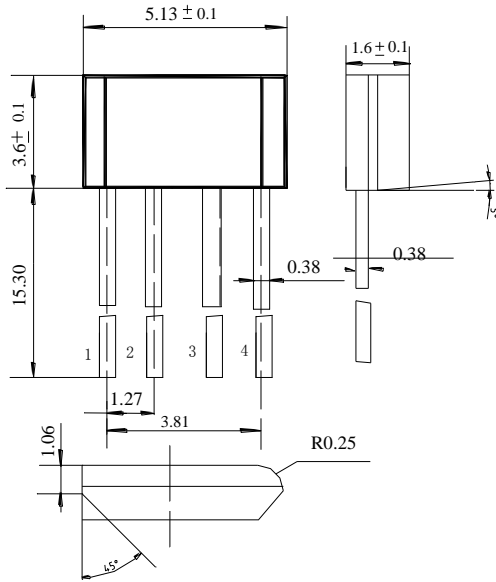
Parameter	Symbol	Value		Unit
		Min	Max	
Supply Voltage	V_{CC}	4.5	20	V
Magnetic Flux Density	B	unlimited	unlimited	mT
Output current	I_o	-	400	mA
Operating Temperature Range	T_A	-20	85	°C
Storage Temperature Range	T_s	-55	150	°C

ELECTRICAL CHARACTERISTICS ($T_A=12^{\circ}\text{C}\sim+85^{\circ}\text{C}$)

Parameter	Test Conditions	Symbol	Value			Unit
			Min	Typ	Max	
Supply Voltage		V_{CC}	4.5	-	20.0	V
Output Low Voltage	$V_{CC} = 4.5\text{V}\sim 20\text{V}$, $B=20\text{mT}$, $I_o=300\text{mA}$	V_{OL}	-	0.2	0.6	V
Output Leakage Current	$V_o=V_{CCmax}$, V_{CC} open-collector output	I_{OH}	-	0.1	10.0	μA
Supply Current	$V_{CC}=V_{CCmax}$, V_o open-collector output	I_{CC}	-	17.0	30.0	mA
Output Rise time	$V_{CC}=12\text{V}$, $R_L=820\ \Omega$, $C_L=20\text{pF}$	t_r	-	0.3	1.5	μs
Output Fall time	$V_{CC}=12\text{V}$, $R_L=820\ \Omega$, $C_L=20\text{pF}$	t_f	-	0.3	1.5	μs



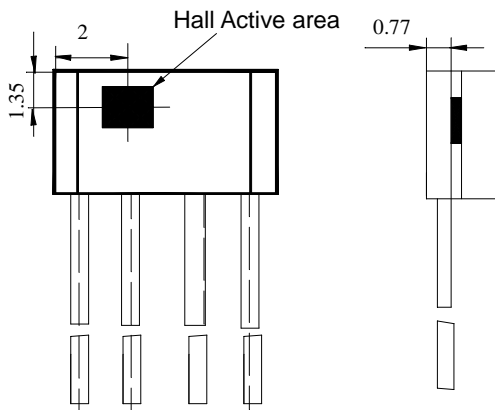
Package (Unit: mm)



Magnetic Characteristics

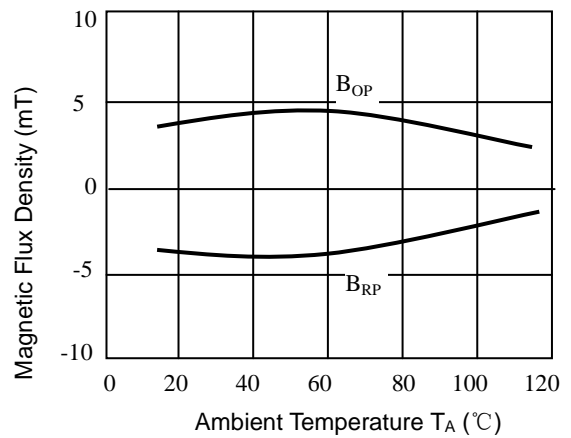
Parameter	Type	Value			Unit
		Min	Typ	Max	
Operate Point (B _{OP})	A	-	-	5	mT
	B	-	-	8	
	C	-	-	12	
Release Point (B _{RP})	A	-5	-	-	
	B	-8	-	-	
	C	-12	-	-	
Hysteresis(B _H)		4	8	-	

Position of Sensitive Area



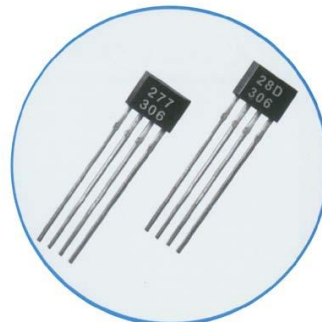
Characteristics Curves

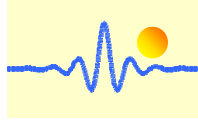
Temperature Characteristics of B_{OP}, B_{RP}



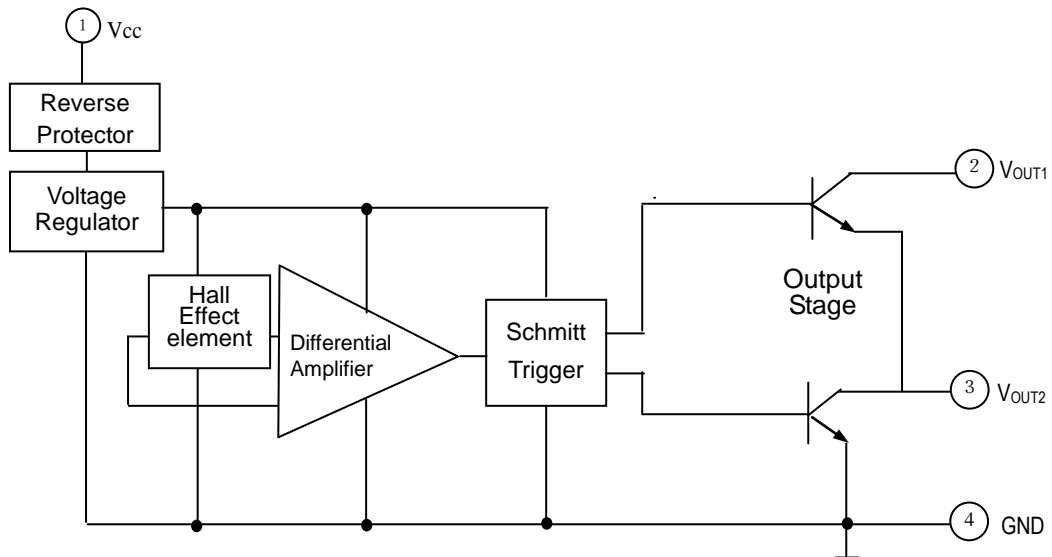
PIN NOTES:

1. Vcc
2. Output 1
3. Output 2
4. GND



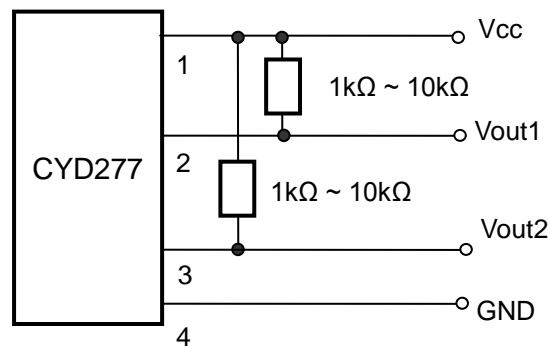


Functional Block Diagram



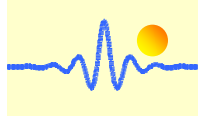
Connection

This sensor has OC (NPN) output voltages. Therefore it is necessary to connect a pull-up resistor in value from 1k Ω to 10k Ω between the power supply Vcc and output pins.



NOTES:

- Voltage Regulator: The output is stable when supply voltage varies from 4.5V to 20V.
- Reverse Protector: When supply voltage is opposed or interfered by reverse pulse voltage in usage, It protects circuit and protective voltage is up to 30V.
- Hall Effect Voltage Generator: It transfers the magnetic signal to the corresponding electric signal.
- Differential Amplifier: It can amplify the weak voltage signal from Hall voltage generator output.



Schmitt Trigger:	It transfers analogy signal from differential amplifier output to digital signal.
Temperature Compensator:	It ensures that the Hall-effect ICs over the temperature range of -20°C to +85°C.
Complementary Follower:	Output current can drive two windings of brushless fan directly. Turning on the brushless fan, and the output stage V_{OUT1} & V_{OUT2} will change when the Hall voltage generator is forced by alternating magnetic, the fan can operate because the direction of load current(winding of the fan) is changed.