

## General Description

The SDC477, is an integrated Hall sensor with H-bridged output driver designed for brushless DC motor applications. The high sensitivity of Hall-effect sensor is suitable for motors from mini-type CPU coolers to blowers and DC fans. Typical operation current is 250mA and operating voltage range is wide.

## Features

- One-chip hall sensor
- Wide operating voltage range: 3.8V~20V
- Output sink current up to 250mA
- Output thermal shutdown protection
- Package : TO-94

## Applications

- Brushless DC motor
- Brushless DC fan
- Revolution counting
- Speed measurement

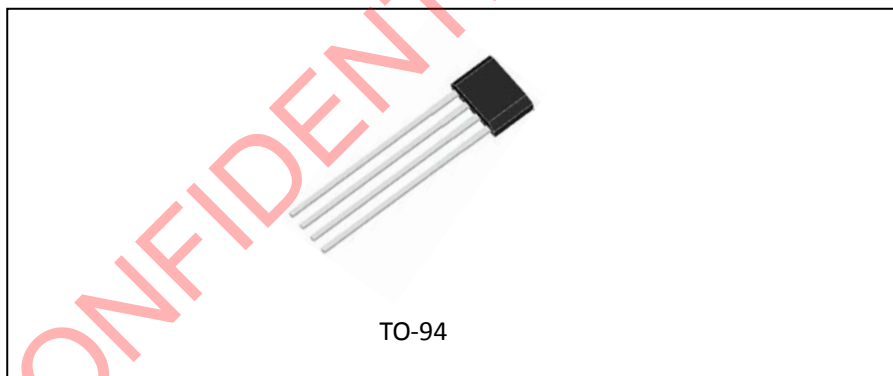


Figure 1. Package Type

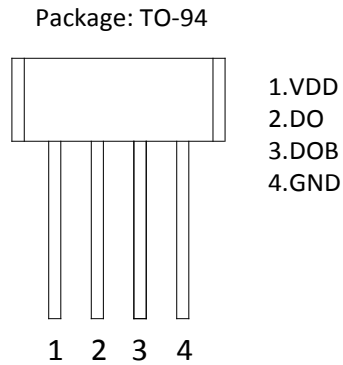
**Pin Configuration**


Figure 2. Pin Configuration

Pin Number	Pin Name	Function
1	VCC	Supply voltage pin
2	DO	Output 2 pin
3	DOB	Output 3 pin
4	GND	Ground pin

Table1. Pin Description

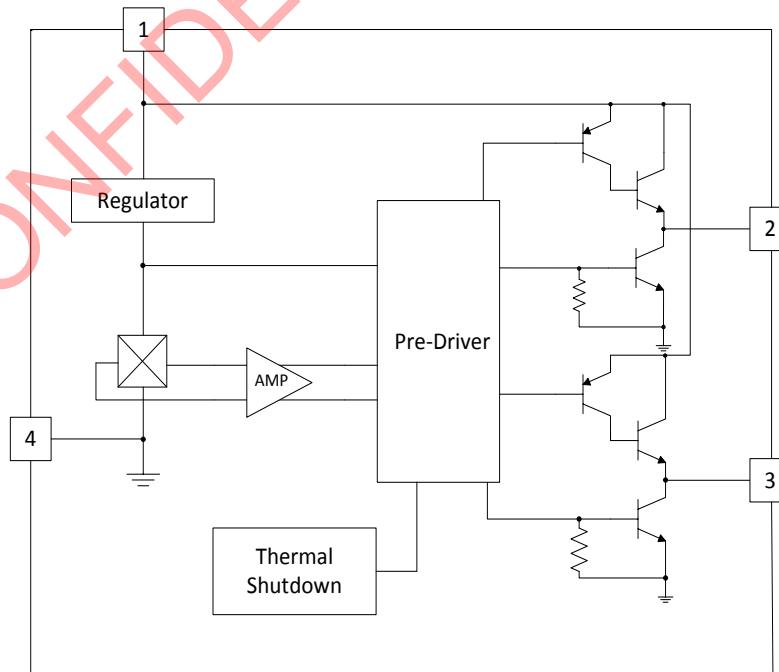
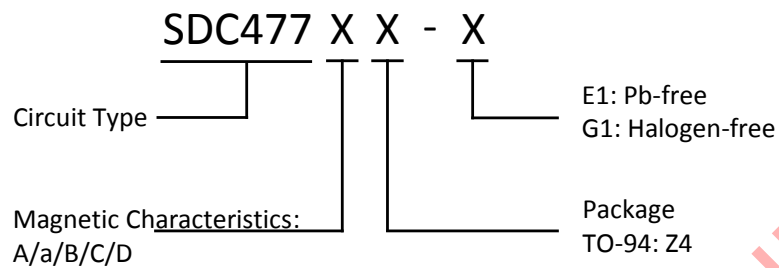
**Functional Block Diagram**


Figure 3. Functional Block Diagram

**Ordering Information**


Package	Temperature Range	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-free	Pb-free	Halogen-free	
TO-94	-20°C~85°C	SDC477AZ4-E1	SDC477AZ4-G1	477	477G	Bulk
		SDC477aZ4-E1	SDC477aZ4-G1	477	477G	Bulk
		SDC477BZ4-E1	SDC477BZ4-G1	477	477G	Bulk
		SDC477CZ4-E1	SDC477CZ4-G1	477	477G	Bulk
		SDC477DZ4-E1	SDC477DZ4-G1	477	477G	Bulk

**Absolute Maximum Ratings** (Note: Stresses greater than those listed under absolute maximum ratings may cause permanent damage to the device.)

Parameter		Symbol	Value	Units
Supply Voltage		$V_{CC}$	24	V
Output Voltage		$V_{OUT}$	24	V
Output current	Continuous	$I_{OUT}$	250	mA
	Hold		350	
	Peak		700	
Package power dissipation		$P_D$	550	mW
Storage temperature range		$T_S$	-65 to 150	°C
Maximum junction temperature		$T_J$	150	°C
ESD, HBM model per Mil-Std-883, Method 3015		HBM	2000	V
ESD, MM model per JEDEC EIA/JESD22-A115		MM	200	V
Latch-up test per JEDEC 78		-	200	mA

Table 2. Absolute Maximum Ratings

**Recommended Operating Conditions**

Parameter	Symbol	Min	Max	Unit
Power supply	$V_{CC}$	3.8	20	V
Operation temperature	$T_a$	-20	85	°C

Table 3 Recommended Operating Conditions

**Electrical Characteristics** ( $T_a=25^{\circ}\text{C}$ ,  $V_{CC}=18\text{V}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply voltage	$V_{CC}$	-	3.8	18	20	V
Quiescent supply current	$I_{CC}$	$V_{CC}=20\text{V}$ , other pins are open	-	10	15	mA
Output saturation voltage	$V_{CE}(\text{sink})$	$V_{CC}=18\text{V}$ , $I_C=200\text{mA}$	-	0.5	0.8	V
	$V_{CE}(\text{drive})$	$V_{CC}=18\text{V}$ , $I_C=200\text{mA}$	-	0.9	1.3	V
Rise time	$t_r$	$R_L=820\Omega$ , $C_L=20\text{pF}$	-	0.5	1.0	us
Fall time	$t_f$	$R_L=820\Omega$ , $C_L=20\text{pF}$	-	0.5	1.5	us
Switch time differential	$\Delta t$	$R_L=820\Omega$ , $C_L=20\text{pF}$	-	0.5	1.0	us

Table 4. Electrical Characteristics

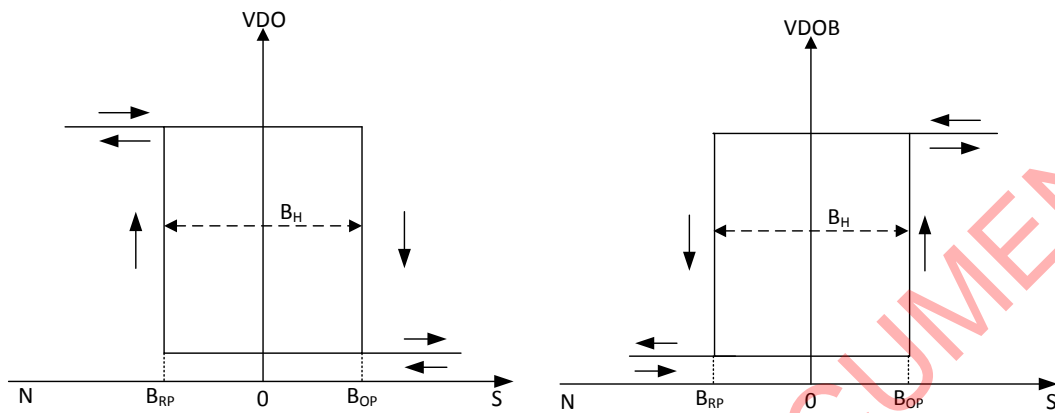
**Magnetic Characteristics** ( $V_{CC}=18V$ , unless otherwise specified)


Figure 4. Magnetic Characteristics

**Grade A**

Parameter	Symbol	Min	Max	Unit
Operate point	$B_{OP}$	10	41	GS
Release point	$B_{RP}$	-41	-10	GS

**Grade a**

Parameter	Symbol	Min	Max	Unit
Operate point	$B_{OP}$	10	70	GS
Release point	$B_{RP}$	-70	-10	GS

**Grade B**

Parameter	Symbol	Min	Max	Unit
Operate point	$B_{OP}$	-	70	GS
Release point	$B_{RP}$	-70	-	GS

**Grade C**

Parameter	Symbol	Min	Max	Unit
Operate point	$B_{OP}$	-	90	GS
Release point	$B_{RP}$	-90	-	GS

**Grade D**

Parameter	Symbol	Min	Max	Unit
Operate point	$B_{OP}$	-	110	GS
Release point	$B_{RP}$	-110	-	GS

Table 5. Magnetic Characteristics

### Function Description

The figure below is the circuit diagram of H-bridge transistors. The single-phase motor rotation depends on a switching current of coil L1. When the magnetic pole is N pole, Q2, Q3, Q5 are turn-off and Q1, Q4, Q6 are turn-on,

L1 has a current from DOB to DO. And when the magnetic pole is S pole, Q1, Q4, Q6 are turn-off and Q2, Q3, Q5 are turn-on. There is a current from DO to DOB between L1.

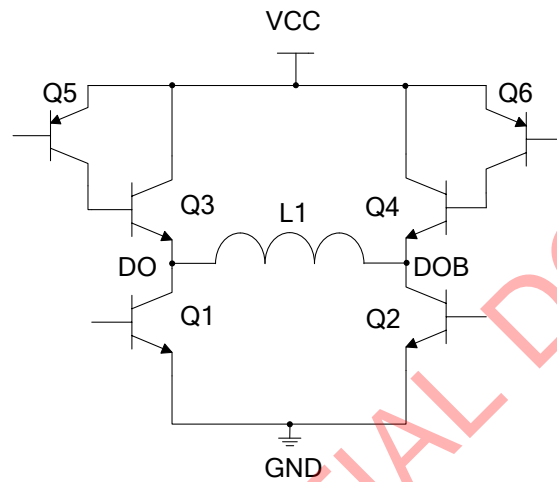


Figure 5. H-Bridge Transistors Output

### Typical Application

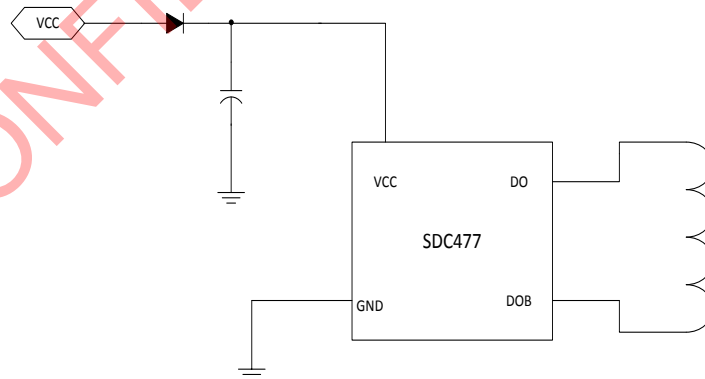
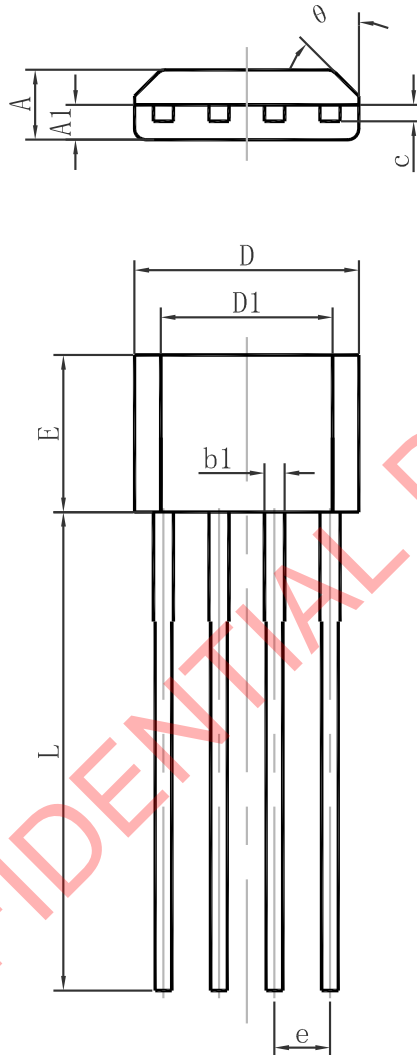


Figure 6. Typical Application

**Package Dimension**
**TO-94**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.800	0.055	0.071
A1	0.700	0.900	0.028	0.035
b1	0.380	0.550	0.015	0.022
C	0.360	0.510	0.014	0.020
D	5.050	5.350	0.202	0.214
D1	4.550	4.850	0.128	0.194
E	3.450	3.750	0.136	0.148
e	1.270 TYP.		0.050 TYP.	
L	14.300	14.700	0.572	0.588
θ	10°TYP.		10°TYP.	



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