



Features

- Built-in protecting diode for chip reverse power connecting
- Operating voltage range:3.5V~24V
- Output sink current up to 0.3A@12V
- On-Chip High sensitivity Hall-effect Sensor
- 40°C to 125°C Operating Temperature
- Rotor-locked shutdown and automatically restart function
- Low Profile SIP-4L Package

Applications

- For 5V/12V single coil DC Fan

General Description

TX2987 is integrated Hall sensors with output drivers, mainly designed for electronic commutation of brush-less DC Fan. This IC is using HV BCD process internally includes the regulator, protecting diode, Hall plate, amplifier, comparator, and a pair of complementary open-Drain outputs (DO, DOB).

To avoid coil burning, rotor-lock shutdown detection circuit shut down the output driver if the rotor is blocked and then the automatic recovery circuit will try to restart the motor. This function repeats while rotor is blocked. Until the blocking is removed, the motor recovers running normally.

Pin Assignment

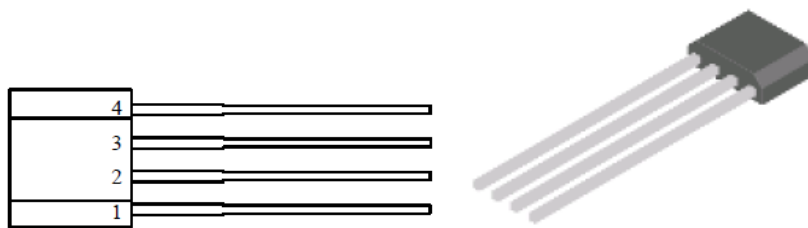


Fig 1 TO94

Pin Description

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



Block Diagram

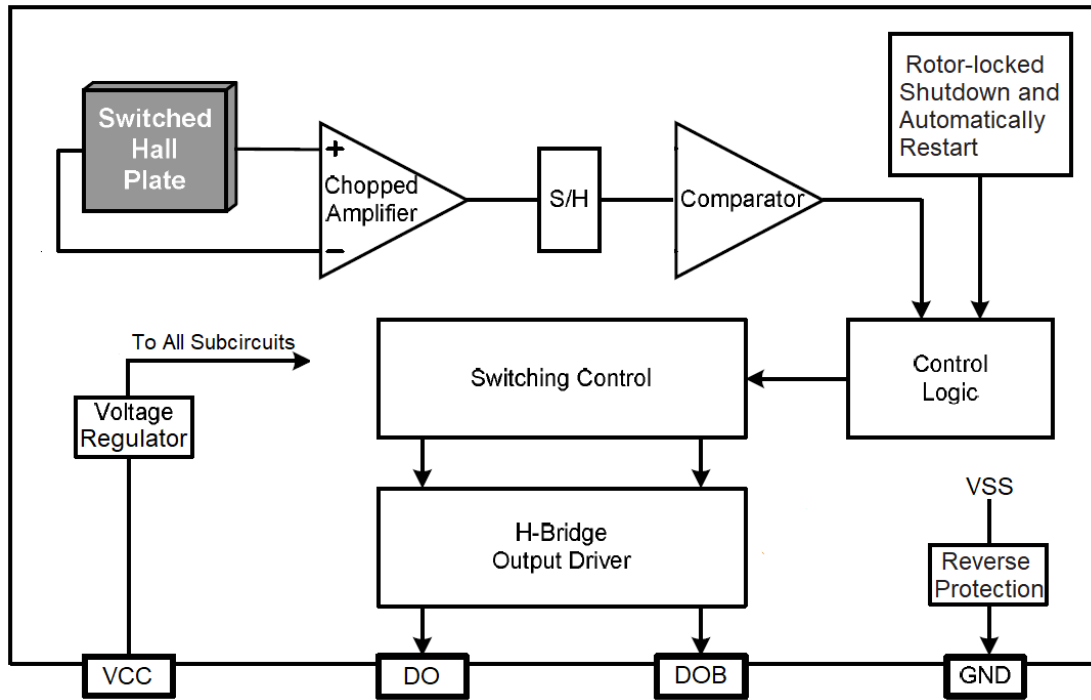


Fig 2

Absolute Maximum Ratings

Table1 (Ta=25°C)

Symbol	Parameter		Value	Unit
VCC	Supply Voltage		28	V
V _{RCC}	Reverse Protection Voltage		-28	V
B	Magnetic Flux Density		Unlimited	Gauss
IO	Output Current	Continuous	300	mA
		Hold	600	mA
		Peak(start up)	800	mA
PD	Power Dissipation		550	mW
θ _{JA}	Thermal Resistance	Die to atmosphere	227	°C/W
θ _{JC}		Die to package case	49	°C/W
TSTG	Storage Temperature		-50 to 150	°C

Note:Stresses greater than those listed under “Absolut Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of 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

Table 2 (Ta=25°C)

Parameter	Symbol	Min	Max	Unit
Supply Voltage	VCC	3.5	24	V
Ambient Temperature	Ta	-40	85	°C

Electrical Characteristics

Table 3 (VCC=12V,Ta=25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{SAT_sink}	Output Saturation Voltage	I _o =200mA,	-	0.3	-	V
V _{SAT_source}		I _o =200mA		VCC-0.6	-	V
I _{CC}	Supply Current	VCC=12V,Output Open		4.5	-	mA
T _{Dead}	Dead Time	R _L =820 Ω C _L =20pF		10		us
t _r	Output Rise Time	R _L =820 Ω C _L =20pF	-	0.5	-	us
t _f	Output Fall Time	R _L =820 Ω C _L =20pF	-	2.0	-	us
T _{on}	Locked Rotor Period		-	0.2	-	s
T _{off}	Locked Rotor Period		-	1.2	-	s

Magnetic Characteristics

Table 4 (Ta=25°C)

Characteristics	Symbol	Min	Typ	Max	Unit
Operating Point	B _{op}	15	25	50	Gauss
Releasing Point	B _{rp}	-50	-25	-15	Gauss
Hysteresis	B _{hys}	30	50	100	Gauss

Driver Output vs. Magnetic Pole

Table 5 (Ta=25°C)

Parameter	Test Conditions	DO	DOB
North Pole	B<B _{rp}	High	Low
South Pole	B>B _{op}	Low	High



Hysteresis Characteristics

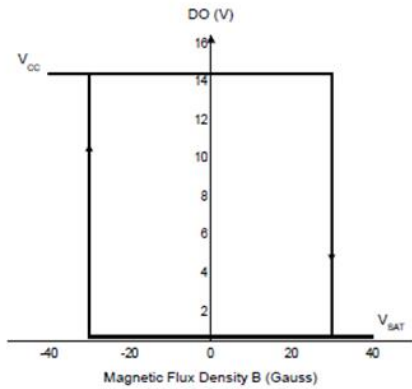


Fig 3 V_{DO} vs. Magnetic Flux Density

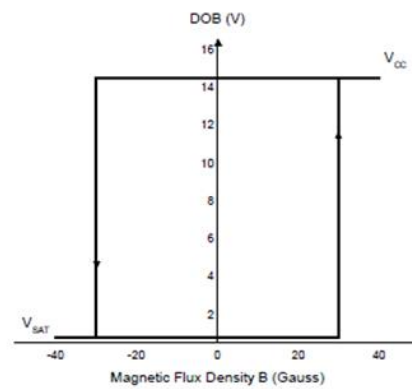


Fig 4 V_{DOB} vs. Magnetic Flux Density

Application Circuits

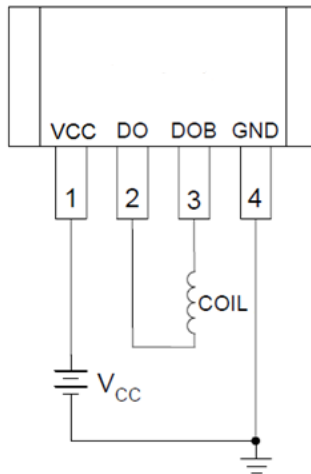


Fig 5

Output Waveforms Description

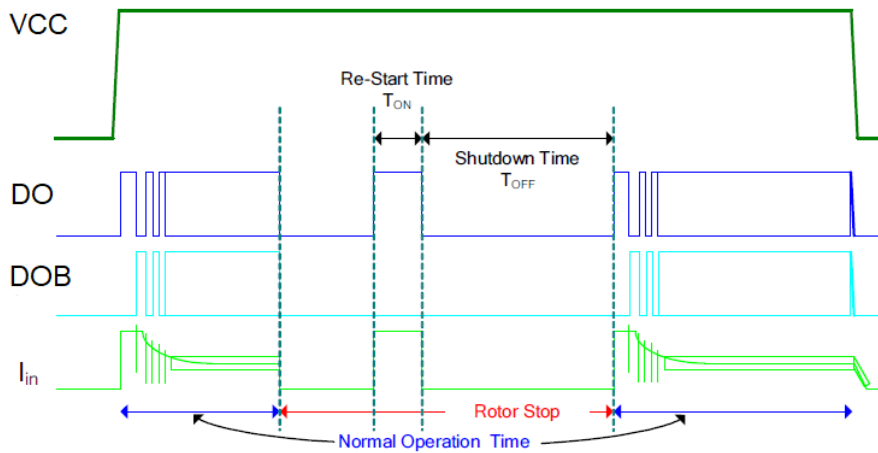


Fig 6



Package Information

TO-94 PACKAGE OUTLINE DIMENSIONS

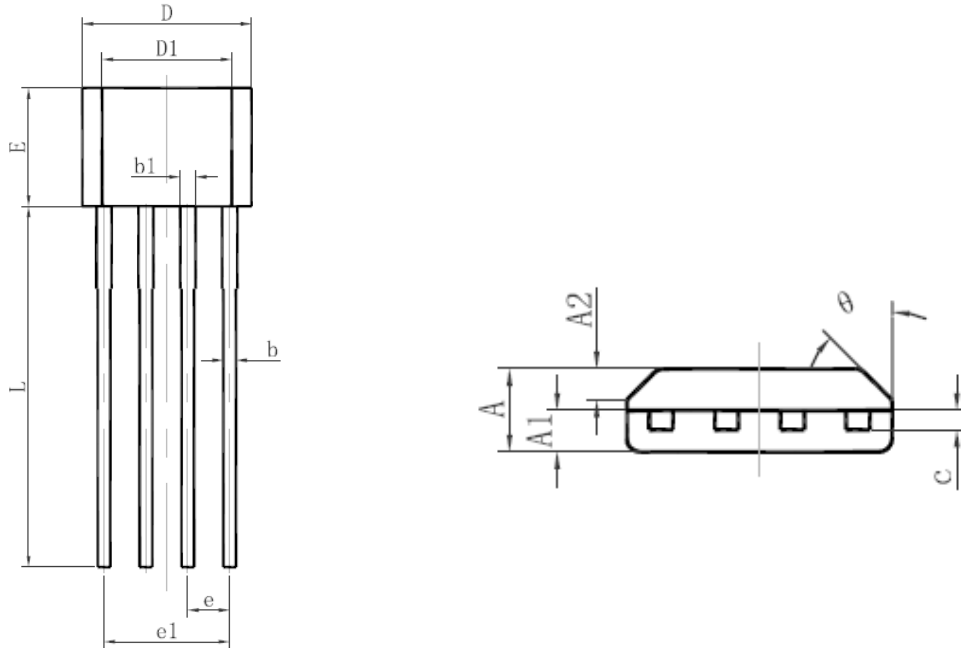


Fig 7

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
A2	0.500	0.700	0.020	0.028
b	0.360	0.500	0.014	0.020
b1	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.980	5.280	0.196	0.208
D1	3.780	4.080	0.149	0.161
E	3.450	3.750	0.136	0.148
e	1.270 TYP.		0.050 TYP.	
e1	3.710	3.910	0.146	0.154
L	14.900	15.300	0.587	0.602
θ	45° TYP.		45° TYP.	

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