

Pull-up Resistor Integrated Hall Effect Latch

DESCRIPTION

TSH193 Hall-effect sensor is a temperature stable, stress-resistant sensor. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. This method reduces the offset voltage normally caused by device over molding, temperature dependencies, and thermal stress.

TSH193 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, Pull-up resistor output. Advanced DMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low inputoffset errors, and small component geometries.

This device requires the presence of both south and north polarity magnetic fields for operation. In the presence of a south polarity field of sufficient strength, the device output sensor on, and only switches off when a north polarity field of sufficient strength is present.

FEATURES

- Chopper stabilized amplifier stage.
- Optimized for BLDC motor applications.
- Reliable and low shifting on high Temp condition.
- Pull-up resistor integrated
- ESD Protection >4kV HBM
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

APPLICATION

- High temperature fan motor
- 3 phase BLDC motor application
- Speed sensing, position sensing
- Revolution counting
- Solid-state switch
- Angular position detection
- Proximity detection

SOT-23



Pin Definition:

1. Vcc

2. Output

3. Ground



Notes: Moisture sensitivity level: level 3. Per J-STD-020

TYPICAL APPLICATION CIRCUIT





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ABSOLUTE MAXIMUM RATINGS (T _A = 25°C unless otherwise noted)					
PARAMETER		SYMBOL	LIMIT	UNIT	
Supply voltage		V _{CC}	18	V	
Output current		Ι _{ουτ}	13	mA	
Magnetic flux density			Unlimited	Gauss	
Operating Temperature Range		T _{OPR}	-40 to +125	°C	
Storage temperature range		T _{STG}	-55 to +150	°C	
Maximum Junction Temperature		TJ	150	°C	
Package Power Dissipation	TO-92S	P _D	606	mW	
	SOT-23		230		

THERMAL PERFORMANCE					
PARAMETER		SYMBOL	LIMIT	UNIT	
Thermal Resistance - Junction to Case	TO-92S	R _{eJC}	206	°C/W	
	SOT-23		543		
Thermal Resistance - Junction to Ambient	TO-92S	R _{eja}	148	°C/W	
	SOT-23		410		

Note: Considering 6 cm² of copper board heat-sink

ELECTRICAL SPECIFICATIONS (DC Operating Parameters : T _A =+25°C, V _{CC} =12V)					
PARAMETER	CONDITIONS	MIN	ТҮР	MAX	UNIT
Supply Voltage	Operating	2.5		16	V
Supply Current	B <b<sub>OP</b<sub>			5	mA
Output Saturation Voltage	B>B _{OP}			400	mV
Output Leakage Current	I _{OFF} B <b<sub>RP, V_{OUT}=12V</b<sub>			10	μA
Output Rise Time	R _L =1.1KΩ, C _L =20pF		0.04	0.45	μs
Output Fall Time	R _L =820Ω; C _L =20pF		0.18	0.45	μs
ESD	НВМ	4			kV
Pull-up Resistor			10		kΩ
Operate Point (B _{OP})		5		25	Gauss
Release Point (B _{RP})		-25		-5	Gauss
Hysteresis (B _{OP} - B _{RP})			30		Gauss

Note: 1G (gauss) = 0.1mT (millitesla)

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSH193CT B0G	TO-92S	1kpcs / Bag
TSH193CX RFG	SOT-23	3kpcs / 7"Reel



OUTPUT BEHAVIOR VERSUS MAGNETIC POLE

DC Operating Parameters: $T_A = -40$ to 125° C, $V_{CC} = 2.5 \sim 18$ V				
Parameter	Test condition	OUT (TO-92S)	OUT (SOT-23)	
North pole	B>B _{OP}	Hi	Low	
South pole	B <b<sub>RP</b<sub>	Low	Hi	



CHARACTERISTICS CURVES

($T_c = 25^{\circ}C$ unless otherwise noted)

Figure 1. Flux Density vs. Supply Voltage

Figure 3. Supply Current vs. Temperature

Figure 5. Saturation Voltage vs. Supply Voltage

Figure 2. Flux Density vs. Temperature

Figure 4. Supply Current vs. Supply Voltage

Figure 6. Saturation Voltage vs. Temperature

CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

Figure 7. Leakage Current vs. Supply Voltage

Figure 8. Power Dissipation vs. Temperature

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

1.52 ±0.10

MARKING DIAGRAM

TO-92S

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-23

SUGGESTED PAD LAYOUT (Unit: Millimeters)

MARKING DIAGRAM

193 = Device Code **WW** = Week Code Table

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