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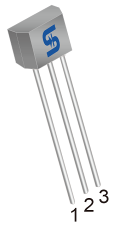
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

TSH188

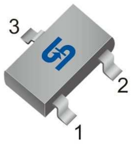
Ultra High Sensitivity Hall Effect Latch

TO-92S



Pin Definition:
1. V_{CC}
2. GND
3. Output

SOT-23



Pin Definition:
1. V_{CC}
2. Output
3. GND

Description

TSH188 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. TSH188 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger. Advanced DMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low input-offset 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

- 100% tested at 125°C
- Temperature compensation function
- Chopper stabilized amplifier stage.
- Optimized for BLDC motor applications.
- Reliable and low shifting on high Temp condition.

Ordering Information

Part No.	Package	Packing
TSH188CT B0G	TO-92S	1Kpcs / Bulk Bag
TSH188CT A3G	TO-92S	2Kpcs / Ammo
TSH188CX RFG	SOT-23	3Kpcs / 7” Reel

Note: “G” denote for Halogen Free Product

Application

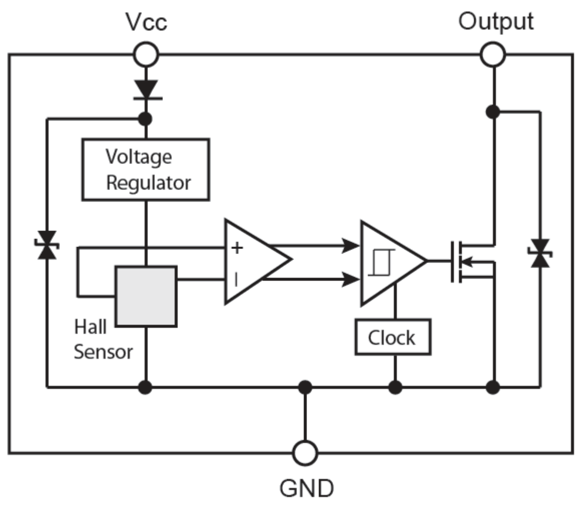
- High temperature Fan motor
- 3 phase BLDC motor application
- Speed sensing, Position sensing, Current sensing
- Revolution counting
- Solid-State Switch
- Linear/Angular Position Detection

Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

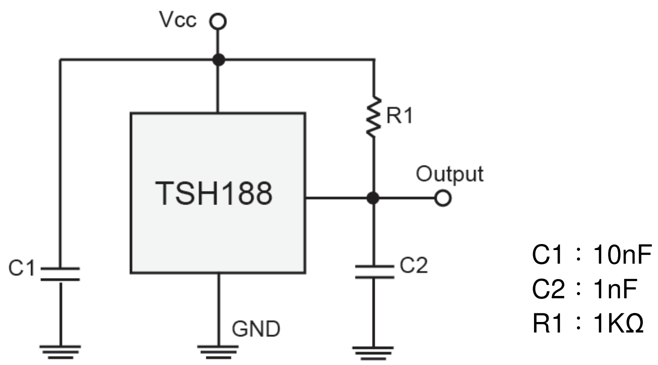
Characteristics		Limit	Value	Unit
Supply voltage		V_{CC}	28	V
Output Voltage		V_{OUT}	28	V
Reverse voltage		$V_{CC/OUT}$	-28	V
Magnetic flux density			Unlimited	Gauss
Output current		I_{OUT}	50	mA
Operating Temperature Range		T_{OPR}	-40 to +125	°C
Storage temperature range		T_{STG}	-55 to +150	°C
Maximum Junction Temp		T_J	150	°C
Thermal Resistance - Junction to Ambient	TO-92S	θ_{JA}	206	°C/W
	SOT-23		543	
Thermal Resistance - Junction to Case	TO-92S	θ_{JC}	148	°C/W
	SOT-23		410	
Package Power Dissipation	TO-92S	P_D	606	mW
	SOT-23		230	

Note: Do not apply reverse voltage to V_{CC} and V_{OUT} Pin, It may be caused for Miss function or damaged device.

Block Diagram



Typical Application Circuit



Electrical Specifications (DC Operating Parameters : T_A=+25°C,V_{CC}=12V)

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage	Operating	2.5	--	24	V
Supply Current	$B<B_{OP}$	--	--	5	mA
Output Saturation Voltage	I_{OUT}=20mA,$B>B_{OP}$	--	--	400	mV
Output Leakage Current	I_{OFF} $B<B_{RP}$, V_{OUT} = 12V	--	--	10	uA
Internal Oscillator Chopper Frequency		--	69	--	kHz
Output Rise Time	R_L=1.1KΩ, C_L=20pF	--	0.04	0.45	uS
Output Fall Time	R_L=820Ω; C_L=20pF	--	0.18	0.45	uS
ESD	HBM	4	--	--	KV
Operate Point		5(-25)	--	25(-5)	Gauss
Release Point		-25(5)	--	-5(25)	Gauss
Hysteresis		--	30	--	Gauss

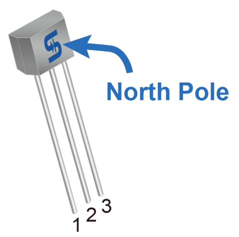
Note: 1G (Gauss) = 0.1mT (millitesta)

Output Behavior versus Magnetic Pole

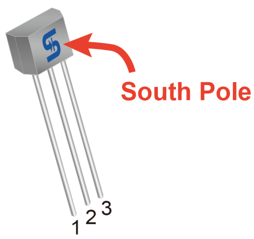
DC Operating Parameters: T_A = -40 to 125°C, V_{CC} = 2.5~24V

Parameter	Test condition	OUT (TO-92S)	OUT (SOT-23)
North pole	$B>B_{OP}$	Open(Hi)	Low
South pole	$B<B_{RP}$	Low	Open(Hi)

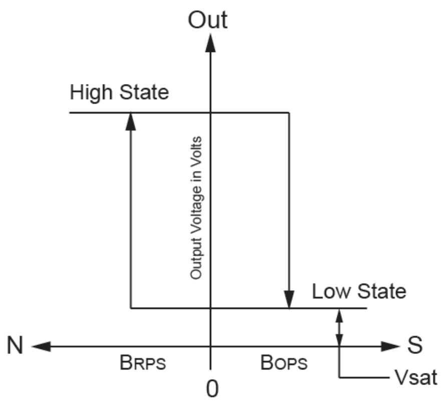
TO-92S



OUT=Hi
(Pull-up Voltage)

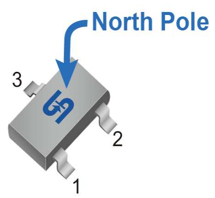


OUT=Low
(VDSon)

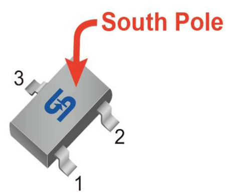


TO-92S - Magnetic Flux Density in Gauss

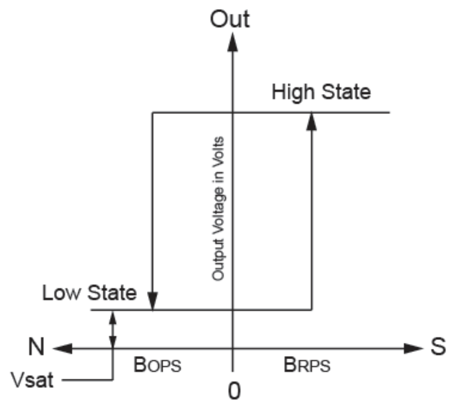
SOT-23



OUT=Low
(VDSon)



OUT=Hi
(Pull-up Voltage)



SOT-23 - Magnetic Flux Density in Gauss

Characteristic Performance

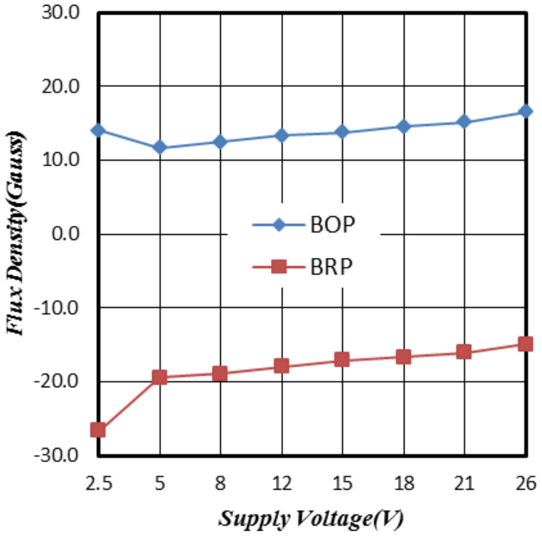


Figure 1. Supply Voltage vs. Flux Density

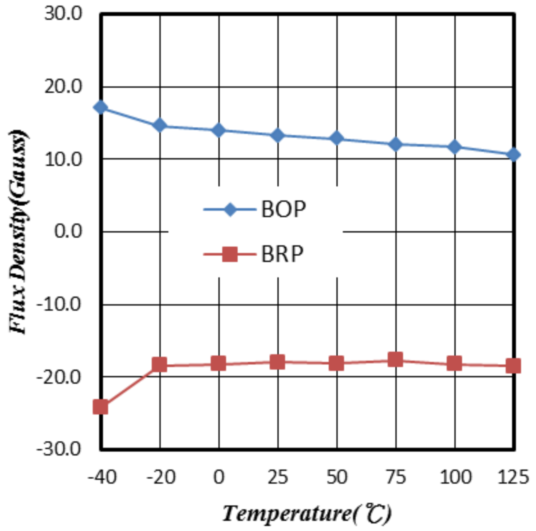


Figure 2. Temperature vs. Flux Density

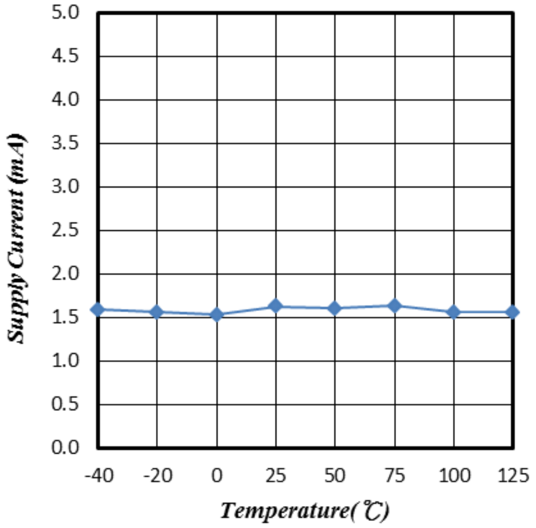


Figure 3. Supply Current vs. Temperature

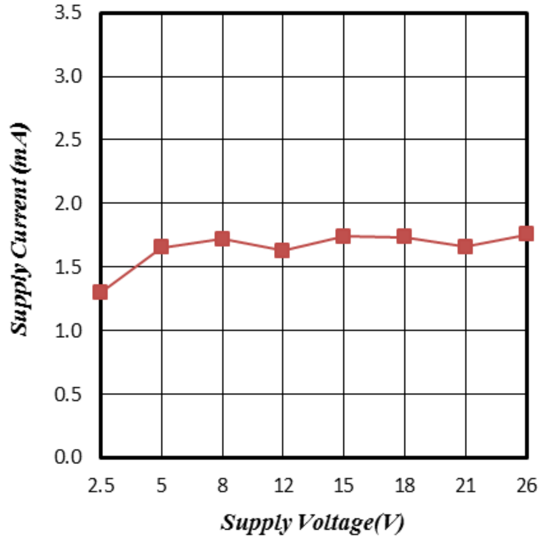


Figure 4. Supply Current vs. Supply Voltage

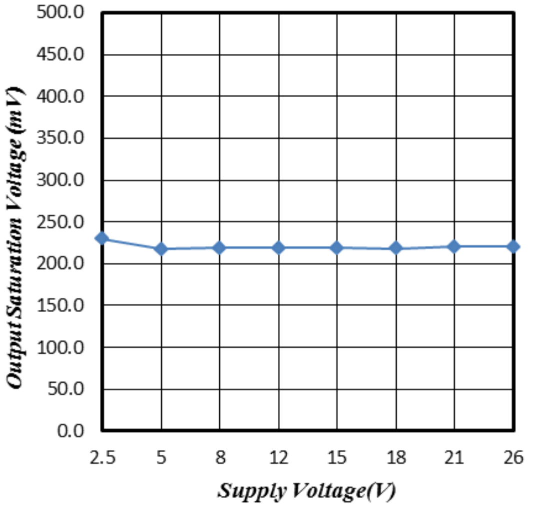


Figure 5. Supply Voltage vs. Saturation Voltage

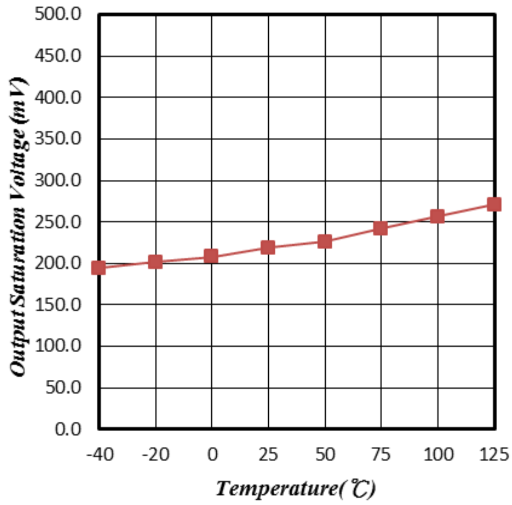


Figure 6. Saturation Voltage vs. Temperature

Characteristic Performance

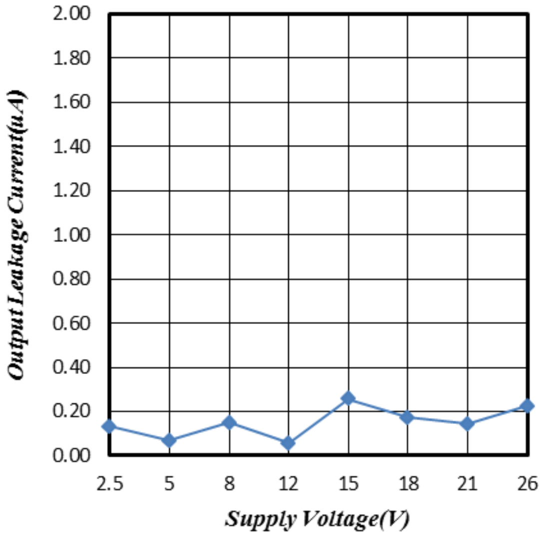


Figure 7. Supply Voltage vs. Leakage Current

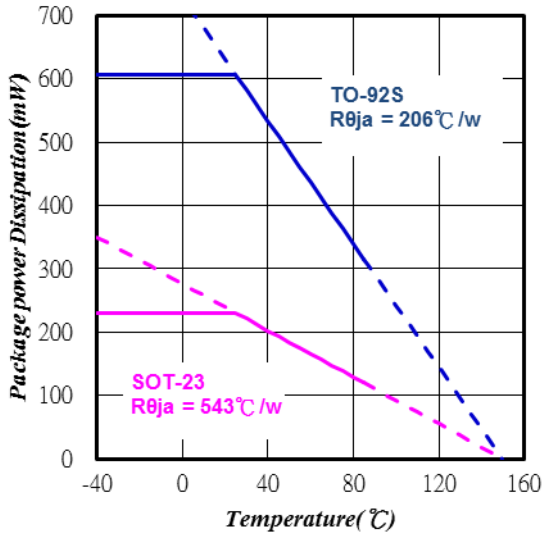


Figure 8. Temperature vs. Power Dissipation

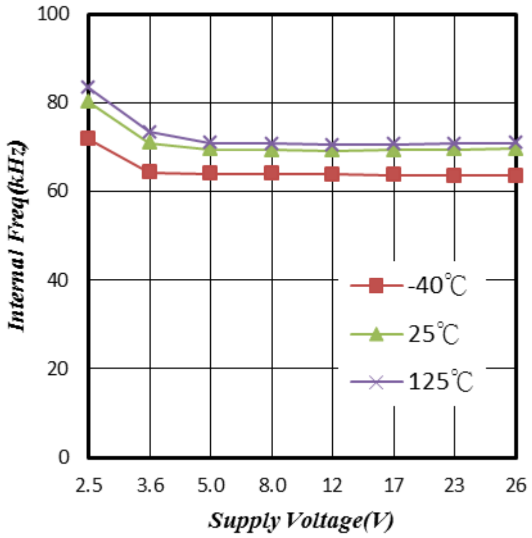


Figure 9. Supply Voltage vs. Internal Frequency

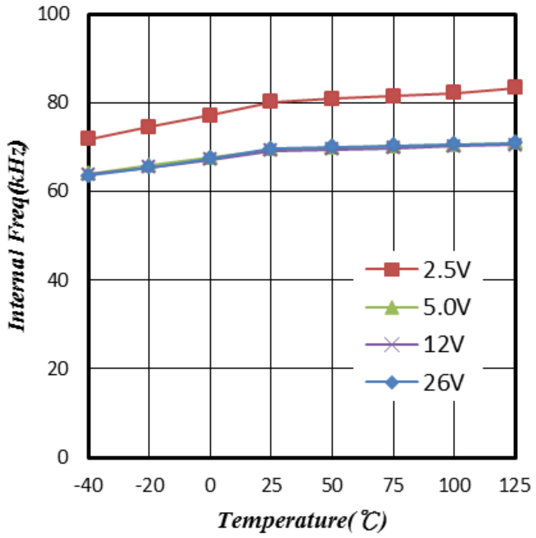
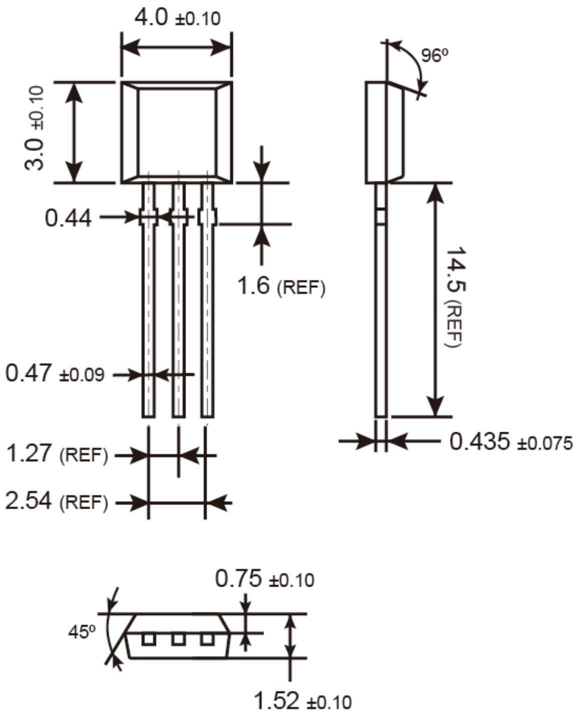
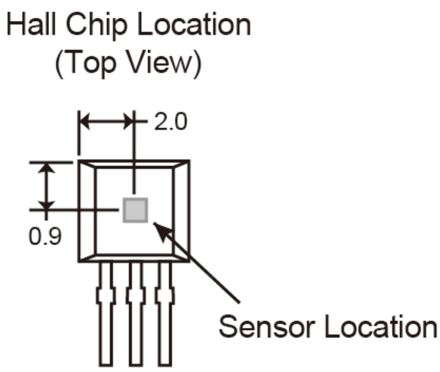


Figure 10. Temperature vs. Internal Frequency

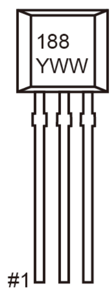
TO-92S Mechanical Drawing





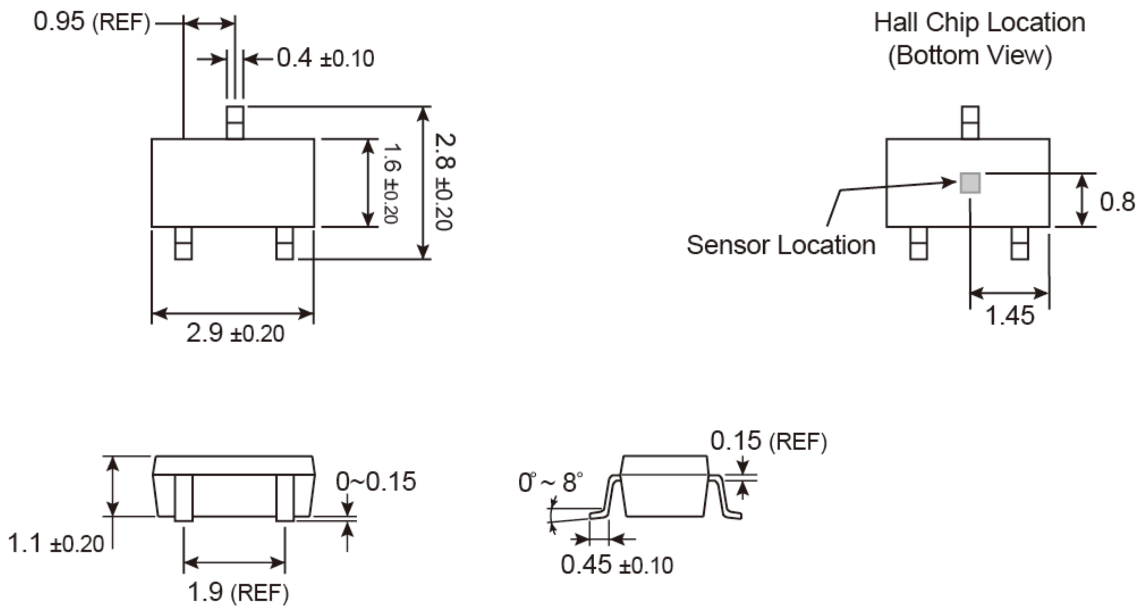
Unit: Millimeters

Marking Diagram



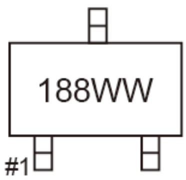
188 = Device Code
Y = Year Code
WW = Week Code (01~52)

SOT-23 Mechanical Drawing



Unit: Millimeters

Marking Diagram



188 = Device Code

WW = Week Code Table

week	1	2	3	4	5	6	7	8	9	10	11	12	13
code	OA	OB	OC	OD	OE	OF	OG	OH	OI	OJ	OK	OL	OM
week	14	15	16	17	18	19	20	21	22	23	24	25	26
code	ON	OO	OP	OQ	OR	OS	OT	OU	OV	OW	OX	OY	OZ
week	27	28	29	30	31	32	33	34	35	36	37	38	39
code	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM
week	40	41	42	43	44	45	46	47	48	49	50	51	52
code	PN	PO	PP	PQ	PR	PS	PT	PU	PV	PW	PX	PY	PZ

Notice