



### TO-92S



#### Pin Definition:

1.  $V_{DD}$
2. GND
3. Output

### Description

TSH181, Hall-Effect sensor, designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall Voltage, and a Schmitt trigger to provide switching hysteresis for noise rejection, and open collector output. An internal band gap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range. The device is identical except for magnetic switch points. The device includes on a single silicon chip a voltage regulator, Hall-voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, open-collector output to sink up to 25mA. A south pole of sufficient strength will turn the output on. The North Pole is necessary to turn the output off. An on-board regulator permits operation with supply voltages of 3.5V to 20 V.

### Features

- Temperature compensation.
- Wide operating voltage range.
- Open-Collector pre-driver.
- Reverse bias protection on power supply pin.
- 100% at 125°C "Hot Test"

### Ordering Information

Part No.	Package	Packing
TSH181CT B0G	TO-92S	1Kpcs / Bulk Bag

**Note:** "G" denote for Halogen Free Product

### Application

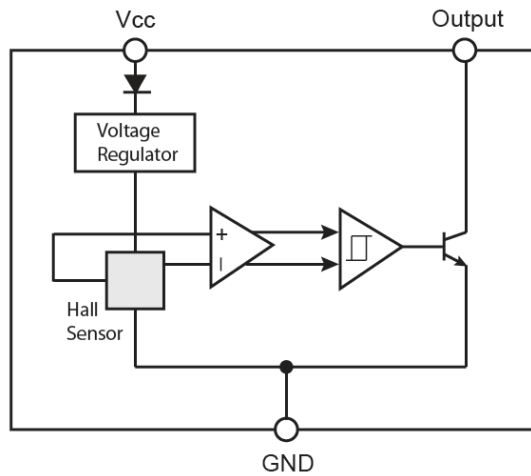
- High temperature Fan motor
- 3 phase BLDC motor application
- Fan motor application
- Speed sensing
- Revolution counting

### Absolute Maximum Rating ( $T_a = 25^\circ\text{C}$ unless otherwise noted)

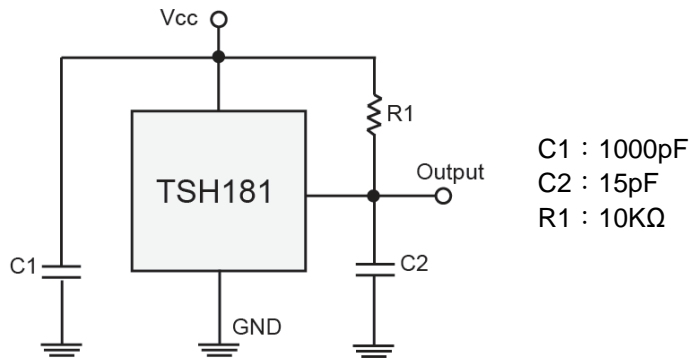
Characteristics	Limit	Value	Unit
Supply voltage	$V_{CC}$	20	V
Output Voltage	$V_{OUT}$	30	V
Reverse voltage	$V_{CC/OUT}$	-20	V
Magnetic flux density		Unlimited	Gauss
Output current	$I_{OUT}$	25	mA
Operating Temperature Range	$T_{OPR}$	-40 to +125	$^\circ\text{C}$
Storage temperature range	$T_{STG}$	-55 to +150	$^\circ\text{C}$
Maximum Junction Temp	$T_J$	150	$^\circ\text{C}$
Thermal Resistance - Junction to Ambient	$\theta_{JA}$	206	$^\circ\text{C/W}$
Thermal Resistance - Junction to Case	$\theta_{JC}$	148	$^\circ\text{C/W}$
Package Power Dissipation	$P_D$	606	mW

**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 : $T_A=+25^{\circ}\text{C}$ , $V_{CC}=12\text{V}$ )

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage	Operating	3.5	--	20	V
Supply Current	$B < B_{OP}$	--	4	8	mA
Output Saturation Voltage	$I_{OUT} = 10\text{mA}$ , $B > B_{OP}$	--	--	700	mV
Output Leakage Current	$I_{OFF}$ $B < B_{RP}$ , $V_{OUT} = 12\text{V}$	--	--	10	uA
Output Rise Time	$R_L=820\Omega$ , $C_L=20\text{pF}$	--	--	1.5	uS
Output Fall Time	$R_L=820\Omega$ ; $C_L=20\text{pF}$	--	--	1.5	uS

### Magnetic Specifications

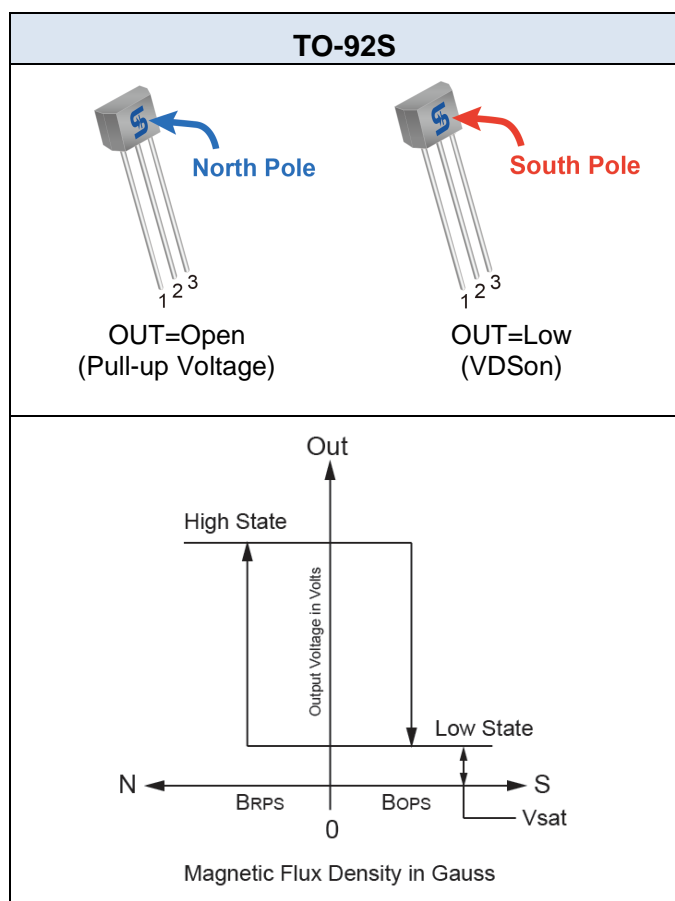
Parameters	Test Conditions	Min	Typ	Max	Units
Operate Point		5	--	90	Gauss
Release Point		-90	--	-5	Gauss
Hysteresis		--	100	--	Gauss

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

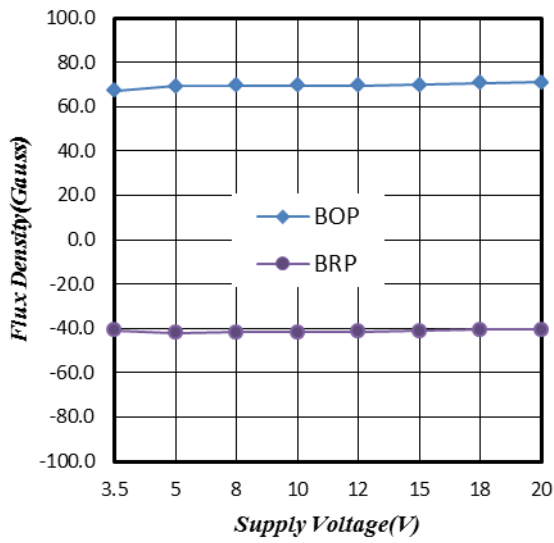
### Output Behavior versus Magnetic Pole

DC Operating Parameters:  $T_A = -40$  to  $125^\circ\text{C}$ ,  $V_{CC} = 3.5$  to  $20\text{V}$

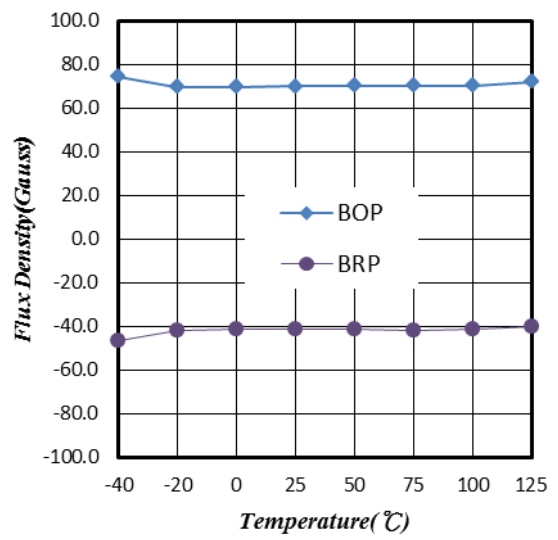
Parameter	Test condition	OUT
North pole	$B > B_{OP}$	Open
South pole	$B < B_{RP}$	Low



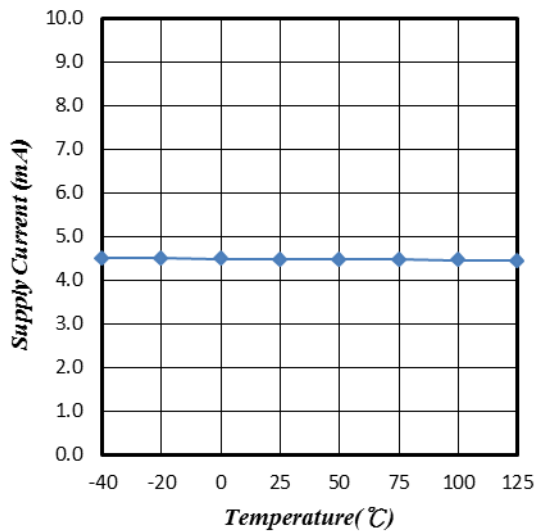
**Characteristic Performance**



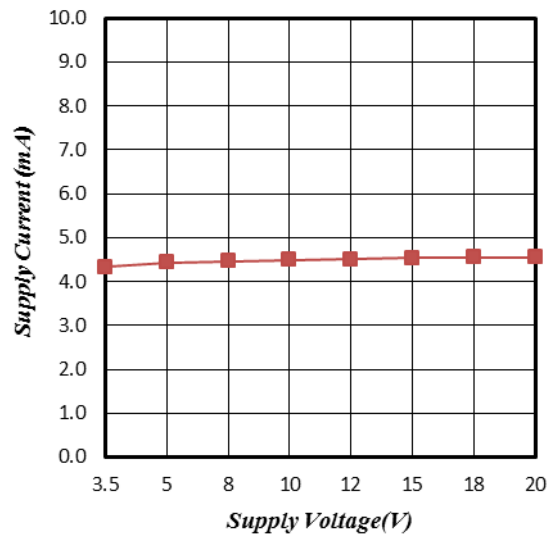
**Figure 1. Supply Voltage vs. Flux Density**



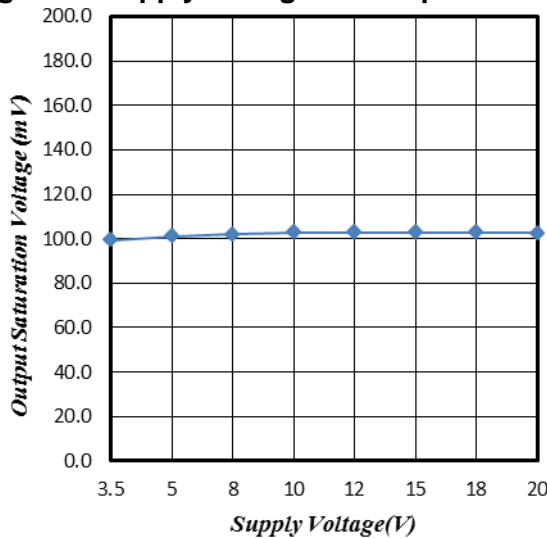
**Figure 2. Temperature vs. Flux Density**



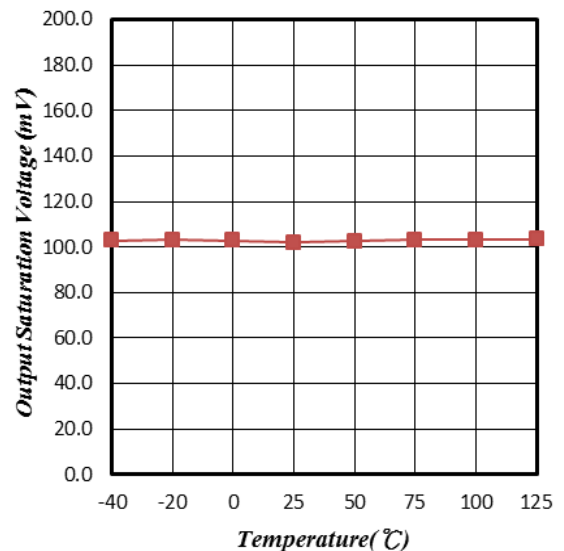
**Figure 3. Supply Voltage vs. Output Voltage**



**Figure 4. Temperature vs. Output Voltage**



**Figure 5. Supply Voltage vs. Leakage Current**



**Figure 6. Power Dissipation vs. Temperature**

### Characteristic Performance

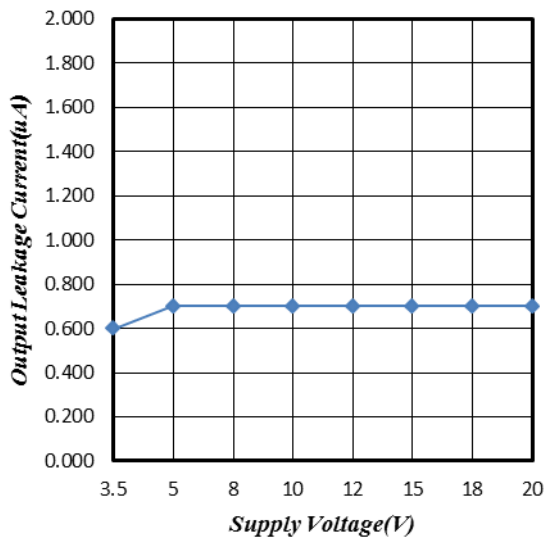


Figure 7. Temperature vs. Supply Current

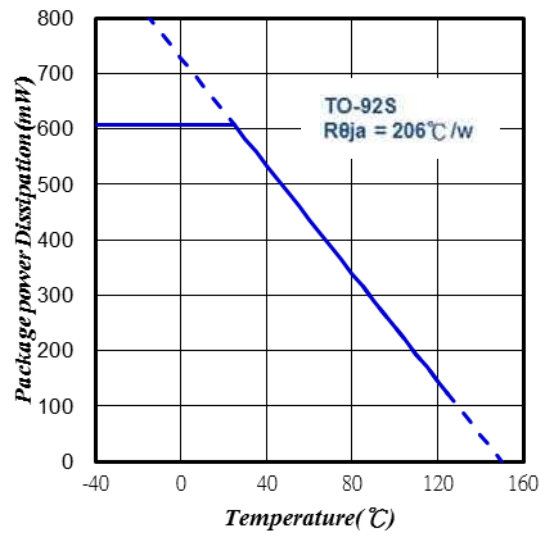


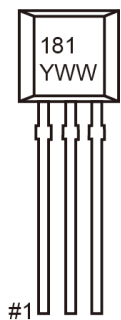
Figure 8. Temperature vs. Power Dissipation

### TO-92S Mechanical Drawing



Unit: Millimeters

### Marking Diagram



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

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