



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

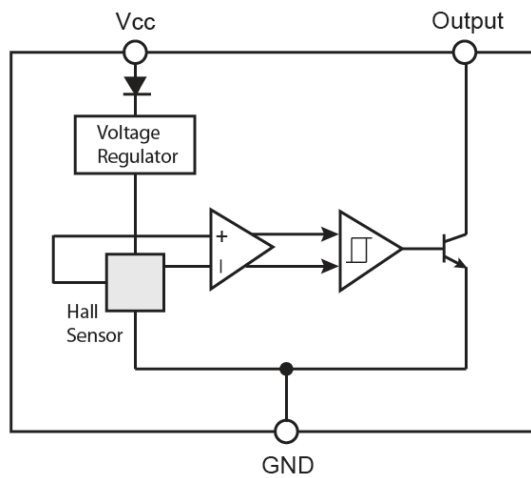
- High temperature Fan motor
- 3 phase BLDC motor application
- Fan motor application
- Speed sensing
- Revolution counting

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

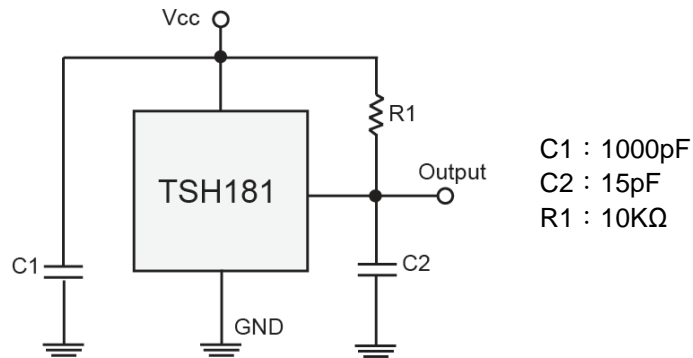
| Characteristics | Limit | Value | Unit |
|--|---------------|-------------|--------------------|
| Supply voltage | V_{CC} | 20 | V |
| Output Voltage | V_{OUT} | 30 | V |
| Reverse voltage | $V_{CC/OUT}$ | -20 | V |
| Magnetic flux density | | Unlimited | Gauss |
| Output current | I_{OUT} | 25 | 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 | θ_{JA} | 206 | $^\circ\text{C/W}$ |
| Thermal Resistance - Junction to Case | θ_{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

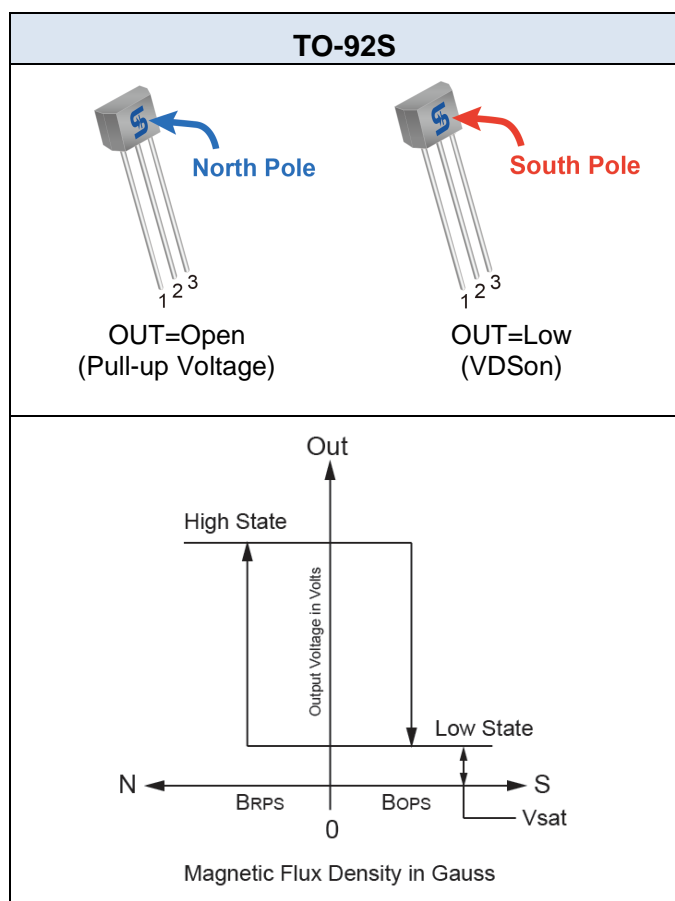
| Parameters | Test Conditions | Min | Typ | Max | Units |
|---------------|-----------------|-----|-----|-----|-------|
| Operate Point | | 5 | -- | 90 | Gauss |
| Release Point | | -90 | -- | -5 | Gauss |
| Hysteresis | | -- | 100 | -- | Gauss |

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

Output Behavior versus Magnetic Pole

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

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



Characteristic Performance

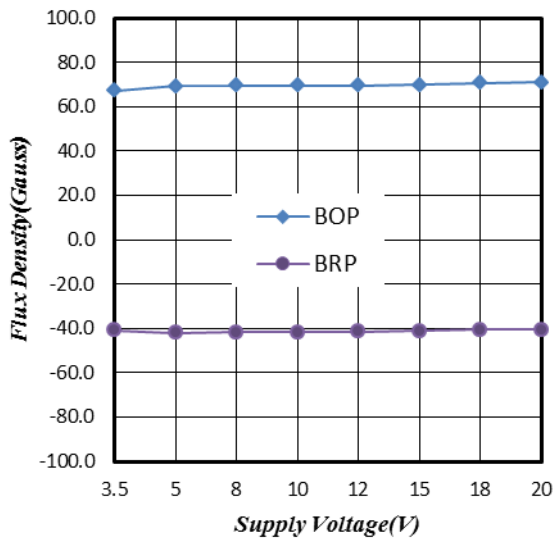


Figure 1. Supply Voltage vs. Flux Density

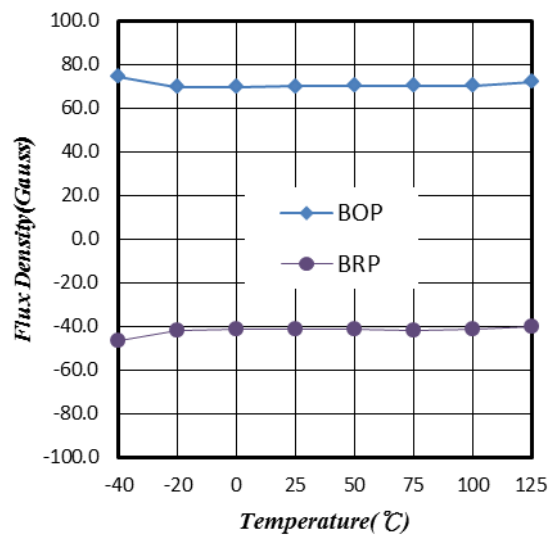


Figure 2. Temperature vs. Flux Density

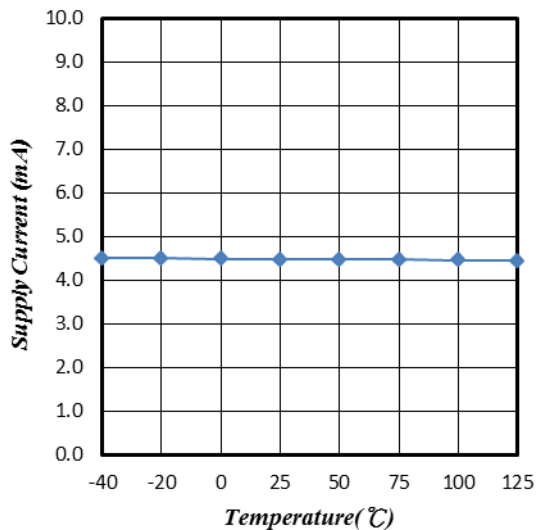


Figure 3. Supply Voltage vs. Output Voltage

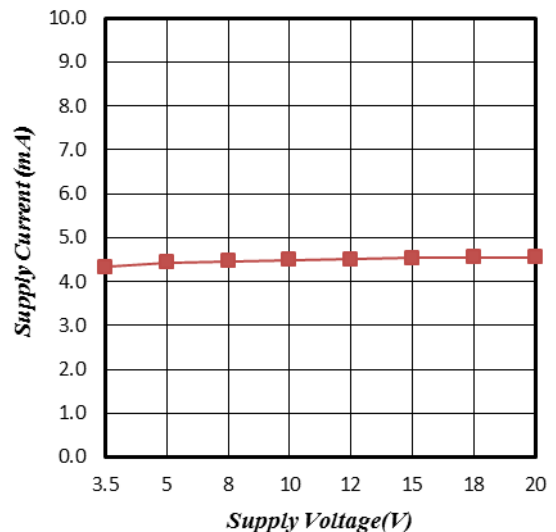


Figure 4. Temperature vs. Output Voltage

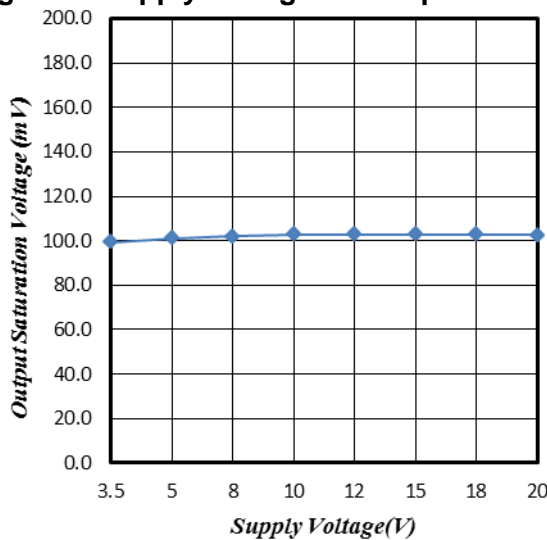


Figure 5. Supply Voltage vs. Leakage Current

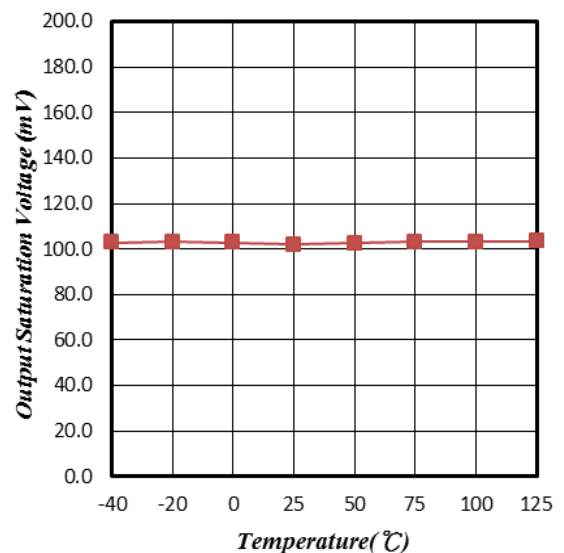


Figure 6. Power Dissipation vs. Temperature

Characteristic Performance

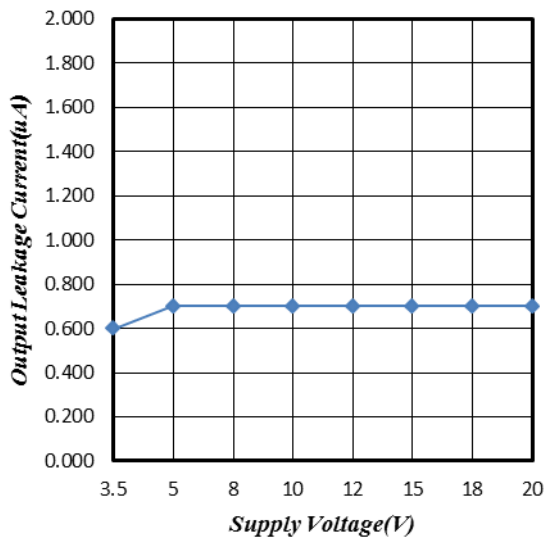


Figure 7. Temperature vs. Supply Current

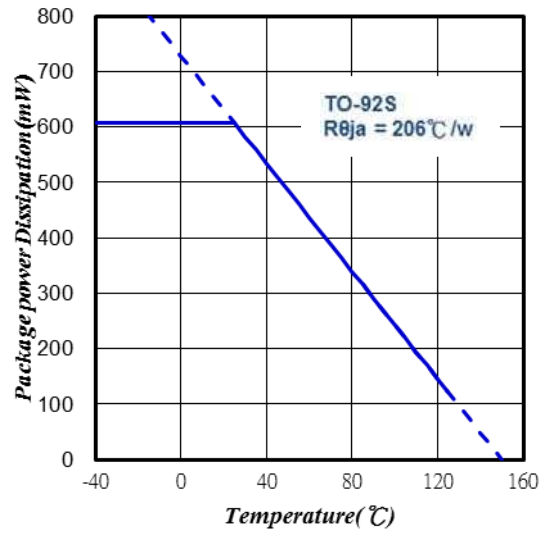
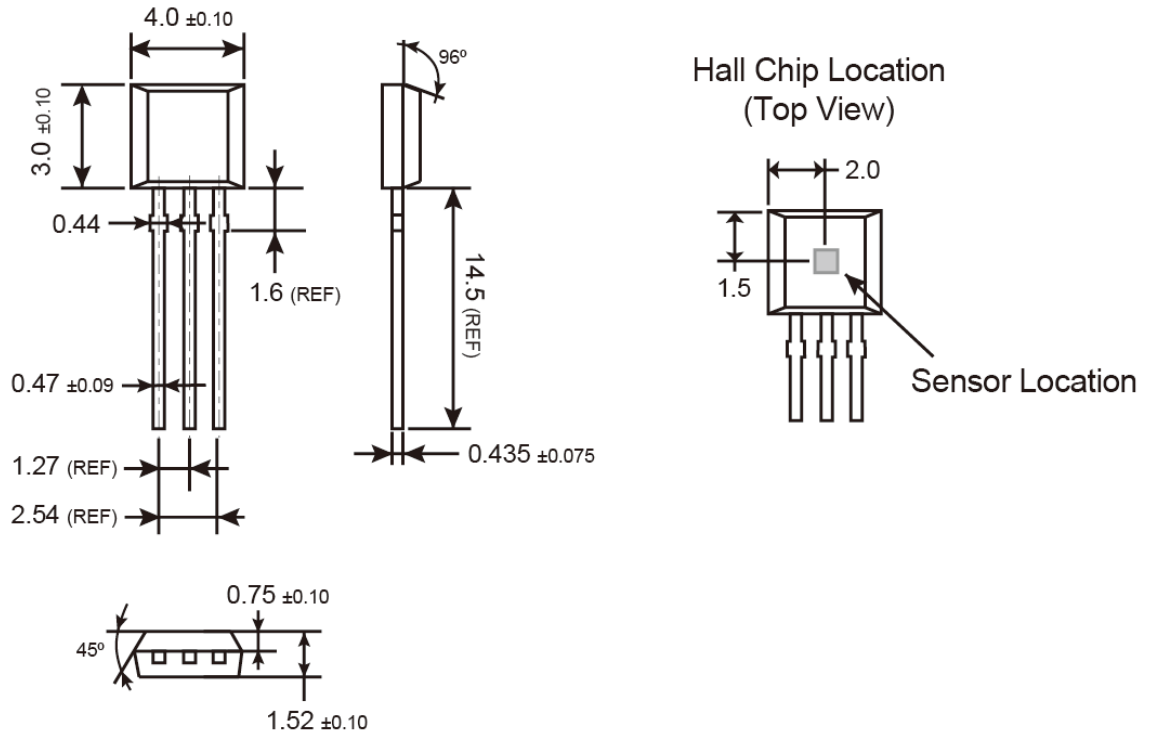


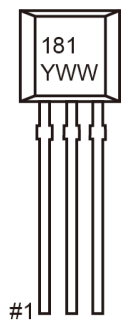
Figure 8. Temperature vs. Power Dissipation

TO-92S Mechanical Drawing



Unit: Millimeters

Marking Diagram



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

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