

Bipolar High Voltage Hall Effect Latch

DESCRIPTION

TS190, 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, 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. 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 4V to 30V.

FEATURES

- Optimized for BLDC motor applications
- High Peak Voltage of 65V
- 100% tested at 125°C
- Temperature compensation function
- RoHS Compliant
- Halogen-free

APPLICATION

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



TO-92S

Pin Definition:

1. Vcc
2. Ground
3. Output



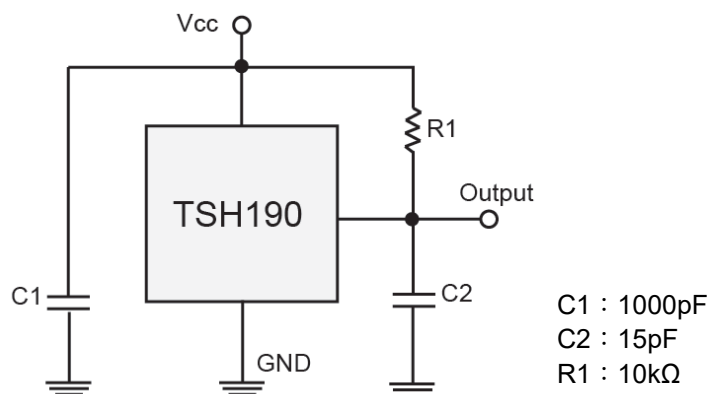
SOT-23

Pin Definition:

1. Vcc
2. Output
3. Ground

Notes: SOT-23 MSL 1 (Moisture Sensitivity Level) per J-STD-020

TYPICAL APPLICATION CIRCUIT



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Supply voltage	V_{CC}	65	V
Output Voltage	V_{OUT}	65	V
Reverse voltage	$V_{CC/OUT}$	-32	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	$^\circ\text{C}$
Package Power Dissipation	TO-92S	P_D	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.

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Thermal Resistance - Junction to Case	TO-92S	$R_{\theta JC}$	$^\circ\text{C/W}$
	SOT-23		
Thermal Resistance - Junction to Ambient	TO-92S	$R_{\theta JA}$	$^\circ\text{C/W}$
	SOT-23		
			206
			543

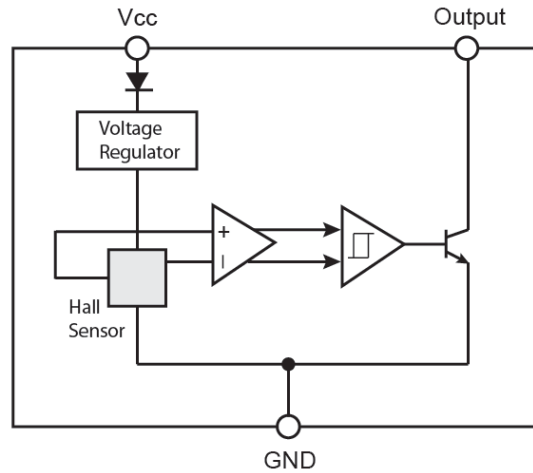
ELECTRICAL SPECIFICATIONS (DC Operating Parameters : $T_A = 25^\circ\text{C}$, $V_{CC} = 12\text{V}$)					
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	Operating	4	--	30	V
Supply Current	$B < B_{OP}$	--	3	8	mA
Output Saturation Voltage	$I_{OUT} = 5\text{mA}$, $B > B_{OP}$	--	--	500	mV
Output Leakage Current	I_{OFF} $B < B_{RP}$, $V_{OUT} = 24\text{V}$	--	--	10	μA
Output Rise Time	$R_L = 820\Omega$, $C_L = 20\text{pF}$	--	1.5	--	μs
Output Fall Time	$R_L = 820\Omega$; $C_L = 20\text{pF}$	--	1.5	--	μs
Operate Point		10	--	110	Gauss
Release Point		-110	--	-10	Gauss
Hysteresis		--	100	--	Gauss

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

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSH190CT B0G	TO-92S	1Kpcs / Bulk Bag
TSH190CX RFG	SOT-23	3Kpcs / 7" Reel

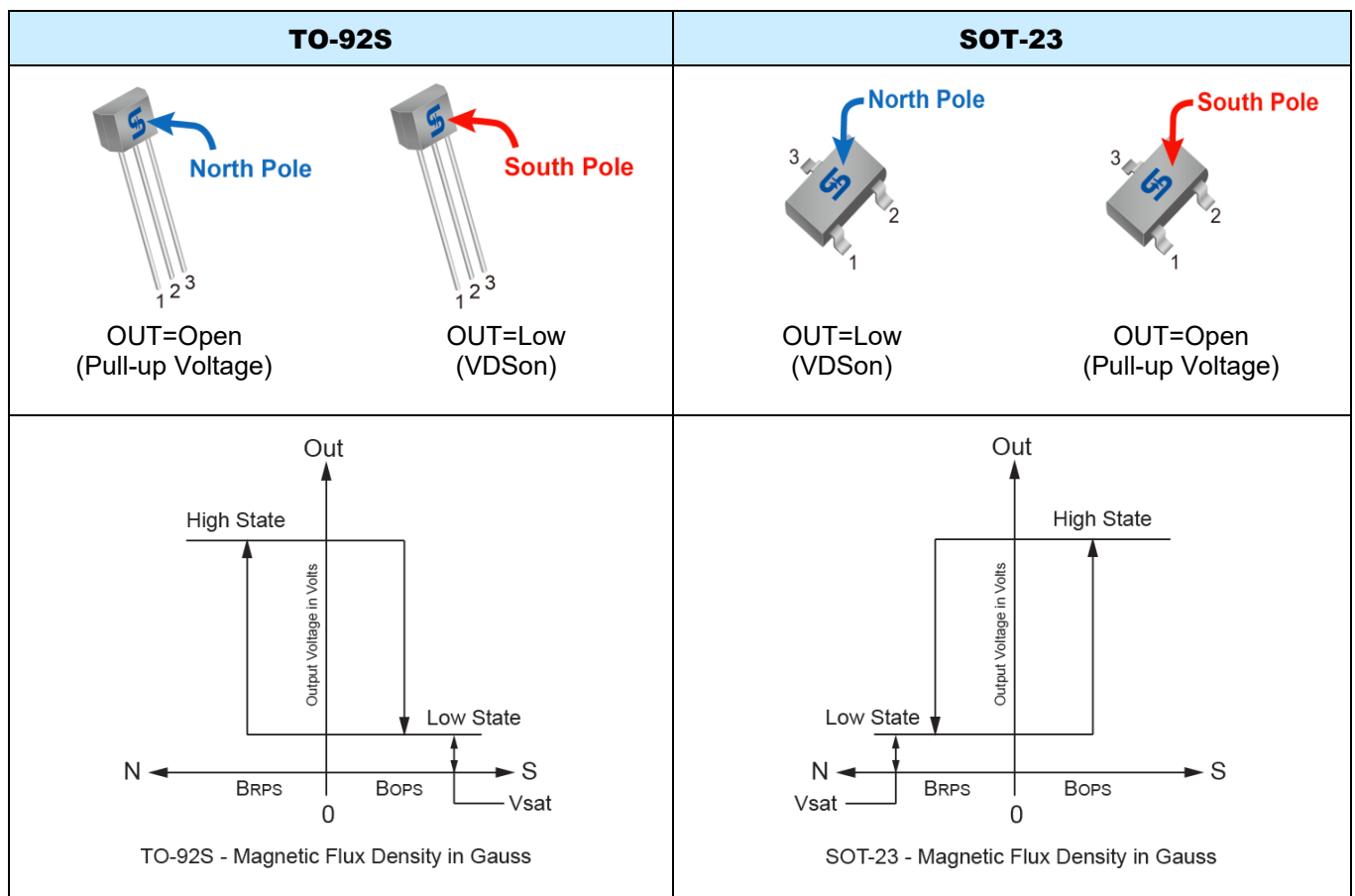
BLOCK DIAGRAM



OUTPUT BEHAVIOR vs. MAGNETIC POLE

DC Operating Parameters: $T_A = -40$ to 125°C , $V_{CC} = 4\text{V} \sim 30\text{V}$

PARAMETER	TEST CONDITION	OUT (TO-92S)	OUT (SOT-23)
North pole	$B > B_{OP}$	Open	Low
South pole	$B < B_{RP}$	Low	Open



CHARACTERISTIC PERFORMANCE

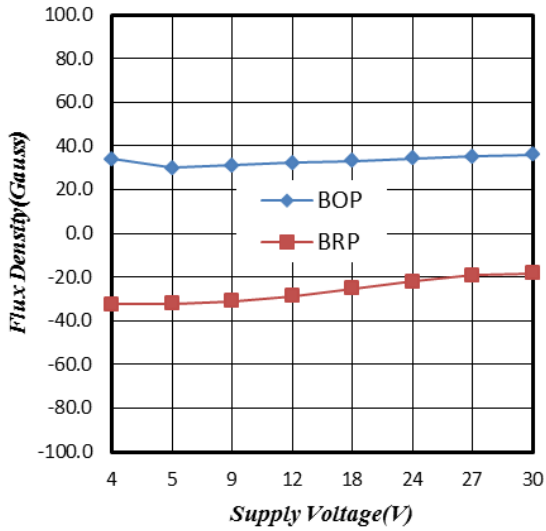


Figure 1. Supply Voltage vs. Flux Density

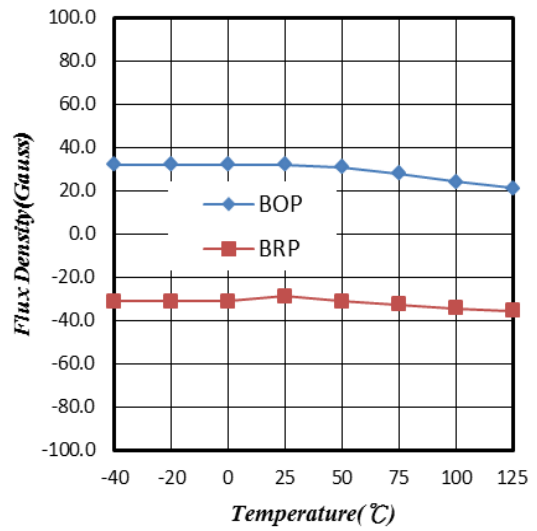


Figure 2. Temperature vs. Flux Density

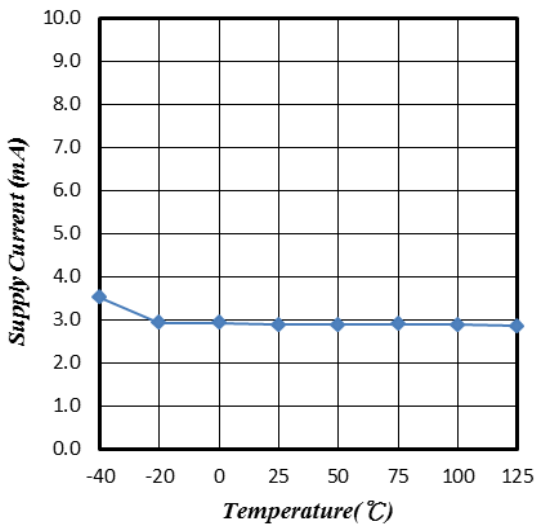


Figure 3. Supply Current vs. Temperature

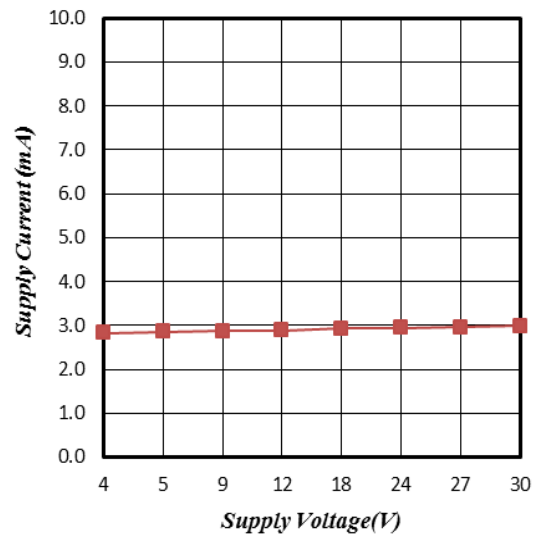


Figure 4. Supply Current vs. Supply Voltage

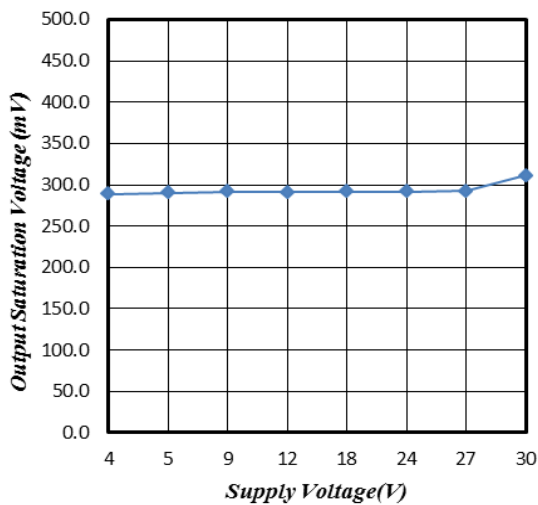


Figure 5. Supply Voltage vs. Saturation Voltage

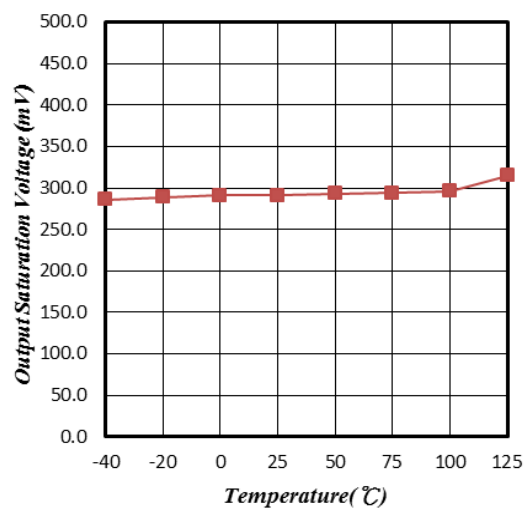


Figure 6. Saturation Voltage vs. Temperature

CHARACTERISTIC PERFORMANCE (CONTINUE)

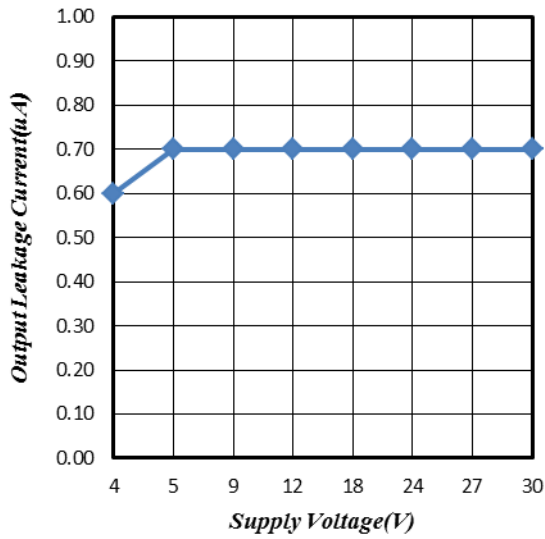


Figure 7. Supply Voltage vs. Leakage Current

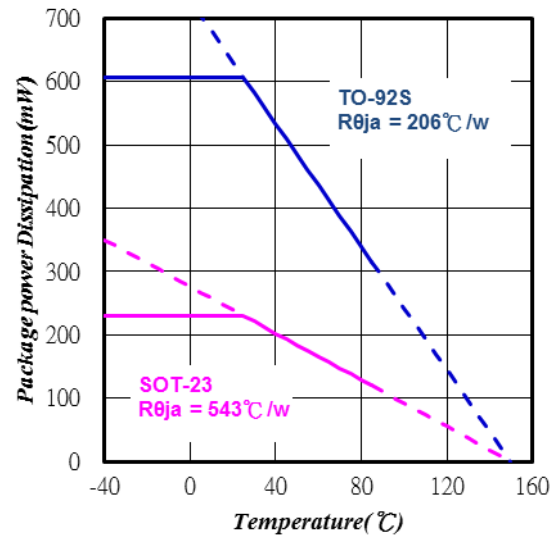
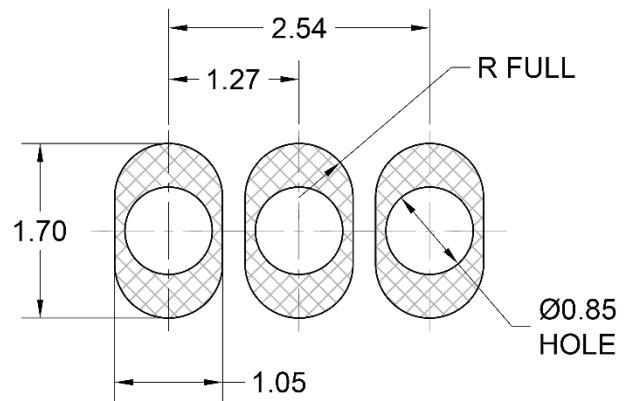
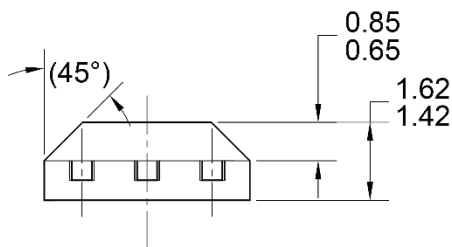
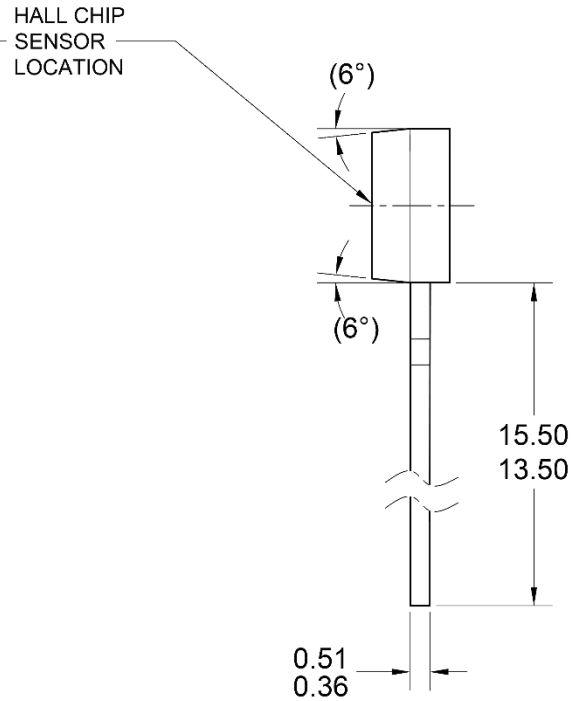
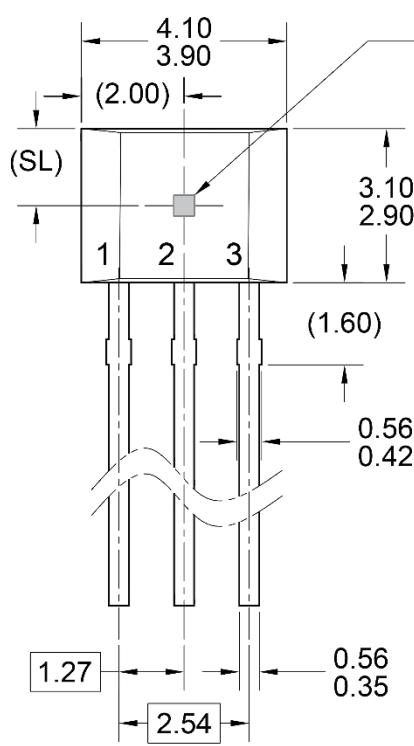


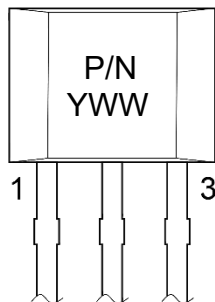
Figure 8. Temperature vs. Power Dissipation

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-92S



SUGGESTED PAD LAYOUT
(SCALE: 2X)



MARKING DIAGRAM

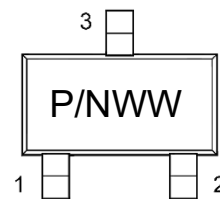
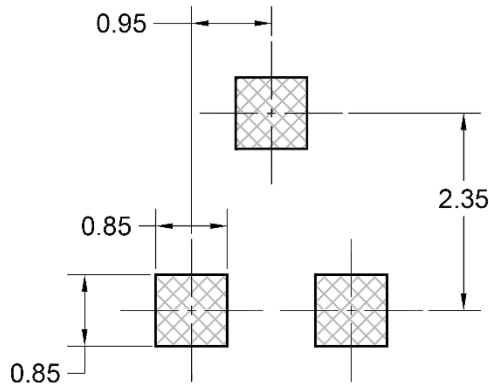
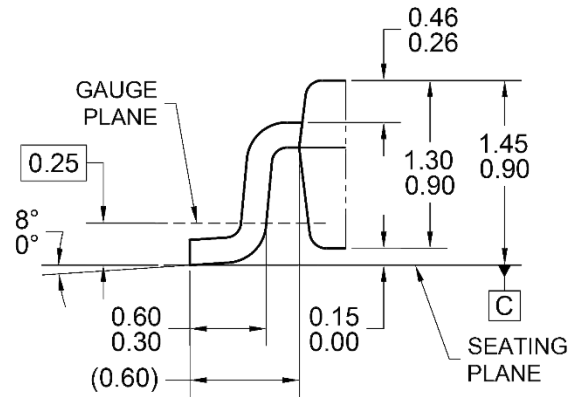
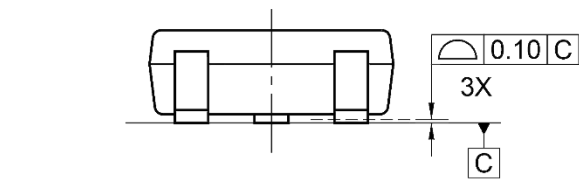
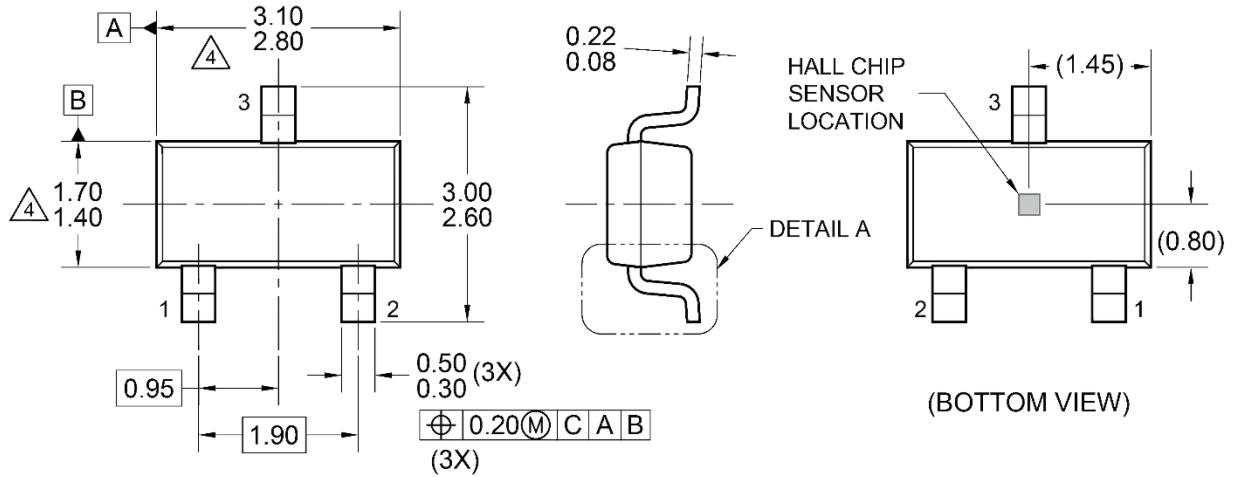
P/N = 190
Y = Year code
WW = Week code (01~52)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. SENSOR LOCATION (SL) : 0.90 REF
4. DWG NO REF: HQ2SD07-TO92S-010 REV B.

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-23



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: EIAJ ED-7500A, SC-59.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-SOT23SL-146 REV A.

P/N = 190
 WW = Date code (Refer to coding table)

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