

Sensitivity Unipolar Hall Effect Switch

DESCRIPTION

TSH282 is an unipolar Hall effect sensor IC. It incorporates advanced chopper stabilization technology to provide accurate and stable magnetic switch points. The design, specifications and performance have been optimized for applications of solid-state switches. The output transistor will be switched on (B_{OP}) in the presence of a sufficiently strong South pole magnetic field facing the marked side of the package. Similarly, the output will be switched off (B_{RP}) in the presence of a weaker South field and remain off with "0" field.

FEATURES

- CMOS Hall IC Technology
- Solid-State Reliability
- Chopper stabilized amplifier stage
- Unipolar, output switches with absolute value of South pole from magnet
- Operation down to 3.0V
- High Sensitivity for direct reed switch replacement applications
- RoHS Compliant
- Halogen-free

APPLICATION

- Solid state switch
- Limit switch, Current limit
- Interrupter
- Current sensing
- Magnet proximity sensor for reed switch replacement



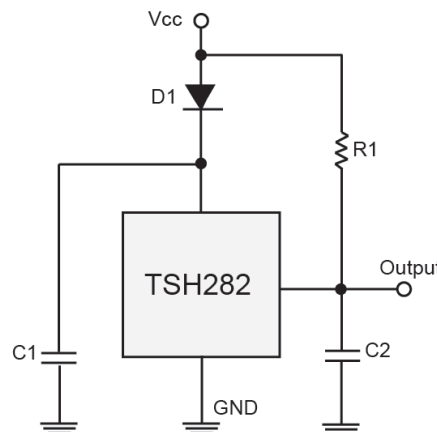
Pin Definition:
1. V_{CC}
2. Ground
3. Output



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

TYPICAL APPLICATION CIRCUIT



D1 : 1N4148 or 100Ω
C1 : 1000pF
C2 : 15pF
R1 : 10kΩ

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Supply voltage	V_{CC}	27	V
Output Voltage	V_{OUT}	27	V
Reverse voltage	$V_{CC/OUT}$	-0.3	V
Magnetic flux density		Unlimited	Gauss
Output current	I_{OUT}	50	mA
Operating Temperature Range	T_{OPR}	-40 to +85	$^\circ\text{C}$
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	606	mW
	SOT-23	230	

Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Thermal Resistance - Junction to Case	TO-92S	148	$^\circ\text{C/W}$
	SOT-23	410	
Thermal Resistance - Junction to Ambient	TO-92S	206	$^\circ\text{C/W}$
	SOT-23	543	

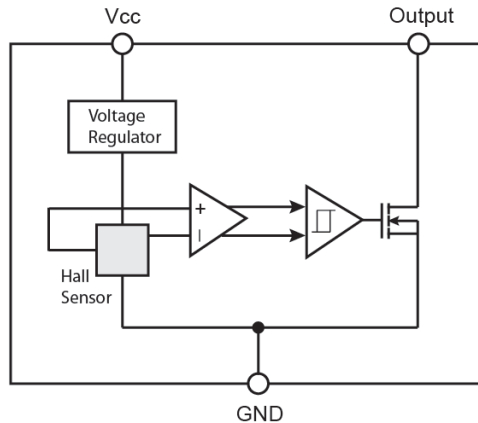
ELECTRICAL SPECIFICATIONS (DC Operating Parameters : $T_A=25^\circ\text{C}$, $V_{CC}=12\text{V}$)					
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	Operating	3.0	--	24	V
Supply Current	$B < B_{OP}$	--	2.5	5.0	mA
Output Low Voltage	$I_{OUT} = 20\text{mA}$, $B > B_{OP}$	--	--	500	mV
Output Leakage Current	I_{OFF} $B < B_{RP}$, $V_{OUT} = 20\text{V}$	--	--	10	μA
Output Rise Time	$R_L = 1\text{k}\Omega$, $C_L = 20\text{pF}$	--	0.04	--	μs
Output Fall Time	$R_L = 1\text{k}\Omega$; $C_L = 20\text{pF}$	--	0.18	--	μs
Operate Point		45	--	100	Gauss
Release Point		25	--	70	Gauss
Hysteresis		--	20	--	Gauss

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

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSH282CT B0G	TO-92S	1Kpcs / Bulk Bag
TSH282CT A3G	TO-92S	4Kpcs / Ammo box
TSH282CX RFG	SOT-23	3Kpcs / 7" Reel

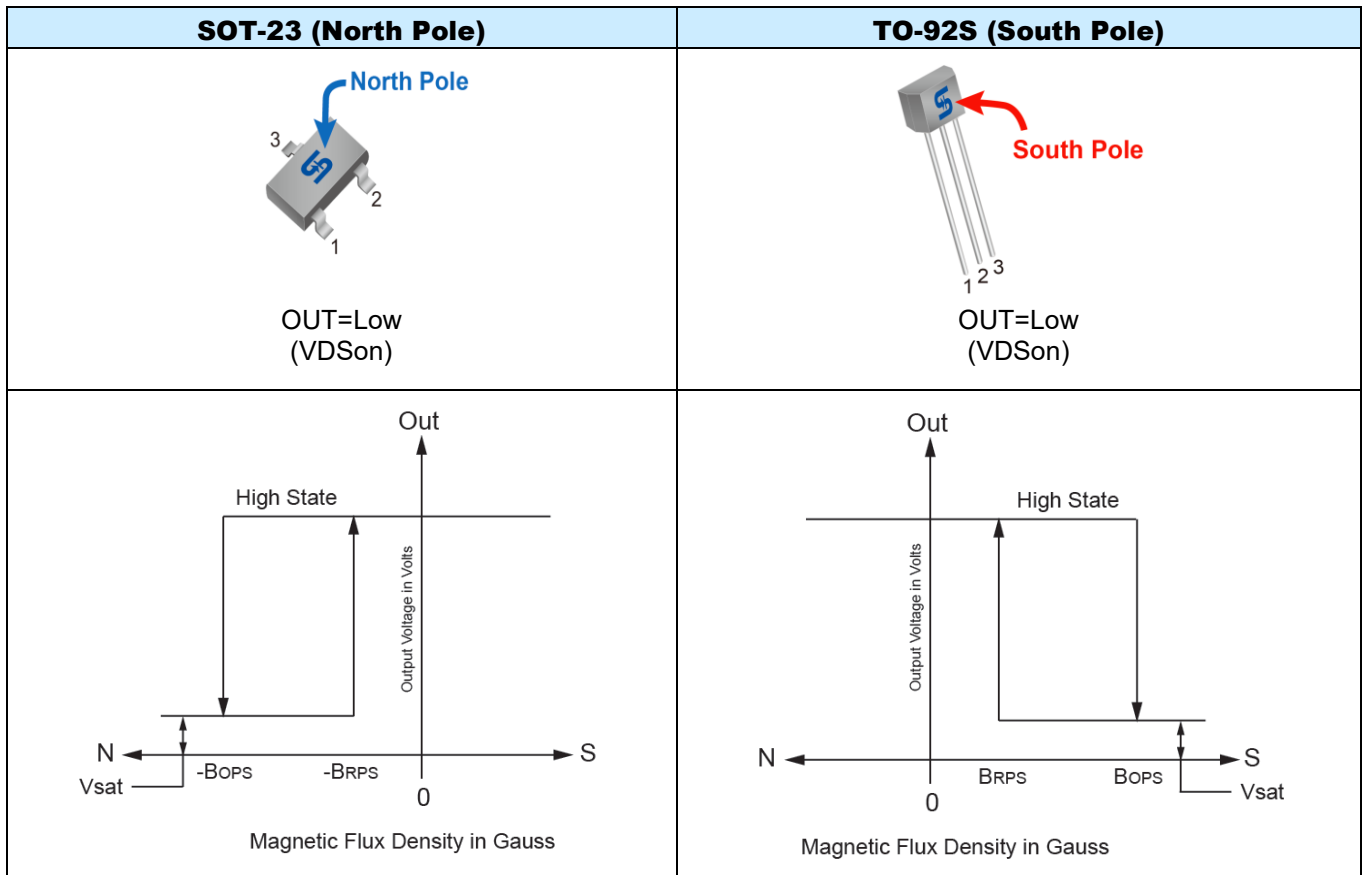
BLOCK DIAGRAM



OUTPUT BEHAVIOR vs. MAGNETIC POLE

DC Operating Parameters: $T_A = -40$ to 125°C , $V_{CC} = 3\text{V} \sim 24\text{V}$

PARAMETER	TEST CONDITION	OUT (TO-92S)	OUT (SOT-23)
South pole	$B > B_{op}$ [(100)~(45)]	Low	Open (Pull-up Voltage)
Null or weak magnetic field	$-B_{rp} \sim +B_{rp}$	Open (Pull-up Voltage)	Open (Pull-up Voltage)
North pole	$B < -B_{op}$ (-25~-70)	Open (Pull-up Voltage)	Low



CHARACTERISTIC PERFORMANCE

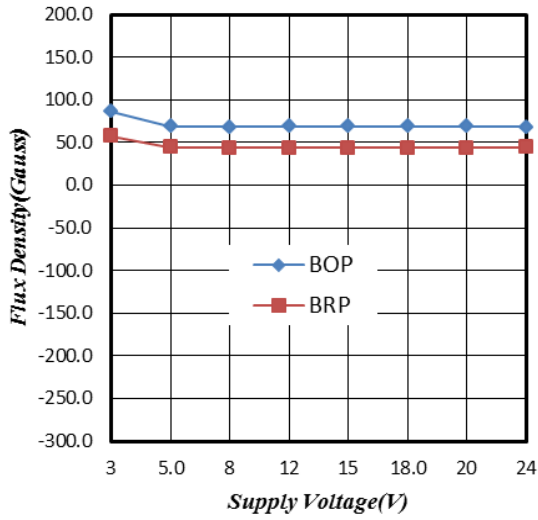


Figure 1. Supply Voltage vs. Flux Density

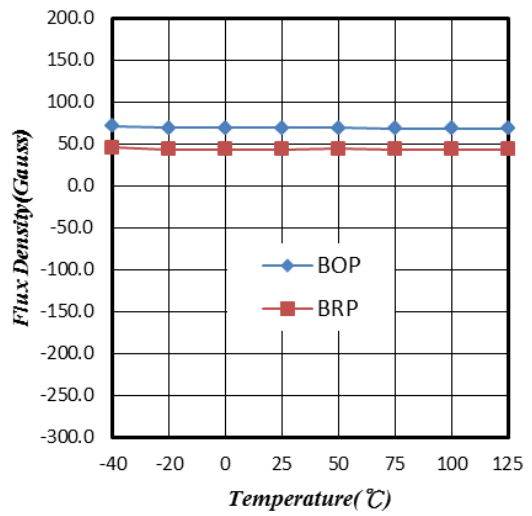


Figure 2. Temperature vs. Flux Density

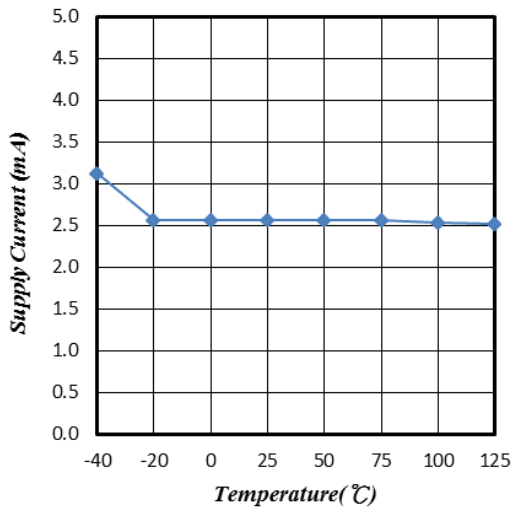


Figure 3. Supply Current vs. Temperature

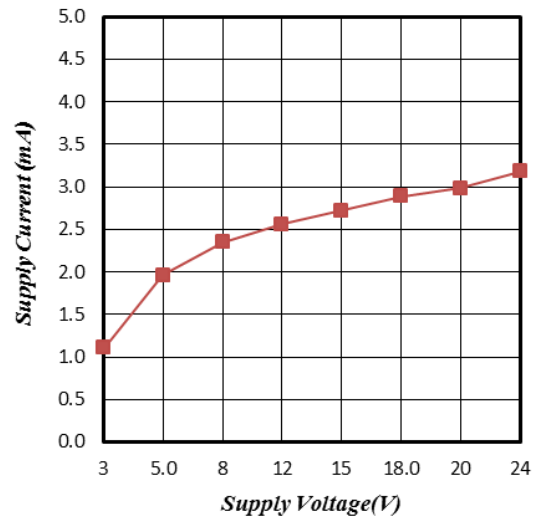


Figure 4. Supply Current vs. Supply Voltage

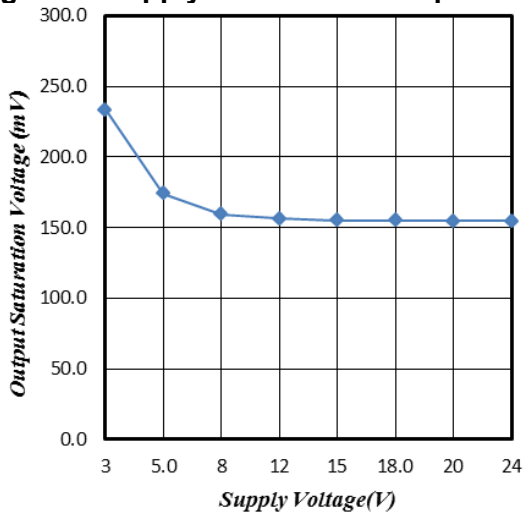


Figure 5. Output Saturation Voltage vs. Supply Voltage

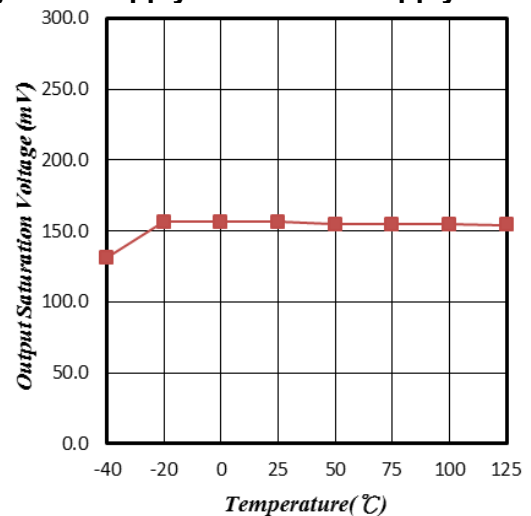


Figure 6. Output Saturation Voltage vs. Temperature

CHARACTERISTIC PERFORMANCE (CONTINUE)

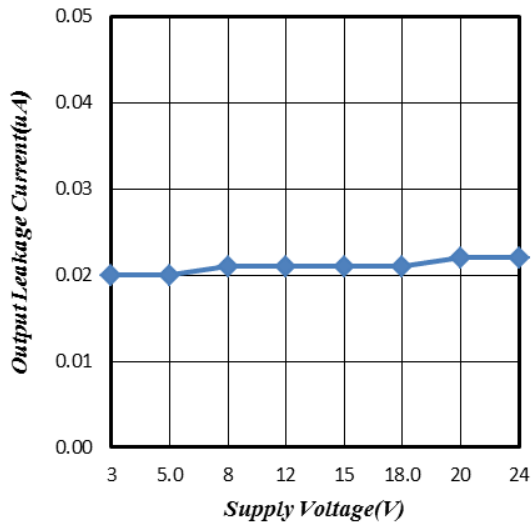


Figure 7. Output Leakage Current vs. Supply Voltage

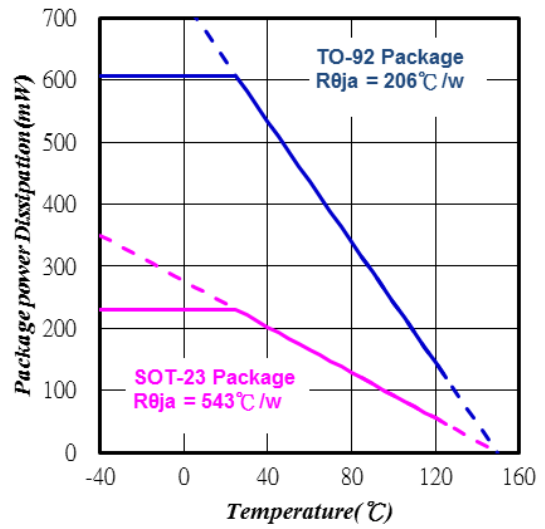
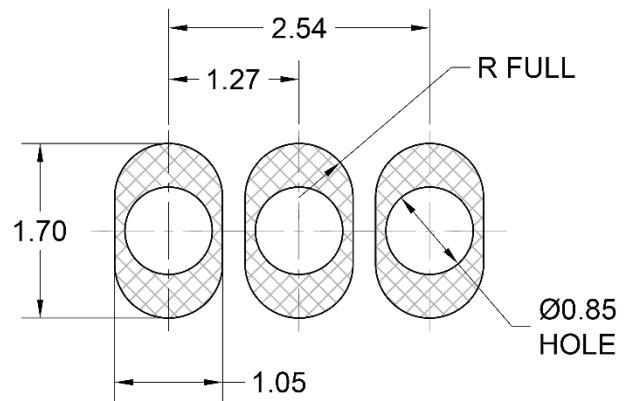
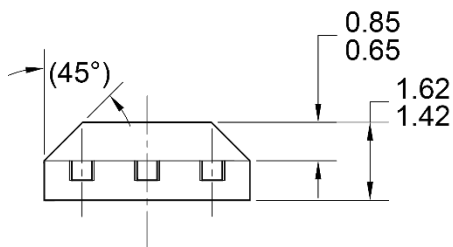
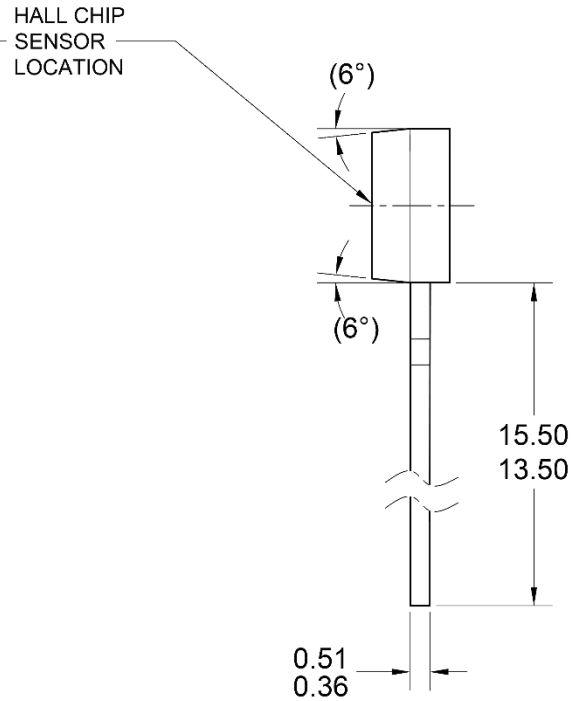
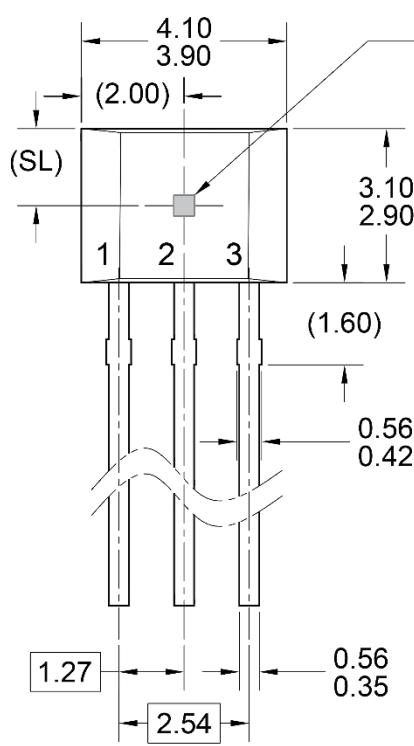


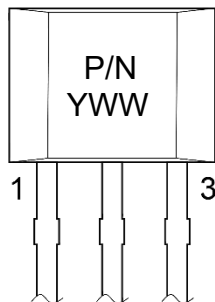
Figure 8. Power Dissipation vs. Temperature

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-92S



SUGGESTED PAD LAYOUT
(SCALE: 2X)



MARKING DIAGRAM

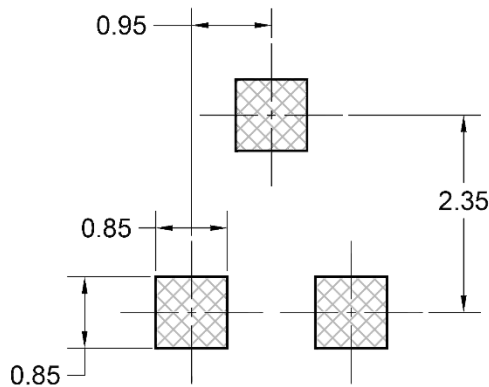
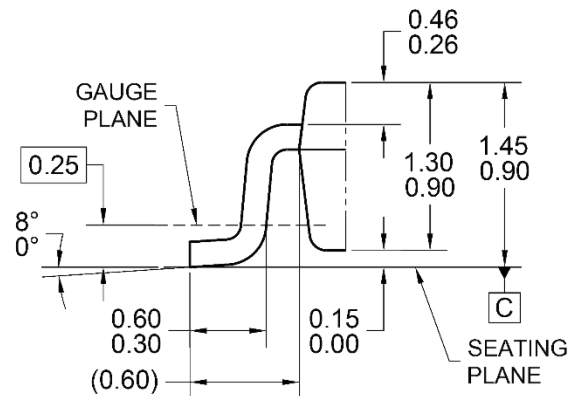
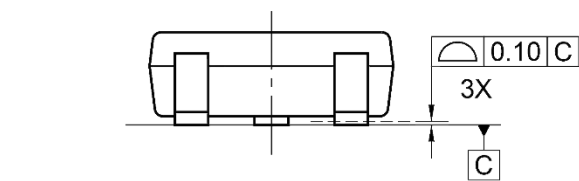
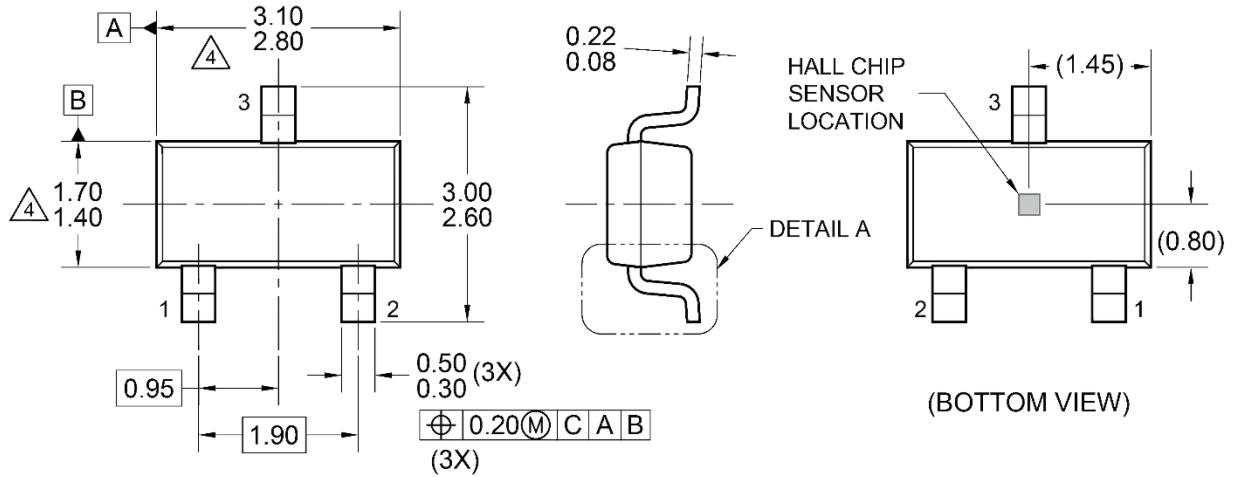
P/N = 282
Y = Year code
WW = Week code (01~52)

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.

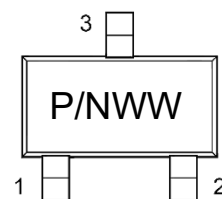
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-23



SUGGESTED PAD LAYOUT

DETAIL A, ROTATED -90°
(SCALE 2:1)



MARKING DIAGRAM

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 = 282
WW = Date code (Refer to coding table)

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