

SH248 Micro-power High Sensitivity Omni-polar Hall Switch

SH248 is a micro-power high sensitivity omni-polar Hall switch designed in advanced CMOS technology. The following are integrated on a single silicon chip: awake/sleep timing controller, Hall voltage generator, offset canceller, chopper stabilized small-signal amplifier, Schmitt trigger, and open-drain output. The consumption current values (average) are made to reduce sharply by intermittent operation.

Features Typical Applications

- High sensitivity (3mT typ.)
- Low power consumption for battery-powered applications (10μA)
- Better reliability than reed switch
- Small package (QFN2020-3)

Typical Applications

- Solid-state switch
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications

Order Information

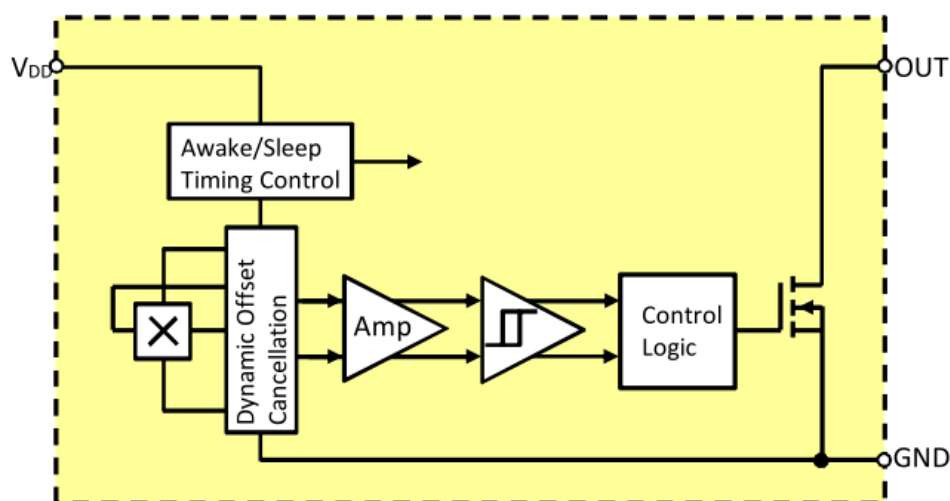
Order No.	Part No.	Temperature	Package	—	Packing
SH248EUA	SH248	E	UA		
SH248ESO-TR	SH248	E	SO	—	TR
SH248EST-TR	SH248	E	ST	—	TR
SH248ESQ-TR	SH248	E	SQ	—	TR

Legend:

Temperature Code: E (-40°C~85°C)

Package Code: UA (TO92S), SO (SOT23), ST (TSOT23), SQ (QFN2020-3)

Packing Code: Brank (Balk, 500pcs/Bag), TR (Tape & Reel, 3,000pcs/Reel)

Functional Block Diagram


Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$)

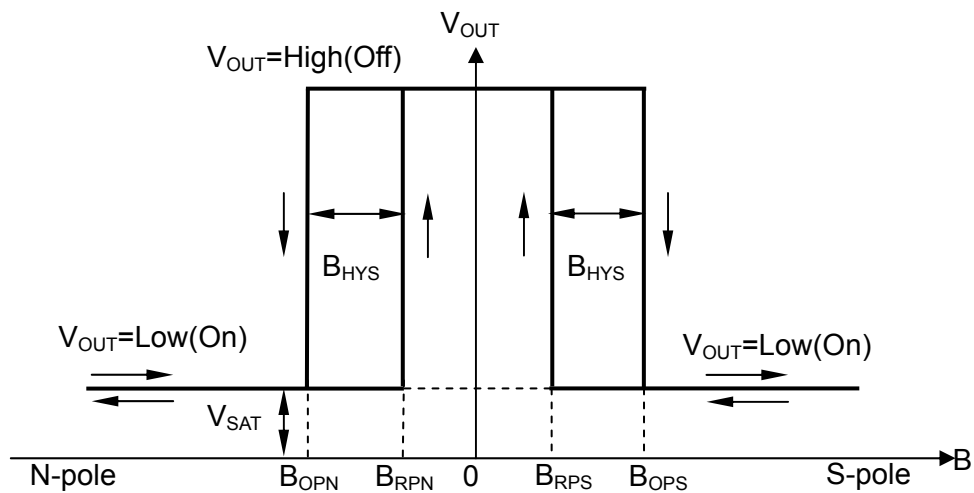
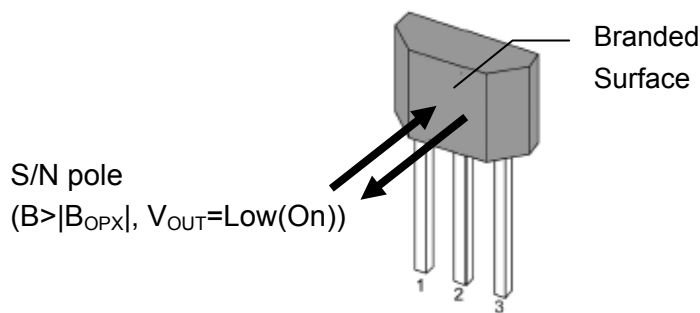
Parameter	Symbol	Value		Unit
		Min	Max	
Supply Voltage	V_{DD}	-0.3	5	V
Output Voltage	V_{OUT}	-0.3	5	V
Output Current	I_{SINK}	-	2	mA
Operating Temperature Range (E)	T_A	-40	85	$^{\circ}\text{C}$
Storage Temperature Range	T_S	-65	150	$^{\circ}\text{C}$
Maximum Junction Temperature	T_J		150	$^{\circ}\text{C}$
Power Dissipation (UA/SO/ST/SQ)	P_D		606/230/400 /230	mW

Electrical Characteristics ($T_A=25^{\circ}\text{C}$, $V_{DD}=3\text{V}$)

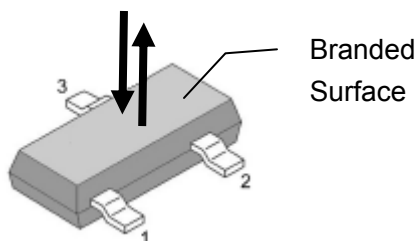
Parameter	Test Condition	Symbol	Value			Unit
			Min	Typ	Max	
Supply Voltage		V_{DD}	2.5	-	3.5	V
Consumption Current (Avg.)	$V_{OUT}=\text{High}$	I_{DD}	-	10	16	μA
Output Saturation Voltage	$I_{SINK}=1\text{mA}$, $V_{OUT}=\text{Low}$	V_{SAT}	-	-	0.3	V
Output Leakage Current	$V_{OUT}=\text{High}$	I_{LEAK}	-	-	10	μA
Awake mode time		t_{AW}	-	70	-	μs
Sleep mode time		t_{SL}	-	70	-	ms

Magnetic Characteristics ($T_A=25^\circ\text{C}$, $V_{DD}=3\text{V}$)

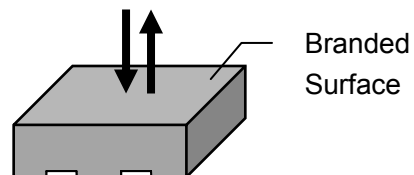
Parameter	Test Condition	Symbol	Value			Unit
			Min	Typ	Max	
Operate Point	S pole to branded side	B_{OPS}	0.6	-	6	mT
	N pole to branded side	B_{OPN}	-6		-0.6	mT
Release Point	S pole to branded side	B_{RPS}	0.5	-	-	mT
	N pole to branded side	B_{RPN}	-	-	-0.5	mT
Hysteresis	$ B_{OPX} - B_{RFX} $	B_{HYS}	-	0.7	-	mT


Switching Characteristics

UA-package

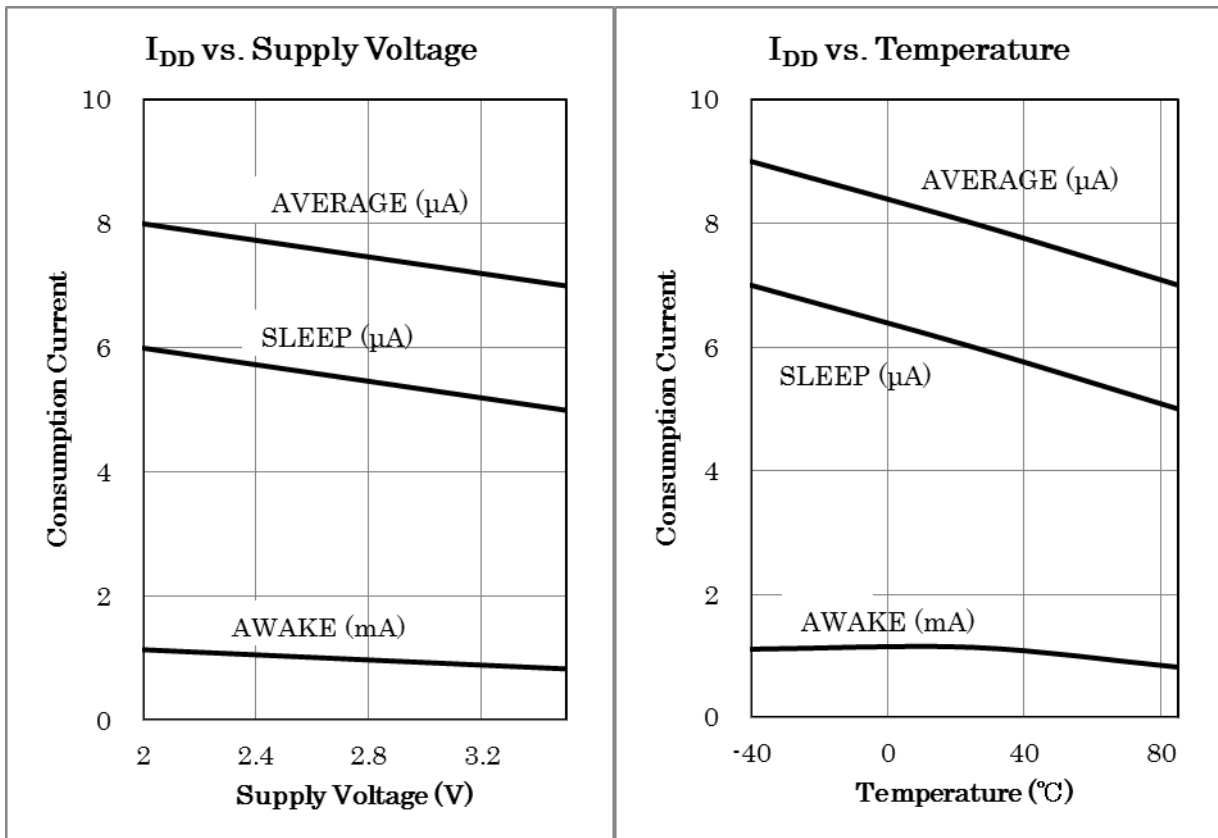
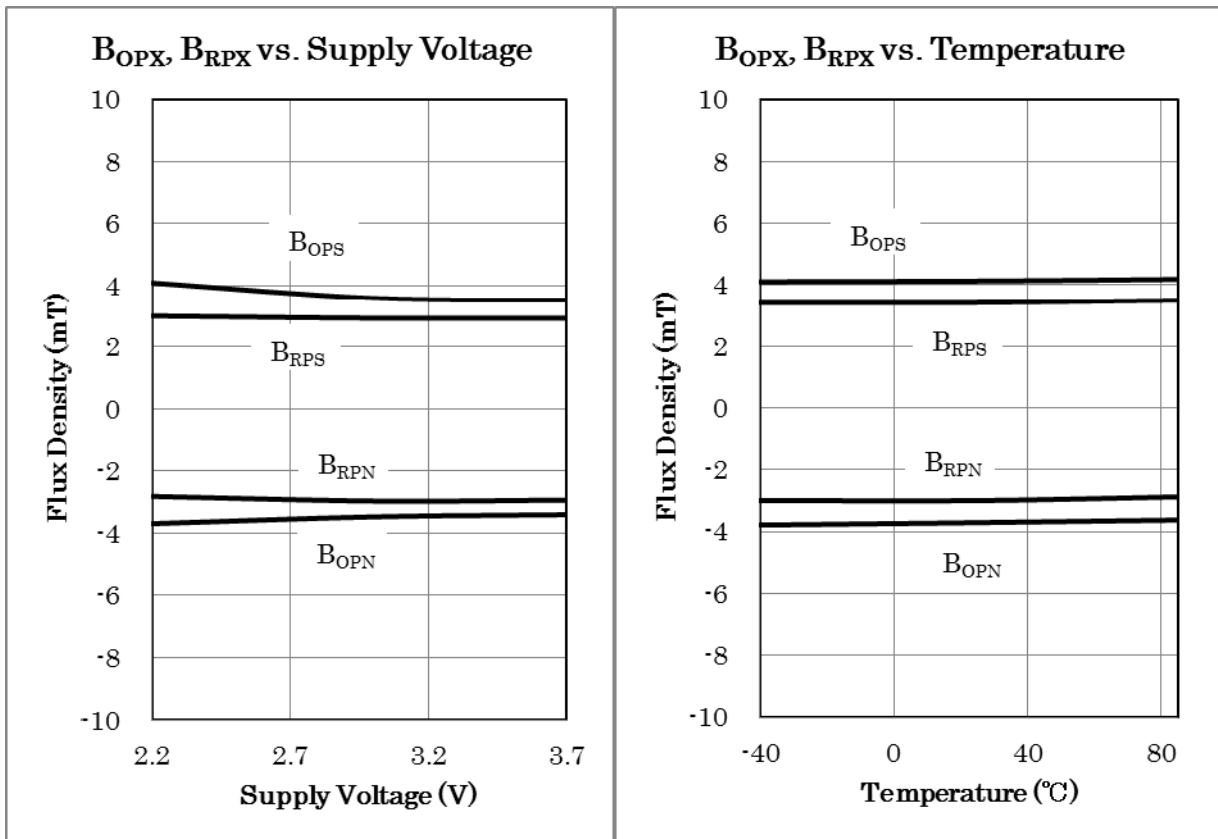
S/N pole ($B > |B_{OPX}|$, $V_{OUT}=\text{Low(On)}$)

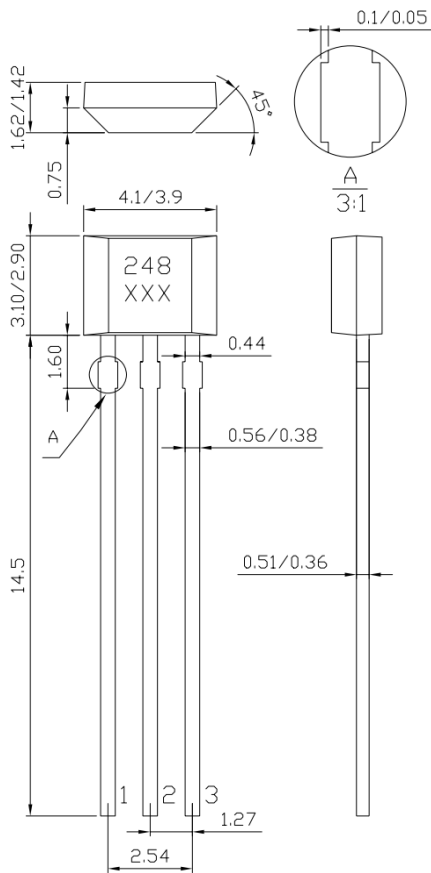
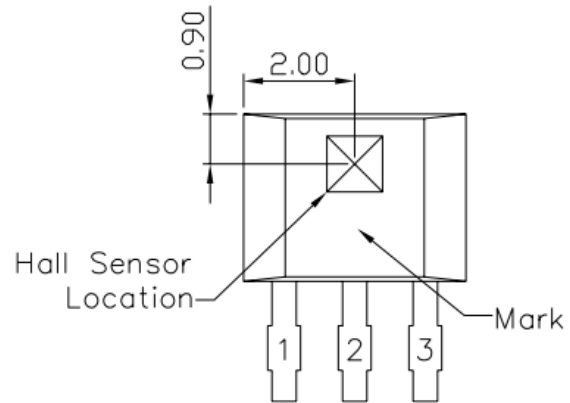

SO/ST-package

S/N pole ($B > |B_{OPX}|$, $V_{OUT}=\text{Low(On)}$)

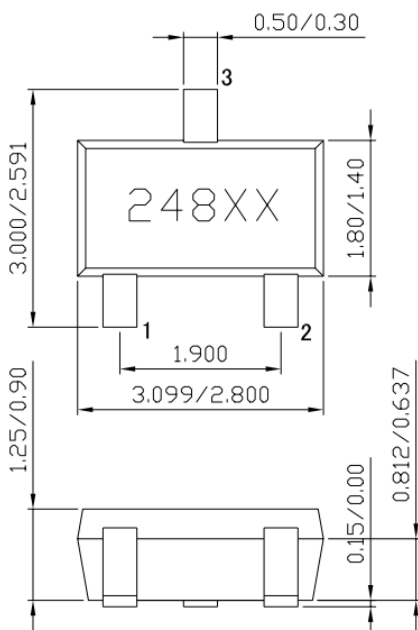
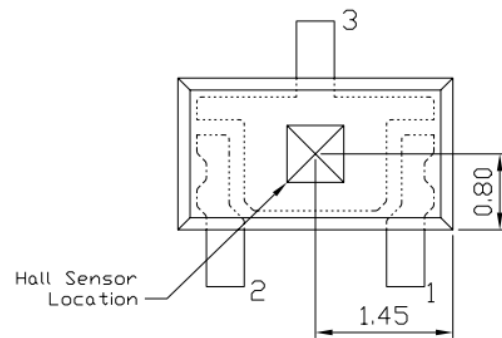

SQ-package

Performance Graphs



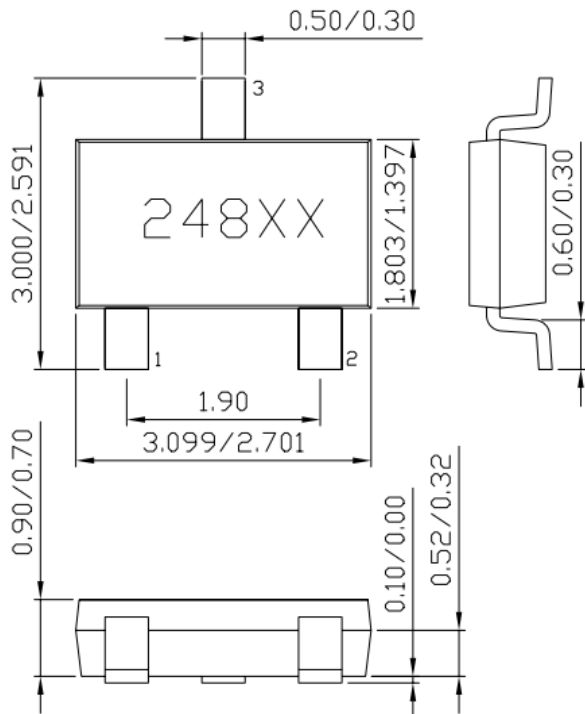
Sensor Location, Package Dimension and Marking
UA-package: TO92S

Hall sensor location

NOTES:

1. Controlling dimension: mm;
2. Leads must be free of flash and plating voids.
3. Do not bend leads within 1 mm of lead to package interface.
4. PINOUT:
 Pin 1 VDD
 Pin 2 GND
 Pin 3 Output

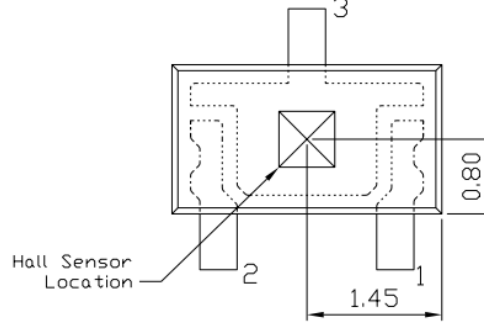
**SO-package: SOT23
(Top view)**

**Hall sensor location
(Bottom view)**

NOTES:

1. PINOUT:
 Pin 1 VDD
 Pin 2 Output
 Pin 3 GND
2. Controlling dimension: mm;
3. Lead thickness after solder plating will be 0.254mm maximum.

ST-package: TSOT23
(Top View)



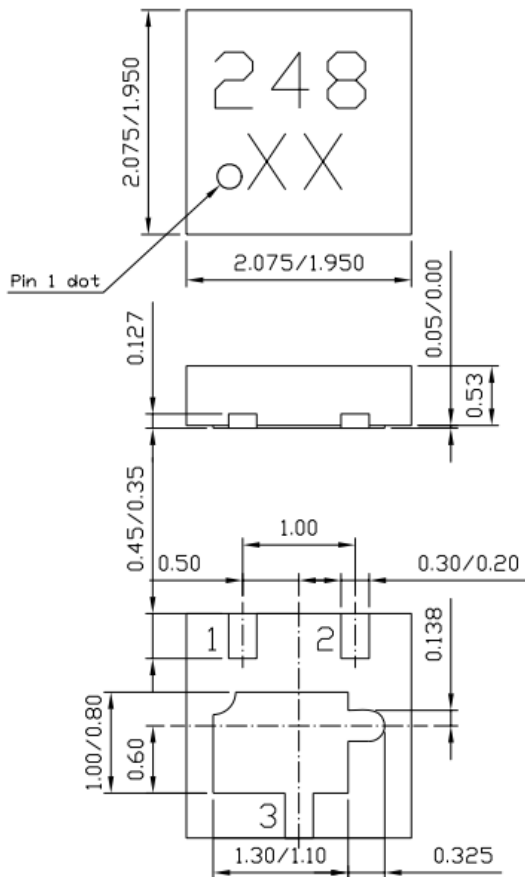
Hall sensor location
(Bottom View)



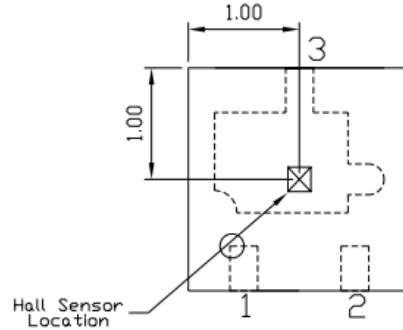
NOTES:

1. PINOUT:
Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND
2. Controlling dimension: mm;

SQ-package: QFN2020-3
(Top View)



Hall sensor location
(Top View)



NOTES:

1. Controlling dimension: mm;
2. Sensor must be in PKG. center.
3. PINOUT:
Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND