SH257 Micro-power High Sensitivity Uni-polar Hall Effect Switch

SH257 is a micro-power high sensitivity uni-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, CMOS output. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. Since SH257 is special made for low operation voltage (1.7V~) and micro-power (5μA typ.), it is suitable for battery-powered applications.

Features

- 1.7 to 5.5V for battery-powered application
- High sensitivity (3mT typ.)
- Stable temperature characteristics
- Low power consumption (5μA typ.)
- High ESD protection (HBM > ±4kV min)
- CMOS output

Typical Applications

- Solid-state switch
- Lid close sensor for battery powered devices
- Water meter
- Floating meter

Order Information

Order No.	Part No.	Temperature	Package	—	Packing
SH257EUA	SH257	E	UA	—	
SH257EST-TR	SH257	E	ST	—	TR

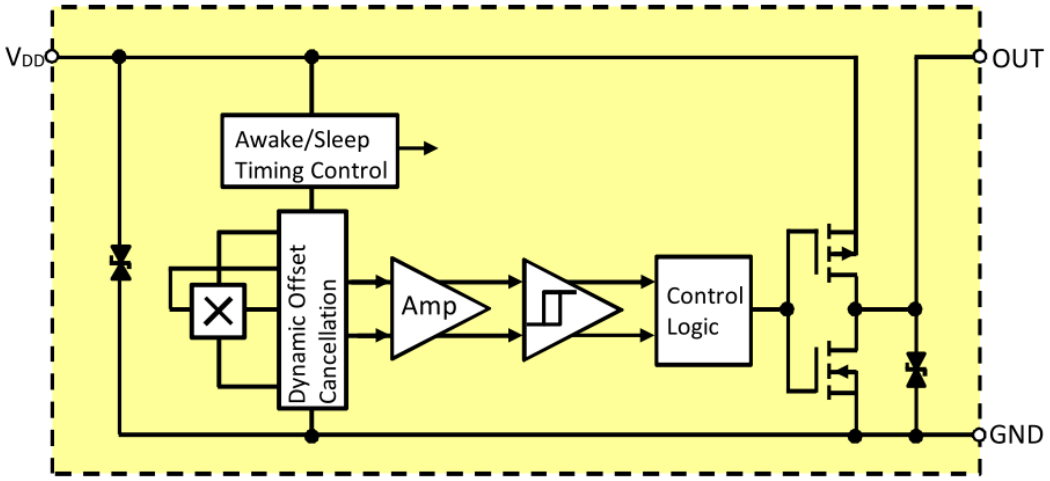
Legend:

Temperature Code: E (-40℃～85℃)

Package Code: UA (TO92S), ST (TSOT23)

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

Functional Block Diagram



Absolute Maximum Ratings (T_A=25℃)

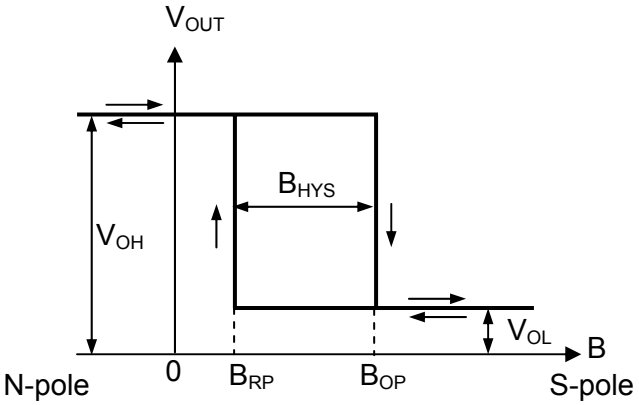
Parameter	Symbol	Value Min	Value Max	Unit
Supply Voltage	V_{DD}	-0.3	7	V
Output Voltage	V_{OUT}	-0.3	7	V
Output Current	I_{OUT}	-	1	mA
Operating Temperature Range (E)	T_A	-40	85	℃
Storage Temperature Range	T_S	-65	150	℃
Maximum Junction Temperature	T_J	-	150	℃
Power Dissipation （UA/ST）	P_D	-	606/400	mW

Electrical Characteristics (T_A=25℃, V_{DD}=2V)

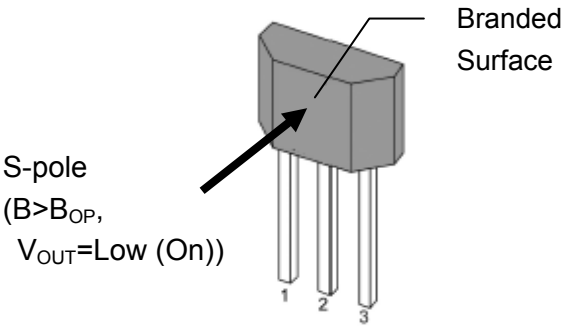
Parameter	Test Condition	Symbol	Value Min	Value Typ	Value Max	Unit
Supply Voltage		V_{DD}	1.7	-	5.5	V
Consumption Current	Awake Mode	I_{DD}	-	1.4	3	mA
	Sleep Mode	I_{DD}		3.6	7	μA
	Average	I_{DD}	-	5	10	μA
Output High Voltage	I_{OUT}=-0.5mA (Sink)	V_{OH}	V_{DD} -0.2	-	-	V
Output Low Voltage	I_{OUT} =0.5mA (Source)	V_{OL}	-	-	0.2	V
Awake Mode Time		t_{AW}	-	40	80	μs
Sleep Mode Time		t_{SL}	-	40	80	ms
Electro-Static Discharge	HBM		4	-	-	kV

UA-package Magnetic Characteristics (T_A=25℃, V_{DD}=2V)

Parameter	Test Condition	Symbol	Value Min	Value Typ	Value Max	Unit
Operate Point	S pole to branded side	B_{OPN}	-	3	5	mT
Release Point	S pole to branded side	B_{RPN}	1	2	-	mT
Hysteresis	$\lvert B_{OPX} - B_{RPX} \rvert$	B_{HYS}	-	1	-	mT



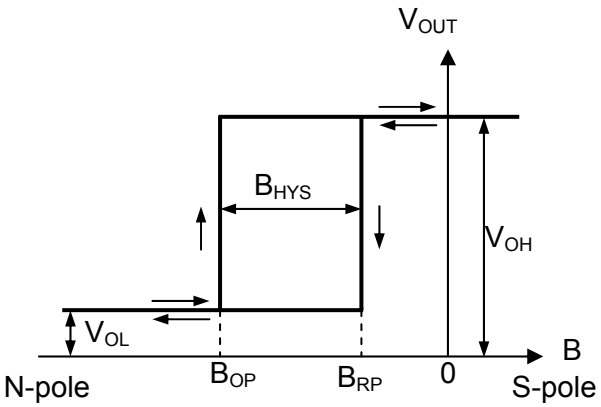
Switching Characteristics



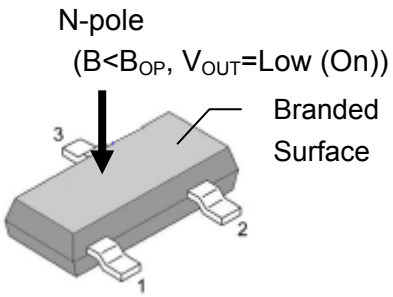
UA-package

ST-package Magnetic Characteristics (T_A=25℃, V_{DD}=2V)

Parameter	Test Condition	Symbol	Value Min	Value Typ	Value Max	Unit
Operate Point	N pole to branded side	B_{OPN}	-5	-3	-	mT
Release Point	N pole to branded side	B_{RPN}	-	-2	-1	mT
Hysteresis	$\lvert B_{OPX} - B_{RPX} \rvert$	B_{HYS}	-	1	-	mT



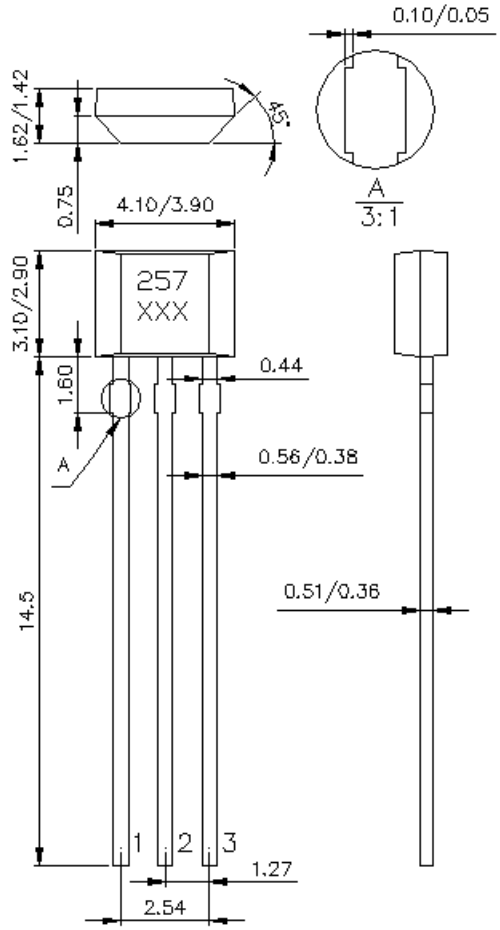
Switching Characteristics



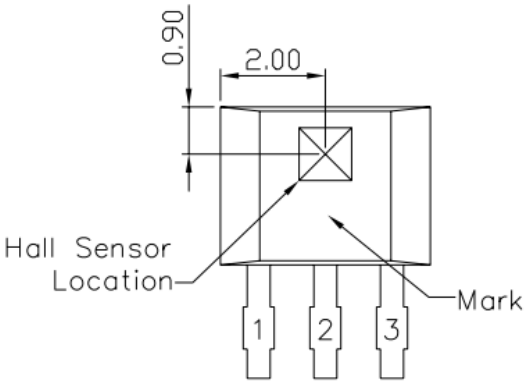
ST-package

Sensor Location, Package Dimension and Marking

UA-package: TO92S



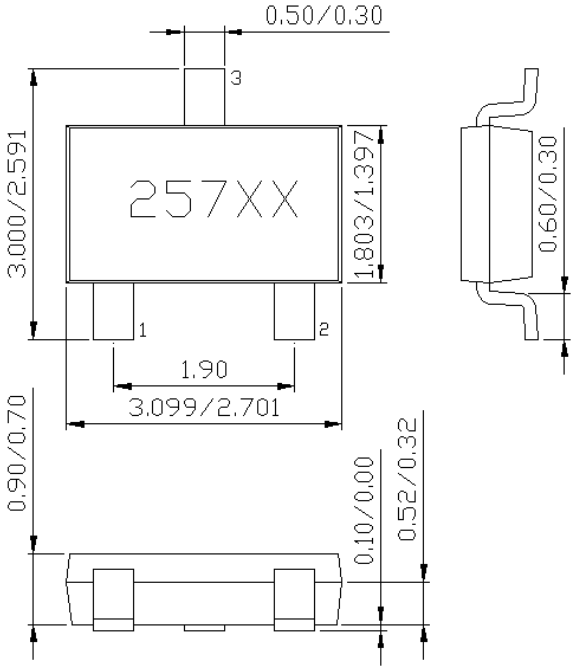
Hall sensor location



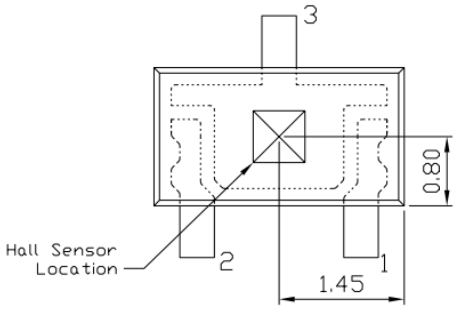
NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash plating voids
3. Don't bend leads within 1 mm of leads to package interface
4. PINOUT:
   Pin 1 VDD
   Pin 2 GND
   Pin 3 Output

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