

# Date Sheet



The "Huaxin" brand was founded in 2003 and has a history of 18 years. The company is mainly engaged in Hall elements, has a group of senior professional device design, integrated circuit design and test engineers, and has a first-class development and test platform. We have developed a number of high-end products with independent intellectual property rights, such as RF LDMOS series and RF VDMOS series, which represent China's integrated circuit level.

## HX258

# Omnipolar Hall Switch

HX258 Hall-effect sensor is a temperature stable, stress-resistant, micro-power switch. Superior high-temperature performance is made possible through a dynamic offset cancellation that utilizes chopper-stabilization. This method reduces the offset voltage normally caused by device over molding, temperature dependencies, and thermal stress.

HX258 includes the following on a single silicon chip: voltage regulator, Hall voltage generator, small-signal amplifier, chopper stabilization, Schmitt trigger, open-drain output. Advanced CMOS wafer fabrication processing is used to take advantage of low-voltage requirements, component matching, very low input-offset errors, and small component geometries.

This device requires the presence of omni-polar magnetic fields for operation.

HX258 is rated for operation between the ambient temperatures  $-40^{\circ}\text{C}$  and  $+85^{\circ}\text{C}$  for the E temperature range. The four package styles available provide magnetically optimized solutions for most applications. Package types SO is an SOT-23(1.1 mm nominal height), SP is an PSOT-23(1.1 mm nominal height), ST is an TSOT-23 (0.7 mm nominal height), a miniature low-profile surface-mount package, while package UA is a three-lead ultra-mini SIP for through-hole mounting.

The package type is in a lead Halogen Free version was verified by third party Lab.

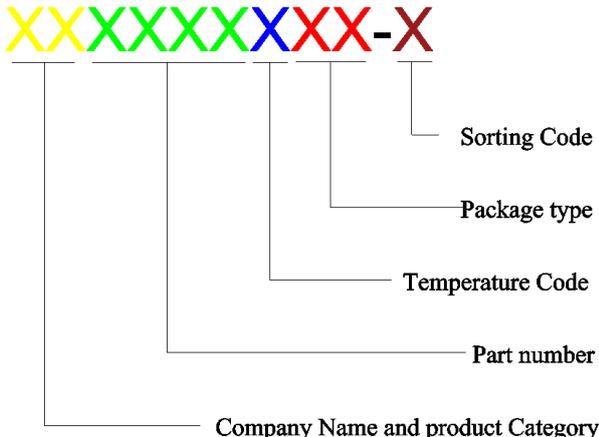
### ***Features and Benefits***

- CMOS Hall IC Technology
- Strong RF noise protection
- 1.70 to 5.5V for battery-powered applications
- Omni polar, output switches with absolute value of North or South pole from magnet
- Operation down to 1.70V, Micro power consumption
- High Sensitivity for reed switch replacement applications
- Multi Small Size option
- Low sensitivity drift in crossing of Temp range
- Ultra Low power consumption at 5uA (Avg)
- High ESD Protection, HBM  $> \pm 4\text{KV}$ ( min )
- Open Drain output

### ***Applications***

- Solid state switch
- Handheld Wireless Handset Awake Switch ( Flip Cell/PHS Phone/Note Book/Flip Video Set)
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle applications
- Water Meter
- Floating Meter
- PDVD
- NB

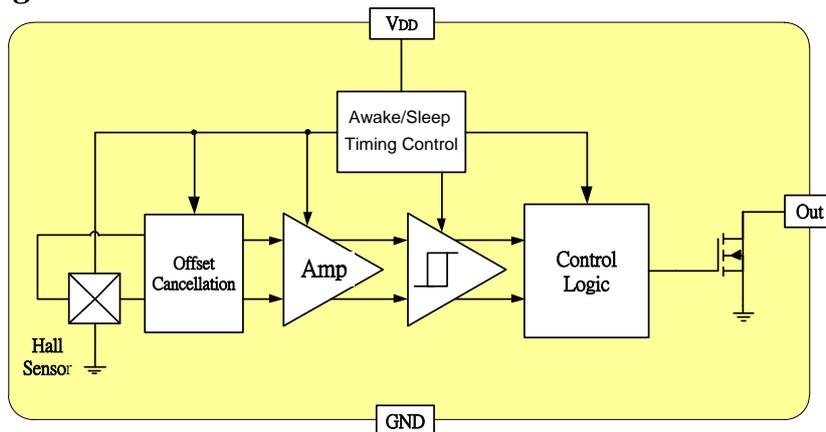
**Ordering Information**

	<p><b>Company Name and Product Category</b> HX:HX Hall Effect/MP:HX Power IC</p> <p><b>Part number</b> 6286,6275,6278,6287,6383,6474,6571,6572,6573,6574... If part # is just 3 digits, the forth digit will be omitted.</p> <p><b>Temperature range</b> E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C</p> <p><b>Package type</b> UA:TO-92S,VK:TO-92S(4pin),VF:TO-92S(5pin),SO:SOT-23, SQ:QFN-3,ST:TSOT-23,SN:SOT-553,SF:SOT-89(5pin), SS:TSOT-26,SD:DFN-6</p> <p><b>Sorting</b> <math>\alpha</math>,<math>\beta</math>,Blank.....</p>
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Part No.	Temperature Suffix	Package Type
HX258EUA	E (-40°C to + 85 °C)	UA (TO-92S)
HX258ESO	E (-40°C to + 85 °C)	SO (SOT-23)
HX258EST	E (-40°C to + 85 °C)	ST (TSOT-23)
HX258ESP	E (-40°C to + 85 °C)	SP (PSOT-23)

Custom sensitivity selection is available by HX sorting technology

**Functional Diagram**



**Note:** Static sensitive device; please observe ESD precautions. Reverse  $V_{DD}$  protection is not included. For reverse voltage protection, a 100 $\Omega$  resistor in series with  $V_{DD}$  is recommended.

**Absolute Maximum Ratings At ( $T_a=25\text{ }^\circ\text{C}$ )**

Characteristics		Values	Unit
Supply voltage, ( $V_{DD}$ )		6	V
Output Voltage, ( $V_{out}$ )		6	V
Reverse voltage, ( $V_{DD}$ ) ( $V_{OUT}$ )		-0.3	V
Magnetic flux density		Unlimited	Gauss
Output current ( $I_{SINK}$ )		1	mA
Operating temperature range, ( $T_a$ )		-40 to +85	$^\circ\text{C}$
Storage temperature range, ( $T_s$ )		-55 to +150	$^\circ\text{C}$
Maximum Junction Temp, ( $T_j$ )		150	$^\circ\text{C}$
Thermal Resistance	( $\theta_{JA}$ ) UA / SO / ST / SP	206 / 543 / 310 / 625	$^\circ\text{C}/\text{W}$
	( $\theta_{JC}$ ) UA / SO / ST / SP	148 / 410 / 223 / 116	$^\circ\text{C}/\text{W}$
Package Power Dissipation, ( $PD$ ) UA / SO / ST / SP		606 / 230 / 400 / 200	mW

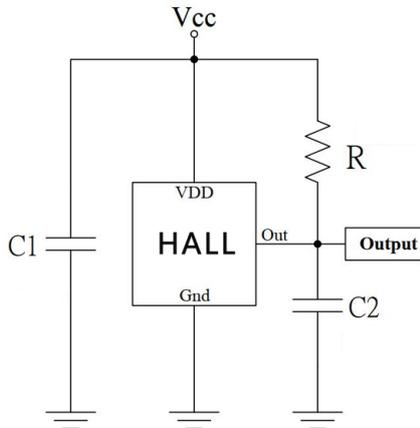
**Note:** Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.

**Electrical Specifications**

DC Operating Parameters  $T_A=+25\text{ }^\circ\text{C}$ ,  $V_{DD}=3\text{V}$

Parameters		Test Conditions	Min	Typ	Max	Units
Supply Voltage, ( $V_{DD}$ )		Operating	1.7		5.5	V
Supply Current, ( $I_{DD}$ )	Awake State			1.5	3.0	mA
	Sleep State			3.5	7.0	$\mu\text{A}$
	Average			5.0	10	$\mu\text{A}$
Output Leakage Current, ( $I_{off}$ )		$B < BRP_x$ , $V_{OUT} = 5.5\text{V}$			1.0	$\mu\text{A}$
Output Saturation Voltage,		$I_{out}=5\text{mA}$ , $B > BOP$			200	mV
Awake mode time, ( $T_{aw}$ )		Operating		40	80	$\mu\text{s}$
Sleep mode time, ( $T_{SL}$ )		Operating		40	80	mS
Duty Cycle, ( $D, C$ )				0.1		%
Response Time, ( $T_{RES}$ )					10	Hz
ESD		HBM	4			KV
Operating Point	BOPS	S pole to branded side, $B > BOP$ , $V_{out}$ On	20		55	Gauss
	BOPN	N pole to branded side, $B > BOP$ , $V_{out}$ On	-55		-20	Gauss
Release Point	BRPS	S pole to branded side, $B < BRP$ , $V_{out}$ Off	10		45	Gauss
	BRPN	N pole to branded side, $B < BRP$ , $V_{out}$ Off	-45		-10	Gauss
Hysteresis		$ BOP_x - BRP_x $		10		Gauss

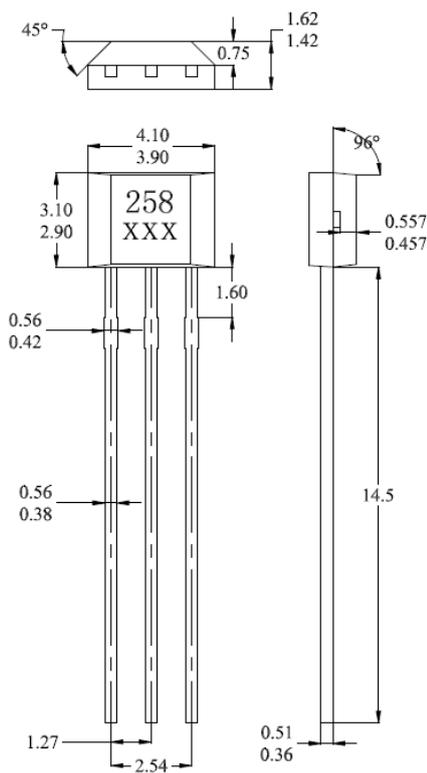
**Typical Application circuit**



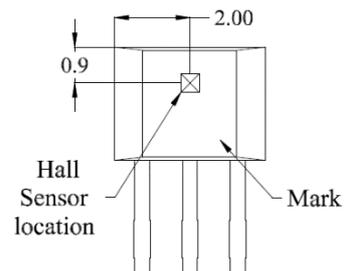
C1 : 10nF  
 C2 : 100pF  
 R1 : 100KΩ

**Sensor Location, package dimension and marking**

**UA Package**

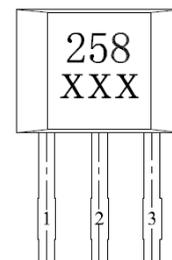


**Hall Chip location**



**Output Pin Assignment**

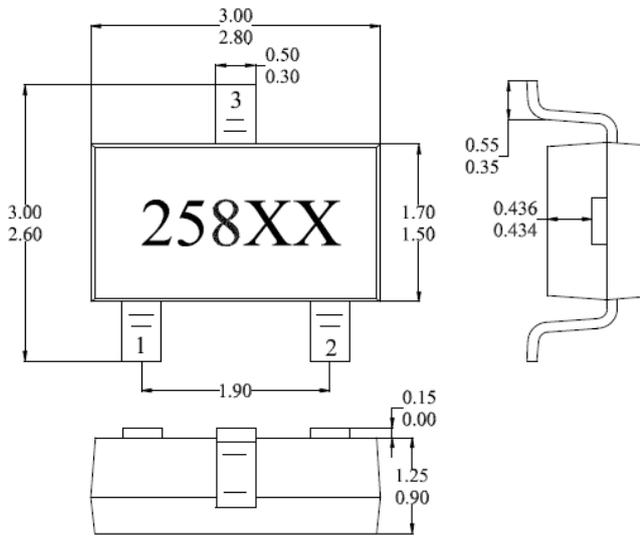
**(Top view)**



**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        VCC  
 Pin 2        GND  
 Pin 3        Output

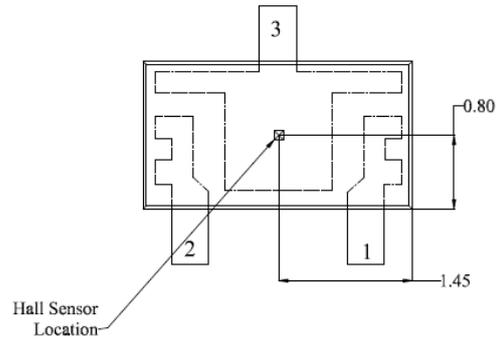
**Package (SOT-23)**  
**(Top View)**



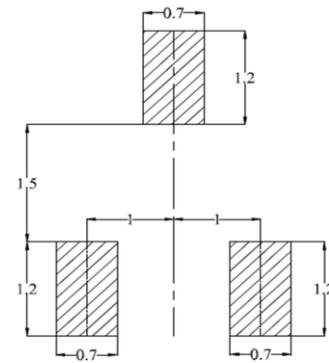
**NOTES:**

1. PINOUT (See Top View at left :)  
Pin 1  $V_{DD}$ ; Pin 2 Output; Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum

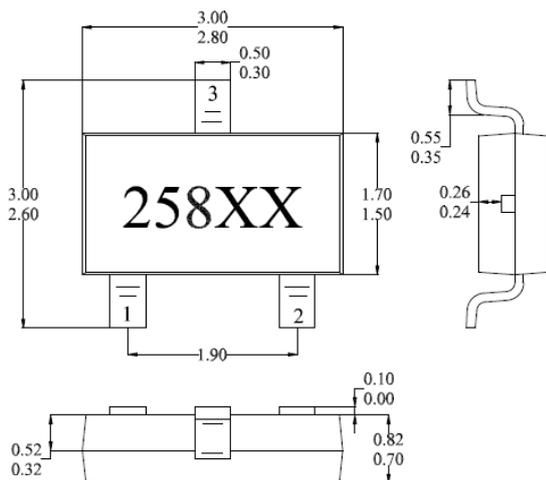
**Hall Plate Chip Location**  
**(Bottom view)**



**(For reference only) Land Pattern**



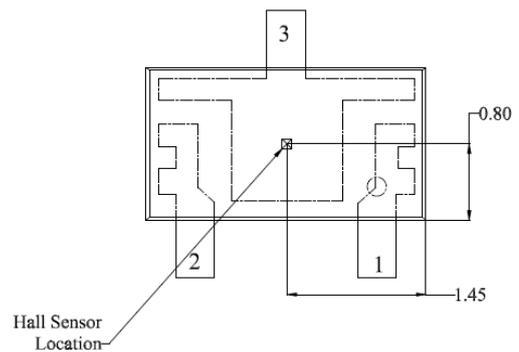
**Package (TSOT-23)**  
**(Top View)**



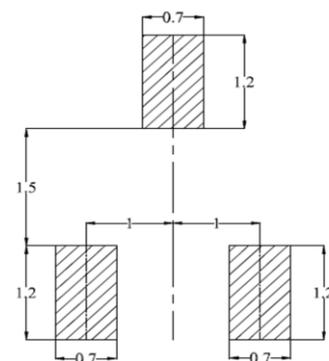
**NOTES:**

1. PINOUT (See Top View at left :)  
Pin 1  $V_{DD}$ ; Pin 2 Output; Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum

**Hall Plate Chip Location**  
**(Bottom view)**



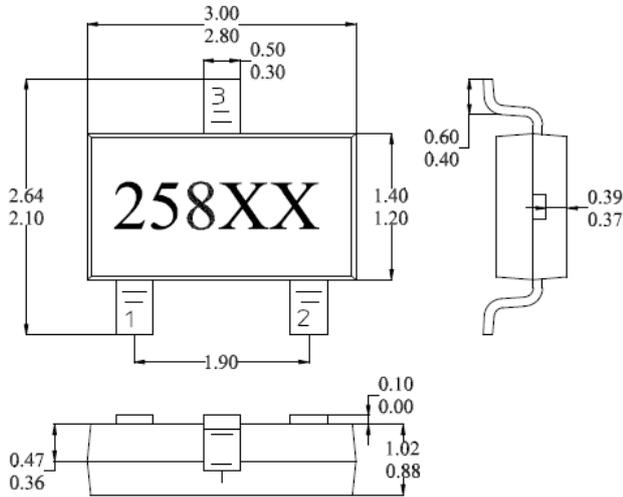
**(For reference only) Land Pattern**



**Package (PSOT-23)**

**(Top View)**

**(Top View)**

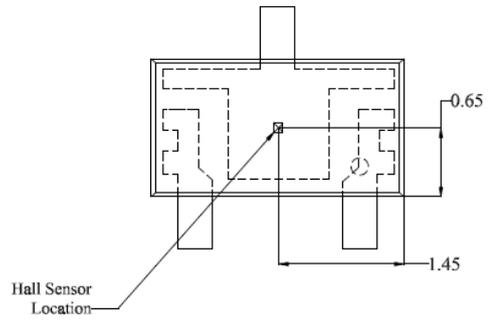


**NOTES:**

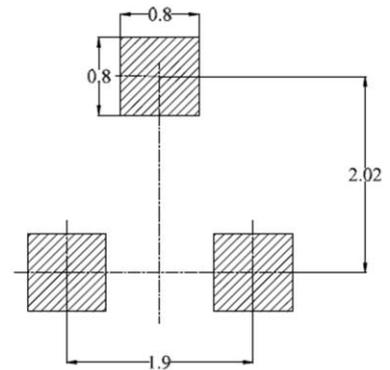
4. PINOUT (See Top View at left :)  
 Pin 1  $V_{DD}$ ; Pin 2 Output; Pin 3 GND
5. Controlling dimension: mm
6. Lead thickness after solder plating will be 0.254mm maximum

**Hall Plate Chip Location**

**(Bottom view)**



**(For reference only) Land Pattern**



### Warm reminder

1. Hall is a sensitive device. Please take electrostatic protection measures during use and storage.

2. During the installation process, the Hall should try to avoid applying mechanical stress to the Hall body. If the pins need to be bent, please operate at a distance of 3 mm from the root of the lead.

3. Recommended soldering temperature: soldering with electric soldering iron, the recommended temperature is 350°C, the longest is 5 seconds.

Wave soldering: The recommended maximum temperature is 260°C, the longest is 3 seconds

Infrared reflow soldering: recommended maximum 245°C, maximum 10 seconds

4. It is not recommended to exceed the parameters in the data sheet. Although the Hall will work normally under the limit parameters, it may cause damage to the Hall or the actual product under extreme conditions for a long time. In order to ensure the normal operation of the Hall and the product For safety and stability, please use it within the scope of the data sheet.

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