

## CMOS Omnipolar™ High Sensitivity Micropower Hall Switch

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### Features and Benefits

- Chopper stabilized amplifier stage
- Micropower consumption for battery-powered application
- Omnipolar, output switches with absolute value of North or South pole from magnet
- High Sensitivity for direct reed switch replacement applications

### Applications

- Solid state switch
- Handheld Wireless Handset Awake Switch
- Lid close sensor for battery powered devices
- Magnet proximity sensor for reed switch replacement in low duty cycle application

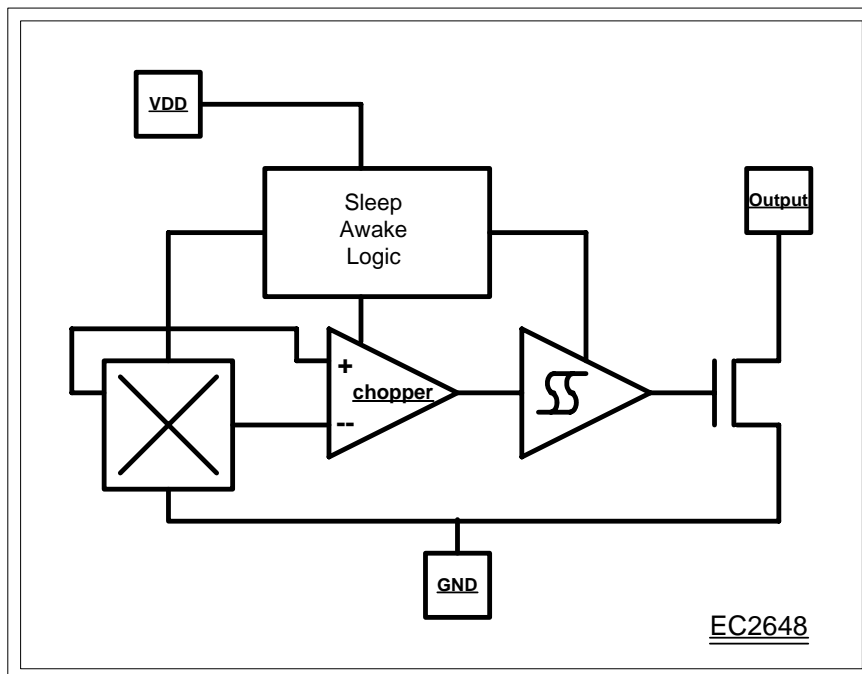
### Description

The EC2648 Omnipolar™ Hall effect sensor IC is fabricated from mixed signal CMOS technology. It incorporates advanced chopper-stabilization techniques to provide accurate and stable magnetic switch points.

The circuit design provides an internally controlled clocking mechanism to cycle power to the Hall element and analog signal processing circuits. This serves to place the high current-consuming portions of the circuit into a “Sleep” mode. Periodically the device is “Awakened” by this internal logic and the magnetic flux from the Hall element is evaluated against the predefined thresholds. If the flux density is above or below the  $B_{OP}$ / $B_{RP}$  thresholds then the output transistor is driven to change states accordingly. While in the “Sleep” cycle the output transistor is latched in its previous state. The design has been optimized for service in applications requiring extended operating lifetime in battery powered systems.

The output transistor of the EC2648 will be latched on ( $B_{OP}$ ) in the presence of a sufficiently strong south or North magnetic field the marked side of the package. The output will be latched off ( $B_{RP}$ ) in the absence of a magnetic field.

The SOT-23 device is magnetically inverted from the UA SIP device

**CMOS Omnipolar™ High Sensitivity Micropower Hall Switch**
**Functional Diagram**

**Electrical Specifications**

 DC operating parameters :  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 3V_{CC}$  ( Unless otherwise specified )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply Voltage	$V_{DD}$	Operating	2.5	2.75	3.5	V
Supply Current	$I_{DD}$	Average		10		$\mu\text{A}$
Output Current	$I_{out}$				1	$\text{mA}$
Saturation Voltage	$V_{SAT}$	$I_{OUT} = 1\text{mA}$			0.4	V
Awake mode time	$T_{aw}$	Operating		150		$\mu\text{s}$
Sleep mode time	$T_{sl}$	Operating		50	70	Ms

**Magnetic Specifications**

 DC operating parameters :  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 3V_{CC}$  ( Unless otherwise specified )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating Point	BOP			$\pm 3.8$	$\pm 6.0$	mT
Release Point	BRP		$\pm 0.5$	$\pm 2.1$		mT
Hysteresis	$B_{hys}$			1.7		mT

**Note : 1mT = 10 Gauss**

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**Absolute Maximum Ratings**

Supply Voltage (Operating). VDD .....	3V
Supply Current (Fault). IDD .....	.5mA
Output Voltage, VOUT .....	.5V
Output Current (Fault) , IOUT .....	.5mA
Operating Temperature Range , TA .....	-40 to 85 °C
Storage Temperature Range , Ts .....	-55 to 150 °C

**Unique Features**

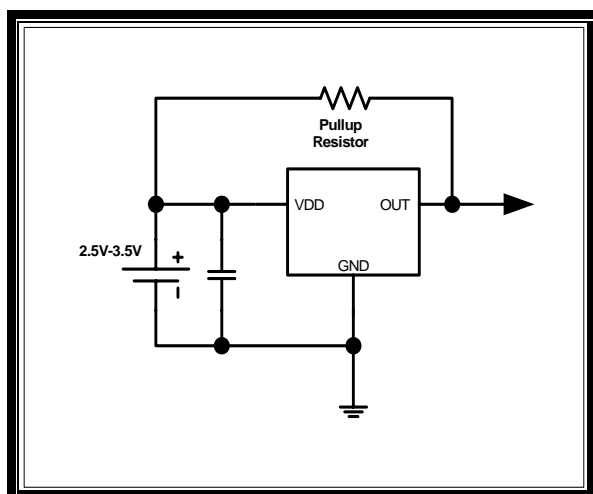
CMOS Hall IC Technology

The chopper stabilized amplifier uses switched capacitor techniques to eliminate the amplifier offset voltage, which, in bipolar devices, is a major source of temperature sensitive drift. CMOS makes this advanced technique possible. The CMOS chip is also much smaller than a bipolar chip, allowing very sophisticated circuitry to be placed in less space. The small chip size also contributes to lower physical stress and less power consumption.

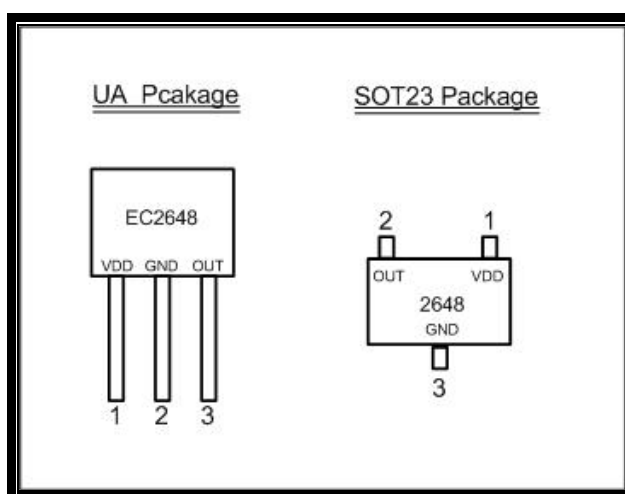
**Installation Comments**

Consider temperature coefficients of Hall IC and magnetics, as well as air gap and life time variations, Observe temperature limits during wave soldering .

**Typical Application**



**Package information**

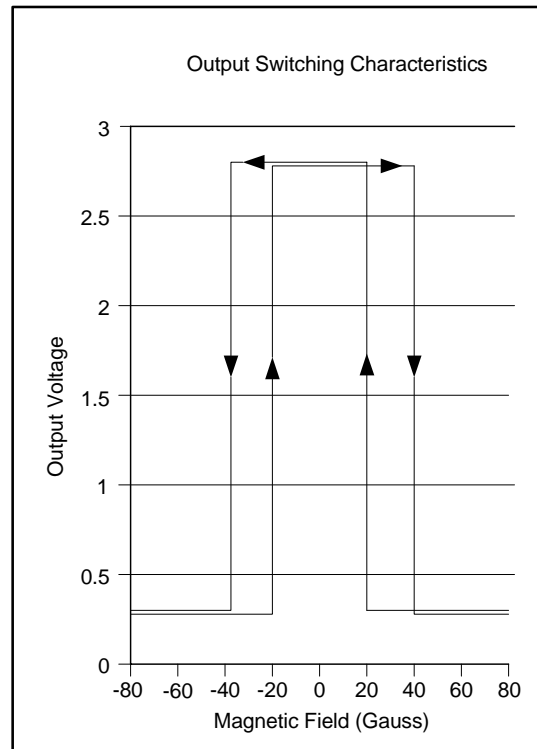
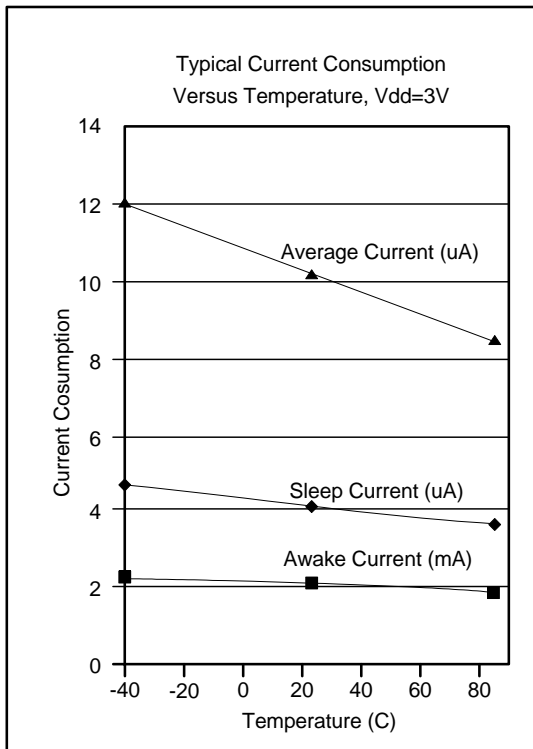
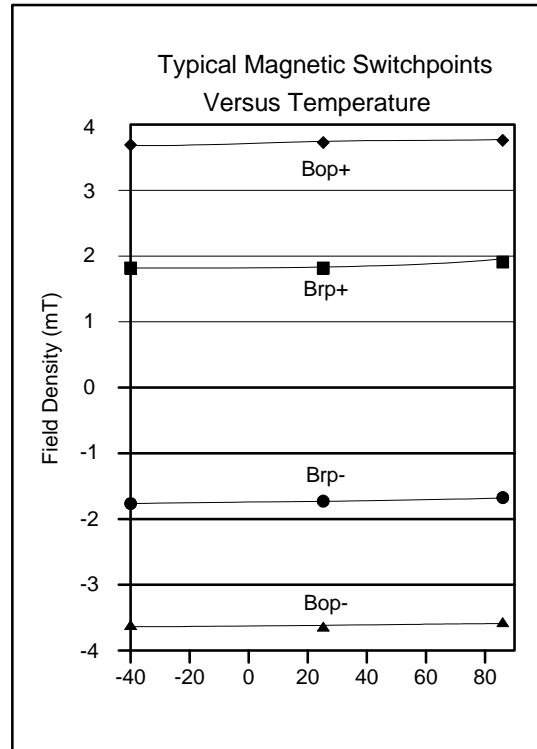
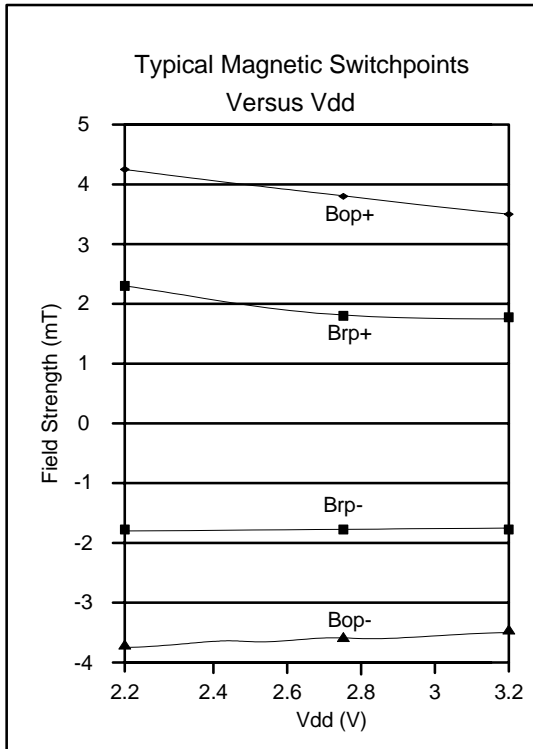


**Ordering information**

Part No .	Temperature Suffix	Package	Temperature Range
EC2648	E	UA	-40 to 85°C Extended
EC2648	E	SOT-23.	-40 to 85°C Extended

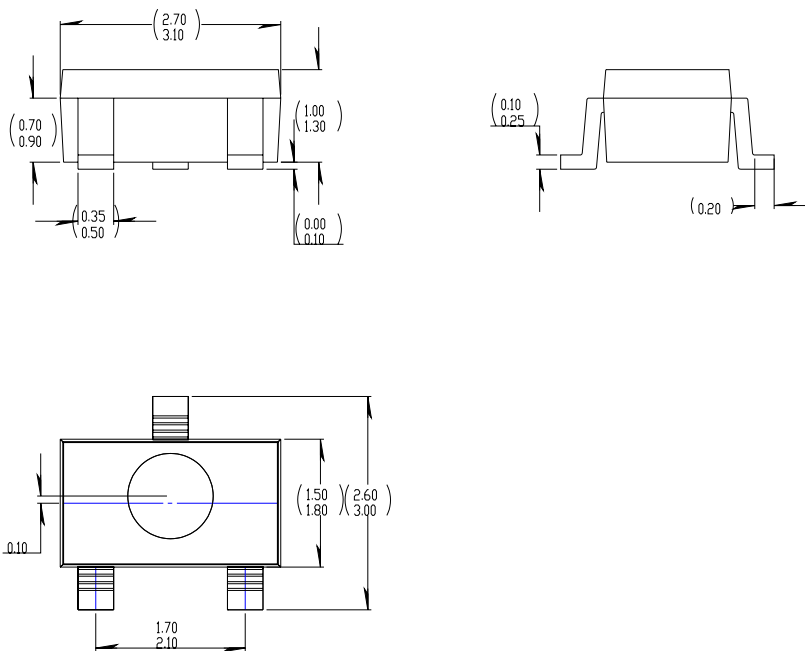
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Performance Graphs



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SOT-23 Package Physical Characteristics



SOT-23 Package Hall Location

