



AR248R 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.

AR248R 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.

AR248R is rated for operation between the ambient temperatures  $-40^{\circ}\text{C}$  and  $+85^{\circ}\text{C}$  for the E temperature range. Package types ST is an SOT-23(0.8 mm nominal height)

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

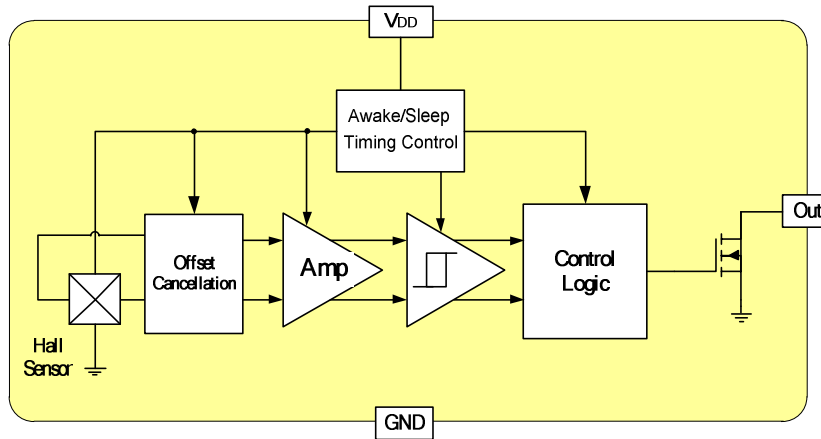
### ***Features and Benefits***

- CMOS Hall IC Technology.
- Solid-State Reliability.
- Micro power consumption for battery-powered applications.
- Omni polar, output switches with absolute value of North or South pole from magnet.
- Operation down to 2.5 V and Max at 5.0V.
- Ultra High Sensitivity for direct reed switch replacement applications.
- Narrower operating range(Bop distribution).
- Custom sensitivity selection is available in optional package.
- Pb Free/Green chip is qualified by third party lab.

### ***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

## 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( $T_a=25^\circ\text{C}$ )

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 ( $I_{out}$ )	2	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	( $\theta_{JA}$ ) ST	$310^\circ\text{C}/\text{W}$	$^\circ\text{C}/\text{W}$
	( $\theta_{JC}$ ) ST	$223^\circ\text{C}/\text{W}$	$^\circ\text{C}/\text{W}$
Package Power Dissipation, ( $P_D$ ) ST	400	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  $T_A=+25^\circ\text{C}$ ,  $V_{DD}=3.0\text{V}$

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage, ( $V_{DD}$ )	Operating	2.5		5.0	V
Supply Current, ( $I_{DD}$ )	Awake State		2.5	4.0	mA
	Sleep State		8.0	12	$\mu\text{A}$
	Average		10	16	$\mu\text{A}$
Output Leakage Current, ( $I_{off}$ )	Output off			1	$\mu\text{A}$
Output Low Voltage, ( $V_{sat}$ )	$I_{OUT}=1\text{mA}$			0.3	V
Awake mode time, ( $T_{aw}$ )	Operating		70		$\mu\text{S}$
Sleep mode time, ( $T_{sl}$ )	Operating		70		mS
Duty Cycle, ( $D, C$ )			0.1		%

### Magnetic Specifications

DC Operating Parameters  $T_A = +25\text{ }^\circ\text{C}$ ,  $V_{DD} = 3.0V$

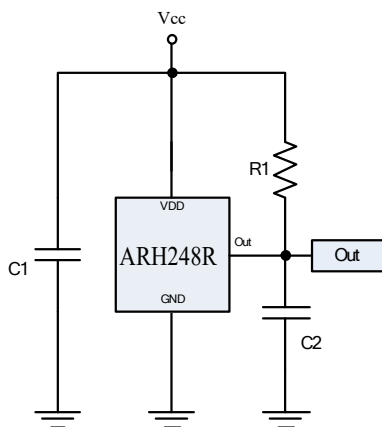
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Operating Point	$B_{OPS}$	N pole to branded side, $B > BOP$ , $V_{out}$ off	30		60	Gauss
	$B_{OPN}$	S pole to branded side, $B > BOP$ , $V_{out}$ off	-60		-30	Gauss
Release Point	$B_{RPS}$	N pole to branded side, $B < BRP$ , $V_{out}$ ON	20		50	Gauss
	$B_{RPN}$	S pole to branded side, $B < BRP$ , $V_{out}$ ON	-50		-20	Gauss
Hysteresis	$B_{HYS}$	$ BOP_x - BRP_x $		7		Gauss

### Output Behavior versus Magnetic Polar

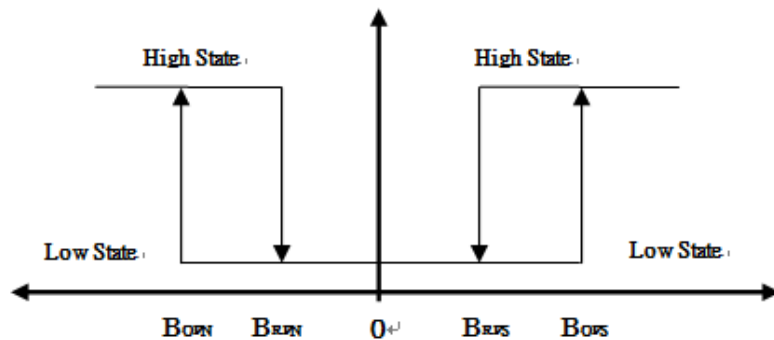
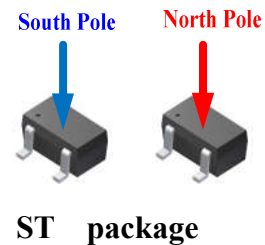
DC Operating Parameters  $T_a = -40$  to  $85\text{ }^\circ\text{C}$ ,  $V_{DD} = 2.5V$  to  $5.0V$

Parameter	Test condition	OUT(ST)
South pole	$B < Bop[(-60 \sim -30)]$	High
Null or weak magnetic field	$B = 0$ or $B < BRP$	Open(Pull-up Voltage)
North pole	$B > Bop(30 \sim 60)$	High

### Typical Application circuit



$C1 : 10nF$   
 $C2 : 100pF$   
 $R1 : 100K\Omega$

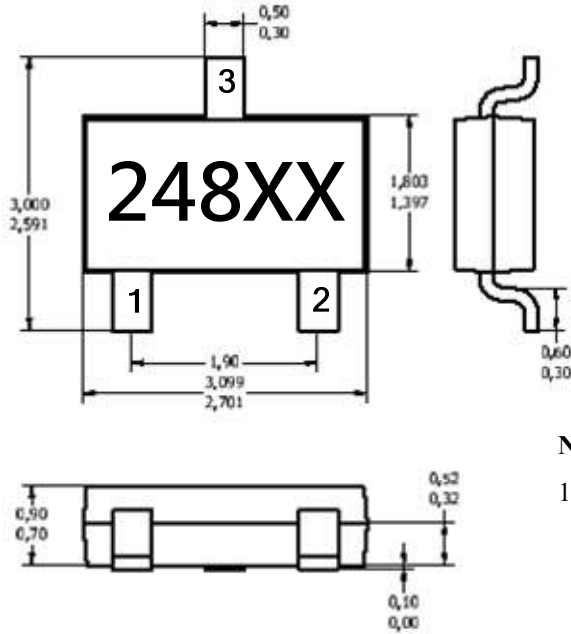




### Sensor Location, Package Dimension and Marking

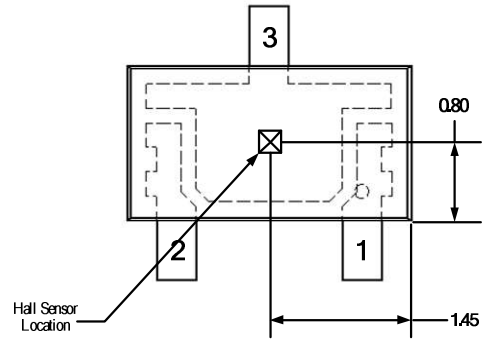
ST Package (TSOT-23)

(Top View)



Hall Plate Chip Location

(Bottom view)



#### NOTES:

- PINOUT (See Top View at left):  
Pin 1 VDD  
Pin 2 Output  
Pin 3 GND
- Controlling dimension: mm;