



## UHE4913

CMOS IC

### LOW POWER HALL EFFECT SWITCH

#### DESCRIPTION

**UHE4913** is a low-power integrated Hall switch designed to sense the applied magnetic flux density and give a digital output, which indicates the present condition of the magnitude sensed.

It is mainly designed for battery-powered system and hand-held equipment, such as cellular flip-phones and PDA's, in which power consumption is one major concern. The typical power consumption of UHE4913 is down to 10µW in 2.7V supply.

The output will be at the "High" level when no magnetic field is applied. When the applied magnetic flux density is stronger than the switching threshold, the output would be at the "Low" level.

#### FEATURES

- \* Micropower Operation
- \* 2.4V to 5.5V Battery Operation
- \* Switching for both poles of magnet
- \* Offset Canceling Technology
- \* Superior Temperature Stability
- \* Extremely Low Switch-Point Drift
- \* Insensitive to Physical Stress

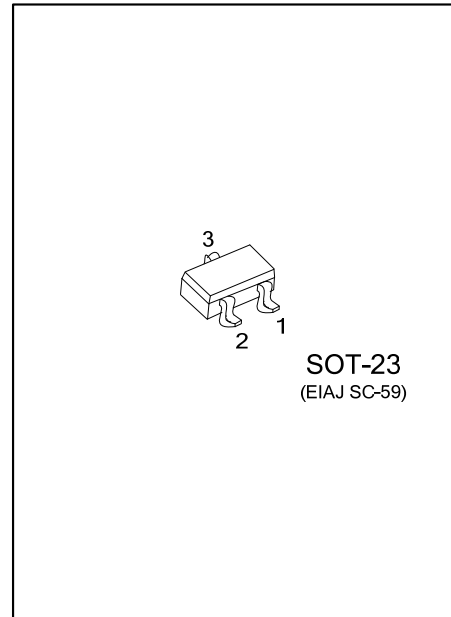
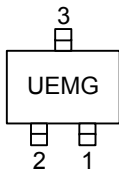
#### ORDERING INFORMATION

| Ordering Number | Package | Pin Assignment |   |   | Packing   |
|-----------------|---------|----------------|---|---|-----------|
|                 |         | 1              | 2 | 3 |           |
| UHE4913G-AE3-R  | SOT-23  | O              | I | G | Tape Reel |

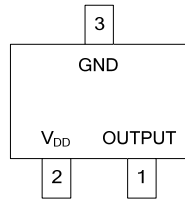
Note: Pin Assignment: O: Output I: V<sub>DD</sub> G: GND

|  |   |
|--|---|
| <p>UHE4913G-AE3-R</p> <p>(1) Packing Type<br/>(2) Package Type<br/>(3) Green Package</p> | <p>(1) R: Tape Reel<br/>(2) AE3: SOT-23<br/>(3) G: Halogen Free and Lead Free</p> |
|--|---|

#### MARKING



■ PIN CONFIGURATION

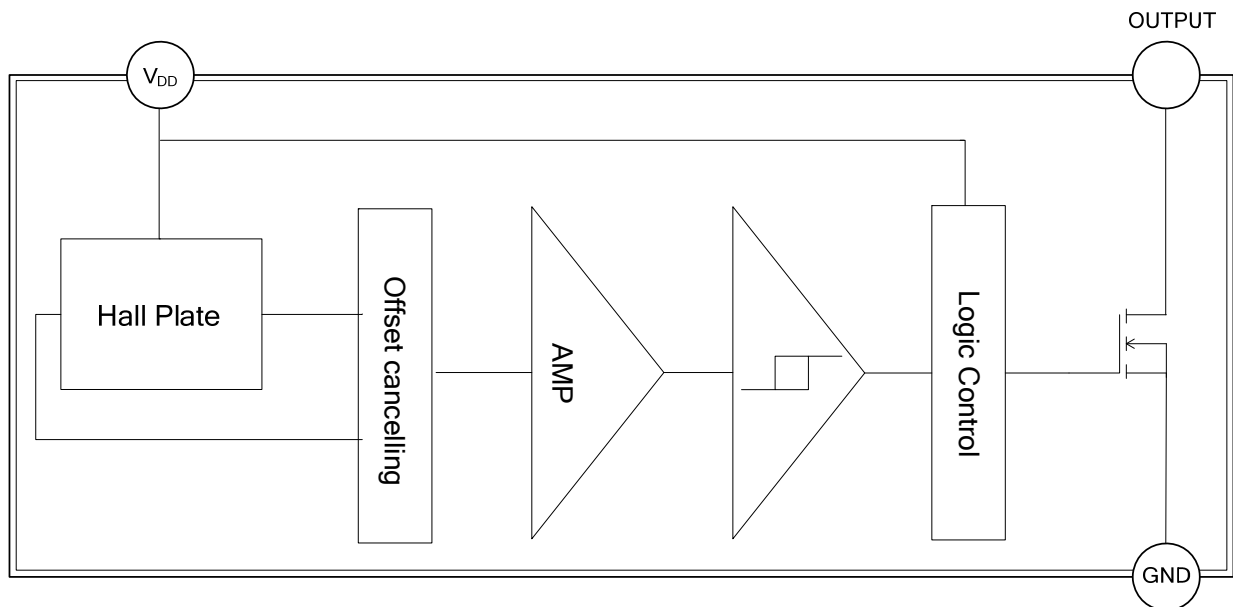


■ PIN DESCRIPTION

| PIN NAME         | PIN TYPE | PIN DESCRIPTION |
|------------------|----------|-----------------|
| V <sub>OUT</sub> | O        | Digital Output  |
| V <sub>DD</sub>  | I        | Power Supply    |
| GND              | G        | Ground          |

Note: O=Output, I=Power Supply, G=Ground

■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATING

| PARAMETER             | SYMBOL    | RATINGS    | UNIT |
|-----------------------|-----------|------------|------|
| Supply Voltage        | $V_{DD}$  | 5.5        | V    |
| Supply current        | $I_Q$     | -1 ~ +2.5  | mA   |
| Magnetic Flux Density | B         | Unlimited  | mT   |
| Junction Temperature  | $T_J$     | 150        | °C   |
| Operation Temperature | $T_{OPR}$ | -40 ~ +85  | °C   |
| Storage Temperature   | $T_{STG}$ | -40 ~ +150 | °C   |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
 Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ RECOMMENDED OPERATING CONDITIONS ( $T_A=25^\circ\text{C}$ )

| PARAMETER           | SYMBOL    | CONDITIONS | MIN  | TYP | MAX | UNIT |
|---------------------|-----------|------------|------|-----|-----|------|
| Supply Voltage      | $V_{DD}$  | Operating  | 2.4  | 2.7 | 5.5 | V    |
| Output Voltage      | $V_{OUT}$ |            | -0.3 | 2.7 | 5.5 | V    |
| Ambient Temperature | $T_A$     |            | -40  | 25  | 85  | °C   |

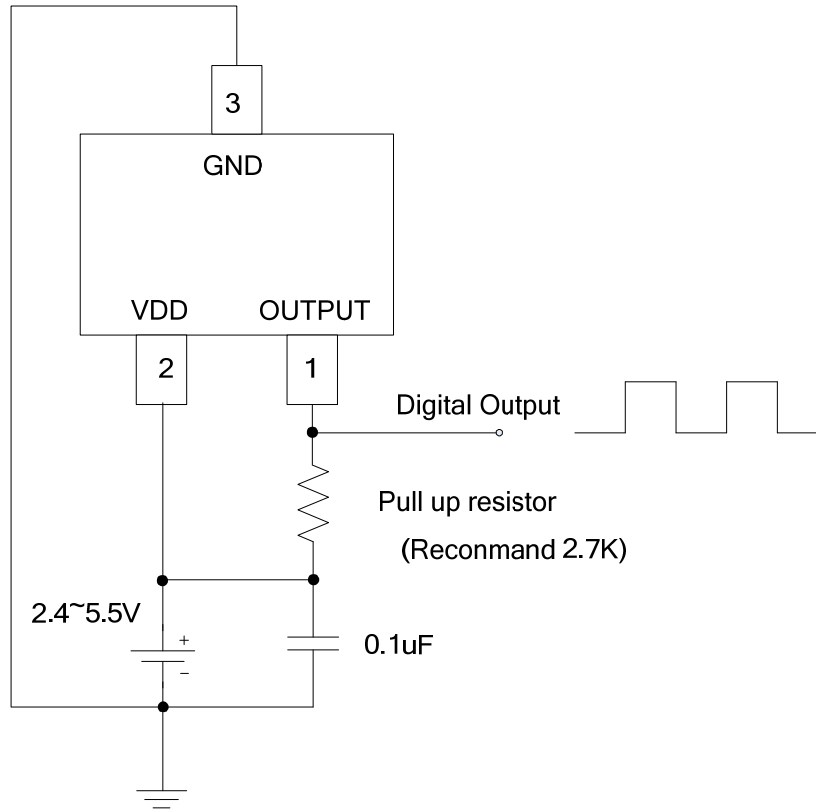
## ■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ )

| PARAMETER                 | SYMBOL        | CONDITIONS                               | MIN | TYP  | MAX | UNIT          |
|---------------------------|---------------|--|-----|------|-----|---------------|
| Output Saturation Voltage | $V_{SAT}$     | $V_{DD}=2.7\text{V}$                     |     | 0.1  |     | V             |
| Output Leakage Current    | $I_{OFF}$     |  |     | 0.01 |     | $\mu\text{A}$ |
| Supply Current            | $I_{DD(EN)}$  | $V_{DD}=2.7\text{V}$                     |     | 1.1  |     | mA            |
|                           | $I_{DD(DIS)}$ |  |     | 2.5  |     | $\mu\text{A}$ |
|                           | $I_{DD(AVG)}$ |  |     | 3    | 20  | $\mu\text{A}$ |
| Operating Time            | $T_{OP}$      | $V_{DD}=2.7\text{V}$                     |     | 50   |     | $\mu\text{s}$ |
| Standby Time              | $T_{SD}$      |  |     | 130  |     | ms            |
| Duty Cycle                | D.C.          |  |     | 0.04 |     | %             |
| Output Rise Time          | $t_R$         | $R_L=2.7\text{K}\Omega, C_L=10\text{pF}$ |     | 0.5  | 1   | $\mu\text{s}$ |
| Output Fall Time          | $t_F$         | $R_L=2.7\text{K}\Omega, C_L=10\text{pF}$ |     | 0.1  | 1   | $\mu\text{s}$ |

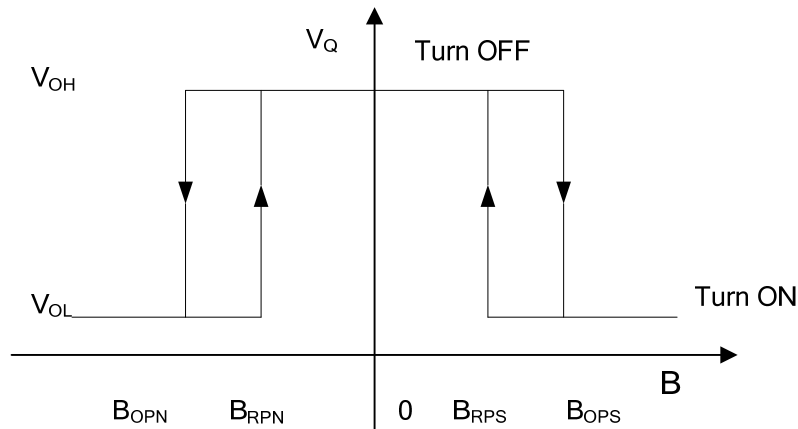
## ■ MAGNETIC CHARACTERISTICS ( $T_A=25^\circ\text{C}, V_{DD}=2.7\text{V}$ )

| PARAMETER        | SYMBOL            | MIN | TYP | MAX | UNIT  |
|------------------|-------------------|-----|-----|-----|-------|
| Operation Points | $ B_{OP} $        | 20  | 35  | 50  | Gauss |
| Release Points   | $ B_{RP} $        | 12  | 27  | 42  |       |
| Hysteresis       | $ B_{OP}-B_{RP} $ | 2   | 8   | 16  |       |

■ TYPICAL APPLICATION CIRCUIT



■ MAGNETIC FLUX



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