

1. Description

The DH246 latching 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. This device requires the presence of both south and north polarity magnetic fields for operation. In the presence of a south polarity field of sufficient strength, the device output latches on, and only switches off when a north polarity field of sufficient strength is present.

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.

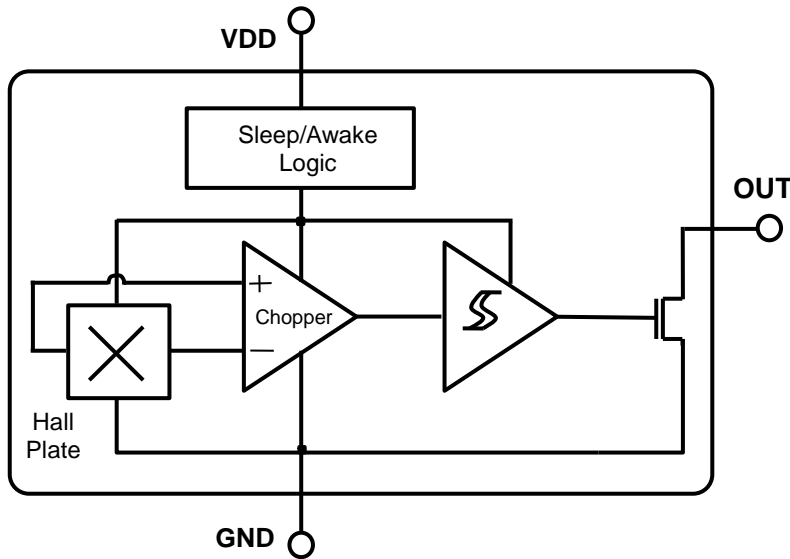
2. Features

- ◆ Micropower consumption for battery powered applications
- ◆ Latching output
- ◆ Operation down to 2.5V
- ◆ High sensitivity for direct reed switch replacement applications
- ◆ Chopper stabilized amplifier stage

3. Applications

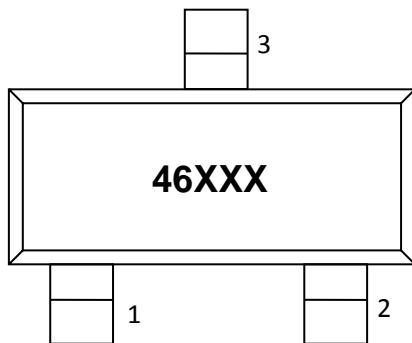
- ◆ Solid state switch
- ◆ Handheld Wireless Handset Awake Switch
- ◆ Lid close sensor for battery powered devices

4. Functional Block Diagram



5. Pin Definitions and Descriptions

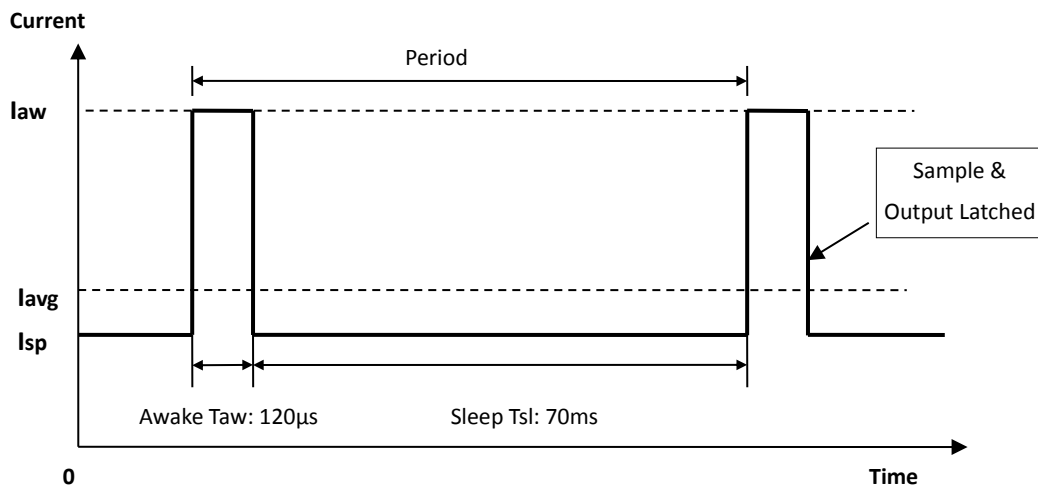
Mark View



Pin Description

| Name | No. | Status | Description |
|-----------------|-----|--------|--------------|
| V _{DD} | 1 | P | Power Supply |
| Out | 2 | O | Output |
| GND | 3 | P | IC Ground |

6. Internal Timing Circuit



7. Absolute Maximum Ratings

| Parameter | Symbol | Value | Units |
|-----------------------------|-----------|------------|-------|
| Supply Voltage (operating) | V_{DD} | 6 | V |
| Supply Current | I_{DD} | 5 | mA |
| Output Voltage | V_{OUT} | 5 | V |
| Output Current | I_{OUT} | 5 | mA |
| Operating Temperature Range | T_A | -40 to 85 | °C |
| Storage Temperature Range | T_S | -50 to 150 | °C |
| ESD Sensitivity | | 4000 | V |

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

8. DC Electrical Specifications

DC Operating Parameters: $T_A = 25^\circ\text{C}$, $V_{DD} = 2.75\text{V}$

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|--------------------|-----------|------------------------|-----|-----|-----|---------------|
| Operating voltage | V_{DD} | Operating | 2.5 | 3 | 5.5 | V |
| Supply current | I_{DD} | Average | | 5 | | μA |
| Output Current | I_{OUT} | | | | 1.0 | mA |
| Saturation Voltage | V_{SAT} | $I_{OUT} = 1\text{mA}$ | | | 0.4 | V |
| Awake mode time | T_{AW} | Operating | | 175 | | μS |
| Sleep mode time | T_{SL} | Operating | | | 70 | mS |

9. Magnetic Specifications

Operating Parameters: $T_A = 25^\circ\text{C}$, $V_{DD} = 2.75V_{DC}$

| Parameter | Symbol | Min | Typ | Max | Units |
|-----------------|-----------|-----|-----|-----|-------|
| Operating Point | B_{OP} | 10 | 30 | 50 | Gs |
| Release Point | B_{RP} | -50 | -30 | -15 | Gs |
| Hysteresis | B_{HYS} | - | 60 | - | Gs |

10. ESD Protection

Human Body Model (HBM) tests according to: Mil. Std. 883F method 3015.7:

| Parameter | Symbol | Limit Values | | Unit | Notes |
|-------------|-----------|--------------|---------|------|-------|
| | | Min | Max | | |
| ESD Voltage | V_{ESD} | | ± 4 | kV | |

11. Unique Features

■ CMOS Hall IC Technology

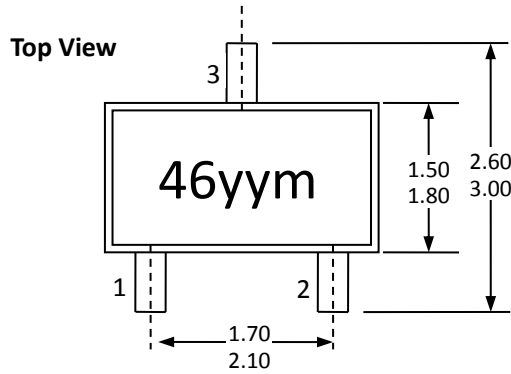
The chopper stabilized amplifier uses switched capacitor techniques to eliminate the amplifier offset voltage, which, in bipolar devices, is a major source of temperature sensitive drift. CMOS makes this advanced technique possible. The CMOS chip is also much smaller than a bipolar chip, allowing very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

12. ESD Precautions

Electronic semiconductor products are sensitive to Electro Static Discharge . Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

13. Package Information

13.1 SOT-23 Package Physical Characteristics

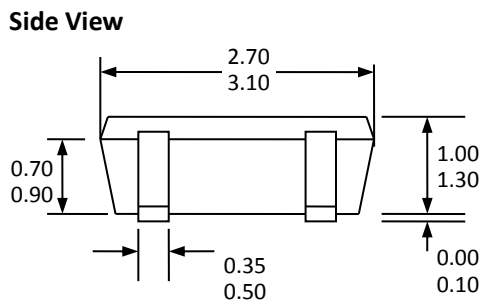


Notes:

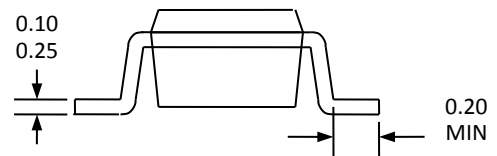
- 1). PINOUT: Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND
- 2). All dimensions are in millimeters;

Marking:

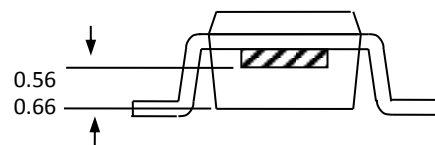
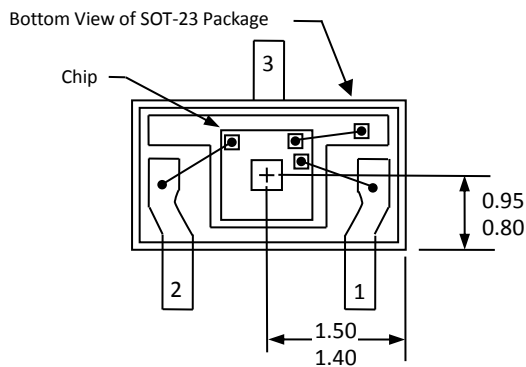
46 -- Code of Device
yy -- last 2 digit of year;
m -- "A"-"Z", Production Lot;



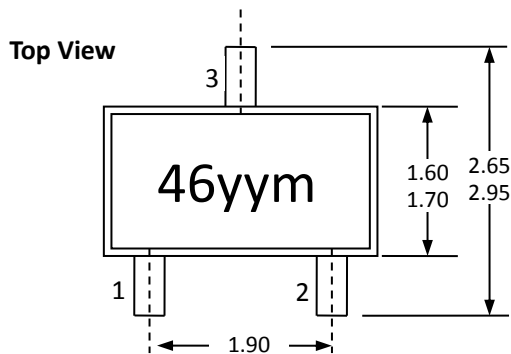
End View



SOT-23 Package Hall Location



13.2 TSOT-23 Package Physical Characteristics



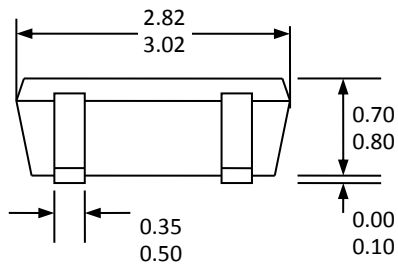
Notes:

- 1). PINOUT: Pin 1 V_{DD}
Pin 2 Output
Pin 3 GND
- 2). All dimensions are in millimeters;

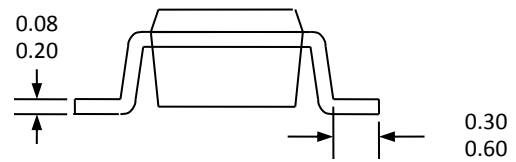
Marking:

46-- Code of Device
yy -- last 2 digit of year;
m – "A"-"Z", Production Lot;

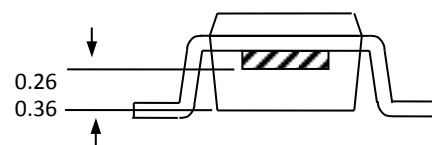
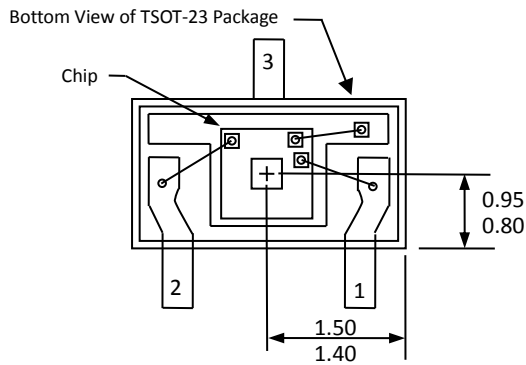
Side View



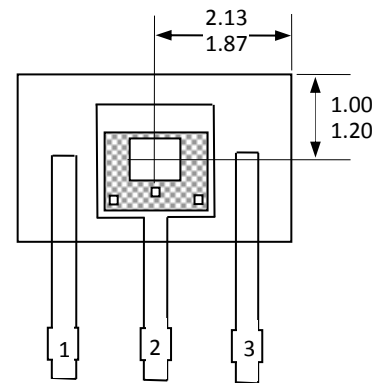
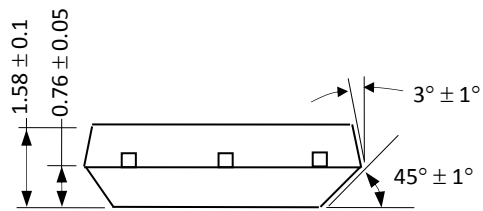
End View



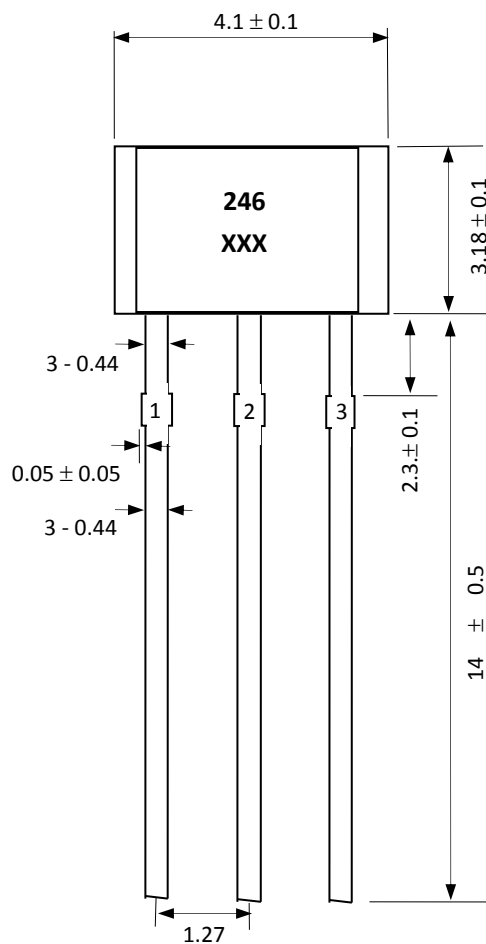
Hall plate location



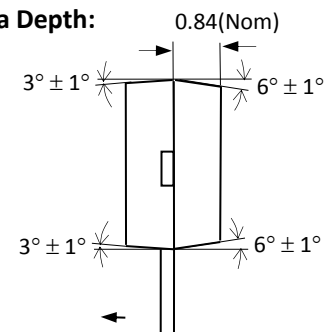
13.3 TO-92 Package Physical Characteristics



Sensor Location



Active Area Depth:



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 V_{DD}
 Pin 2 GND
 Pin 3 Output

14. Ordering Information

| Part No. | Temperature Suffix | Package Code |
|----------|--------------------|--------------|
| DH246 | E (-40°C ~ 85°C) | UA (TO-92S) |
| | | SO (SOT-23) |
| | | ST (TSOT-25) |