



### XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch

#### XYT1661 General Description

The XYT1661 Omnipolar Hall effect sensor IC is fabricated from mixed signal CMOS technology. It is comprised of two Hall plates and a CMOS output driver, mainly designed for battery-operation. The total power consumption in normal operation is typically 3.6 $\mu$ W with a 1.8V power source. either north or south poles of sufficient strength will turn the output on. The output will be turned off under no magnetic field. While the magnetic flux density (B) is larger than operating point (BOP), the output will be turned on (low), the output is held until B is lower than release point (BRP), and then turned off.

The XYT1661 is available in many flexible packaging options, such as SOT23-3L/SIP-3L. Operating temperature range of the XYT1661 is from -40°C to 85°C.

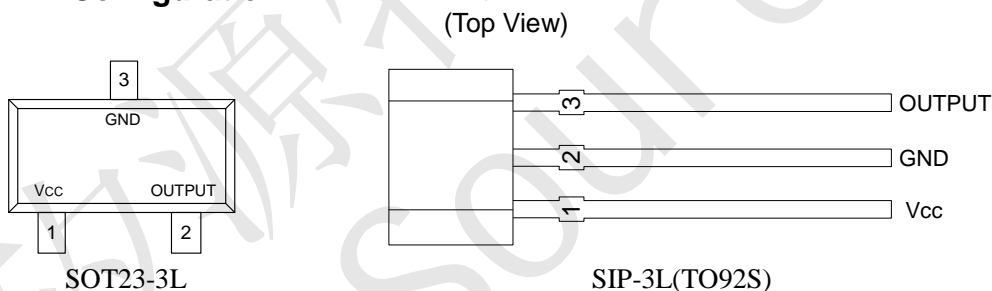
#### XYT1661 Features

- 1.9 $\mu$ A Micro power design
- Operation with North or South pole(omnipolar)
- CMOS Output
- 1.65V to 5.5V battery operation
- High sensitivity and high stability of the magnetic switching points
- High resistance to mechanical stress
- Digital output signal
- Good RF noise immunity
- -40°C to 85°C operating temperature
- SOT23-3L/SIP-3L(TO92S) package

#### XYT1661 Applications

- Smart meter
- toys
- Cover switch in Notebook PC/PDA
- Contact-less switch in consumer products
- Solid State Switch
- Handheld Wireless Handset Awake Switch
- Lid close sensor for battery-powered device
- Magnet proximity sensor for reed switch replacement in low duty cycle applications

#### XYT1661 Pin Configuration



| Pin Name        | Pin      |        | Description                                   |
|-----------------|----------|--------|---|
|                 | SOT23-3L | SIP-3L |   |
| V <sub>CC</sub> | 1        | 1      | IC Power Supply                               |
| OUTPUT          | 2        | 3      | It is low state during the S/N magnetic field |
| GND             | 3        | 2      | IC Ground                                     |

#### XYT1661 Application Circuit

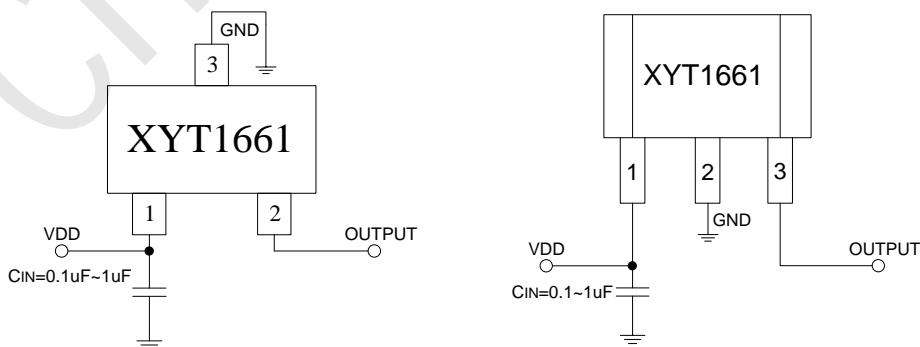


Figure 1, application circuit

Note: C<sub>IN</sub> is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 0.1~1 $\mu$ F.



### XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch

#### ■ XYT1661 Ordering Information

| Part Number | Package Type | Packing Qty  | B <sub>OP</sub> (Gauss) | B <sub>RP</sub> (Gauss) | Temperature | Eco Plan | Lead |
|-------------|--------------|--------------|-------------------------|-------------------------|-------------|----------|------|
| XYT1661WAD  | SOT23-3L     | 3000pcs/Reel | ±30(Typ.)               | ±20(Typ.)               | -40~ +85℃   | ROHS     | Cu   |
| XYT1661MD   | SIP-3L       | 1000pcs/Bag  | ±30(Typ.)               | ±20(Typ.)               | -40~ +85℃   | ROHS     | Cu   |

#### ■ XYT1661 Block Diagram

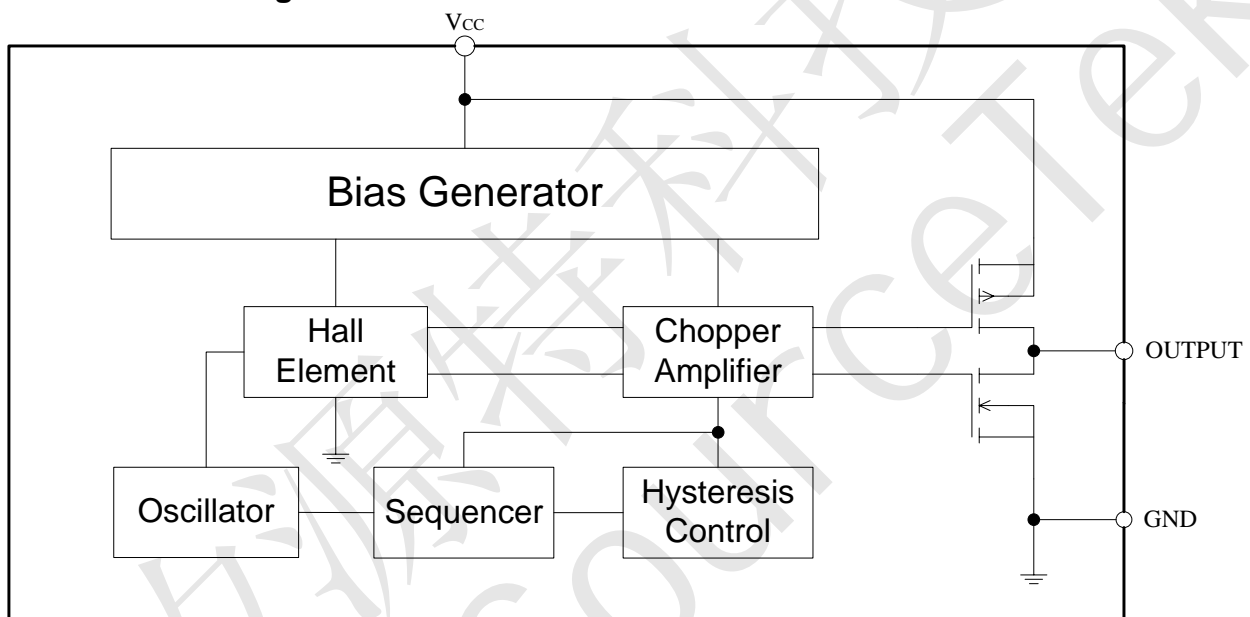


Figure 2, Block Diagram Of XYT1661

#### ■ XYT1661 Absolute Maximum Ratings (T<sub>A</sub>=25℃ unless otherwise noted)

| Parameter  | Symbol            | Rating      | Unit |
|--|-------------------|-------------|------|
| V <sub>CC</sub> to GND                           | V <sub>CC</sub>   | -0.3 to 6   | V    |
| Magnetic Flux Density                            | B                 | Unlimited   |      |
| Storage Temperature Range                        | T <sub>S</sub>    | -65 to +150 | ℃    |
| Operating Junction Temperature Range             | T <sub>J</sub>    | -40 to 150  | ℃    |
| Maximum Power Dissipation                        | SOT23-3L          | 230         | mW   |
|  | SIP-3L            | 300         |      |
| Maximum Soldering Temperature (at leads, 10 sec) | T <sub>LEAD</sub> | 260         | ℃    |

#### ■ XYT1661 Recommended Operating Conditions (T<sub>A</sub>=25℃ unless otherwise noted)

| Parameter                   | Symbol          | Conditions | Rating     | Unit |
|-----------------------------|-----------------|------------|------------|------|
| Supply Voltage              | V <sub>DD</sub> | Operating  | 1.65 ~ 5.5 | V    |
| Operating Temperature Range | T <sub>A</sub>  | Operating  | -40 ~ +85  | ℃    |



### XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch

#### ■ XYT1661 Electrical Characteristics

Unless otherwise noted, typical values are at  $T_A=25^{\circ}\text{C}$ ,  $V_{DD}=1.8\text{V}$

| Symbol        | Parameter              | Conditions  | Min. | Typ. | Max. | Unit          |
|---------------|------------------------|---|------|------|------|---------------|
| $V_{OL}$      | Output On Voltage      | $I_{OUT}=-1\text{mA}$   | -0.3 | 0.1  | +0.3 | V             |
| $I_{OFF}$     | Output Leakage Current | $V_{OUT}=5.5\text{V}$ , Output off  | -    | <0.1 | 1.0  | $\mu\text{A}$ |
| $I_{CC}(EN)$  | Supply Current         | Chip enable, $T_A=25^{\circ}\text{C}$ ,<br>$V_{DD}=1.8\text{V}$                             | -    | 0.9  | 1.6  | mA            |
| $I_{CC}(EN)$  |                        | Chip enable, $T_A=-40\sim 85^{\circ}\text{C}$ ,<br>$V_{DD}=1.65\sim 5.5\text{V}$            | -    | 0.9  | 1.95 | mA            |
| $I_{CC}(DIS)$ |                        | Chip disable, $T_A=25^{\circ}\text{C}$ ,<br>$V_{DD}=1.8\text{V}$                            | -    | 0.72 | 2    | $\mu\text{A}$ |
| $I_{CC}(DIS)$ |                        | Chip disable, $T_A=-40\sim 85^{\circ}\text{C}$ ,<br>$V_{DD}=1.65\sim 5.5\text{V}$           | -    | 0.72 | 3    | $\mu\text{A}$ |
| $I_{CC}(AVG)$ |                        | Average supply current,<br>$T_A=25^{\circ}\text{C}$ , $V_{DD}=1.8\text{V}$                  | -    | 1.9  | 2.1  | $\mu\text{A}$ |
| $I_{CC}(AVG)$ |                        | Average supply current,<br>$T_A=-40\sim 85^{\circ}\text{C}$ , $V_{DD}=1.65\sim 5.5\text{V}$ | -    | 1.9  | 4.9  | $\mu\text{A}$ |
| $T_{awake}$   |                        | Awake Time  | -    | -    | 31   | 60            |
| $T_{period}$  | Period                 | -   | -    | 30   | 60   | ms            |
| D.C.          | Duty Cycle             | -   | -    | 0.11 | -    | %             |

#### ■ XYT1661 Magnetic Characteristics

| $V_{DD}=1.8\text{V}, T_A=25^{\circ}\text{C}$ |           |      |      |      |       |
|--|-----------|------|------|------|-------|
| Parameter                                    | Symbol    | Min. | Typ. | Max. | Unit  |
| South Pole Operate point                     | $B_{OPS}$ | 15   | 30   | 50   | Gauss |
| South Pole Release point                     | $B_{RPS}$ | 5    | 20   | 48   | Gauss |
| North Pole Operate point                     | $B_{OPN}$ | -50  | -30  | -15  | Gauss |
| North Pole Release point                     | $B_{RPN}$ | -48  | -20  | -5   | Gauss |
| Hysteresis                                   | $B_{HYS}$ | 5    | 10   | 20   | Gauss |

#### ■ XYT1661 Output VS Magnetic Pole

| Part Number | Magnetic Pole | Test Conditions | Output |
|-------------|---------------|-----------------|--------|
| XYT1661     | South Pole    | $B > B_{OPS}$   | Low    |
| XYT1661     | South Pole    | $B < B_{RPS}$   | High   |
| XYT1661     | North Pole    | $B < B_{OPN}$   | Low    |
| XYT1661     | North Pole    | $B > B_{RPN}$   | High   |



### XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch

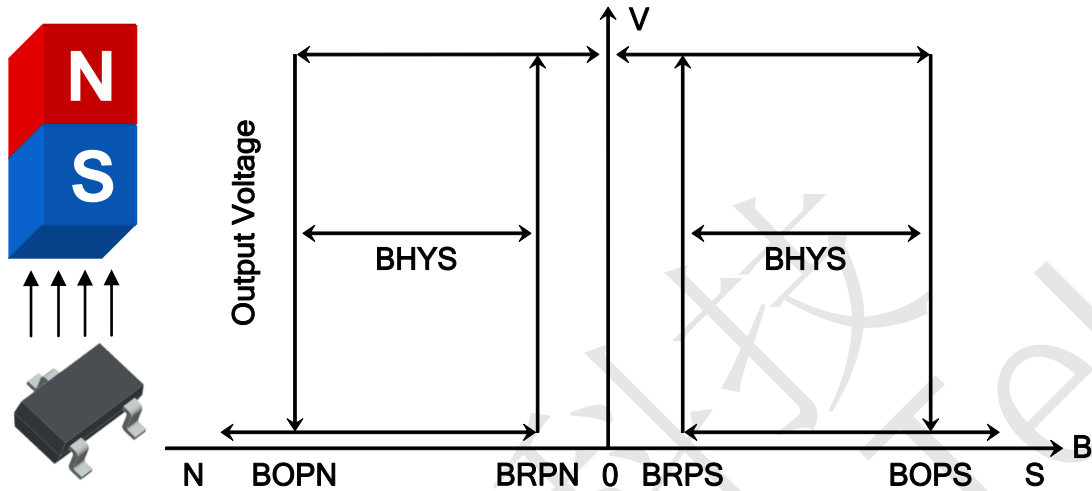


Figure 3, Magnetic Operational Characteristics Of XYT1661

#### ■ XYT1661 Hall Sensor Location

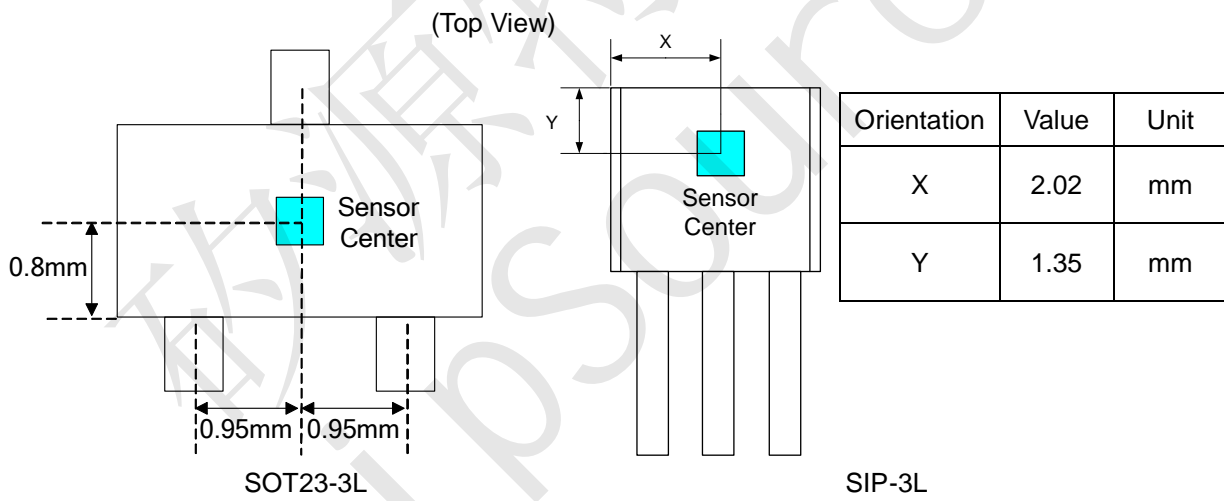


Figure4, Hall Sensor Location



**XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch**

■ **XYT1661 Land Pattern (for reference only)**

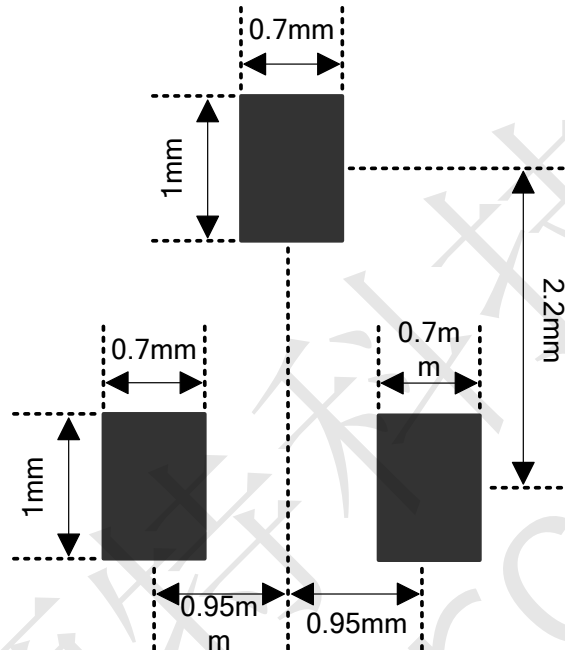
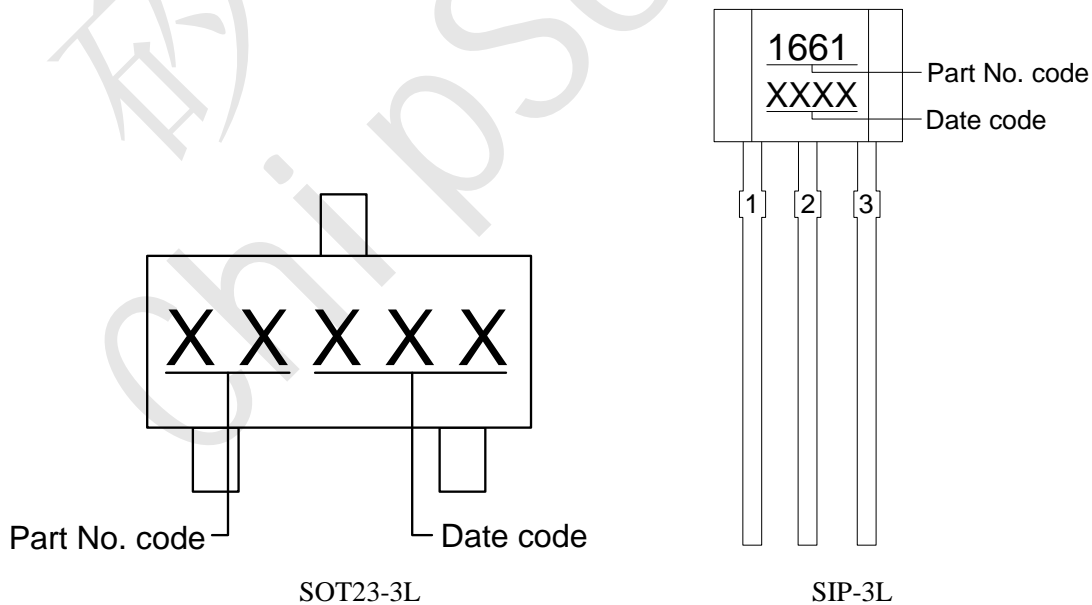


Figure 5, Land Pattern Dimension (SOT23-3L)

■ **XYT1661 Marking Information**

(Top View)

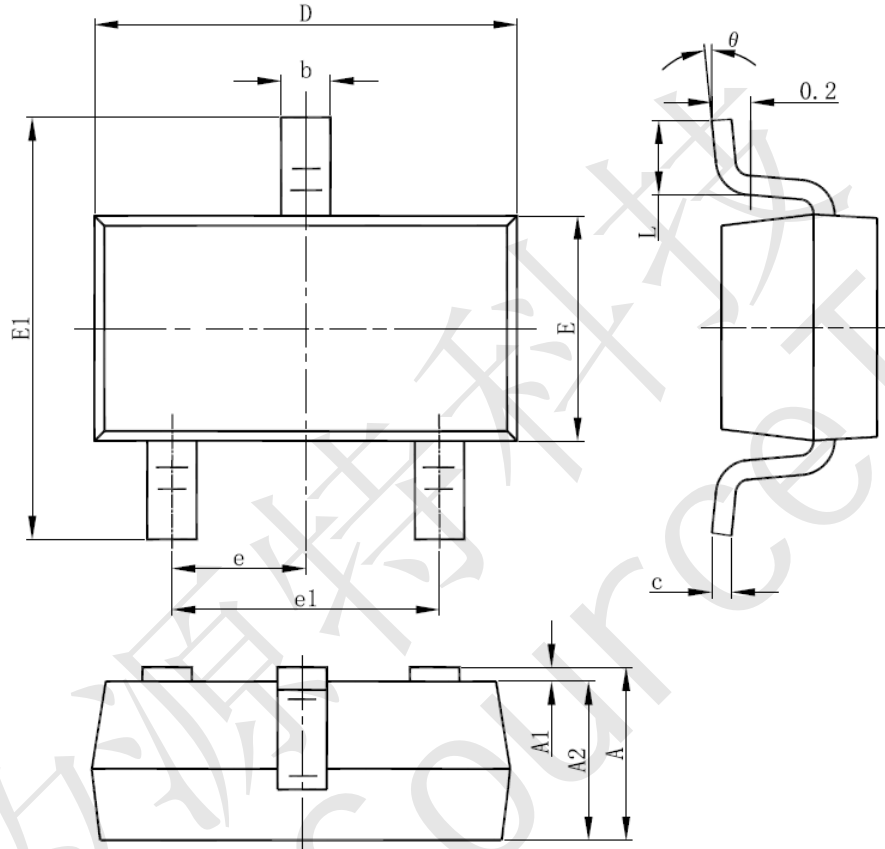




**XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch**

■ **XYT1661 Package Information**

1)SOT23-3L



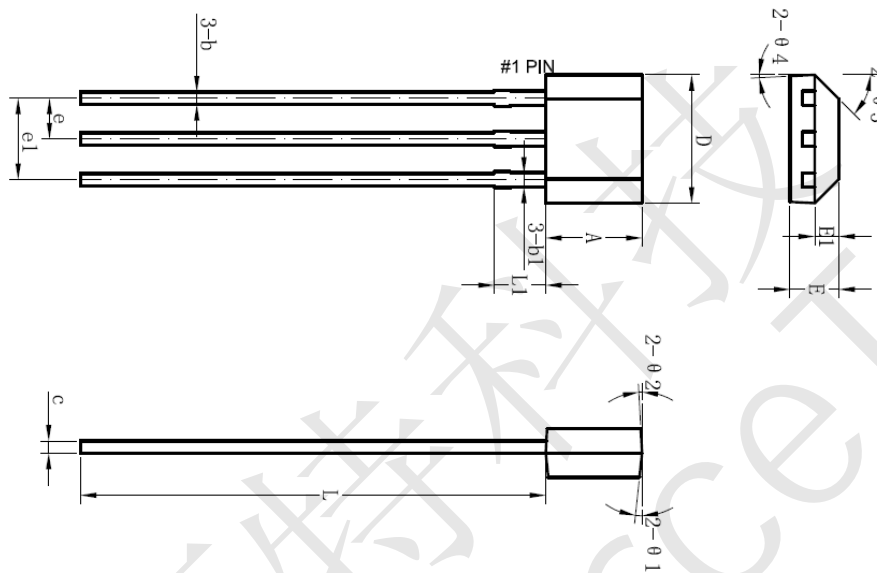
| Symbol | Dimensions In Millimeters |       |       | Dimensions In Inches |       |       |
|--------|---------------------------|-------|-------|----------------------|-------|-------|
|        | Min.                      | Typ.  | Max.  | Min.                 | Typ.  | Max.  |
| A      | 1.050                     | 1.15  | 1.250 | 0.041                | 0.045 | 0.049 |
| A1     | 0.000                     | 0.050 | 0.100 | 0.000                | 0.002 | 0.004 |
| A2     | 1.050                     | 1.100 | 1.150 | 0.041                | 0.043 | 0.045 |
| b      | 0.300                     | 0.400 | 0.500 | 0.012                | 0.016 | 0.020 |
| c      | 0.100                     | 0.150 | 0.200 | 0.004                | 0.006 | 0.008 |
| D      | 2.820                     | 2.920 | 3.020 | 0.111                | 0.115 | 0.119 |
| E      | 1.500                     | 1.600 | 1.700 | 0.059                | 0.063 | 0.067 |
| E1     | 2.650                     | 2.800 | 2.950 | 0.104                | 0.110 | 0.116 |
| e1     | 1.800                     | 1.900 | 2.000 | 0.071                | 0.075 | 0.079 |
| e      | 0.950 REF                 |       |       | 0.037 REF            |       |       |
| L      | 0.300                     | 0.450 | 0.600 | 0.012                | 0.018 | 0.024 |
| θ      | 0°                        | 4°    | 8°    | 0°                   | 4°    | 8°    |



### XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch

#### ■ XYT1661 Package Information

2)SIP-3L



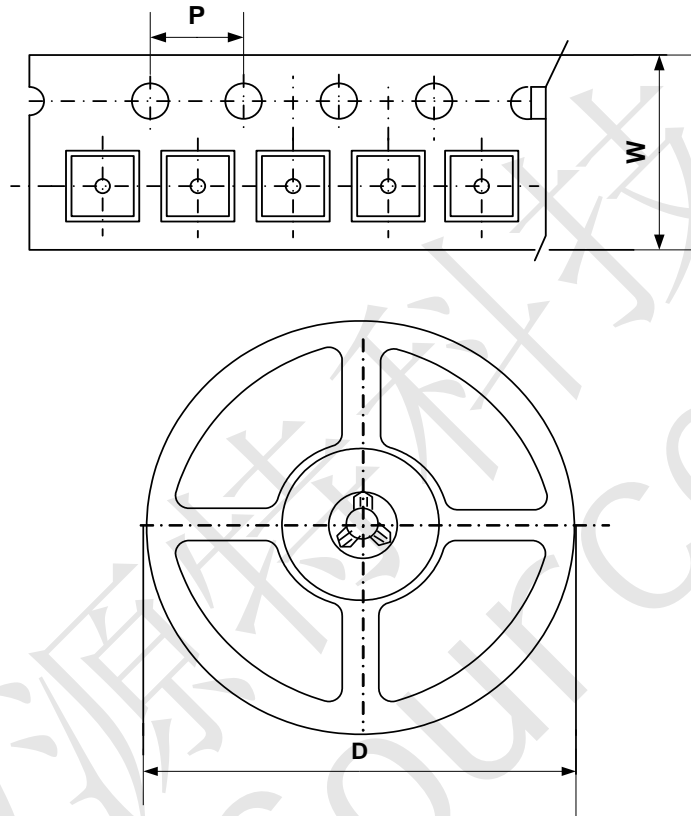
| Symbol | Dimensions In Millimeters |       |       | Dimensions In Inches |       |      |
|--------|---------------------------|-------|-------|----------------------|-------|------|
|        | Min.                      | Typ.  | Max.  | Min.                 | Typ.  | Max. |
| A      | 2.90                      | 3.00  | 3.10  | 0.11                 | 0.12  | 0.12 |
| b      | 0.35                      | 0.39  | 0.56  | 0.01                 | 0.02  | 0.02 |
| b1     |                           | 0.44  |       |                      | 0.02  |      |
| c      | 0.36                      | 0.38  | 0.51  | 0.01                 | 0.01  | 0.02 |
| D      | 3.9                       | 4.0   | 4.2   | 0.15                 | 0.16  | 0.16 |
| E      | 1.42                      | 1.52  | 1.62  | 0.06                 | 0.06  | 0.06 |
| E1     |                           | 0.75  |       |                      | 0.03  |      |
| e      |                           | 1.27  |       |                      | 0.05  |      |
| e1     |                           | 2.54  |       |                      | 0.10  |      |
| L      | 13.50                     | 14.50 | 15.50 | 0.53                 | 0.57  | 0.61 |
| L1     |                           | 1.60  |       |                      | 0.06  |      |
| Θ1     |                           | 6°    |       |                      | 0.24° |      |
| Θ2     |                           | 3°    |       |                      | 0.12° |      |
| Θ3     |                           | 45°   |       |                      | 1.77° |      |
| Θ4     |                           | 3°    |       |                      | 0.12° |      |



**XYT1661 Micro Power Omnipolar Hall-effect Sensor Switch**

■ **XYT1661 Packing Information**

1)SOT23-3L



| Package Type | Carrier Width (W) | Pitch (P)  | Reel Size(D) | Packing Minimum |
|--------------|-------------------|------------|--------------|-----------------|
| SOT23-3L     | 8.0±0.1 mm        | 4.0±0.1 mm | 180±1 mm     | 3000pcs         |

Note: Carrier Tape Dimension, Reel Size and Packing Minimum

2)SIP-3L

1. Packing Type: Bag
2. Packing minimum: 1000pcs/Bag