



■ **General Description**

The OCH4003 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 3.6μW 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 OCH4003 is available in many flexible packaging options, such as SOT23-3L/SIP-3L. Operating temperature range of the OCH4003 is from -40°C to 85°C.

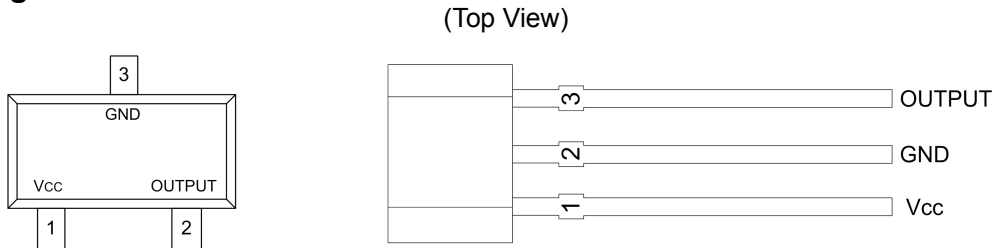
■ **Features**

- 1.9uA 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

■ **Applications**

- Smart meter
- toys
- Cover switch in Notebook PC/PDA
- Contact-less switch in consumer products
- SolidState 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

■ **Pin Configuration**



SOT23-3LSIP-3L(TO92S)

PinName	Pin		Description
	SOT23-3L	SIP-3L	
V _{CC}	1	1	IC Power Supply
OUTPUT	2	3	It is low state during the S/N magnetic field
GND	3	2	IC Ground

■ **Application Circuit**

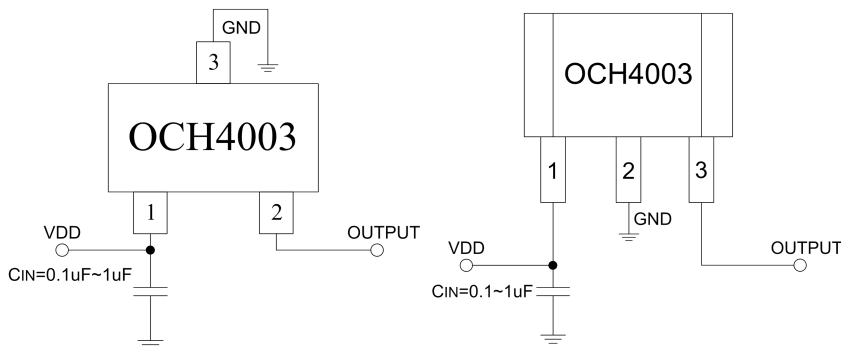


Figure 1, application circuit

Note: C_{IN} is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 0.1~1uF.

■ **Ordering Information**

Part Number	Package Type	Packing Qty	B _{OP} (Gauss)	B _{RP} (Gauss)	Temperature	Eco Plan	Lead
OCH4003WAD	SOT23-3L	3000pcs/Reel	±30(Typ.)	±20(Typ.)	-40~ +85℃	ROHS	Cu
OCH4003MD	SIP-3L	1000pcs/Bag	±30(Typ.)	±20(Typ.)	-40~ +85℃	ROHS	Cu

■ **Block Diagram**

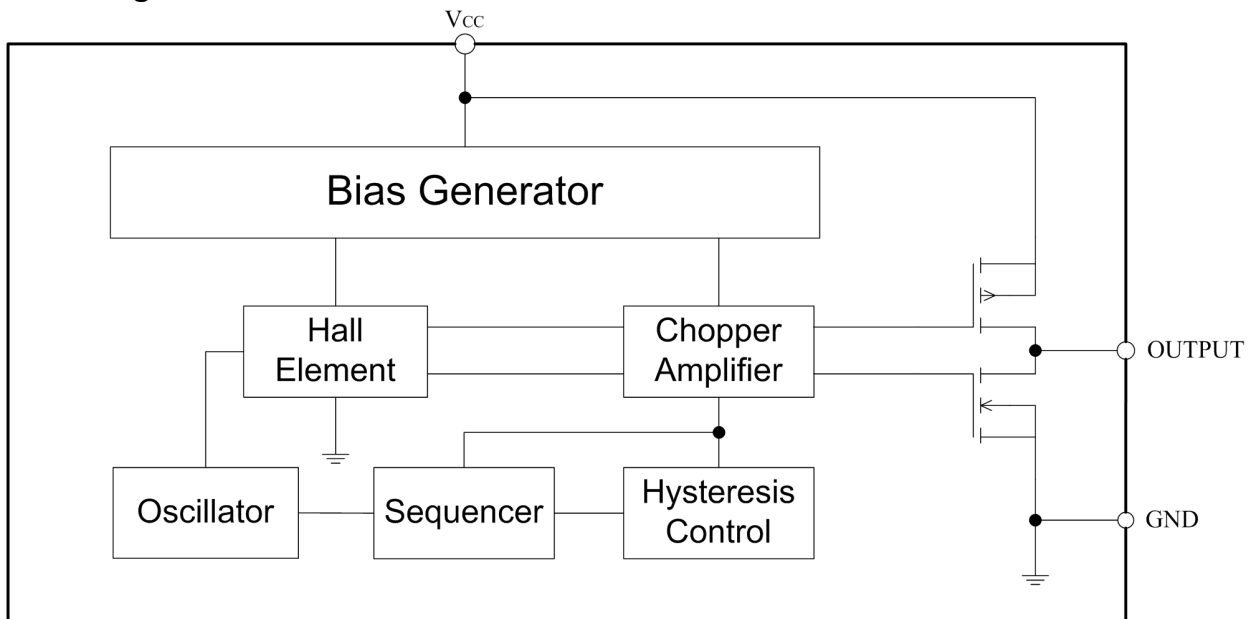


Figure 2, Block Diagram Of OCH4003

■ **Absolute Maximum Ratings** (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
V _{CC} to GND	V _{CC}	-0.3 to 6	V
Magnetic Flux Density	B	Unlimited	
Storage Temperature Range	T _S	-65 to +150	℃
Operating Junction Temperature Range	T _J	-40 to 150	℃
Maximum Power Dissipation	SOT23-3L	230	mW
	SIP-3L	300	
Maximum Soldering Temperature(at leads, 10 sec)	T _{LEAD}	260	℃

■ **Recommended Operating Conditions** (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Rating	Unit
Supply Voltage	V _{DD}	Operating	1.65 ~ 5.5	V
Operating Temperature Range	T _A	Operating	-40 ~ +85	℃



■ **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	μA
$I_{CC}(EN)$	Supply Current	Chip enable, $T_A=25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	-	0.9	1.6	mA
$I_{CC}(EN)$		Chip enable, $T_A=-40\sim 85^{\circ}\text{C}$, $V_{DD}=1.65\sim 5.5\text{V}$	-	0.9	1.95	mA
$I_{CC}(DIS)$		Chip disable, $T_A=25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	-	0.72	2	μA
$I_{CC}(DIS)$		Chip disable, $T_A=-40\sim 85^{\circ}\text{C}$, $V_{DD}=1.65\sim 5.5\text{V}$	-	0.72	3	μA
$I_{CC}(AVG)$		Average supply current, $T_A=25^{\circ}\text{C}$, $V_{DD}=1.8\text{V}$	-	1.9	2.1	μA
$I_{CC}(AVG)$		Average supply current, $T_A=-40\sim 85^{\circ}\text{C}$, $V_{DD}=1.65\sim 5.5\text{V}$	-	1.9	4.9	μA
T_{awake}		Awake Time	-	-	31	60
T_{period}	Period	-	-	30	60	ms
D.C.	Duty Cycle	-	-	0.11	-	%

■ **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

■ **Output VS Magnetic Pole**

Part Number	Magnetic Pole	Test Conditions	Output
OCH4003	South Pole	$B > B_{OPS}$	Low
OCH4003	South Pole	$B < B_{RPS}$	High
OCH4003	North Pole	$B < B_{OPN}$	Low
OCH4003	North Pole	$B > B_{RPN}$	High

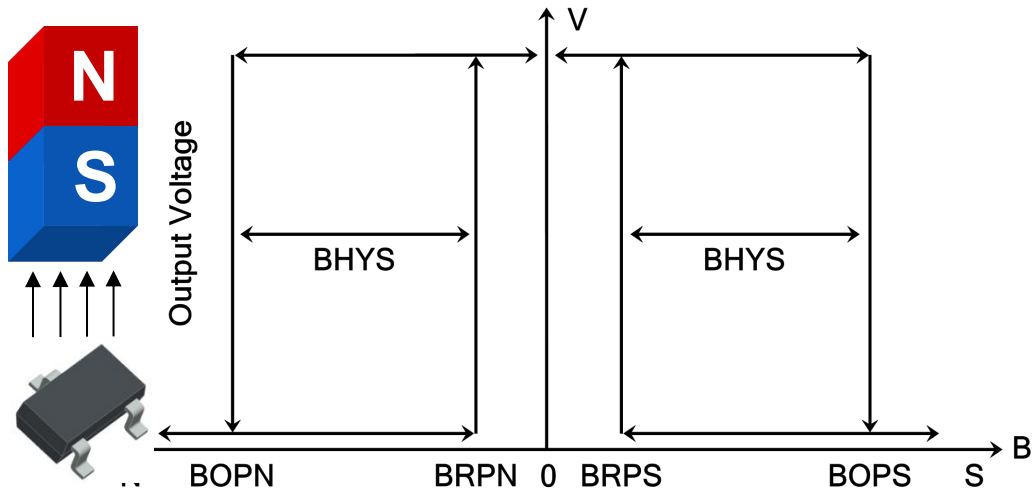


Figure 3, Magnetic Operational CharacteristicsOfOCH4003

■ **Hall Sensor Location**

(Top View)

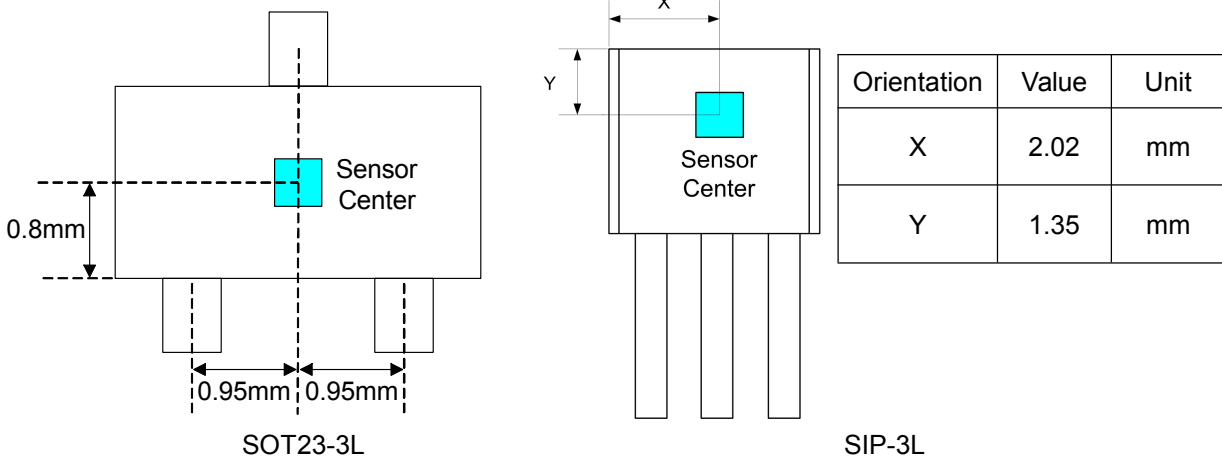


Figure4, Hall Sensor Location

■ Land Pattern (for reference only)

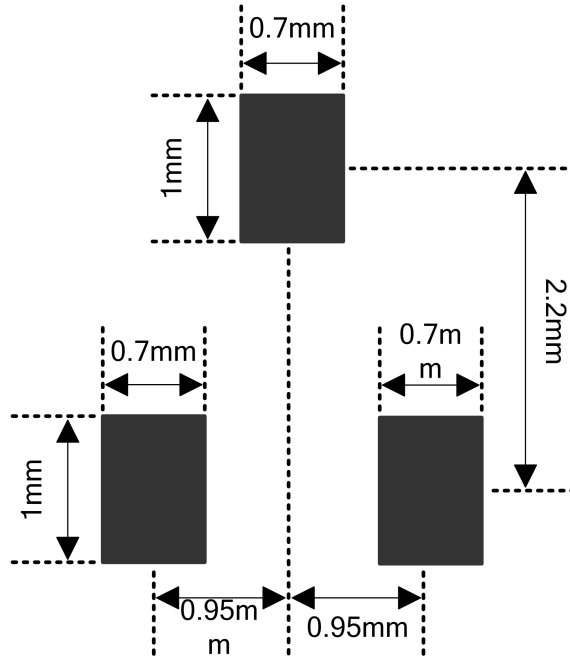
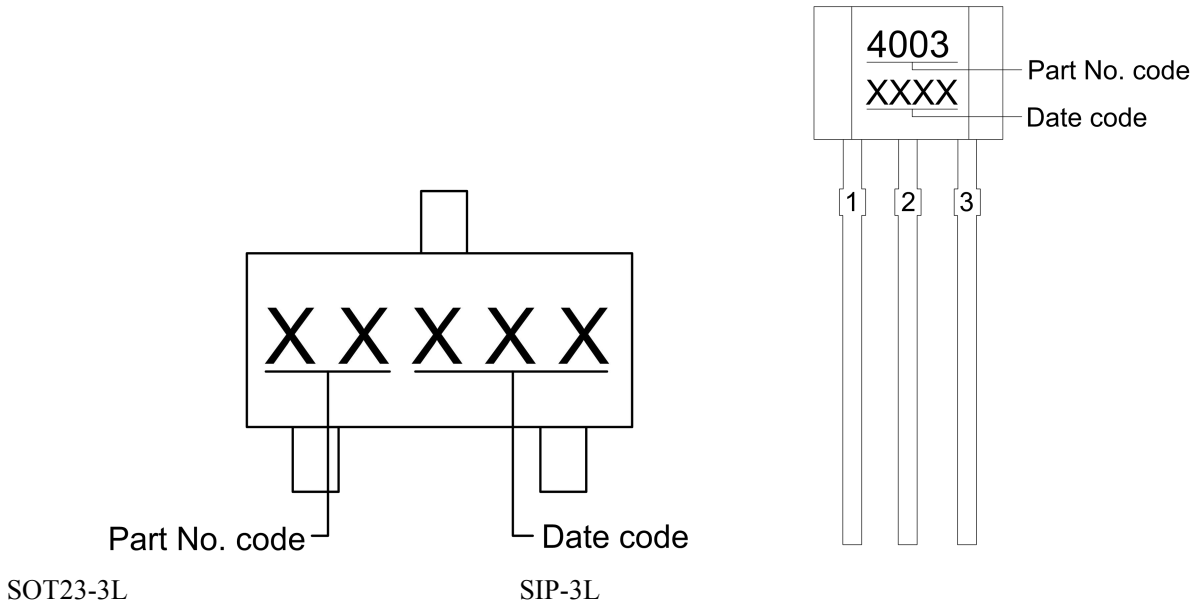


Figure 5, Land Pattern Dimension (SOT23-3L)

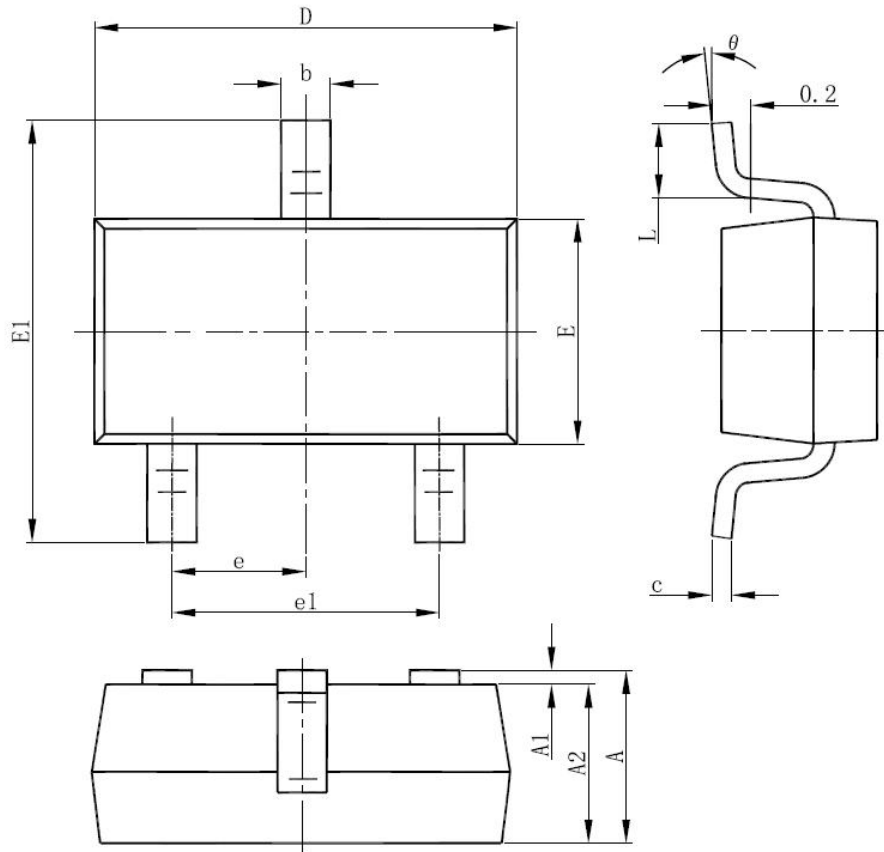
■ Marking Information

(Top View)



■ Package Information

1)SOT23-3L

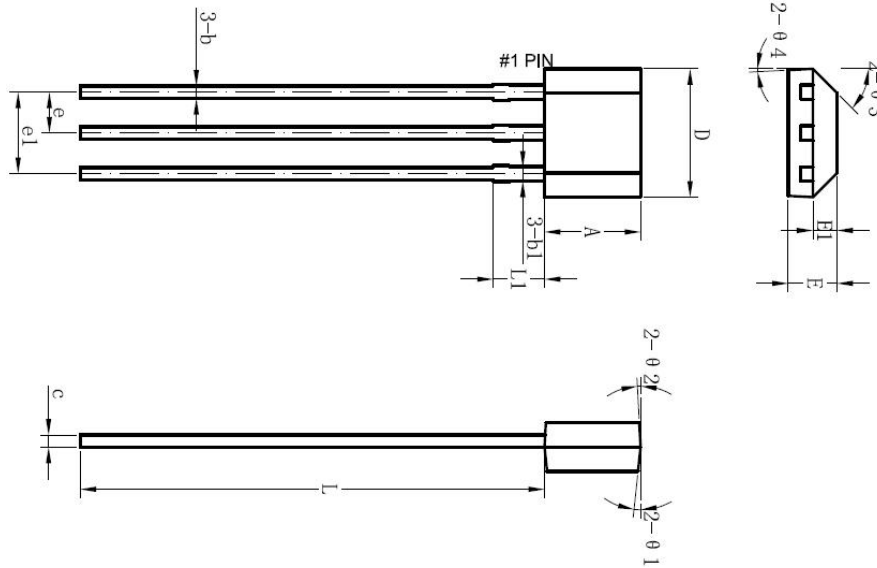


Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.050	1.15	1.250	0.041	0.045	0.049
A1	0.000	0.050	0.100	0.000	0.002	0.004
A2	1.050	1.100	1.150	0.041	0.043	0.045
b	0.300	0.400	0.500	0.012	0.016	0.020
c	0.100	0.150	0.200	0.004	0.006	0.008
D	2.820	2.920	3.020	0.111	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°



■ Package Information

2)SIP-3L

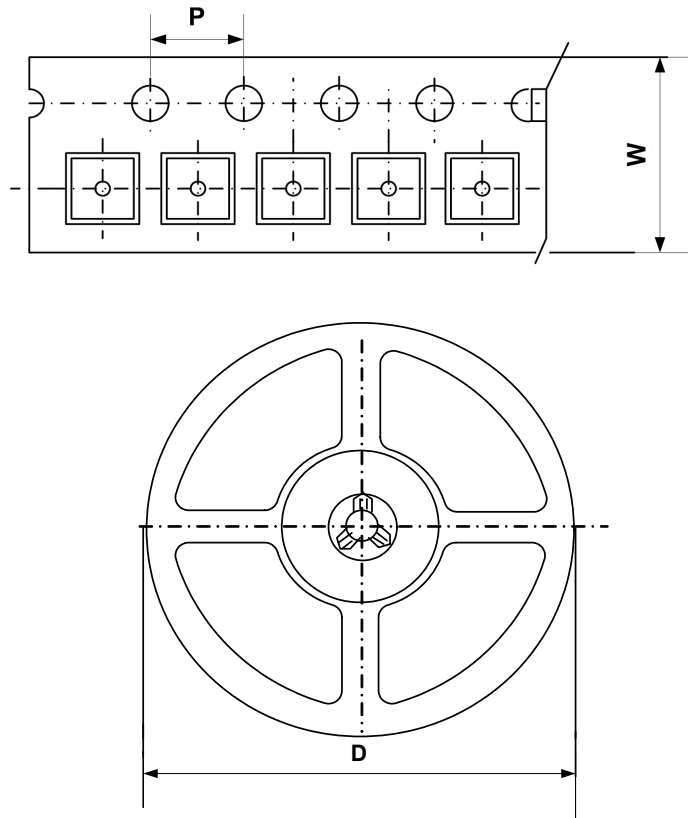


Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.90	3.00	3.10	0.11	0.12	0.12
b	0.35	0.39	0.56	0.01	0.02	0.02
b1		0.44			0.02	
c	0.36	0.38	0.51	0.01	0.01	0.02
D	3.9	4.0	4.2	0.15	0.16	0.16
E	1.42	1.52	1.62	0.06	0.06	0.06
E1		0.75			0.03	
e		1.27			0.05	
e1		2.54			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°	



■ 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

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