

Analog Semiconductor IC

HM3033H Series

Low current consumption, 3.0mT High sensitivity
CMOS Hall Magnetic Sensor Switch

(IMPORTANT: Please check the last page for Genuine Product Labeling)

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Products Data Sheet

Analog Semiconductor IC

Low current consumption, 3.0mT High sensitivity CMOS Hall Magnetic Sensor Switch

HMX3033H Series

GENERAL DESCRIPTIONS

HMX3033H series are monolithic ICs with built-in Hall magnet sensor element and CMOS switch. It becomes the non-contact switch with low current consumption, high sensitivity and reliability which is combined with magnet.

A vertical magnetic field to the electrode of the package can be detected by an arbitrary polarity. (N pole $\Leftrightarrow$ S pole)



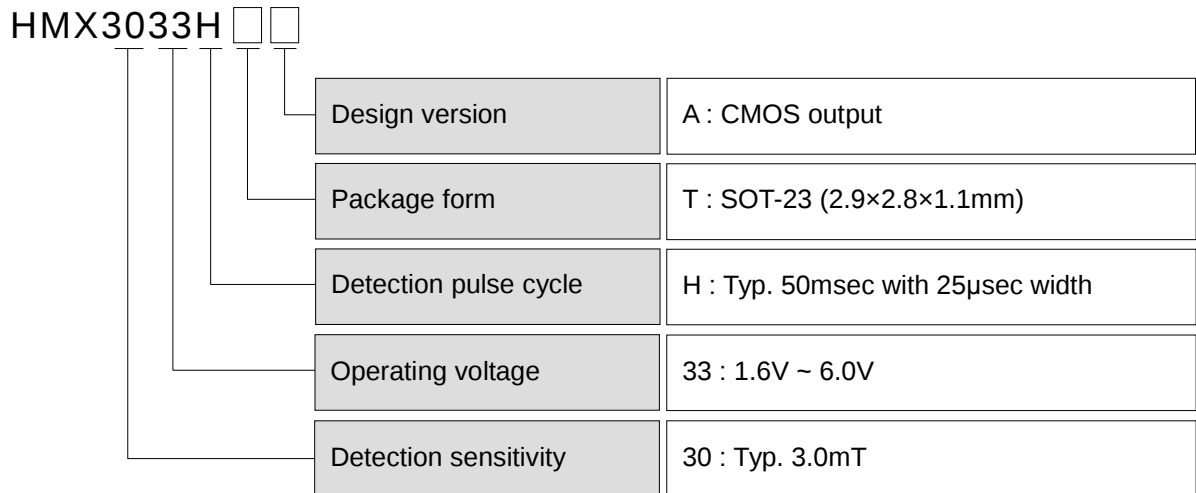
FEATURES

- CMOS + Hall monolithic structure
- Low current consumption 5.0 μ A ($V_{IN}=3.3V$, $T_a=25^{\circ}C$)
- High-sensitivity Typ. 3.0mT
- Operating temperature range $-40 \sim +85^{\circ}C$
- Operating voltage range 1.6V ~ 6.0V
- Detection pulse driving cycle Typ. 50msec with 50 μ sec width
- Magnetic direction Omnipolar Hall Effect Switch
- Detection magnetic field Vertical direction of marked side of package
(Electrode vertical both direction)
- Small package SOT-23 (2.9 $\times$ 2.8 $\times$ 1.1mm)

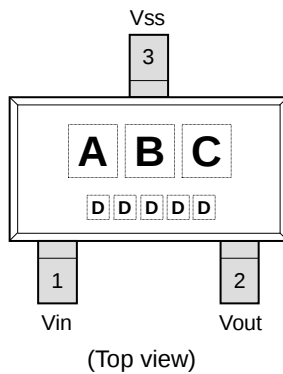
APPLICATIONS

- Detection of opening and closing : Mobile phone, Notebook PC, Microwave oven, Washing machine, Rice cooker, Refrigerator, Electronic dictionary, Digital camera, etc.
- Detection of position : Air cylinder, Antitheft window, Digital door lock, etc.
- Detection of water level : Water purifier, Humidifier, Bidet, etc.
- Detection of rotation : Water meter, Gas meter, Wattmeter, Speed meter, etc.
- Power supply switch : Cordless phone, Electric toothbrush, etc.

PRODUCTS NUMBERING GUIDE



PIN CONFIGURATION / MARKING SPECIFICATION



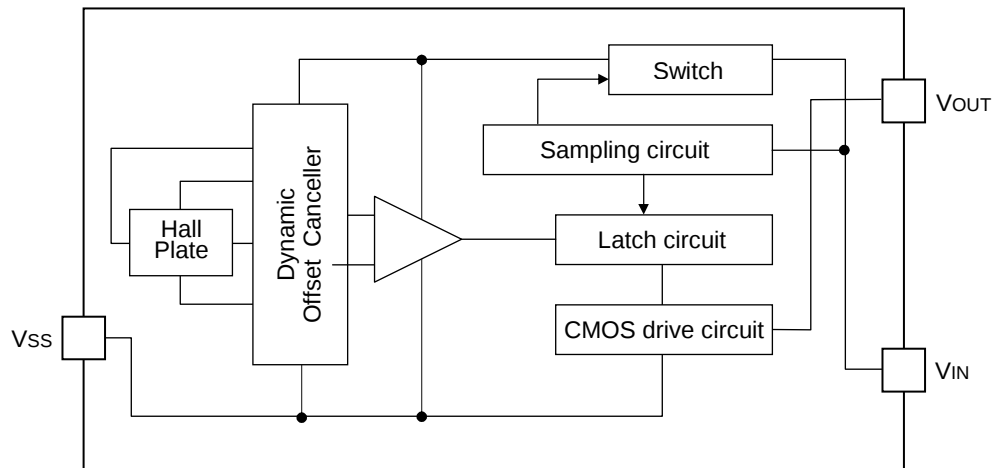
Pin Configuration

No.	Symbol	Descriptions
1	VIN	Voltage input
2	VOUT	Output
3	VSS	Power ground

Marking Specification

Code	Mark	Contents
A	H	Series name
BC	HA	Products specification & version
D	Internal rule	Lot number

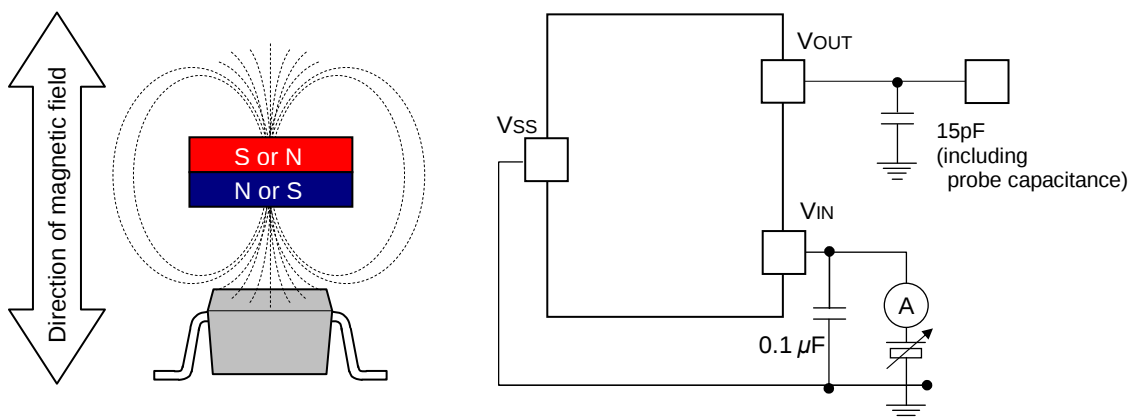
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Items	Symbol	Min.	Typ.	Max.	Conditions	Unit
Operating temperature	TOPR	-30	-	+85		°C
Storage temperature	TSTG	-40	-	+125		°C
Supply voltage	VMAX	VIN-0.3	-	VIN+7.0		V
Assembly temp. condition	TASY	-	255	260	t=max:5sec/Tmax	°C

TEST CIRCUIT



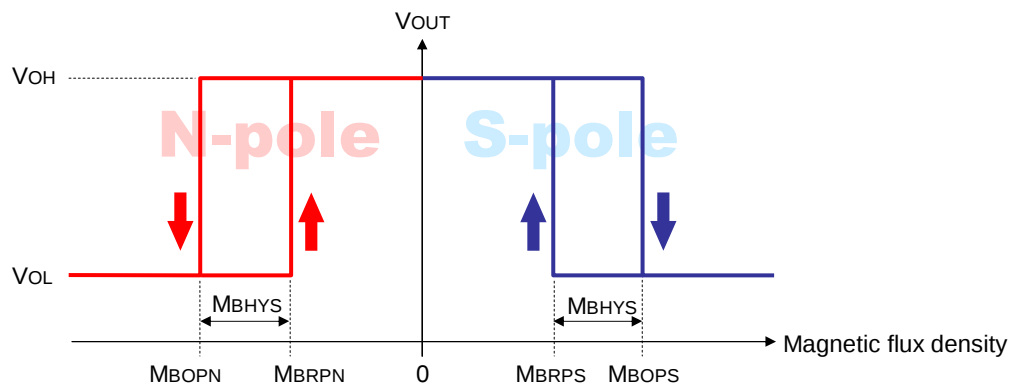
ELECTRICAL CHARACTERISTICS(Unless otherwise specified, $V_{DD}=3.3V$, $T_a=25^{\circ}C$)

Items	Symbol	Min.	Typ.	Max.	Conditions	Unit
Operating voltage	V_{IN}	1.6	3.3	6.0		V
Current consumption	I_{AVG}	-	5.0	-	Avg. current at $V_{IN}=3.3V$	μA
Detection pulse driving cycle	P_c	-	50	90	Pulse width : 1/1000	msec
"H"-level output voltage	V_{OH}	$V_{IN}-0.4$	-	-	$I_{OH}=-0.5mA$	V
"L"-level output voltage	V_{OL}	-	-	0.4	$I_{OL}=+0.5mA$	V

MAGNETIC CHARACTERISTICS(Unless otherwise specified, $V_{DD}=3.3V$, $T_a=25^{\circ}C$)

Items	Symbol	Min.	Typ.	Max.	Unit
Magnetic flux density at operating point (H→L)	MBOPS	1.5*	3.0	5.0	mT
	MBOPN	-5.0	-3.0	-1.5*	
Magnetic flux density at release point (L→H)	MBRPS	1.2	2.5	4.7*	mT
	MBRPN	-4.7*	-2.5	-1.2	
Width of hysteresis	MBHYS	0.3*	0.5	1.2*	mT

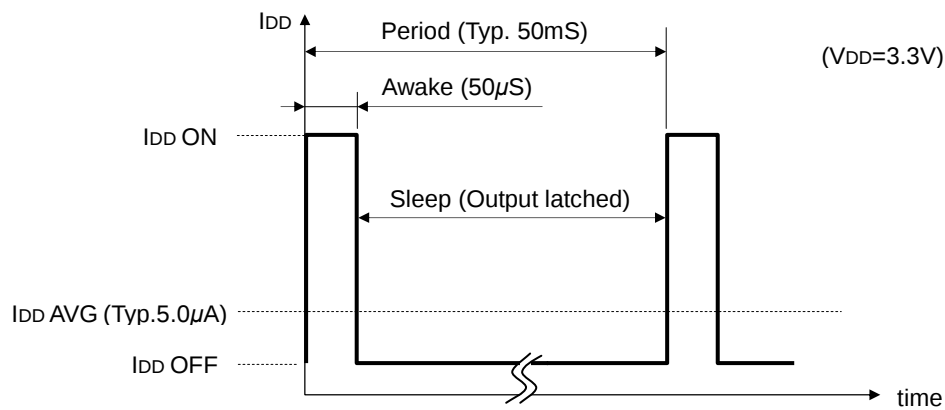
Note : The values with [*] marks are guaranteed by design, not tested in production.

MAGNETIC-ELECTRIC CONVERSION CHARACTERISTIC

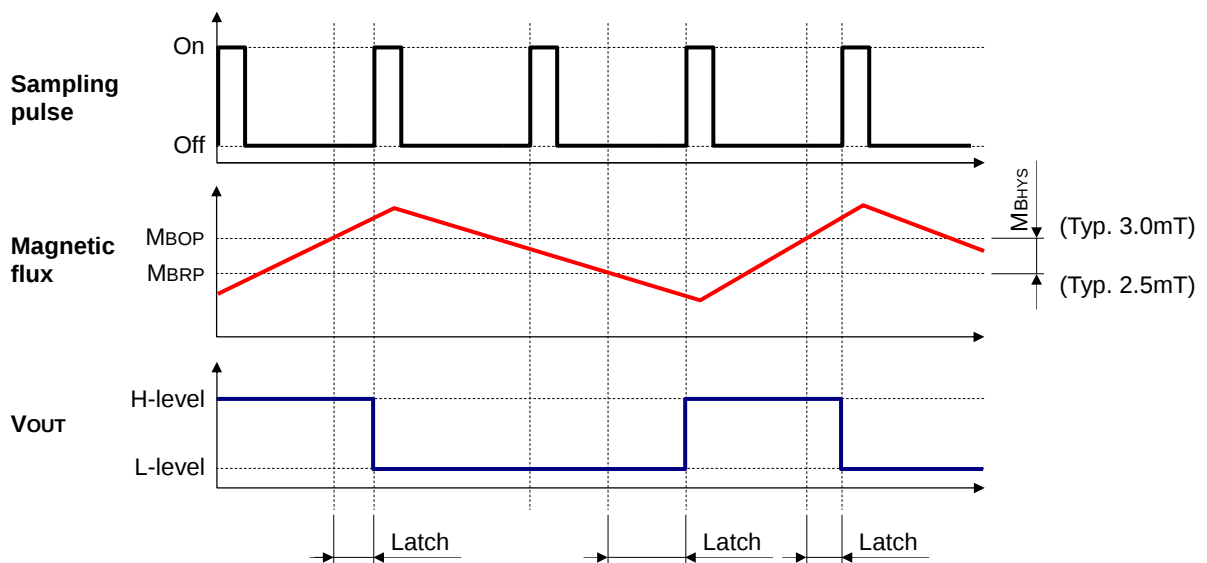
MAGNETIC FLUX DENSITY AND OUTPUT VOLTAGE LEVEL

Conditions		Output level
Magnet & Power	Magnet flux density	
Magnet = OFF / Power = ON	$M = 0\text{mT}$	High-level
Magnet = ON / Power = ON	$M \geq 5.0\text{mT}$	Low-level
Magnet = OFF / Power = ON	$M \leq 1.2\text{mT}$	High-level

DETECTION PULSE DRIVING CYCLE (SAMPLING CYCLE)

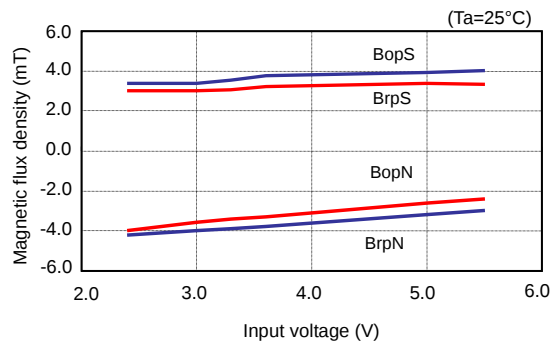


OUTPUT SWITCHING TIMING CHART

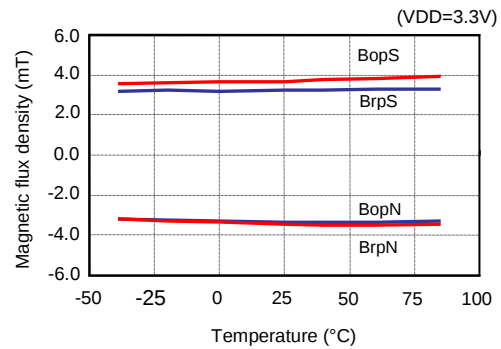


TYPICAL ELECTRIC CHARACTERISTICS

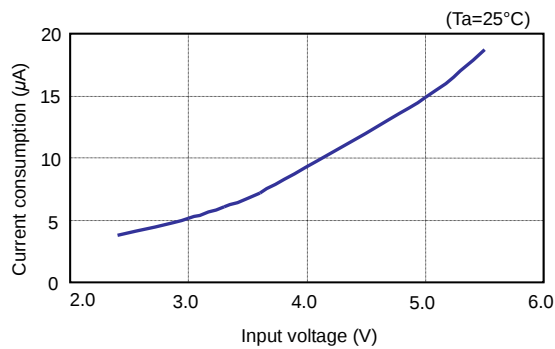
● Magnetic flux density vs. Input voltage



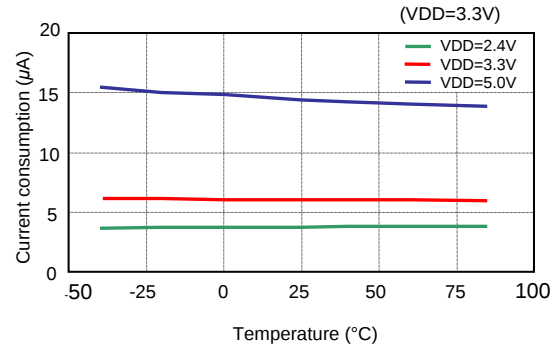
● Magnetic flux density vs. Ambient temp.



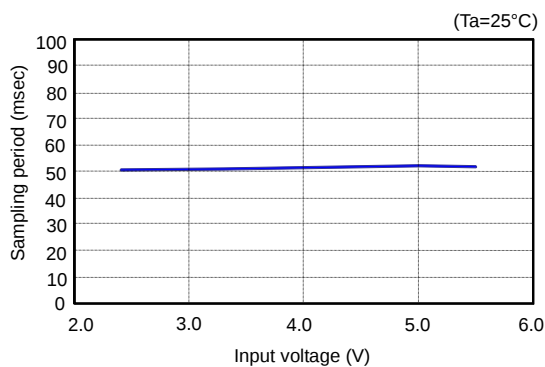
● Current consumption vs. Input voltage



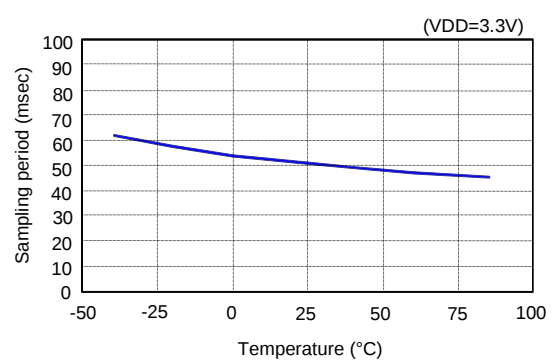
● Current consumption vs. Ambient temp.



● Sampling period vs. Input voltage

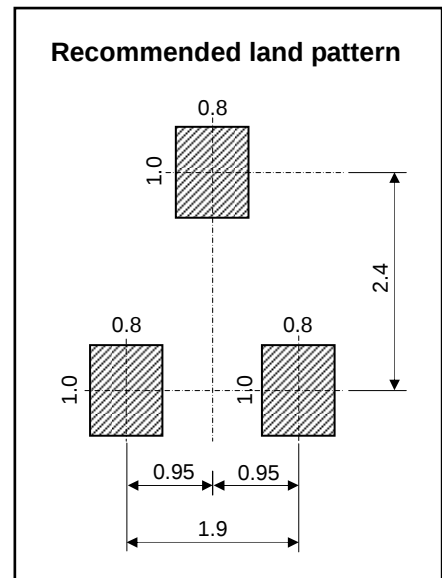
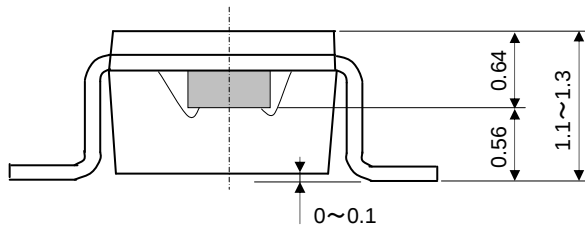
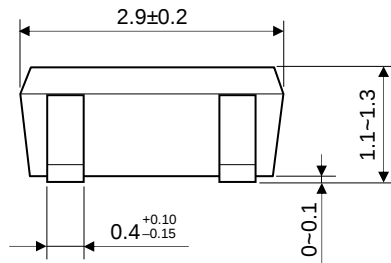
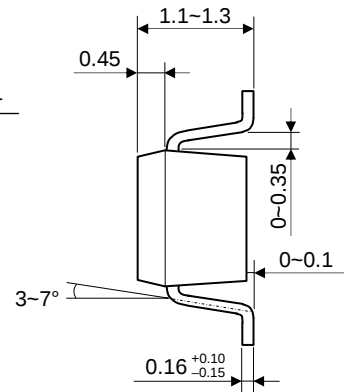
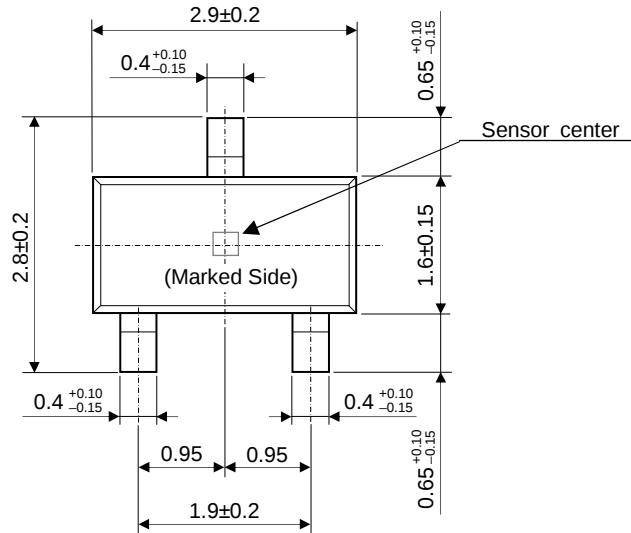


● Sampling period vs. Ambient temp.



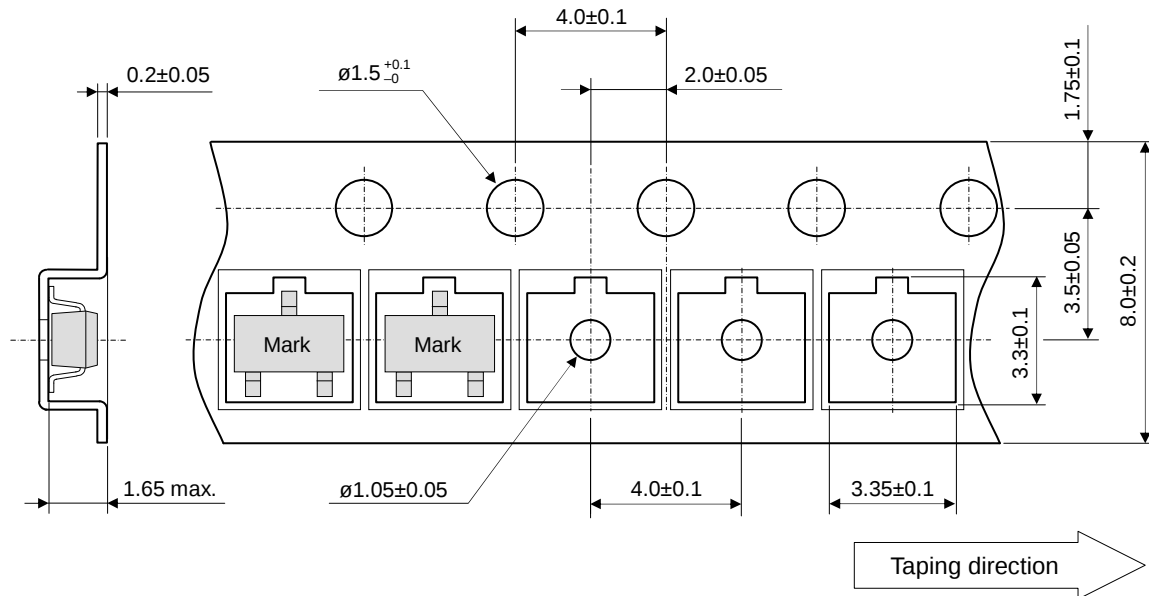
PACKAGE DIMENSIONS (SOT-23)

(Unit : mm)



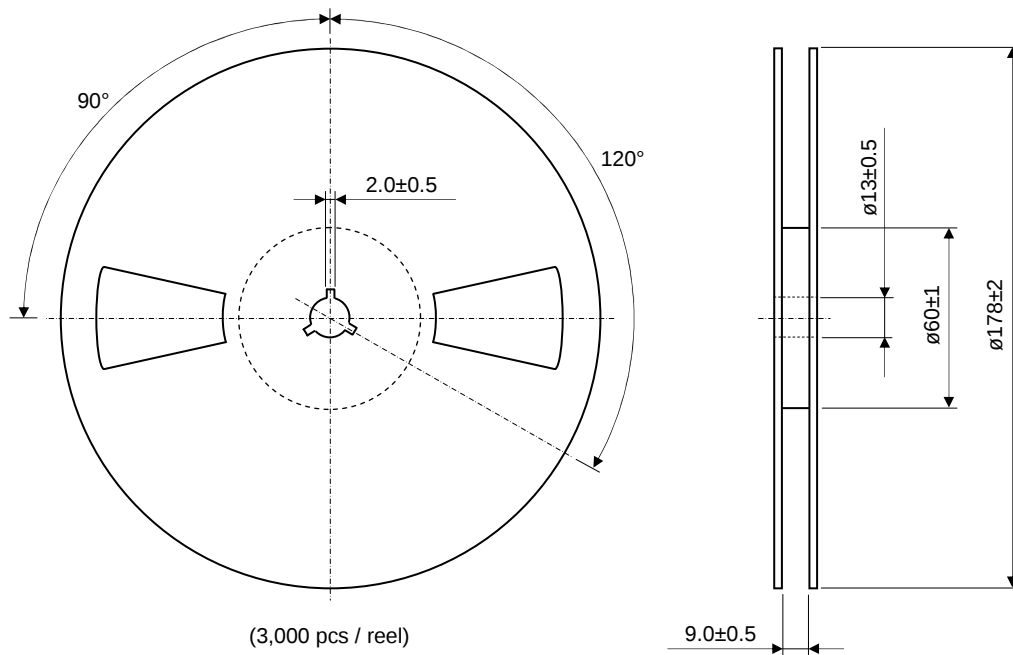
TAPING AND LOADING SPECIFICATIONS (SOT-23)

(Unit : mm)



REEL DIMENSIONS (SOT-23)

(Unit : mm)





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