



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS4GT00xx

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电源管理IC



通信接口芯片



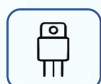
二三极管



LDO稳压器



逻辑器件



MOSFETs



运算放大器



显示驱动



MCU单片机



光电器件



AOS4GT00 Quadruple 2-Input Exclusive-OR Gate

DESCRIPTIONS

The AOS4GT00 quadruple 2-input positive-NAND gate is designed for 2.0V to 5.5V V_{CC} operation. The AOS4GT00 device performs the Boolean function $Y = \overline{A \cdot B}$ or $Y = \overline{A} + \overline{B}$ in positive logic. The device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down. The AOS4GT00 is available in Green SOP14 and TSSOP14 packages. It operates over an ambient temperature range of -40°C to $+125^{\circ}\text{C}$.

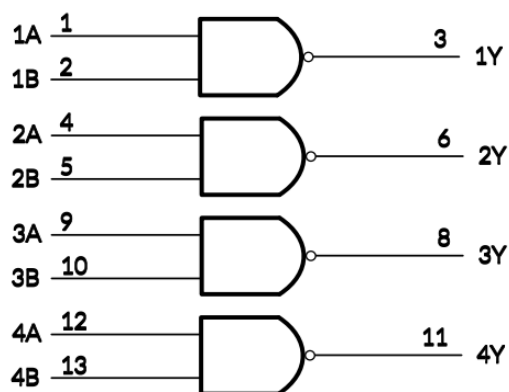
FEATURES

Operating Voltage Range: 2.0V to 5.5V
Low Power Consumption: $1\mu\text{A}$ (Max)
Operating Temperature Range: -40°C to 125°C
Inputs Are TTL-Voltage Compatible
High Output Drive: $\pm 32\text{mA}$ at $V_{CC}=5.0\text{V}$
Micro SIZE PACKAGES: SOP14, TSSOP14

APPLICATIONS

Active Noise Elimination
Bar Code Scanner
Blood Pressure Monitor
CPAP Machine
Fingerprint identification
Network attached storage(NAS)

LOGIC SYMBOL

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
AOS4GT00	SOP14	8.65mm × 3.90mm
	TSSOP-14	5.00mm × 4.40mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

FUNCTION TABLE

INPUTS		OUTPUT
A	B	Y
H	H	L
L	H	H
H	L	H
L	L	H

H=High Voltage Level

L=Low Voltage Level

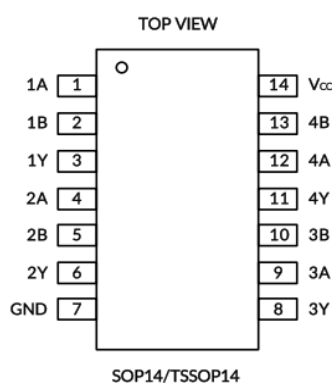
PACKAGE/ORDERING INFORMATION⁽¹⁾

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING ⁽²⁾	MSL ⁽³⁾	PACKAGE OPTION
AOS4GT00	AOS4GT00XP	-40℃~+125℃	SOP14	AOS4GT00	MSL3	Tape and Reel,4000
	AOS4GT00XQ	-40℃~+125℃	TSSOP-14	AOS4GT00	MSL3	Tape and Reel,4000

NOTE:

- (1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.
- (2) There may be additional marking, which relates to the lot trace code information(data code and vendor code), the logo or the environmental category on the device.
- (3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN	NAME	I/O ⁽¹⁾	FUNCTION
SOIC-14(SOP14)/TSSOP-14			
1	1A	I	Channel 1 logic input
2	1B	I	Channel 1 logic input
3	1Y	O	Logic level output 1
4	2A	I	Channel 2 logic input
5	2B	I	Channel 2 logic input
6	2Y	O	Logic level output 2
7	GND	-	Ground
8	3Y	O	Logic level output 3
9	3A	I	Channel 3 logic input
10	3B	I	Channel 3 logic input
11	4Y	O	Logic level output 4
12	4A	I	Channel 4 logic input
13	4B	I	Channel 4 logic input
14	Vcc	-	Power Supply

(1) I=input, O=output, P=power.



Specifications

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) ⁽¹⁾⁽²⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage range		-0.5	6.5	V
V _I	Input voltage range ⁽²⁾		-0.5	6.5	
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾		-0.5	6.5	
V _O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾		-0.5	V _{CC} +0.5	
I _{IK}	Input clamp current	V _I <0		-50	mA
I _{OK}	Output clamp current	V _O <0		-50	
I _O	Continuous output current			± 50	
	Continuous current through V _{CC} or GND			± 100	
θ _{JA}	Package thermal impedance ⁽⁴⁾	SOP14		134	°C/W
		TSSOP-14		152	
T _J	Junction temperature ⁽⁵⁾		-65	150	°C
T _{stg}	Storage temperature		-65	150	

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V_{CC} is provided in the *Recommended Operating Conditions* table.
- (4) The package thermal impedance is calculated in accordance with JESD-51.
- (5) The maximum power dissipation is a function of T_{J(MAX)}, R_{θJA}, and T_A. The maximum allowable power dissipation at any ambient temperature is P_D = (T_{J(MAX)} - T_A) / R_{θJA}. All numbers apply for packages soldered directly onto a PCB.



ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), MIL-STD-883K METHOD 3015.9	± 2000	V
		Charged-device model (CDM), ANSI/ESDA/JEDEC JS-002-2018	± 1000	
		Machine Model (MM), JESD22-A115C(2010)	± 200	



ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

**ELECTRICAL CHARACTERISTICS**

over recommended operating free-air temperature range (TYP values are at $T_A=+25^{\circ}\text{C}$, Full=-40 $^{\circ}\text{C}$ to 125 $^{\circ}\text{C}$, unless otherwise noted.) ⁽¹⁾

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply Voltage	V_{CC}	Operating	2.0	5.5	V
		Data retention only	1.0		
High-Level Input Voltage	V_{IH}	$V_{CC}=2.0\text{V}$	1.5		
		$V_{CC}=3.3\text{V}$	1.7		
		$V_{CC}=4.5\text{V to } 5.5\text{V}$	2.0		
Low-Level Input Voltage	V_{IL}	$V_{CC}=2.0\text{V}$		0.3	
		$V_{CC}=3.3\text{V}$		0.55	
		$V_{CC}=4.5\text{V to } 5.5\text{V}$		0.8	
Input Voltage	V_I		0	5.5	
Output Voltage	V_O		0	V_{CC}	
Input Transition Rise or Fall	$\Delta t, \Delta v$	$V_{CC}=2.0\text{V to } 5.5\text{V}$		5	ns/V
Operating Temperature	T_A		-40	125	$^{\circ}\text{C}$

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.



DC Characteristics

PARAMETER		CONDITIONS	V _{CC}	TEMP	MIN ⁽²⁾	TYP ⁽³⁾	MAX ⁽²⁾	UNIT
V _{OH}		I _{OH} =-100 μA	2.0V to 5.5V	Full	V _{CC} -0.1			V
		I _{OH} =-8mA	2.0V		1.6			
		I _{OH} =-24mA	3.3V		2.5			
		I _{OH} =-32mA	4.5V		3.8			
			5V		4.2			
			5.5V		4.8			
V _{OL}		I _{OH} =100 μA	2.0V to 5.5V	Full			0.1	V
		I _{OH} =8mA	2.0V				0.45	
		I _{OH} =24mA	3.3V				0.55	
		I _{OH} =32mA	4.5V				0.55	
			5V				0.5	
			5.5V				0.45	
I _I	A or B inputs	V _I =5.5V or GND	0V to 5.5V	+25°C		±0.1	±1	μA
				Full			±5	
I _{off}		V _I or V _O =5.5V	0	+25°C		±0.1	±1	
				Full			±10	
I _{CC}		V _I =5.5V or GND, I _O =0	2.0V to 5.5V	+25°C		0.1	1	
				Full			10	
I _{CCT}		One input at 3.4V, Other inputs at V _{CC} or GND	5.5V	Full			500	
C _i (Input Capacitance)		V _{CC} =0V, f=10MHz	0V	+25°C		1.5		pF

- (1) All unused inputs of the device must be held at VCC or GND to ensure proper device operation.
- (2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.
- (3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.



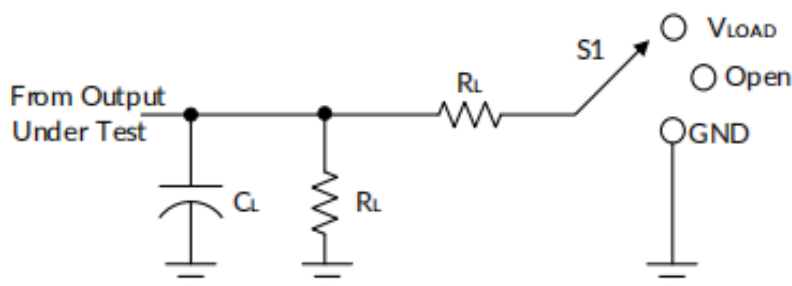
AC Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS		MIN ⁽²⁾	TYP ⁽³⁾	MAX ⁽²⁾	UNIT
Propagation Delay	t_{pd}	$V_{CC}=2.0V \pm 0.2V$	$C_L=30pF, R_L=500\Omega$		8.8		ns
		$V_{CC}=3.3V \pm 0.3V$	$C_L=50pF, R_L=500\Omega$		4.2		
		$V_{CC}=5V \pm 0.5V$	$C_L=50pF, R_L=500\Omega$		3.2		
Power dissipationCapacitance	C_{pd}	No load			18		pF

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.
- (2) This parameter is ensured by design and/or characterization and is not tested in production.
- (3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

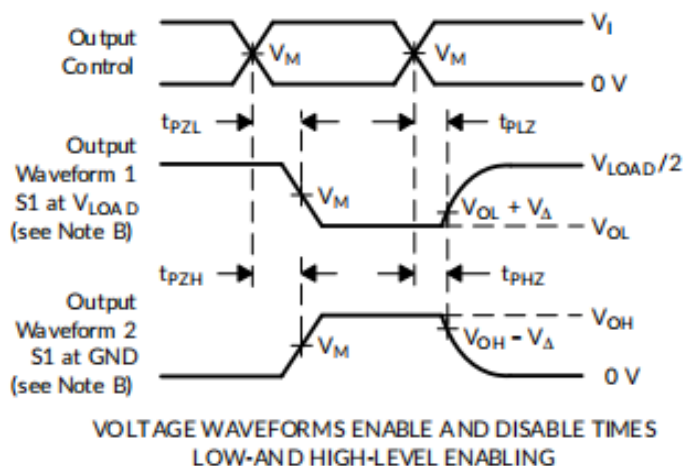
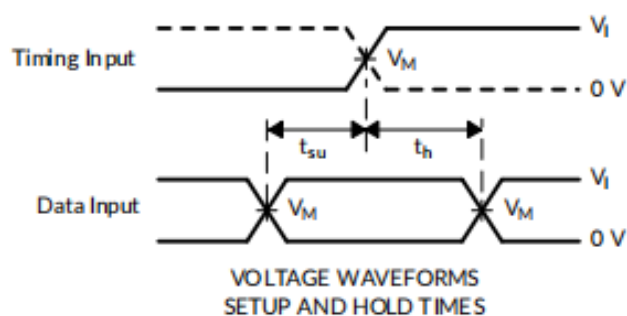
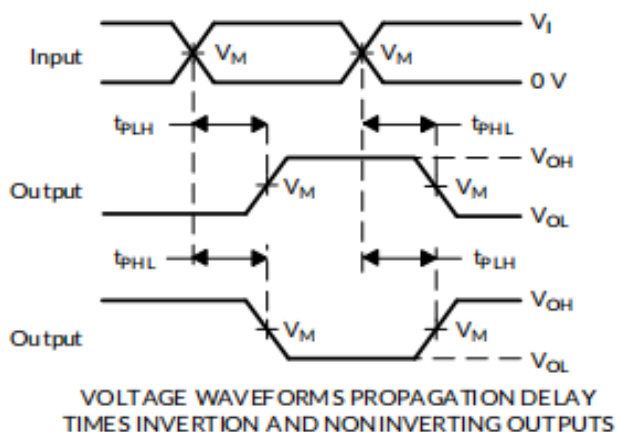
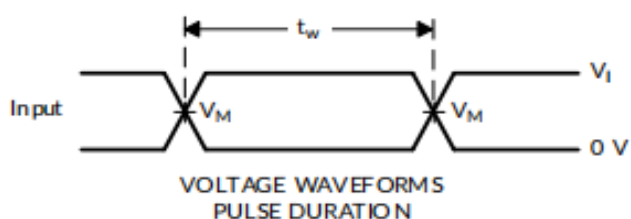


Parameter Measurement Information



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$2.0V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500Ω	0.15V
$3.3V \pm 0.3V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	6V	50pF	500Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500Ω	0.3V



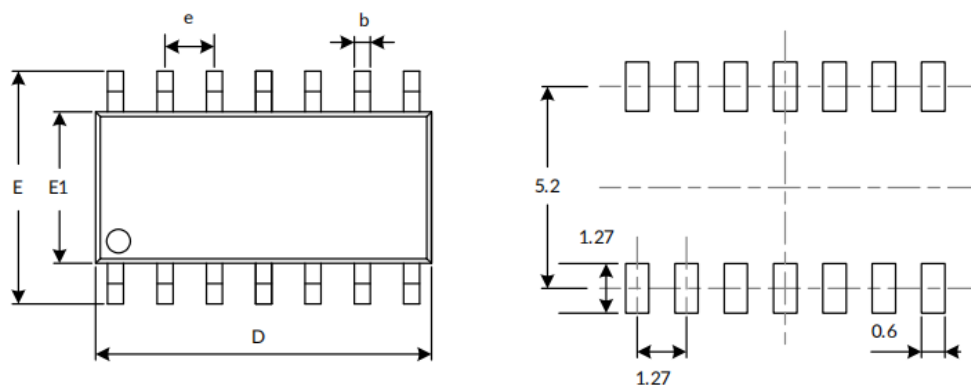


- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 - C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_o = 50 \Omega$.
 - D. The outputs are measured one at a time, with one transition per measurement.
 - E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - F. t_{PZL} and t_{PZH} are the same as t_{en} .
 - G. t_{PLH} and t_{PHL} are the same as t_{pd} .
 - H. All parameters and waveforms are not applicable to all devices.

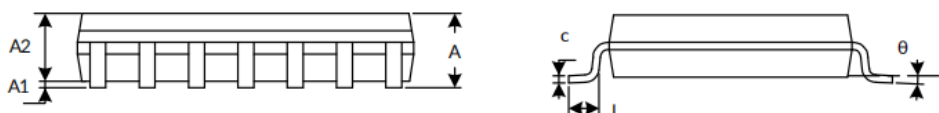
Figure 1. Load Circuit and Voltage Waveforms



PACKAGE OUTLINE DIMENSIONS SOP14



RECOMMENDED LAND PATTERN (Unit: mm)



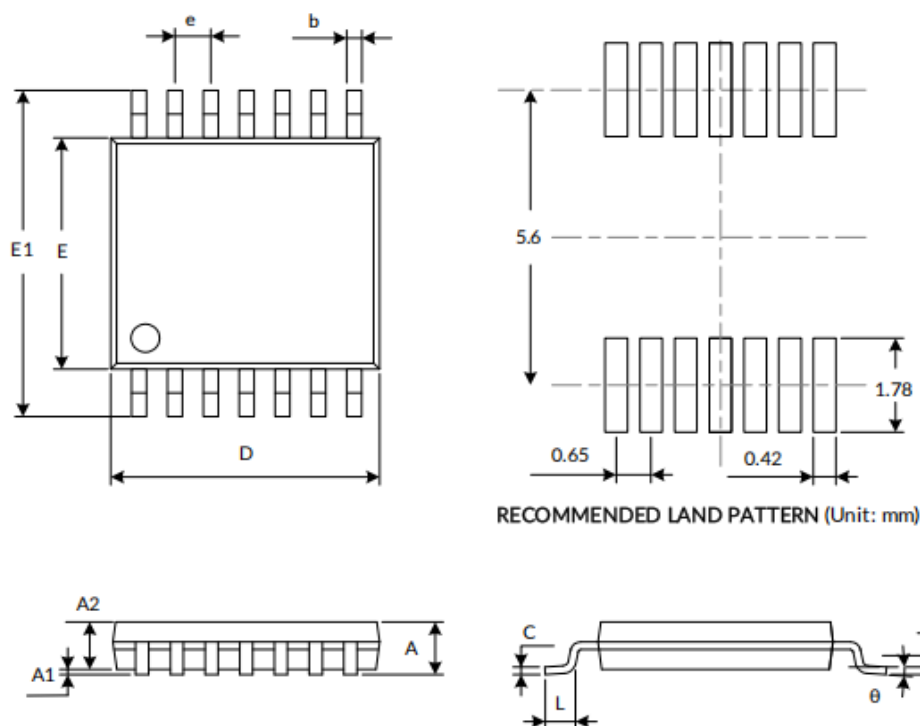
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D ⁽¹⁾	8.450	8.850	0.333	0.348
e	1.270(BSC) ⁽²⁾		0.050(BSC) ⁽²⁾	
E	5.800	6.200	0.228	0.244
E1 ⁽¹⁾	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0 °	8 °	0 °	8 °

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



TSSOP-14⁽³⁾



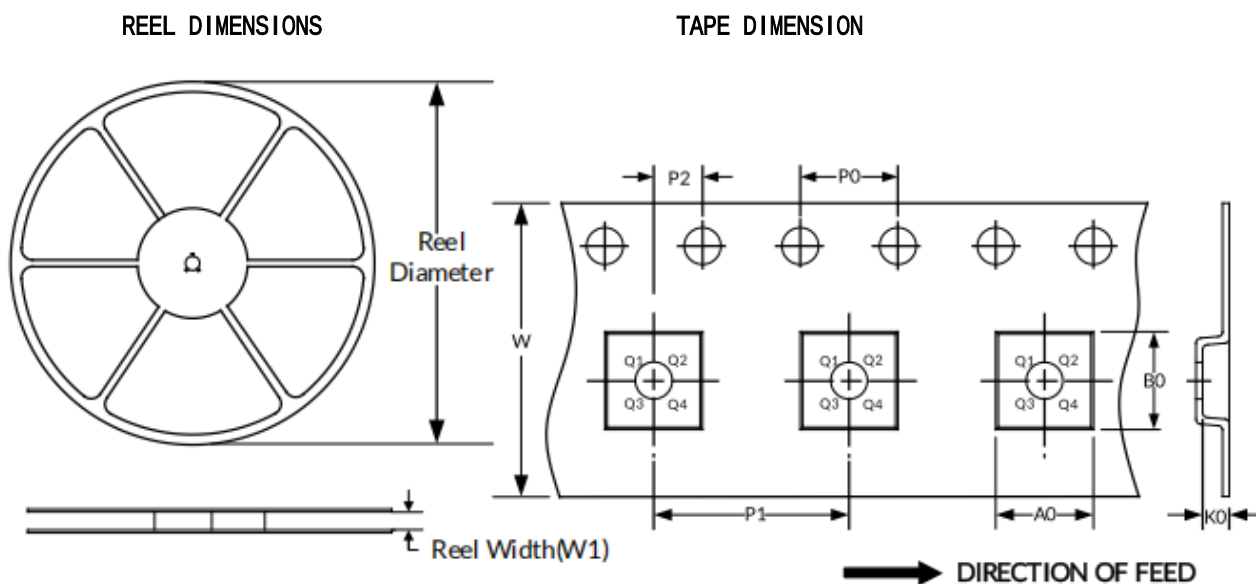
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
$A^{(1)}$		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
$D^{(1)}$	4.860	5.100	0.191	0.201
$E^{(1)}$	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650(BSC) ⁽²⁾		0.026(BSC) ⁽²⁾	
L	0.500	0.700	0.020	0.028
H	0.250(TYP)		0.010(TYP)	
θ	1 °	7 °	1 °	7 °

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.



TAPE AND REEL INFORMATION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width(mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOP14	13''	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP-14	13''	12.4	6.95	5.60	1.20	4.0	8.0	2.0	12.0	Q1

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.