AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS1G04xx

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

AOS1G04 Single Inverter Gate

DESCRIPTIONS

The AOS1G04 Single inverter gate is designed for 1.65V to 5.5V V_{cc} operation
.The AOS1G04 device performs the Boolean function $Y=\overline{A}$.
The CMOS device has high output drive while maintaining low static power dissipation
over a broad V_{cc} operating range.
The AOS1G04 is available in Green SOT23-5, SC70-5 and XDFN1X1-6 packages. It operates
 over an ambient temperature range of -40℃ to 125℃.

FEATURES

Operating Voltage Range: 1.65V to 5.5V
Low Power Consumption: 1μA (Max)
Operating Temperature Range:-40℃ to 125℃
Inputs Accept Voltage to 5.5V
High Output Drive:±24mA at V_{cc}=3.0V
Ioff Supports Partial-Power-Down Mode Operation
Micro Size Packages: SOT23-5, SC70-5, XDFN1X1-6

APPLICATIONS

AC Receiver
Blu-ray Players and Home Theaters
Desktops or Notebook PCs
Digital Video Cameras (DVC)
Mobile Phones
Personal Navigation Device(GPS)
Portable Media Player

Functional Block Diagram
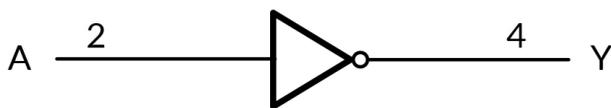
Device Information[1]

PART NUMBER	PACKAGE	BODY SIZE (NOM)
AOS1G04	SOT23-5	2.92mm×1.60mm
	SC70-5	2.10mm×1.25mm
	XDFN1X1-6	1.00mm×1.00mm

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

FUNCTION TABLE

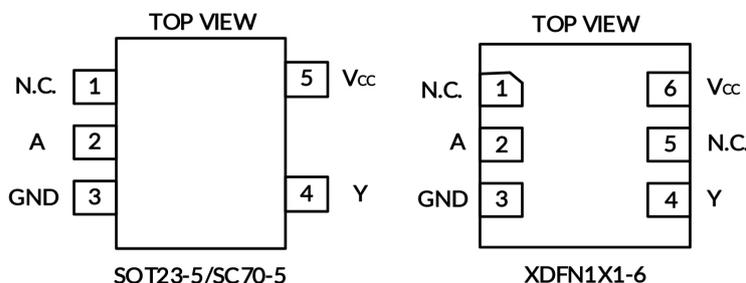| INPUTS	OUTPUT
A	Y
H	L
L	L

$Y=\overline{A}$

H=High Voltage Level
L=Low Voltage Level

PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING(1)	MSL(3)	PACKAGE OPTION
AOS1G04	AOS1G04XF5	-40℃~+125℃	SC70-5(4)	1G04	MSL3	Tape and Reel,3000
	AOS1G04XC5	-40℃~+125℃	SOT23-5	1G04	MSL3	Tape and Reel,3000
	AOS1G04XUTDN6	-40℃~+125℃	XDFN1X1-6	04(5)	MSL3	Tape and Reel,5000

NOTE:
(1) This information is the most current data available for the designated devices. This data is subject to change without noticeand 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) AOS classify the MSL level with using the common preconditioning setting in our assembly factory conforming to the JEDEC industrial standard J-STD-20F, Please align with AOS if your end application isquitecritical to the preconditioning setting or if you have special requirement.
(4) Equivalent to SOT353.
(5) 04: Identification Code.

PIN CONFIGURATIONS

TOP VIEW

N.C. [1]　　　　[5] Vcc
A [2]
GND [3]　　　　[4] Y

SOT23-5/SC70-5

TOP VIEW

N.C. [1]　　　　[6] Vcc
A [2]　　　　[5] N.C.
GND [3]　　　　[4] Y

XDFN1X1-6

PIN DESCRIPTION

PIN		NAME	I/O(1)	FUNCTION
SOT23-5/SC70-5	XDFN1X1-6			
1	1	N.C. (2)	-	Not connected
2	2	A	I	Input
3	3	GND	P	Ground
4	4	Y	O	Output
-	5	N.C. (2)	-	Not connected
5	6	Vcc	P	Power pin

(1) I=input, O=output, P=power.
(2) There is no internal connection. Typically, GND is the recommended connection to a heat spreading plane.

Specifications
Absolute Maximum Ratings[1]

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 highor lowstate[2][3]		-0.5	$V_{CC} \pm 0.5$	
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	
JA	Package thermal impedance[4]	SOT23-5		230	℃/W
		SC70-5		380	
		XDFN1X1-6		438	
T_J	Junction temperature[5]		-65	150	℃
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_{JA}, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{JA}$. All numbers apply for packages soldered directly onto a PCB.

ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), per EIA/JESD22-a114, all pins	± 4000	V
		Charged-device model (CDM), per JS-002, all pins	± 1500	
		Machine model (MM), per EIA/JESD22-a115, all pins	± 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 (Full=-40℃ to +125℃, typical values are at T_A= +25℃, unless otherwise noted.) [1]

Recommended Operating Conditions

PARAMETER	SYMBOL	Vcc	MIN	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65	5.5	V
		Data retention only	1.5		
High-Level Input Voltage	V_{IH}	Vcc=1.65V to 1.95V	0.65×Vcc		
		Vcc=2.3V to 2.7V	1.7		
		Vcc=3V to 3.6V	2		
		Vcc=4.5V to 5.5V	0.7×Vcc		
Low-Level Input Voltage	V_{IL}	Vcc=1.65V to 1.95V		0.35×Vcc	
		Vcc=2.3V to 2.7V		0.7	
		Vcc=3V to 3.6V		0.8	
		Vcc=4.5V to 5.5V		0.3×Vcc	
Input Voltage	V_I		0	5.5	
Output Voltage	V_O		0	Vcc	
Input Transition Rise or Fall	t, v	Vcc=1.8V±0.15V, 2.5V±0.2V		20	ns/V
		Vcc=3.3V±0.3V		10	
		Vcc=5V±0.5V		5	
Operating Temperature	T_A		-40	125	℃

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

DC Characteristics

PARAMETER		CONDITIONS	V_{CC}	TEMP	MIN	TYP	MAX	UNIT
V_{OH}		$I_{OH}=-100\mu A$	1.65V to 5.5V	Full	$V_{CC}-0.1$			V
		$I_{OH}=-4mA$	1.65V		1.2			
		$I_{OH}=-8mA$	2.3V		1.9			
		$I_{OH}=-16mA$	3V		2.4			
		$I_{OH}=-24mA$			2.3			
		$I_{OH}=-32mA$	4.5V		3.8			
V_{OL}		$I_{OH}=100\mu A$	1.65V to 5.5V	Full			0.1	
		$I_{OH}=4mA$	1.65V				0.45	
		$I_{OH}=8mA$	2.3V				0.3	
		$I_{OH}=16mA$	3V				0.4	
		$I_{OH}=24mA$					0.55	
		$I_{OH}=32mA$	4.5V				0.55	
I_I	A or B inputs	$V_I=5.5V$ or GND	0V to 5.5V	+25℃		±0.1	±1	μA
				Full			±5	
I_{off}		V_I or $V_0=5.5V$	0	+25℃		±0.1	±1	
				Full			±10	
I_{CC}		$V_I=5.5V$ or GND, $I_0=0$	1.65V to 5.5V	+25℃		0.1	1	
				Full			10	
$\triangle I_{CC}$		One input at $V_{CC}-0.6V$, Other inputs at V_{CC} or GND	3V to 5.5V	Full			500	
Ci (Input Capacitance)		VI=VCC or GND	3.3V	+25℃		4		pF

(1) All unused inputs of the device must be held at VCCor GND to ensure proper device operation.
(2) Limits are 100% production tested at 25℃. 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}	$V_{CC}=1.8V\pm0.15V$	$C_L=30pF, R_L=1k$		13.0		ns
		$V_{CC}=2.5V\pm0.2V$	$C_L=30pF, R_L=500$		5.1		
		$V_{CC}=3.3V\pm0.3V$	$C_L=50pF, R_L=500$		4.2		
		$V_{CC}=5V\pm0.5V$	$C_L=50pF, R_L=500$		3.3		
Power dissipationca pacitance	C_{pd}	$V_{CC}=1.8V$	$f=10MHz$		16		pF
		$V_{CC}=2.5V$			18		
		$V_{CC}=3.3V$			18		
		$V_{CC}=5V$			20		

(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.
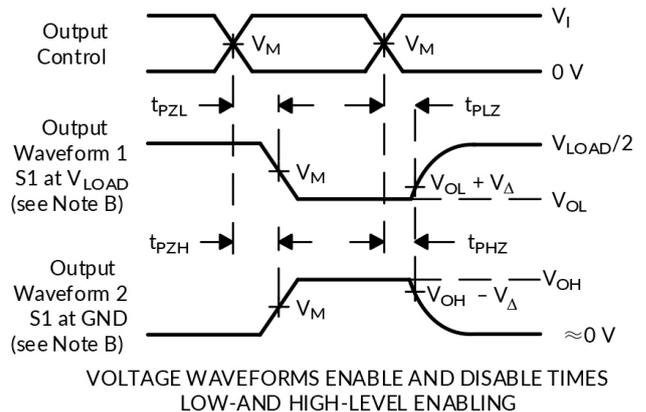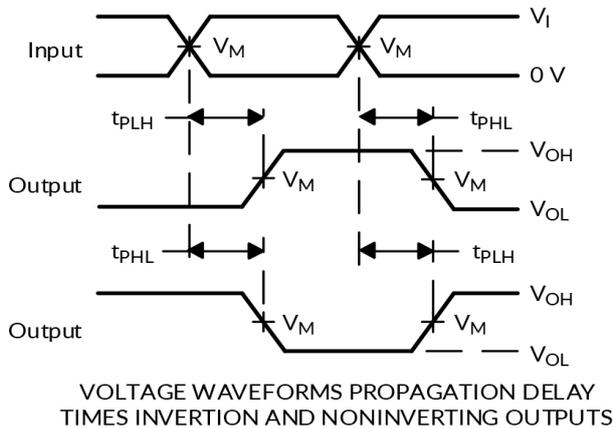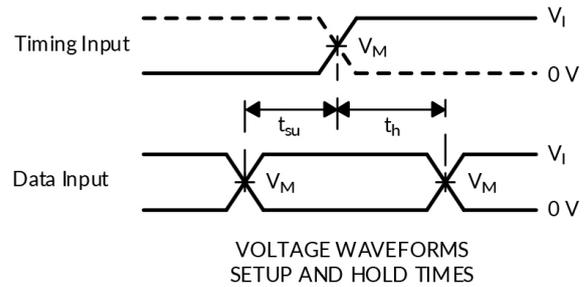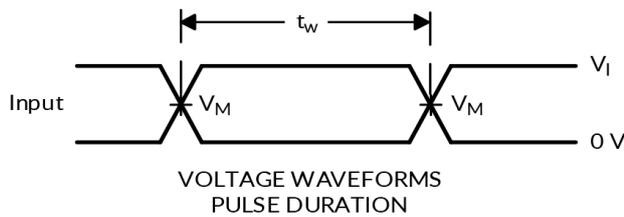
PARAMETER MEASUREMENT INFORMATION
Open-Drain
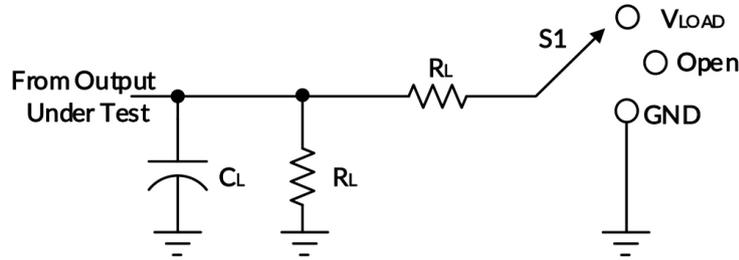
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V
	V_I	t_r/t_f					
$1.8V \pm 0.15V$	V_{CC}	$\leq$2ns	$V_{CC}/2$	2 x V_{CC}	30pF	1k	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq$2ns	$V_{CC}/2$	2 x V_{CC}	30pF	500	0.15V
$3.3V \pm 0.3V$	3V	$\leq$2.5ns	1.5V	6V	50pF	500	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq$2.5ns	$V_{CC}/2$	2 x V_{CC}	50pF	500	0.3V

VOLTAGE WAVEFORMS
PULSE DURATION

VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES

VOLTAGE WAVEFORMS PROPAGATION DELAY
TIMES INVERTION AND NONINVERTING OUTPUTS

VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES
LOW-AND HIGH-LEVEL ENABLING

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 MHz, Z_0 = 50 .
       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}.
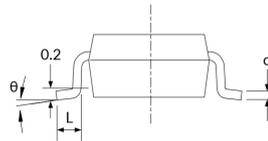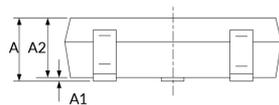   H. All parameters and waveforms are not applicable to all devices.

<div align="center">**Figure 1. Load Circuit and Voltage Waveforms**</div>

PACKAGE OUTLINE DIMENSIONS
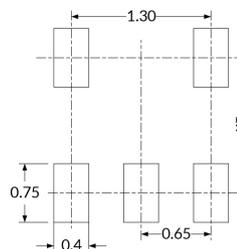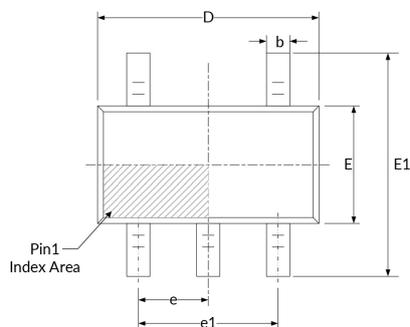## SOT23-5[3]
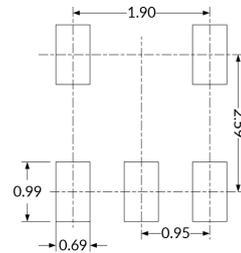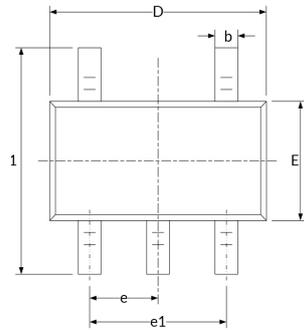
RECOMMENDED LAND PATTERN (Unit: mm)

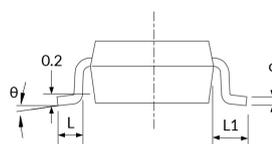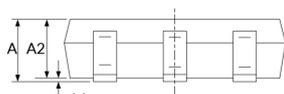| Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A[1]	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D[1]	2.820	3.020	0.111	0.119
E[1]	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)[2]		0.037(BSC)[2]	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
	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.

SC70-5[3]

RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A[1]	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.175	0.003	0.006
D[1]	2.000	2.200	0.079	0.087
E[1]	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC)[2]		0.026(BSC)[2]	
e1	1.300(BSC)[2]		0.051(BSC)[2]	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
	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.

XDFN1X1-6[3]

TOP VIEW

LAND PATTERN EXAMPLE

SIDE VIEW

SIDE VIEW

BOTTOM VIEW
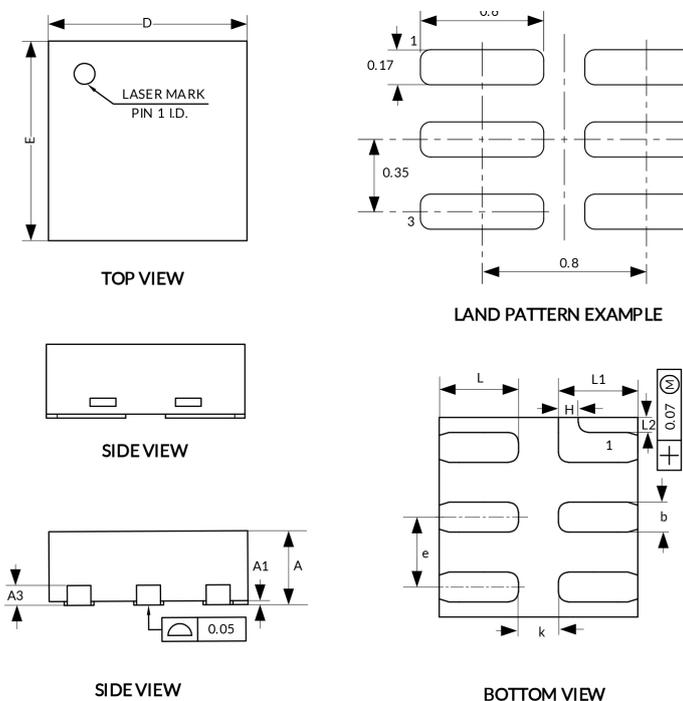
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A[1]	0.340	0.400	0.013	0.016
A1	0.000	0.050	0.000	0.002
A3	0.100(REF)[2]		0.004(REF)[2]	
b	0.100	0.200	0.004	0.008
D[1]	0.950	1.050	0.037	0.041
E[1]	0.950	1.050	0.037	0.041
e	0.300	0.400	0.012	0.016
H	0.100(REF)[2]		0.004(REF)[2]	
K	0.150		0.006	
L	0.350	0.450	0.014	0.018
L1	0.350	0.450	0.014	0.018
L2	0.075(REF)[2]		0.003(REF)[2]	

NOTE:
1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. REF is the abbreviation for Reference.
3. This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS   TAPE DIMENSION
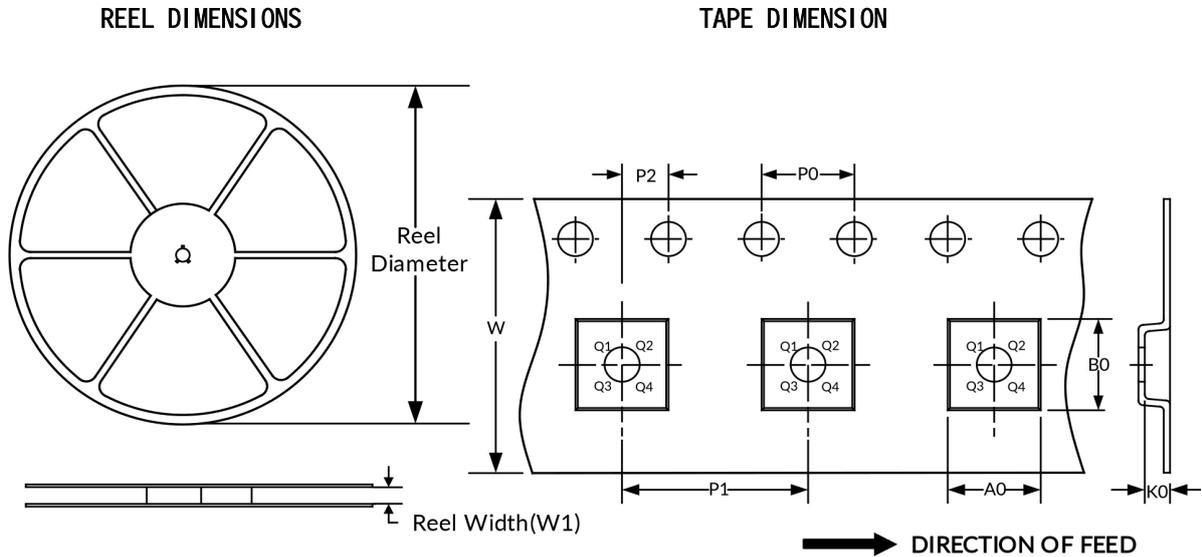
NOTE: The picture is only for reference. Please make the object as the standard.

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
SC70-5	7''	9.5	2.25	2.55	1.20	4.0	4.0	2.0	8.0	Q3
SOT23-5	7''	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
XDFN1X1-6	7''	9.5	1.14	1.17	0.56	4.0	4.0	2.0	8.0	Q3

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