74LVC1G07Q
Automotive, Single Buffer/Driver with Open-Drain Output

GENERAL DESCRIPTION

The 74LVC1G07Q is a single buffer/driver with open-drain output. The device is specified to operate over the 1.65V to 5.5V V_{CC} operating range. The open-drain output of the device can be connected to other open-drain outputs to achieve active-low wired-OR and active-high wired-AND functions. The maximum sink current is 32mA.

This device is highly suitable for partial power-down applications by using power-off circuit. When the device is powered down, the output is disabled, and the current backflow can be prevented from passing through the device.

The device is AEC-Q100 qualified (Automotive Electronics Council (AEC) standard Q100 Grade 1) and it is suitable for automotive applications.

The 74LVC1G07Q is available in Green SC70-5 and SOT-23-5 packages. It operates over a temperature range of -40℃ to +125℃.

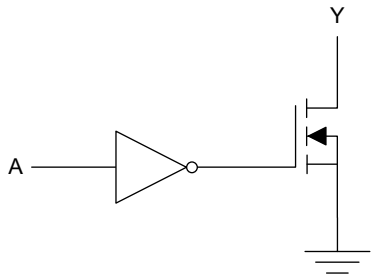
FEATURES

- **AEC-Q100 Qualified for Automotive Applications**
  Device Temperature Grade 1
  T_A = -40℃ to +125℃
- **Wide Operating Voltage Range: 1.65V to 5.5V**
- **Input Accepts Voltages up to 5.5V**
- **24mA Output Current at V_{CC} = 3.0V**
- **Low Power Dissipation: I_{CC} = 10μA (MAX)**
- **Propagation Delay: t_{PD} = 4ns (TYP) at V_{CC} = 3.3V**
- **Able to Translate Up or Down**
- **Support Partial Power-Down Mode**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green SC70-5 and SOT-23-5 Packages**

APPLICATIONS

Automotive Application
Audio Equipment
LCD TV
Panel
Computing: Server, PC, Pad, Notebook, SSD
Smartphone
Telecom Equipment

LOGIC DIAGRAM



FUNCTION TABLE

INPUT	OUTPUT
A	Y
H	Z
L	L

H = High Voltage Level
L = Low Voltage Level
Z = High-Impedance State

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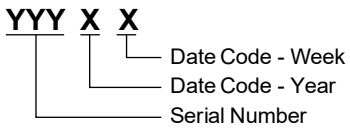
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
74LVC1G07Q	SC70-5	-40℃ to +125℃	74LVC1G07QC5G/TR	1IRXX	Tape and Reel, 3000
	SOT-23-5	-40℃ to +125℃	74LVC1G07QN5G/TR	1LA XXXXX	Tape and Reel, 3000

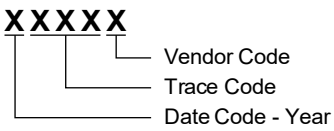
MARKING INFORMATION

NOTE: XX = Date Code. XXXXX = Date Code, Trace Code and Vendor Code.

SC70-5



SOT-23-5



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Range, V_{CC} ..... -0.5V to 6.5V
Input Voltage Range, V_I (1) ..... -0.5V to 6.5V
Output Voltage Range, V_O (1)
Active Mode or Power-Off State..... -0.5V to 6.5V
Input Clamp Current, I_{IK} (V_I < 0V) .....-50mA
Output Clamp Current, I_{OK} (V_O < 0V) .....-50mA
Continuous Output Current, I_O ..... ±50mA
Continuous Current through V_{CC} or GND..... ±100mA
Junction Temperature (2) .....+150℃
Storage Temperature Range .....-65℃ to +150℃
Lead Temperature (Soldering, 10s).....+260℃
ESD Susceptibility (3) (4)
HBM.....±8000V
CDM .....±1000V

NOTES:

1. The input and output voltage ratings may be exceeded if the input and output clamp current ratings are observed.

2. The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

3. For human body model (HBM), all pins comply with AEC-Q100-002 specification.

4. For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{CC}..... 1.65V to 5.5V
Input Voltage Range, V_I..... 0V to 5.5V
Output Voltage Range, V_O
Active Mode or Power-Off State ..... 0V to 5.5V
Low-Level Output Current, I_{OL}
V_{CC} = 1.65V ..... 4mA (MAX)
V_{CC} = 2.3V ..... 8mA (MAX)
V_{CC} = 2.7V ..... 12mA (MAX)
V_{CC} = 3.0V ..... 24mA (MAX)
V_{CC} = 4.5V ..... 32mA (MAX)
Input Transition Rise or Fall Rate, Δt/ΔV
V_{CC} = 1.8V ± 0.15V..... 20ns/V (MAX)
V_{CC} = 2.5V ± 0.2V..... 20ns/V (MAX)
V_{CC} = 3.3V ± 0.3V..... 10ns/V (MAX)
V_{CC} = 5.0V ± 0.5V..... 5ns/V (MAX)
Operating Temperature Range ..... -40℃ to +125℃

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

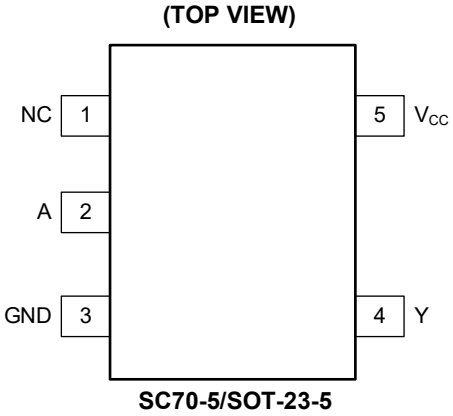
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	NC	No Connection.
2	A	Data Input.
3	GND	Ground.
4	Y	Data Output.
5	V_{CC}	Supply Voltage.

ELECTRICAL CHARACTERISTICS

(Full = -40℃ to +125℃, all typical values are measured at T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
High-Level Input Voltage	V_{IH}	V_{CC} = 1.65V to 1.95V	Full	0.65 × V_{CC}			V
		V_{CC} = 2.3V to 2.7V	Full	1.7			
		V_{CC} = 2.7V to 3.6V	Full	2.0			
		V_{CC} = 4.5V to 5.5V	Full	0.7 × V_{CC}			
Low-Level Input Voltage	V_{IL}	V_{CC} = 1.65V to 1.95V	Full			0.35 × V_{CC}	V
		V_{CC} = 2.3V to 2.7V	Full			0.7	
		V_{CC} = 2.7V to 3.6V	Full			0.8	
		V_{CC} = 4.5V to 5.5V	Full			0.3 × V_{CC}	
Low-Level Output Voltage	V_{OL}	V_{CC} = 1.65V to 5.5V, I_{OL} = 100μA	Full		0.01	0.1	V
		V_{CC} = 1.65V, I_{OL} = 4mA	Full		0.10	0.45	
		V_{CC} = 2.3V, I_{OL} = 8mA	Full		0.15	0.3	
		V_{CC} = 2.7V, I_{OL} = 12mA	Full		0.20	0.3	
		V_{CC} = 3.0V, I_{OL} = 16mA	Full		0.25	0.4	
		V_{CC} = 3.0V, I_{OL} = 24mA	Full		0.35	0.55	
		V_{CC} = 4.5V, I_{OL} = 32mA	Full		0.40	0.55	
Input Leakage Current	I_I	A input, V_{CC} = 0V to 5.5V, V_I = 5.5V or GND	Full		±0.1	±5	μA
Off-State Output Current	I_{OZ}	V_{CC} = 5.5V, V_I = V_{IH}, V_O = V_{CC} or GND	Full		±0.1	±10	μA
Power-Off Leakage Current	I_{OFF}	V_{CC} = 0V, V_O = 5.5V	Full		±0.1	±10	μA
Supply Current	I_{CC}	V_{CC} = 1.65V to 5.5V, V_I = 5.5V or GND, I_O = 0A	Full		0.1	10	μA
Additional Supply Current	ΔI_{CC}	V_{CC} = 3.0V to 5.5V, input at V_I = V_{CC} - 0.6V	Full		0.1	500	μA
Input Capacitance	C_I	V_{CC} = 3.3V, V_I = V_{CC} or GND	+25℃		4		pF
Output Capacitance	C_O	V_{CC} = 3.3V, V_O = V_{CC} or GND	+25℃		4		pF

DYNAMIC CHARACTERISTICS

(See Figure 1 for test circuit. Full = -40℃ to +125℃, all typical values are measured at T_A = +25℃ and V_{CC} = 1.8V, 2.5V, 3.3V and 5.0V respectively, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN (1)	TYP	MAX (1)	UNITS
Propagation Delay (2)	t_{PD}	A to Y, see Figure 2	V_{CC} = 1.8V ± 0.15V	Full	1.0	7.5	11.5	ns
			V_{CC} = 2.5V ± 0.2V	Full	0.5	5.0	7.5	
			V_{CC} = 3.3V ± 0.3V	Full	0.5	4.0	6.5	
			V_{CC} = 5.0V ± 0.5V	Full	0.5	3.5	5.5	
Power Dissipation Capacitance (3)	C_{PD}	f = 10MHz	V_{CC} = 1.8V	+25℃		4		pF
			V_{CC} = 2.5V	+25℃		4		
			V_{CC} = 3.3V	+25℃		5		
			V_{CC} = 5.0V	+25℃		6		

NOTES:

1. Specified by design and characterization, not production tested.

2. t_{PD} is the same as t_{PZL} and t_{PLZ}.

3. C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

   $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$

   where:

   f_i = Input frequency in MHz.

   f_o = Output frequency in MHz.

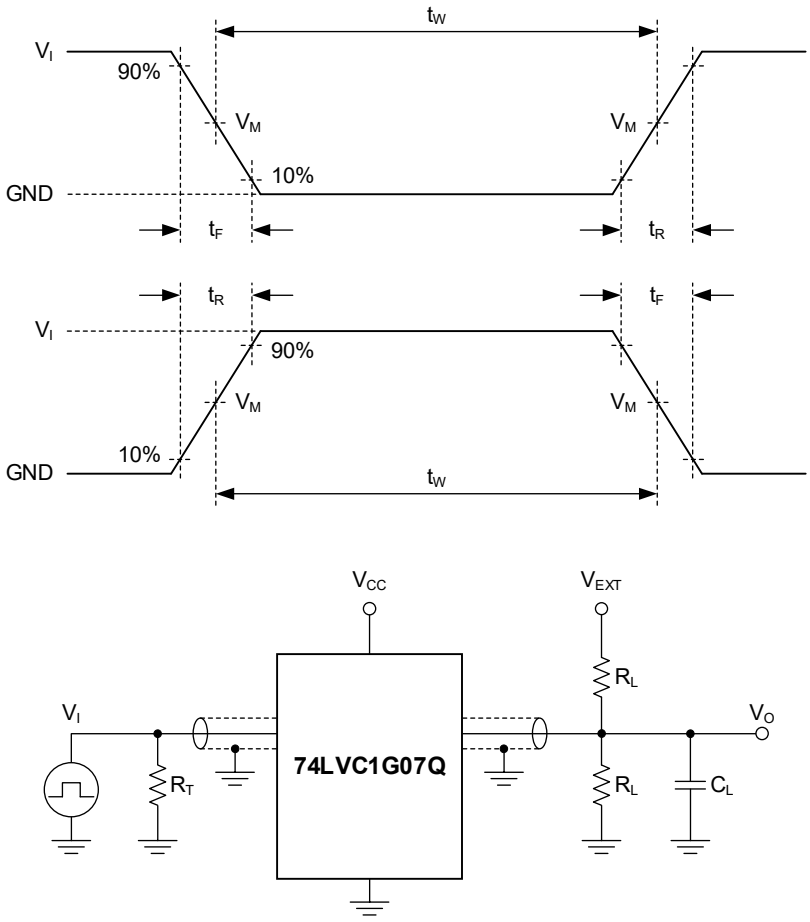
   C_L = Output load capacitance in pF.

   V_{CC} = Supply voltage in Volts.

   N = Number of inputs switching.

   $\Sigma(C_L \times V_{CC}^2 \times f_o)$ = Sum of the outputs.

TEST CIRCUIT



Test conditions are given in Table 1.

Definitions for test circuit:

R_L: Load resistance.

C_L: Load capacitance (includes jig and probe).

R_T: Termination resistance (equals to output impedance Z_O of the pulse generator).

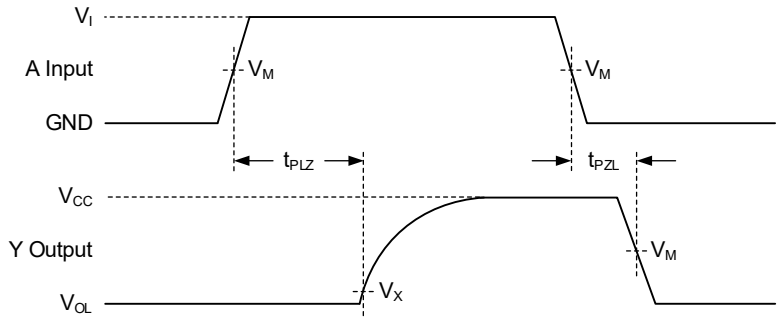
V_{EXT}: External voltage is used to measure switching time.

Figure 1. Test Circuit for Measuring Switching Times

Table 1. Test Conditions

SUPPLY VOLTAGE	INPUT		LOAD		V_{EXT}
V_{CC}	V_I	t_R, t_F	C_L	R_L	t_{PZL}, t_{PLZ}
1.8V ± 0.15V	V_{CC}	≤ 2.0ns	30pF	1kΩ	2 × V_{CC}
2.5V ± 0.2V	V_{CC}	≤ 2.0ns	30pF	500Ω	2 × V_{CC}
3.3V ± 0.3V	3V	≤ 2.5ns	50pF	500Ω	6V
5.0V ± 0.5V	V_{CC}	≤ 2.5ns	50pF	500Ω	2 × V_{CC}

WAVEFORMS



Test conditions are given in Table 1.

Measurement points are given in Table 2.

Logic levels: V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 2. Input A to Output Y Propagation Delay Times

Table 2. Measurement Points

SUPPLY VOLTAGE	INPUT		OUTPUT	
V_{CC}	V_I	V_M (1)	V_M	V_X
1.8V ± 0.15V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V
2.5V ± 0.2V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V
3.3V ± 0.3V	3V	1.5V	1.5V	V_{OL} + 0.3V
5.0V ± 0.5V	V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.3V

NOTE:

1. The measurement points should be V_{IH} or V_{IL} when the input rising or falling time exceeds 2.5ns.

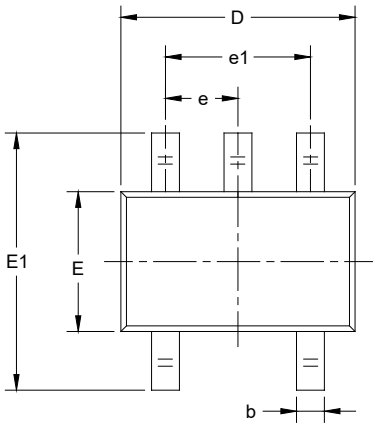
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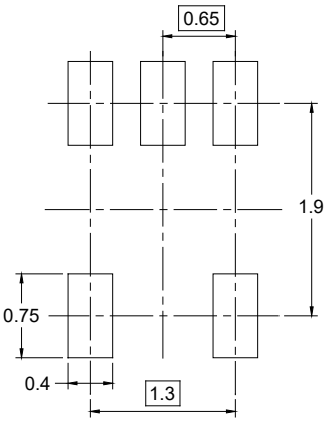
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (MAY 2025) to REV.A	Page
Changed from product preview to production data	All

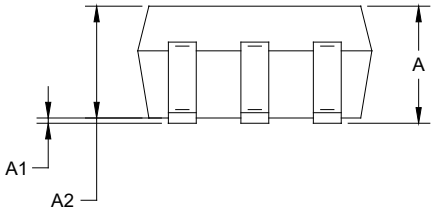
PACKAGE OUTLINE DIMENSIONS

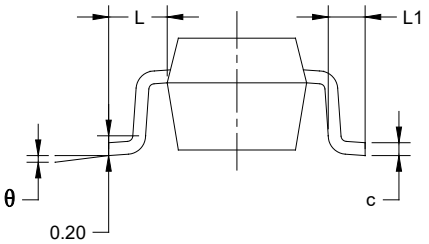
SC70-5





RECOMMENDED LAND PATTERN (Unit: mm)



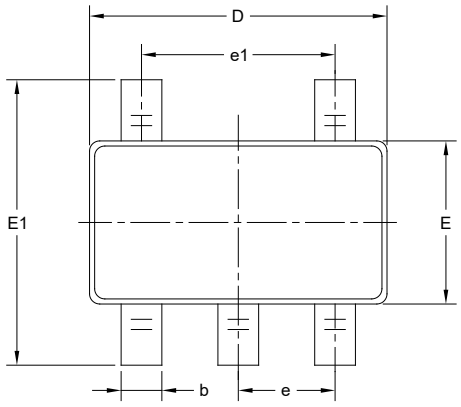


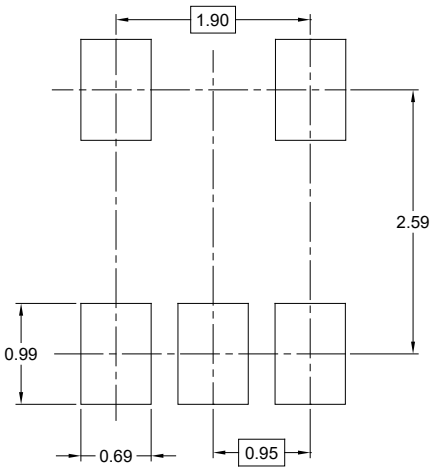
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.220	0.003	0.009
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.65 TYP		0.026 TYP	
e1	1.300 BSC		0.051 BSC	
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

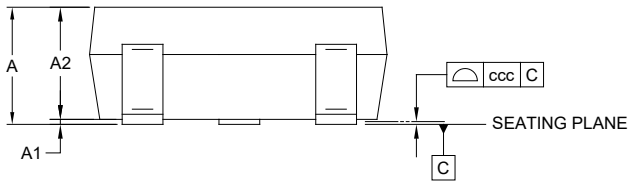
PACKAGE OUTLINE DIMENSIONS

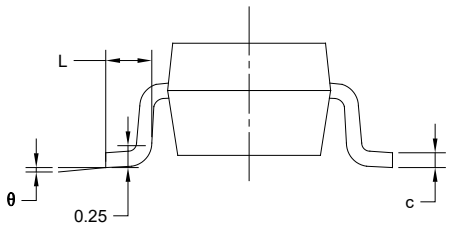
SOT-23-5





RECOMMENDED LAND PATTERN (Unit: mm)



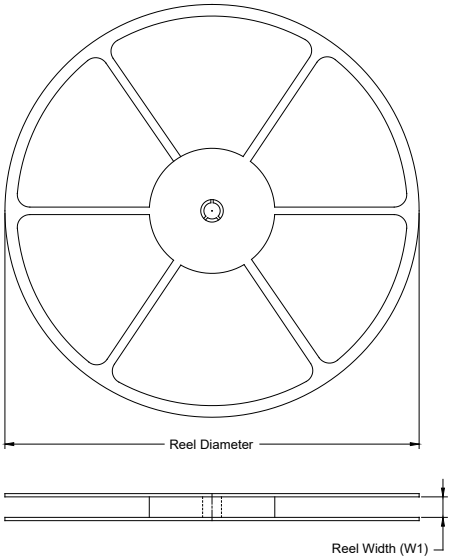


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

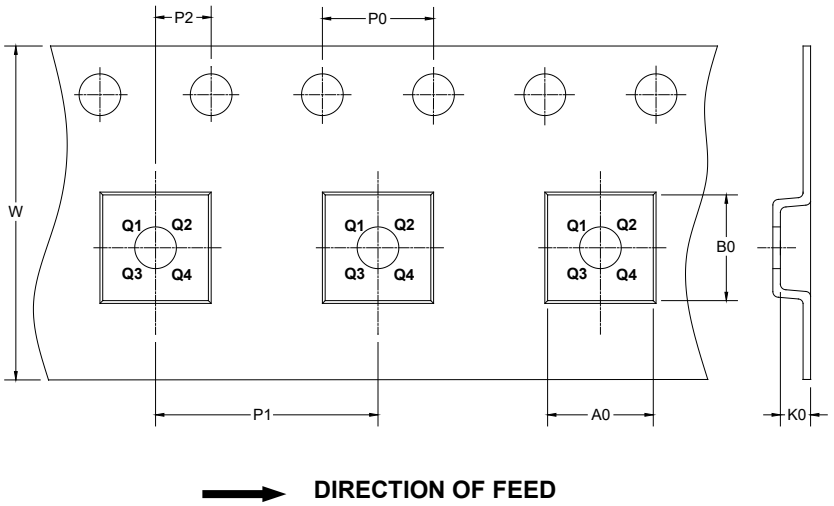
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



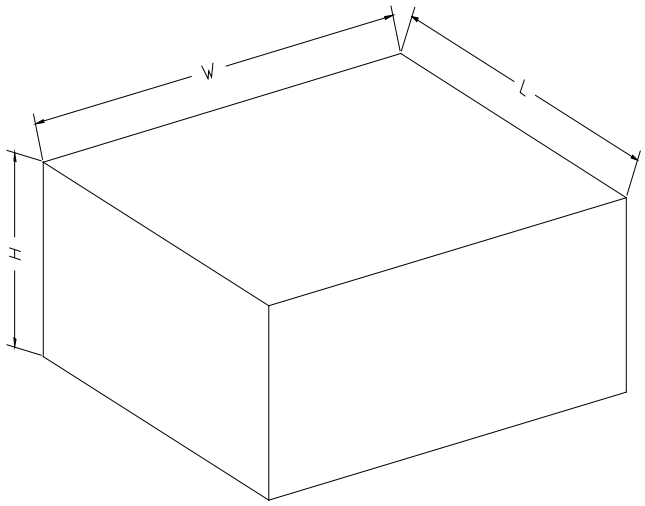
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SC70-5	7″	9.5	2.40	2.50	1.20	4.0	4.0	2.0	8.0	Q3
SOT-23-5	7″	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

DD0001

CARTON BOX DIMENSIONS



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

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7″ (Option)	368	227	224	8
7″	442	410	224	18

DD0002