

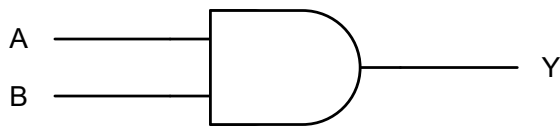
GENERAL DESCRIPTION

The SGM7SZ08 is a single two-input AND with advanced CMOS technology. The supply voltage pin of this device accepts any voltage from 1.65V to 5.5V. The inputs can tolerate a maximum of 6V, regardless of the supply voltage range. When V_{CC} is at 0V, the inputs and output are in the high-impedance state.

This device can achieve ultra-high speed operation with high output drive, while the low static power dissipation over the wide supply voltage operating range is maintained.

The SGM7SZ08 is available in Green SOT-23-5, SC70-5, XTDFN-1×1-6L and UTDFN-1.45×1-6L packages. It operates over an ambient temperature range of -40°C to +85°C.

LOGIC SYMBOL



FEATURES

- **Wide Supply Voltage Range: 1.65V to 5.5V**
- **Ultra-High Speed: t_{PD} of 3.6ns (TYP) into 50pF at $V_{CC} = 3.3V$**
- **Support LCX Performance at $V_{CC} = 3.3V$**
- **High Output Drive: $\pm 24mA$ at $V_{CC} = 3V$**
- **Inputs Over-Voltage Tolerance Makes 5V to 3V Translation Available**
- **Power Down High-Impedance Inputs/Output**
- **Available in Green SOT-23-5, SC70-5, XTDFN-1×1-6L and UTDFN-1.45×1-6L Packages**

FUNCTION TABLE

| INPUTS | | OUTPUT |
|--------|---|--------|
| A | B | Y |
| L | L | L |
| L | H | L |
| H | L | L |
| H | H | H |

$Y = AB$

H = HIGH Logic Level

L = LOW Logic Level

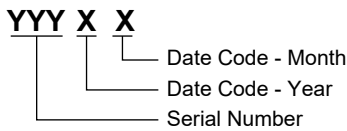
PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|----------|---------------------|-----------------------------|-------------------|-----------------|----------------------|
| SGM7SZ08 | SC70-5 | -40°C to +85°C | SGM7SZ08YC5G/TR | SF5XX | Tape and Reel, 3000 |
| | SOT-23-5 | -40°C to +85°C | SGM7SZ08YN5G/TR | SF6XX | Tape and Reel, 3000 |
| | XTDFN-1×1-6L | -40°C to +85°C | SGM7SZ08YXDM6G/TR | G2 | Tape and Reel, 10000 |
| | UTDFN-1.45×1-6L | -40°C to +85°C | SGM7SZ08YUDL6G/TR | G3X | Tape and Reel, 5000 |

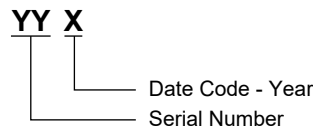
MARKING INFORMATION

NOTE: X = Date Code. XX = Date Code.

SC70-5/SOT-23-5



UTDFN-1.45×1-6L



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, V_{CC} -0.5V to 6.0V
- DC Input Voltage, V_{IN}..... -0.5V to 6.0V
- DC Output Voltage, V_{OUT}..... -0.5V to 6.0V
- DC Input Diode Current, I_{IK}
(V_{IN} < -0.5V).....-50mA
- DC Output Diode Current, I_{OK}
(V_{OUT} < -0.5V)-50mA
- DC Output Current, I_{OUT}..... ±50mA
- DC V_{CC} or Ground Current, I_{CC} or I_{GND}..... ±50mA
- Junction Temperature+150°C
- Storage Temperature Range -65°C to +150°C
- Lead Temperature (Soldering, 10s).....+260°C
- ESD Susceptibility
- HBM..... 7000V
- MM.....400V

RECOMMENDED OPERATING CONDITIONS

- Operating Temperature Range-40°C to +85°C

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.

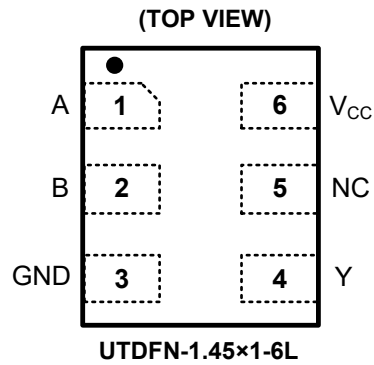
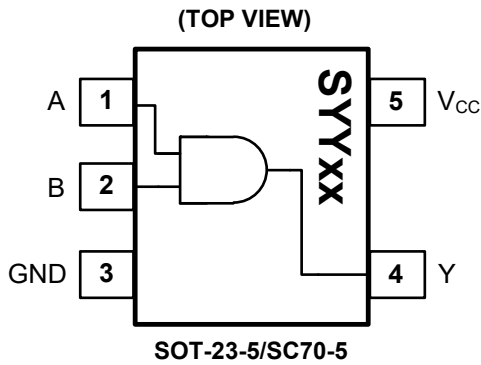
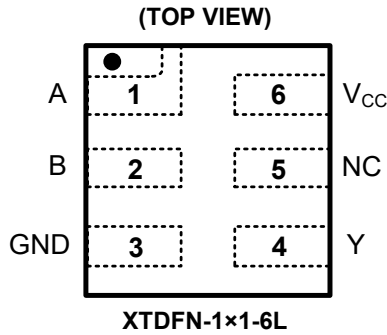
ESD SENSITIVITY CAUTION

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 |
|---------------------|----------------------------------|-----------------|---|
| SOT-23-5/ SC70-5 | UTDFN-1.45×1-6L/ XTDFN-1×1-6L | | |
| 1 | 1 | A | Input. Unused input must be held high or low. It may not float. |
| 2 | 2 | B | Input. Unused input must be held high or low. It may not float. |
| 3 | 3 | GND | Ground. |
| 4 | 4 | Y | Output. |
| 5 | 6 | V _{CC} | Power Supply. |
| — | 5 | NC | No Connection. |

ELECTRICAL CHARACTERISTICS

(T_A = -40°C to +85°C, typical values are at T_A = +25°C, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | V _{CC} (V) | MIN | TYP | MAX | UNITS | |
|-------------------------------|---------------------------------|--|--------------------------|---------------------|------|---------------------|-------|----|
| General | | | | | | | | |
| Power Supply Range | V _{CC} | | | 1.65 | | 5.50 | V | |
| Supply Voltage Data Retention | | | | 1.50 | | 5.50 | | |
| Input Voltage | V _{IN} | | | 0.00 | | 5.50 | V | |
| Output Voltage | V _{OUT} | | | 0.00 | | V _{CC} | V | |
| Input Rise and Fall Times | t _r , t _f | | 1.8, 2.5 ± 0.2 | 0 | | 20 | ns/V | |
| | | | 3.3 ± 0.3 | 0 | | 10 | | |
| | | | 5.0 ± 0.5 | 0 | | 5 | | |
| DC Performance | | | | | | | | |
| HIGH Level Input Voltage | V _{IH} | | 1.65 to 5.5 | 0.75V _{CC} | | | V | |
| LOW Level Input Voltage | V _{IL} | | 1.65 to 5.5 | | | 0.25V _{CC} | V | |
| HIGH Level Output Voltage | V _{OH} | V _{IN} = V _{IH} | I _{OH} = -100µA | 1.65 | 1.62 | 1.65 | V | |
| | | | | 1.80 | 1.77 | 1.80 | | |
| | | | | 2.30 | 2.27 | 2.30 | | |
| | | | | 3.00 | 2.97 | 3.00 | | |
| | | | 4.50 | 4.47 | 4.50 | | | |
| | | | I _{OH} = -4mA | 1.65 | 1.46 | 1.55 | | |
| | | | I _{OH} = -8mA | 2.30 | 2.03 | 2.18 | | |
| | | | I _{OH} = -16mA | 3.00 | 2.51 | 2.81 | | |
| LOW Level Output Voltage | V _{OL} | V _{IN} = V _{IL} | I _{OL} = 100µA | 1.65 | | 0.00 | 0.02 | |
| | | | | 1.80 | | 0.00 | 0.02 | |
| | | | | 2.30 | | 0.00 | 0.02 | |
| | | | | 3.00 | | 0.00 | 0.02 | |
| | | | 4.50 | | 0.00 | 0.02 | | |
| | | | I _{OL} = 4mA | 1.65 | | 0.06 | 0.11 | |
| | | | I _{OL} = 8mA | 2.30 | | 0.09 | 0.17 | |
| | | | I _{OL} = 16mA | 3.00 | | 0.16 | 0.32 | |
| I _{OL} = 24mA | 3.00 | | 0.24 | 0.49 | | | | |
| I _{OL} = 32mA | 4.50 | | 0.29 | 0.55 | | | | |
| Input Leakage Current | I _{IN} | V _{IN} = 5.5V, GND | | 0 to 5.5 | | ±0.10 | ±5 | µA |
| Power Off Leakage Current | I _{OFF} | V _{IN} or V _{OUT} = 5.5V | | 0 | | 0.10 | 5 | µA |
| Quiescent Supply Current | I _{CC} | V _{IN} = 5.5V, GND | | 1.65 to 5.5 | | 0.10 | 10 | µA |

ELECTRICAL CHARACTERISTICS (continued)

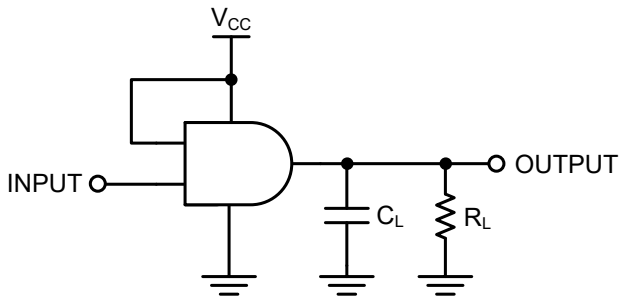
(T_A = -40°C to +85°C, typical values are at T_A = +25°C, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|--|-------------------------------------|---------------------------------|---|--|------|-------|
| AC Performance | | | | | | |
| Propagation Delay | t _{PHL} , t _{PLH} | V _{CC} = 1.65V | C _L = 15pF, R _L = 1MΩ, Figure 1, Figure 2 | | 8.8 | ns |
| | | V _{CC} = 1.80V | | | 7.2 | |
| | | V _{CC} = 2.50V ± 0.20V | | | 4.1 | |
| | | V _{CC} = 3.30V ± 0.30V | | | 3.2 | |
| | | V _{CC} = 5.00V ± 0.50V | | | 2.6 | |
| | | V _{CC} = 3.30V ± 0.30V | | C _L = 50pF, R _L = 500Ω, Figure 1, Figure 2 | | |
| | | V _{CC} = 5.00V ± 0.50V | | | 2.8 | |
| Input Capacitance | C _{IN} | V _{CC} = 0V | | 4.0 | | pF |
| Power Dissipation Capacitance ⁽²⁾ | C _{PD} | V _{CC} = 3.30V | Figure 3 | | 19.0 | pF |
| | | V _{CC} = 5.00V | | | 20.0 | |

NOTES:

1. Unused inputs must be held HIGH or LOW. They may not float.
2. C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle (see Figure 3). C_{PD} is related to dynamic operating current I_{CCD} by the expression: I_{CCD} = (C_{PD}) (V_{CC}) (f_{IN}) + (I_{CC,Static}).

TEST CIRCUITS



C_L includes load and stray capacitance; Input PRR = 1.0MHz; t_w = 500ns.

Figure 1. AC Test Circuit

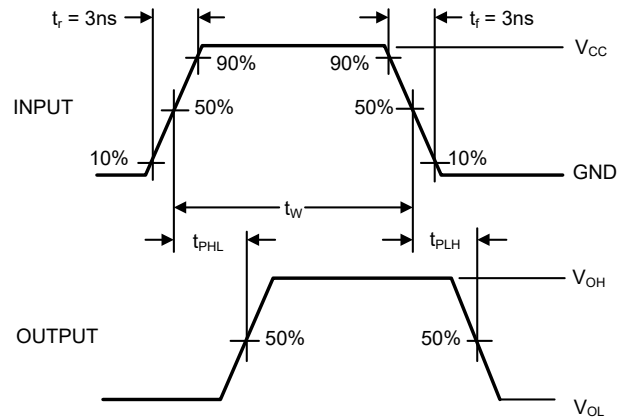
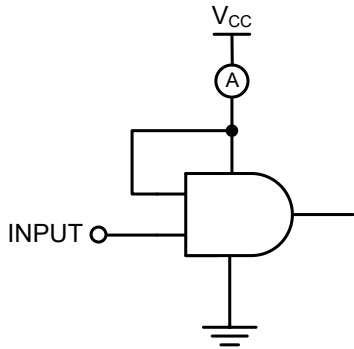


Figure 2. AC Waveforms



Input = AC Waveform; t_r = t_f = 1.8ns; PRR = 10MHz; Duty Cycle = 50%.

Figure 3. I_{CCD} Test Circuit

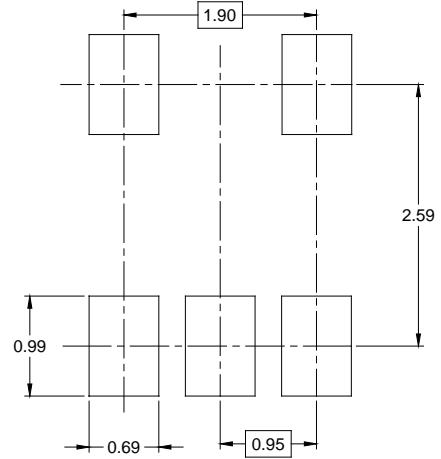
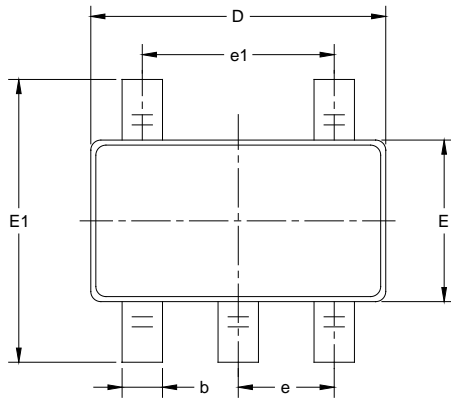
REVISION HISTORY

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

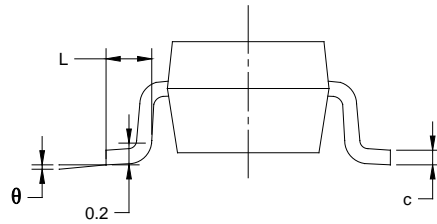
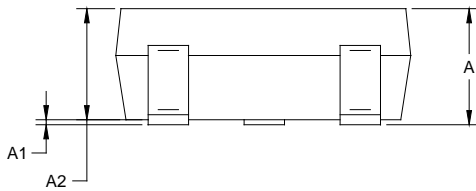
| SEPTEMBER 2021 – REV.A.1 to REV.A.2 | | Page |
|---|--|------|
| Updated Package Outline Dimensions section | | 8, 9 |
| JUNE 2015 – REV.A to REV.A.1 | | Page |
| Changed Packing Option | | 2 |
| Changed Tape and Reel Information | | 11 |
| Changes from Original (OCTOBER 2013) to REV.A | | Page |
| Changed from product preview to production data | | All |

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



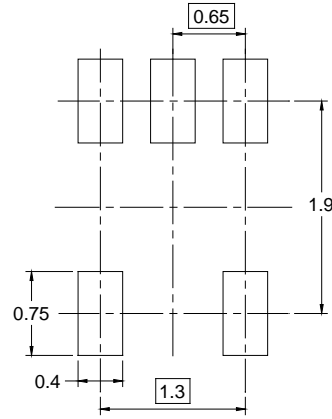
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950 BSC | | 0.037 BSC | |
| e1 | 1.900 BSC | | 0.075 BSC | |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

NOTES:

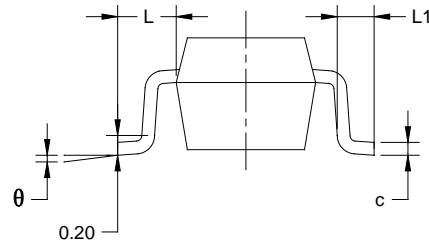
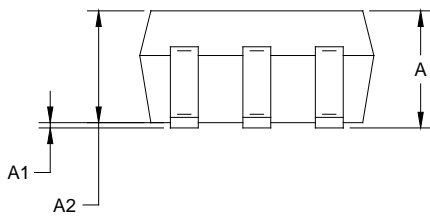
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

SC70-5



RECOMMENDED LAND PATTERN (Unit: mm)



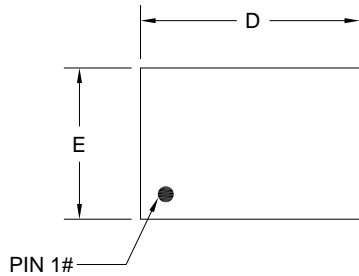
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.800 | 1.100 | 0.031 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.800 | 1.000 | 0.031 | 0.039 |
| b | 0.150 | 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:

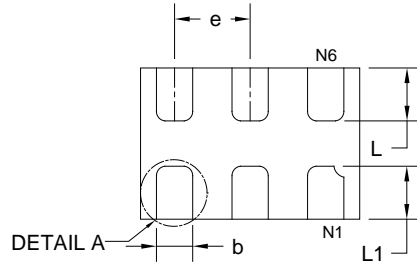
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

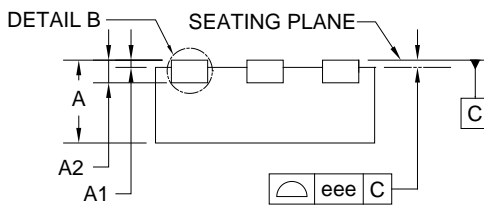
UTDFN-1.45x1-6L



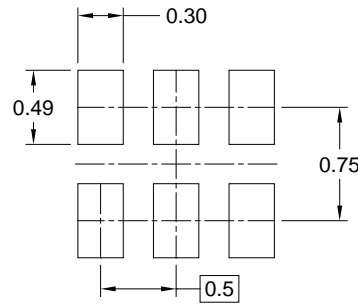
TOP VIEW



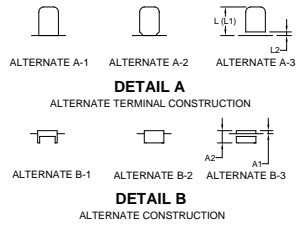
BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

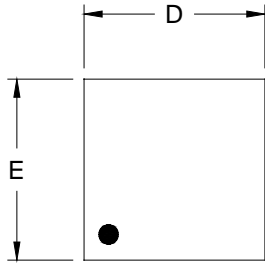


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.450 | 0.600 | 0.018 | 0.024 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A2 | 0.150 REF | | 0.006 REF | |
| D | 1.374 | 1.526 | 0.054 | 0.060 |
| E | 0.924 | 1.076 | 0.036 | 0.042 |
| b | 0.150 | 0.300 | 0.006 | 0.012 |
| e | 0.500 TYP | | 0.020 TYP | |
| eee | 0.050 | | 0.002 | |
| L | 0.250 | 0.450 | 0.010 | 0.018 |
| L1 | 0.250 | 0.500 | 0.010 | 0.020 |
| L2 | 0.000 | 0.100 | 0.000 | 0.004 |

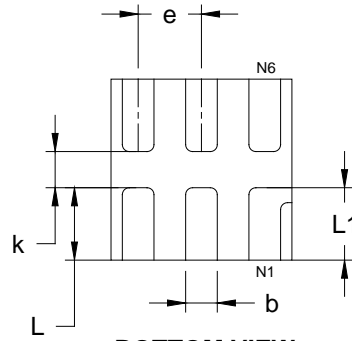
NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

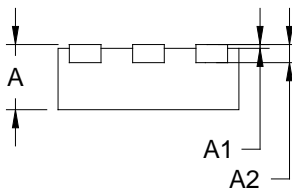
XTDFN-1x1-6L



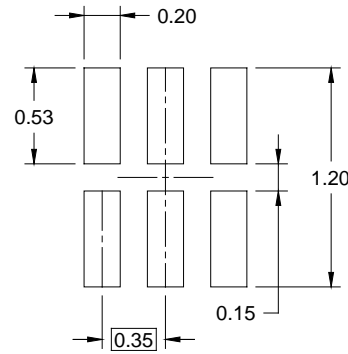
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.320 | 0.400 | 0.013 | 0.016 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A2 | 0.100 REF | | 0.004 REF | |
| D | 0.950 | 1.050 | 0.037 | 0.041 |
| E | 0.950 | 1.050 | 0.037 | 0.041 |
| k | 0.150 MIN | | 0.006 MIN | |
| b | 0.120 | 0.230 | 0.005 | 0.009 |
| e | 0.350 TYP | | 0.014 TYP | |
| L | 0.350 | 0.450 | 0.014 | 0.018 |
| L1 | 0.350 | 0.450 | 0.014 | 0.018 |

NOTE: This drawing is subject to change without notice.

PACKAGE INFORMATION

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 |
|-----------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| SOT-23-5 | 7" | 9.5 | 3.20 | 3.20 | 1.40 | 4.0 | 4.0 | 2.0 | 8.0 | Q3 |
| SC70-5 | 7" | 9.5 | 2.25 | 2.55 | 1.20 | 4.0 | 4.0 | 2.0 | 8.0 | Q3 |
| UTDFN-1.45×1-6L | 7" | 9.5 | 1.15 | 1.60 | 0.75 | 4.0 | 4.0 | 2.0 | 8.0 | Q1 |
| XTDFN-1×1-6L | 7" | 9.5 | 1.16 | 1.16 | 0.50 | 4.0 | 2.0 | 2.0 | 8.0 | Q1 |

D00001

PACKAGE INFORMATION

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

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