

GENERAL DESCRIPTION

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

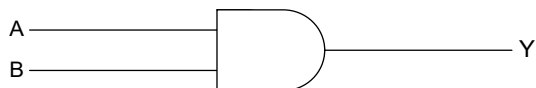
This device can achieve ultra-high speed operation with high output drive, meanwhile, the low static power dissipation is maintained over the wide supply voltage operating range.

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

FEATURES

- **Wide Supply Voltage Range: 1.65V to 5.5V**
- **Inputs Over-Voltage Tolerance Makes 5V to 3V Translation Available**
- **+24mA/-24mA Output Current at $V_{CC} = 3.0V$**
- **Ultra-High Speed: t_{PD} of 3.6ns (TYP) into 50pF at $V_{CC} = 3.3V$**
- **Support LCX Performance at $V_{CC} = 3.3V$**
- **Power-Down High-Impedance Inputs/Output**
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green SC70-5, SOT-23-5, XTDFN-1×1-6L and UTDFN-1.45×1-6L Packages**

LOGIC SYMBOL



FUNCTION TABLE

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

$$Y = AB$$

H = High Voltage Level

L = Low Voltage Level

PACKAGE/ORDERING INFORMATION

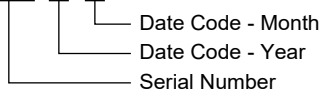
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM7SZ08	SC70-5	-40°C to +85°C	SGM7SZ08YC5G/TR	SF5XX	Tape and Reel, 3000
	SOT-23-5	-40°C to +85°C	SGM7SZ08YN5G/TR	SF6XX	Tape and Reel, 3000
	XTDFN-1×1-6L	-40°C to +85°C	SGM7SZ08YXDM6G/TR	G2	Tape and Reel,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

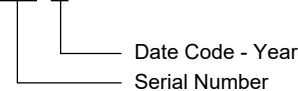
YYY X X



Date Code - Month
Date Code - Year
Serial Number

UTDFN-1.45×1-6L

YY X



Date Code - Year
Serial Number

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} $\pm 50mA$
 DC V_{CC} or Ground Current, I_{CC} or I_{GND} $\pm 50mA$
 Junction Temperature +150°C
 Storage Temperature Range -65°C to +150°C
 Lead Temperature (Soldering, 10s) +260°C
 ESD Susceptibility
 HBM $\pm 7000V$
 CDM (SC70-5/SOT-23-5) $\pm 2000V$

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.

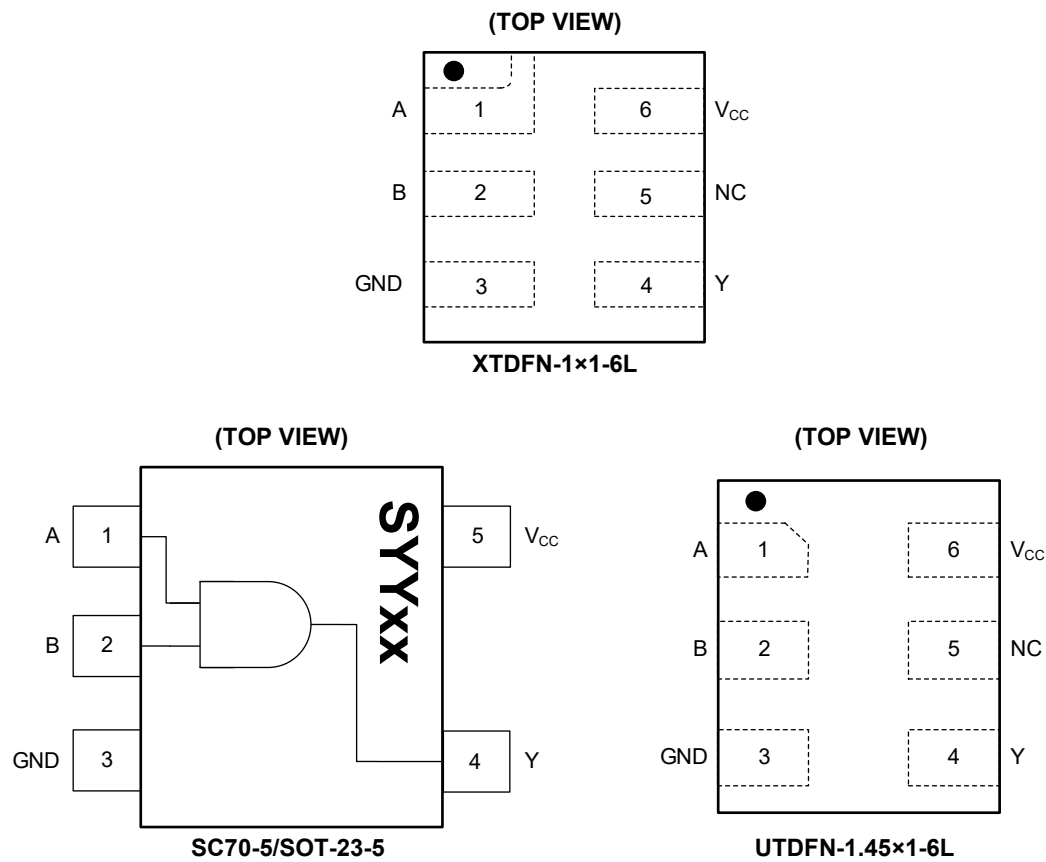
ESD SENSITIVITY CAUTION

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

ELECTRICAL CHARACTERISTICS(T_A = -40°C to +85°C, typical values are measured 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	0.75 × V _{CC}			V
Low-Level Input Voltage	V _{IL}			1.65 to 5.5			0.25 × V _{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		
			I _{OH} = -24mA	3.00	2.34	2.70		
I _{OH} = -32mA	4.50	4.01	4.20					
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IL}	I _{OL} = 100μA	1.65		0.00	0.02	V
				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

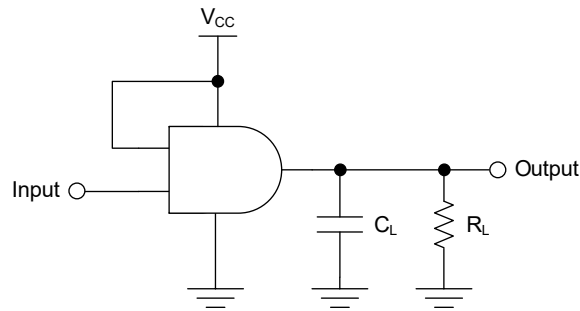
ELECTRICAL CHARACTERISTICS (continued)(T_A = -40°C to +85°C, typical values are measured at T_A = +25°C, unless otherwise noted.) ⁽¹⁾

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		3.6		
		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



NOTE:

R_L : Load resistance.

C_L : Load and stray capacitance.

Input PRR = 1.0MHz, $t_W = 500\text{ns}$.

Figure 1. AC Test Circuit

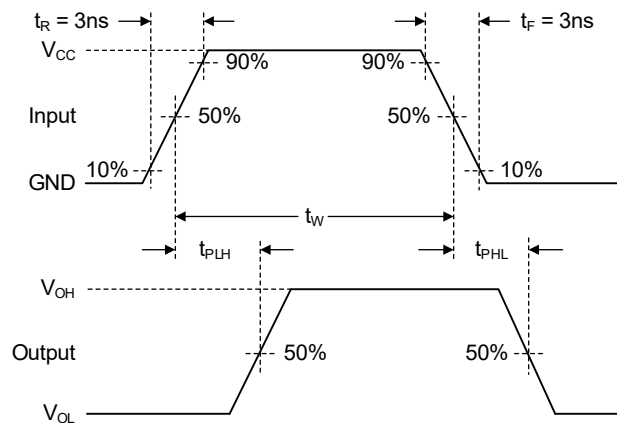
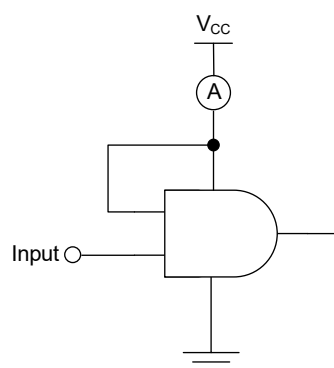


Figure 2. AC Waveforms



NOTE:

Input = AC waveform, $t_R = t_F = 1.8\text{ns}$, PRR = 10MHz, duty cycle = 50%.

Figure 3. I_{CCD} Test Circuit

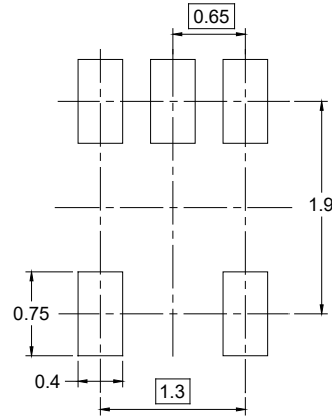
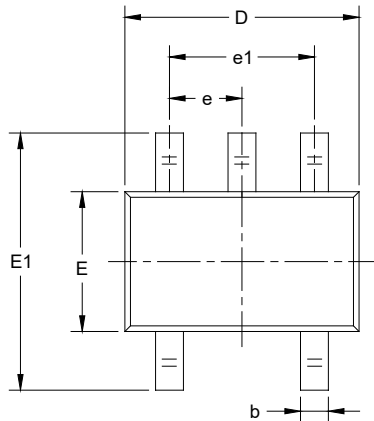
REVISION HISTORY

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

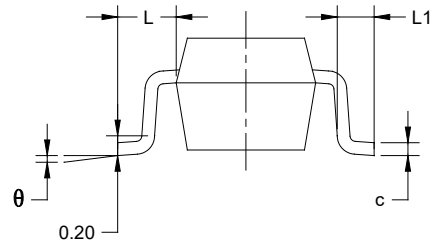
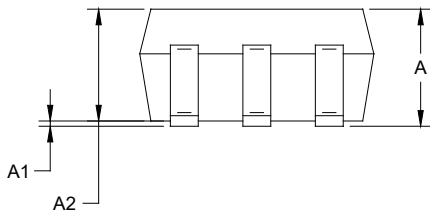
APRIL 2026 – REV.A.2 to REV.A.3	Page
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Updated Package Outline Dimensions section	9, 10
Updated Tape and Reel Information	12
SEPTEMBER 2021 – REV.A.1 to REV.A.2	Page
Updated Package Outline Dimensions section	8, 9
JUNE 2015 – REV.A to REV.A.1	Page
Changed 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

SC70-5



RECOMMENDED LAND PATTERN (Unit: mm)



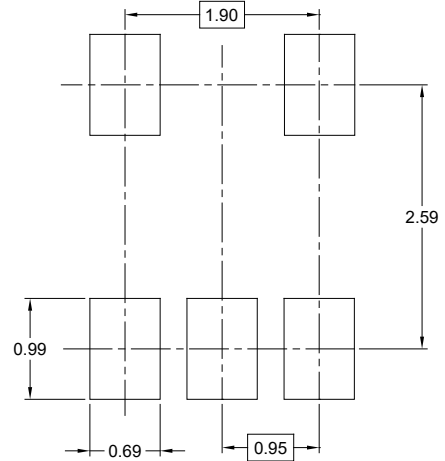
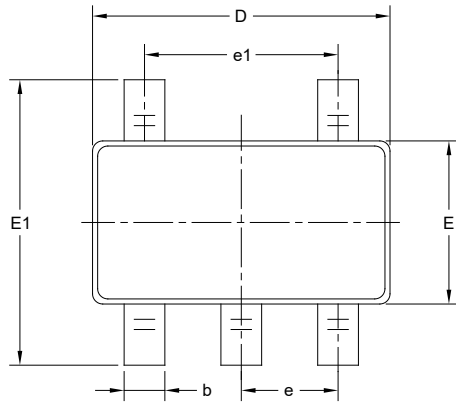
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.220	0.003	0.009
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.65 TYP		0.026 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:

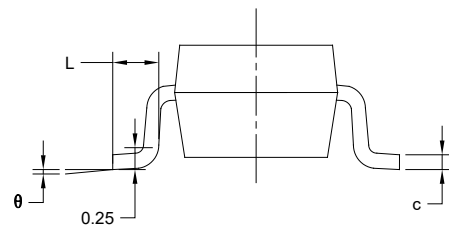
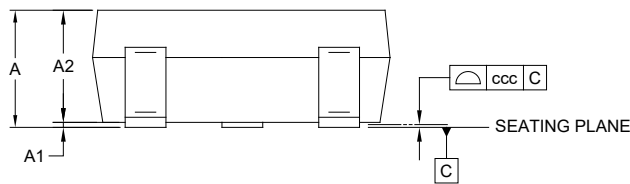
1. Body dimensions do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



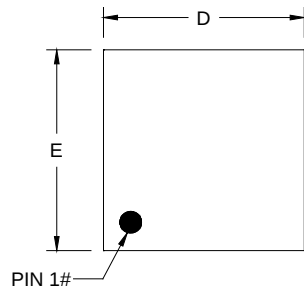
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

NOTES:

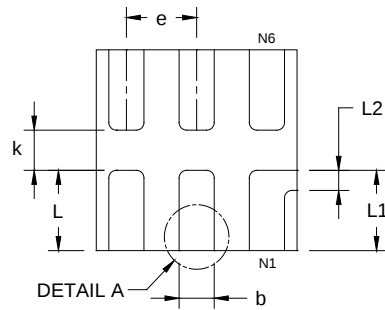
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

PACKAGE OUTLINE DIMENSIONS

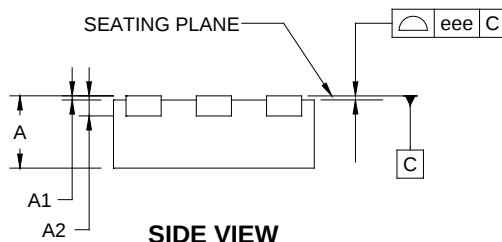
XTDFN-1×1-6L



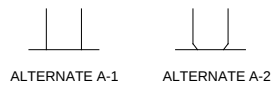
TOP VIEW



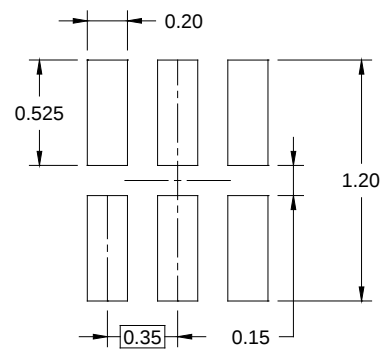
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTION



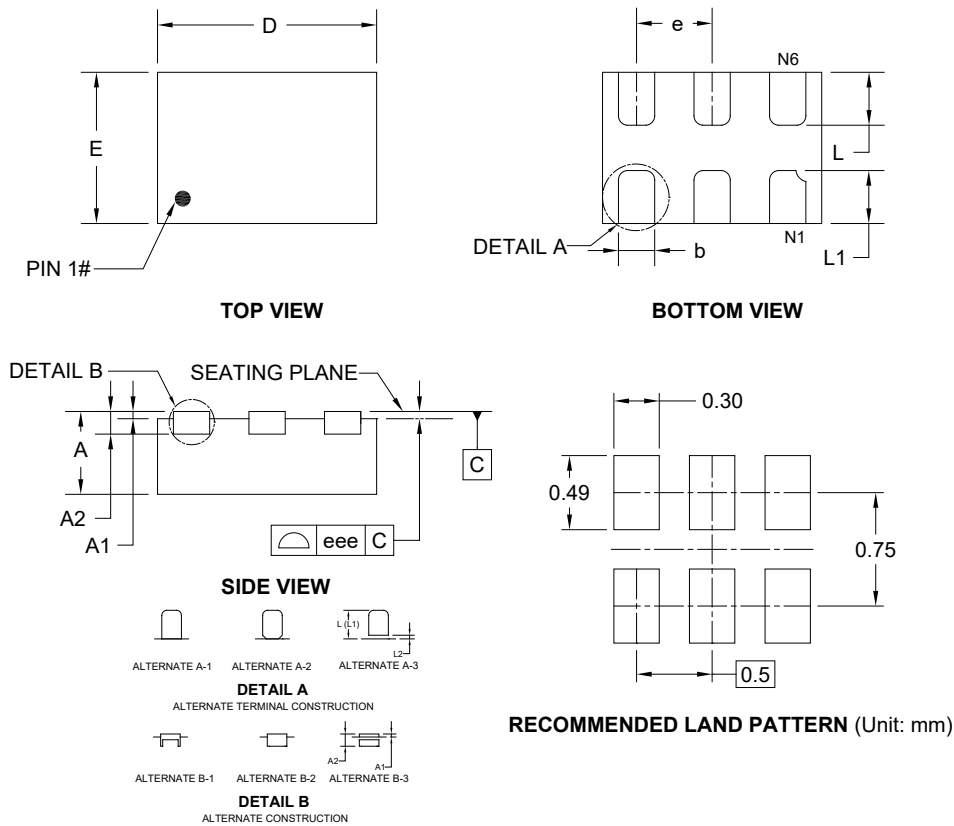
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.320	-	0.400
A1	0.000	-	0.050
A2	0.100 REF		
b	0.120	-	0.230
D	0.950	-	1.050
E	0.950	-	1.050
e	0.350 BSC		
k	0.150 MIN		
L	0.350	-	0.450
L1	0.350	-	0.450
L2	0.100 REF		
eee	0.050		

NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

UTDFN-1.45×1-6L



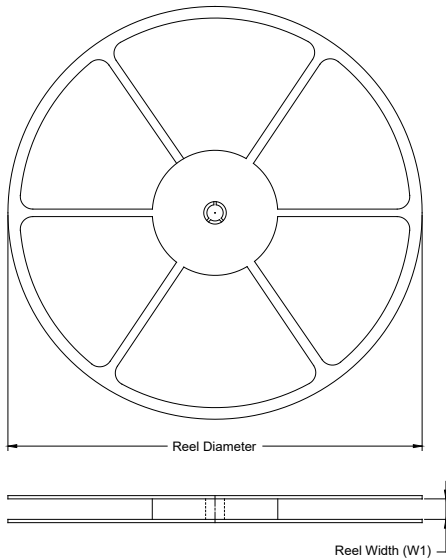
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.450	0.600	0.018	0.024
A1	0.000	0.050	0.000	0.002
A2	0.150 REF		0.006 REF	
D	1.374	1.526	0.054	0.060
E	0.924	1.076	0.036	0.042
b	0.150	0.300	0.006	0.012
e	0.500 TYP		0.020 TYP	
eee	0.050		0.002	
L	0.250	0.450	0.010	0.018
L1	0.250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

NOTE: This drawing is subject to change without notice.

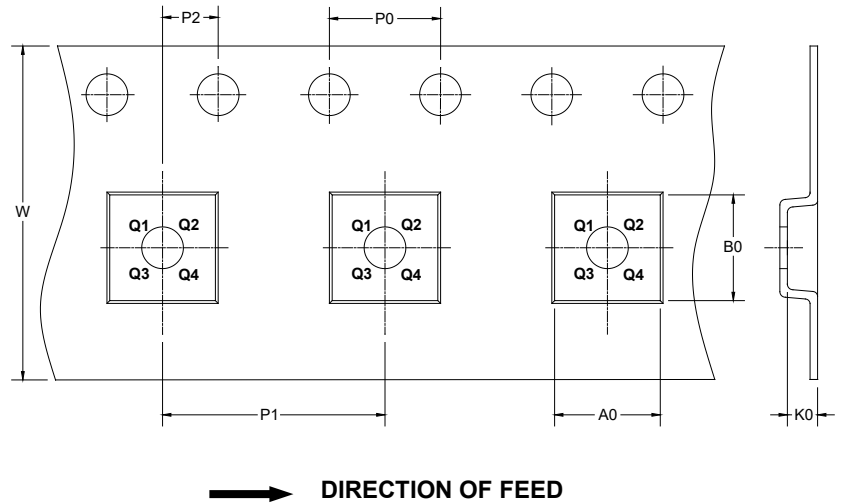
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

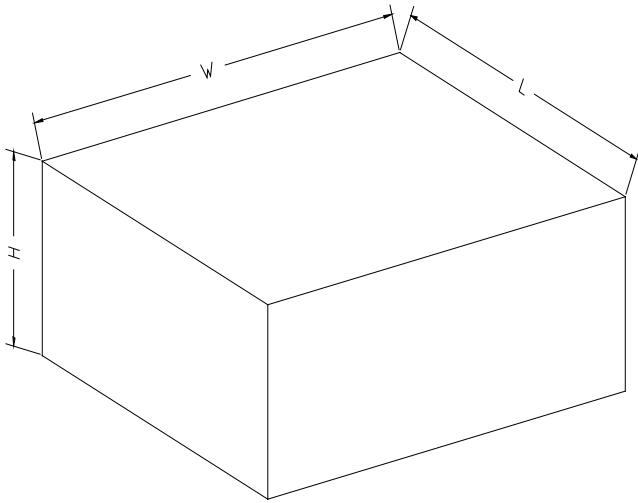
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
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
XTDFN-1×1-6L	7"	9.5	1.16	1.16	0.50	4.0	2.0	2.0	8.0	Q1
UTDFN-1.45×1-6L	7"	9.5	1.15	1.60	0.75	4.0	4.0	2.0	8.0	Q1

DD0001

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