

GENERAL DESCRIPTION

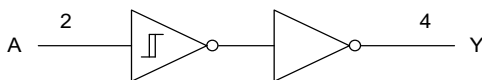
The 74AUP1G17 is a low power single Schmitt-trigger buffer and it operates supply voltage range from 0.8V to 3.6V. The device can keep very low static and dynamic power dissipation over the entire supply voltage range, so it can extend battery operation time and maintain good signal integrity.

This device is a separate gate with Schmitt-trigger input, which has the characteristics of slow input conversion and better input switch-noise immunity.

This device is highly suitable for partial power-down applications by using power-off leakage current (I_{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 74AUP1G17 is available in Green SC70-5, SOT-23-5 and UTDFN-1.45×1-6AL packages. It operates over an ambient temperature range of -40°C to +125°C.

LOGIC DIAGRAM



FEATURES

- **Wide Supply Voltage Range: 0.8V to 3.6V**
- **Inputs Accept Voltages Higher than the Supply Voltage**
- **+4mA/-4mA Output Current**
- **Low Quiescent Current: $I_{CC} = 0.1\mu A$ (TYP)**
- **Low Dynamic Power Dissipation: $C_{PD} = 7.5pF$ at $V_{CC} = 3.3V$ (TYP)**
- **Input with Schmitt-Trigger**
- **Support Partial Power-Down Mode**
- **-40°C to +125°C Operating Temperature Range**
- **Available in Green SC70-5, SOT-23-5 and UTDFN-1.45×1-6AL Packages**

APPLICATIONS

Industrial Equipment
 Computing: Server, PC & Notebooks
 Telecom Equipment
 Medical Equipment

FUNCTION TABLE

INPUT	OUTPUT
A	Y
H	H
L	L

H = High Voltage Level
 L = Low Voltage Level

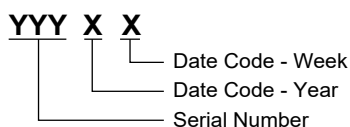
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
74AUP1G17	SC70-5	-40°C to +125°C	74AUP1G17XC5G/TR	081XX	Tape and Reel, 3000
	SOT-23-5	-40°C to +125°C	74AUP1G17XN5G/TR	08LXX	Tape and Reel, 3000
	UTDFN-1.45×1-6AL	-40°C to +125°C	74AUP1G17XUDL6G/TR	06X	Tape and Reel, 5000

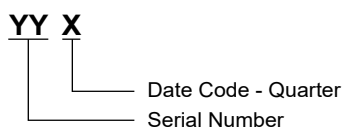
MARKING INFORMATION

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

SC70-5/SOT-23-5



UTDFN-1.45×1-6AL



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 ⁽¹⁾

Supply Voltage Range, V_{CC}	-0.5V to 4.6V
Input Voltage Range, V_I ⁽²⁾	-0.5V to 4.6V
Output Voltage Range, V_O ⁽²⁾	
Active Mode or Power-Off State	-0.5V to 4.6V
Input Clamp Current, I_{IK} ($V_I < 0V$)	-50mA
Output Clamp Current, I_{OK} ($V_O < 0V$)	-50mA
Continuous Output Current, I_O	±20mA
Continuous Current through V_{CC} or GND	±50mA
Junction Temperature ⁽³⁾	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility	
HBM	7000V
CDM	1000V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{CC}	0.8V to 3.6V
Input Voltage Range, V_I	0V to 3.6V
Output Voltage Range, V_O	
Active Mode	0V to V_{CC}
Power-Off State	0V to 3.6V
Output Current, I_O	±4mA
Input Transition Rise or Fall Rate, $\Delta t/\Delta V$	200ns/V (MAX)
Operating Temperature Range	-40°C to +125°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.
- The minimum input voltage ratings and output voltage ratings may be exceeded if the input and output current ratings are observed.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

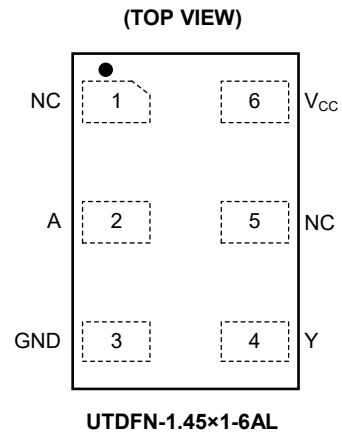
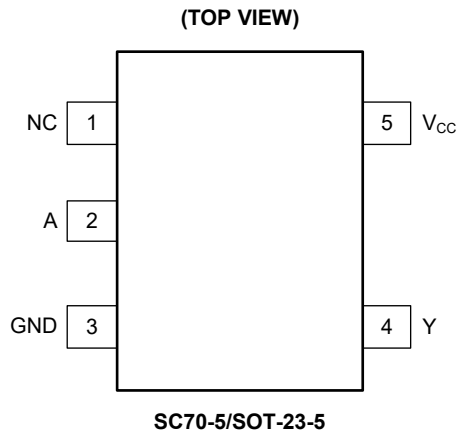
ESD SENSITIVITY CAUTION

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-1.45x1-6AL		
1	1, 5	NC	No Connection.
2	2	A	Data Input.
3	3	GND	Ground.
4	4	Y	Data Output.
5	6	V _{CC}	Supply Voltage.

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

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
High-Level Output Voltage	V _{OH}	V _{CC} = 0.8V to 3.6V, I _{OH} = -20μA	Full	V _{CC} - 0.1	V _{CC} - 0.01		V
		V _{CC} = 1.1V, I _{OH} = -1.1mA	Full	0.7 × V _{CC}	0.99		
		V _{CC} = 1.4V, I _{OH} = -1.7mA	Full	1.03	1.28		
		V _{CC} = 1.65V, I _{OH} = -1.9mA	Full	1.30	1.54		
		V _{CC} = 2.3V, I _{OH} = -2.3mA	Full	1.97	2.19		
		V _{CC} = 2.3V, I _{OH} = -3.1mA	Full	1.85	2.15		
		V _{CC} = 3.0V, I _{OH} = -2.7mA	Full	2.67	2.89		
		V _{CC} = 3.0V, I _{OH} = -4.0mA	Full	2.55	2.84		
Low-Level Output Voltage	V _{OL}	V _{CC} = 0.8V to 3.6V, I _{OL} = 20μA	Full		0.01	0.10	V
		V _{CC} = 1.1V, I _{OL} = 1.1mA	Full		0.09	0.3 × V _{CC}	
		V _{CC} = 1.4V, I _{OL} = 1.7mA	Full		0.10	0.37	
		V _{CC} = 1.65V, I _{OL} = 1.9mA	Full		0.10	0.35	
		V _{CC} = 2.3V, I _{OL} = 2.3mA	Full		0.10	0.33	
		V _{CC} = 2.3V, I _{OL} = 3.1mA	Full		0.14	0.45	
		V _{CC} = 3.0V, I _{OL} = 2.7mA	Full		0.11	0.33	
		V _{CC} = 3.0V, I _{OL} = 4.0mA	Full		0.16	0.45	
Input Leakage Current	I _I	A input, V _{CC} = 0V to 3.6V, V _I = GND to 3.6V	Full		±0.01	±0.5	μA
Power-Off Leakage Current	I _{OFF}	V _{CC} = 0V, V _I or V _O = 0V to 3.6V	Full		±0.01	±0.5	μA
Additional Power-Off Leakage Current	ΔI _{OFF}	V _{CC} = 0V to 0.2V, V _I or V _O = 0V to 3.6V	Full		±0.01	±0.6	μA
Supply Current	I _{CC}	V _{CC} = 0.8V to 3.6V, V _I = GND or V _{CC} to 3.6V, I _O = 0A	Full		0.1	0.9	μA
Additional Supply Current	ΔI _{CC}	V _{CC} = 3.3V, V _I = V _{CC} - 0.6V, I _O = 0A	+25°C		1	50	μA
Input Capacitance	C _i	V _{CC} = 0V, V _I = V _{CC} or GND	+25°C		5		pF
		V _{CC} = 3.6V, V _I = V _{CC} or GND	+25°C		5		
Output Capacitance	C _O	V _{CC} = 0V, V _O = GND	+25°C		4.5		pF

ELECTRICAL CHARACTERISTICS (continued)

PARAMETER	SYMBOL	CONDITIONS	-40°C to +85°C		-40°C to +125°C		UNITS
			MIN	MAX	MIN	MAX	
Positive-Going Input Threshold Voltage	V_{T+}	$V_{CC} = 0.8V$	0.30	0.60	0.30	0.62	V
		$V_{CC} = 1.1V$	0.53	0.90	0.53	0.92	
		$V_{CC} = 1.4V$	0.74	1.11	0.74	1.13	
		$V_{CC} = 1.65V$	0.91	1.29	0.91	1.31	
		$V_{CC} = 2.3V$	1.37	1.77	1.37	1.80	
		$V_{CC} = 3.0V$	1.88	2.29	1.88	2.32	
Negative-Going Input Threshold Voltage	V_{T-}	$V_{CC} = 0.8V$	0.10	0.60	0.10	0.60	V
		$V_{CC} = 1.1V$	0.26	0.65	0.26	0.65	
		$V_{CC} = 1.4V$	0.39	0.75	0.39	0.75	
		$V_{CC} = 1.65V$	0.47	0.84	0.47	0.84	
		$V_{CC} = 2.3V$	0.69	1.04	0.69	1.04	
		$V_{CC} = 3.0V$	0.88	1.26	0.88	1.27	
Hysteresis Voltage ($V_{T+} - V_{T-}$)	ΔV_T	$V_{CC} = 0.8V$	0.07	0.50	0.07	0.50	V
		$V_{CC} = 1.1V$	0.08	0.46	0.08	0.46	
		$V_{CC} = 1.4V$	0.18	0.56	0.18	0.56	
		$V_{CC} = 1.65V$	0.27	0.66	0.27	0.66	
		$V_{CC} = 2.3V$	0.53	0.92	0.53	0.92	
		$V_{CC} = 3.0V$	0.77	1.31	0.74	1.31	

DYNAMIC CHARACTERISTICS(See Figure 1 for test circuit. Full = -40°C to +125°C, all typical values are measured at T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN ⁽¹⁾	TYP	MAX ⁽¹⁾	UNITS	
Propagation Delay ⁽²⁾	t _{PD}	A to Y, C _L = 30pF	V _{CC} = 0.8V	Full		41.0	ns	
			V _{CC} = 1.2V ± 0.1V	Full	2.0	15.0		44.0
			V _{CC} = 1.5V ± 0.1V	Full	1.0	10.5		20.5
			V _{CC} = 1.8V ± 0.15V	Full	0.5	8.5		16.5
			V _{CC} = 2.5V ± 0.2V	Full	0.5	6.0		12.0
			V _{CC} = 3.3V ± 0.3V	Full	0.5	5.5		10.0
Power Dissipation Capacitance ⁽³⁾	C _{PD}	f = 10MHz	V _{CC} = 0.8V	+25°C		6.5	pF	
			V _{CC} = 1.2V ± 0.1V	+25°C		7.0		
			V _{CC} = 1.5V ± 0.1V	+25°C		7.0		
			V _{CC} = 1.8V ± 0.15V	+25°C		7.0		
			V _{CC} = 2.5V ± 0.2V	+25°C		7.0		
			V _{CC} = 3.3V ± 0.3V	+25°C		7.5		

NOTES:

- Specified by design and characterization, not production tested.
- t_{PD} is the same as t_{PLH} and t_{PHL}.
- C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

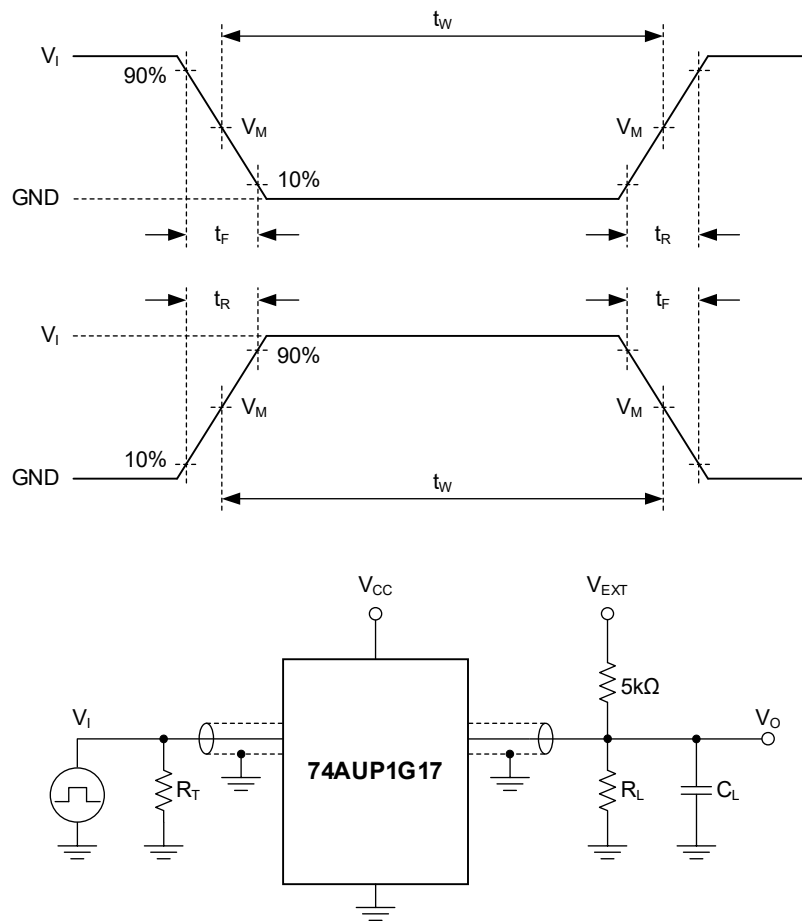
where:

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.

Σ(C_L × V_{CC}² × 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

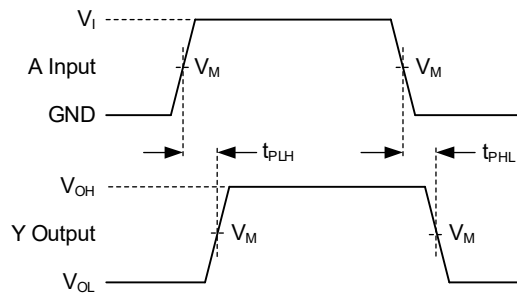
SUPPLY VOLTAGE	INPUT		LOAD		V_{EXT}		
V_{CC}	V_I	t_R, t_F	C_L	$R_L^{(1)(2)}$	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
0.8V to 3.6V	V_{CC}	$\leq 3.0\text{ns}$	30pF	5k Ω , 1M Ω	Open	GND	$2 \times V_{CC}$

NOTES:

1. $R_L = 5\text{k}\Omega$ is used to measure enable and disable times.

2. $R_L = 1\text{M}\Omega$ is used to measure propagation delays, setup and hold times and pulse width.

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
0.8V to 3.6V	V_{CC}	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

NOTE:

1. The measurement points should be V_{IH} or V_{IL} when the input rising or falling time exceeds 3.0ns.

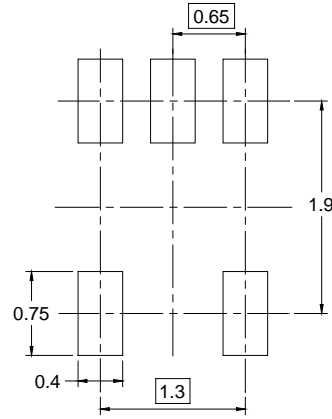
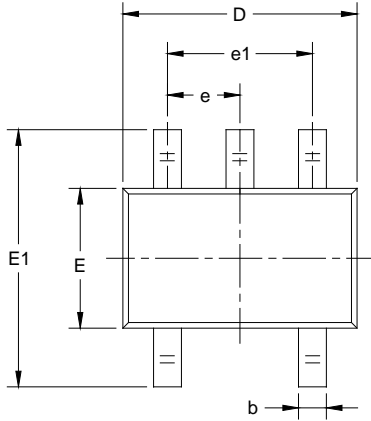
REVISION HISTORY

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

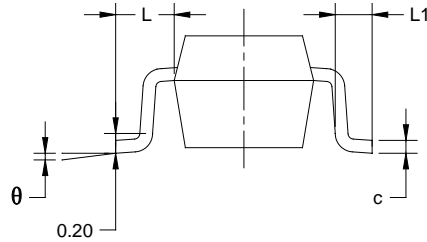
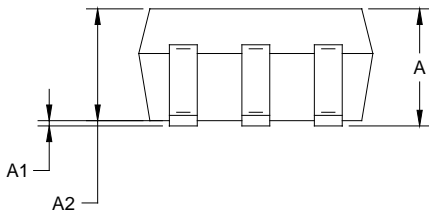
Changes from Original (DECEMBER 2023) to REV.A	Page
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PACKAGE OUTLINE DIMENSIONS

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°

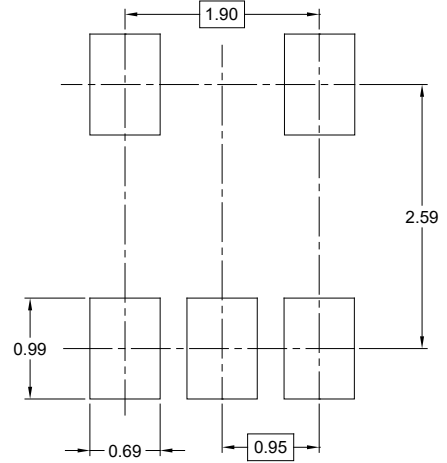
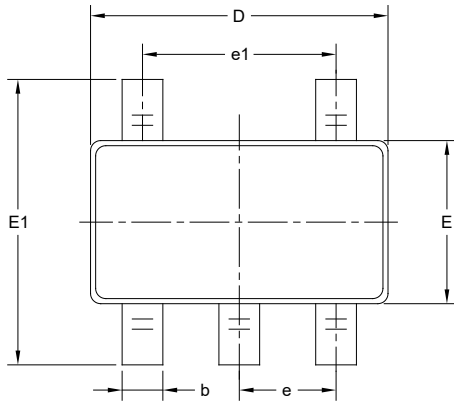
NOTES:

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

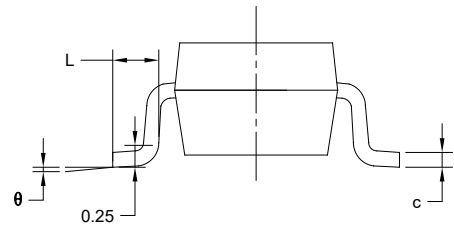
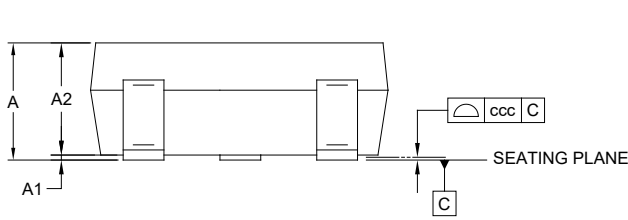
PACKAGE INFORMATION

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



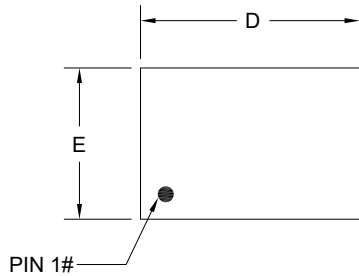
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

NOTES:

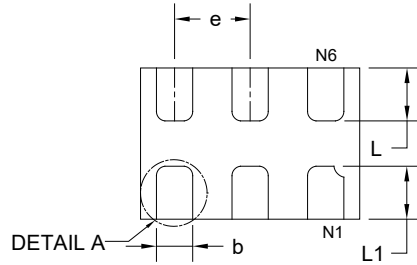
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

PACKAGE OUTLINE DIMENSIONS

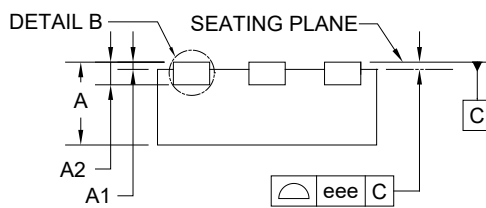
UTDFN-1.45×1-6AL



TOP VIEW



BOTTOM VIEW



SIDE VIEW

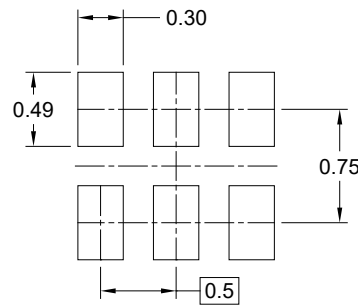


DETAIL A



DETAIL B

ALTERNATE CONSTRUCTION



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.450	-	0.600
A1	-0.004	-	0.050
A2	0.150 REF		
b	0.150	-	0.300
D	1.374	-	1.526
E	0.924	-	1.076
e	0.500 BSC		
L	0.250	-	0.450
L1	0.250	-	0.500
L2	0.000	-	0.100
eee	0.050		

NOTE: This drawing is subject to change without notice.

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
UTDFN-1.45×1-6AL	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