

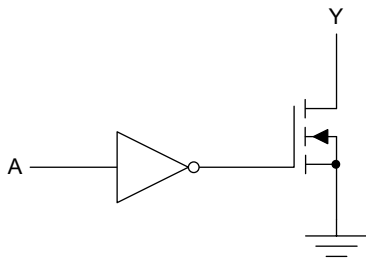
GENERAL DESCRIPTION

The 74AUP1G07 is a single buffer/driver with open-drain output. The device is specified to operate over the 0.8V to 3.6V 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 or active-high wired-AND function.

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 74AUP1G07 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 Output Current**
- **Low Quiescent Current: $I_{CC} = 0.1\mu A$ (TYP)**
- **Low Dynamic Power Dissipation: $C_{PD} = 2.5pF$ 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
- Medical Equipment
- Computing: Server, PC and Notebook
- Smartphone
- Telecom Equipment

FUNCTION TABLE

| INPUT | OUTPUT |
|-------|--------|
| A | Y |
| H | Z |
| L | L |

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

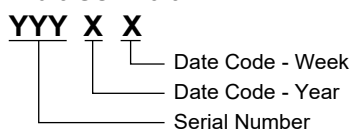
PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|-----------|---------------------|-----------------------------|--------------------|-----------------|---------------------|
| 74AUP1G07 | SC70-5 | -40°C to +125°C | 74AUP1G07XC5G/TR | 08HXX | Tape and Reel, 3000 |
| | SOT-23-5 | -40°C to +125°C | 74AUP1G07XN5G/TR | 08KXX | Tape and Reel, 3000 |
| | UTDFN-1.45×1-6AL | -40°C to +125°C | 74AUP1G07XUDL6G/TR | 05X | Tape and Reel, 3000 |

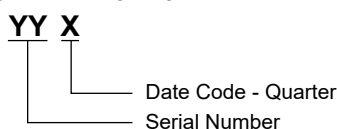
MARKING INFORMATION

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 or Power-Off State | 0V to 3.6V |
| Low-Level Output Current, I_{OL} | 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.

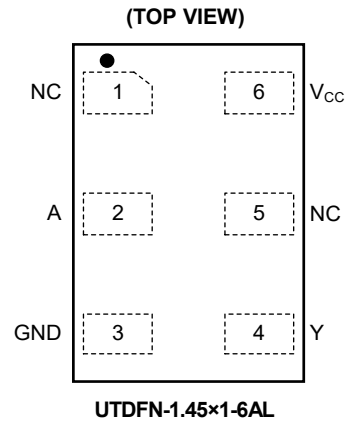
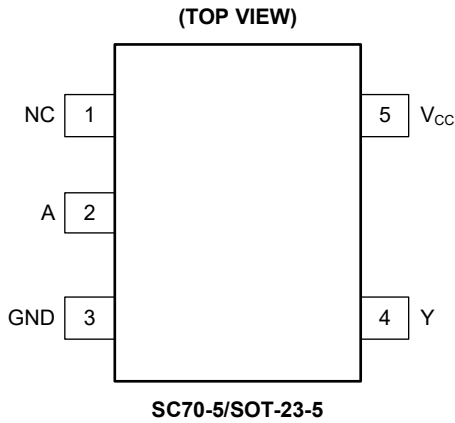
ESD SENSITIVITY CAUTION

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 $T_A = +25^\circ\text{C}$, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|--------------------------------------|------------------|--|-------|----------------------|------------|----------------------|---------------|
| High-Level Input Voltage | V_{IH} | $V_{CC} = 0.8\text{V}$ | Full | $0.70 \times V_{CC}$ | | | V |
| | | $V_{CC} = 0.9\text{V to } 1.95\text{V}$ | Full | $0.65 \times V_{CC}$ | | | |
| | | $V_{CC} = 2.3\text{V to } 2.7\text{V}$ | Full | 1.6 | | | |
| | | $V_{CC} = 3.0\text{V to } 3.6\text{V}$ | Full | 2.0 | | | |
| Low-Level Input Voltage | V_{IL} | $V_{CC} = 0.8\text{V}$ | Full | | | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9\text{V to } 1.95\text{V}$ | Full | | | $0.30 \times V_{CC}$ | |
| | | $V_{CC} = 2.3\text{V to } 2.7\text{V}$ | Full | | | 0.7 | |
| | | $V_{CC} = 3.0\text{V to } 3.6\text{V}$ | Full | | | 0.9 | |
| Low-Level Output Voltage | V_{OL} | $V_{CC} = 0.8\text{V to } 3.6\text{V}, I_{OL} = 20\mu\text{A}$ | Full | | 0.01 | 0.10 | V |
| | | $V_{CC} = 1.1\text{V}, I_{OL} = 1.1\text{mA}$ | Full | | 0.09 | $0.3 \times V_{CC}$ | |
| | | $V_{CC} = 1.4\text{V}, I_{OL} = 1.7\text{mA}$ | Full | | 0.10 | 0.37 | |
| | | $V_{CC} = 1.65\text{V}, I_{OL} = 1.9\text{mA}$ | Full | | 0.10 | 0.35 | |
| | | $V_{CC} = 2.3\text{V}, I_{OL} = 2.3\text{mA}$ | Full | | 0.10 | 0.33 | |
| | | $V_{CC} = 2.3\text{V}, I_{OL} = 3.1\text{mA}$ | Full | | 0.14 | 0.45 | |
| | | $V_{CC} = 3.0\text{V}, I_{OL} = 2.7\text{mA}$ | Full | | 0.11 | 0.33 | |
| | | $V_{CC} = 3.0\text{V}, I_{OL} = 4.0\text{mA}$ | Full | | 0.16 | 0.45 | |
| Input Leakage Current | I_I | A input, $V_{CC} = 0\text{V to } 3.6\text{V}, V_I = \text{GND to } 3.6\text{V}$ | Full | | ± 0.01 | ± 0.5 | μA |
| Off-State Output Current | I_{OZ} | $V_{CC} = 0\text{V to } 3.6\text{V}, V_I = V_{IH}, V_O = 0\text{V to } 3.6\text{V}$ | Full | | ± 0.01 | ± 0.5 | μA |
| Power-Off Leakage Current | I_{OFF} | $V_{CC} = 0\text{V}, V_I \text{ or } V_O = 0\text{V to } 3.6\text{V}$ | Full | | ± 0.01 | ± 0.5 | μA |
| Additional Power-Off Leakage Current | ΔI_{OFF} | $V_{CC} = 0\text{V to } 0.2\text{V}, V_I \text{ or } V_O = 0\text{V to } 3.6\text{V}$ | Full | | ± 0.01 | ± 0.6 | μA |
| Supply Current | I_{CC} | $V_{CC} = 0.8\text{V to } 3.6\text{V}, V_I = \text{GND or } V_{CC} \text{ to } 3.6\text{V}, I_O = 0\text{A}$ | Full | | 0.1 | 0.9 | μA |
| Additional Supply Current | ΔI_{CC} | $V_{CC} = 3.3\text{V}, V_I = V_{CC} - 0.6\text{V}, I_O = 0\text{A}$ | Full | | 0.5 | 50 | μA |
| Input Capacitance | C_i | $V_{CC} = 0\text{V}, V_I = V_{CC} \text{ or } \text{GND}$ | +25°C | | 4 | | pF |
| | | $V_{CC} = 3.6\text{V}, V_I = V_{CC} \text{ or } \text{GND}$ | +25°C | | 4 | | |
| Output Capacitance | C_o | $V_{CC} = 0\text{V}, V_O = \text{GND}$ | +25°C | | 4.5 | | pF |

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 _{PLZ} | A to Y, C _L = 30pF | V _{CC} = 0.8V | Full | | 21.0 | | ns |
| | | | V _{CC} = 1.2V ± 0.1V | Full | 1.0 | 12.0 | 20.7 | |
| | | | V _{CC} = 1.5V ± 0.1V | Full | 1.0 | 9.5 | 16.0 | |
| | | | V _{CC} = 1.8V ± 0.15V | Full | 1.0 | 10.0 | 18.0 | |
| | | | V _{CC} = 2.5V ± 0.2V | Full | 0.5 | 7.0 | 14.0 | |
| | | | V _{CC} = 3.3V ± 0.3V | Full | 0.5 | 9.5 | 17.0 | |
| | t _{PZL} | A to Y, C _L = 30pF | V _{CC} = 0.8V | Full | | 32.0 | | ns |
| | | | V _{CC} = 1.2V ± 0.1V | Full | 1.0 | 12.0 | 28.5 | |
| | | | V _{CC} = 1.5V ± 0.1V | Full | 0.5 | 8.5 | 14.5 | |
| | | | V _{CC} = 1.8V ± 0.15V | Full | 0.5 | 6.5 | 12.1 | |
| | | | V _{CC} = 2.5V ± 0.2V | Full | 0.5 | 5.0 | 8.5 | |
| | | | V _{CC} = 3.3V ± 0.3V | Full | 0.5 | 4.0 | 9.0 | |
| Power Dissipation Capacitance ⁽³⁾ | C _{PD} | f = 10MHz | V _{CC} = 0.8V | +25°C | | 2.0 | | pF |
| | | | V _{CC} = 1.2V ± 0.1V | +25°C | | 2.0 | | |
| | | | V _{CC} = 1.5V ± 0.1V | +25°C | | 2.0 | | |
| | | | V _{CC} = 1.8V ± 0.15V | +25°C | | 2.0 | | |
| | | | V _{CC} = 2.5V ± 0.2V | +25°C | | 2.5 | | |
| | | | V _{CC} = 3.3V ± 0.3V | +25°C | | 2.5 | | |

NOTES:

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

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

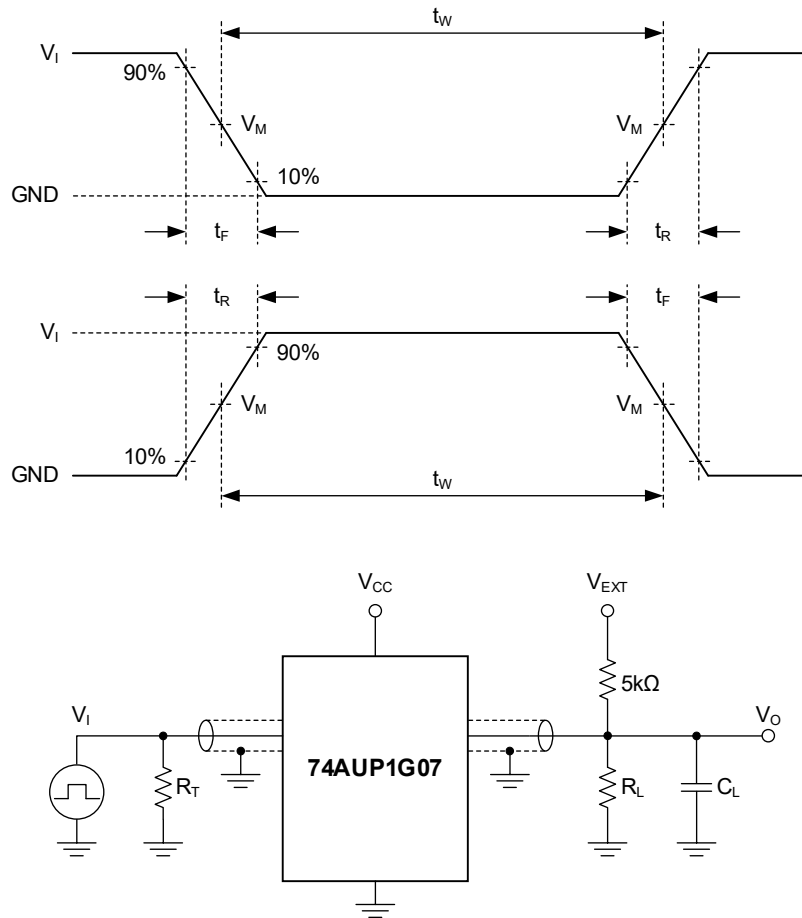
where:

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

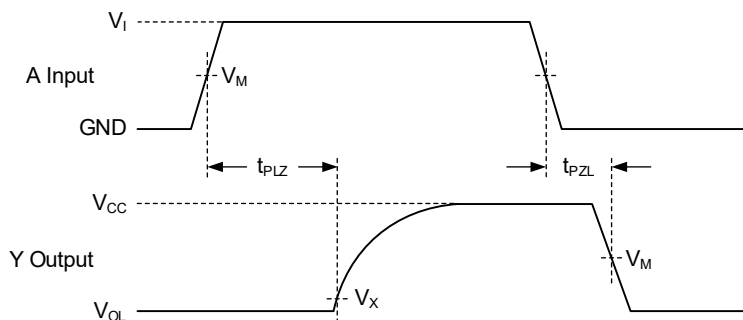
| SUPPLY VOLTAGE | INPUT | | LOAD | | V_{EXT} | | |
|----------------|----------|---------------------|-------|----------------|--------------------|--------------------|--------------------|
| V_{CC} | V_I | t_R, t_F | C_L | $R_L^{(1)(2)}$ | t_{PLH}, t_{PHL} | t_{PZH}, t_{PHZ} | t_{PZL}, t_{PLZ} |
| 0.8V to 3.6V | V_{CC} | $\leq 3.0\text{ns}$ | 30pF | 5kΩ, 1MΩ | 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_I | $V_M^{(1)}$ | V_M | V_X |
| 0.8V to 1.6V | V_{CC} | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.1V$ |
| 1.65V to 2.7V | V_{CC} | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15V$ |
| 3.0V to 3.6V | V_{CC} | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.3V$ |

NOTE:

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

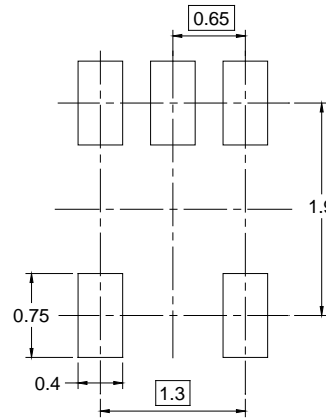
REVISION HISTORY

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

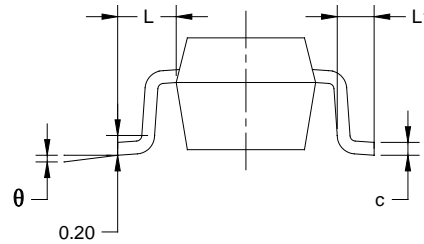
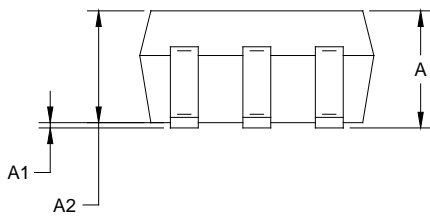
| Changes from Original (DECEMBER 2023) to REV.A | Page |
|--|------|
| Changed from product preview to production data..... | All |

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° |

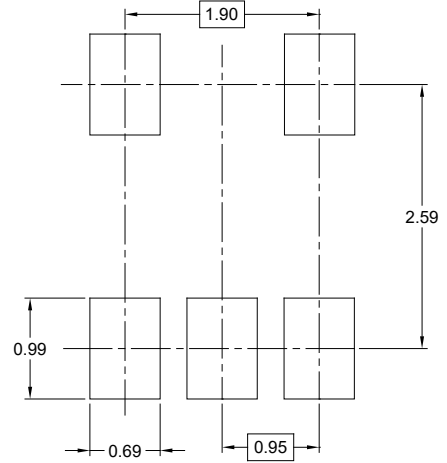
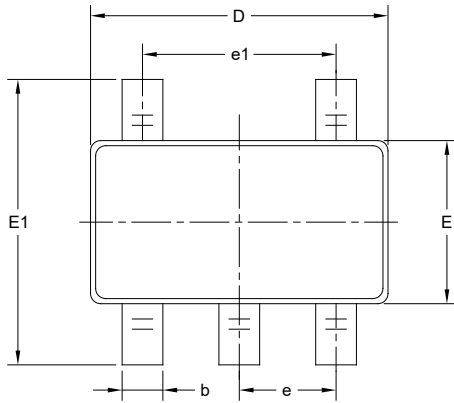
NOTES:

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

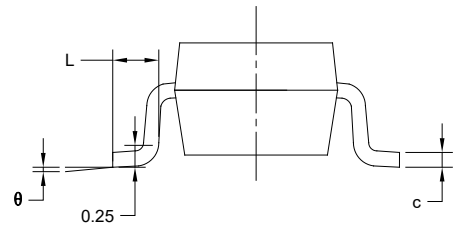
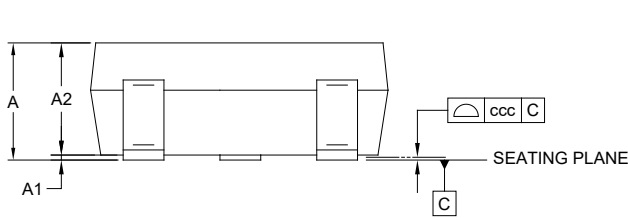
PACKAGE INFORMATION

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



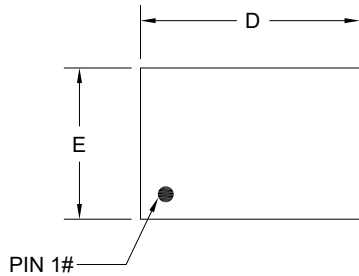
| Symbol | Dimensions In Millimeters | | |
|----------|---------------------------|-----|-------|
| | MIN | MOD | MAX |
| A | - | - | 1.450 |
| A1 | 0.000 | - | 0.150 |
| A2 | 0.900 | - | 1.300 |
| b | 0.300 | - | 0.500 |
| c | 0.080 | - | 0.220 |
| D | 2.750 | - | 3.050 |
| E | 1.450 | - | 1.750 |
| 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:

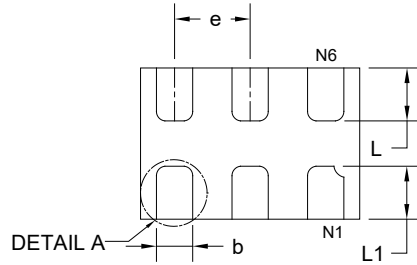
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

PACKAGE OUTLINE DIMENSIONS

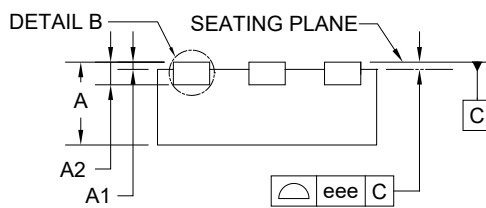
UTDFN-1.45×1-6AL



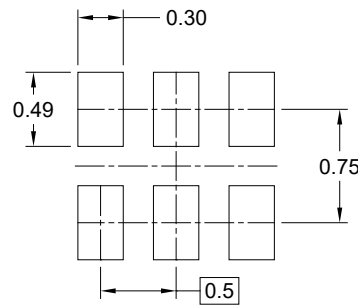
TOP VIEW



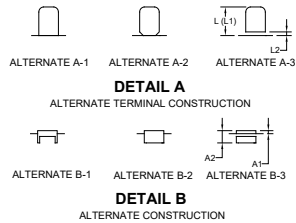
BOTTOM VIEW



SIDE VIEW



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.

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 |
| 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