

# TinyLogic UHS 2-Input NAND Gate, Open Drain Output NC7SZ38

## Description

The NC7SZ38 is a single 2-Input NAND gate with open drain output stage from onsemi's Ultra-High Speed Series of TinyLogic. The device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive while maintaining low static power dissipation over a very broad  $V_{CC}$  operating range. The device is specified to operate over the 1.65 V to 5.5 V  $V_{CC}$  range. The inputs and output are high impedance when  $V_{CC}$  is 0 V. Inputs tolerate voltages up to 5.5 V, independent of  $V_{CC}$  when in the high impedance state. The open drain output stage tolerates voltages up to 6 V independent of  $V_{CC}$  when in the high impedance state.

## Features

- Ultra-High Speed:  $t_{PD} = 2.2$  ns (Typical) into 50 pF at 5 V  $V_{CC}$
- Open Drain Output Stage for OR Tied Applications
- High Output Sink Drive:  $\pm 24$  mA at 3 V  $V_{CC}$
- Broad  $V_{CC}$  Operating Range: 1.65 V to 5.5 V
- Matches Performance of LCX Operated at 3.3 V  $V_{CC}$
- Power Down High-Impedance Inputs / Outputs
- Over-Voltage Tolerance Inputs Facilitate 5 V to 3 V Translation
- Proprietary Noise / EMI Reduction Circuitry
- Ultra-Small MicroPak™ Packages
- Space-Saving SOT23-5, SC-74A and SC-88A Packages
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

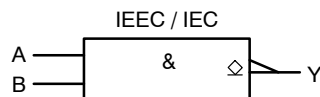
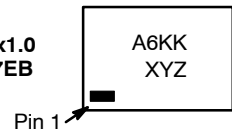


Figure 1. Logic Symbol

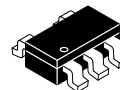
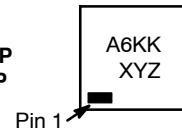
## MARKING DIAGRAMS



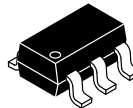
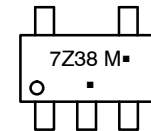
SIP6 1.45x1.0  
CASE 127EB



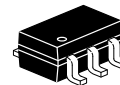
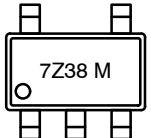
UDFN6  
1.0X1.0, 0.35P  
CASE 517DP



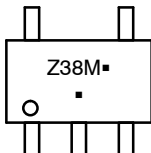
SC-74A  
CASE 318BQ



SOT23-5  
CASE 527AH



SC-88A  
CASE 419A-02



A6, 7Z38, Z38 = Specific Device Code  
KK = 2-Digit Lot Run Traceability Code  
XY = 2-Digit Date Code Format  
Z = Assembly Plant Code  
M = Data Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or position may vary depending upon manufacturing location.

## ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 5.

NC7SZ38

Pin Configurations

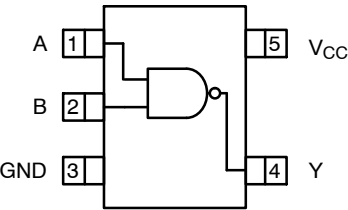


Figure 2. SOT23-5, SC-88A and SC-74A (Top View)

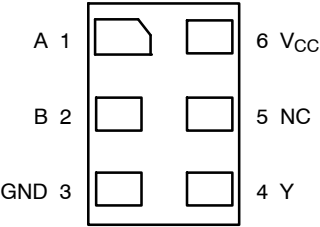


Figure 3. MicroPak (Top Through View)

PIN DEFINITIONS

| Pin # SC-88A / SC-74A / SOT23-5 | Pin # MicroPak | Name            | Description    |
|---------------------------------|----------------|-----------------|----------------|
| 1                               | 1              | A               | Input          |
| 2                               | 2              | B               | Input          |
| 3                               | 3              | GND             | Ground         |
| 4                               | 4              | Y               | Output         |
| 5                               | 6              | V <sub>CC</sub> | Supply Voltage |
|                                 | 5              | NC              | No Connect     |

FUNCTION TABLE

| Inputs |   | Output |
|--------|---|--------|
| A      | B | Y      |
| L      | L | *H     |
| L      | H | *H     |
| H      | L | *H     |
| H      | H | L      |

H = HIGH Logic Level  
L = LOW Logic Level  
\*H = High Impedance Output State, Open Drain

# ABSOLUTE MAXIMUM RATINGS

| Symbol                              | Parameter                                         |                        | Min  | Max  | Unit |
|-------------------------------------|---------------------------------------------------|------------------------|------|------|------|
| V <sub>CC</sub>                     | Supply Voltage                                    |                        | -0.5 | 6.5  | V    |
| V <sub>IN</sub>                     | DC Input Voltage                                  |                        | -0.5 | 6.5  | V    |
| V <sub>OUT</sub>                    | DC Output Voltage                                 |                        | -0.5 | 6.5  | V    |
| I <sub>IK</sub>                     | DC Input Diode Current                            | V <sub>IN</sub> < 0 V  | -    | -50  | mA   |
| I <sub>OK</sub>                     | DC Output Diode Current                           | V <sub>OUT</sub> < 0 V | -    | -50  | mA   |
| I <sub>OUT</sub>                    | DC Output Current                                 |                        | -    | ±50  | mA   |
| I <sub>CC</sub> or I <sub>GND</sub> | DC V <sub>CC</sub> or Ground Current              |                        | -    | ±50  | mA   |
| T <sub>STG</sub>                    | Storage Temperature Range                         |                        | -65  | +150 | °C   |
| T <sub>J</sub>                      | Junction Temperature Under Bias                   |                        | -    | +150 | °C   |
| T <sub>L</sub>                      | Junction Lead Temperature (Soldering, 10 Seconds) |                        | -    | +260 | °C   |
| P <sub>D</sub>                      | Power Dissipation in Still Air                    | SC-74A / SOT23-5       | -    | 390  | mW   |
|                                     |                                                   | SC-88A                 | -    | 332  |      |
|                                     |                                                   | MicroPak-6             | -    | 812  |      |
|                                     |                                                   | MicroPak2™-6           | -    | 812  |      |
| ESD                                 | Human Body Model, JEDEC: JESD22-A114              |                        | -    | 4000 | V    |
|                                     | Charge Device Model, JEDEC: JESD22-C101           |                        | -    | 2000 |      |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

# RECOMMENDED OPERATING CONDITIONS

| Symbol                          | Parameter                     | Conditions                            | Min  | Max | Unit |
|---------------------------------|-------------------------------|---------------------------------------|------|-----|------|
| V <sub>CC</sub>                 | Supply Voltage Operating      |                                       | 1.65 | 5.5 | V    |
|                                 | Supply Voltage Data Retention |                                       | 1.50 | 5.5 |      |
| V <sub>IN</sub>                 | Input Voltage                 |                                       | 0    | 5.5 | V    |
| V <sub>OUT</sub>                | Output Voltage                |                                       | 0    | 5.5 | V    |
| T <sub>A</sub>                  | Operating Temperature         |                                       | -40  | +85 | °C   |
| t <sub>r</sub> , t <sub>f</sub> | Input Rise and Fall Times     | V <sub>CC</sub> = 1.8 V, 2.5 V ±0.2 V | 0    | 20  | ns/V |
|                                 |                               | V <sub>CC</sub> = 3.3 V ±0.3 V        | 0    | 10  |      |
|                                 |                               | V <sub>CC</sub> = 5.0 V ±0.5 V        | 0    | 5   |      |
| θ <sub>JA</sub>                 | Thermal Resistance            | SC-74A / SOT23-5                      | -    | 320 | °C/W |
|                                 |                               | SC-88A                                | -    | 377 |      |
|                                 |                               | MicroPak-6                            | -    | 154 |      |
|                                 |                               | MicroPak2-6                           | -    | 154 |      |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

1. Unused inputs must be held HIGH or LOW. They may not float.

## DC ELECTRICAL CHARACTERISTICS

| Symbol           | Parameter                 | V <sub>CC</sub> (V) | Conditions                                                                         | T <sub>A</sub> = +25°C |      |                      | T <sub>A</sub> = -40 to +85°C |                      | Unit |
|------------------|---------------------------|---------------------|------------------------------------------------------------------------------------|------------------------|------|----------------------|-------------------------------|----------------------|------|
|                  |                           |                     |                                                                                    | Min                    | Typ  | Max                  | Min                           | Max                  |      |
| V <sub>IH</sub>  | HIGH Level Input Voltage  | 1.65 to 1.95        |                                                                                    | 0.65 V <sub>CC</sub>   | –    | –                    | 0.65 V <sub>CC</sub>          | –                    | V    |
|                  |                           | 2.30 to 5.50        |                                                                                    | 0.70 V <sub>CC</sub>   | –    | –                    | 0.70 V <sub>CC</sub>          | –                    |      |
| V <sub>IL</sub>  | LOW Level Input Voltage   | 1.65 to 1.95        |                                                                                    | –                      | –    | 0.35 V <sub>CC</sub> | –                             | 0.35 V <sub>CC</sub> | V    |
|                  |                           | 2.30 to 5.50        |                                                                                    | –                      | –    | 0.30 V <sub>CC</sub> | –                             | 0.30 V <sub>CC</sub> |      |
| I <sub>LKG</sub> | HIGH Level Output Leakage | 5.50                | V <sub>IN</sub> = V <sub>IL</sub> ,<br>V <sub>OUT</sub> = V <sub>CC</sub> or GND   | –                      | –    | ±5                   | –                             | ±10                  | µA   |
| V <sub>OL</sub>  | LOW Level Output Voltage  | 1.65                | V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> ,<br>I <sub>OL</sub> = 100 µA | –                      | 0.00 | 0.10                 | –                             | 0.10                 | V    |
|                  |                           | 1.80                |                                                                                    | –                      | 0.00 | 0.10                 | –                             | 0.10                 |      |
|                  |                           | 2.30                |                                                                                    | –                      | 0.00 | 0.10                 | –                             | 0.10                 |      |
|                  |                           | 3.00                |                                                                                    | –                      | 0.00 | 0.10                 | –                             | 0.10                 |      |
|                  |                           | 4.50                |                                                                                    | –                      | 0.00 | 0.10                 | –                             | 0.10                 |      |
|                  |                           | 1.65                | I <sub>OL</sub> = 4 mA                                                             | –                      | 0.80 | 0.24                 | –                             | 0.24                 |      |
|                  |                           | 2.30                | I <sub>OL</sub> = 8 mA                                                             | –                      | 0.10 | 0.30                 | –                             | 0.30                 |      |
|                  |                           | 3.00                | I <sub>OL</sub> = 16 mA                                                            | –                      | 0.15 | 0.40                 | –                             | 0.40                 |      |
|                  |                           | 3.00                | I <sub>OL</sub> = 24 mA                                                            | –                      | 0.22 | 0.55                 | –                             | 0.55                 |      |
|                  |                           | 4.50                | I <sub>OL</sub> = 32 mA                                                            | –                      | 0.22 | 0.55                 | –                             | 0.55                 |      |
| I <sub>IN</sub>  | Input Leakage Current     | 5.50                | V <sub>IN</sub> = 5.5 V, GND                                                       | –                      | –    | ±1                   | –                             | ±10                  | µA   |
| I <sub>OFF</sub> | Power Off Leakage Current | 0                   | V <sub>IN</sub> or V <sub>OUT</sub> = 5.5 V                                        | –                      | –    | 1                    | –                             | 10                   | µA   |
| I <sub>CC</sub>  | Quiescent Supply Current  | 5.50                | V <sub>IN</sub> = 5.5 V, GND                                                       | –                      | –    | 2                    | –                             | 20                   | µA   |

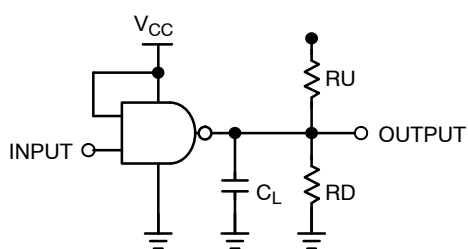
## AC ELECTRICAL CHARACTERISTICS

| Symbol           | Parameter                                            | V <sub>CC</sub> (V) | Conditions                                                                                                             | T <sub>A</sub> = +25°C |     |      | T <sub>A</sub> = -40 to +85°C |      | Unit |
|------------------|------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------|------------------------|-----|------|-------------------------------|------|------|
|                  |                                                      |                     |                                                                                                                        | Min                    | Typ | Max  | Min                           | Max  |      |
| t <sub>pZL</sub> | Propagation Delay<br>(Figure 4, 5)                   | 1.65                | C <sub>L</sub> = 50 pF,<br>R <sub>U</sub> = 500 Ω,<br>R <sub>D</sub> = 500 Ω,<br>V <sub>IN</sub> = 2 · V <sub>CC</sub> | –                      | 6.5 | 12.7 | –                             | 13.2 | ns   |
|                  |                                                      | 1.80                |                                                                                                                        | –                      | 5.4 | 10.5 | –                             | 11.0 |      |
|                  |                                                      | 2.50 ±0.20          |                                                                                                                        | –                      | 3.5 | 7.0  | –                             | 7.5  |      |
|                  |                                                      | 3.30 ±0.30          |                                                                                                                        | –                      | 2.8 | 5.0  | –                             | 5.2  |      |
|                  |                                                      | 5.00 ±0.50          |                                                                                                                        | –                      | 2.2 | 4.3  | –                             | 4.5  |      |
| t <sub>pLZ</sub> |                                                      | 1.65                | C <sub>L</sub> = 50 pF,<br>R <sub>U</sub> = 500 Ω,<br>R <sub>D</sub> = 500 Ω,<br>V <sub>IN</sub> = 2 · V <sub>CC</sub> | –                      | 5.5 | 12.7 | –                             | 13.2 | ns   |
|                  |                                                      | 1.80                |                                                                                                                        | –                      | 4.6 | 10.5 | –                             | 11.0 |      |
|                  |                                                      | 2.50 ±0.20          |                                                                                                                        | –                      | 3.0 | 7.0  | –                             | 7.5  |      |
|                  |                                                      | 3.30 ±0.30          |                                                                                                                        | –                      | 2.1 | 5.0  | –                             | 5.2  |      |
|                  |                                                      | 5.00 ±0.50          |                                                                                                                        | –                      | 1.3 | 4.3  | –                             | 4.5  |      |
| C <sub>IN</sub>  | Input Capacitance                                    | 0.00                |                                                                                                                        | –                      | 4.0 | –    | –                             | –    | pF   |
| C <sub>OUT</sub> | Output Capacitance                                   | 0.00                |                                                                                                                        | –                      | 5.0 | –    | –                             | –    | pF   |
| C <sub>PD</sub>  | Power Dissipation Capacitance<br>(Note 2) (Figure 6) | 3.30                |                                                                                                                        | –                      | 5.1 | –    | –                             | –    | pF   |
|                  |                                                      | 5.00                |                                                                                                                        | –                      | 7.3 | –    | –                             | –    |      |

2. C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I<sub>CCD</sub>) at no output loading and operating at 50% duty cycle. C<sub>PD</sub> is related to I<sub>CCD</sub> dynamic operating current by the expression:  
 $I_{CCD} = (C_{PD}) (V_{CC}) (f_{IN}) + (I_{CCstatic})$ .



## NC7SZ38



NOTE:

3.  $C_L$  includes load and stray capacitance.  
Input PRR = 10 MHz  $t_W = 500$  ns.

Figure 4. AC Test Circuit

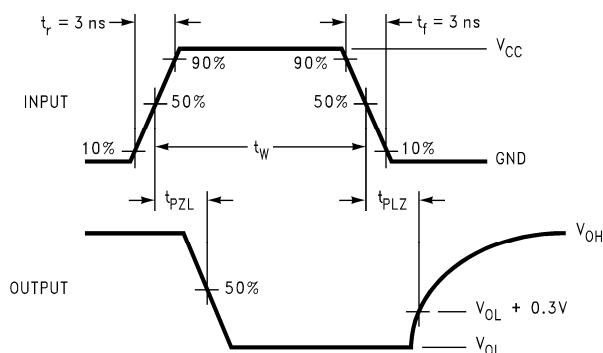
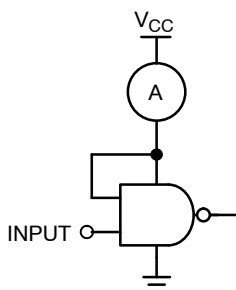


Figure 5. AC Waveforms



NOTE:

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

Figure 6. Test Circuit

### DEVICE ORDERING INFORMATION

| Device     | Top Mark | Packages         | Shipping†          |
|------------|----------|------------------|--------------------|
| NC7SZ38M5X | 7Z38     | SC-74A           | 3000 / Tape & Reel |
| NC7SZ38P5X | Z38      | SC-88A           | 3000 / Tape & Reel |
| NC7SZ38L6X | A6       | SIP6, MicroPak   | 5000 / Tape & Reel |
| NC7SZ38FHX | A6       | UDFN6, MicroPak2 | 5000 / Tape & Reel |

### DISCONTINUED (Note 5)

|                   |      |                  |                    |
|-------------------|------|------------------|--------------------|
| NC7SZ38M5X-L22090 | 7Z38 | SOT23-5          | 3000 / Tape & Reel |
| NC7SZ38P5X-L22057 | Z38  | SC-88A           | 3000 / Tape & Reel |
| NC7SZ38L6X-L22175 | A6   | SIP6, MicroPak   | 5000 / Tape & Reel |
| NC7SZ38FHX-L22175 | A6   | UDFN6, MicroPak2 | 5000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

5. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

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**SIP6 1.45X1.0**  
CASE 127EB  
ISSUE O

DATE 31 AUG 2016

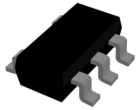


## NOTES:

1. CONFORMS TO JEDEC STANDARD MO-252 VARIATION UAAD
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y14.5M-2009
4. PIN ONE IDENTIFIER IS 2X LENGTH OF ANY OTHER LINE IN THE MARK CODE LAYOUT.

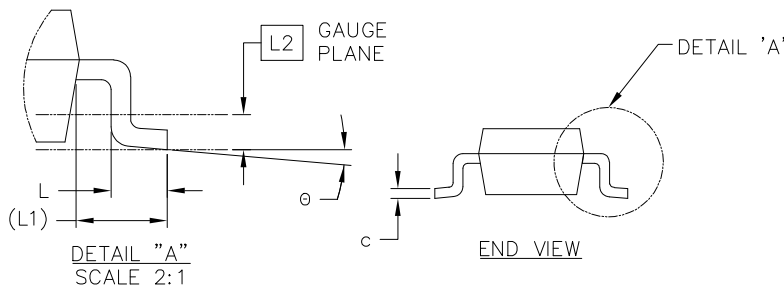
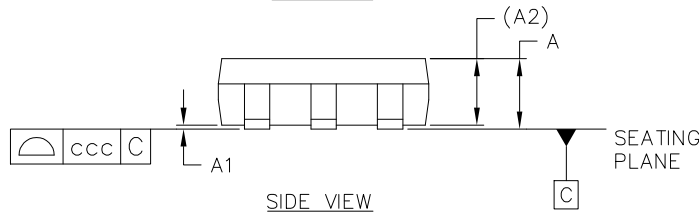
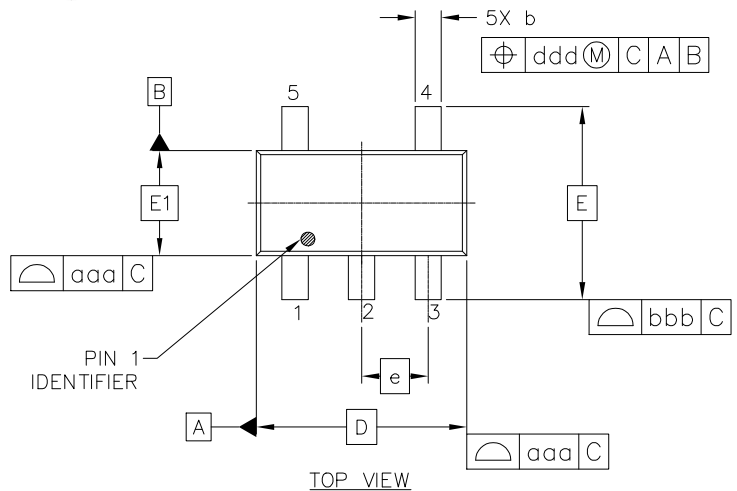
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**SC-74A-5 3.00x1.50x0.95, 0.95P**  
**CASE 318BQ**  
**ISSUE D**

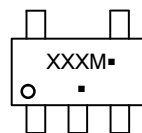
DATE 13 APR 2026



**NOTES:**

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15mm PER SIDE.

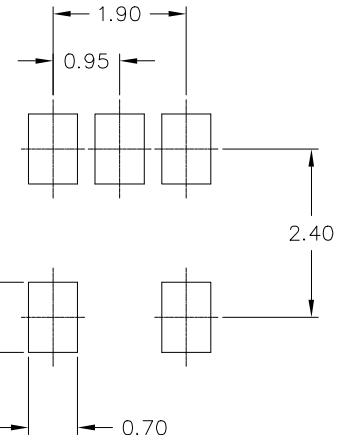
**GENERIC MARKING DIAGRAM\***



XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

| MILLIMETERS                 |          |      |      |
|-----------------------------|----------|------|------|
| DIM                         | MIN      | NOM  | MAX  |
| A                           | 0.90     | 1.00 | 1.10 |
| A1                          | 0.01     | 0.05 | 0.10 |
| A2                          | 0.95 REF |      |      |
| b                           | 0.25     | 0.37 | 0.50 |
| c                           | 0.10     | 0.18 | 0.26 |
| D                           | 3.00 BSC |      |      |
| E                           | 2.75 BSC |      |      |
| E1                          | 1.50 BSC |      |      |
| e                           | 0.95 BSC |      |      |
| L                           | 0.20     | 0.40 | 0.60 |
| L1                          | 0.60 REF |      |      |
| L2                          | 0.25 BSC |      |      |
| θ                           | 0°       | 5°   | 10°  |
| TOLERANCE FORM AND POSITION |          |      |      |
| aaa                         | 0.15     |      |      |
| bbb                         | 0.15     |      |      |
| ccc                         | 0.05     |      |      |
| ddd                         | 0.20     |      |      |



**RECOMMENDED MOUNTING FOOTPRINT**

\*For additional information in our Pb-Free Strategy and Soldering details, Please download the onsemi Soldering and Mounting Techniques Reference manual. SOLDERRM/D.

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

|                         |                                       |                                                                                                                                                                                  |
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| <b>DESCRIPTION:</b>     | <b>SC-74A-5 3.00x1.50x0.95, 0.95P</b> | <b>PAGE 1 OF 1</b>                                                                                                                                                               |

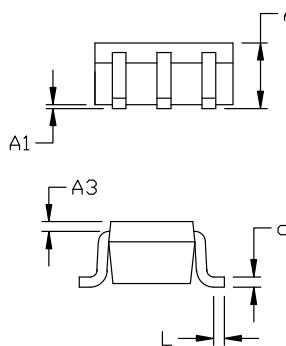
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SCALE 2:1

**SC-88A (SC-70-5/SOT-353)**  
CASE 419A-02  
ISSUE M

DATE 11 APR 2023

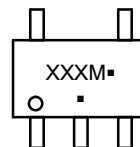

RECOMMENDED  
MOUNTING FOOTPRINT

\* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETERS
- 419A-01 OBSOLETE. NEW STANDARD 419A-02
- DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.1016MM PER SIDE.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 0.80        | 0.95 | 1.10 |
| A1  | ---         | ---  | 0.10 |
| A3  | 0.20 REF    |      |      |
| b   | 0.10        | 0.20 | 0.30 |
| c   | 0.10        | ---  | 0.25 |
| D   | 1.80        | 2.00 | 2.20 |
| E   | 2.00        | 2.10 | 2.20 |
| E1  | 1.15        | 1.25 | 1.35 |
| e   | 0.65 BSC    |      |      |
| L   | 0.10        | 0.15 | 0.30 |

**GENERIC MARKING  
DIAGRAM\***


\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

XXX = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

## STYLE 1:

- PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

## STYLE 2:

- PIN 1. ANODE
2. EMITTER
3. BASE
4. COLLECTOR
5. CATHODE

## STYLE 3:

- PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. CATHODE 1

## STYLE 4:

- PIN 1. SOURCE 1
2. DRAIN 1/2
3. SOURCE 1
4. GATE 1
5. GATE 2

## STYLE 5:

- PIN 1. CATHODE
2. COMMON ANODE
3. CATHODE 2
4. CATHODE 3
5. CATHODE 4

## STYLE 6:

- PIN 1. EMITTER 2
2. BASE 2
3. EMITTER 1
4. COLLECTOR
5. COLLECTOR 2/BASE 1

## STYLE 7:

- PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

## STYLE 8:

- PIN 1. CATHODE
2. COLLECTOR
3. N/C
4. BASE
5. EMITTER

## STYLE 9:

- PIN 1. ANODE
2. CATHODE
3. ANODE
4. ANODE
5. ANODE

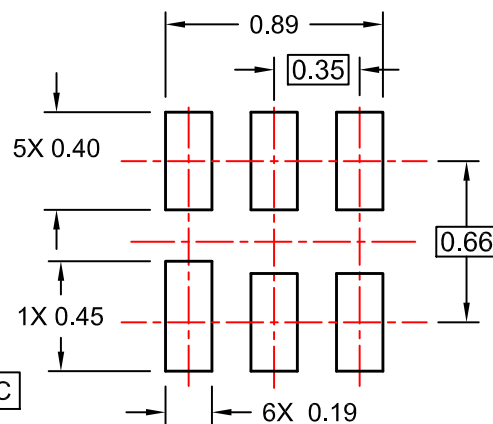
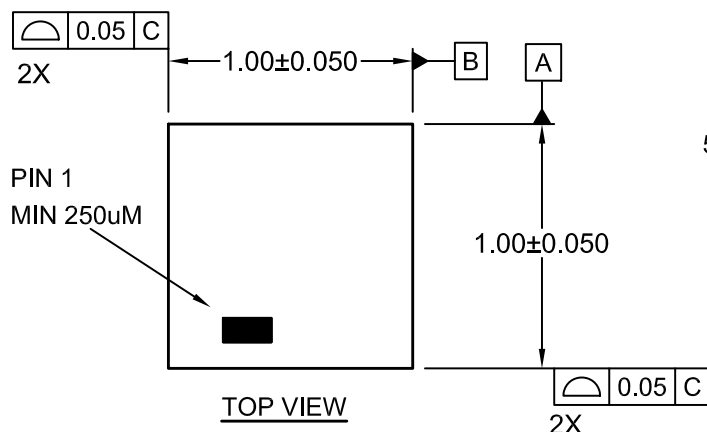
Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

|                         |                                 |                                                                                                                                                                                  |
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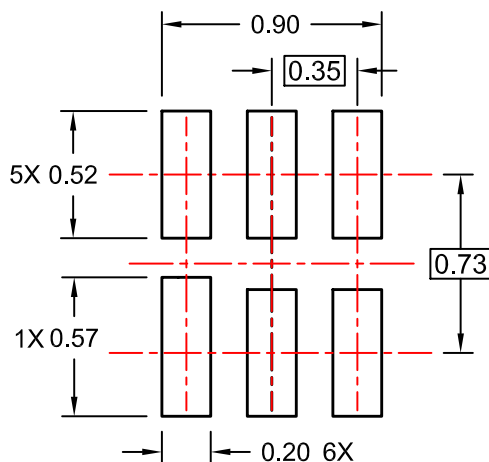
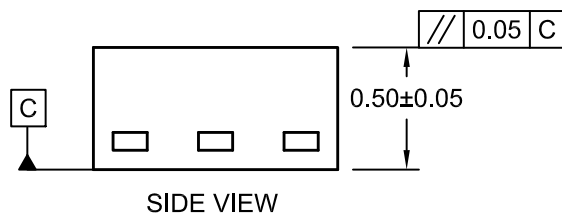
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UDFN6 1.0X1.0, 0.35P  
CASE 517DP  
ISSUE O

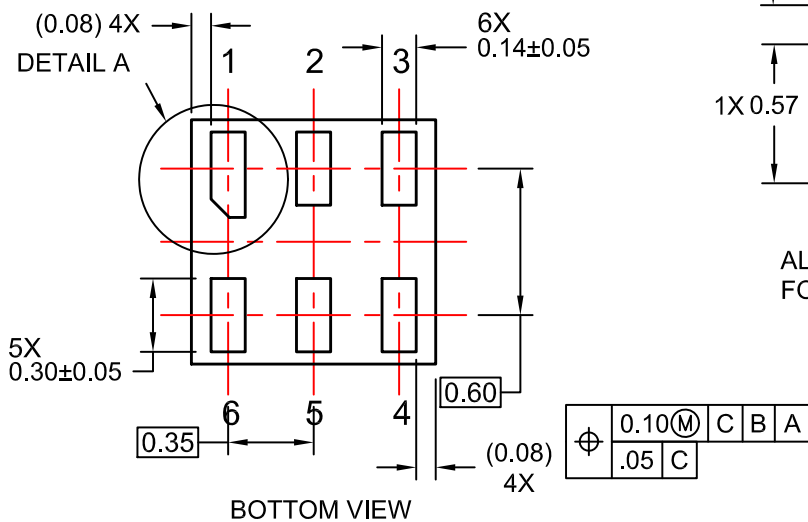
DATE 31 AUG 2016



## RECOMMENDED LAND PATTERN FOR SPACE CONSTRAINED PCB

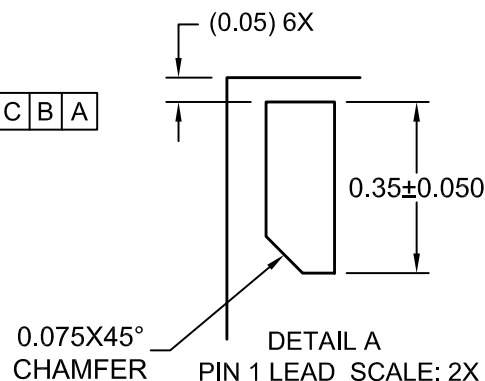


## ALTERNATIVE LAND PATTERN FOR UNIVERSAL APPLICATION



NOTES:

- A. COMPLIES TO JEDEC MO-252 STANDARD  
B. DIMENSIONS ARE IN MILLIMETERS.  
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009



|                         |                             |                                                                                                                                                                                     |
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**SOT-23, 5 Lead**  
**CASE 527AH**  
**ISSUE A**

DATE 09 JUN 2021

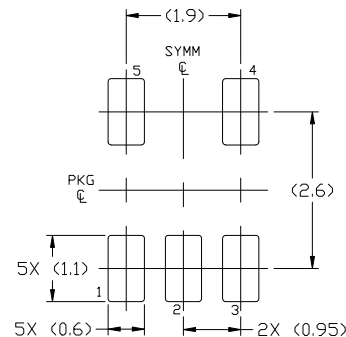

XXX = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1989A
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.25 PER SIDE. D AND E1 DIMENSIONS ARE DETERMINED AT DATUM D.
5. DIMENSION 'b' DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE 'b' DIMENSION AT MAXIMUM MATERIAL CONDITION. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD SHALL NOT BE LESS THAN 0.07mm.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 0.90        | —    | 1.45 |
| A1  | 0.00        | —    | 0.15 |
| A2  | 0.90        | 1.15 | 1.30 |
| b   | 0.30        | —    | 0.50 |
| c   | 0.08        | —    | 0.22 |
| D   | 2.90 BSC    |      |      |
| E   | 2.80 BSC    |      |      |
| E1  | 1.60 BSC    |      |      |
| e   | 0.95 BSC    |      |      |
| L   | 0.30        | 0.45 | 0.60 |
| L1  | 0.60 REF    |      |      |
| L2  | 0.25 REF    |      |      |
| θ   | 0°          | 4°   | 8°   |
| θ1  | 0°          | 10°  | 15°  |
| θ2  | 0°          | 10°  | 15°  |


**RECOMMENDED**  
**MOUNTING FOOTPRINT**

For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

|                         |                       |                                                                                                                                                                                  |
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| <b>DESCRIPTION:</b>     | <b>SOT-23, 5 LEAD</b> | <b>PAGE 1 OF 1</b>                                                                                                                                                               |

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