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[^0]
## TinyLogic ULP-A Buffer with Three-State Output

## NC7SP126

The NC7SP126 is a single non-inverting 3-state buffer in tiny footprint packages. The device is designed to operate for $\mathrm{V}_{\mathrm{CC}}=0.9 \mathrm{~V}$ to 3.6 V .

## Features

- Designed for 0.9 V to $3.6 \mathrm{~V} \mathrm{~V}_{\mathrm{CC}}$ Operation
- $2.6 \mathrm{~ns}_{\mathrm{t}}^{\mathrm{PD}}$ at 3.3 V (Typ)
- Inputs/Outputs Over-Voltage Tolerant up to 3.6 V
- IOFF Supports Partial Power Down Protection
- Source/Sink 2.6 mA at 3.3 V
- Available in SC-88A and MicroPak ${ }^{\mathrm{TM}}$ Packages
- These Devices are $\mathrm{Pb}-$ Free, Halogen Free/BFR Free and are RoHS Compliant


Figure 1. Pinout Diagrams (Top Views)


Figure 2. Logic Symbol


## ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 7 of this data sheet.

## PIN ASSIGNMENT

| Pin | SC88A | MicroPak |
| :---: | :---: | :---: |
| 1 | OE | OE |
| 2 | A | A |
| 3 | GND | GND |
| 4 | Y | Y |
| 5 | V CC | N.C. |
| 6 | - | $V_{C C}$ |

[^1]FUNCTION TABLE

| Input |  | Output |
| :---: | :---: | :---: |
| OE | A | Y |
| L | X | Z |
| H | L | L |
| H | H | H |

$X=$ Don't Care
$Z=$ High Impedance State

MAXIMUM RATINGS

\begin{tabular}{|c|c|c|c|}
\hline Symbol \& Characteristics \& Value \& Unit \\
\hline \(\mathrm{V}_{\mathrm{CC}}\) \& DC Supply Voltage \& -0.5 to +4.3 \& V \\
\hline \(\mathrm{V}_{\text {IN }}\) \& DC Input Voltage \& -0.5 to +4.3 \& V \\
\hline \(\mathrm{V}_{\text {OUT }}\) \& \begin{tabular}{l}
DC Output Voltage \\
Active-Mode (High or Low State) \\
Tri-State Mode (Note 1) \\
Power-Down Mode \(\left(\mathrm{V}_{\mathrm{CC}}=0 \mathrm{~V}\right)\)
\end{tabular} \& \[
\begin{gathered}
-0.5 \text { to } \mathrm{V}_{\mathrm{cc}}+0.5 \\
-0.5 \text { to }+4.3 \\
-0.5 \text { to }+4.3
\end{gathered}
\] \& V \\
\hline \(\mathrm{I}_{\text {IK }}\) \& DC Input Diode Current \(\mathrm{V}_{\text {IN }}<\mathrm{GND}\) \& -50 \& mA \\
\hline lok \& DC Output Diode Current \(\mathrm{V}_{\text {OUT }}<\mathrm{GND}\) \& -50 \& mA \\
\hline IOUT \& DC Output Source/Sink Current \& \(\pm 50\) \& mA \\
\hline \(\mathrm{I}_{\text {CC }}\) or \(\mathrm{I}_{\text {GND }}\) \& DC Supply Current per Supply Pin or Ground Pin \& \(\pm 50\) \& mA \\
\hline \(\mathrm{T}_{\text {STG }}\) \& Storage Temperature Range \& -65 to +150 \& \({ }^{\circ} \mathrm{C}\) \\
\hline \(\mathrm{T}_{\mathrm{L}}\) \& Lead Temperature, 1 mm from Case for 10 Seconds \& 260 \& \({ }^{\circ} \mathrm{C}\) \\
\hline \(\mathrm{T}_{J}\) \& Junction Temperature Under Bias \& +150 \& \({ }^{\circ} \mathrm{C}\) \\
\hline \(\theta_{\text {JA }}\) \& Thermal Resistance (Note 2) \(\begin{array}{r}\text { SC-88A } \\ \text { MicroPak }\end{array}\) \& \[
\begin{aligned}
\& 377 \\
\& 154
\end{aligned}
\] \& \({ }^{\circ} \mathrm{C} / \mathrm{W}\) \\
\hline \(\mathrm{P}_{\mathrm{D}}\) \& Power Dissipation in Still Air

SC-88A

MicroPak \& $$
\begin{aligned}
& 332 \\
& 812
\end{aligned}
$$ \& mW <br>

\hline MSL \& Moisture Sensitivity \& Level 1 \& - <br>
\hline $\mathrm{F}_{\mathrm{R}}$ \& Flammability Rating Oxygen Index: 28 to 34 \& UL 94 V-0 @ 0.125 in \& - <br>

\hline $\mathrm{V}_{\text {ESD }}$ \& ESD Withstand Voltage (Note 3) $\begin{array}{r}\text { Human Body Model } \\ \text { Charged Device Model }\end{array}$ \& $$
\begin{aligned}
& 4000 \\
& 2000
\end{aligned}
$$ \& V <br>

\hline ILatchup \& Latchup Performance (Note 4) \& $\pm 100$ \& mA <br>
\hline
\end{tabular}

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.

1. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 10 mm -by-1 inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.
4. Tested to EIA/JESD78 Class II.

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter |  | Min | Max | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\mathrm{CC}}$ | Positive DC Supply Voltage |  | 0.9 | 3.6 | V |
| $\mathrm{V}_{\text {IN }}$ | DC Input Voltage |  | 0 | 3.6 | V |
| $\mathrm{V}_{\text {OUT }}$ | DC Output Voltage | Active-Mode (High or Low State) <br> Tri-State Mode (Note 1) <br> Power-Down Mode ( $\mathrm{V}_{\mathrm{CC}}=0 \mathrm{~V}$ ) | $\begin{aligned} & 0 \\ & 0 \\ & 0 \end{aligned}$ | $\begin{gathered} \mathrm{V}_{\mathrm{CC}} \\ 3.6 \\ 3.6 \end{gathered}$ |  |
| $\mathrm{T}_{\mathrm{A}}$ | Operating Temperature Range |  | -40 | +85 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{t}_{\mathrm{r}}, \mathrm{t}_{\mathrm{f}}$ | Input Transition Rise and Fall Time | $\mathrm{V}_{\mathrm{CC}}=3.3 \mathrm{~V} \pm 0.3 \mathrm{~V}$ | 0 | 10 | $\mathrm{ns} / \mathrm{V}$ |

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.

DC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Condition | $\mathrm{V}_{\mathrm{cc}}(\mathrm{V})$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ |  |  | $\mathrm{T}_{\mathrm{A}}=-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Min | Typ | Max | Min | Max |  |
| $\mathrm{V}_{\mathrm{IH}}$ | High-Level Input Voltage |  | 0.9 | - | 0.5 | - | - | - | V |
|  |  |  | 1.1 to 1.3 | $0.65 \times \mathrm{V}_{\mathrm{CC}}$ | - | - | $0.65 \times \mathrm{V}_{\mathrm{CC}}$ | - |  |
|  |  |  | 1.4 to 1.6 | $0.65 \times \mathrm{V}_{\mathrm{CC}}$ | - | - | $0.65 \times \mathrm{V}_{\mathrm{CC}}$ | - |  |
|  |  |  | 1.65 to 1.95 | $0.65 \times \mathrm{V}_{\mathrm{CC}}$ | - | - | $0.65 \times \mathrm{V}_{\mathrm{CC}}$ | - |  |
|  |  |  | 2.3 to 2.7 | 1.6 | - | - | 1.6 | - |  |
|  |  |  | 3.0 to 3.6 | 2.1 | - | - | 2.1 | - |  |
| $\mathrm{V}_{\text {IL }}$ | Low-Level Input Voltage |  | 0.9 | - | 0.5 | - | - | - | V |
|  |  |  | 1.1 to 1.3 | - | - | $0.35 \times \mathrm{V}_{\mathrm{CC}}$ | - | $0.35 \times V_{C C}$ |  |
|  |  |  | 1.4 to 1.6 | - | - | $0.35 \times V_{C C}$ | - | $0.35 \times V_{C C}$ |  |
|  |  |  | 1.65 to 1.95 | - | - | $0.35 \times \mathrm{V}_{\mathrm{CC}}$ | - | $0.35 \times V_{C C}$ |  |
|  |  |  | 2.3 to 2.7 | - | - | 0.7 | - | 0.7 |  |
|  |  |  | 3.0 to 3.6 | - | - | 0.9 | - | 0.9 |  |
| $\mathrm{V}_{\mathrm{OH}}$ | High-Level Output Voltage | $\mathrm{V}_{\mathrm{IN}}=\mathrm{V}_{\text {IH }}$ or $\mathrm{V}_{\text {IL }}$ |  |  |  |  |  |  | V |
|  |  | $\mathrm{I}_{\mathrm{OH}}=-20 \mu \mathrm{~A}$ | 0.9 | - | $\begin{gathered} \mathrm{V}_{\mathrm{CC}}- \\ 0.1 \end{gathered}$ | - | - | - |  |
|  |  |  | 1.1 to 1.3 | $\mathrm{V}_{\mathrm{CC}}-0.1$ | - | - | $\mathrm{V}_{\mathrm{CC}}-0.1$ | - |  |
|  |  |  | 1.4 to 1.6 | $\mathrm{V}_{C C}-0.1$ | - | - | $\mathrm{V}_{C C}-0.1$ | - |  |
|  |  |  | 1.65 to 1.95 | $V_{C C}-0.1$ | - | - | $\mathrm{V}_{\mathrm{CC}}-0.1$ | - |  |
|  |  |  | 2.3 to 2.7 | $\mathrm{V}_{C C}-0.1$ | - | - | $\mathrm{V}_{\mathrm{CC}}-0.1$ | - |  |
|  |  |  | 3.0 to 3.6 | $\mathrm{V}_{\mathrm{CC}}-0.1$ | - | - | $\mathrm{V}_{\mathrm{CC}}-0.1$ | - |  |
|  |  | $\mathrm{I}_{\mathrm{OH}}=-0.5 \mathrm{~mA}$ | 1.1 to 1.3 | $0.75 \times \mathrm{V}_{\mathrm{CC}}$ | - | - | $0.70 \times \mathrm{V}_{\mathrm{CC}}$ | - |  |
|  |  | $\mathrm{I}_{\mathrm{OH}}=-1 \mathrm{~mA}$ | 1.4 to 1.6 | 1.07 | - | - | 0.99 | - |  |
|  |  | $\mathrm{I}_{\mathrm{OH}}=-1.5 \mathrm{~mA}$ | 1.65 to 1.95 | 1.24 | - | - | 1.22 | - |  |
|  |  | $\mathrm{I}_{\mathrm{OH}}=-2.1 \mathrm{~mA}$ | 2.3 to 2.7 | 1.95 | - | - | 1.87 | - |  |
|  |  | $\mathrm{I}_{\mathrm{OH}}=-2.6 \mathrm{~mA}$ | 3.0 to 3.6 | 2.61 | - | - | 2.55 | - |  |

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DC ELECTRICAL CHARACTERISTICS (continued)

| Symbol | Parameter | Condition | $\mathrm{V}_{\mathrm{cc}}(\mathrm{V})$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ |  |  | $\mathrm{T}_{\mathrm{A}}=-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Min | Typ | Max | Min | Max |  |
| $\mathrm{V}_{\mathrm{OL}}$ | Low-Level Output Voltage | $\mathrm{V}_{\mathrm{IN}}=\mathrm{V}_{\mathrm{IH}}$ or $\mathrm{V}_{\text {IL }}$ |  |  |  |  |  |  | V |
|  |  | $\mathrm{l}_{\mathrm{OL}}=20 \mu \mathrm{~A}$ | 0.9 | - | 0.1 | - | - | - |  |
|  |  |  | 1.1 to 1.3 | - | - | 0.1 | - | 0.1 |  |
|  |  |  | 1.4 to 1.6 | - | - | 0.1 | - | 0.1 |  |
|  |  |  | 1.65 to 1.95 | - | - | 0.1 | - | 0.1 |  |
|  |  |  | 2.3 to 2.7 | - | - | 0.1 | - | 0.1 |  |
|  |  |  | 3.0 to 3.6 | - | - | 0.1 | - | 0.1 |  |
|  |  | $\mathrm{I}_{\mathrm{OL}}=0.5 \mathrm{~mA}$ | 1.1 to 1.3 | - | - | $0.3 \times \mathrm{V}_{\mathrm{CC}}$ | - | $0.3 \times \mathrm{V}_{\mathrm{CC}}$ |  |
|  |  | $\mathrm{l}_{\mathrm{OL}}=1 \mathrm{~mA}$ | 1.4 to 1.6 | - | - | 0.31 | - | 0.37 |  |
|  |  | $\mathrm{I}_{\mathrm{OL}}=1.5 \mathrm{~mA}$ | 1.65 to 1.95 | - | - | 0.31 | - | 0.35 |  |
|  |  | $\mathrm{I}_{\mathrm{OL}}=2.1 \mathrm{~mA}$ | 2.3 to 2.7 | - | - | 0.31 | - | 0.33 |  |
|  |  | $\mathrm{I}_{\mathrm{OL}}=2.6 \mathrm{~mA}$ | 3.0 to 3.6 | - | - | 0.31 | - | 0.33 |  |
| $\mathrm{I}_{\mathrm{IN}}$ | Input Leakage Current | $\mathrm{V}_{\mathrm{IN}}=0 \mathrm{~V}$ to 3.6 V | 0.9 to 3.6 | - | - | $\pm 0.1$ | - | $\pm 0.5$ | $\mu \mathrm{A}$ |
| $\mathrm{I}_{\mathrm{OZ}}$ | 3-State Output Leakage Current | $\begin{aligned} & \mathrm{V}_{\text {IN }}=\mathrm{V}_{\text {IH }} \text { or } \mathrm{V}_{\text {IL }} \\ & \mathrm{V}_{\text {OUT }}=0 \mathrm{~V} \text { to } 3.6 \mathrm{~V} \end{aligned}$ | 0.9 to 3.6 | - | - | $\pm 0.5$ | - | $\pm 0.5$ | $\mu \mathrm{A}$ |
| IOFF | Power Off Leakage Current | $\mathrm{V}_{\mathrm{IN}}=0 \mathrm{~V}$ to 3.6 V or $V_{\text {OUT }}=0 \mathrm{~V}$ to 3.6 V | 0 | - | - | 0.5 | - | 0.5 | $\mu \mathrm{A}$ |
| $\mathrm{I}_{\mathrm{CC}}$ | Quiescent Supply Current | $\mathrm{V}_{\text {IN }}=\mathrm{V}_{\mathrm{CC}}$ or GND | 0.9 to 3.6 | - | - | 0.9 | - | 0.9 | $\mu \mathrm{A}$ |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Condition | $\mathrm{V}_{\mathrm{Cc}}(\mathrm{V})$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ |  |  | $\mathrm{T}_{\mathrm{A}}=-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Min | Typ | Max | Min | Max |  |
| $\mathrm{t}_{\text {PLH }}, \mathrm{t}_{\text {PHL }}$ | Propagation Delay, <br> A to Y (Figures 3 and 4) | $\mathrm{R}_{\mathrm{L}}=1 \mathrm{M} \Omega, \mathrm{C}_{\mathrm{L}}=10 \mathrm{pF}$ | 0.9 | - | 50.7 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 13.4 | 27.6 | - | 39.6 |  |
|  |  |  | 1.40 to 1.60 | - | 6.8 | 11.2 | - | 14.5 |  |
|  |  |  | 1.65 to 1.95 | - | 4.8 | 8.6 | - | 11.6 |  |
|  |  |  | 2.3 to 2.7 | - | 3.1 | 6.3 | - | 8.2 |  |
|  |  |  | 3.0 to 3.6 | - | 2.6 | 5.3 | - | 7.2 |  |
| $\mathrm{t}_{\mathrm{PZH}}, \mathrm{t}_{\text {PZL }}$ | Output Enable Time, OE to Y (Figures 3 and 4) | $\begin{aligned} & \mathrm{R}_{1}=\mathrm{R}_{\mathrm{L}}=5 \mathrm{k} \Omega \\ & \mathrm{C}_{\mathrm{L}}=10 \mathrm{pF} \end{aligned}$ | 0.9 | - | 50.6 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 13.2 | 26.7 | - | 40.4 |  |
|  |  |  | 1.40 to 1.60 | - | 6.7 | 11.9 | - | 14.8 |  |
|  |  |  | 1.65 to 1.95 | - | 4.7 | 9.7 | - | 12.3 |  |
|  |  |  | 2.3 to 2.7 | - | 3.0 | 7.7 | - | 10.5 |  |
|  |  |  | 3.0 to 3.6 | - | 2.5 | 6.9 | - | 8.6 |  |
| $\mathrm{t}_{\text {PHZ }}, \mathrm{t}_{\text {PLZ }}$ | Output Disable Time, OE to Y (Figures 3 and 4) | $\begin{aligned} & \mathrm{R}_{1}=\mathrm{R}_{\mathrm{L}}=5 \mathrm{k} \Omega \\ & \mathrm{C}_{\mathrm{L}}=10 \mathrm{pF} \end{aligned}$ | 0.9 | - | 14.6 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 8.2 | 20.5 | - | 42.0 |  |
|  |  |  | 1.40 to 1.60 | - | 6.3 | 15.3 | - | 18.0 |  |
|  |  |  | 1.65 to 1.95 | - | 6.1 | 14.7 | - | 17.8 |  |
|  |  |  | 2.3 to 2.7 | - | 5.8 | 13.7 | - | 15.0 |  |
|  |  |  | 3.0 to 3.6 | - | 5.7 | 13.5 | - | 14.8 |  |

AC ELECTRICAL CHARACTERISTICS (continued)

| Symbol | Parameter | Condition | $\mathrm{V}_{\text {cc }}(\mathrm{V})$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ |  |  | $\mathrm{T}_{\mathrm{A}}=-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Min | Typ | Max | Min | Max |  |
| $\mathrm{t}_{\text {PLH }}, \mathrm{t}_{\text {PHL }}$ | Propagation Delay, A to Y (Figures 3 and 4) | $\mathrm{R}_{\mathrm{L}}=1 \mathrm{M} \Omega, \mathrm{C}_{\mathrm{L}}=15 \mathrm{pF}$ | 0.9 | - | 52.3 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 14.0 | 28.6 | - | 42.5 |  |
|  |  |  | 1.40 to 1.60 | - | 7.2 | 11.8 | - | 15.4 |  |
|  |  |  | 1.65 to 1.95 | - | 5.2 | 9.1 | - | 12.2 |  |
|  |  |  | 2.3 to 2.7 | - | 3.4 | 6.6 | - | 8.6 |  |
|  |  |  | 3.0 to 3.6 | - | 2.8 | 5.6 | - | 7.5 |  |
| $\mathrm{t}_{\mathrm{PZH}}, \mathrm{t}_{\text {PZL }}$ | Output Enable Time, OE to Y (Figures 3 and 4) | $\begin{aligned} & \mathrm{R}_{1}=\mathrm{R}_{\mathrm{L}}=5 \mathrm{k} \Omega \\ & \mathrm{C}_{\mathrm{L}}=15 \mathrm{pF} \end{aligned}$ | 0.9 | - | 52.2 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 13.7 | 27.9 | - | 43.3 |  |
|  |  |  | 1.40 to 1.60 | - | 7.1 | 12.5 | - | 15.5 |  |
|  |  |  | 1.65 to 1.95 | - | 5.1 | 10.2 | - | 12.9 |  |
|  |  |  | 2.3 to 2.7 | - | 3.2 | 8.0 | - | 9.9 |  |
|  |  |  | 3.0 to 3.6 | - | 2.7 | 7.2 | - | 8.9 |  |
| $\mathrm{t}_{\text {PHZ }}, \mathrm{t}_{\text {PLZ }}$ | Output Disable Time, OE to Y (Figures 3 and 4) | $\begin{aligned} & \mathrm{R}_{1}=\mathrm{R}_{\mathrm{L}}=5 \mathrm{k} \Omega \\ & \mathrm{C}_{\mathrm{L}}=15 \mathrm{pF} \end{aligned}$ | 0.9 | - | 16.1 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 9.3 | 21.6 | - | 44.9 |  |
|  |  |  | 1.40 to 1.60 | - | 7.1 | 15.9 | - | 18.8 |  |
|  |  |  | 1.65 to 1.95 | - | 7.1 | 15.2 | - | 18.2 |  |
|  |  |  | 2.3 to 2.7 | - | 6.8 | 14.1 | - | 15.4 |  |
|  |  |  | 3.0 to 3.6 | - | 6.5 | 13.9 | - | 15.1 |  |
| $\mathrm{t}_{\text {PLH }}, \mathrm{t}_{\text {PHL }}$ | Propagation Delay, A to Y (Figures 3 and 4) | $\mathrm{R}_{\mathrm{L}}=1 \mathrm{M} \Omega, \mathrm{C}_{\mathrm{L}}=30 \mathrm{pF}$ | 0.9 | - | 56.9 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 15.6 | 32.0 | - | 51.1 |  |
|  |  |  | 1.40 to 1.60 | - | 8.6 | 13.8 | - | 17.7 |  |
|  |  |  | 1.65 to 1.95 | - | 6.3 | 10.6 | - | 14.0 |  |
|  |  |  | 2.3 to 2.7 | - | 4.1 | 7.6 | - | 9.9 |  |
|  |  |  | 3.0 to 3.6 | - | 3.4 | 6.4 | - | 8.9 |  |
| $\mathrm{t}_{\mathrm{PZH}}, \mathrm{t}_{\text {PZL }}$ | Output Enable Time, OE to Y (Figures 3 and 4) | $\begin{aligned} & \mathrm{R}_{1}=\mathrm{R}_{\mathrm{L}}=5 \mathrm{k} \Omega \\ & \mathrm{C}_{\mathrm{L}}=30 \mathrm{pF} \end{aligned}$ | 0.9 | - | 56.8 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 15.4 | 31.6 | - | 51.9 |  |
|  |  |  | 1.40 to 1.60 | - | 8.5 | 14.5 | - | 17.9 |  |
|  |  |  | 1.65 to 1.95 | - | 6.2 | 11.7 | - | 14.7 |  |
|  |  |  | 2.3 to 2.7 | - | 3.9 | 9.1 | - | 11.1 |  |
|  |  |  | 3.0 to 3.6 | - | 3.3 | 8.1 | - | 10.1 |  |
| $\mathrm{t}_{\text {PHZ }}, \mathrm{t}_{\text {PLZ }}$ | Output Disable Time, OE to Y (Figures 3 and 4) | $\begin{aligned} & \mathrm{R}_{1}=\mathrm{R}_{\mathrm{L}}=5 \mathrm{k} \Omega \\ & \mathrm{C}_{\mathrm{L}}=30 \mathrm{pF} \end{aligned}$ | 0.9 | - | 20.3 | - | - | - | ns |
|  |  |  | 1.10 to 1.30 | - | 12.3 | 24.8 | - | 53.5 |  |
|  |  |  | 1.40 to 1.60 | - | 10.2 | 20.5 | - | 21.1 |  |
|  |  |  | 1.65 to 1.95 | - | 10.2 | 19.5 | - | 20.5 |  |
|  |  |  | 2.3 to 2.7 | - | 9.5 | 18.5 | - | 19.5 |  |
|  |  |  | 3.0 to 3.6 | - | 8.6 | 14.8 | - | 16.3 |  |

CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Test Condition | Typical $\left(\mathbf{T}_{\mathbf{A}}=\mathbf{2 5}{ }^{\circ} \mathbf{C}\right)$ | Unit |
| :---: | :--- | :--- | :---: | :---: |
| $\mathrm{C}_{\mathrm{IN}}$ | Input Capacitance | $\mathrm{V}_{\mathrm{CC}}=0 \mathrm{~V}$ | 2.0 | pF |
| $\mathrm{C}_{\mathrm{OUT}}$ | Output Capacitance | $\mathrm{V}_{\mathrm{CC}}=0 \mathrm{~V}$ | 4.0 | pF |
| $\mathrm{C}_{\mathrm{PD}}$ | Power Dissipation Capacitance (Note 5) | $\mathrm{f}=10 \mathrm{MHz}, \mathrm{V}_{\mathrm{CC}}=0.9$ to $3.6 \mathrm{~V}, \mathrm{~V}_{\mathrm{IN}}=0 \mathrm{~V}$ or $\mathrm{V}_{\mathrm{CC}}$ | 8.0 | pF |

5. $\mathrm{C}_{P D}$ is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation $I_{C C(O P R)}=C_{P D} \bullet V_{C C} \bullet f_{i n}+I_{C C} . C_{P D}$ is used to determine the no-load dynamic power consumption: $\mathrm{P}_{\mathrm{D}}=\mathrm{C}_{\mathrm{PD}} \bullet \mathrm{V}_{\mathrm{CC}}{ }^{2} \bullet \mathrm{f}_{\mathrm{in}}+\mathrm{I}_{\mathrm{CC}} \bullet \mathrm{V}_{\mathrm{CC}}$.

$\mathrm{C}_{\mathrm{L}}$ includes probe and jig capacitance
$\mathrm{R}_{\mathrm{T}}$ is $\mathrm{Z}_{\mathrm{OUT}}$ of pulse generator (typically $50 \Omega$ ) $\mathrm{f}=1 \mathrm{MHz}$

| Test | Switch Position |
| :---: | :---: |
| $\mathrm{t}_{\text {PLH }} / \mathrm{t}_{\text {PHL }}$ | Open |
| $\mathrm{t}_{\text {PLZ }} / \mathrm{t}_{\text {PZL }}$ | $2 \times \mathrm{V}_{\mathrm{CC}}$ |
| $\mathrm{t}_{\mathrm{PHZ}} / \mathrm{t}_{\text {PZH }}$ | GND |

Figure 3. Test Circuit


| $\mathbf{V}_{\mathbf{C C}}, \mathbf{V}$ | $\mathbf{V}_{\mathbf{m i}}, \mathbf{V}$ | $\mathbf{V}_{\mathbf{m o}} \mathbf{V}$ | $\mathbf{V}_{\mathbf{Y}}, \mathbf{V}$ |
| :---: | :---: | :---: | :---: |
| 0.9 | $\mathrm{~V}_{\mathrm{CC}} / 2$ | $\mathrm{~V}_{\mathrm{CC}} / 2$ | 0.1 |
| 1.1 to 1.3 | $\mathrm{~V}_{\mathrm{CC}} / 2$ | $\mathrm{~V}_{\mathrm{CC}} / 2$ | 0.1 |
| 1.4 to 1.6 | $\mathrm{~V}_{\mathrm{CC}} / 2$ | $\mathrm{~V}_{\mathrm{CC}} / 2$ | 0.1 |
| 1.65 to 1.95 | $\mathrm{~V}_{\mathrm{CC}} / 2$ | $\mathrm{~V}_{\mathrm{CC}} / 2$ | 0.15 |
| 2.3 to 2.7 | $\mathrm{~V}_{\mathrm{CC}} / 2$ | $\mathrm{~V}_{\mathrm{CC}} / 2$ | 0.15 |
| 3.0 to 3.6 | 1.5 | 1.5 | 0.3 |

Figure 4. Switching Waveforms

ORDERING INFORMATION

| Device | Package | Marking | Pin 1 Orientation <br> (See below) | Shipping $^{\dagger}$ |
| :--- | :---: | :---: | :---: | :---: |
| NC7SP126P5X | SC-88A | P26 | Q4 | $3000 /$ Tape \& Reel |
| NC7SP126L6X | MicroPak | L6 | Q4 | $5000 /$ Tape \& Reel |
| NC7SP126FHX | MicroPak2 | L6 | Q4 | $5000 /$ Tape \& Reel |

$\dagger$ 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.

Pin 1 Orientation in Tape and Reel
Direction of Feed


## NC7SP126

## PACKAGE DIMENSIONS

SIP6 1.45X1.0
CASE 127EB
ISSUE O


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.

## PACKAGE DIMENSIONS

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


SIDE VIEW


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

5X
$0.30 \pm 0.05$
BOTTOM VIEW



## NC7SP126

## PACKAGE DIMENSIONS

## SC-88A (SC-70-5/SOT-353)

CASE 419A-02
ISSUE L


NOTES:

1. DIMENSIONING AND TOLERANCING

PER ANSI Y14.5M, 1982
2. CONTROLLING DIMENSION: INCH.
3. 419A-01 OBSOLETE. NEW STANDARD 419A-01
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | INCHES |  | MILLIMETERS |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | MIN | MAX | MIN | MAX |  |  |
| A | 0.071 | 0.087 | 1.80 | 2.20 |  |  |
| B | 0.045 | 0.053 | 1.15 | 1.35 |  |  |
| C | 0.031 | 0.043 | 0.80 | 1.10 |  |  |
| D | 0.004 | 0.012 | 0.10 |  |  |  |
| G | 0.026 |  | 0.30 |  |  |  |
| H | -- |  | 0.004 | 0.65 BSC |  |  |
| J | 0.004 | 0.010 | 0.10 |  |  |  |
| K | 0.004 | 0.012 | 0.10 |  |  |  |
| 0.10 |  | 0.25 |  |  |  |  |
| N | 0.008 |  | REF | 0.20 REF |  |  |
| S | 0.079 |  | 0.087 | 2.00 |  | 2.20 |

```
STYLE 5:
    PIN 1. CATHODE
    2. COMMON ANODE
    3. CATHODE
    4. CATTHODE
    4. CATHODE
```

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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[^1]:    N.C. = No Connect

