

TinyLogic ULP-A Buffer

NC7SV34

The NC7SV34 is a single Buffer in tiny footprint packages. The device is designed to operate for $V_{CC} = 0.9\text{ V}$ to 3.6 V .

Features

- Designed for 0.9 V to 3.6 V V_{CC} Operation
- 1.4 ns t_{PD} at 3.3 V (Typ)
- Inputs/Outputs Over-Voltage Tolerant up to 3.6 V
- I_{OFF} Supports Partial Power Down Protection
- Source/Sink 24 mA at 3.3 V
- Available in SC-88A and MicroPak™ Packages
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

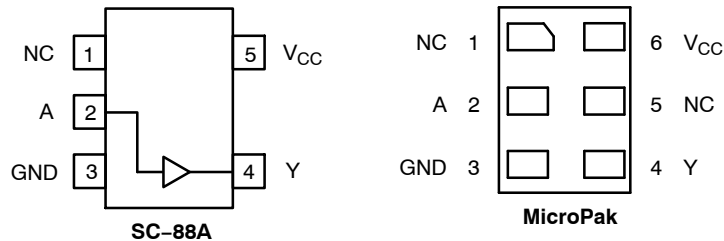


Figure 1. Pinout Diagrams (Top Views)

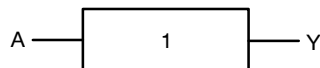
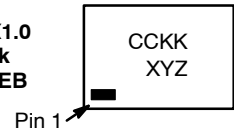


Figure 2. Logic Symbol

MARKING DIAGRAMS



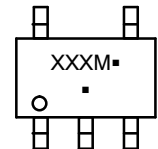
SIP6 1.45X1.0
MicroPak
CASE 127EB



CC = Specific Device Code
KK = 2-Digit Lot Run Traceability Code
XY = 2-Digit Date Code
Z = Assembly Plant Code



SC-88A
CASE 419AC



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

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 6 of this data sheet.

PIN ASSIGNMENT

| Pin | SC-88A | MicroPak |
|-----|----------|----------|
| 1 | N.C. | N.C. |
| 2 | A | A |
| 3 | GND | GND |
| 4 | Y | Y |
| 5 | V_{CC} | N.C. |
| 6 | - | V_{CC} |

N.C. = No Connect

FUNCTION TABLE

| Input | Output |
|-------|--------|
| A | Y |
| L | L |
| H | H |

NC7SV34

MAXIMUM RATINGS

| Symbol | Characteristics | Value | Unit |
|-----------------------|--|--|------|
| V_{CC} | DC Supply Voltage | -0.5 to +4.3 | V |
| V_{IN} | DC Input Voltage | -0.5 to +4.3 | V |
| V_{OUT} | DC Output Voltage Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ($V_{CC} = 0$ V) | -0.5 to $V_{CC} + 0.5$ -0.5 to +4.3 -0.5 to +4.3 | V |
| I_{IK} | DC Input Diode Current $V_{IN} < GND$ | -50 | mA |
| I_{OK} | DC Output Diode Current $V_{OUT} < GND$ | -50 | mA |
| I_{OUT} | DC Output Source/Sink Current | ± 50 | mA |
| I_{CC} or I_{GND} | DC Supply Current per Supply Pin or Ground Pin | ± 50 | mA |
| T_{STG} | Storage Temperature Range | -65 to +150 | °C |
| T_L | Lead Temperature, 1 mm from Case for 10 Seconds | 260 | °C |
| T_J | Junction Temperature Under Bias | +150 | °C |
| θ_{JA} | Thermal Resistance (Note 2) SC-88A MicroPak | 377 154 | °C/W |
| P_D | Power Dissipation in Still Air SC-88A MicroPak | 332 812 | mW |
| MSL | Moisture Sensitivity | Level 1 | - |
| F_R | Flammability Rating Oxygen Index: 28 to 34 | UL 94 V-0 @ 0.125 in | - |
| V_{ESD} | ESD Withstand Voltage (Note 3) Human Body Model Charged Device Model | 2000 1000 | V |
| $I_{Latchup}$ | Latchup Performance (Note 4) | ± 100 | mA |

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.

NC7SV34

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Min | Max | Unit |
|---------------------------------|---|---------------------------------|-----------------|------|
| V _{CC} | Positive DC Supply Voltage | 0.9 | 3.6 | V |
| V _{IN} | DC Input Voltage | 0 | 3.6 | V |
| V _{OUT} | DC Output Voltage | 0 | V _{CC} | |
| | Active-Mode (High or Low State) | 0 | 3.6 | |
| | Tri-State Mode (Note 1) | 0 | 3.6 | |
| | Power-Down Mode (V _{CC} = 0 V) | 0 | 3.6 | |
| T _A | Operating Temperature Range | −40 | +85 | °C |
| t _r , t _f | Input Transition Rise and Fall Time | V _{CC} = 3.3 V ± 0.3 V | | ns/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 | V_{CC} (V) | $T_A = 25^\circ\text{C}$ | | | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ | | Unit |
|----------|---------------------------|--------------------------------------|--------------|--------------------------|----------------|----------------------|---|----------------------|------|
| | | | | Min | Typ | Max | Min | Max | |
| V_{IH} | High-Level Input Voltage | | 0.9 | – | 0.5 | – | – | – | V |
| | | | 1.1 to 1.3 | $0.65 \times V_{CC}$ | – | – | $0.65 \times V_{CC}$ | – | |
| | | | 1.4 to 1.6 | $0.65 \times V_{CC}$ | – | – | $0.65 \times V_{CC}$ | – | |
| | | | 1.65 to 1.95 | $0.65 \times V_{CC}$ | – | – | $0.65 \times V_{CC}$ | – | |
| | | | 2.3 to <2.7 | 1.6 | – | – | 1.6 | – | |
| | | | 2.7 to 3.6 | 2.0 | – | – | 2.0 | – | |
| V_{IL} | Low-Level Input Voltage | | 0.9 | – | 0.5 | – | – | – | V |
| | | | 1.1 to 1.3 | – | – | $0.35 \times V_{CC}$ | – | $0.35 \times V_{CC}$ | |
| | | | 1.4 to 1.6 | – | – | $0.35 \times V_{CC}$ | – | $0.35 \times V_{CC}$ | |
| | | | 1.65 to 1.95 | – | – | $0.35 \times V_{CC}$ | – | $0.35 \times V_{CC}$ | |
| | | | 2.3 to <2.7 | – | – | 0.7 | – | 0.7 | |
| | | | 2.7 to 3.6 | – | – | 0.8 | – | 0.8 | |
| V_{OH} | High-Level Output Voltage | $V_{IN} = V_{IH} \text{ or } V_{IL}$ | | | | | | | V |
| | | $I_{OH} = -100 \mu\text{A}$ | 0.9 | – | $V_{CC} - 0.1$ | – | – | – | |
| | | | 1.1 to 1.3 | $V_{CC} - 0.1$ | – | – | $V_{CC} - 0.1$ | – | |
| | | | 1.4 to 1.6 | $V_{CC} - 0.1$ | – | – | $V_{CC} - 0.1$ | – | |
| | | | 1.65 to 1.95 | $V_{CC} - 0.2$ | – | – | $V_{CC} - 0.2$ | – | |
| | | | 2.3 to <2.7 | $V_{CC} - 0.2$ | – | – | $V_{CC} - 0.2$ | – | |
| | | | 2.7 to 3.6 | $V_{CC} - 0.2$ | – | – | $V_{CC} - 0.2$ | – | |
| | | $I_{OH} = -2 \text{ mA}$ | 1.1 to 1.3 | $0.75 \times V_{CC}$ | – | – | $0.75 \times V_{CC}$ | – | |
| | | $I_{OH} = -4 \text{ mA}$ | 1.4 to 1.6 | $0.75 \times V_{CC}$ | – | – | $0.75 \times V_{CC}$ | – | |
| | | $I_{OH} = -6 \text{ mA}$ | 1.65 to 1.95 | 1.25 | – | – | 1.25 | – | |
| | | | 2.3 to <2.7 | 2.0 | – | – | 2.0 | – | |
| | | $I_{OH} = -12 \text{ mA}$ | 2.3 to <2.7 | 1.8 | – | – | 1.8 | – | |
| | | | 2.7 to 3.6 | 2.2 | – | – | 2.2 | – | |
| | | $I_{OH} = -18 \text{ mA}$ | 2.3 to <2.7 | 1.7 | – | – | 1.7 | – | |
| | | | 2.7 to 3.6 | 2.4 | – | – | 2.4 | – | |
| | | $I_{OH} = -24 \text{ mA}$ | 2.7 to 3.6 | 2.2 | – | – | 2.2 | – | |

NC7SV34

DC ELECTRICAL CHARACTERISTICS (continued)

| Symbol | Parameter | Condition | V _{CC} (V) | T _A = 25°C | | | T _A = -40°C to +85°C | | Unit |
|------------------|---------------------------|---|---------------------|-----------------------|-----|------------------------|---------------------------------|------------------------|------|
| | | | | Min | Typ | Max | Min | Max | |
| V _{OL} | Low-Level Output Voltage | V _{IN} = V _{IH} or V _{IL} | | | | | | | V |
| | | I _{OL} = 100 μA | 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 | – | – | 0.2 | – | 0.2 | |
| | | | 2.3 to < 2.7 | – | – | 0.2 | – | 0.2 | |
| | | | 2.7 to 3.6 | – | – | 0.2 | – | 0.2 | |
| | | I _{OL} = 2 mA | 1.1 o 1.3 | – | – | 0.25 x V _{CC} | – | 0.25 x V _{CC} | |
| | | I _{OL} = 4 mA | 1.4 to 1.6 | – | – | 0.25 x V _{CC} | – | 0.25 x V _{CC} | |
| | | I _{OL} = 6 mA | 1.65 to 1.95 | – | – | 0.3 | – | 0.3 | |
| | | I _{OL} = 12 mA | 2.3 to <2.7 | – | – | 0.4 | – | 0.4 | |
| | | | 2.7 to 3.6 | – | – | 0.4 | – | 0.4 | |
| | | I _{OL} = 18 mA | 2.3 to <2.7 | – | – | 0.6 | – | 0.6 | |
| | | | 2.7 to 3.6 | – | – | 0.4 | – | 0.4 | |
| | | I _{OL} = 24 mA | 2.7 to 3.6 | – | – | 0.55 | – | 0.55 | |
| I _{IN} | Input Leakage Current | V _{IN} = 0 V to 3.6 V | 0.9 to 3.6 | – | – | ±0.1 | – | ±0.5 | μA |
| I _{OFF} | Power Off Leakage Current | V _{IN} = 0 V to 3.6 V or V _{OUT} = 0 V to 3.6 V | 0 | – | – | 0.5 | – | 0.5 | μA |
| I _{CC} | Quiescent Supply Current | V _{IN} = V _{CC} or GND | 0.9 to 3.6 | – | – | 0.9 | – | 0.9 | μA |

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

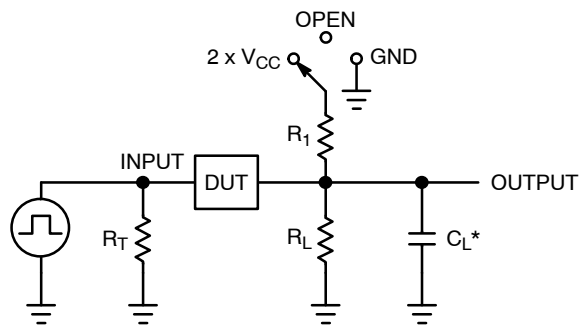
| Symbol | Parameter | Condition | V _{CC} (V) | T _A = 25°C | | | T _A = -40°C to +85°C | | Unit |
|--|---|--|---------------------|-----------------------|------|------|---------------------------------|------|------|
| | | | | Min | Typ | Max | Min | Max | |
| t _{PLH} , t _{PHL} | Propagation Delay, A to Y (Figures 3 and 4) | R _L = 1 MΩ, C _L = 15 pF | 0.9 | – | 18.5 | – | – | – | ns |
| | | R _L = 2 kΩ, C _L = 15 pF | 1.1 to 1.3 | – | 5.4 | 13.0 | – | 16.9 | |
| | | | 1.4 to 1.6 | – | 2.8 | 6.1 | – | 7.0 | |
| | | R _L = 500 Ω, C _L = 30 pF | 1.65 to 1.95 | – | 2.3 | 5.2 | – | 6.2 | |
| | | | 2.3 to 2.7 | – | 1.7 | 3.7 | – | 4.4 | |
| | | | 2.7 to 3.6 | – | 1.4 | 3.3 | – | 3.8 | |

CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Test Condition | Typical (T _A = 25°C) | Unit |
|------------------|--|--|---------------------------------|------|
| C _{IN} | Input Capacitance | V _{CC} = 0 V | 2.0 | pF |
| C _{OUT} | Output Capacitance | V _{CC} = 0 V | 4.5 | pF |
| C _{PD} | Power Dissipation Capacitance (Note 5) | f = 10 MHz, V _{CC} = 0.9 to 3.6 V, V _{IN} = 0 V or V _{CC} | 10.0 | pF |

5. C_{PD} 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_{CC(OPR)} = C_{PD} • V_{CC} • f_{in} + I_{CC}. C_{PD} is used to determine the no-load dynamic power consumption: P_D = C_{PD} • V_{CC}² • f_{in} + I_{CC} • V_{CC}.

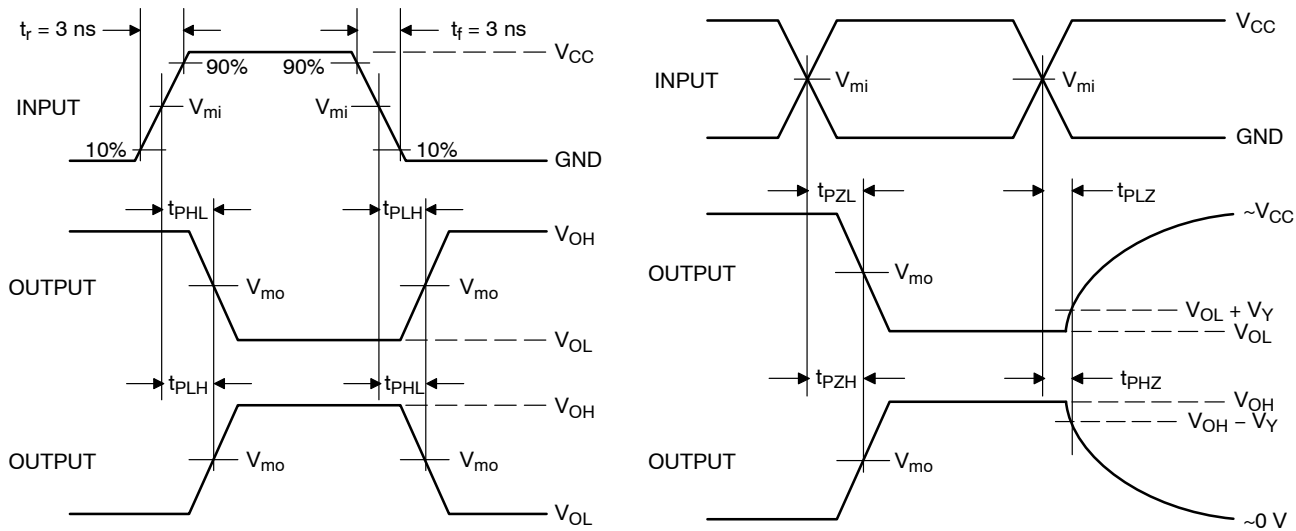
NC7SV34



C_L includes probe and jig capacitance
 R_T is Z_{OUT} of pulse generator (typically 50 Ω)
 $f = 1$ MHz

| Test | Switch Position |
|---------------------|-------------------|
| t_{PLH} / t_{PHL} | Open |
| t_{PLZ} / t_{PZL} | $2 \times V_{CC}$ |
| t_{PHZ} / t_{PZH} | GND |

Figure 3. Test Circuit



| V_{CC}, V | V_{mi}, V | V_{mo}, V | V_Y, V |
|--------------|--------------|--------------|----------|
| 0.9 | $V_{CC} / 2$ | $V_{CC} / 2$ | 0.1 |
| 1.1 to 1.3 | $V_{CC} / 2$ | $V_{CC} / 2$ | 0.1 |
| 1.4 to 1.6 | $V_{CC} / 2$ | $V_{CC} / 2$ | 0.1 |
| 1.65 to 1.95 | $V_{CC} / 2$ | $V_{CC} / 2$ | 0.15 |
| 2.3 to 2.7 | $V_{CC} / 2$ | $V_{CC} / 2$ | 0.15 |
| 3.0 to 3.6 | 1.5 | 1.5 | 0.3 |

Figure 4. Switching Waveforms

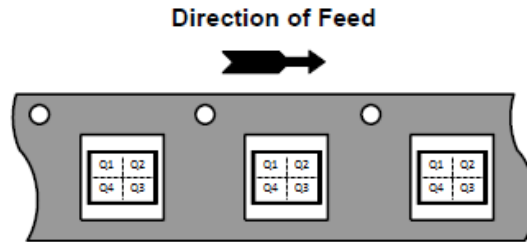
NC7SV34

ORDERING INFORMATION

| Device | Package | Marking | Pin 1 Orientation (See below) | Shipping [†] |
|------------|----------|---------|----------------------------------|-----------------------|
| NC7SV34P5X | SC-88A | V34 | Q4 | 3000 / Tape & Reel |
| NC7SV34L6X | MicroPak | G7 | Q4 | 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.

PIN 1 ORIENTATION IN TAPE AND REEL



MicroPak is trademark of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries.

SIP6 1.45X1.0
CASE 127EB
ISSUE O

DATE 31 AUG 2016



NOTES:

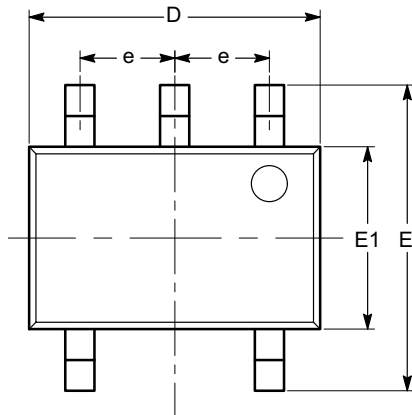
1. CONFORMS TO JEDEC STANDARD MO-252 VARIATION UAAD
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y14.5M-2009
4. PIN ONE IDENTIFIER IS 2X LENGTH OF ANY OTHER LINE IN THE MARK CODE LAYOUT.

| | | |
|-------------------------|----------------------|---|
| DOCUMENT NUMBER: | 98AON13590G | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION: | SIP6 1.45X1.0 | PAGE 1 OF 1 |

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

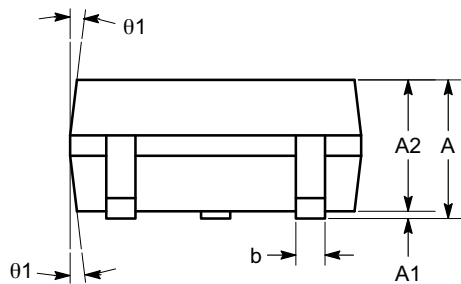
SC-88A (SC-70 5 Lead), 1.25x2
CASE 419AC-01
ISSUE A

DATE 29 JUN 2010

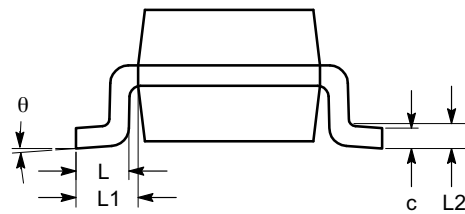


TOP VIEW

| SYMBOL | MIN | NOM | MAX |
|--------|----------|------|------|
| A | 0.80 | | 1.10 |
| A1 | 0.00 | | 0.10 |
| A2 | 0.80 | | 1.00 |
| b | 0.15 | | 0.30 |
| c | 0.10 | | 0.18 |
| D | 1.80 | 2.00 | 2.20 |
| E | 1.80 | 2.10 | 2.40 |
| E1 | 1.15 | 1.25 | 1.35 |
| e | 0.65 BSC | | |
| L | 0.26 | 0.36 | 0.46 |
| L1 | 0.42 REF | | |
| L2 | 0.15 BSC | | |
| θ | 0° | | 8° |
| θ1 | 4° | | 10° |



SIDE VIEW



END VIEW

Notes:

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MO-203.

| | | |
|-------------------------|--------------------------------------|--|
| DOCUMENT NUMBER: | 98AON34260E | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION: | SC-88A (SC-70 5 LEAD), 1.25X2 | PAGE 1 OF 1 |

onsemi and Onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales