

MOSFET – Power, Single, P-Channel, SOT-223

-60 V, -2.6 A

NTF2955, NVF2955

Features

- Design for low $R_{DS(on)}$
- Withstands High Energy in Avalanche and Commutation Modes
- AEC-Q101 Qualified – NVF2955
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Power Supplies
- PWM Motor Control
- Converters
- Power Management

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | | | Symbol | Value | Unit |
|--|--------------|-----------------------|--------------------------------------|------------|------|
| Drain-to-Source Voltage | | | V _{DSS} | −60 | V |
| Gate-to-Source Voltage | | | V _{GS} | ±20 | V |
| Continuous Drain Current (Note 1) | Steady State | T _A = 25°C | I _D | −2.6 | A |
| | | T _A = 85°C | | −2.0 | |
| Power Dissipation (Note 1) | Steady State | T _A = 25°C | P _D | 2.3 | W |
| Continuous Drain Current (Note 2) | Steady State | T _A = 25°C | I _D | −1.7 | A |
| | | T _A = 85°C | | −1.3 | |
| Power Dissipation (Note 2) | | T _A = 25°C | P _D | 1.0 | W |
| Pulsed Drain Current | tp = 10 μs | | I _{DM} | −17 | A |
| Operating Junction and Storage Temperature | | | T _J , T _{STG} | −55 to 175 | °C |
| Single Pulse Drain-to-Source Avalanche Energy (V _{DD} = 25 V, V _G = 10 V, I _{PK} = 6.7 A, L = 10 mH, R _G = 25 Ω) | | | EAS | 225 | mJ |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 seconds) | | | T _L | 260 | °C |

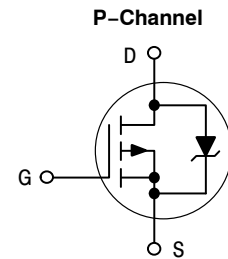
THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Max | Unit |
|---|-----------------|-----|--------------------|
| Junction-to-Tab (Drain) – Steady State (Note 2) | $R_{\theta JC}$ | 14 | $^\circ\text{C/W}$ |
| Junction-to-Ambient – Steady State (Note 1) | $R_{\theta JA}$ | 65 | |
| Junction-to-Ambient – Steady State (Note 2) | $R_{\theta JA}$ | 150 | |

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. When surface mounted to an FR4 board using 1 in. pad size (Cu. area = 1.127 in² [1 oz] including traces)
2. When surface mounted to an FR4 board using the minimum recommended pad size (Cu. area = 0.341 in²)

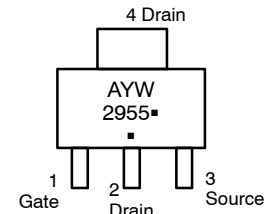
| $V_{(BR)DSS}$ | $R_{DS(on)}$ TYP | I_D MAX |
|---------------|------------------------|-----------|
| -60 V | 145 m Ω @ -10 V | -2.6 A |



MARKING DIAGRAM AND PIN ASSIGNMENT



SOT-223
CASE 318E
STYLE 3



A = Assembly Location
Y = Year
W = Work Week
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|------------|-------------------|-----------------------|
| NTF2955T1G | SOT-223 (Pb-Free) | 1000 /Tape & Reel |
| NVF2955T1G | SOT-223 (Pb-Free) | 1000/ Tape & Reel |

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

NTF2955, NVF2955

ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise stated)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|-----------|--------|----------------|-----|-----|-----|------|
|-----------|--------|----------------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | | | |
|---|-------------------|--|---------------------------|------|-----------|-------|---------------|
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$ | -60 | - | - | V | |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | $V_{(BR)DSS}/T_J$ | | - | 66.4 | - | mV/°C | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{GS} = 0\text{ V}, V_{DS} = -60\text{ V}$ | $T_J = 25^\circ\text{C}$ | - | - | -1.0 | μA |
| | | | $T_J = 125^\circ\text{C}$ | - | - | -50 | |
| Gate-to-Source Leakage Current | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | - | - | ± 100 | nA | |

ON CHARACTERISTICS (Note 3)

| | | | | | | |
|-------------------------------|---------------------|--|------|------|------|----|
| Gate Threshold Voltage | V _{GS(TH)} | V _{GS} = V _{DS} , I _D = -1.0 mA | -2.0 | - | -4.0 | V |
| Drain-to-Source On Resistance | R _{DS(on)} | V _{GS} = -10 V, I _D = -0.75 A | - | 145 | 170 | mΩ |
| | | V _{GS} = -10 V, I _D = -1.5 A | - | 150 | 180 | |
| | | V _{GS} = -10 V, I _D = -2.4 A | - | 154 | 185 | |
| Forward Transconductance | g _{FS} | V _{GS} = -15 V, I _D = -0.75 A | - | 1.77 | | S |

CHARGES AND CAPACITANCES

| | | | | | | |
|------------------------------|---------------------|--|---|------|---|----|
| Input Capacitance | C _{ISS} | V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 25 V | - | 492 | - | pF |
| Output Capacitance | C _{OSS} | | - | 165 | - | |
| Reverse Transfer Capacitance | C _{RSS} | | - | 50 | - | |
| Total Gate Charge | Q _{G(TOT)} | V _{GS} = 10 V, V _{DS} = 30 V, I _D = 1.5 A | - | 14.3 | - | nC |
| Threshold Gate Charge | Q _{G(TH)} | | - | 1.2 | - | |
| Gate-to-Source Charge | Q _{GS} | | - | 2.3 | - | |
| Gate-to-Drain Charge | Q _{GD} | | - | 5.2 | - | |

SWITCHING CHARACTERISTICS (Note 4)

| | | | | | | |
|---------------------|---------------------|---|---|-----|---|----|
| Turn-On Delay Time | t _{d(ON)} | V _{GS} = 10 V, V _{DD} = 25 V, I _D = 1.5 A, R _G = 9.1 Ω, R _L = 25 Ω | - | 11 | - | ns |
| Rise Time | t _r | | - | 7.6 | - | |
| Turn-Off Delay Time | t _{d(OFF)} | | - | 65 | - | |
| Fall Time | t _f | | - | 38 | - | |

DRAIN-SOURCE DIODE CHARACTERISTICS

| | | | | | | | |
|-------------------------|-----------------|--|------------------------|-------|-------|-------|---|
| Forward Diode Voltage | V _{SD} | V _{GS} = 0 V, I _S = 1.5 A | T _J = 25°C | – | –1.10 | –1.30 | V |
| | | | T _J = 125°C | – | –0.9 | – | |
| Reverse Recovery Time | t _{RR} | V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 1.5 A | – | 36 | – | ns | |
| Charge Time | t _a | | – | 20 | – | | |
| Discharge Time | t _b | | – | 16 | – | | |
| Reverse Recovery Charge | Q _{RR} | | – | 0.139 | – | nC | |

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.

3. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

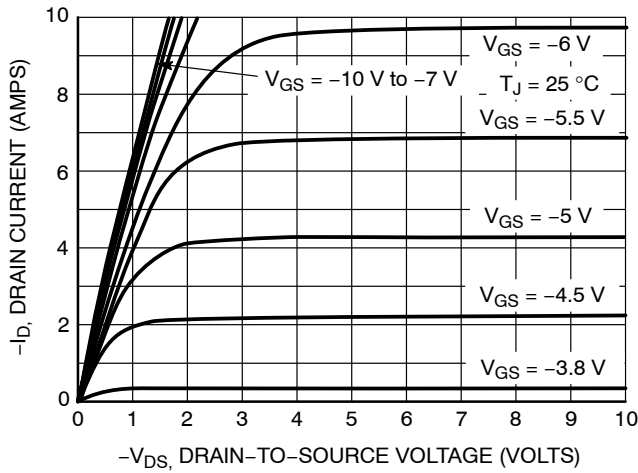


Figure 1. On-Region Characteristics

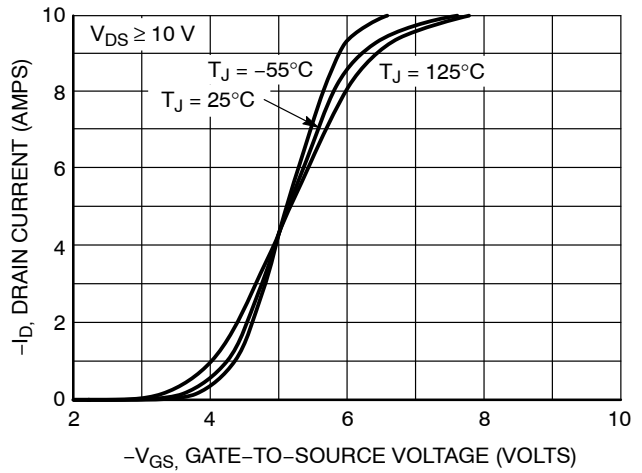


Figure 2. Transfer Characteristics

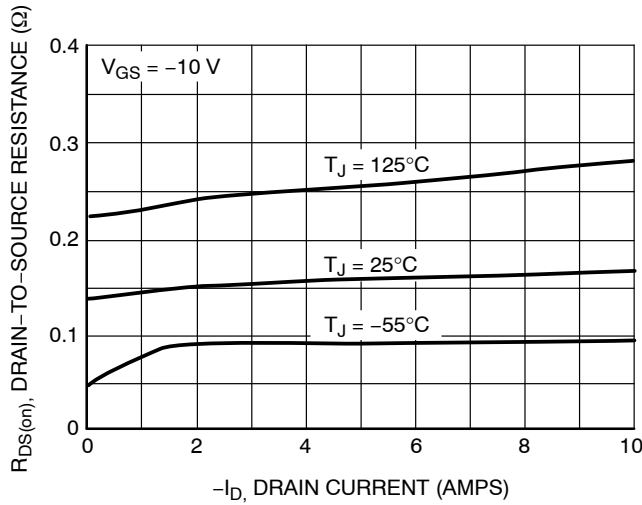


Figure 3. On-Resistance versus Drain Current and Temperature

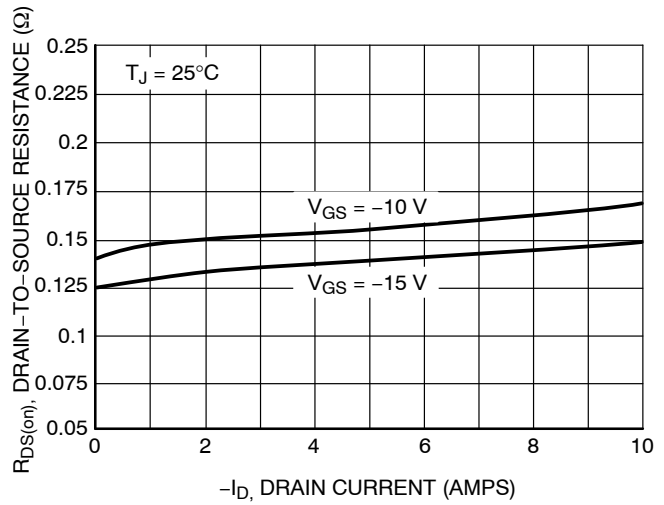


Figure 4. On-Resistance versus Drain Current and Gate Voltage

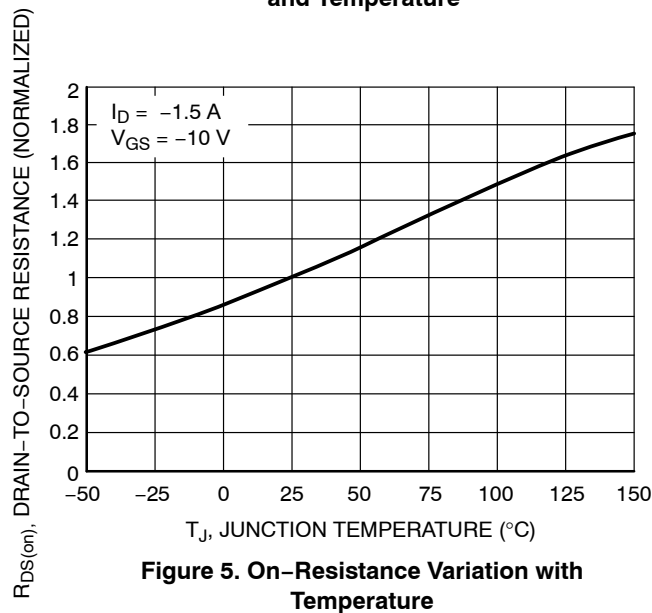


Figure 5. On-Resistance Variation with Temperature

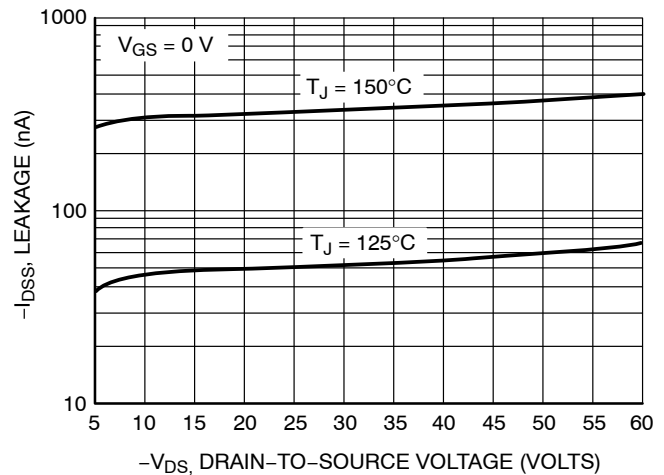
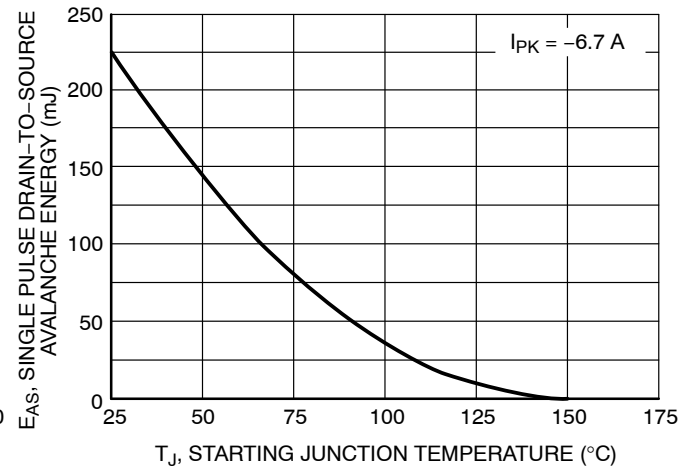
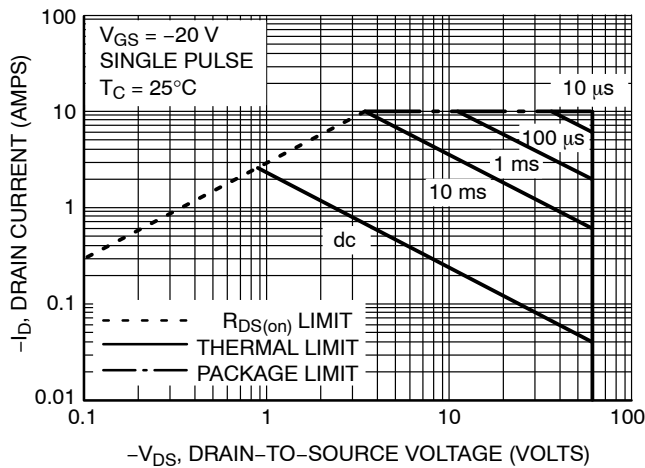
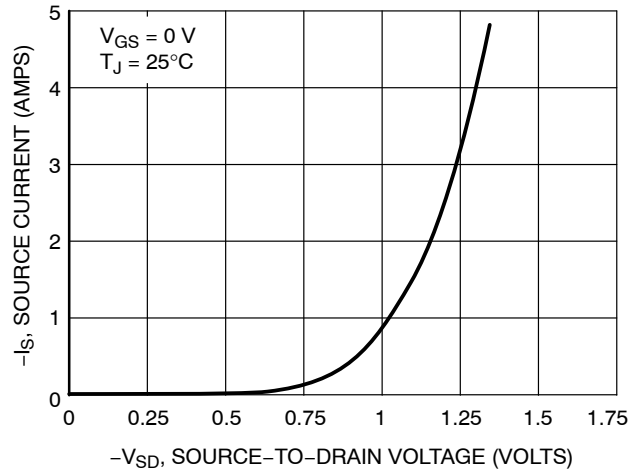
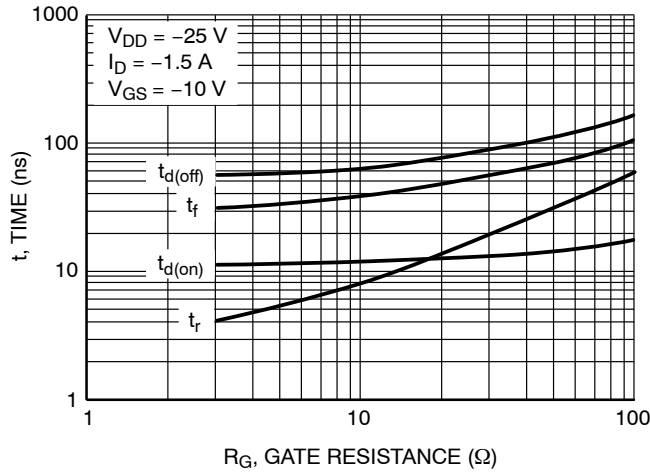
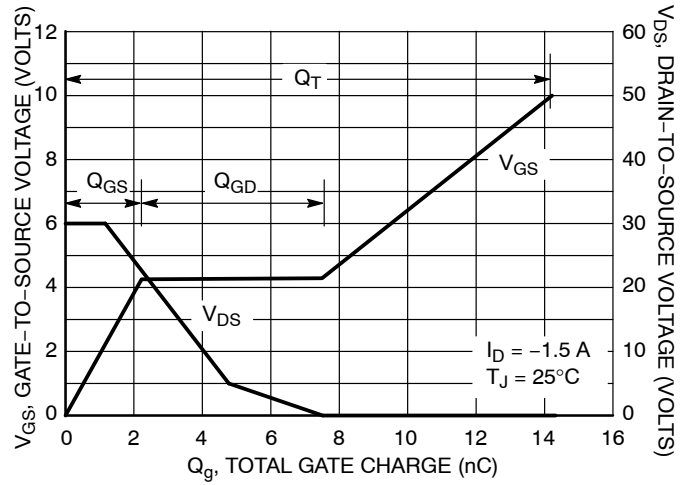
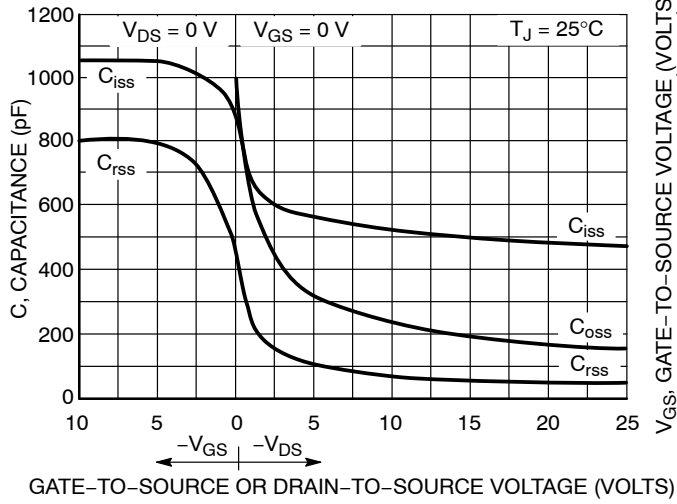


Figure 6. Drain-to-Source Leakage Current versus Voltage

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



NTF2955, NVF2955

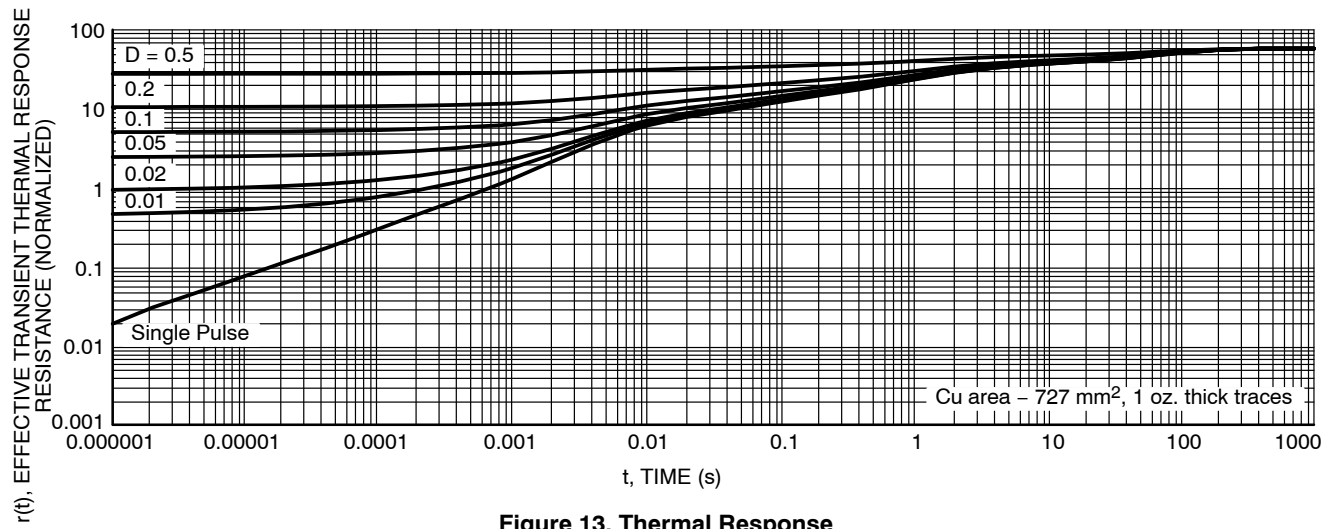


Figure 13. Thermal Response

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