

# FDME905PT

## P-Channel POWERTRENCH® MOSFET

-12 V, -8 A, 22 mΩ

### General Description

This device is designed specifically for battery charging or load switching in cellular handset and other ultraportable applications. It features a MOSFET with low on-state resistance.

The MicroFET 1.6x1.6 Thin package offers exceptional thermal performance for its physical size and is well suited to switching and linear mode applications.

### Features

- Max  $R_{DS(on)}$  = 22 mΩ at  $V_{GS} = -4.5$  V,  $I_D = -8$  A
- Max  $R_{DS(on)}$  = 26 mΩ at  $V_{GS} = -2.5$  V,  $I_D = -7.3$  A
- Max  $R_{DS(on)}$  = 97 mΩ at  $V_{GS} = -1.8$  V,  $I_D = -3.8$  A
- Low Profile: 0.55 mm Maximum in the New Package MicroFET 1.6x1.6 Thin
- Free from Halogenated Compounds and Antimony Oxides
- These Devices are Pb-Free and are RoHS Compliant

### MOSFET MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , Unless otherwise specified)

Symbol	Parameter	Ratings	Unit
$V_{DS}$	Drain to Source Voltage	-12	V
$V_{GS}$	Gate to Source Voltage	±8	V
$I_D$	Drain Current Continuous ( $T_A = 25^\circ\text{C}$ ) (Note 1a) Pulsed	-8 -30	A
$P_D$	Power Dissipation ( $T_A = 25^\circ\text{C}$ ) (Note 1a) ( $T_A = 25^\circ\text{C}$ ) (Note 1b)	2.1 0.7	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

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.

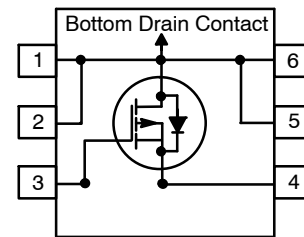


ON Semiconductor®

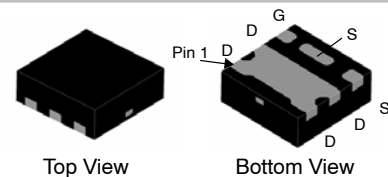
[www.onsemi.com](http://www.onsemi.com)

$V_{DS}$	$I_D$ MAX	$R_{DS(on)}$ MAX
-12 V	-8 A	22 mΩ

### ELECTRICAL CONNECTION

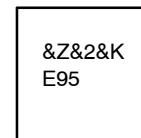


P-Channel MOSFET



MicroFET  
(UDFN6)  
CASE 517DV

### MARKING DIAGRAM



- &Z = Assembly Plant Code
- &2 = Numeric Date Code
- &K = Lot Code
- E95 = Specific Device Code

### ORDERING INFORMATION

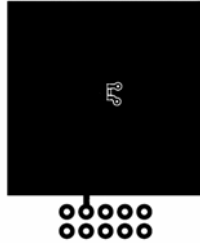
See detailed ordering and shipping information on page 2 of this data sheet.

# FDME905PT

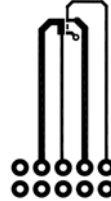
## THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4.5	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	60	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	175	$^{\circ}\text{C}/\text{W}$

1. Repetitive rating: pulse-width limited by maximum junction temperature.



a) 60  $^{\circ}\text{C}/\text{W}$  when mounted on a 1 in<sup>2</sup> pad of 2 oz copper



b). 175  $^{\circ}\text{C}/\text{W}$  when mounted on a minimum pad of 2 oz copper

## PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
E95	FDME905PT	MicroFET 1.6x1.6 Thin (Pb-Free / Halide Free)	7"	8 mm	5,000 Units

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
--------	-----------	-----------------	-----	-----	-----	------

### OFF CHARACTERISTICS

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = 250 \mu\text{A}$ , $V_{GS} = 0 \text{V}$	-12	-	-	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$ , referenced to $25^{\circ}\text{C}$	-	-8.7	-	$\text{mV}/^{\circ}\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -9.6 \text{V}$ , $V_{GS} = 0 \text{V}$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate to Source Leakage Current, Forward	$V_{GS} = \pm 8 \text{V}$ , $V_{DS} = 0 \text{V}$	-	-	$\pm 100$	nA

### ON CHARACTERISTICS

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = -250 \mu\text{A}$	-0.4	-0.7	-1.0	V
$\Delta V_{GS(th)}/\Delta T_J$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$ , referenced to $25^{\circ}\text{C}$	-	2.5	-	$\text{mV}/^{\circ}\text{C}$

# FDME905PT

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
--------	-----------	-----------------	-----	-----	-----	------

### ON CHARACTERISTICS

R <sub>DS(on)</sub>	Drain to Source On Resistance	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -8 A	-	18	22	mΩ
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -7.3 A	-	22	26	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -3.8 A,	-	28	97	
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -8 A, T <sub>J</sub> = 125°C	-	23	32	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> = -5 V, I <sub>D</sub> = -8 A	-	38	-	S

### DYNAMIC CHARACTERISTICS

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -6 V, V <sub>GS</sub> = 0 V, f = 1 MHz	-	1740	2315	pF
C <sub>oss</sub>	Output Capacitance		-	350	525	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	311	465	pF

### SWITCHING CHARACTERISTICS

t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = -6 V, I <sub>D</sub> = -8 A, V <sub>GS</sub> = -4.5 V, R <sub>GEN</sub> = 6 Ω	-	9.5	19	ns
t <sub>r</sub>	Rise Time		-	8	16	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		-	90	144	ns
t <sub>f</sub>	Fall Time		-	42	67	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> = -6 V, I <sub>D</sub> = -8 A, V <sub>GS</sub> = -4.5 V	-	14	20	nC
Q <sub>gs</sub>	Gate to Source Gate Charge		-	2.4	-	nC
Q <sub>gd</sub>	Gate to Drain "Miller" Charge		-	3	-	nC

### DRAIN-SOURCE DIODE CHARACTERISTICS

V <sub>SD</sub>	Source to Drain Diode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = -8 A (Note 2)	-	-0.8	-1.2	V
		V <sub>GS</sub> = 0 V, I <sub>S</sub> = -1.8 A (Note 2)	-	-0.7	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = -8 A, di/dt = 100 A/μs	-	17	31	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	4.5	10	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.

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.

# FDME905PT

## TYPICAL CHARACTERISTICS

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

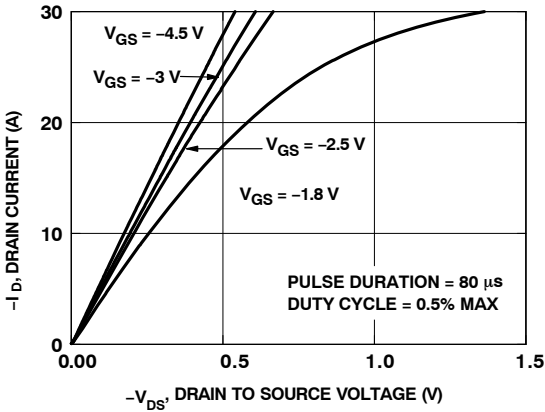


Figure 1. On-Region Characteristics

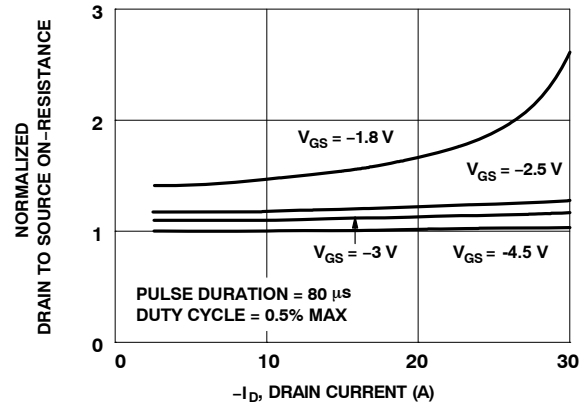


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

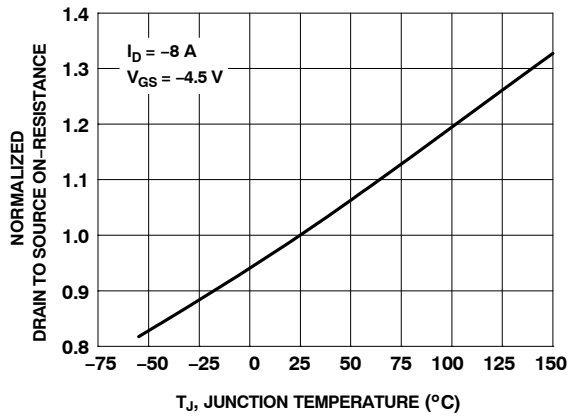


Figure 3. Normalized On-Resistance vs. Junction Temperature

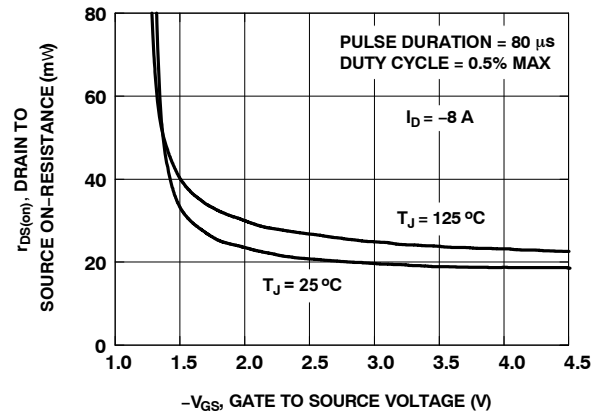


Figure 4. On-Resistance vs. Gate to Source Voltage

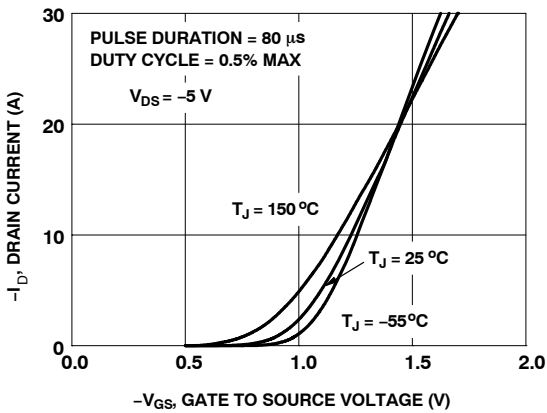


Figure 5. Transfer Characteristics

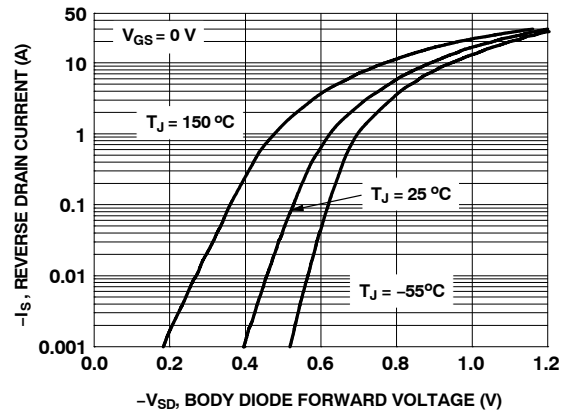


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

# FDME905PT

## TYPICAL CHARACTERISTICS

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

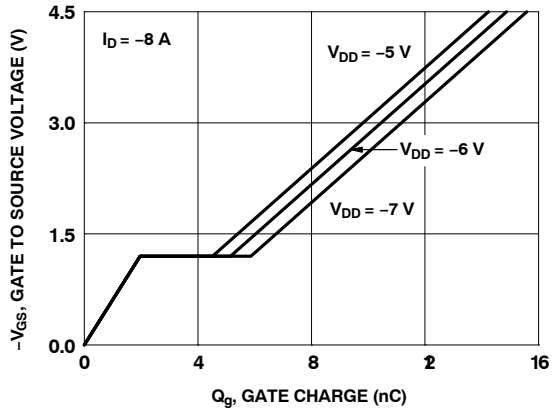


Figure 7. Gate Charge Characteristics

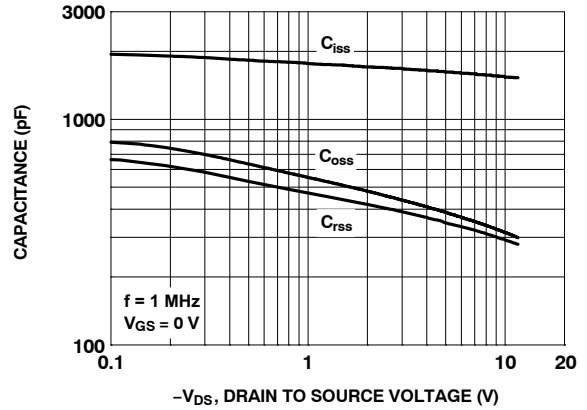


Figure 8. Capacitance vs. Drain to Source Voltage

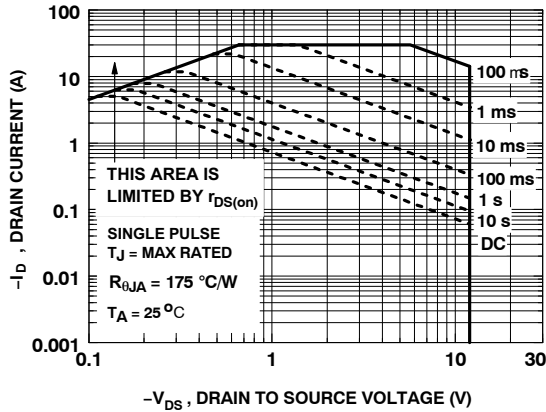


Figure 9. Forward Bias Safe Operating Area

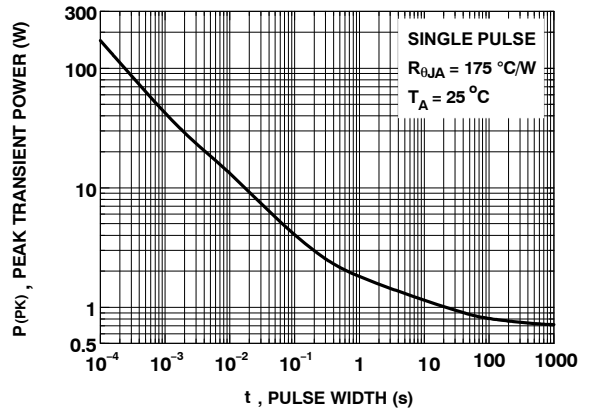


Figure 10. Single Pulse Maximum Power Dissipation

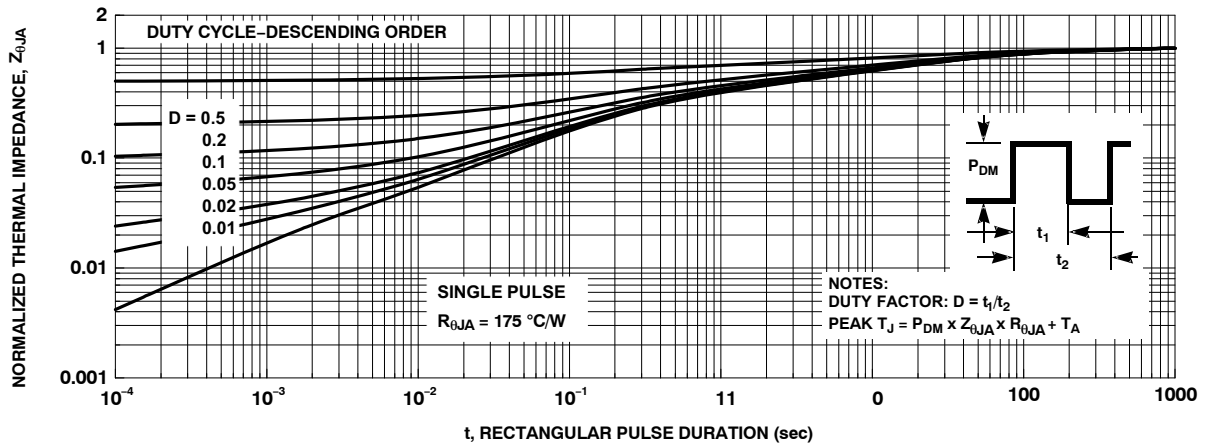


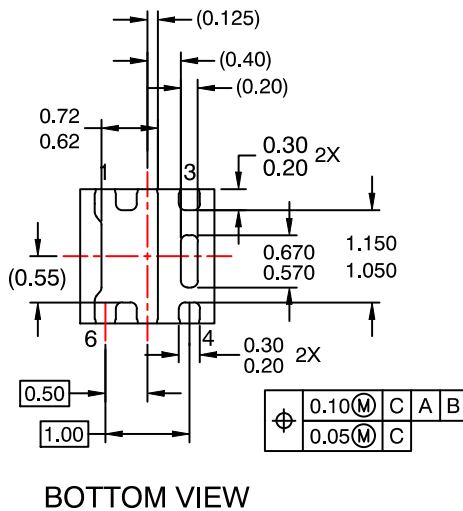
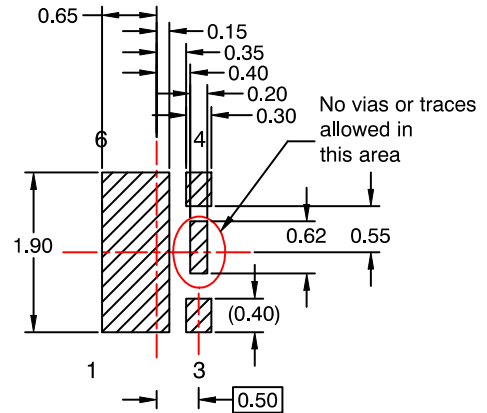
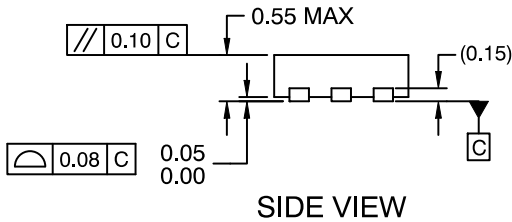
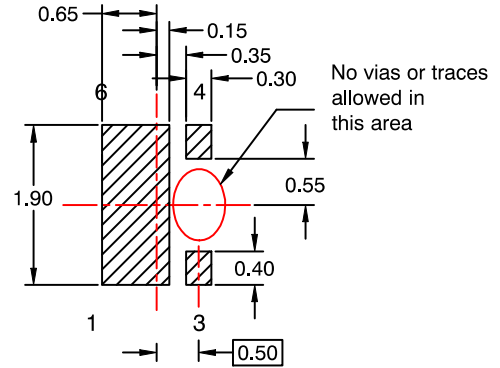
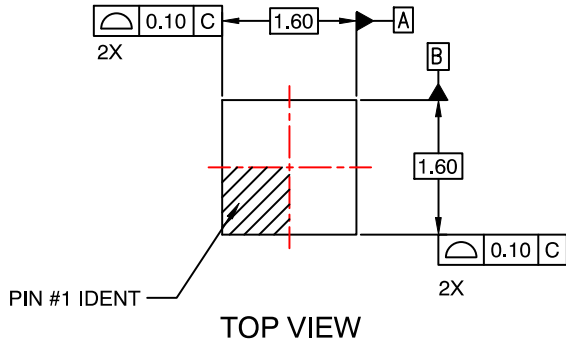
Figure 11. Junction-to-Ambient Transient Thermal Response Curve

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



**UDFN6 1.6x1.6, 0.5P**  
**CASE 517DV**  
**ISSUE O**

DATE 31 OCT 2016



**RECOMMENDED LAND PATTERN OPT 2**

- NOTES:**
- A. DOES NOT FULLY CONFORM TO JEDEC REGISTRATION
  - B. DIMENSIONS ARE IN MILLIMETERS.
  - C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.

<b>DOCUMENT NUMBER:</b>	<b>98AON13700G</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>UDFN6 1.6x1.6, 0.5P</b>	<b>PAGE 1 OF 1</b>

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. ON Semiconductor 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](http://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.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**onsemi Website:** [www.onsemi.com](http://www.onsemi.com)

### TECHNICAL SUPPORT

**North American Technical Support:**

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative