

# Switch-Mode Power Rectifiers

## MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

These state-of-the-art devices are a series designed for use in switching power supplies, inverters and as free wheeling diodes.

### Features

- Ultrafast 25 ns, 50 ns and 75 ns Recovery Times
- 175°C Operating Junction Temperature
- Low Forward Voltage
- Low Leakage Current
- High Temperature Glass Passivated Junction
- Reverse Voltage to 600 V
- Shipped in Plastic Bags, 500 per Bag
- Available in Tape and Reel, 1500 per Reel, by Adding a “RLG” Suffix to the Part Number
- MUR460 available in Fan Fold Ammo Pak, 1000 per Box, by adding a “FFG” suffix to the part number
- These are Pb-Free Packages\*

### Mechanical Characteristics:

- Case: Epoxy, Molded
- Weight: 1.1 Gram (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Polarity: Cathode indicated by Polarity Band



**ON Semiconductor®**

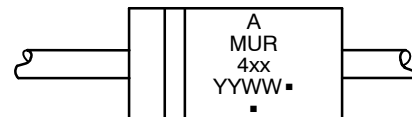
[www.onsemi.com](http://www.onsemi.com)

## ULTRAFAST RECTIFIERS 4.0 AMPERES, 50–600 VOLTS



**AXIAL LEAD  
CASE 267  
STYLE 1**

### MARKING DIAGRAM



A = Assembly Location  
MUR4xx = Device Number  
x = 05, 10, 15, 20, 40, 60  
YY = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

# MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

## MAXIMUM RATINGS

Rating	Symbol	MUR						Unit
		405	410	415	420	440	460	
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	50	100	150	200	400	600	V
Average Rectified Forward Current (Square Wave) (Mounting Method #3 Per Note 2)	$I_{F(AV)}$	4.0 @ $T_A = 80^\circ\text{C}$				4.0 @ $T_A = 40^\circ\text{C}$		A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions, half wave, single phase, 60 Hz)	$I_{FSM}$	125				110		A
Operating Junction Temperature & Storage Temperature	$T_J, T_{stg}$	-65 to +175						$^\circ\text{C}$

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.

## THERMAL CHARACTERISTICS

Rating	Symbol	MUR						Unit
		405	410	415	420	440	460	
Maximum Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	See Note 2						$^\circ\text{C}/\text{W}$
Maximum Thermal Resistance, Junction-to-Case Body	$\Psi_{\theta JC}$	6.6						$^\circ\text{C}/\text{W}$

## ELECTRICAL CHARACTERISTICS

Rating	Symbol	MUR						Unit
		405	410	415	420	440	460	
Maximum Instantaneous Forward Voltage (Note 1) ( $I_F = 3.0\text{ A}$ , $T_J = 150^\circ\text{C}$ ) ( $I_F = 3.0\text{ A}$ , $T_J = 25^\circ\text{C}$ ) ( $I_F = 4.0\text{ A}$ , $T_J = 25^\circ\text{C}$ )	$V_F$	0.71 0.88 0.89				1.05 1.25 1.28		V
Maximum Instantaneous Reverse Current (Note 1) (Rated dc Voltage, $T_J = 150^\circ\text{C}$ ) (Rated dc Voltage, $T_J = 25^\circ\text{C}$ )	$i_R$	150 5				250 10		$\mu\text{A}$
Maximum Reverse Recovery Time ( $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ ) ( $I_F = 0.5\text{ A}$ , $i_R = 1.0\text{ A}$ , $I_{REC} = 0.25\text{ A}$ )	$t_{rr}$	35 25				75 50		ns
Maximum Forward Recovery Time ( $I_F = 1.0\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , Recovery to 1.0 V)	$t_{fr}$	25				50		ns
Controlled Avalanche Energy (Maximum)	$W_{aval}$					5		mJ
Typical Peak Reverse Recovery Current ( $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )	$I_{RM}$	0.8				1.7		A

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

### ORDERING INFORMATION

Device	Package	Shipping†
MUR405G	Axial Lead*	500 Units / Bag
MUR410G	Axial Lead*	
MUR410RLG	Axial Lead*	1500 / Tape & Reel
MUR415G	Axial Lead*	500 Units / Bag
MUR415RLG	Axial Lead*	1500 / Tape & Reel
MUR420G	Axial Lead*	500 Units / Bag
MUR420RLG	Axial Lead*	1500 / Tape & Reel
MUR440G	Axial Lead*	500 Units / Bag
MUR440RLG	Axial Lead*	1500 / Tape & Reel
MUR460G	Axial Lead*	500 Units / Bag
MUR460FFG	Axial Lead*	1000 Units / Box
MUR460RLG	Axial Lead*	1500 / Tape & Reel

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

\*These packages are inherently Pb-Free.

# MUR405, MUR410, MUR415, MUR420, MUR440, MUR460

## MUR405, MUR410, MUR415, MUR420

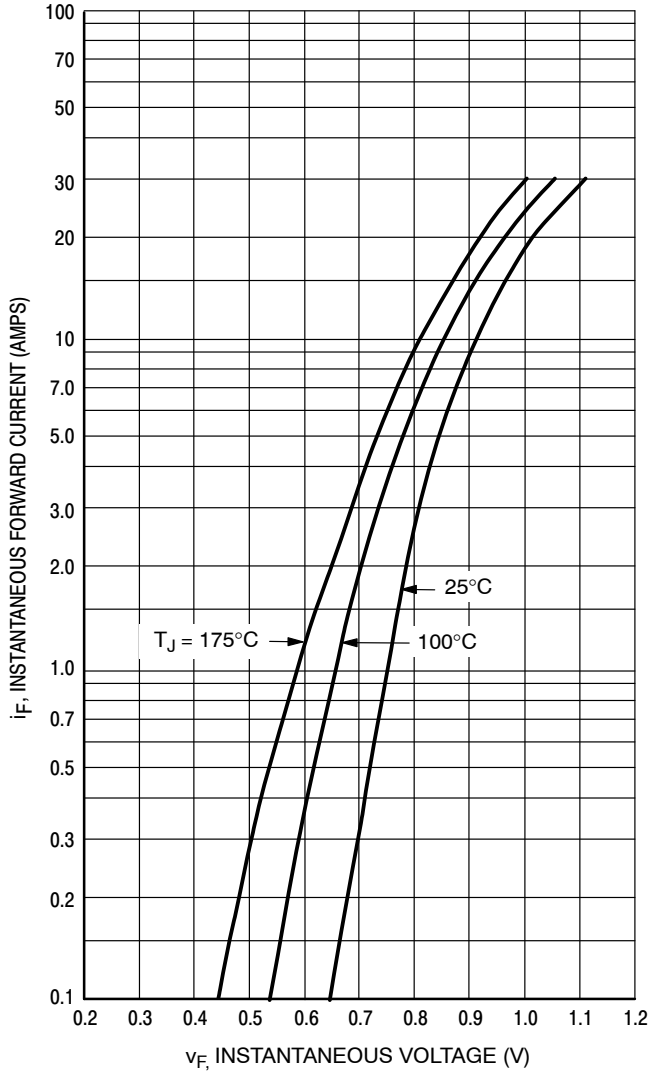


Figure 1. Typical Forward Voltage

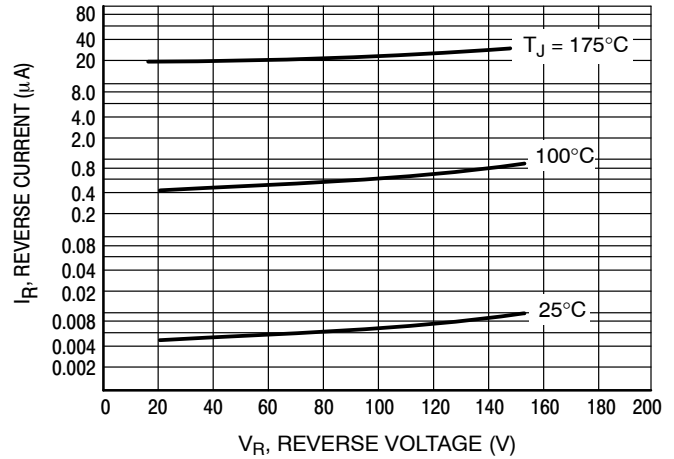


Figure 2. Typical Reverse Current

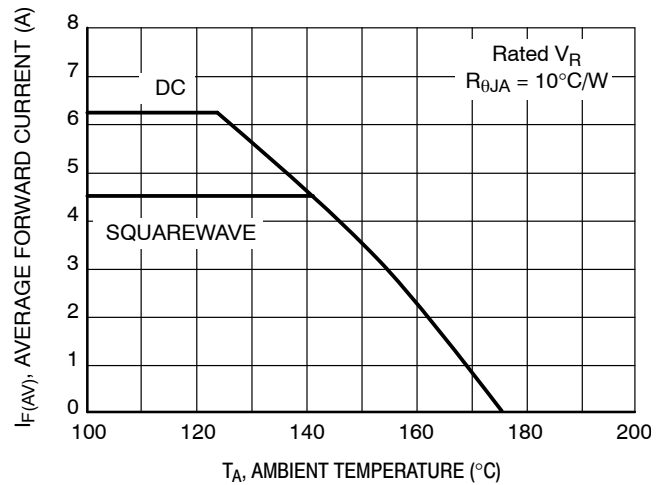


Figure 3. Current Derating  
(Mounting Method #3 Per Note 2)

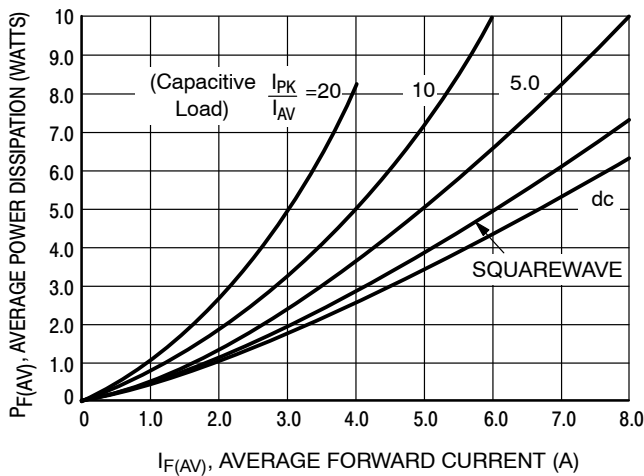


Figure 4. Power Dissipation

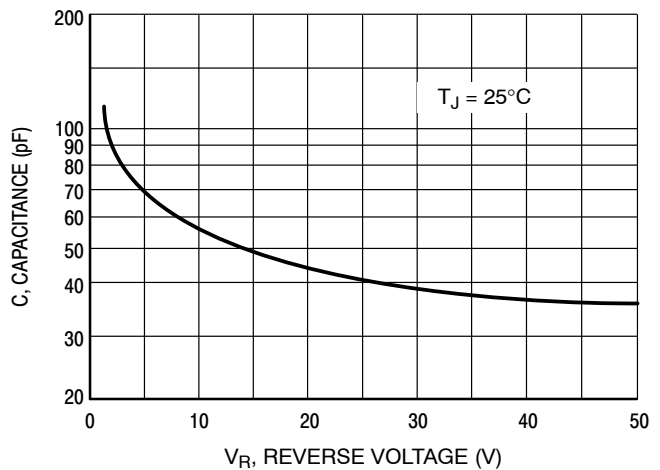


Figure 5. Typical Capacitance

MUR440, MUR460

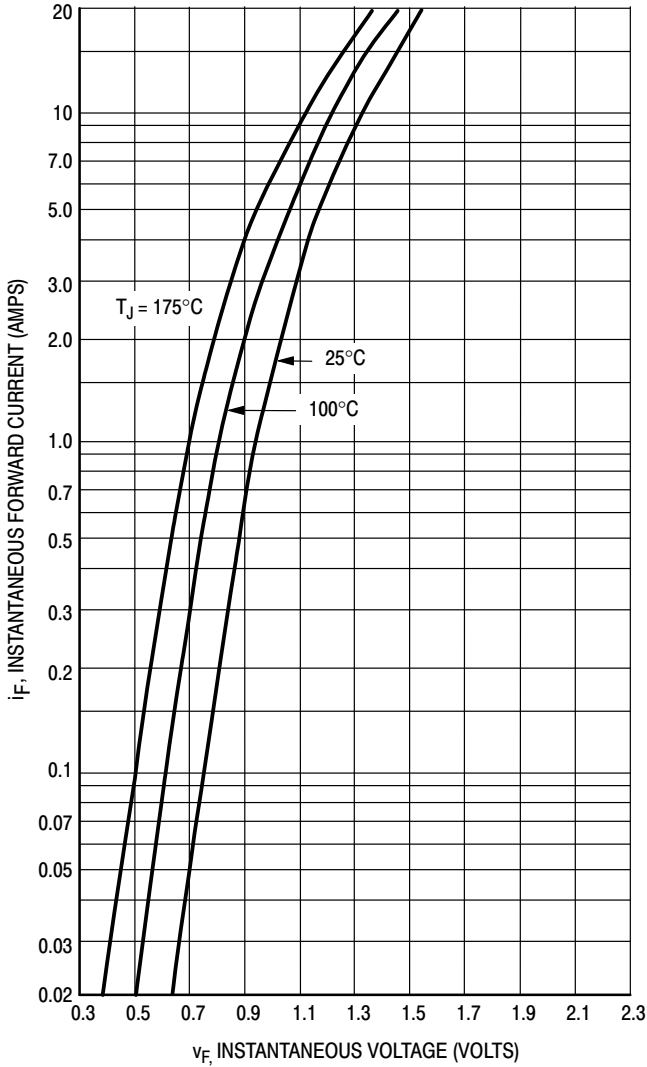


Figure 6. Typical Forward Voltage

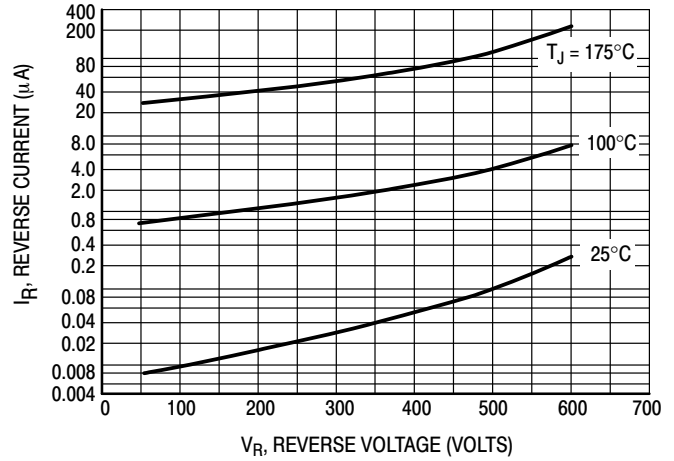


Figure 7. Typical Reverse Current

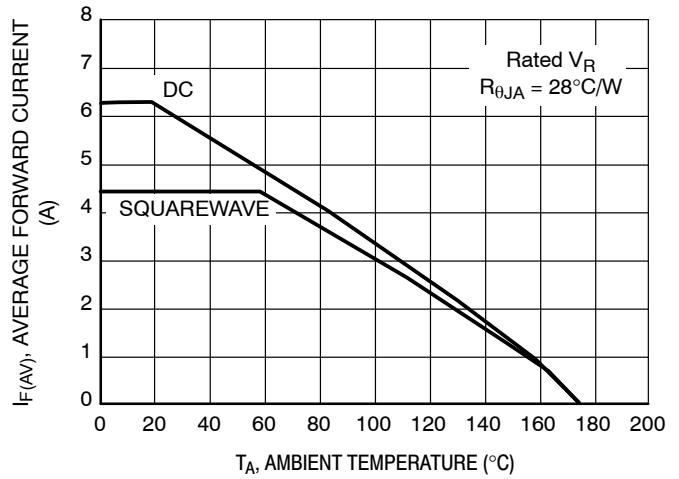


Figure 8. Current Derating  
(Mounting Method #3 Per Note 2)

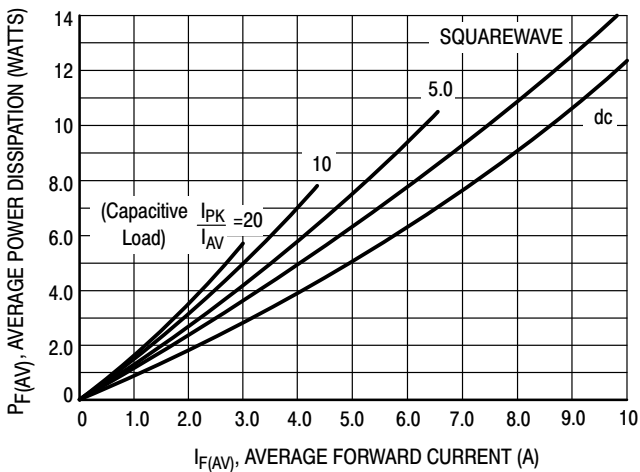


Figure 9. Power Dissipation

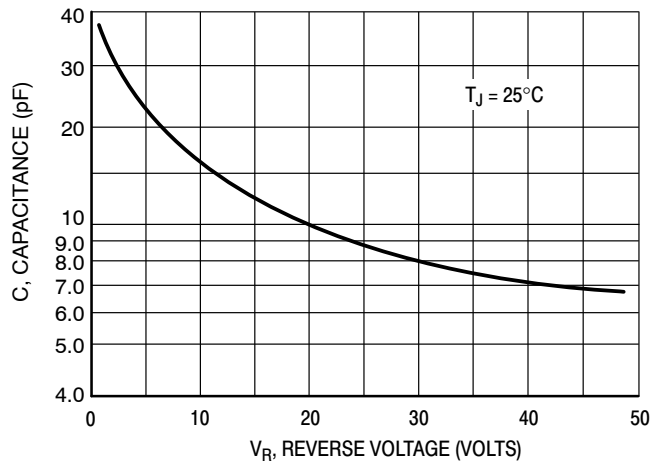
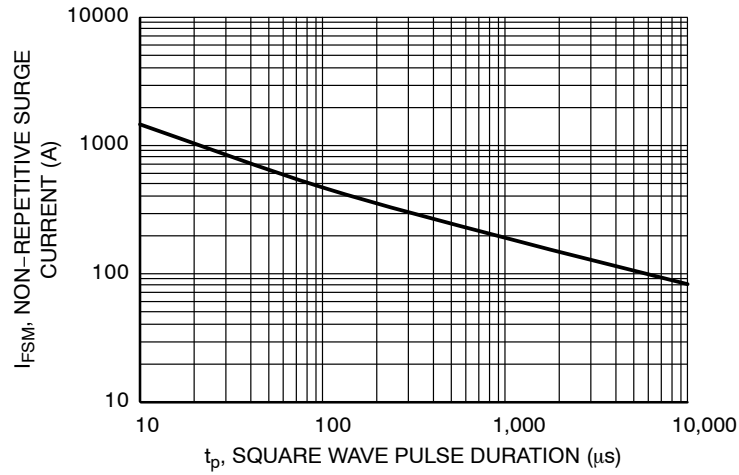


Figure 10. Typical Capacitance

MUR440, MUR460



**Figure 11. Typical Non-Repulsive Surge Current**

\*Typical performance based on a limited sample size. ON Semiconductor does not guarantee ratings not listed in the Maximum Ratings table.

NOTE 2 — AMBIENT MOUNTING DATA

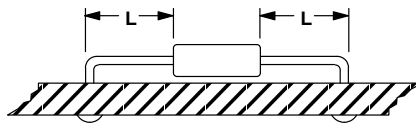
Data shown for thermal resistance junction-to-ambient ( $R_{\theta JA}$ ) for the mountings shown is to be used as typical guideline values for preliminary engineering or in case the tie point temperature cannot be measured.

TYPICAL VALUES FOR  $R_{\theta JA}$  IN STILL AIR

Mounting Method	$R_{\theta JA}$	Lead Length, L (IN)				Units
		1/8	1/4	1/2	3/4	
1		50	51	53	55	$^{\circ}\text{C}/\text{W}$
2		58	59	61	63	$^{\circ}\text{C}/\text{W}$
3		28				$^{\circ}\text{C}/\text{W}$

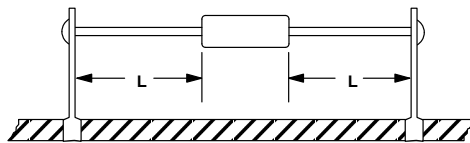
MOUNTING METHOD 1

P.C. Board Where Available Copper Surface area is small.



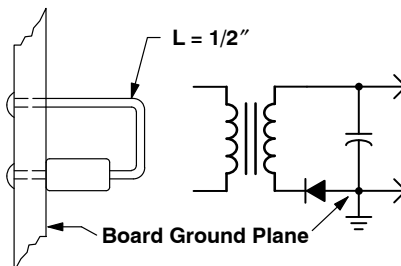
MOUNTING METHOD 2

Vector Push-In Terminals T-28



MOUNTING METHOD 3

P.C. Board with 1-1/2" x 1-1/2" Copper Surface





**AXIAL LEAD**  
**CASE 267-05**  
**ISSUE G**

**DATE 06/06/2000**



SCALE 1:1



- NOTES:
1. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 267-04 OBSOLETE, NEW STANDARD 267-05.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.287	0.374	7.30	9.50
B	0.189	0.209	4.80	5.30
D	0.047	0.051	1.20	1.30
K	1.000	---	25.40	---

STYLE 1:  
 PIN 1. CATHODE (POLARITY BAND)  
 2. ANODE

STYLE 2:  
 NO POLARITY

<b>DOCUMENT NUMBER:</b>	<b>98ASB42170B</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>AXIAL LEAD</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