

# MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G, SUR8820G, SUR8840G

## Switch-mode Power Rectifiers

This series is designed for use in switching power supplies, inverters and as free wheeling diodes.

### Features

- Ultrafast 25 and 50 Nanosecond Recovery Time
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Low Forward Voltage
- Low Leakage Current
- Reverse Voltage to 600 V
- ESD Ratings:
  - ♦ Machine Model = C (> 400 V)
  - ♦ Human Body Model = 3B (> 16,000 V)
- SUR8 Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant\*

### Mechanical Characteristics:

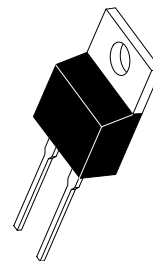
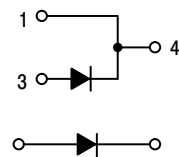
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max for 10 Seconds



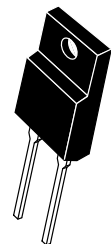
ON Semiconductor®

<http://onsemi.com>

## ULTRAFAST RECTIFIERS 8.0 AMPERES, 50–600 VOLTS

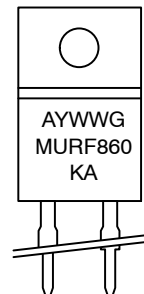
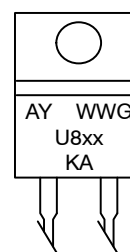


TO-220AC  
CASE 221B  
STYLE 1



TO-220 FULLPAK  
CASE 221AG  
STYLE 1

### MARKING DIAGRAMS



A = Assembly Location  
Y = Year  
WW = Work Week  
U8XX = Device Code  
xx = 05, 10, 15, 20, 40, or 60  
G = Pb-Free Package  
KA = Diode Polarity

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 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.

# MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G, SUR8820G, SUR8840G

## MAXIMUM RATINGS

| Rating                                                                                                     | Symbol                          | MUR/SUR8    |     |     |     |     |     | Unit             |
|------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|-----|-----|-----|-----|-----|------------------|
|                                                                                                            |                                 | 805         | 810 | 815 | 820 | 840 | 860 |                  |
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                     | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 50          | 100 | 150 | 200 | 400 | 600 | V                |
| Average Rectified Forward Current<br>Total Device, (Rated $V_R$ ), $T_C = 150^\circ\text{C}$               | $I_{F(AV)}$                     | 8.0         |     |     |     |     |     | A                |
| Peak Repetitive Forward Current<br>(Rated $V_R$ , Square Wave, 20 kHz), $T_C = 150^\circ\text{C}$          | $I_{FM}$                        | 16          |     |     |     |     |     | A                |
| Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz) | $I_{FSM}$                       | 100         |     |     |     |     |     | A                |
| Operating Junction Temperature and Storage Temperature Range                                               | $T_J, T_{stg}$                  | -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

| Characteristic                                      | Symbol           | MUR/SUR8 |     |     |     |     |     | Unit |
|-----------------------------------------------------|------------------|----------|-----|-----|-----|-----|-----|------|
|                                                     |                  | 805      | 810 | 815 | 820 | 840 | 860 |      |
| Maximum Thermal Resistance, Junction-to-Case        | R <sub>θJC</sub> | 3.0      |     |     |     | 2.0 |     | °C/W |
| Thermal Resistance, Junction-to-Case<br>MURF860     | R <sub>θJC</sub> | 4.75     |     |     |     |     |     | °C/W |
| Thermal Resistance, Junction-to-Ambient             | R <sub>θJA</sub> | 73       |     |     |     |     |     | °C/W |
| Thermal Resistance, Junction-to-Ambiente<br>MURF860 | R <sub>θJA</sub> | 75       |     |     |     |     |     | °C/W |

## ELECTRICAL CHARACTERISTICS

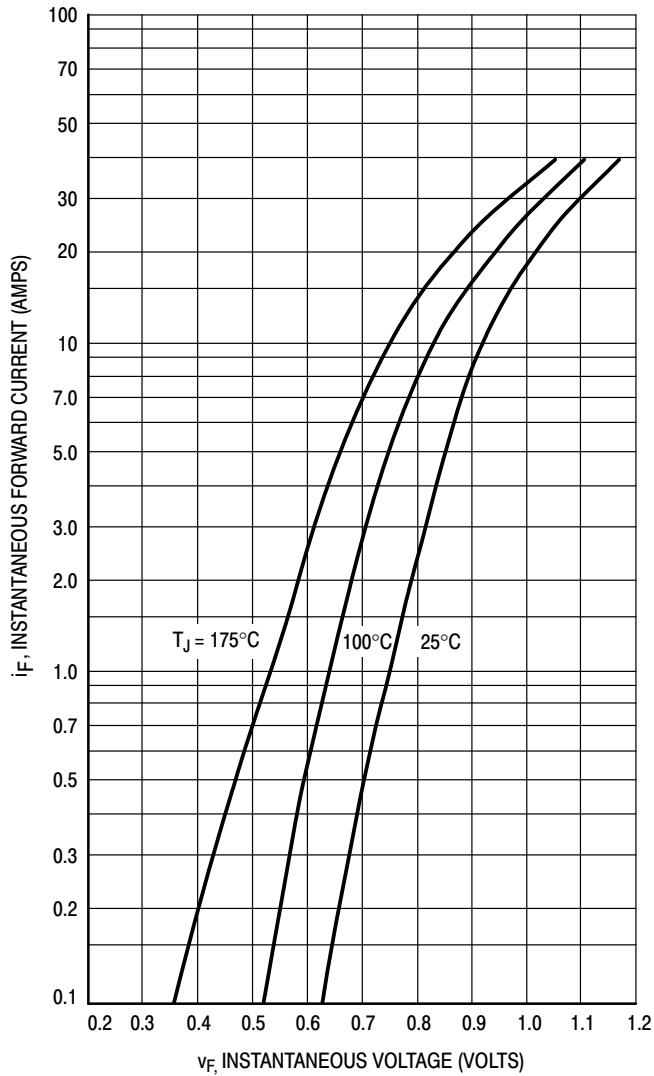
| Characteristic                                                                                                                                                               | Symbol   | MUR/SUR8       |     |     |     |              |              | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|-----|-----|-----|--------------|--------------|---------------|
|                                                                                                                                                                              |          | 805            | 810 | 815 | 820 | 840          | 860          |               |
| Maximum Instantaneous Forward Voltage (Note 1)<br>( $I_F = 8.0\text{ A}$ , $T_C = 150^\circ\text{C}$ )<br>( $I_F = 8.0\text{ A}$ , $T_C = 25^\circ\text{C}$ )                | $V_F$    | 0.895<br>0.975 |     |     |     | 1.00<br>1.30 | 1.20<br>1.50 | V             |
| Maximum Instantaneous Reverse Current (Note 1)<br>(Rated DC Voltage, $T_J = 150^\circ\text{C}$ )<br>(Rated DC Voltage, $T_J = 25^\circ\text{C}$ )                            | $I_R$    | 250<br>5.0     |     |     |     | 500<br>10    |              | $\mu\text{A}$ |
| Maximum Reverse Recovery Time<br>( $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )<br>( $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{REC} = 0.25\text{ A}$ ) | $t_{rr}$ | 35<br>25       |     |     |     | 60<br>50     |              | ns            |

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.

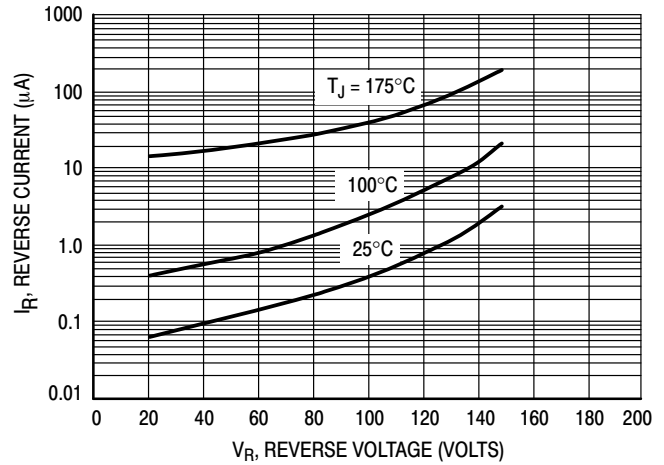
1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

**MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,  
SUR8820G, SUR8840G**

**MUR805G, MUR810G, MUR815G, MUR820G, SUR8820G**

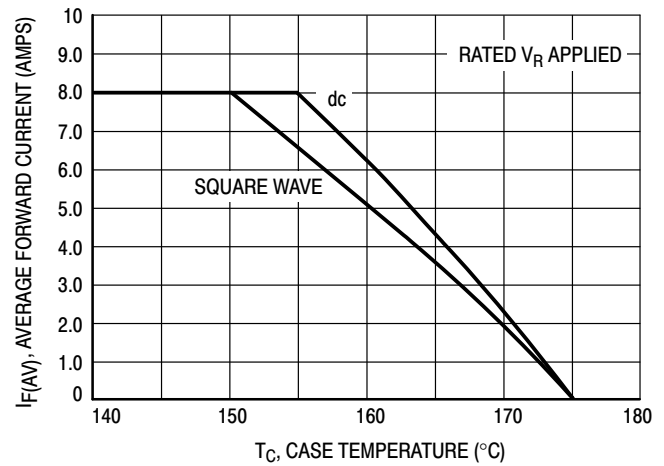


**Figure 1. Typical Forward Voltage**

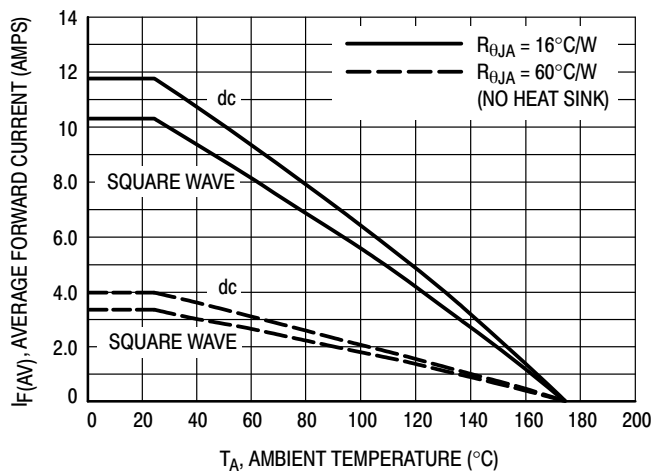


**Figure 2. Typical Reverse Current\***

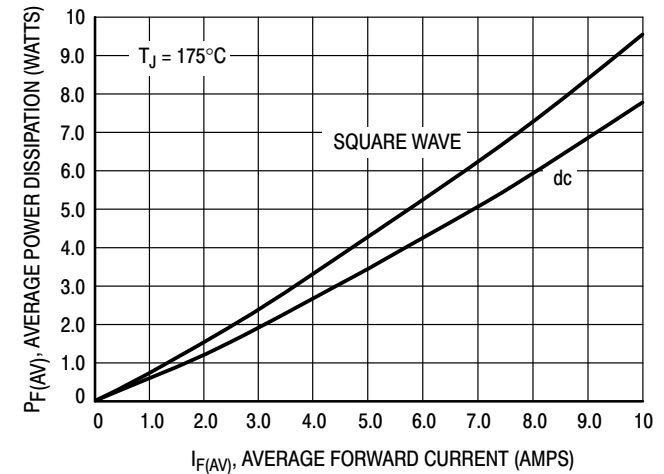
\* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .



**Figure 3. Current Derating, Case**



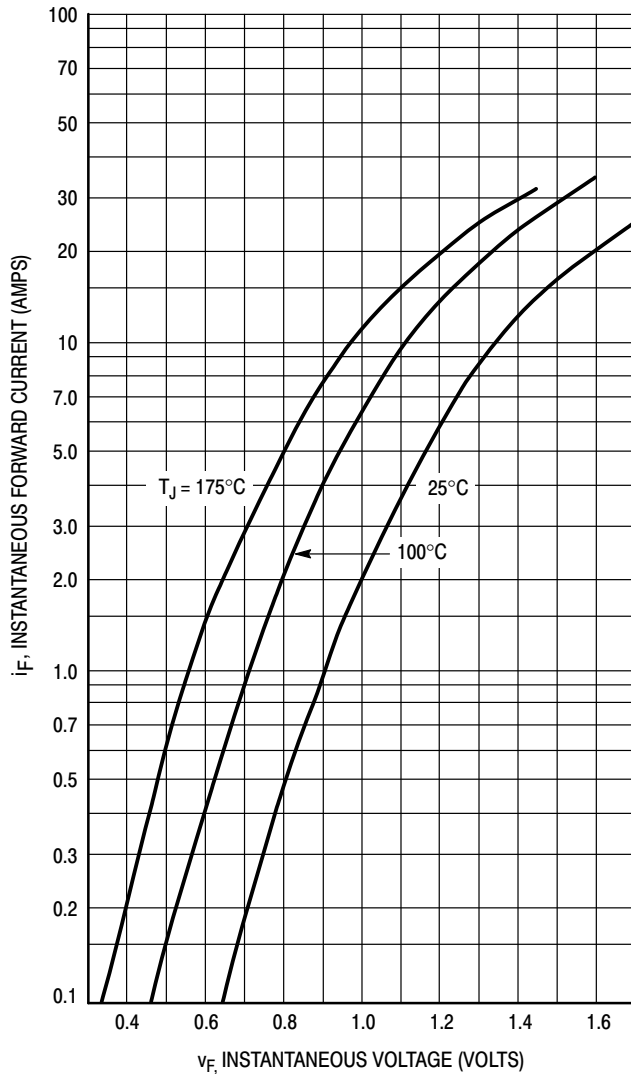
**Figure 4. Current Derating, Ambient**



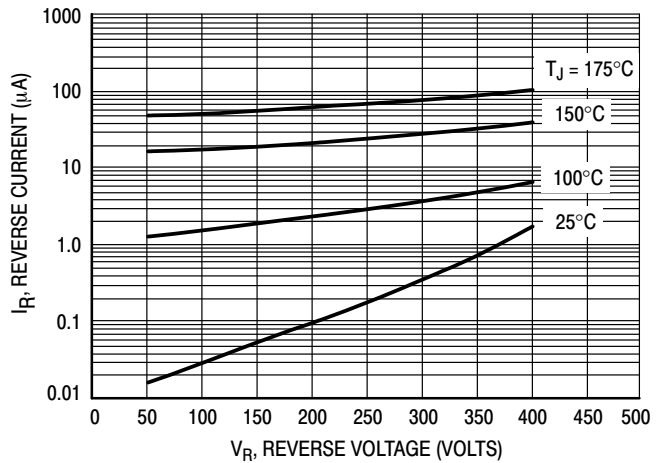
**Figure 5. Power Dissipation**

**MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,  
SUR8820G, SUR8840G**

**MUR840G, SUR8840G**

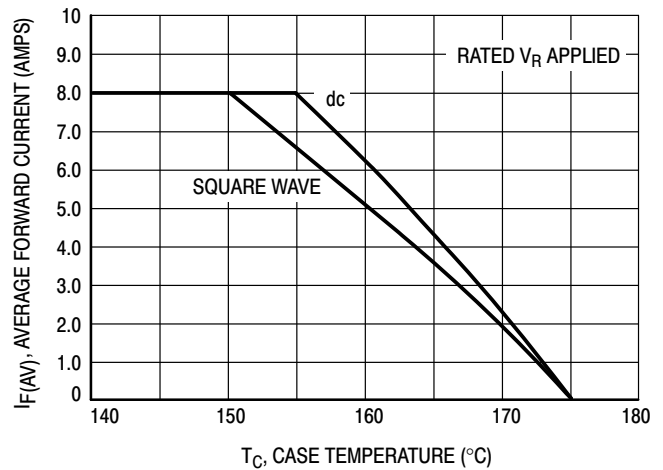


**Figure 6. Typical Forward Voltage**

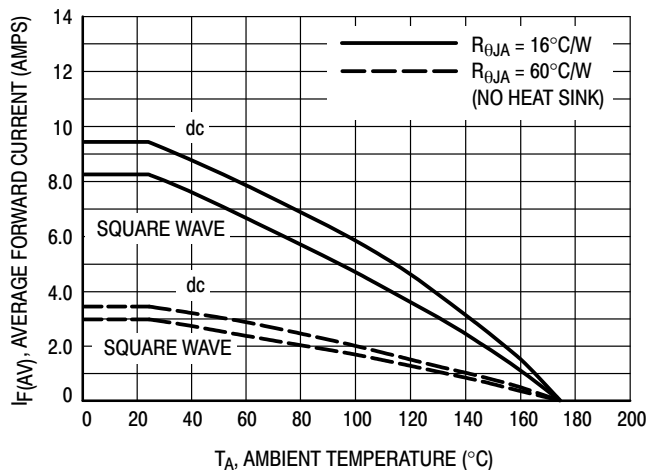


**Figure 7. Typical Reverse Current\***

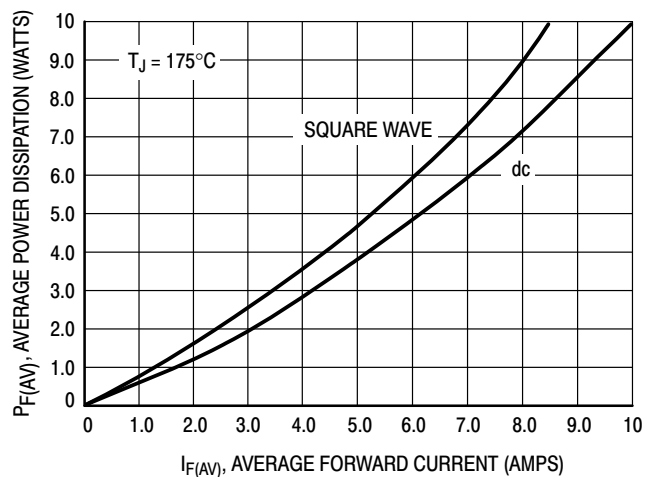
\* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .



**Figure 8. Current Derating, Case**



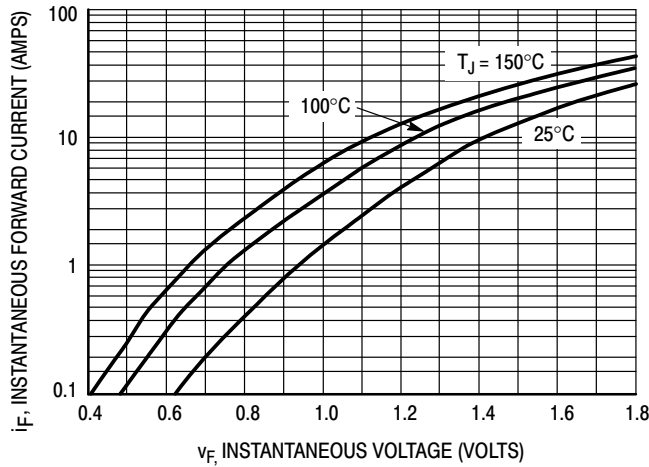
**Figure 9. Current Derating, Ambient**



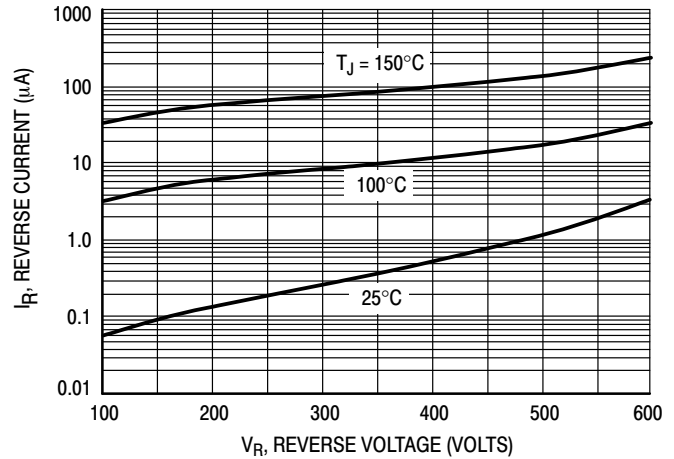
**Figure 10. Power Dissipation**

**MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,  
SUR8820G, SUR8840G**

**MUR860G, MURF860G**

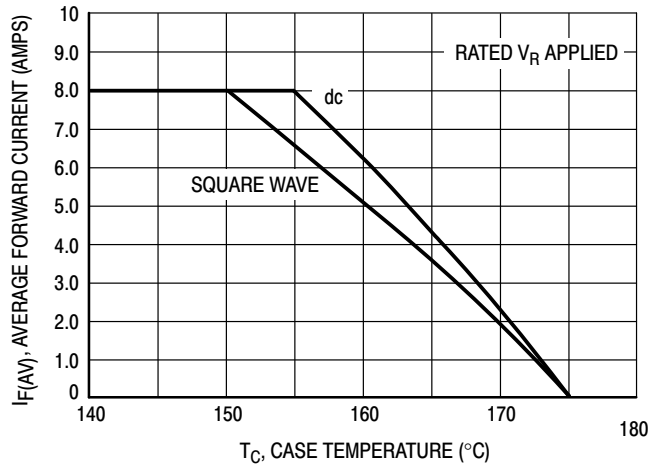


**Figure 11. Typical Forward Voltage**

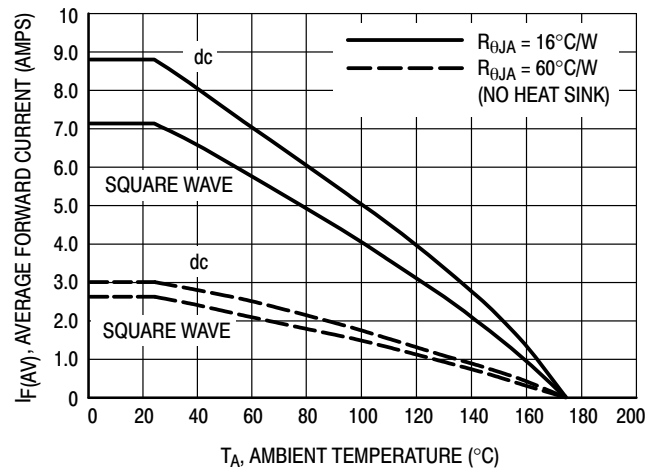


**Figure 12. Typical Reverse Current\***

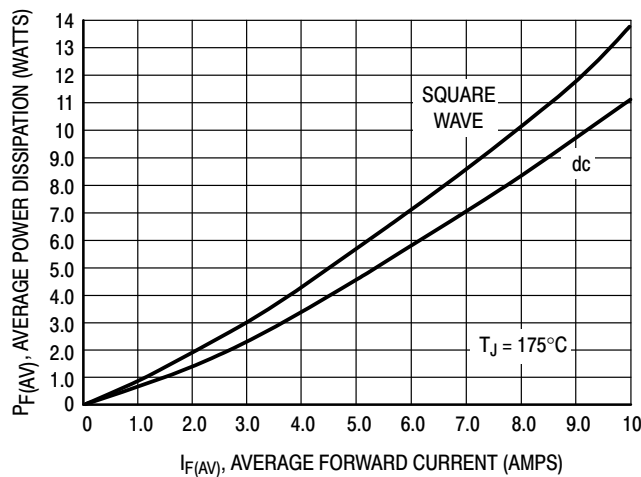
\* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .



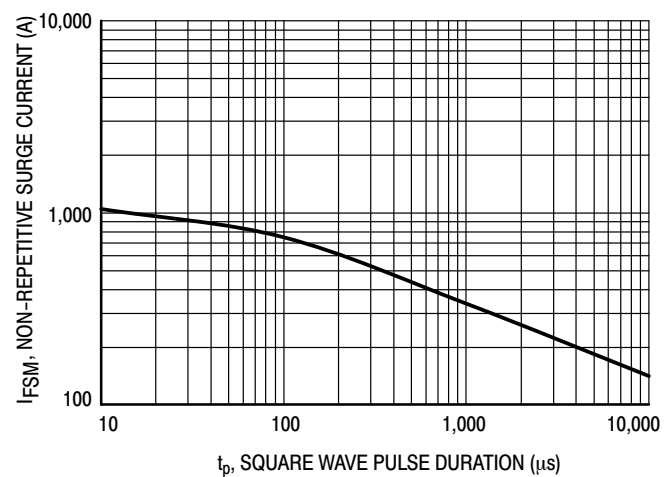
**Figure 13. Current Derating, Case**



**Figure 14. Current Derating, Ambient**



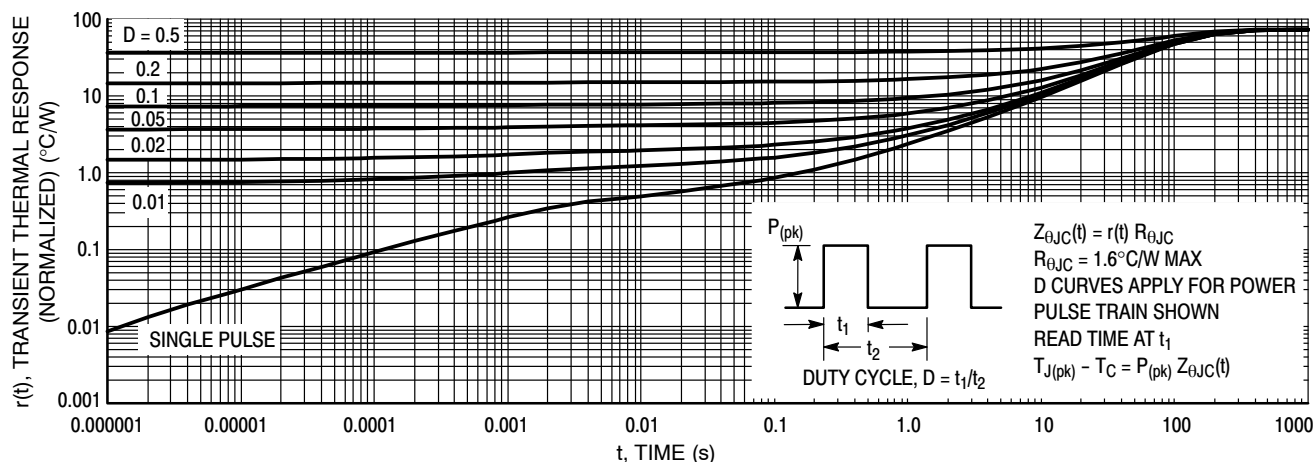
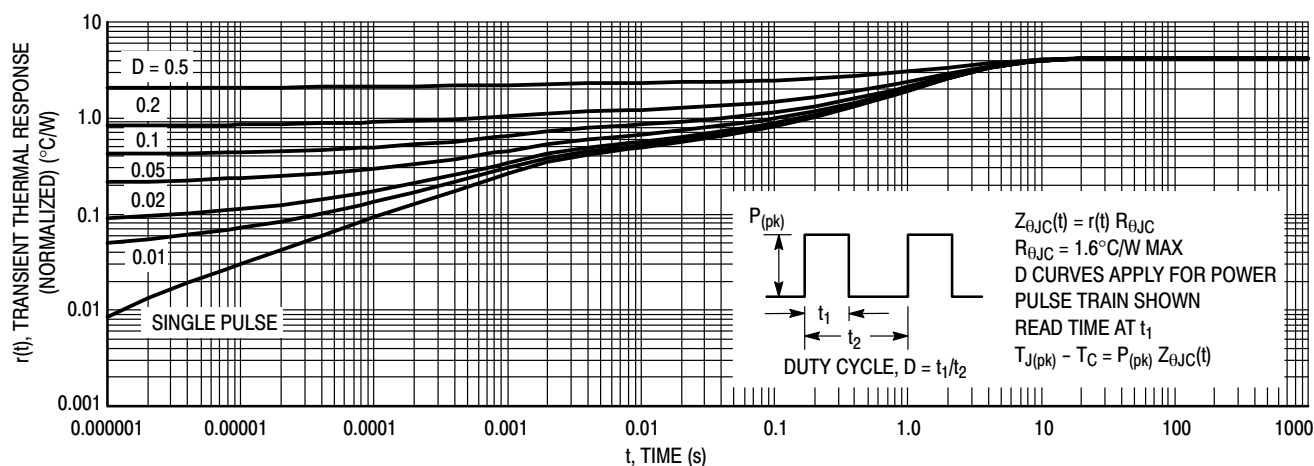
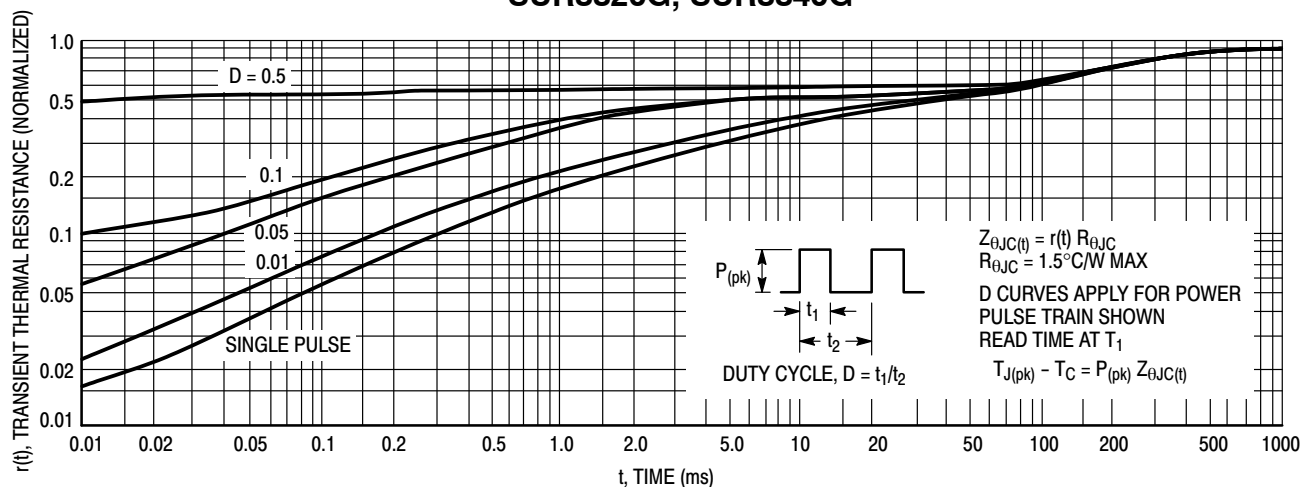
**Figure 15. Power Dissipation**



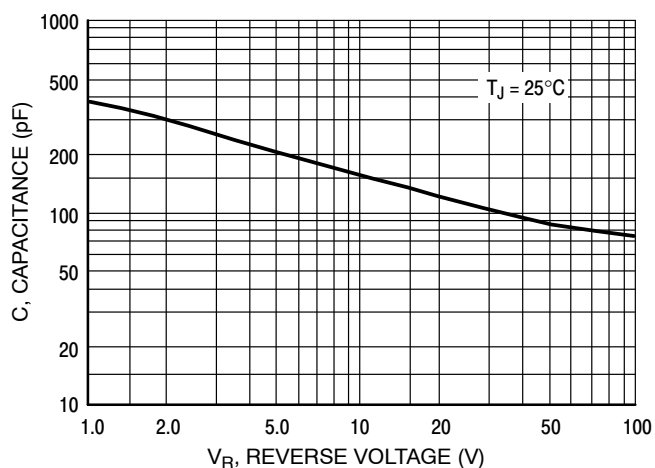
**Figure 16. Typical Non-Repetitive Surge Current**

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

**MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G, SUR8820G, SUR8840G**



**MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,  
SUR8820G, SUR8840G**



**Figure 20. Typical Capacitance**

**ORDERING INFORMATION**

| Device   | Package               | Shipping        |
|----------|-----------------------|-----------------|
| MUR805G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| MUR810G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| MUR815G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| MUR820G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| SUR8820G | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| MUR840G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| SUR8840G | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| MUR860G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail |
| MURF860G | TO-220FP<br>(Pb-Free) | 50 Units / Rail |

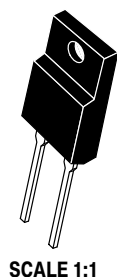
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®

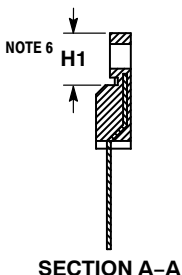
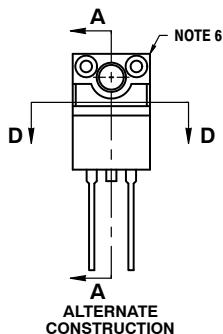
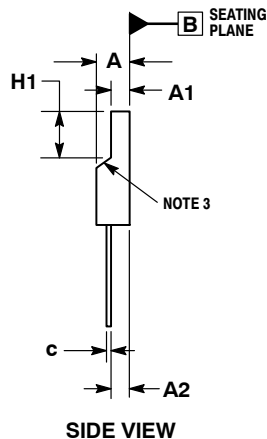
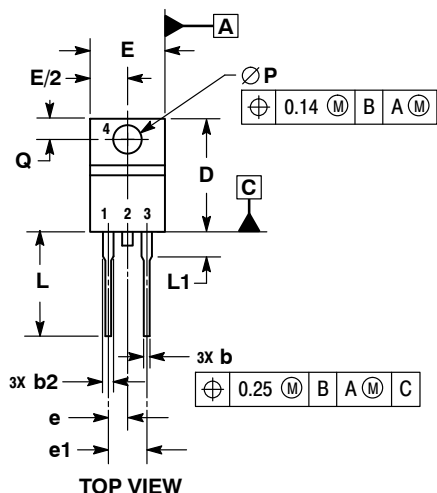


## TO-220 FULLPACK, 2-LEAD CASE 221AG ISSUE B

DATE 27 AUG 2015



SCALE 1:1

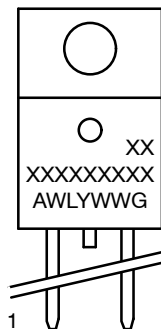


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 4.30        | 4.70  |
| A1  | 2.50        | 2.90  |
| A2  | 2.50        | 2.90  |
| b   | 0.54        | 0.84  |
| b2  | 1.10        | 1.40  |
| c   | 0.49        | 0.79  |
| D   | 14.22       | 15.88 |
| E   | 9.65        | 10.67 |
| e   | 2.54 BSC    |       |
| e1  | 5.08 BSC    |       |
| H1  | 6.40        | 6.90  |
| L   | 12.70       | 14.73 |
| L1  | ---         | 2.80  |
| P   | 3.00        | 3.40  |
| Q   | 2.80        | 3.20  |

### GENERIC MARKING DIAGRAM\*



A = Assembly Location  
WL = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present.

|                  |                         |                                                                                                                                                                                  |
|------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DOCUMENT NUMBER: | 98AON52563E             | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION:     | TO-220 FULLPACK, 2-LEAD | PAGE 1 OF 1                                                                                                                                                                      |

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.

# MECHANICAL CASE OUTLINE

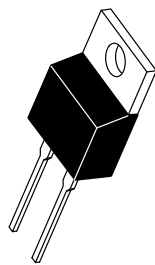
## PACKAGE DIMENSIONS

ON Semiconductor®

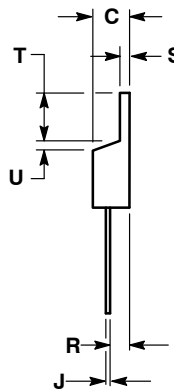
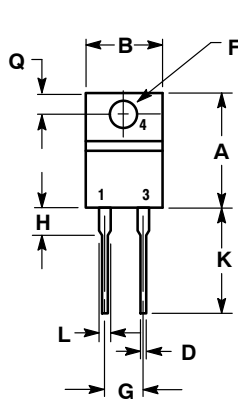


### TO-220, 2-LEAD CASE 221B-04 ISSUE F

DATE 12 APR 2013



SCALE 1:1



#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.595  | 0.620 | 15.11       | 15.75 |
| B   | 0.380  | 0.405 | 9.65        | 10.29 |
| C   | 0.160  | 0.190 | 4.06        | 4.82  |
| D   | 0.025  | 0.039 | 0.64        | 1.00  |
| F   | 0.142  | 0.161 | 3.61        | 4.09  |
| G   | 0.190  | 0.210 | 4.83        | 5.33  |
| H   | 0.110  | 0.130 | 2.79        | 3.30  |
| J   | 0.014  | 0.025 | 0.36        | 0.64  |
| K   | 0.500  | 0.562 | 12.70       | 14.27 |
| L   | 0.045  | 0.060 | 1.14        | 1.52  |
| Q   | 0.100  | 0.120 | 2.54        | 3.04  |
| R   | 0.080  | 0.110 | 2.04        | 2.79  |
| S   | 0.045  | 0.055 | 1.14        | 1.39  |
| T   | 0.235  | 0.255 | 5.97        | 6.48  |
| U   | 0.000  | 0.050 | 0.000       | 1.27  |

STYLE 1:  
PIN 1. CATHODE  
2. N/A  
3. ANODE  
4. CATHODE

STYLE 2:  
PIN 1. ANODE  
2. N/A  
3. CATHODE  
4. ANODE

DOCUMENT NUMBER: 98ASB42149B

Electronic versions are uncontrolled except when accessed directly from the Document Repository.  
Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.

DESCRIPTION: TO-220, 2-LEAD

PAGE 1 OF 1

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