

# 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:

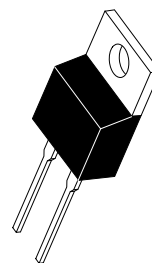
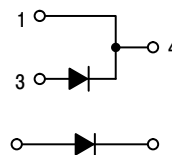
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max for 10 Seconds



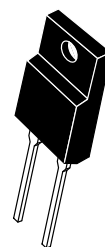
ON Semiconductor®

<http://onsemi.com>

## ULTRAFAST RECTIFIERS 8.0 AMPERES, 50–600 VOLTS

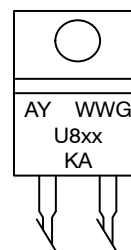


TO-220AC  
CASE 221B  
STYLE 1



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

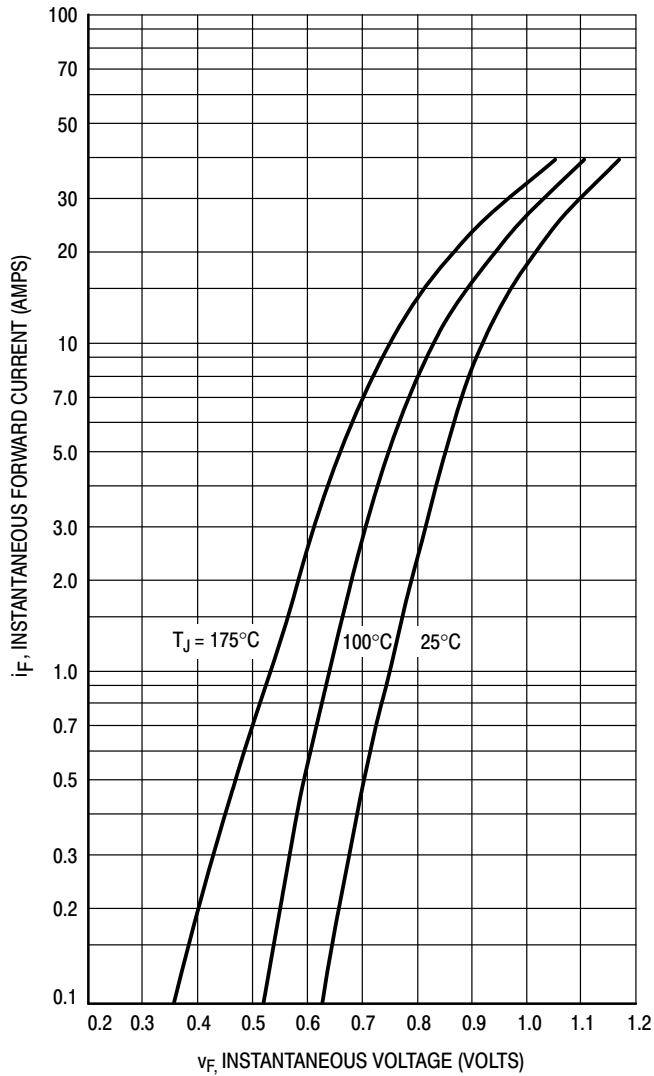
| Characteristic                                                                                                                                                               | Symbol   | MUR/SUR8       |     |     |     |              |              | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|-----|-----|-----|--------------|--------------|---------------|
|                                                                                                                                                                              |          | 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.

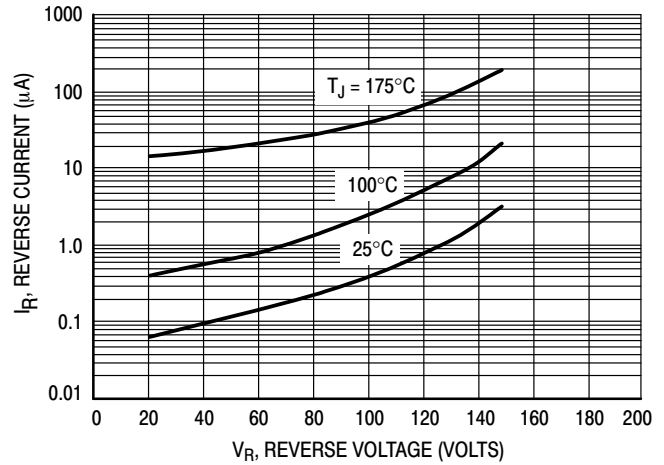
1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

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

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

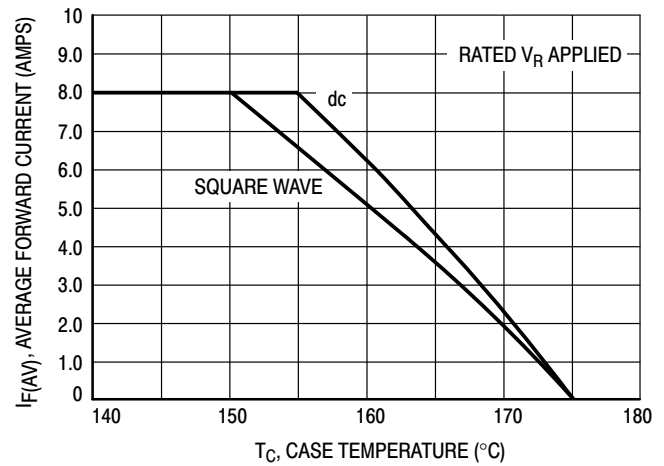


**Figure 1. Typical Forward Voltage**

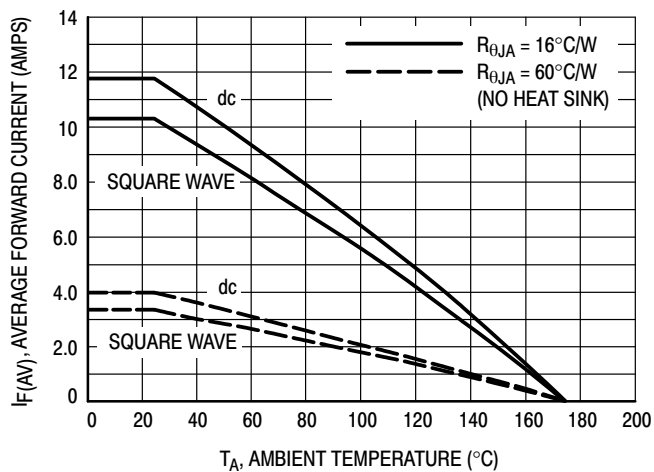


**Figure 2. Typical Reverse Current\***

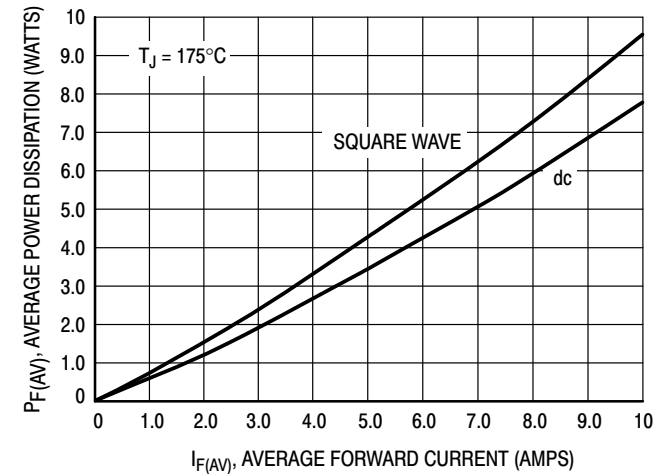
\* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .



**Figure 3. Current Derating, Case**



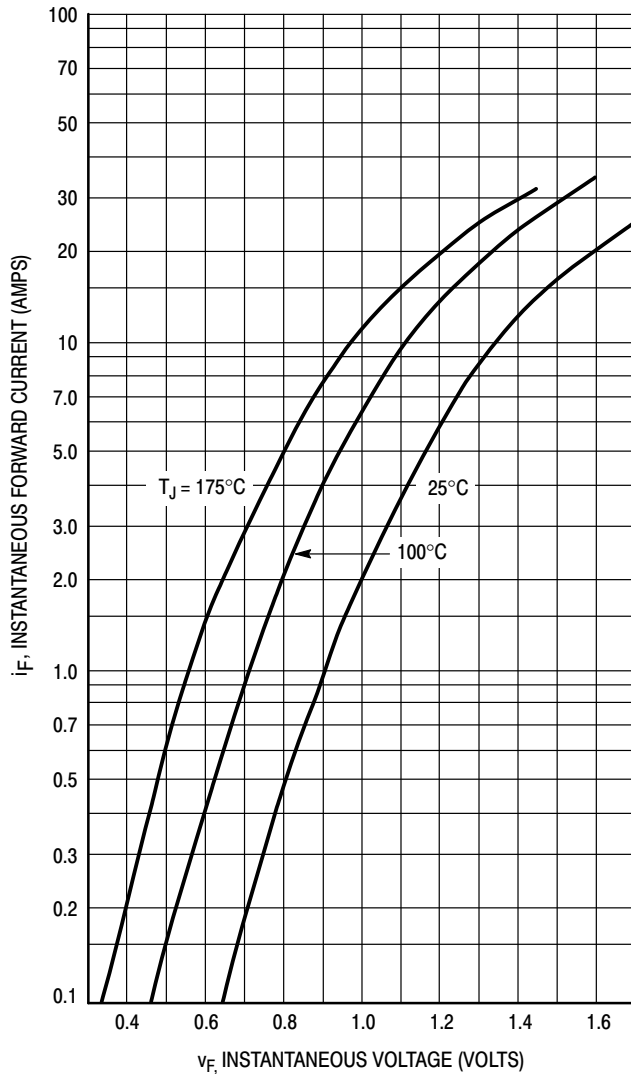
**Figure 4. Current Derating, Ambient**



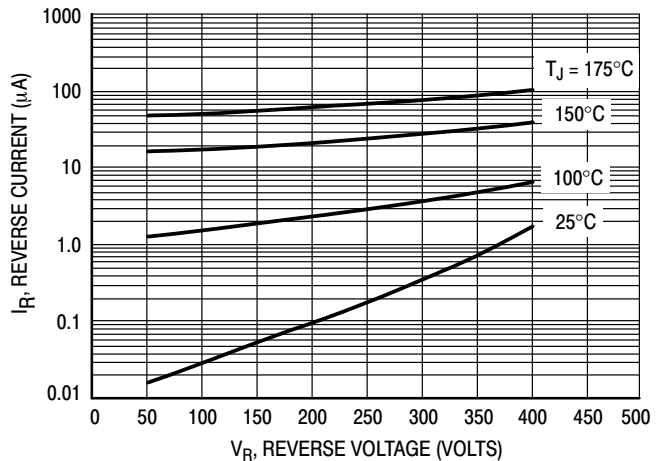
**Figure 5. Power Dissipation**

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

**MUR840G, SUR8840G**

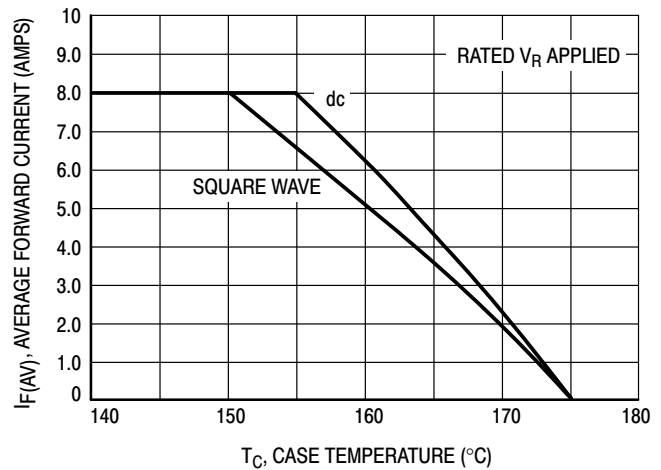


**Figure 6. Typical Forward Voltage**

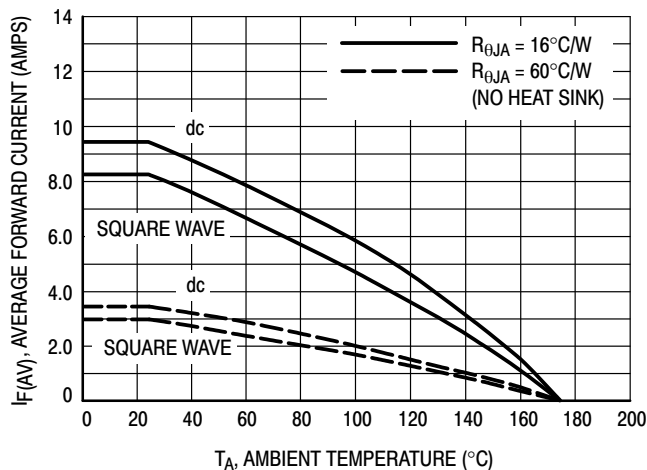


**Figure 7. Typical Reverse Current\***

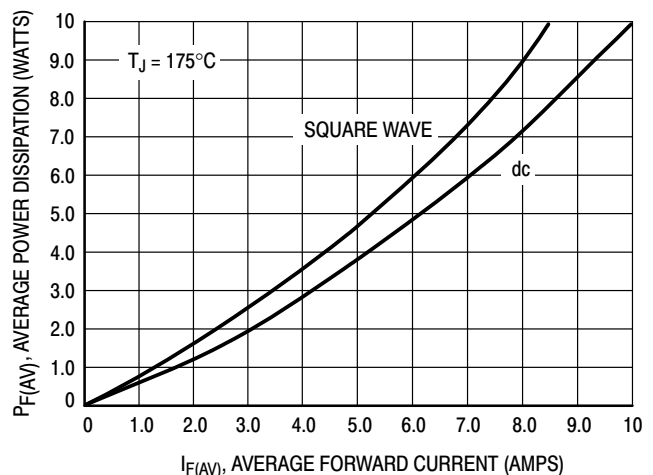
\* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .



**Figure 8. Current Derating, Case**



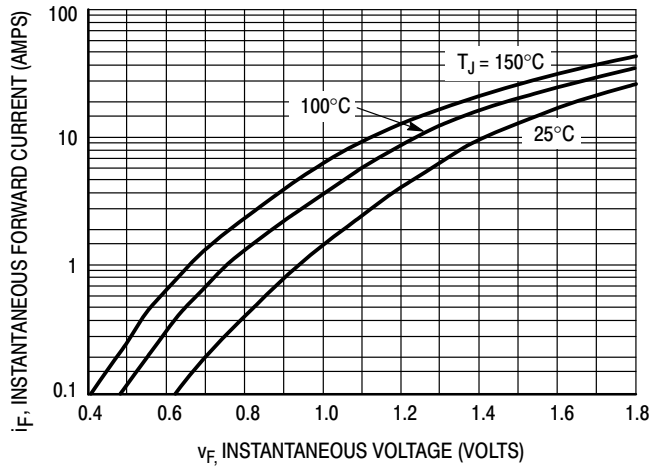
**Figure 9. Current Derating, Ambient**



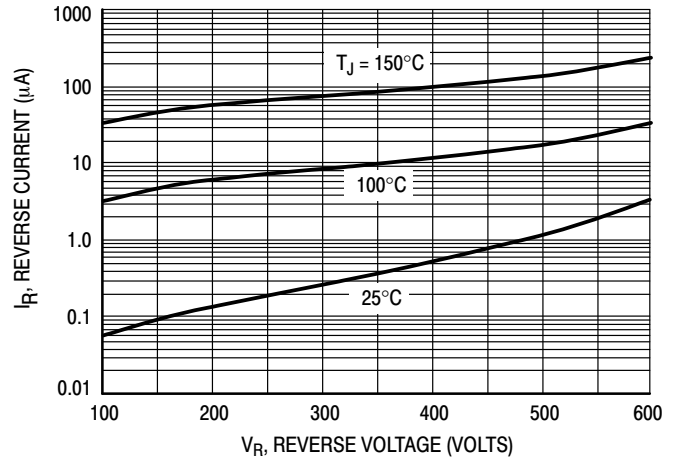
**Figure 10. Power Dissipation**

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

**MUR860G, MURF860G**

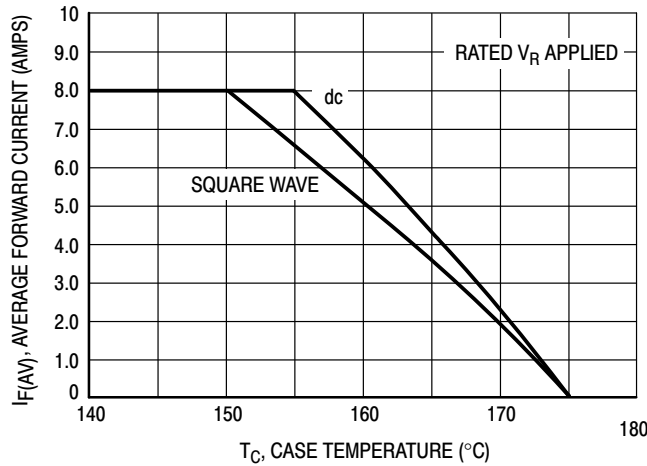


**Figure 11. Typical Forward Voltage**

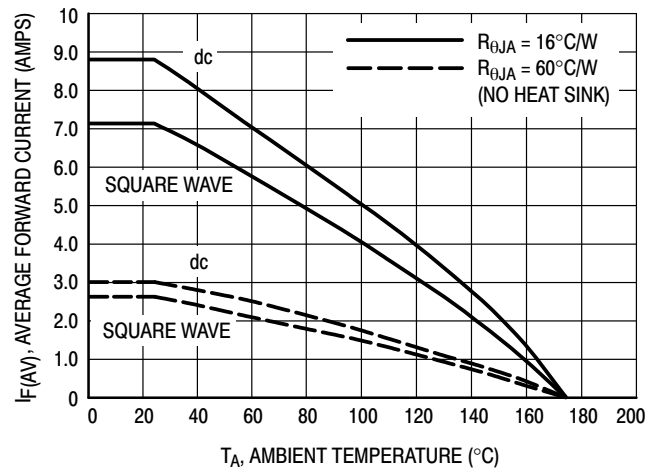


**Figure 12. Typical Reverse Current\***

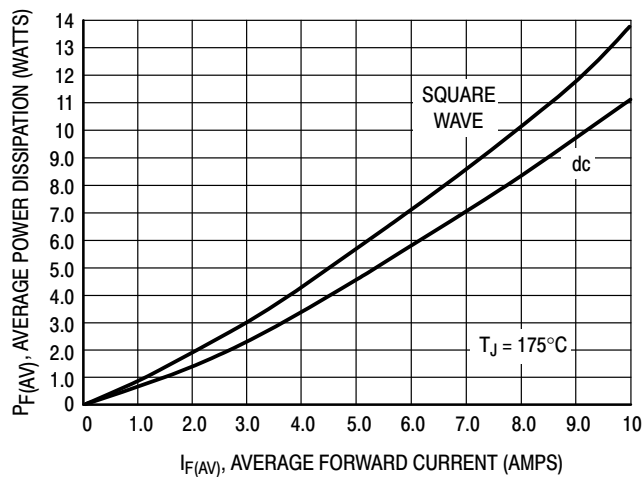
\* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .



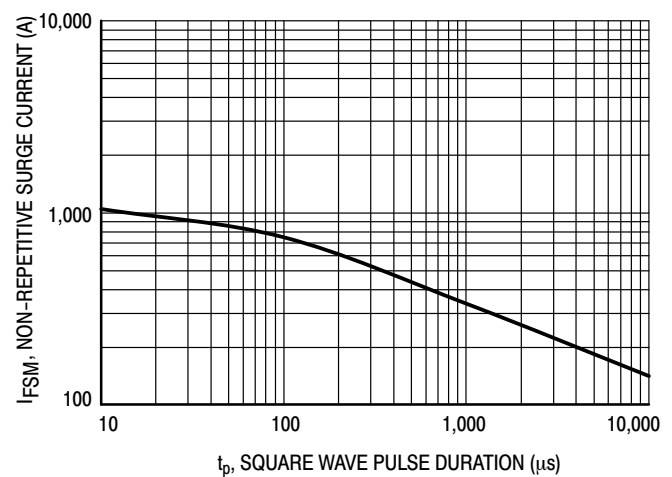
**Figure 13. Current Derating, Case**



**Figure 14. Current Derating, Ambient**



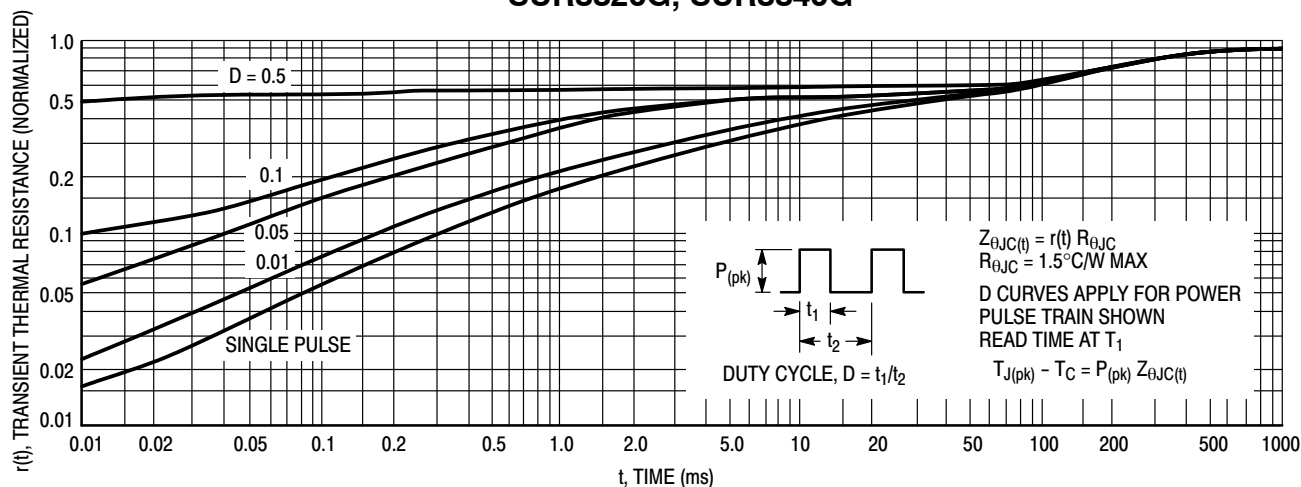
**Figure 15. Power Dissipation**



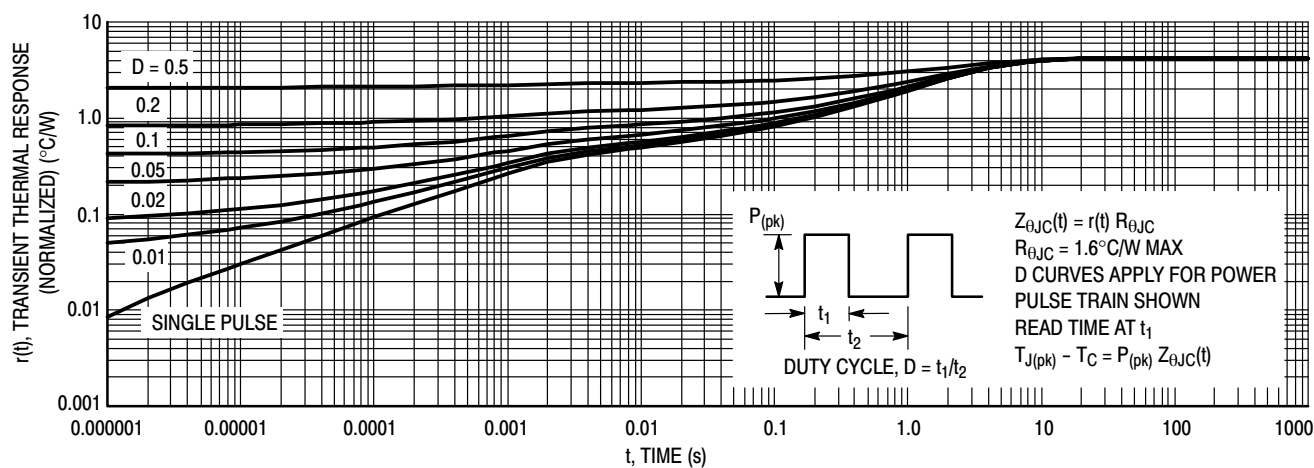
**Figure 16. Typical Non-Repetitive Surge Current**

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

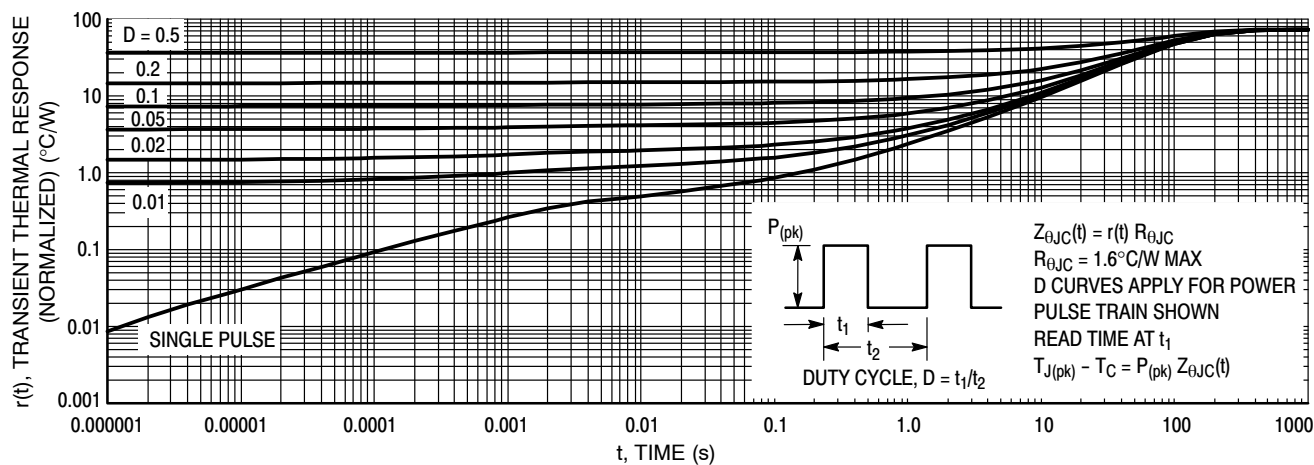
**MUR805G, MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,  
SUR8820G, SUR8840G**



**Figure 17. Thermal Response**

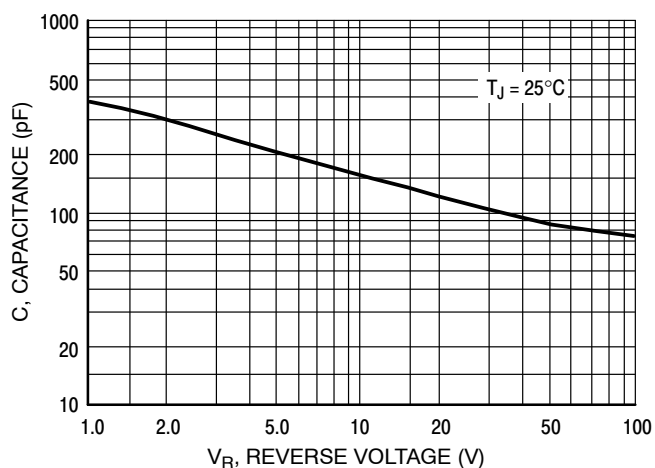


**Figure 18. Thermal Response, (MURF860G) Junction-to-Case ( $R_{\theta JC}$ )**



**Figure 19. Thermal Response, (MURF860G) Junction-to-Ambient ( $R_{\theta JA}$ )**

**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 |

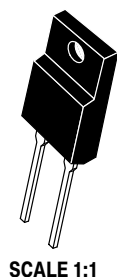
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

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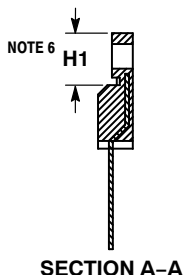
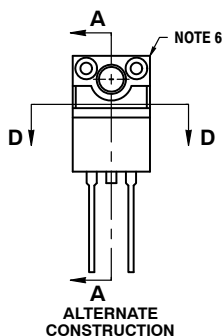
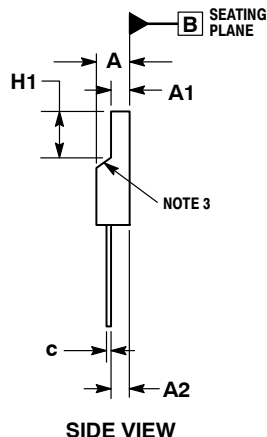
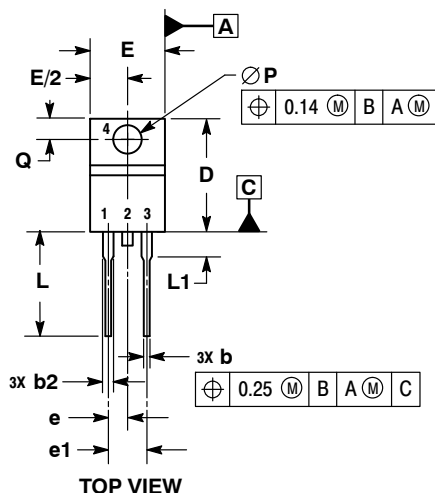


## TO-220 FULLPACK, 2-LEAD CASE 221AG ISSUE B

DATE 27 AUG 2015



SCALE 1:1

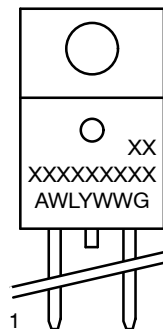


### NOTES:

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.

|                  |                         |                                                                                                                                                                                  |
|------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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# MECHANICAL CASE OUTLINE

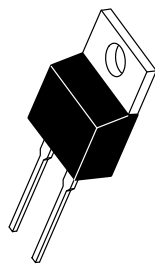
## PACKAGE DIMENSIONS

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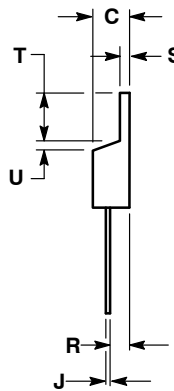
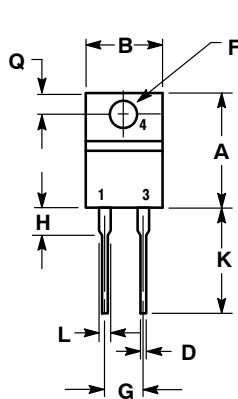


### TO-220, 2-LEAD CASE 221B-04 ISSUE F

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

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DESCRIPTION: TO-220, 2-LEAD

PAGE 1 OF 1

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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