

# Switch-mode Power Rectifiers

## MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

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

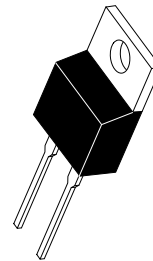
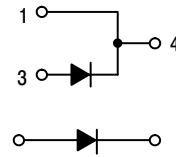
### Features

- 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\*

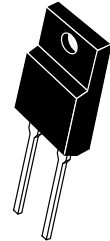
### Mechanical Characteristics:

- 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

## ULTRAFAST RECTIFIERS 8.0 AMPERES, 50–600 VOLTS

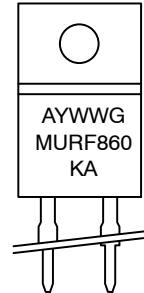
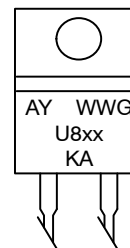


TO-220AC  
CASE 221B  
STYLE 1



TO-220 FULLPAK  
CASE 221AG  
STYLE 1

### MARKING DIAGRAM



|      |                                |
|------|--------------------------------|
| 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.

NOTE: Some of the device on this data sheet have been **DISCONTINUED**. Please refer to the table on page 7

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

# MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

## 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  $\leq 2.0\%$ .

# MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

## MUR805G, MUR810G, MUR815G, MUR820G, SUR8820G

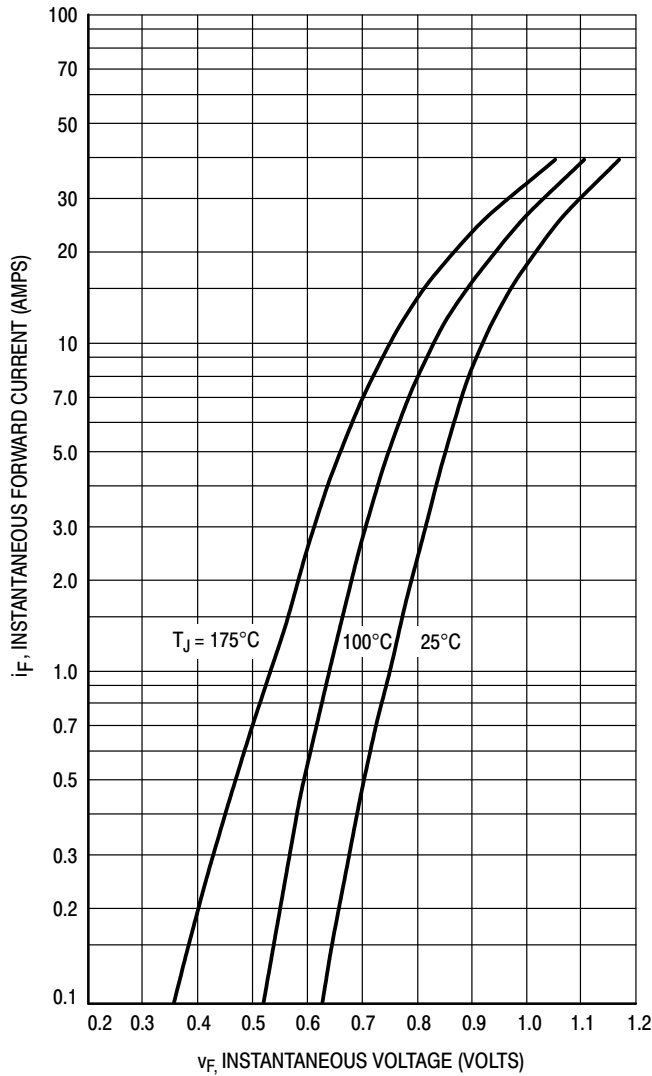


Figure 1. Typical Forward Voltage

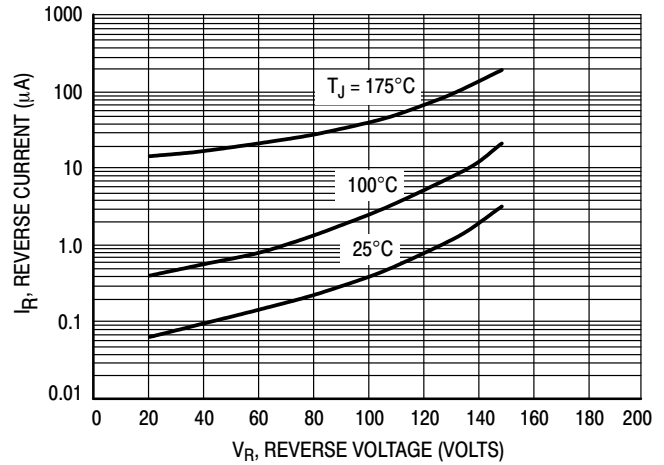


Figure 2. Typical Reverse Current\*

\* 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  $V_R$ .

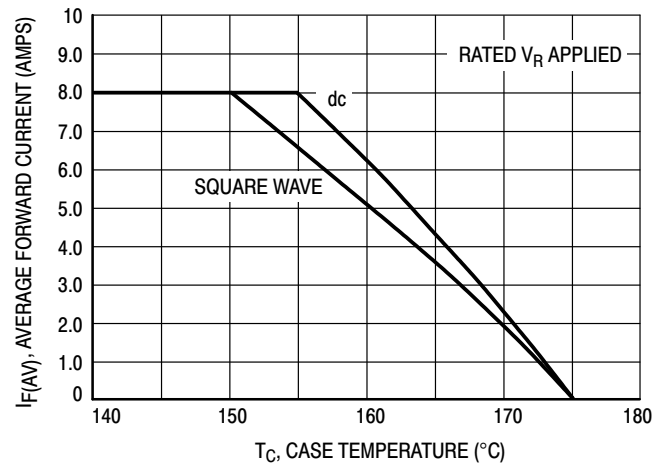


Figure 3. Current Derating, Case

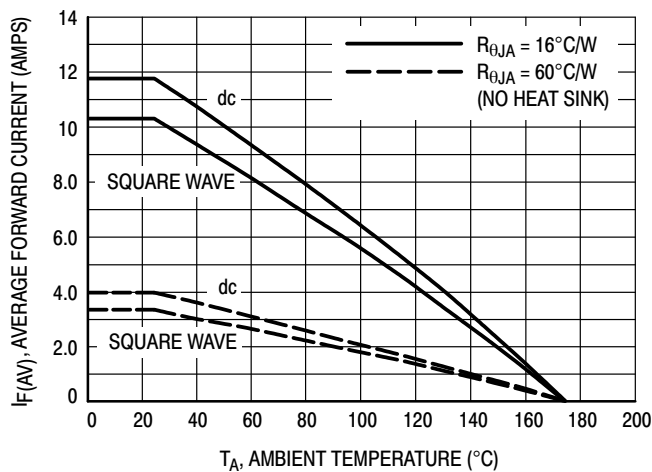


Figure 4. Current Derating, Ambient

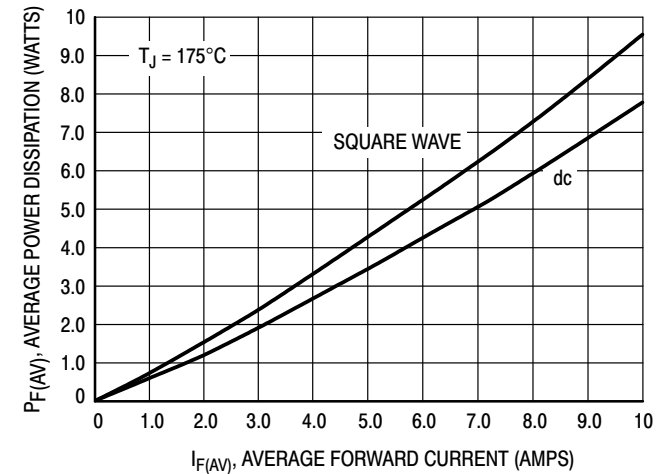


Figure 5. Power Dissipation

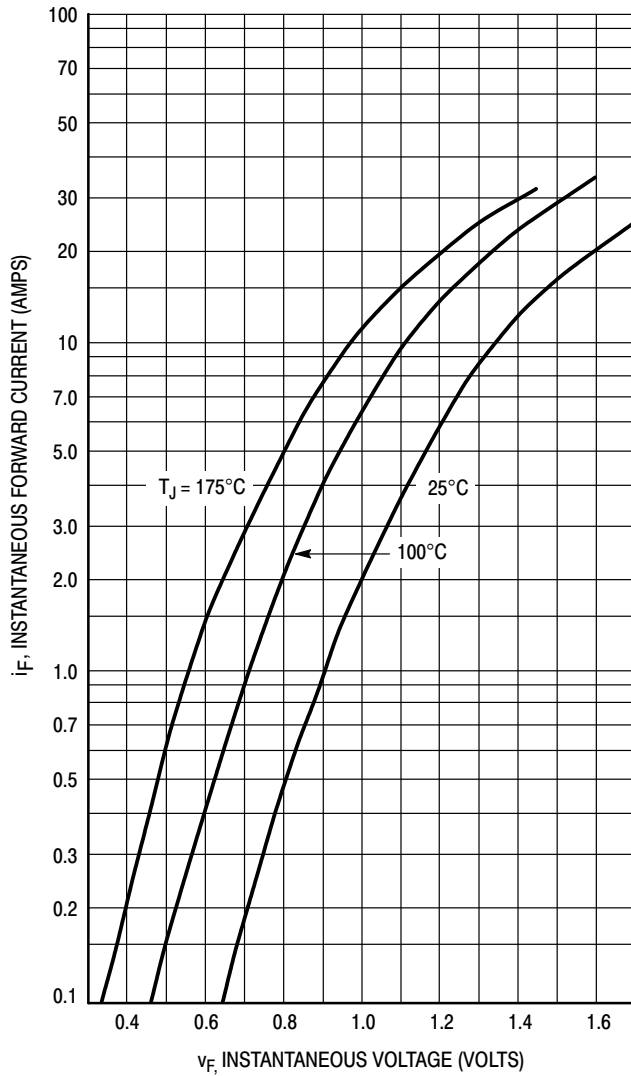


Figure 6. Typical Forward Voltage

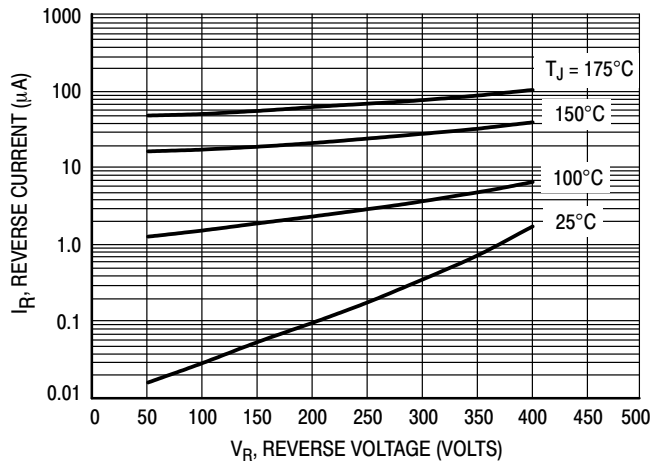


Figure 7. Typical Reverse Current\*

\* 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  $V_R$ .

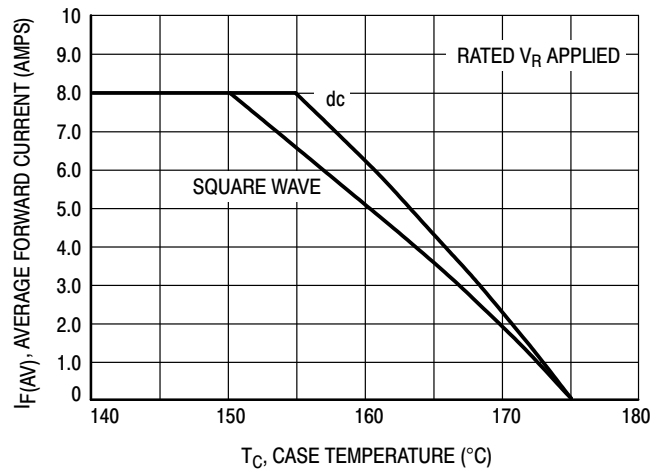


Figure 8. Current Derating, Case

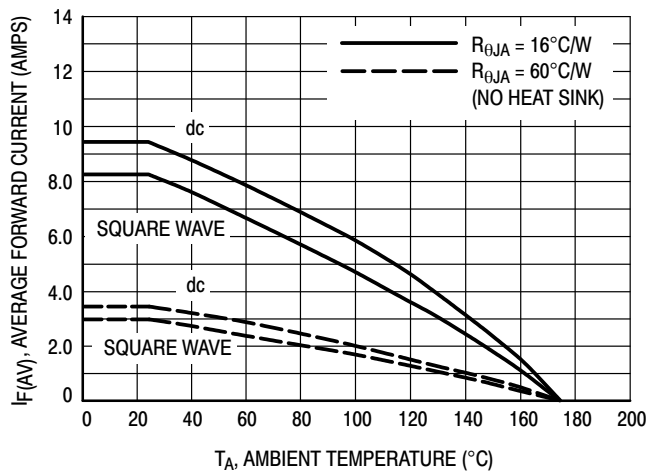


Figure 9. Current Derating, Ambient

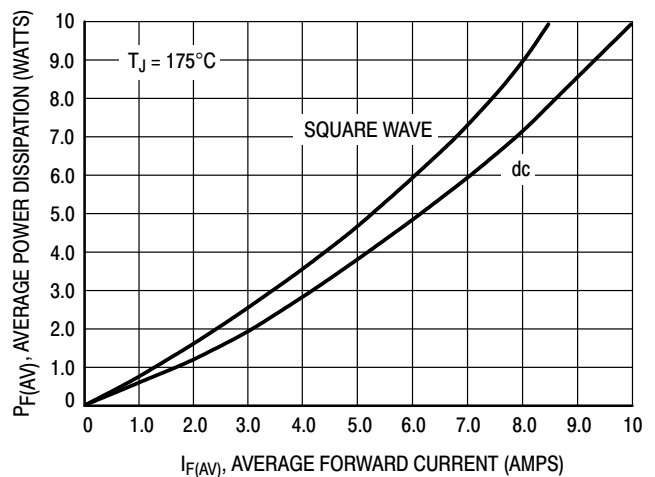


Figure 10. Power Dissipation

# MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

## MUR860G, MURF860G

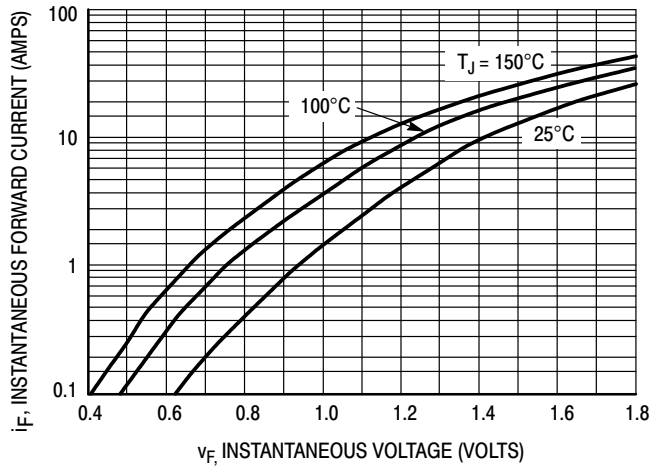


Figure 11. Typical Forward Voltage

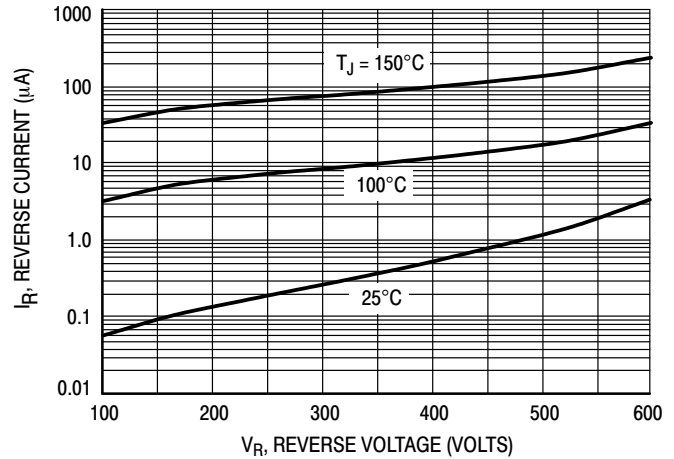


Figure 12. Typical Reverse Current\*

\* 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  $V_R$ .

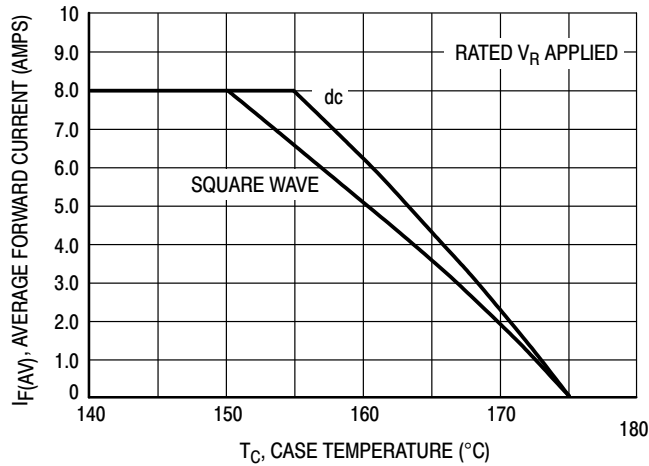


Figure 13. Current Derating, Case

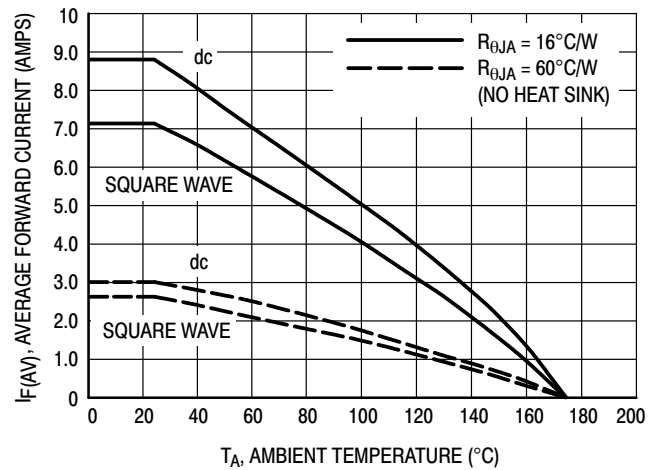


Figure 14. Current Derating, Ambient

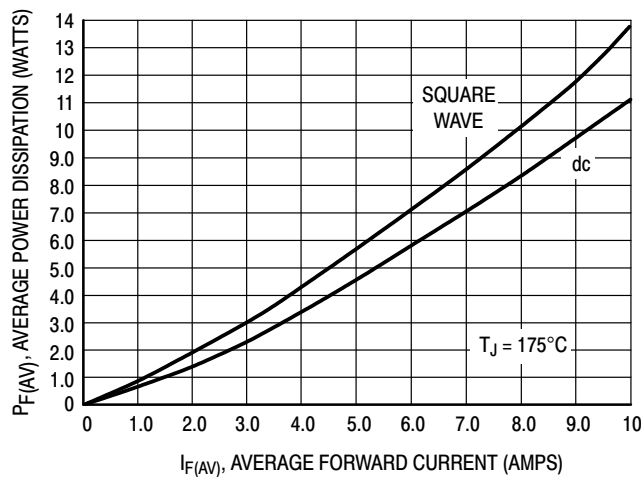


Figure 15. Power Dissipation

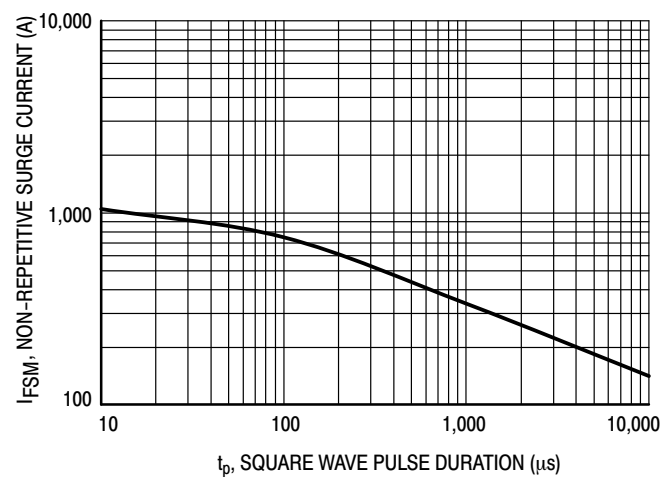


Figure 16. Typical Non-Repetitive Surge Current

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

# MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

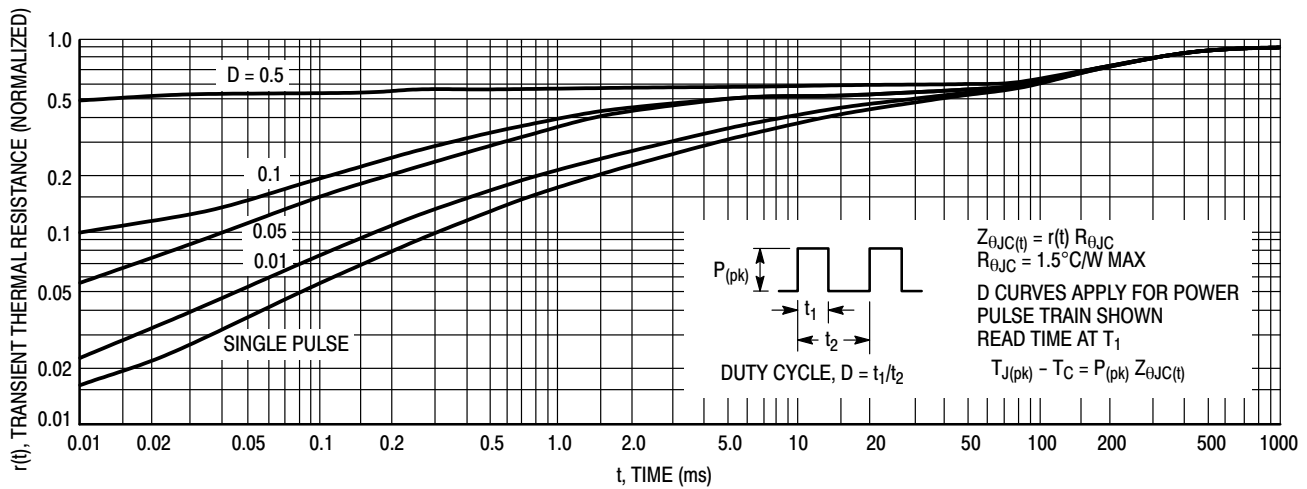


Figure 17. Thermal Response

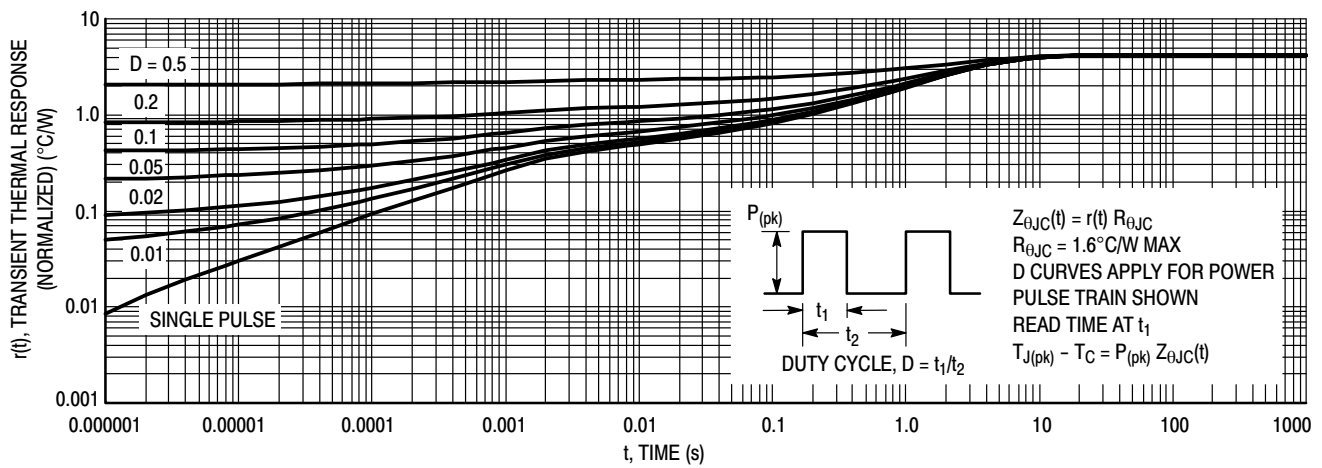


Figure 18. Thermal Response, (MURF860G) Junction-to-Case ( $R_{\theta JC}$ )

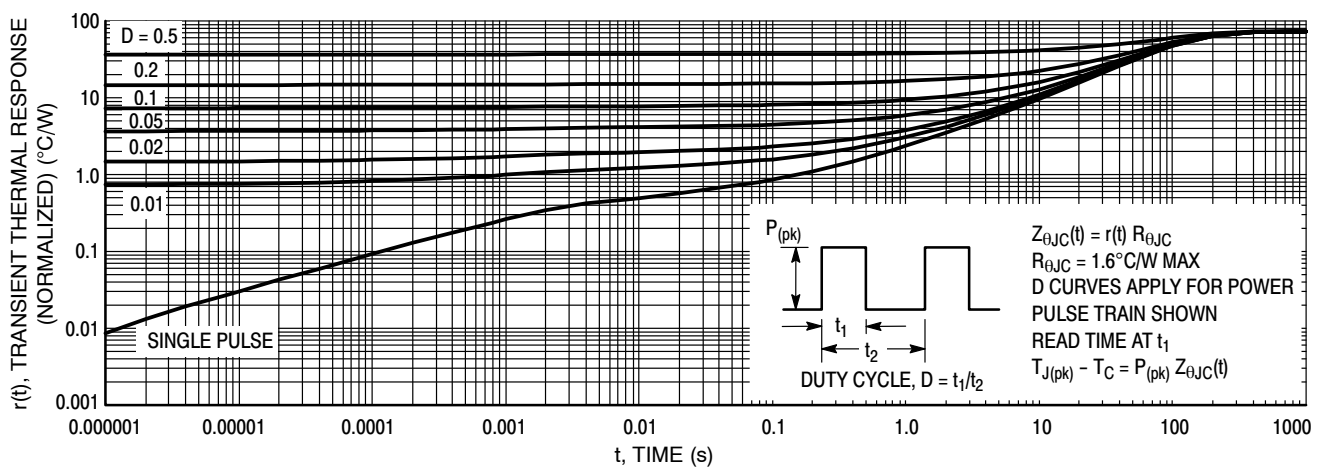


Figure 19. Thermal Response, (MURF860G) Junction-to-Ambient ( $R_{\theta JA}$ )

# MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

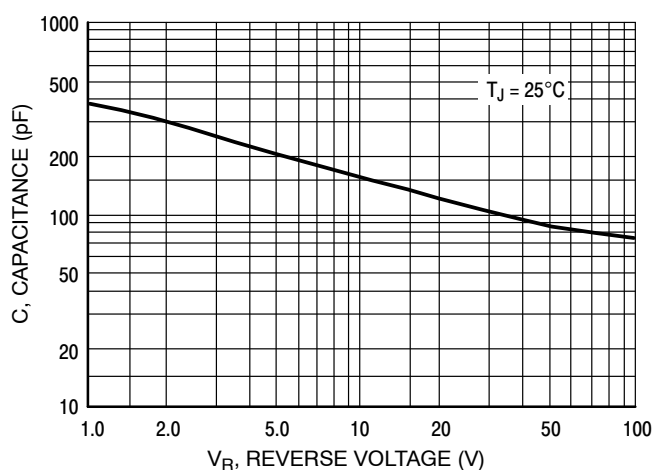


Figure 20. Typical Capacitance

## ORDERING INFORMATION

| Device   | Package               | Shipping        |
|----------|-----------------------|-----------------|
| 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 |
| MUR840G  | 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 |

## DISCONTINUED (Note 2)

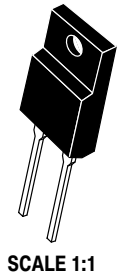
| Device   | Package               | Shipping <sup>†</sup> |
|----------|-----------------------|-----------------------|
| MUR805G  | TO-220AC<br>(Pb-Free) | 50 Units / Rail       |
| SUR8820G | TO-220AC<br>(Pb-Free) | 50 Units / Rail       |
| SUR8840G | TO-220AC<br>(Pb-Free) | 50 Units / Rail       |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

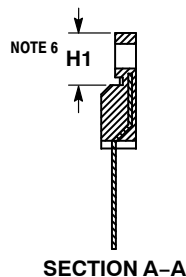
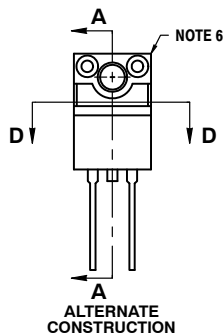
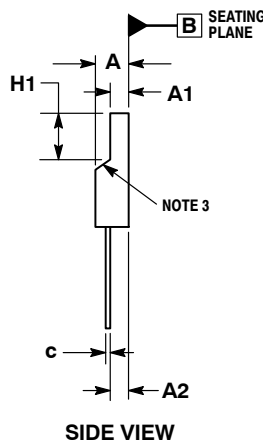
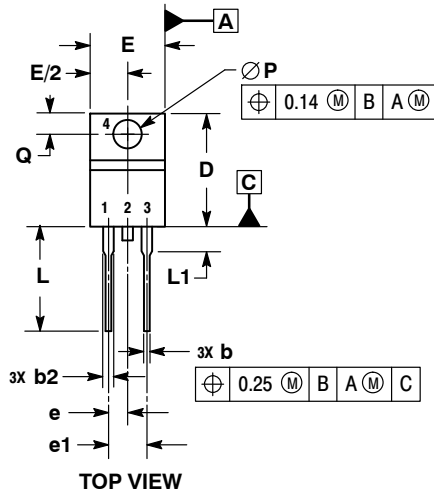
2. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on [www.onsemi.com](http://www.onsemi.com).

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

DATE 27 AUG 2015



SCALE 1:1

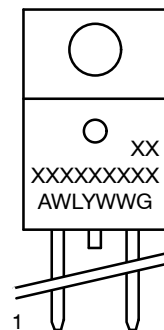


NOTES:

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.

| MILLIMETERS |          |       |
|-------------|----------|-------|
| DIM         | 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\*



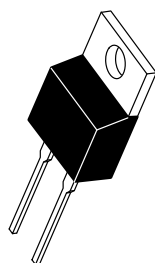
A = Assembly Location  
WL = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*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.

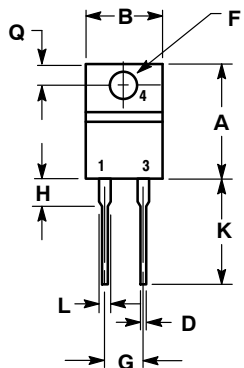
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|------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | TO-220 FULLPACK, 2-LEAD | PAGE 1 OF 1                                                                                                                                                                         |

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SCALE 1:1



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

DATE 12 APR 2013

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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