# THE DATASHEET OF

# MUR1540

# MUR1510G, MUR1515G, MUR1520G, MUR1540G, MUR1560G, MURF1560G, SUR81520G, SUR81560G

# Switch-mode Power Rectifiers

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

**Features**

- Ultrafast 35 and 60 Nanosecond Recovery Time
- 175°C Operating Junction Temperature
- High Voltage Capability to 600 V
- ESD Ratings:
  - Machine Model = C
  - Human Body Model = 3B
- Low Forward Drop
- Low Leakage Specified @ 150°C Case Temperature
- Current Derating Specified @ Both Case and Ambient Temperatures
- SUR8 Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- All Packages are Pb−Free*

**Mechanical Characteristics:**

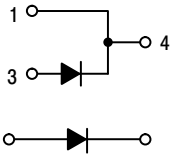
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

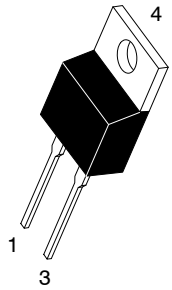
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**ON Semiconductor®**

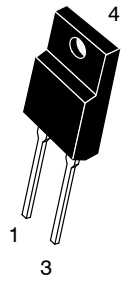
**http://onsemi.com**

## ULTRAFAST RECTIFIERS 15 AMPERES, 100−600 VOLTS



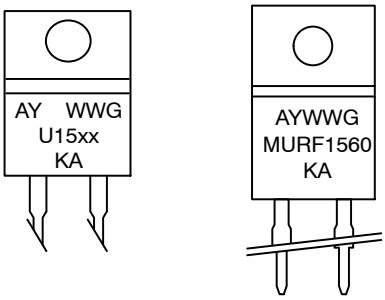




**TO−220AC**
**CASE 221B**
**STYLE 1**




**TO−220 FULLPAK**
**CASE 221AG**
**STYLE 1**

**MARKING DIAGRAMS**




| | |
|---|---|
| A | = Assembly Location |
| Y | = Year |
| WW | = Work Week |
| G | = Pb−Free Package |
| U15xx | = Device Code<br>xx = 10, 15, 20, 40 or 60 |
| KA | = Diode Polarity |

**ORDERING INFORMATION**

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

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## MAXIMUM RATINGS

| Rating | Symbol | MUR/SUR8 | | | | | Unit |
|---|---|---|---|---|---|---|---|
| | | 1510 | 1515 | 1520 | 1540 | 1560 | |
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 100 | 150 | 200 | 400 | 600 | V |
| Average Rectified Forward Current (Rated $V_R$) | $I_{F(AV)}$ | 15 @ $T_C$ = 150°C | | | | 15 @ $T_C$ = 145°C | A |
| Peak Rectified Forward Current (Rated $V_R$, Square Wave, 20 kHz) | $I_{FRM}$ | 30 @ $T_C$ = 150°C | | | | 30 @ $T_C$ = 145°C | A |
| Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz) | $I_{FSM}$ | 200 | | | 150 | | A |
| Operating Junction Temperature and Storage Temperature Range | $T_J$, $T_{stg}$ | −65 to +175 | | | | | °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 | Value | Unit |
|---|---|---|---|
| MUR1510 Series: Thermal Resistance<br>Junction−to−Case<br>Junction−to−Ambient | <br>$R_{\theta JC}$<br>$R_{\theta JA}$ | <br>1.5<br>73 | °C/W |
| MURF1560: Thermal Resistance<br>Junction−to−Case<br>Junction−to−Ambient | <br>$R_{\theta JC}$<br>$R_{\theta JA}$ | <br>4.25<br>75 | °C/W |

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | 1510 | 1515 | 1520 | 1540 | 1560 | Unit |
|---|---|---|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 1)<br>($i_F$ = 15 A, $T_C$ = 150°C)<br>($i_F$ = 15 A, $T_C$ = 25°C) | $v_F$ | 0.85<br>1.05 | | | 1.12<br>1.25 | 1.20<br>1.50 | V |
| Maximum Instantaneous Reverse Current (Note 1)<br>(Rated DC Voltage, $T_C$ = 150°C)<br>(Rated DC Voltage, $T_C$ = 25°C) | $i_R$ | 500<br>10 | | | 500<br>10 | 1000<br>10 | μA |
| Maximum Reverse Recovery Time<br>($I_F$ = 1.0 A, di/dt = 50 A/μs) | $t_{rr}$ | 35 | | | 60 | | 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 μs, Duty Cycle ≤ 2.0%.

## MUR1510G, MUR1515G, MUR1520G, SUR81520G

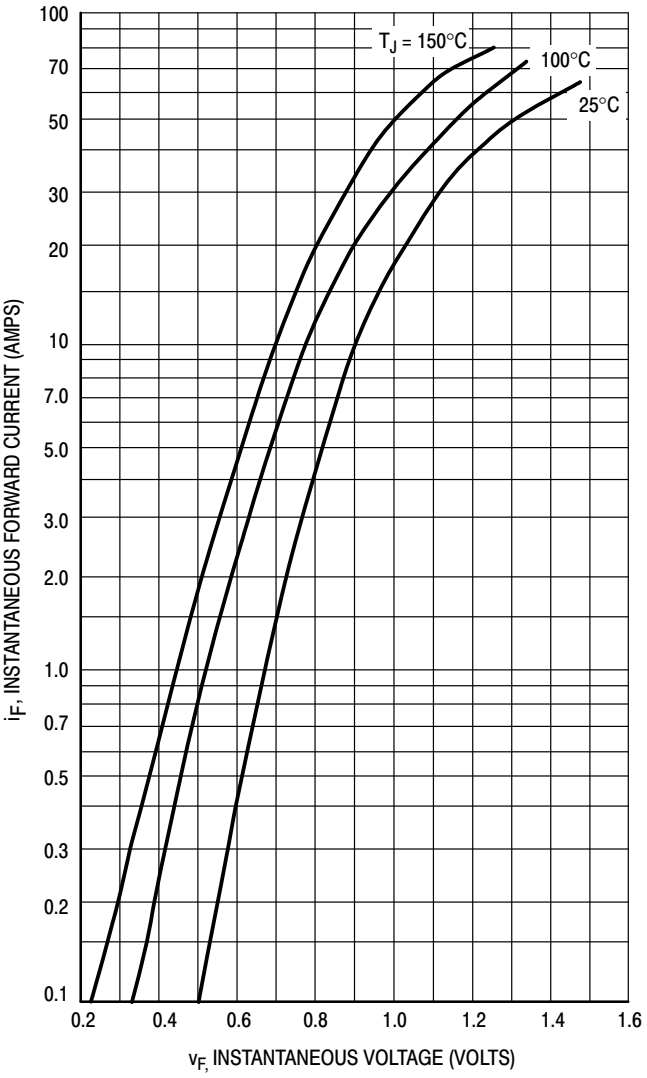



**Figure 1. Typical Forward Voltage**

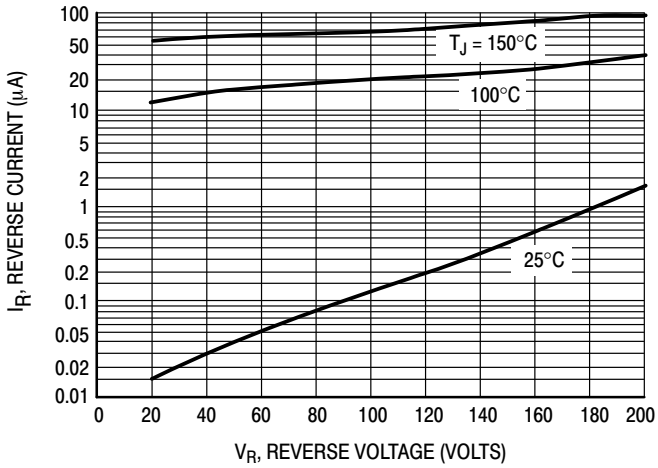



**Figure 2. Typical Reverse Current**

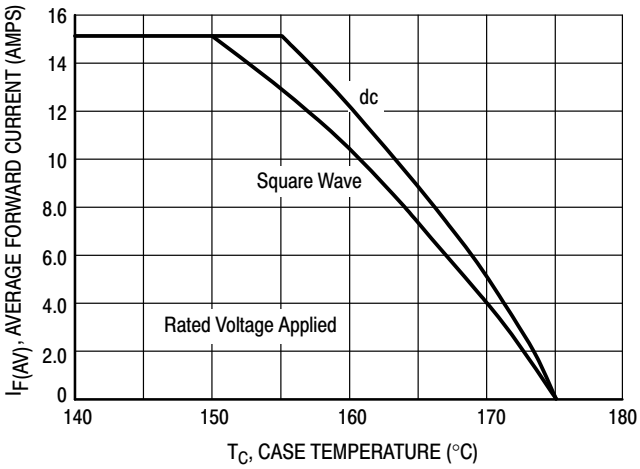



**Figure 3. Current Derating, Case**

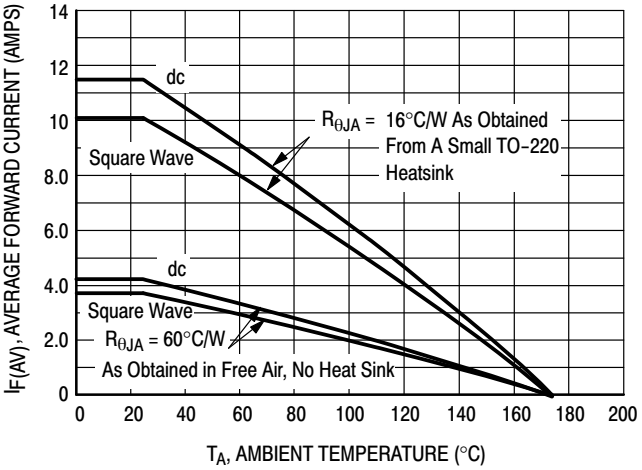



**Figure 4. Current Derating, Ambient**

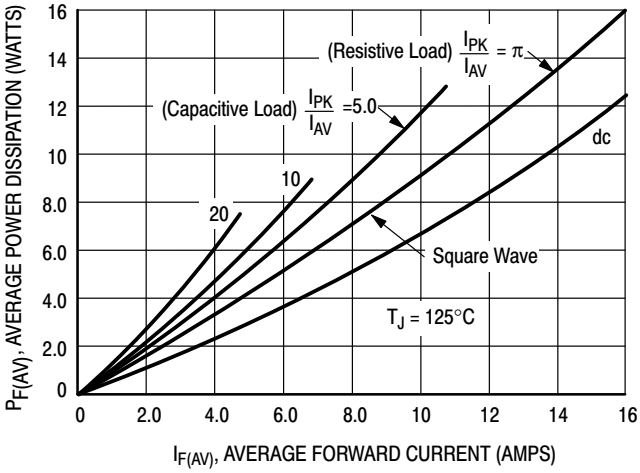



**Figure 5. Power Dissipation**

**MUR1540G**

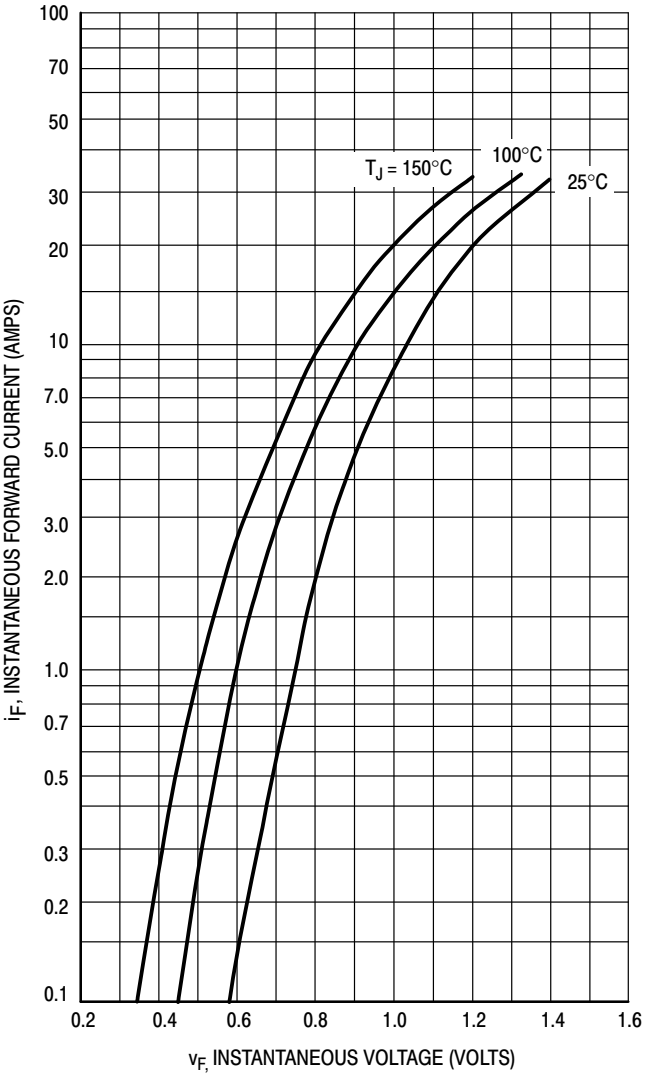



**Figure 6. Typical Forward Voltage**

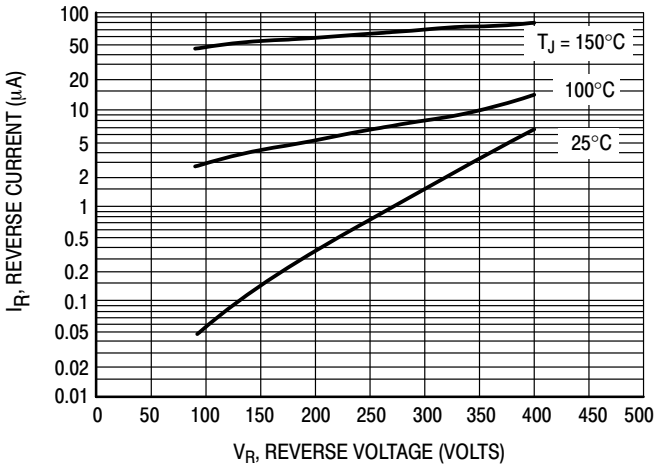



**Figure 7. Typical Reverse Current**

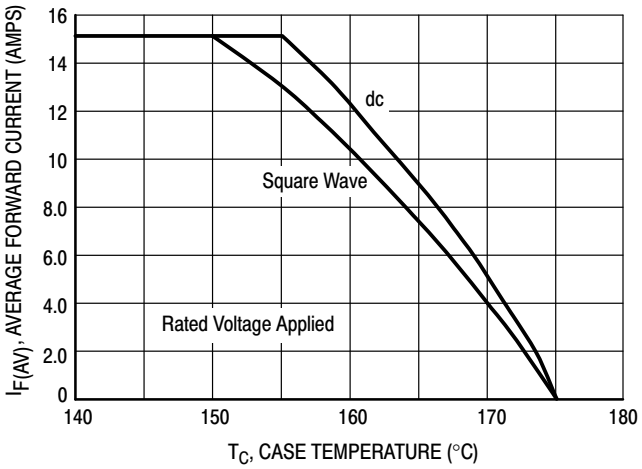



**Figure 8. Current Derating, Case**

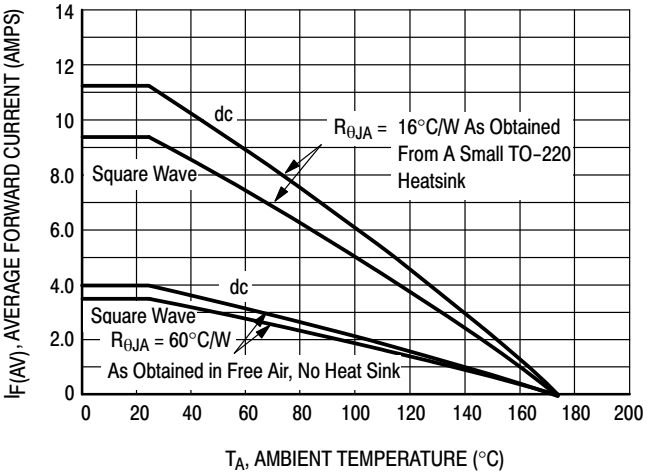



**Figure 9. Current Derating, Ambient**

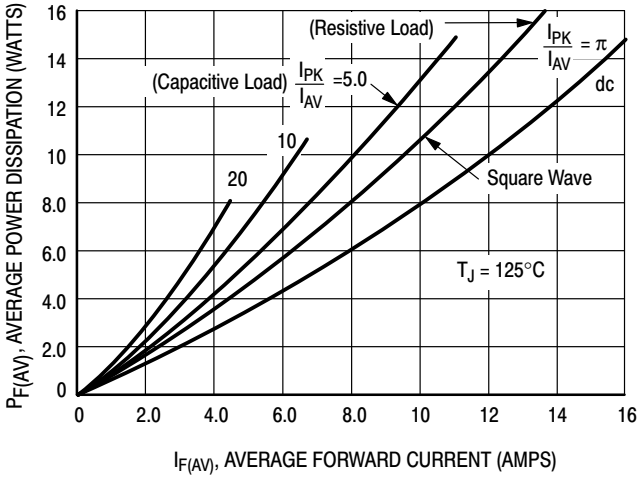



**Figure 10. Power Dissipation**

**MUR1560G, MURF1560G, SUR81560G**

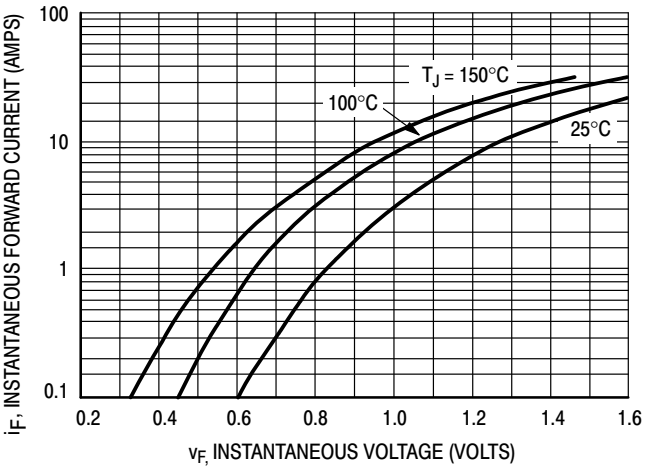



**Figure 11. Typical Forward Voltage**

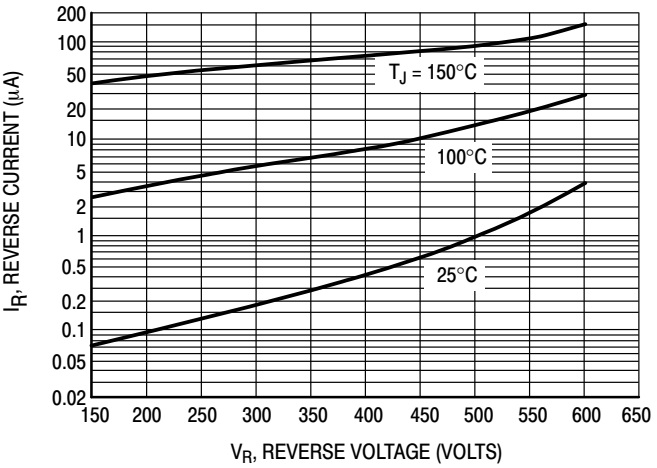



**Figure 12. Typical Reverse Current**

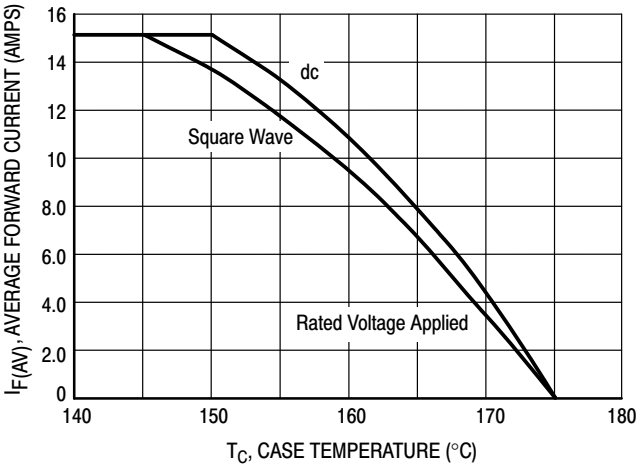



**Figure 13. Current Derating, Case**

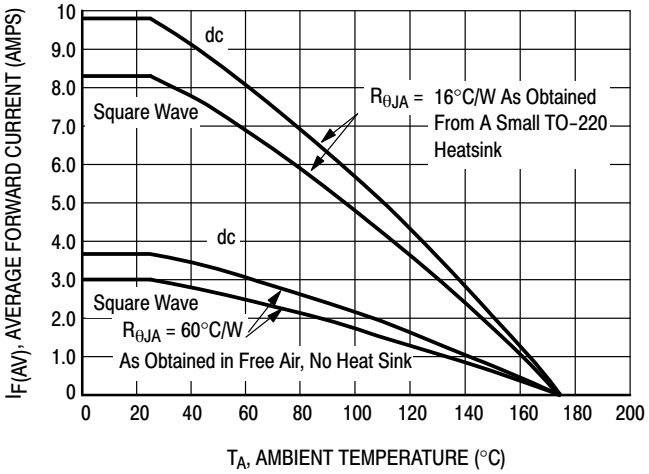



**Figure 14. Current Derating, Ambient**

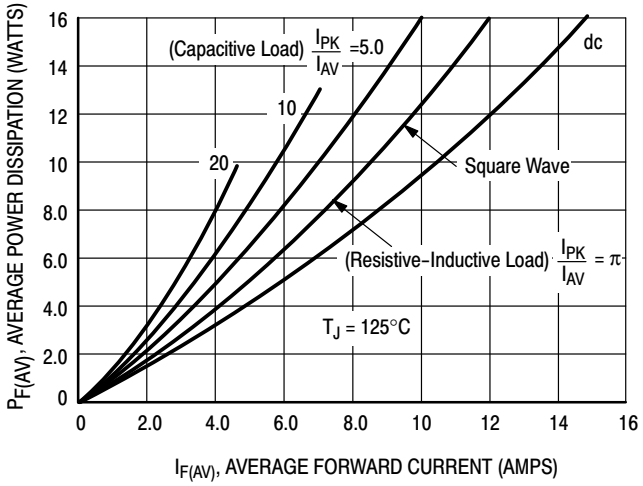



**Figure 15. Power Dissipation**

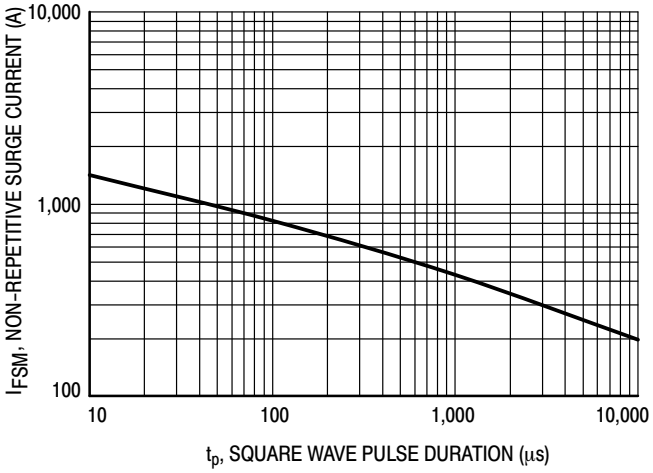



**Figure 16. Typical Non−Repetitive Surge Current**

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

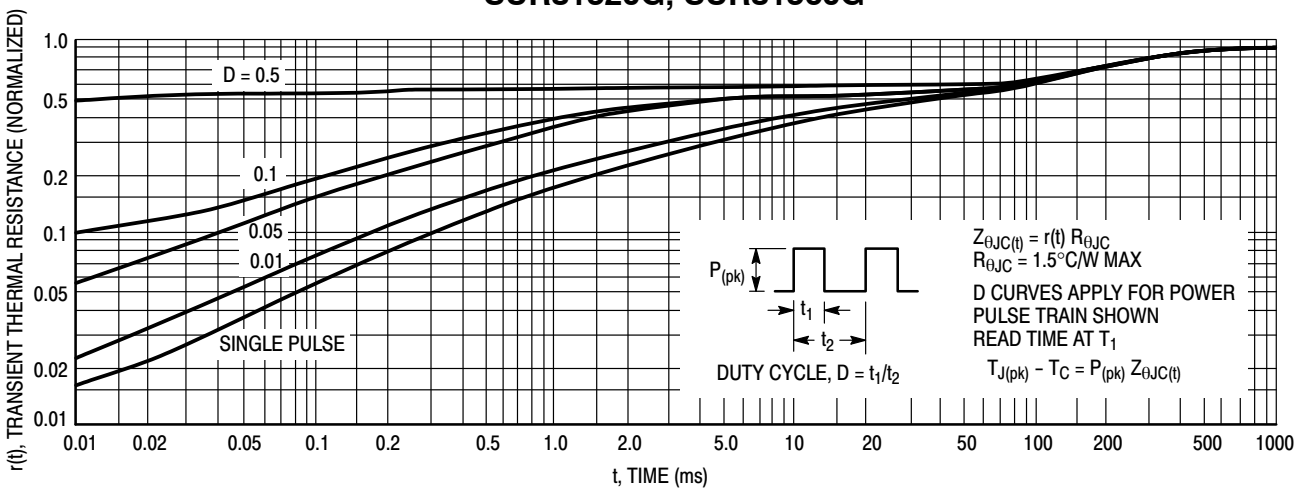



**Figure 17. Thermal Response**

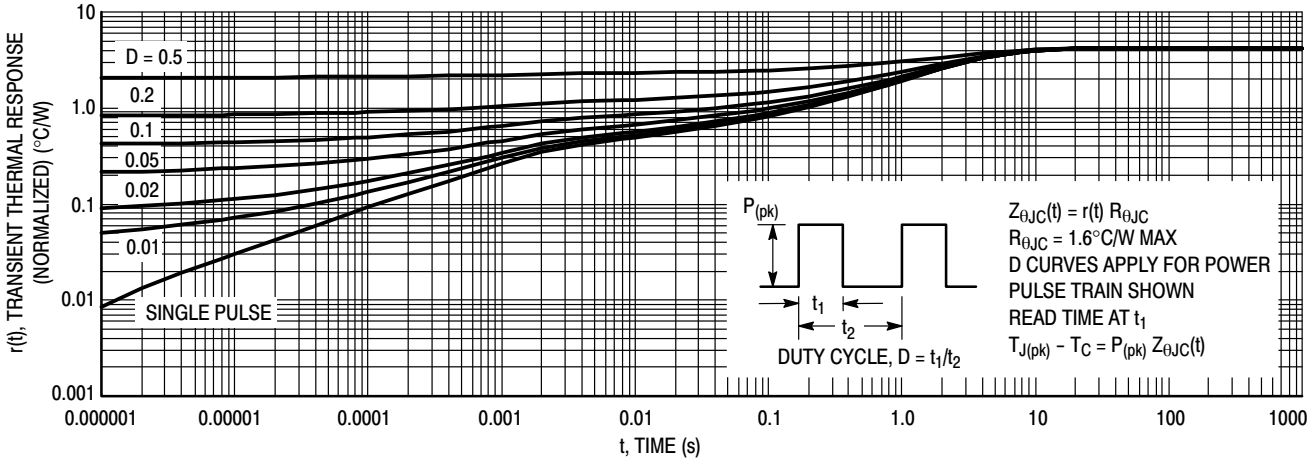



**Figure 18. Thermal Response, (MURF1560G) Junction−to−Case ($R_{\theta JC}$)**

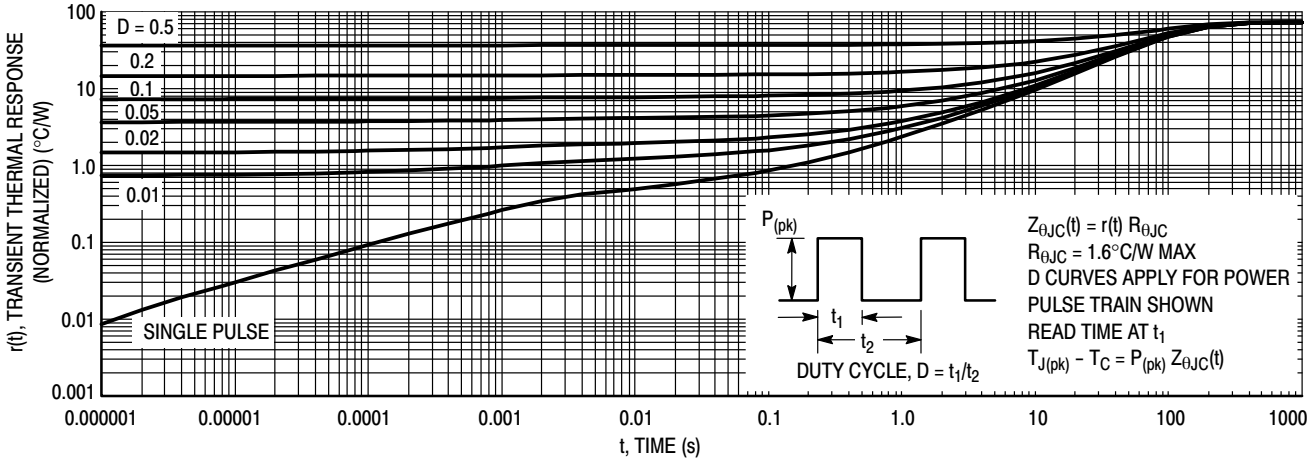



**Figure 19. Thermal Response, (MURF1560G) Junction−to−Ambient ($R_{\theta JA}$)**

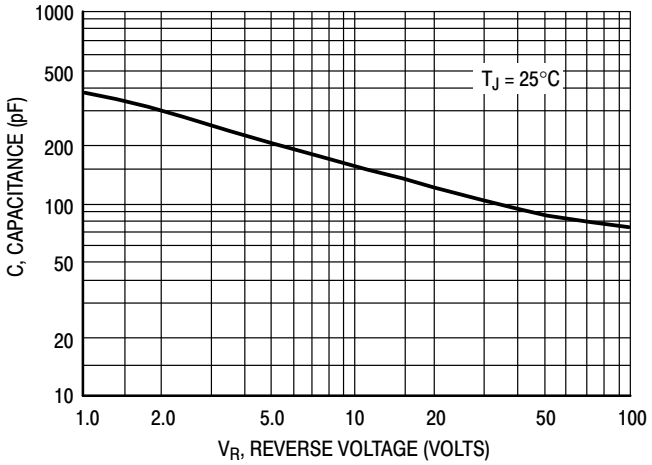



**Figure 20. Typical Capacitance**

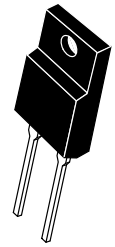
**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| MUR1510G | TO−220AC (Pb−Free) | 50 Units / Rail |
| MUR1515G | TO−220AC (Pb−Free) | 50 Units / Rail |
| MUR1520G | TO−220AC (Pb−Free) | 50 Units / Rail |
| SUR81520G | TO−220AC (Pb−Free) | 50 Units / Rail |
| MUR1540G | TO−220AC (Pb−Free) | 50 Units / Rail |
| MUR1560G | TO−220AC (Pb−Free) | 50 Units / Rail |
| SUR81560G | TO−220AC (Pb−Free) | 50 Units / Rail |
| MURF1560G | TO−220FP (Pb−Free) | 50 Units / Rail |

†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.

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

DATE 27 AUG 2015



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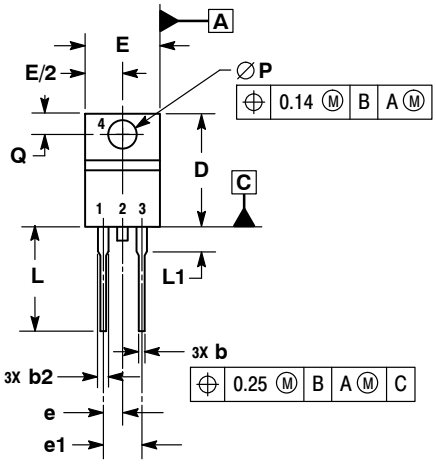
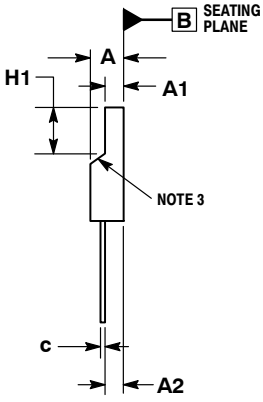
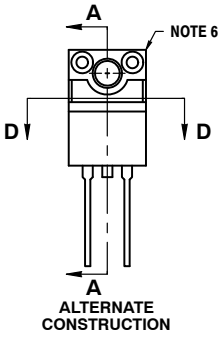



TOP VIEW

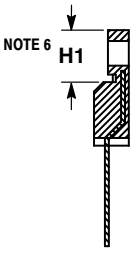



SIDE VIEW




ALTERNATE CONSTRUCTION

SECTION D−D

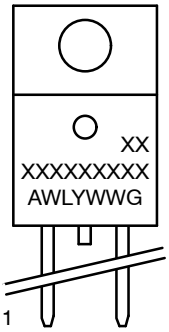



SECTION A−A

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.

| | | |
|---|---|---|
| **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** |

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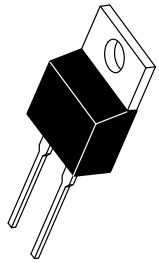
# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

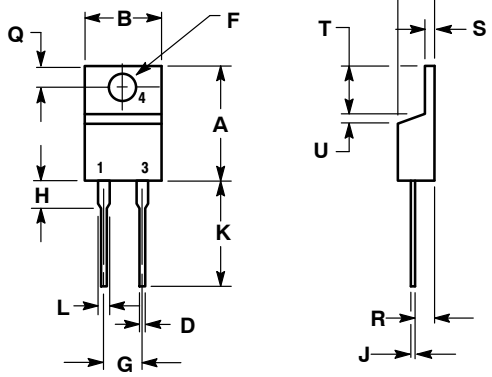
ON Semiconductor®

**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.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | 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** |

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