

# MUR3020PTG, SUR83020PTG, MUR3040PTG, MUR3060PTG, SUR83060PTG



**ON Semiconductor®**

<http://onsemi.com>

## Switch-mode Power Rectifiers

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

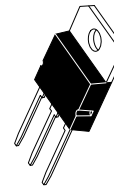
### Features

- Ultrafast 35 and 60 Nanosecond Recovery Time
- 175°C Operating Junction Temperature
- High Voltage Capability to 600 V
- Low Forward Drop
- Low Leakage Specified @ 150°C Case Temperature
- Current Derating Specified @ Both Case and Ambient Temperatures
- Epoxy Meets UL 94 V-0 @ 0.125 in
- High Temperature Glass Passivated Junction
- ESD Ratings:
  - ◆ Machine Model = C (> 400 V)
  - ◆ Human Body Model = 3B (> 16,000 V)
- AEC-Q101 Qualified and PPAP Capable
- SUR8 Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- All Packages are Pb-Free\*

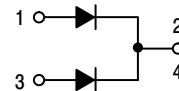
### Mechanical Characteristics:

- Case: Epoxy, Molded
- Weight: 4.3 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
- Shipped 30 Units Per Plastic Tube

## ULTRAFAST RECTIFIERS 30 AMPERES, 200-600 VOLTS



SOT-93  
(TO-218)  
CASE 340D  
STYLE 2



### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package  
MUR30x0PT = Device Code  
x = 2, 4, or 6

### ORDERING INFORMATION

| Device      | Package          | Shipping      |
|-------------|------------------|---------------|
| MUR3020PTG  | SOT-93 (Pb-Free) | 30 Units/Rail |
| SUR83020PTG | SOT-93 (Pb-Free) | 30 Units/Rail |
| MUR3040PTG  | SOT-93 (Pb-Free) | 30 Units/Rail |
| MUR3060PTG  | SOT-93 (Pb-Free) | 30 Units/Rail |
| SUR83060PTG | SOT-93 (Pb-Free) | 30 Units/Rail |

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

# MUR3020PTG, SUR83020PTG, MUR3040PTG, MUR3060PTG, SUR83060PTG

## MAXIMUM RATINGS (Per Leg)

| Rating   | Symbol                          | MUR3020PTG/<br>SUR83020PTG                                       | MUR3040PTG | MUR3060PTG/<br>SUR83060PTG                                       | Unit             |
|--|---------------------------------|--|------------|--|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                                 | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 200  | 400        | 600  | V                |
| Average Rectified Forward Current (Rated $V_R$ )<br>Per Leg<br>Per Device  | $I_{F(AV)}$                     | 15 @ $T_C = 150^\circ\text{C}$<br>30 @ $T_C = 150^\circ\text{C}$ |            | 15 @ $T_C = 145^\circ\text{C}$<br>30 @ $T_C = 145^\circ\text{C}$ | A                |
| Peak Rectified Forward Current, Per Leg<br>(Rated $V_R$ , Square Wave, 20 kHz)   | $I_{FRM}$                       | 30 @ $T_C = 150^\circ\text{C}$                                   |            | 30 @ $T_C = 145^\circ\text{C}$                                   | A                |
| Nonrepetitive Peak Surge Current (Surge applied at<br>rated load conditions, halfwave, single phase, 60 Hz)<br>Per Leg | $I_{FSM}$                       | 200  |            |  | A                |
| Operating Junction and Storage Temperature   | $T_J, T_{stg}$                  | - 65 to +175   |            |  | $^\circ\text{C}$ |

## THERMAL CHARACTERISTICS (Per Diode Leg)

|  |                                    |           |  |                    |
|--|------------------------------------|-----------|--|--------------------|
| Maximum Thermal Resistance,<br>Junction-to-Case<br>Junction-to-Ambient | $R_{\theta JC}$<br>$R_{\theta JA}$ | 1.5<br>40 |  | $^\circ\text{C/W}$ |
|--|------------------------------------|-----------|--|--------------------|

## ELECTRICAL CHARACTERISTICS (Per Diode Leg)

|   |          |              |              |            |               |
|---|----------|--------------|--------------|------------|---------------|
| Maximum Instantaneous Forward Voltage (Note 1)<br>( $I_F = 15$ Amp, $T_C = 150^\circ\text{C}$ )<br>( $I_F = 15$ Amp, $T_C = 25^\circ\text{C}$ )   | $V_F$    | 0.85<br>1.05 | 1.12<br>1.25 | 1.2<br>1.5 | V             |
| Maximum Instantaneous Reverse Current (Note 1)<br>(Rated DC Voltage, $T_J = 150^\circ\text{C}$ )<br>(Rated DC Voltage, $T_J = 25^\circ\text{C}$ ) | $i_R$    | 500<br>10    |              | 1000<br>10 | $\mu\text{A}$ |
| Maximum Reverse Recovery Time<br>( $i_F = 1.0$ A, $di/dt = 50$ A/ $\mu\text{s}$ )   | $t_{rr}$ | 35           | 60           |            | ns            |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

MUR3020PTG, SUR83020PTG

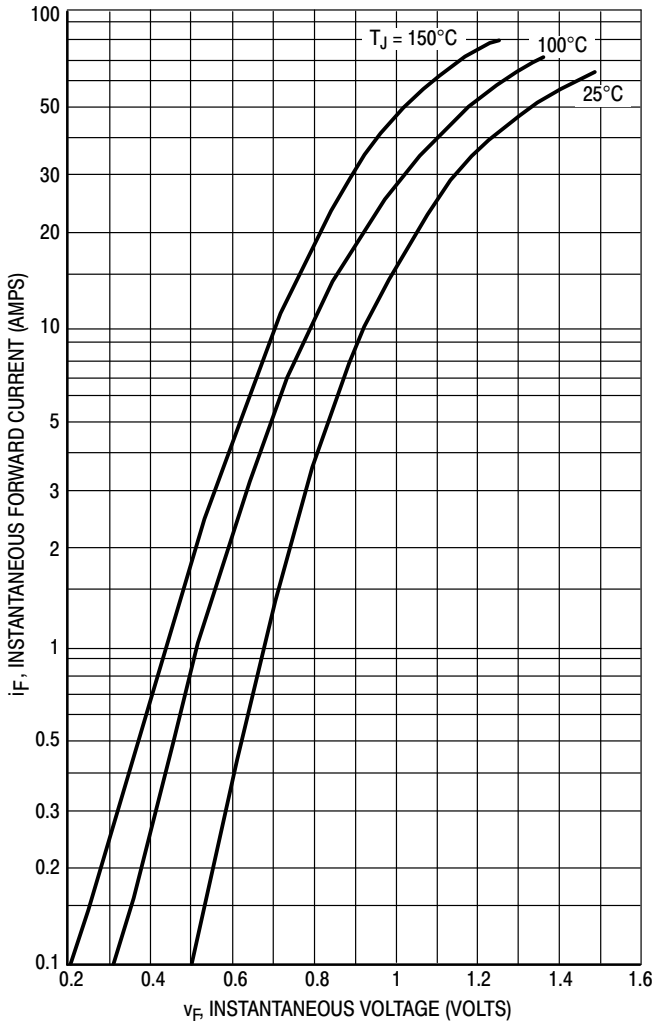


Figure 1. Typical Forward Voltage (Per Leg)

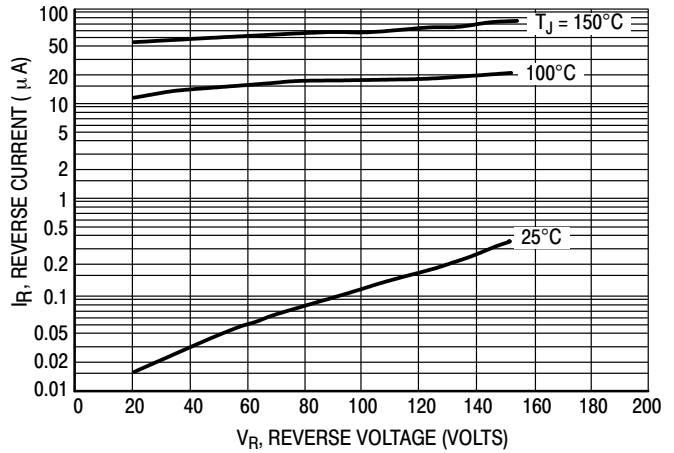


Figure 2. Typical Reverse Current (Per Leg)

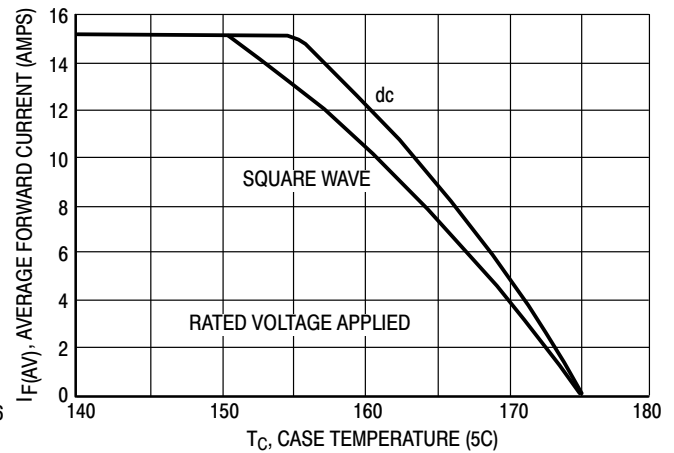


Figure 3. Current Derating, Case (Per Leg)

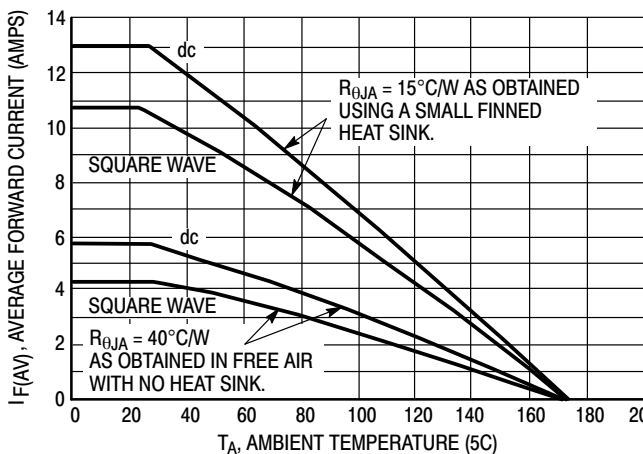


Figure 4. Current Derating, Ambient (Per Leg)

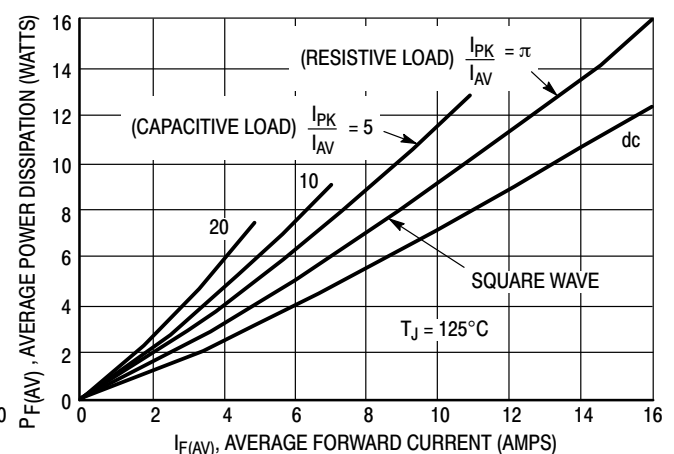


Figure 5. Power Dissipation (Per Leg)

MUR3040PTG

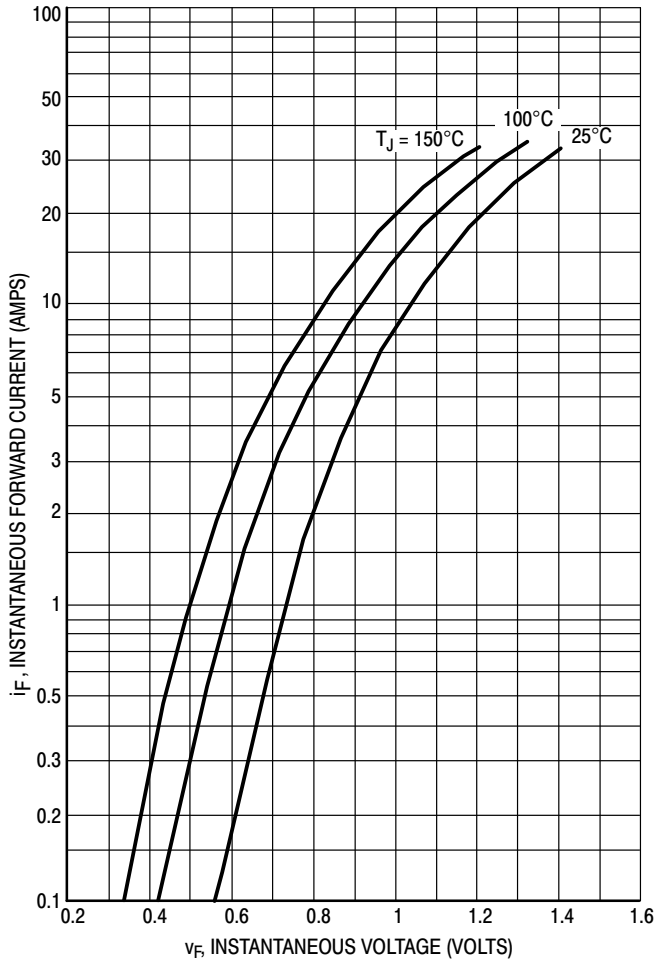


Figure 6. Typical Forward Voltage (Per Leg)

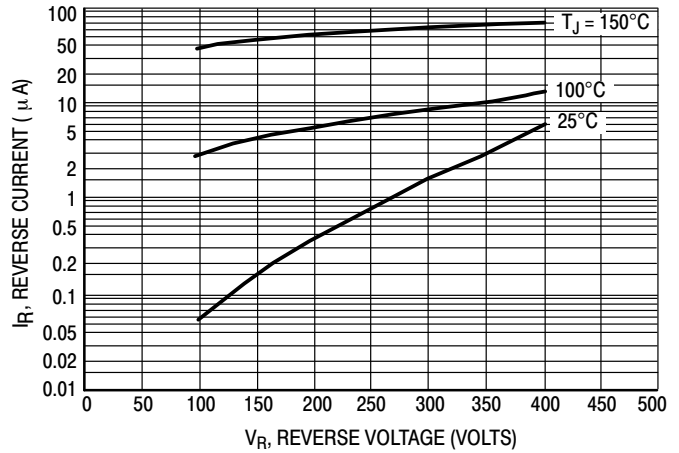


Figure 7. Typical Reverse Current (Per Leg)

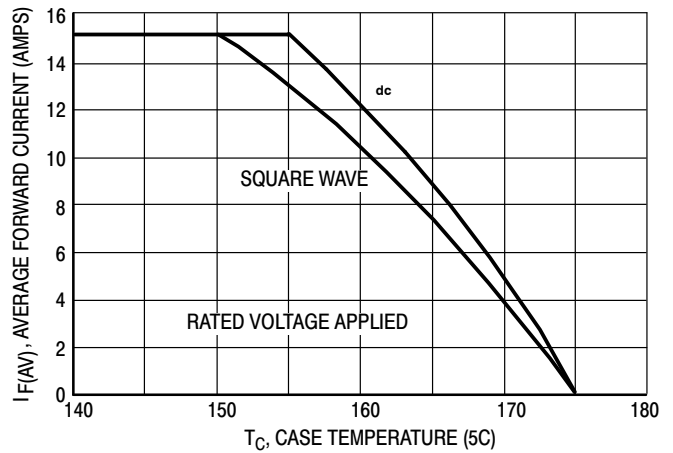


Figure 8. Current Derating, Case (Per Leg)

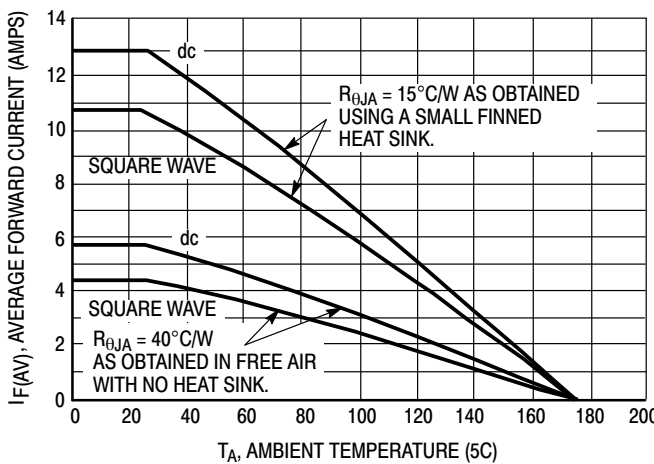


Figure 9. Current Derating, Ambient (Per Leg)

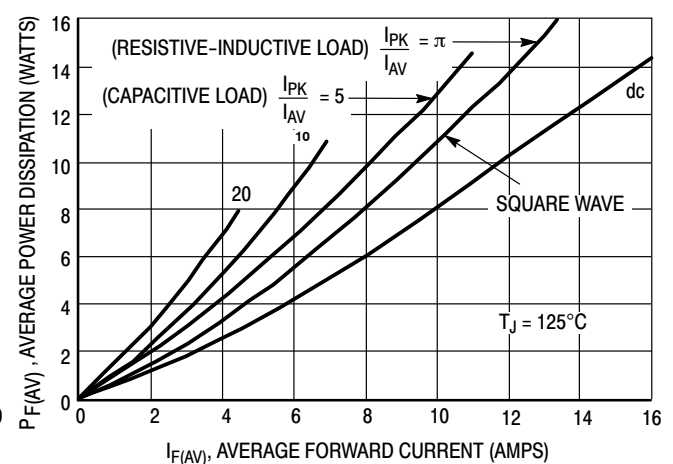


Figure 10. Power Dissipation (Per Leg)

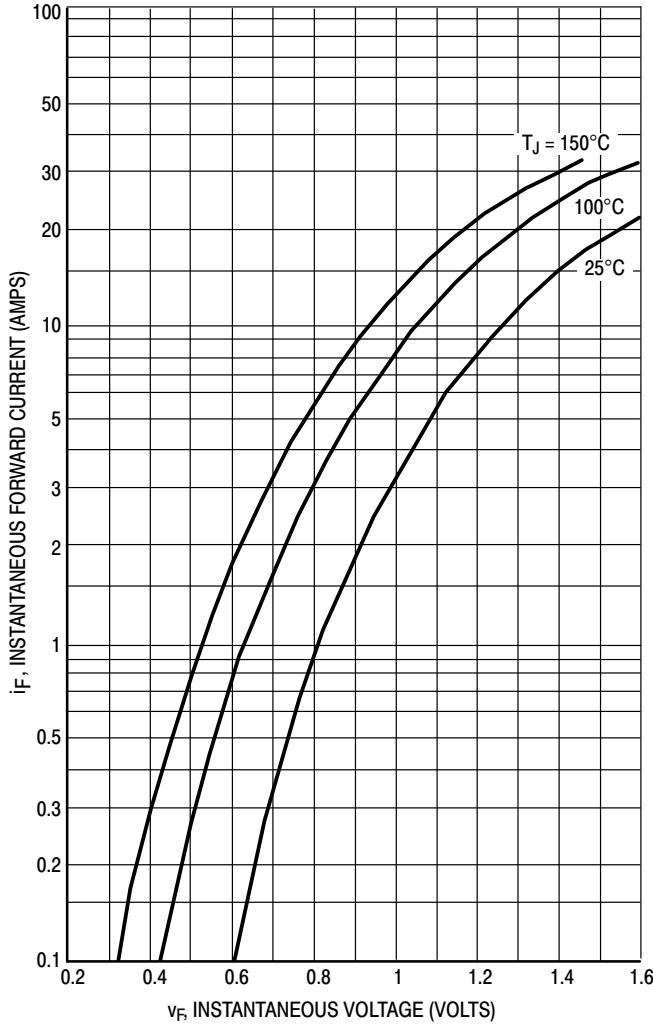


Figure 11. Typical Forward Voltage (Per Leg)

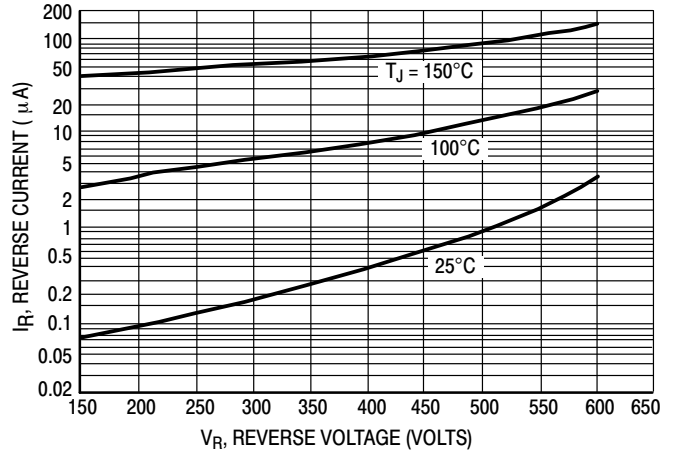


Figure 12. Typical Reverse Current (Per Leg)

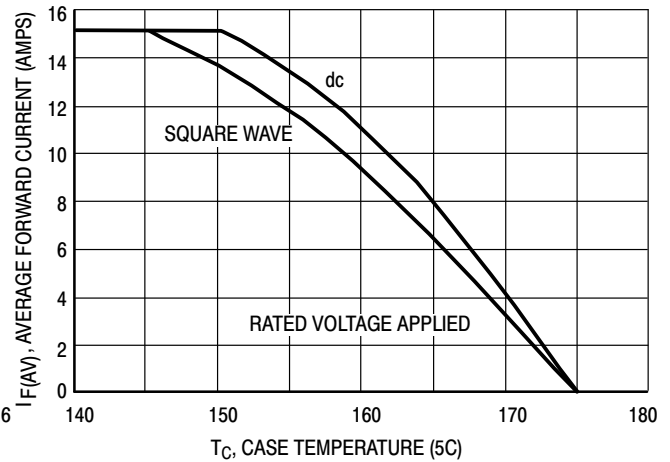


Figure 13. Current Derating, Case (Per Leg)

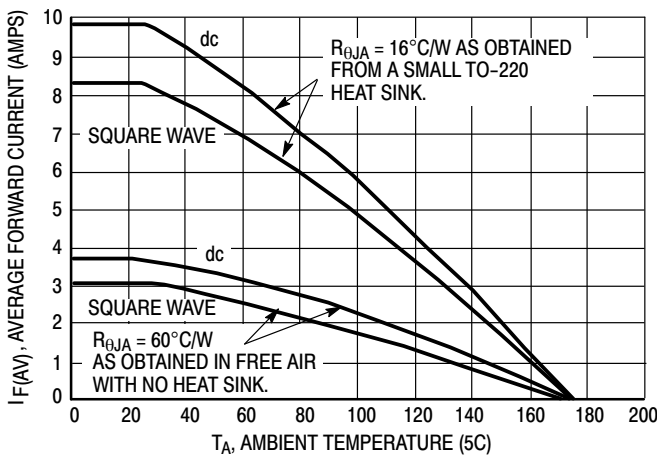


Figure 14. Current Derating, Ambient (Per Leg)

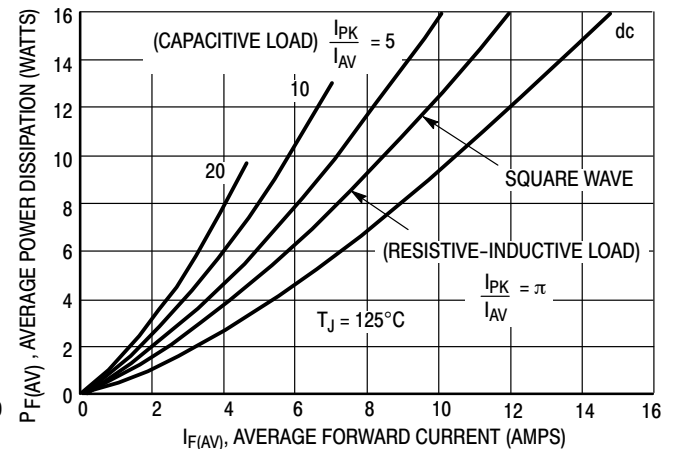


Figure 15. Power Dissipation (Per Leg)

MUR3020PTG, SUR83020PTG, MUR3040PTG, MUR3060PTG, SUR83060PTG

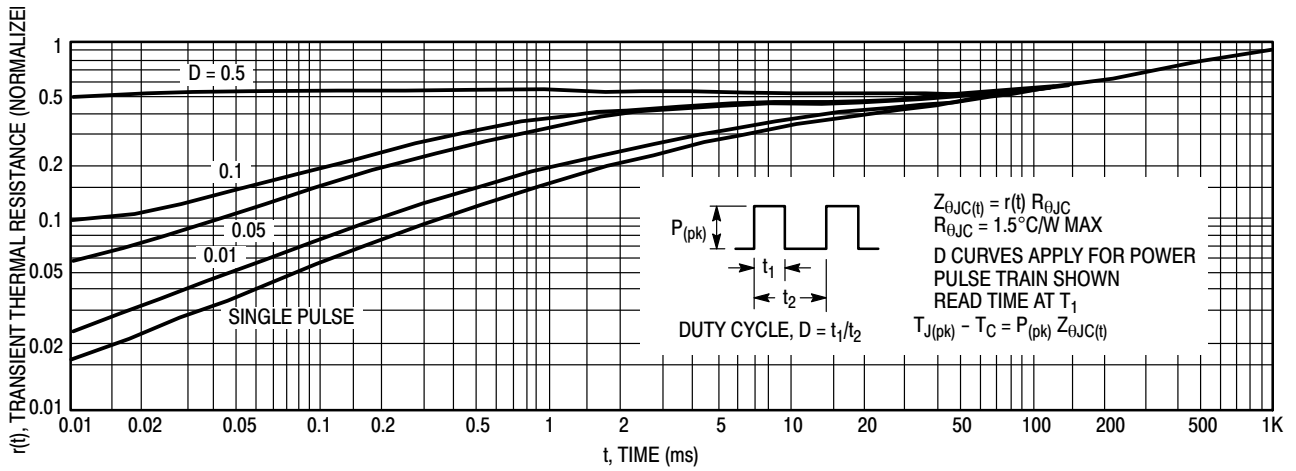


Figure 16. Thermal Response

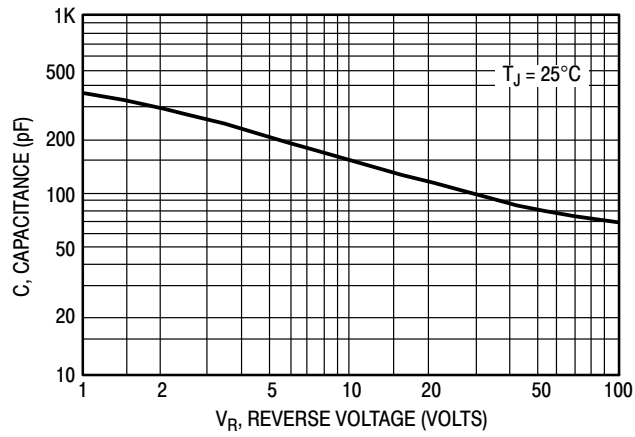
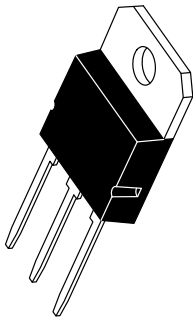


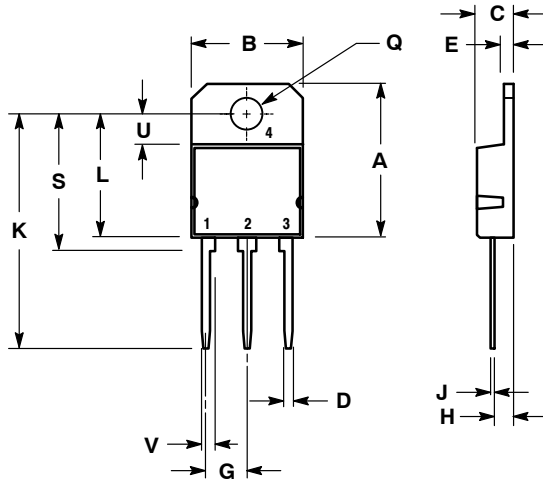
Figure 17. Typical Capacitance (Per Leg)

**SOT-93 (TO-218)**  
**CASE 340D-02**  
**ISSUE E**

DATE 03 JAN 2002



SCALE 1:1



STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

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

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | ---         | 20.35 | ---       | 0.801 |
| B   | 14.70       | 15.20 | 0.579     | 0.598 |
| C   | 4.70        | 4.90  | 0.185     | 0.193 |
| D   | 1.10        | 1.30  | 0.043     | 0.051 |
| E   | 1.17        | 1.37  | 0.046     | 0.054 |
| G   | 5.40        | 5.55  | 0.213     | 0.219 |
| H   | 2.00        | 3.00  | 0.079     | 0.118 |
| J   | 0.50        | 0.78  | 0.020     | 0.031 |
| K   | 31.00 REF   |       | 1.220 REF |       |
| L   | ---         | 16.20 | ---       | 0.638 |
| Q   | 4.00        | 4.10  | 0.158     | 0.161 |
| S   | 17.80       | 18.20 | 0.701     | 0.717 |
| U   | 4.00 REF    |       | 0.157 REF |       |
| V   | 1.75 REF    |       | 0.069     |       |

**GENERIC MARKING DIAGRAM\***



A = Assembly Location  
Y = Year  
WW = Work Week  
XXXXX = Device Code

\*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. Some products may not follow the Generic Marking.

|                         |                        |   |
|-------------------------|------------------------|---|
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| <b>DESCRIPTION:</b>     | <b>SOT-93 (TO-218)</b> | <b>PAGE 1 OF 1</b>  |

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