# MUR3020PTG, SUR83020PTG, MUR3040PTG, MUR3060PTG, SUR83060PTG

# 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

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

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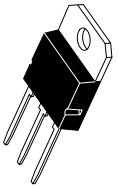
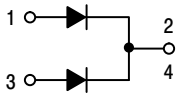
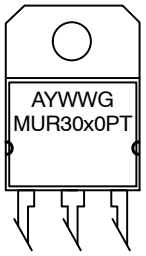
## ULTRAFAST RECTIFIERS 30 AMPERES, 200−600 VOLTS



**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 |

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**MAXIMUM RATINGS** (Per Leg)

| Rating | Symbol | MUR3020PTG/ SUR83020PTG | MUR3040PTG | MUR3060PTG/ 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°C<br>30 @ $T_C$ = 150°C | | 15 @ $T_C$ = 145°C<br>30 @ $T_C$ = 145°C | A |
| Peak Rectified Forward Current, Per Leg<br>(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)<br>Per Leg | $I_{FSM}$ | 200 | | | A |
| Operating Junction and Storage Temperature | $T_J$, $T_{stg}$ | – 65 to +175 | | | °C |

**THERMAL CHARACTERISTICS** (Per Diode Leg)

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

**ELECTRICAL CHARACTERISTICS** (Per Diode Leg)

| | | | | | |
|---|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 1)<br>($I_F$ = 15 Amp, $T_C$ = 150°C)<br>($I_F$ = 15 Amp, $T_C$ = 25°C) | $V_F$ | <br>0.85<br>1.05 | <br>1.12<br>1.25 | <br>1.2<br>1.5 | V |
| Maximum Instantaneous Reverse Current (Note 1)<br>(Rated DC Voltage, $T_J$ = 150°C)<br>(Rated DC Voltage, $T_J$ = 25°C) | $i_R$ | <br>500<br>10 | | <br>1000<br>10 | μA |
| Maximum Reverse Recovery Time<br>($i_F$ = 1.0 A, di/dt = 50 A/μs) | $t_{rr}$ | 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 μs, Duty Cycle ≤ 2.0%.

## MUR3020PTG, SUR83020PTG

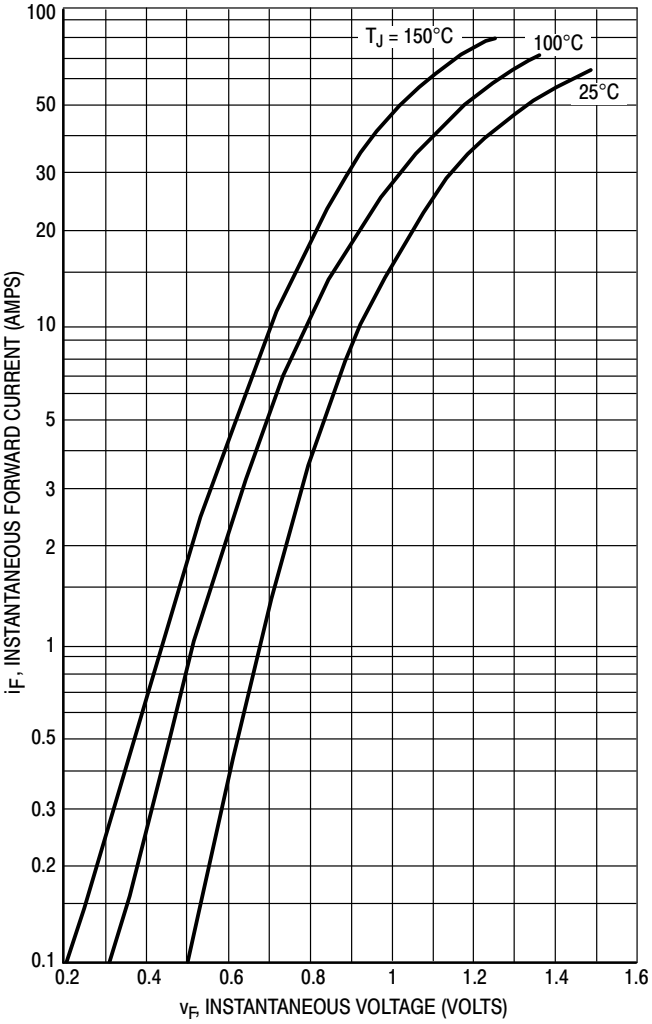



**Figure 1. Typical Forward Voltage (Per Leg)**

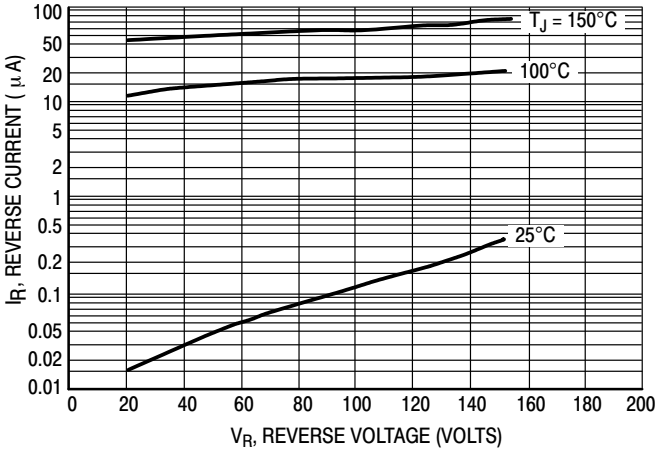



**Figure 2. Typical Reverse Current (Per Leg)**

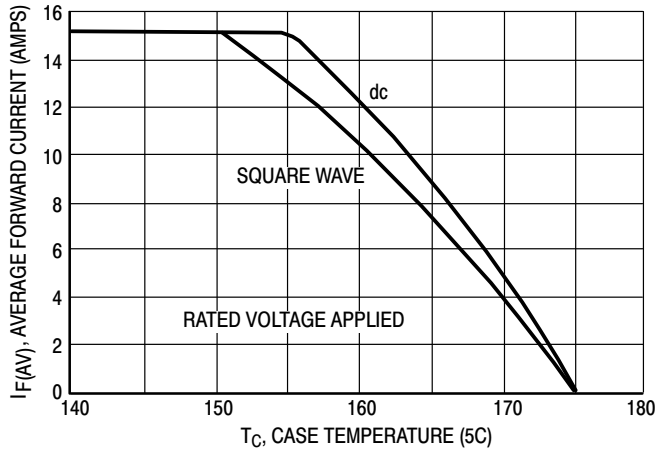



**Figure 3. Current Derating, Case (Per Leg)**

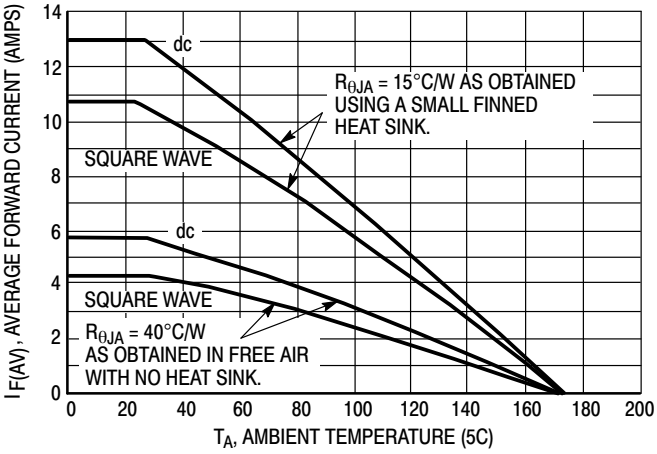



**Figure 4. Current Derating, Ambient (Per Leg)**

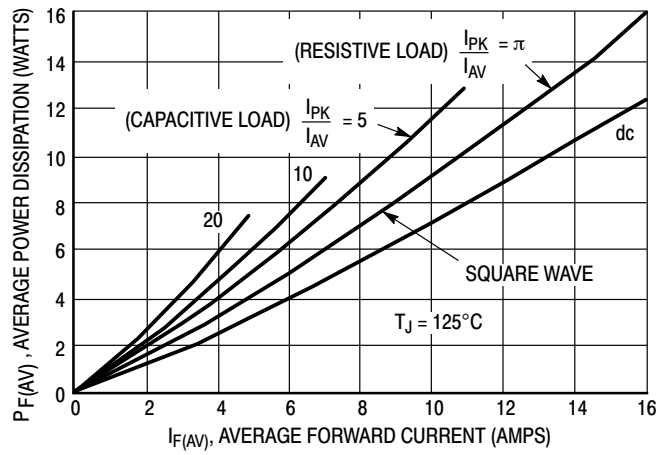



**Figure 5. Power Dissipation (Per Leg)**

**MUR3040PTG**

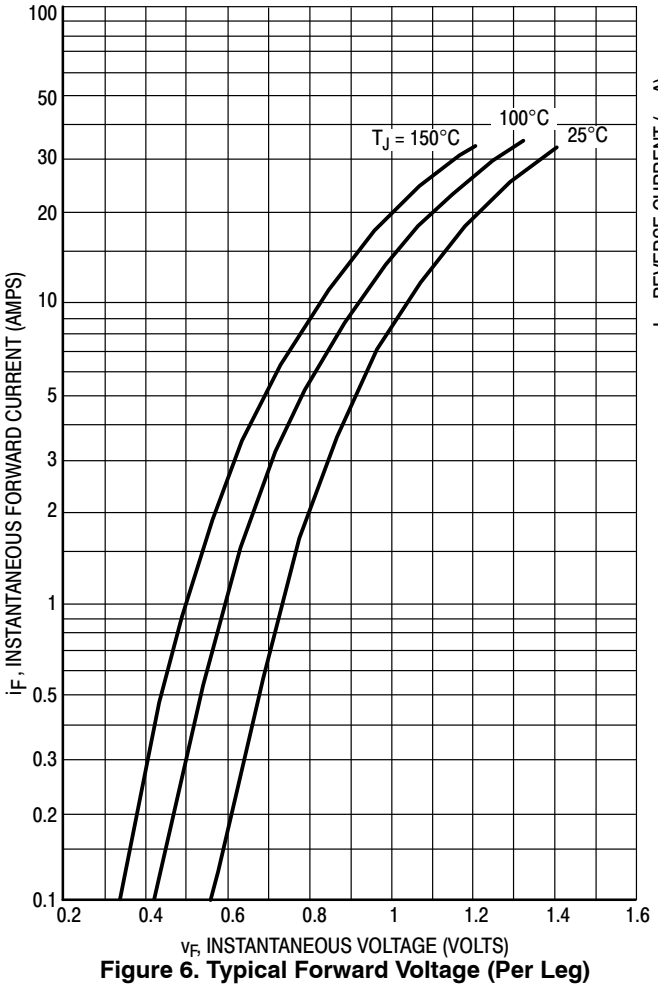



**Figure 6. Typical Forward Voltage (Per Leg)**

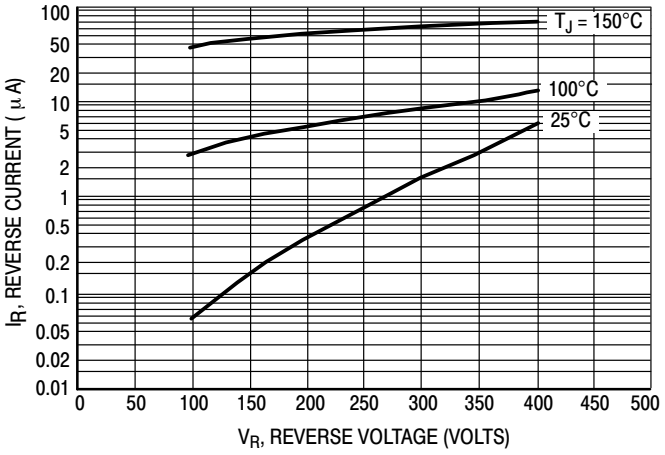



**Figure 7. Typical Reverse Current (Per Leg)**

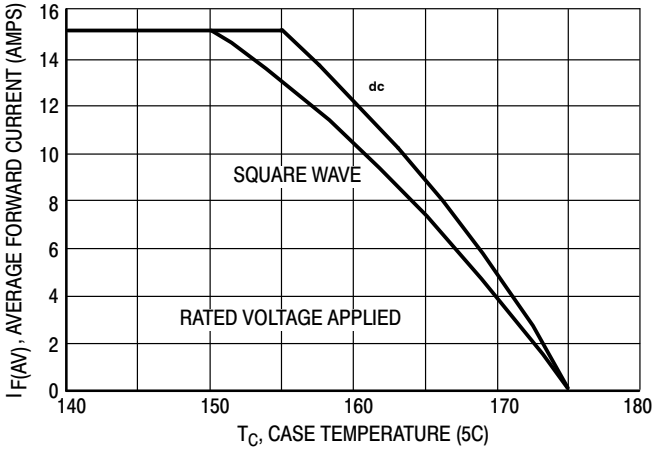



**Figure 8. Current Derating, Case (Per Leg)**

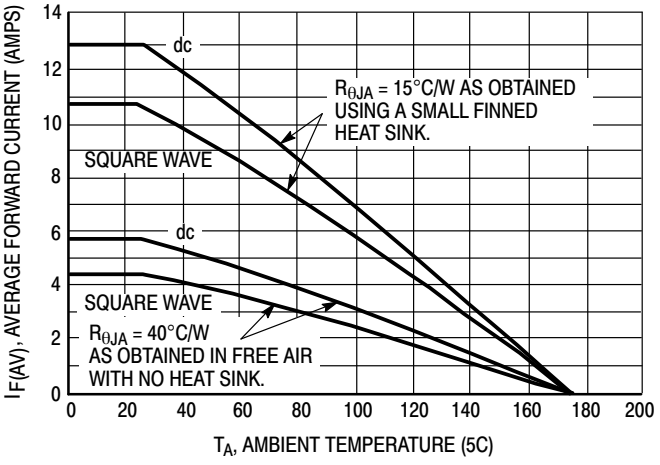



**Figure 9. Current Derating, Ambient (Per Leg)**

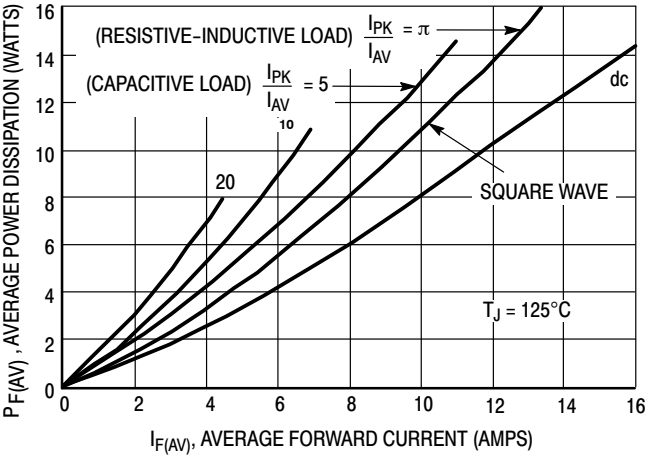



**Figure 10. Power Dissipation (Per Leg)**

**MUR3060PTG, SURS3060PTG**

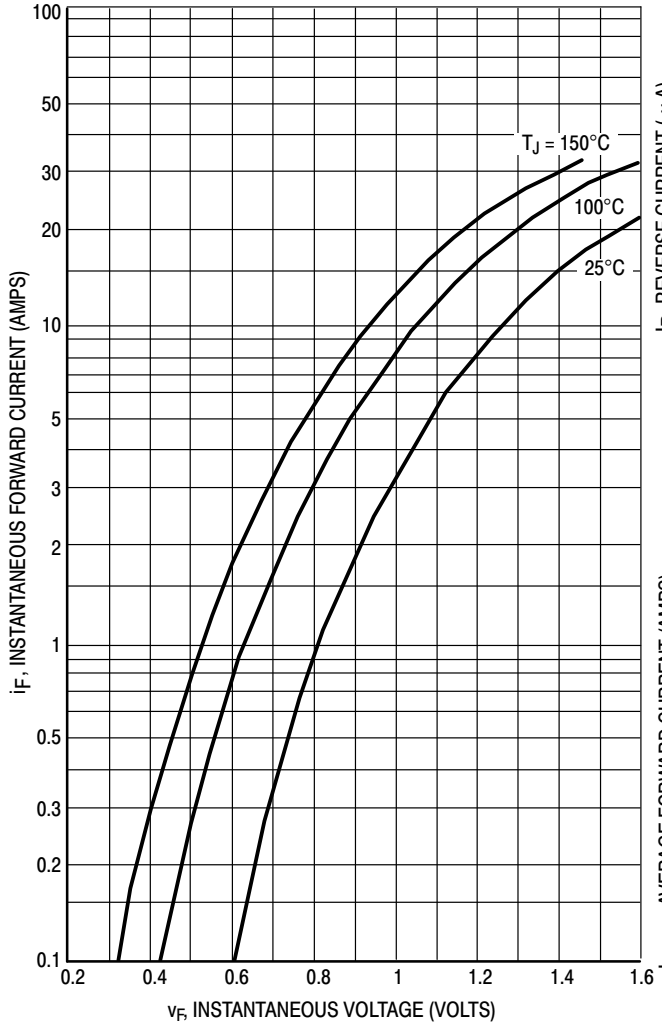



**Figure 11. Typical Forward Voltage (Per Leg)**

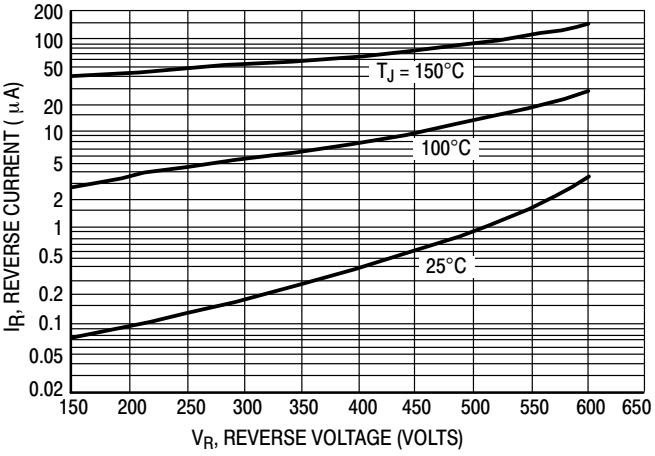



**Figure 12. Typical Reverse Current (Per Leg)**

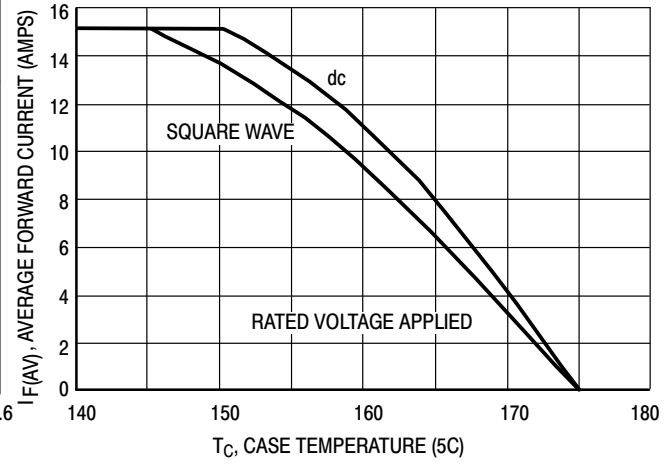



**Figure 13. Current Derating, Case (Per Leg)**

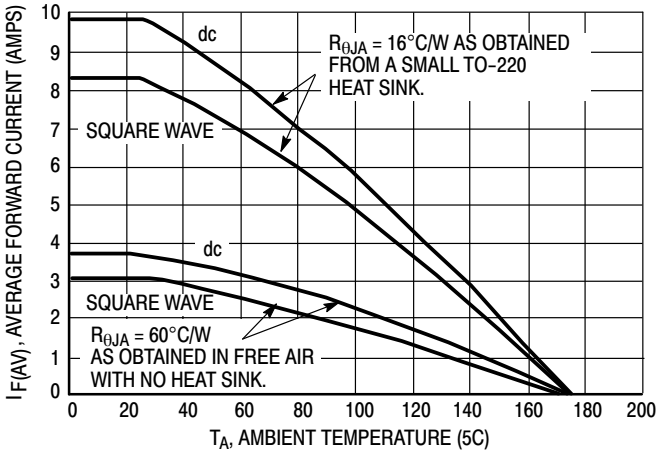



**Figure 14. Current Derating, Ambient (Per Leg)**

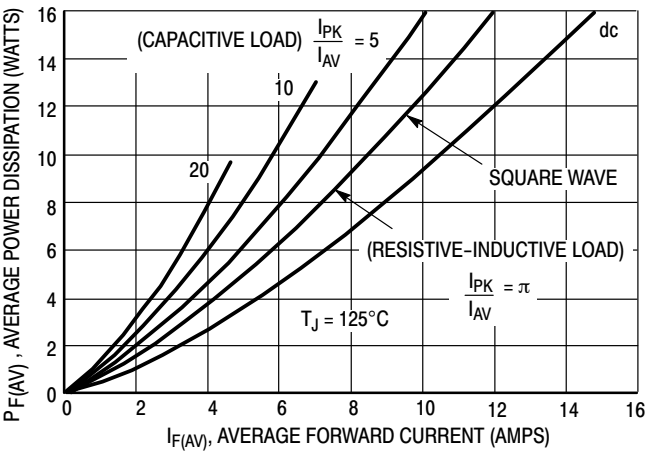



**Figure 15. Power Dissipation (Per Leg)**

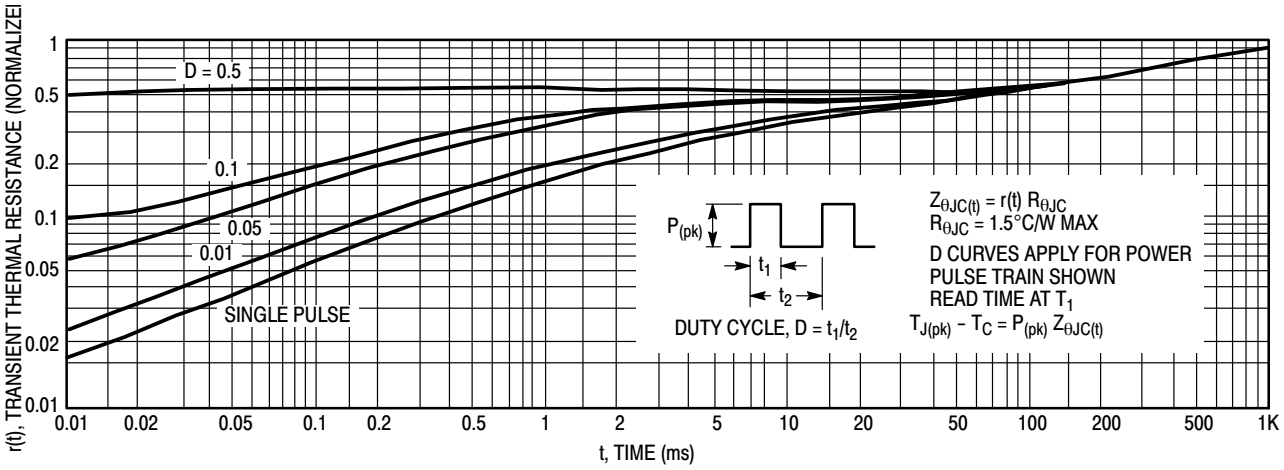



**Figure 16. Thermal Response**

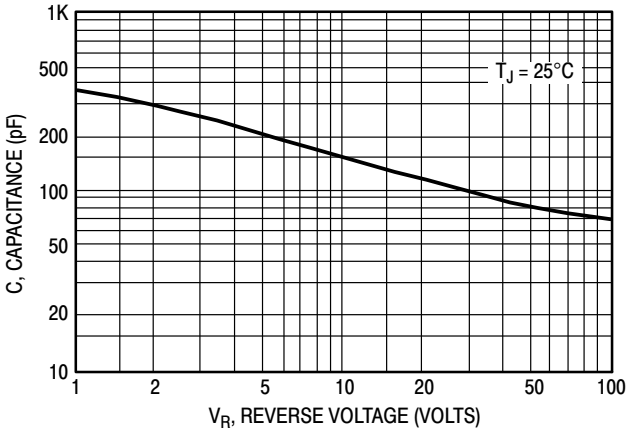


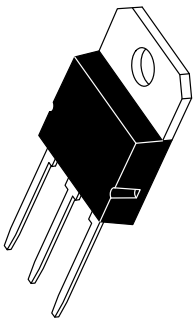

**Figure 17. Typical Capacitance (Per Leg)**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

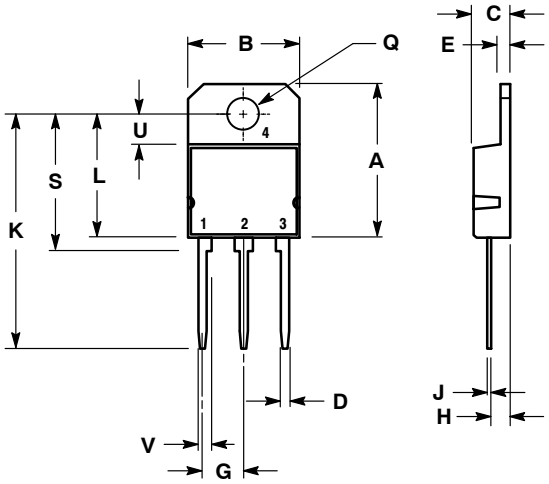
ON Semiconductor®

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

**DATE 01/03/2002**



**SCALE 1:1**



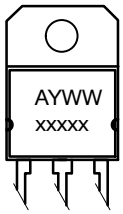

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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.

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

### MARKING DIAGRAM




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

| | | | |
|---|---|---|---|
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