MOTOROLA
**SEMICONDUCTOR**
TECHNICAL DATA

# Switchmode Power Rectifiers

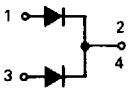
**MUR3005PT thru MUR3060PT**

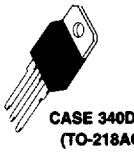
MUR3020PT and MUR3060PT are Motorola Preferred Devices

**ULTRAFAST RECTIFIERS 30 AMPERES 50–600 VOLTS**

. . . designed for use in switching power supplies, inverters and as free wheeling diodes, these state-of-the-art devices have the following features:

- Ultrafast 35 and 60 Nanosecond Recovery Time
- 175°C Operating Junction Temperature
- High Voltage Capability to 600 Volts
- Low Forward Drop
- Low Leakage Specified @ 150°C Case Temperature
- Current Derating Specified @ Both Case and Ambient Temperatures
- Epoxy Meets UL94, $V_O$ @ 1/8"
- High Temperature Glass Passivated Junction



CASE 340D-01
(TO-218AC)

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## MAXIMUM RATINGS

| Rating | Symbol | MUR | | | | | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 3005PT | 3010PT | 3015PT | 3020PT | 3030PT | 3040PT | 3050PT | 3060PT | |
| 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 | 300 | 400 | 500 | 600 | Volts |
| Average Rectified Forward Current (Rated $V_R$)<br>Per Leg<br>Per Device | $I_{F(AV)}$ | 15<br>30 | $T_C$ = 150°C | | | | | 15<br>30 | $T_C$ = 145°C | Amps |
| Peak Repetitive Forward Current, Per Leg (Rated $V_R$, Square Wave, 20 kHz), $T_C$ = 150°C | $I_{FRM}$ | 30 @ $T_C$ = 150°C | | | | | | 30 @ $T_C$ = 145°C | | Amps |
| Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz) Per Leg | $I_{FSM}$ | 200 | | | | 150 | | | | Amps |
| Operating Junction Temperature and Storage Temperature | $T_J$, $T_{stg}$ | −65 to +175 | | | | | | | | °C |

## THERMAL CHARACTERISTICS PER DIODE LEG

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

## ELECTRICAL CHARACTERISTICS PER DIODE LEG

| | | | | | |
|---|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (1)<br>($i_F$ = 15 Amps, $T_C$ = 150°C)<br>($i_F$ = 15 Amps, $T_C$ = 25°C) | $v_F$ | 0.85<br>1.05 | | 1.12<br>1.25 | 1.2<br>1.5 | Volts |
| Maximum Instantaneous Reverse Current (1)<br>(Rated dc Voltage, $T_C$ = 150°C)<br>(Rated dc Voltage, $T_C$ = 25°C) | $i_R$ | 500<br>10 | | | 1000<br>10 | μA |
| Maximum Reverse Recovery Time<br>($I_F$ = 1 Amp, di/dt = 50 Amps/μs) | $t_{rr}$ | 35 | | 60 | | ns |

(1) Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2%.

# MUR3005PT thru MUR3060PT

## MUR3005PT, 3010PT, and 3015PT



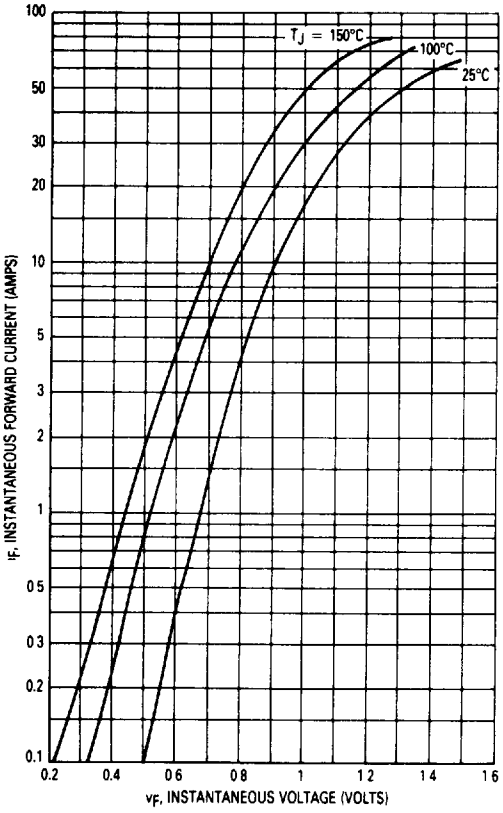
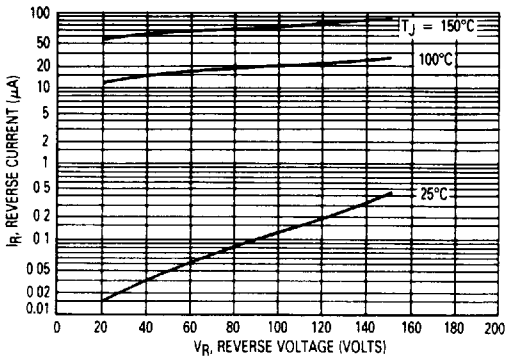



**Figure 1. Typical Forward Voltage (Per Leg)**




*The curves shown are typical for the highest voltage device in the voltage 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 2. Typical Reverse Current (Per Leg)***

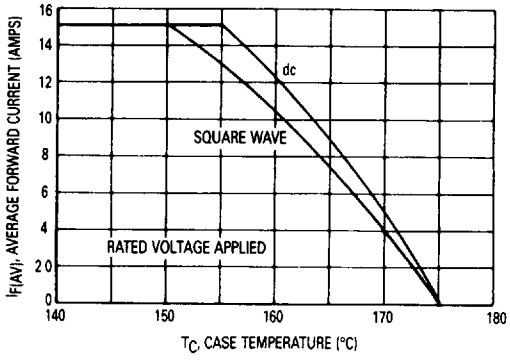



**Figure 3. Current Derating, Case (Per Leg)**

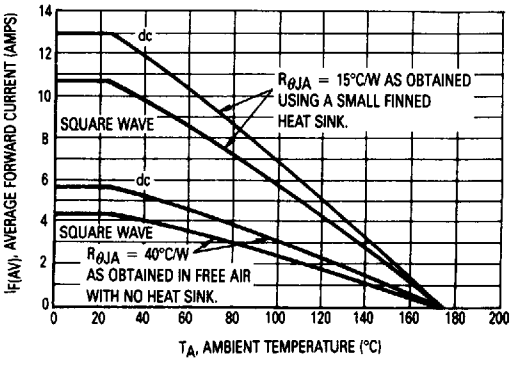



**Figure 4. Current Derating, Ambient (Per Leg)**

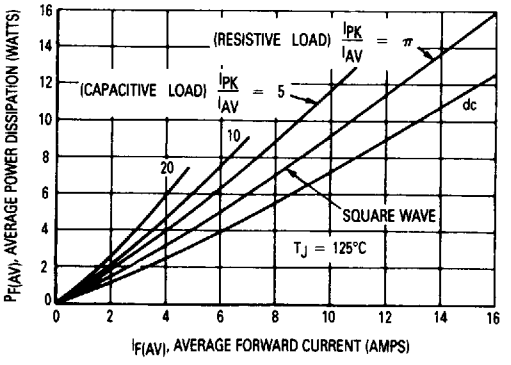



**Figure 5. Power Dissipation (Per Leg)**

# MUR3005PT thru MUR3060PT

## MUR3020PT,3030PT, and 3040PT

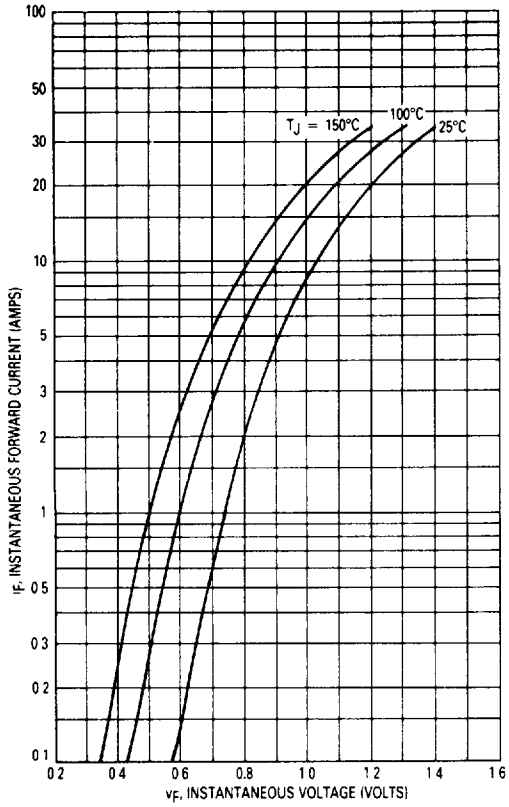
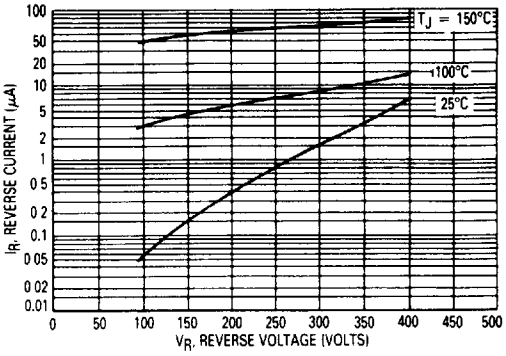



Figure 6. Typical Forward Voltage (Per Leg)




*The curves shown are typical for the highest voltage device in the voltage 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 7. Typical Reverse Current (Per Leg)*

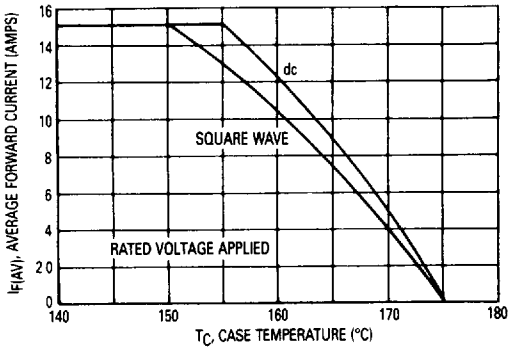



Figure 8. Current Derating, Case (Per Leg)

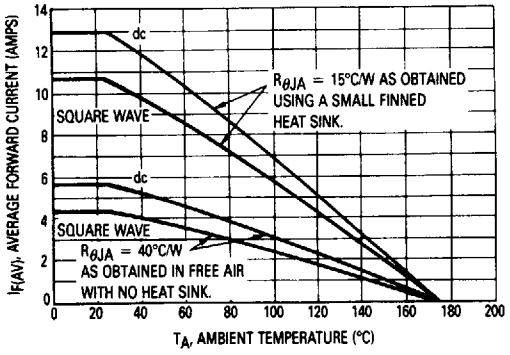



Figure 9. Current Derating, Ambient (Per Leg)

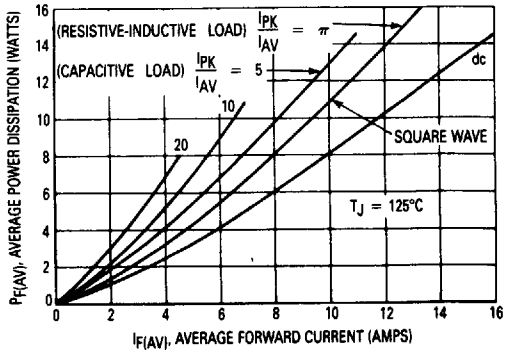



Figure 10. Power Dissipation (Per Leg)

# MUR3005PT thru MUR3060PT

## MUR3050PT and MUR3060PT



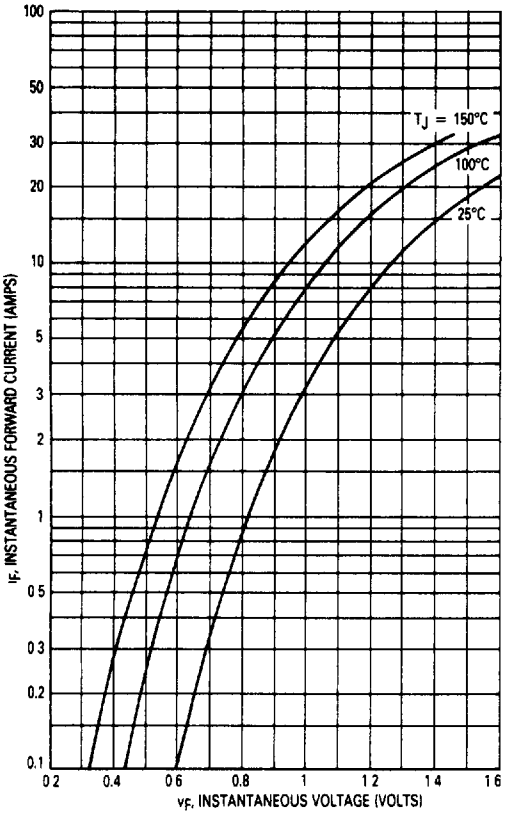
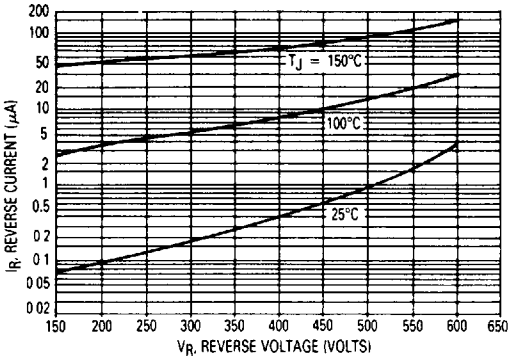



Figure 11. Typical Forward Voltage




*The curves shown are typical for the highest voltage device in the voltage 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 12. Typical Reverse Current*

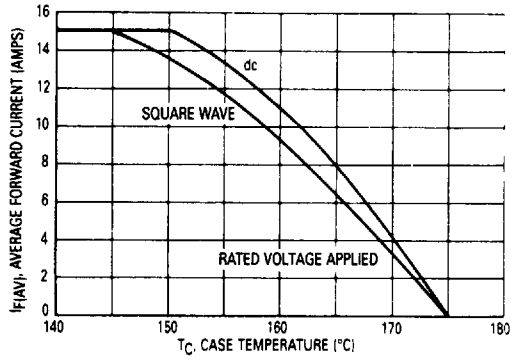



Figure 13. Current Derating, Case

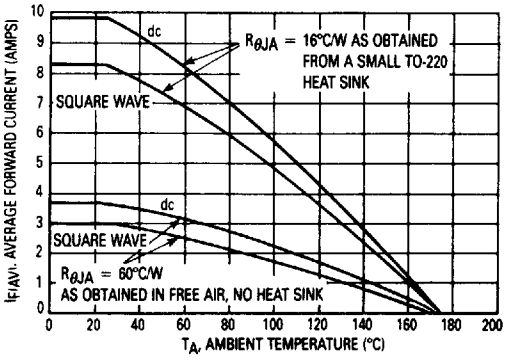



Figure 14. Current Derating, Ambient

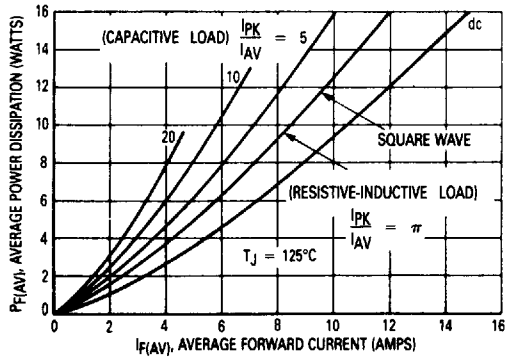



Figure 15. Power Dissipation

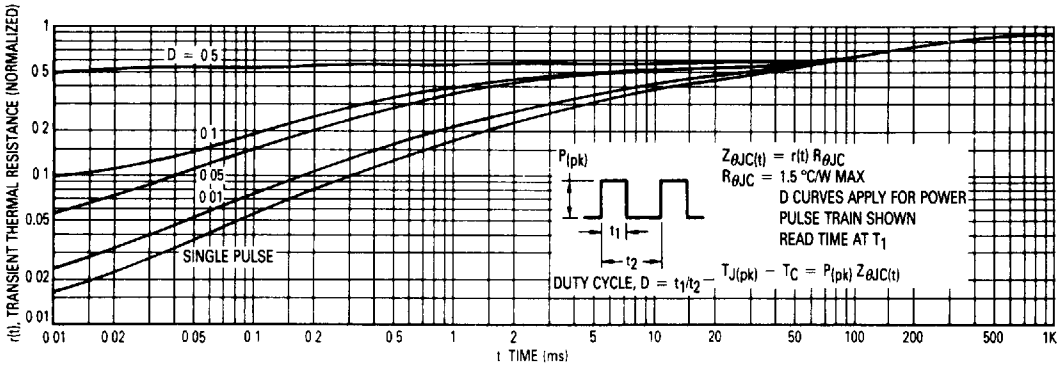



**Figure 16. Thermal Response**

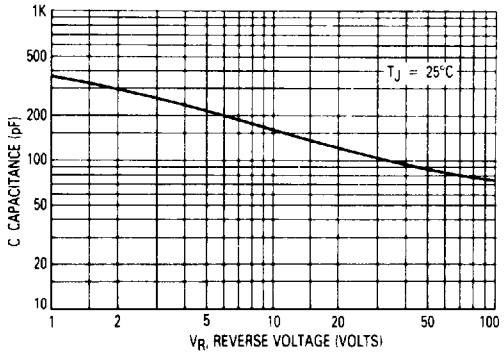



**Figure 17. Typical Capacitance (Per Leg)**