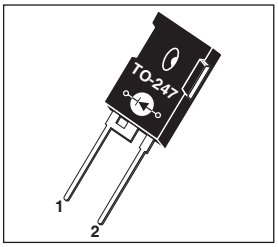
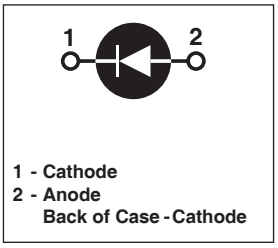
ADVANCED POWER TECHNOLOGY®

**600V 15A**
**APT15D60B**
**APT15D60BG***

***G Denotes RoHS Compliant, Pb Free Terminal Finish.**

# ULTRAFAST SOFT RECOVERY RECTIFIER DIODE




1 - Cathode
2 - Anode
Back of Case - Cathode

## PRODUCT APPLICATIONS

- Anti-Parallel Diode
  - -Switchmode Power Supply
  - -Inverters
- Free Wheeling Diode
  - -Motor Controllers
  - -Converters
  - -Inverters
- Snubber Diode
- PFC

## PRODUCT FEATURES

- Ultrafast Recovery Times
- Soft Recovery Characteristics
- Popular TO-247 Package
- Low Forward Voltage
- Low Leakage Current

## PRODUCT BENEFITS

- Low Losses
- Low Noise Switching
- Cooler Operation
- Higher Reliability Systems
- Increased System Power Density

## MAXIMUM RATINGS

All Ratings: $T_C$ = 25°C unless otherwise specified.

| Symbol | Characteristic / Test Conditions | APT15D60B(G) | UNIT |
|---|---|---|---|
| $V_R$ | Maximum D.C. Reverse Voltage | 600 | Volts |
| $V_{RRM}$ | Maximum Peak Repetitive Reverse Voltage | | |
| $V_{RWM}$ | Maximum Working Peak Reverse Voltage | | |
| $I_{F(AV)}$ | Maximum Average Forward Current ($T_C$ = 133°C, Duty Cycle = 0.5) | 15 | Amps |
| $I_{F(RMS)}$ | RMS Forward Current (Square wave, 50% duty) | 32 | |
| $I_{FSM}$ | Non-Repetitive Forward Surge Current ($T_J$ = 45°C, 8.3ms) | 110 | |
| $T_J$,$T_{STG}$ | Operating and StorageTemperature Range | -55 to 175 | °C |
| $T_L$ | Lead Temperature for 10 Sec. | 300 | |

## STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$ = 15A | | 1.6 | 1.8 | Volts |
| | | $I_F$ = 30A | | 1.9 | | |
| | | $I_F$ = 15A, $T_J$ = 125°C | | 1.4 | | |
| $I_{RM}$ | Maximum Reverse Leakage Current | $V_R$ = $V_R$ Rated | | | 150 | µA |
| | | $V_R$ = $V_R$ Rated, $T_J$ = 125°C | | | 500 | |
| $C_T$ | Junction Capacitance, $V_R$ = 200V | | | 23 | | pF |

## DYNAMIC CHARACTERISTICS

**APT15D60B(G)**

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 1A, $di_F/dt$ = -100A/µs, $V_R$ = 30V, $T_J$ = 25°C | - | 21 | | ns |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 15A, $di_F/dt$ = -200A/µs $V_R$ = 400V, $T_C$ = 25°C | - | 80 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 95 | | nC |
| $I_{RRM}$ | Maximum Reverse Recovery Current | | - | 3 | - | Amps |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 15A, $di_F/dt$ = -200A/µs $V_R$ = 400V, $T_C$ = 125°C | - | 150 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 520 | | nC |
| $I_{RRM}$ | Maximum Reverse Recovery Current | | - | 7 | - | Amps |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 15A, $di_F/dt$ = -1000A/µs $V_R$ = 400V, $T_C$ = 125°C | - | 60 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 810 | | nC |
| $I_{RRM}$ | Maximum Reverse Recovery Current | | - | 22 | | Amps |

## THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance | | | 1.35 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance | | | 40 | °C/W |
| $W_T$ | Package Weight | | 0.22 | | oz |
| | | | 5.9 | | g |
| Torque | Maximum Mounting Torque | | | 10 | lb•in |
| | | | | 1.1 | N•m |

**APT Reserves the right to change, without notice, the specifications and information contained herein.**

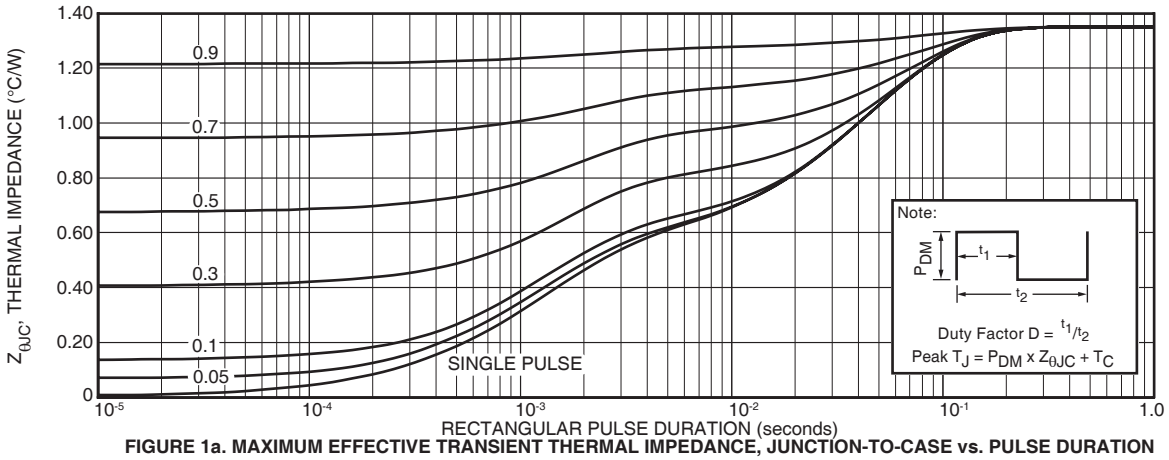



**FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION**

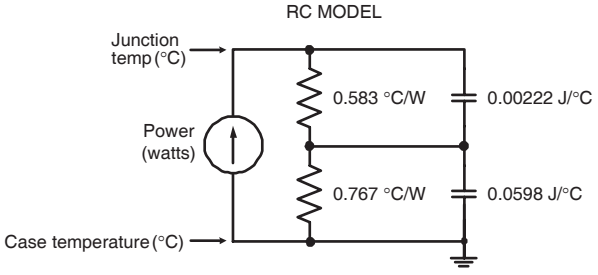



**FIGURE 1b, TRANSIENT THERMAL IMPEDANCE MODEL**

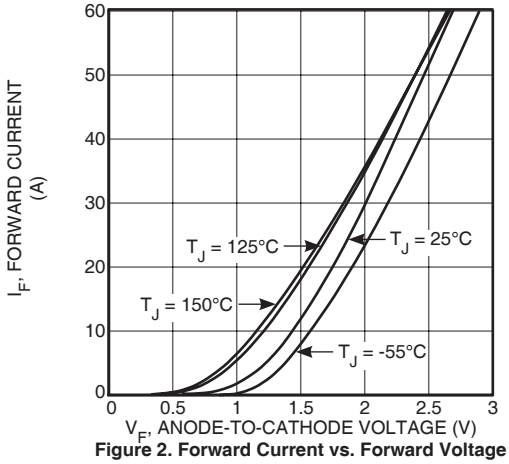



**Figure 2. Forward Current vs. Forward Voltage**

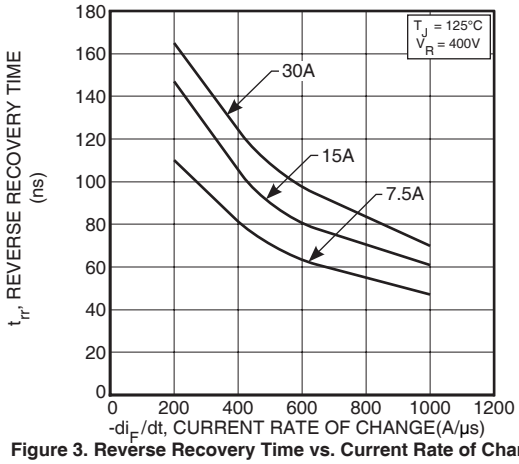



**Figure 3. Reverse Recovery Time vs. Current Rate of Change**

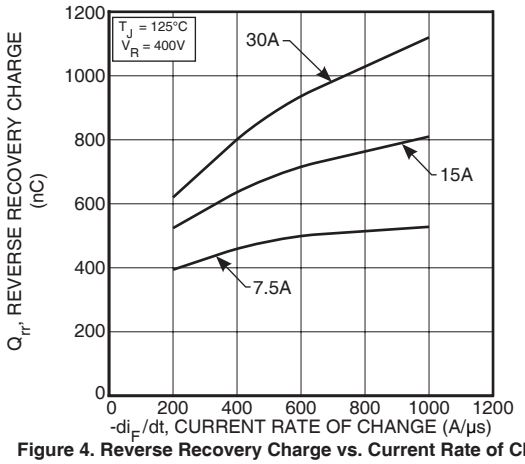



**Figure 4. Reverse Recovery Charge vs. Current Rate of Change**

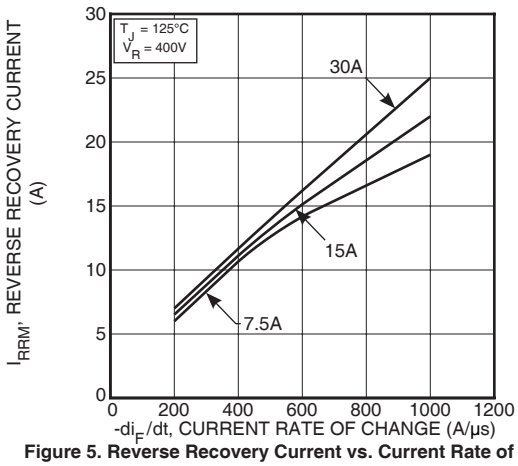



**Figure 5. Reverse Recovery Current vs. Current Rate of Change**

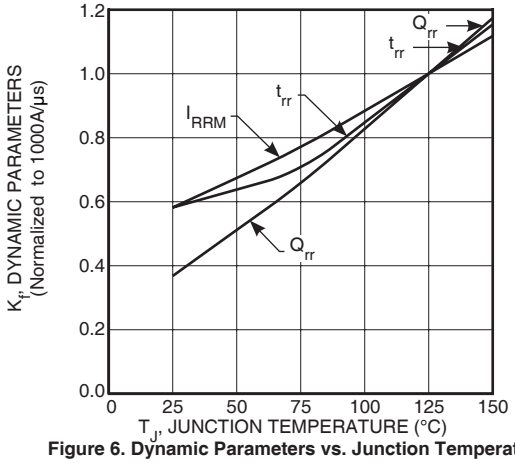



**Figure 6. Dynamic Parameters vs. Junction Temperature**

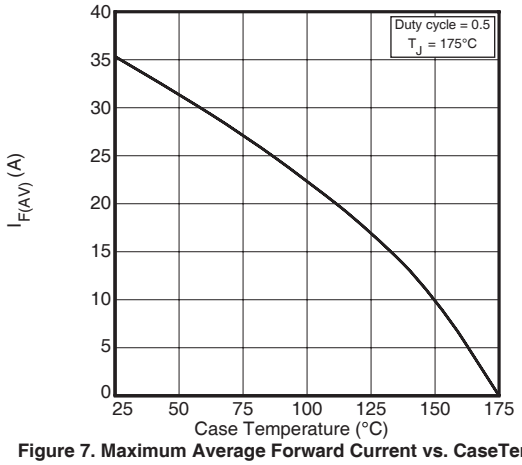



**Figure 7. Maximum Average Forward Current vs. CaseTemperature**

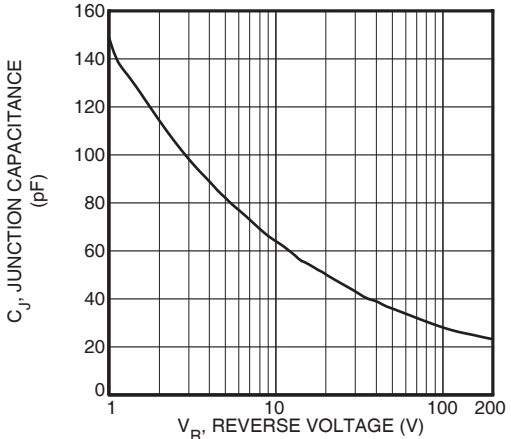



**Figure 8. Junction Capacitance vs. Reverse Voltage**

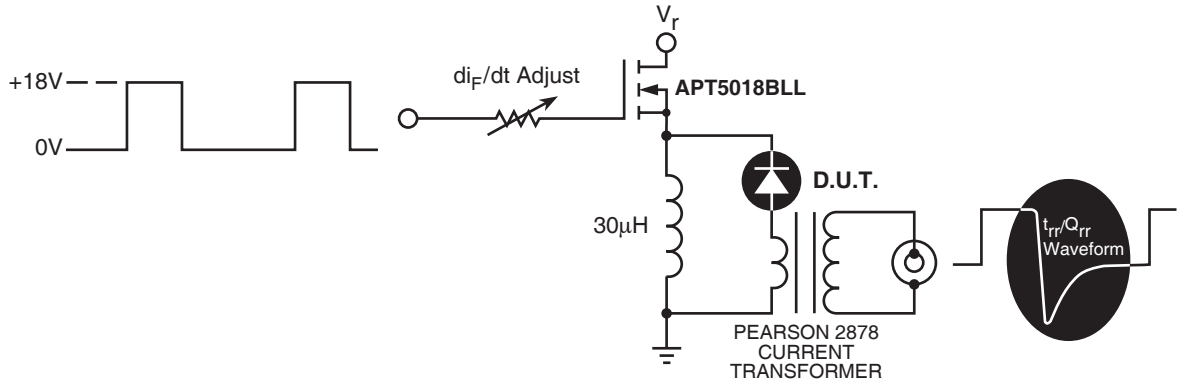
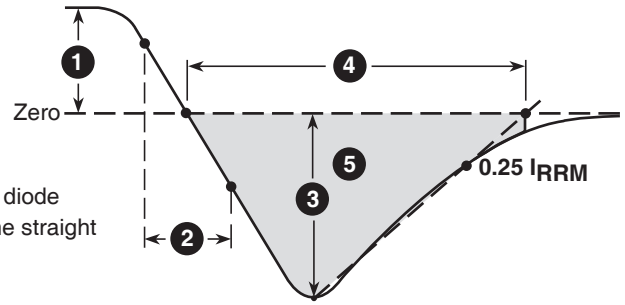



**Figure 9. Diode Test Circuit**

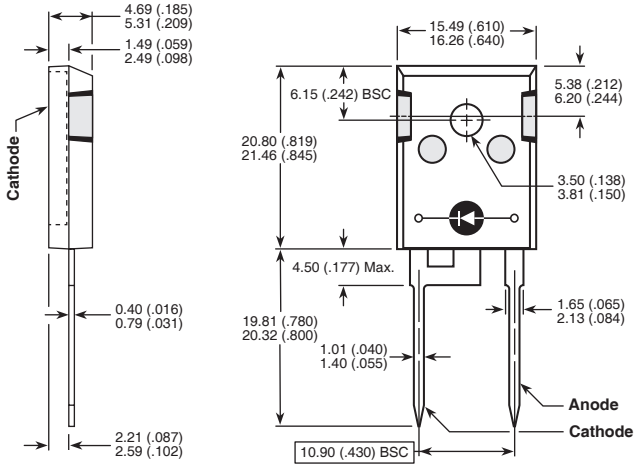



1. $I_F$ - Forward Conduction Current
2. $di_F/dt$ - Rate of Diode Current Change Through Zero Crossing.
3. $I_{RRM}$ - Maximum Reverse Recovery Current.
4. $t_{rr}$ - Reverse Recovery Time, measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through $I_{RRM}$ and $0.25 \bullet I_{RRM}$ passes through zero.
5. $Q_{rr}$ - Area Under the Curve Defined by $I_{RRM}$ and $t_{rr}$.

**Figure 10, Diode Reverse Recovery Waveform and Definitions**

## TO-247 Package Outline

(e1) SAC: Tin, Silver, Copper




Dimensions in Millimeters and (Inches)

APT's products are covered by one or more of U.S.patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. US and Foreign patents pending. All Rights Reserved.