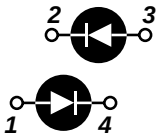
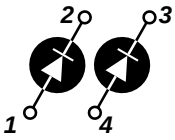


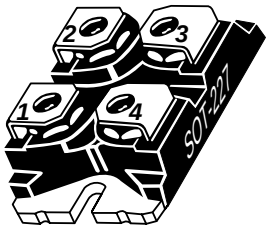

*Anti-Parallel*

**APT2X60D20J**




*Parallel*

**APT2X61D20J**




**ADVANCED POWER TECHNOLOGY®**

**APT2X60D20J 200V 60A**

**APT2X61D20J 200V 60A**

# DUAL DIE ISOTOP® PACKAGE

# ULTRAFAST SOFT RECOVERY DUAL RECTIFIER DIODES

## PRODUCT APPLICATIONS

- **Anti-Parallel Diode**
  - **-Switchmode Power Supply**
  - **-Inverters**
- **Free Wheeling Diode**
  - **-Motor Controllers**
  - **-Converters**
- **Snubber Diode**
- **Uninterruptible Power Supply (UPS)**
- **Induction Heating**
- **High Speed Rectifiers**

## PRODUCT FEATURES

- **Ultrafast Recovery Times**
- **Soft Recovery Characteristics**
- **Popular SOT-227 Package**
- **Low Forward Voltage**
- **High Blocking 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 | APT2X60/2X61D20J | UNIT |
|---|---|---|---|
| $V_R$ | Maximum D.C. Reverse Voltage | 200 | Volts |
| $V_{RRM}$ | Maximum Peak Repetitive Reverse Voltage | | |
| $V_{RWM}$ | Maximum Working Peak Reverse Voltage | | |
| $I_F(AV)$ | Maximum Average Forward Current ($T_C$ = 100°C, Duty Cycle = 0.5) | 60 | Amps |
| $I_F(RMS)$ | RMS Forward Current | 100 | |
| $I_{FSM}$ | Non-Repetitive Forward Surge Current ($T_J$ = 45°C, 8.3ms) | 600 | |
| $T_J$,$T_{STG}$ | Operating and StorageTemperature Range | -55 to 150 | °C |
| $T_L$ | Lead Temperature: 0.063" from Case for 10 Sec. | 300 | |

**STATIC ELECTRICAL CHARACTERISTICS**

| Symbol | Characteristic / Test Conditions | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_F$ | Maximum Forward Voltage | $I_F$ = 60A | | | 1.15 | Volts |
| | | $I_F$ = 120A | | 1.26 | | |
| | | $I_F$ = 60A, $T_J$ = 150°C | | | 0.93 | |
| $I_{RM}$ | Maximum Reverse Leakage Current | $V_R$ = $V_R$ Rated | | | 250 | µA |
| | | $V_R$ = $V_R$ Rated, $T_J$ = 125°C | | | 500 | |
| $C_T$ | Junction Capacitance, $V_R$ = 200V | | | 215 | | pF |
| $L_S$ | Series Inductance (Lead to Lead 5mm from Base) | | | 10 | | nH |

*APT Website - http://www.advancedpower.com*

**USA**
**405 S.W. Columbia Street Bend, Oregon 97702-1035 Phone: (541) 382-8028 FAX: (541) 388-0364**
**EUROPE**
**Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord F-33700 Merignac - France Phone: (33) 5 57 92 15 15 FAX: (33) 5 56 47 97 61**

053-2003 Rev B

## DYNAMIC CHARACTERISTICS

| Symbol | Characteristic | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $t_{rr1}$ | Reverse Recovery Time, $I_F$ = 1.0A, $di_F/dt$ = -15A/µs, $V_R$ = 30V, $T_J$ = 25°C | | | 50 | 70 | ns |
| $t_{rr2}$ | Reverse Recovery Time | $T_J$ = 25°C | | 36 | | |
| $t_{rr3}$ | $I_F$ = 60A, $di_F/dt$ = -480A/µs, $V_R$ = 100V | $T_J$ = 100°C | | 71 | | |
| $t_{fr1}$ | Forward Recovery Time | $T_J$ = 25°C | | 180 | | |
| $t_{fr2}$ | $I_F$ = 60A, $di_F/dt$ = 480A/µs, $V_R$ = 100V | $T_J$ = 100°C | | 180 | | |
| $I_{RRM1}$ | Reverse Recovery Current | $T_J$ = 25°C | | 12 | 20 | Amps |
| $I_{RRM2}$ | $I_F$ = 60A, $di_F/dt$ = -480A/µs, $V_R$ = 100V | $T_J$ = 100°C | | 21 | 35 | |
| $Q_{rr1}$ | Recovery Charge | $T_J$ = 25°C | | 270 | | nC |
| $Q_{rr2}$ | $I_F$ = 60A, $di_F/dt$ = -480A/µs, $V_R$ = 100V | $T_J$ = 100°C | | 750 | | |
| $V_{fr1}$ | Forward Recovery Voltage | $T_J$ = 25°C | | 7 | | Volts |
| $V_{fr2}$ | $I_F$ = 60A, $di_F/dt$ = 480A/µs, $V_R$ = 100V | $T_J$ = 100°C | | 7 | | |
| diM/dt | Rate of Fall of Recovery Current | $T_J$ = 25°C | | 1000 | | A/µs |
| | $I_F$ = 60A, $di_F/dt$ = -480A/µs, $V_R$ = 100V | $T_J$ = 100°C | | 1500 | | |

## THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance | | | 0.66 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance | | | 20 | |
| $V_{Isolation}$ | RMS Voltage (50-60 Hz Sinusoidal Waveform from Terminals to Mounting Base for 1 Min.) | 2500 | | | Volts |
| $W_T$ | Package Weight | | 1.03 | | oz |
| | | | 29.2 | | gm |
| Torque | Maximum Torque (Mounting = 8-32 or 4mm Machine and Terminals = 4mm Machine) | | | 13.6 | lb•in |
| | | | | 1.5 | N•m |

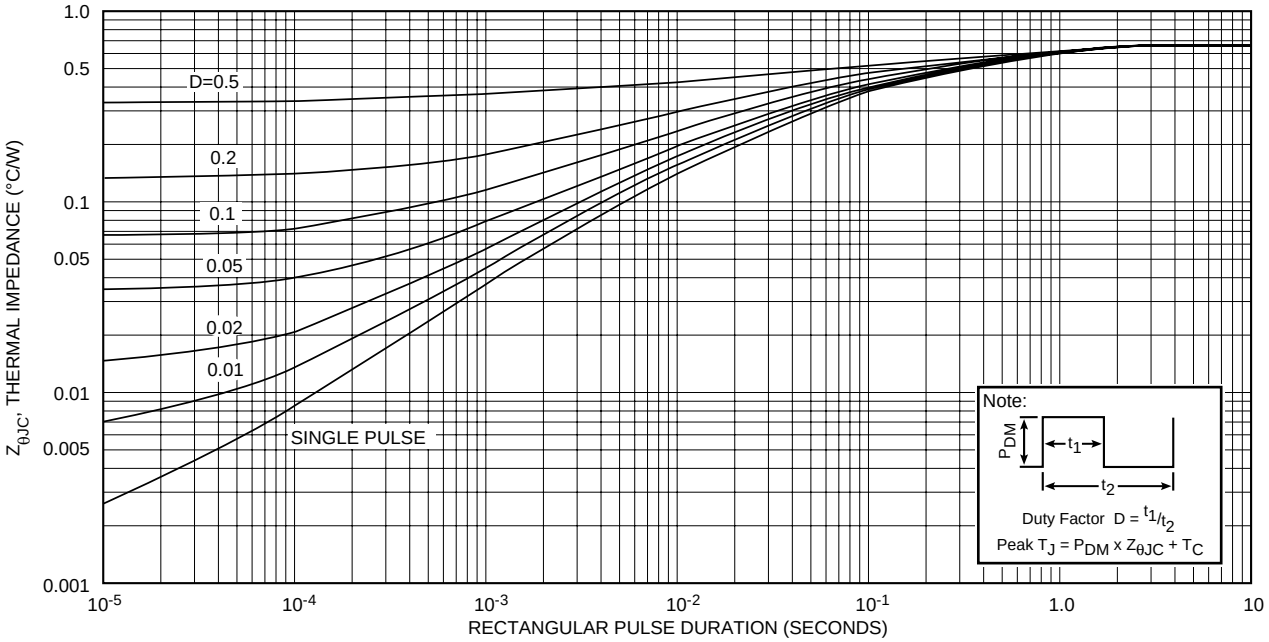



**FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION**

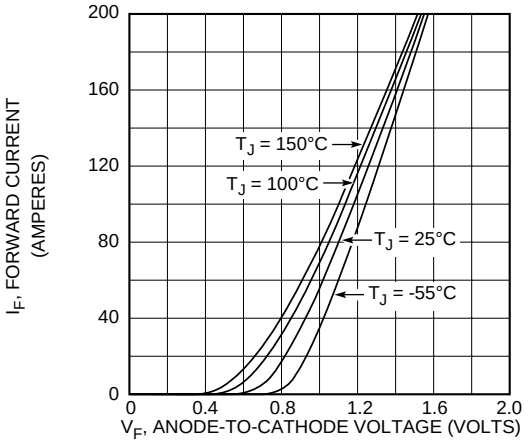



**Figure 2, Forward Voltage Drop vs Forward Current**

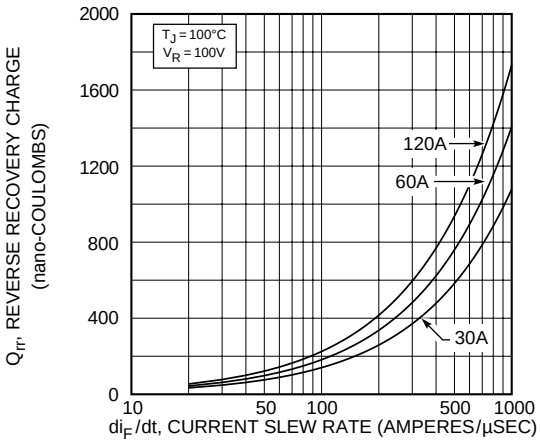



**Figure 3, Reverse Recovery Charge vs Current Slew Rate**

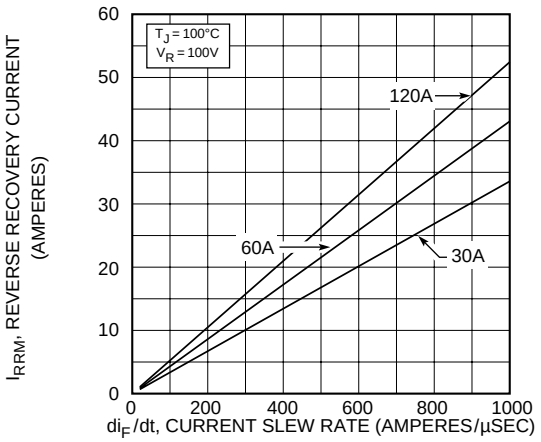



**Figure 4, Reverse Recovery Current vs Current Slew Rate**

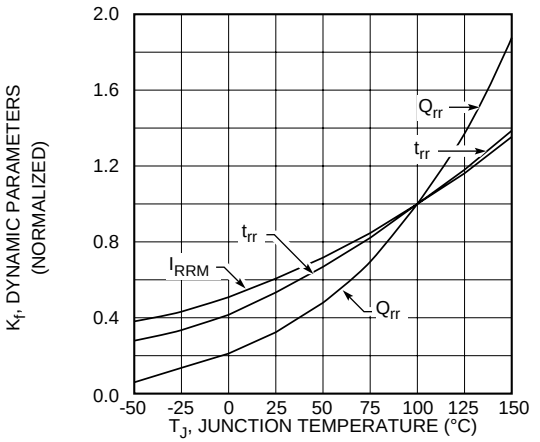



**Figure 5, Dynamic Parameters vs Junction Temperature**

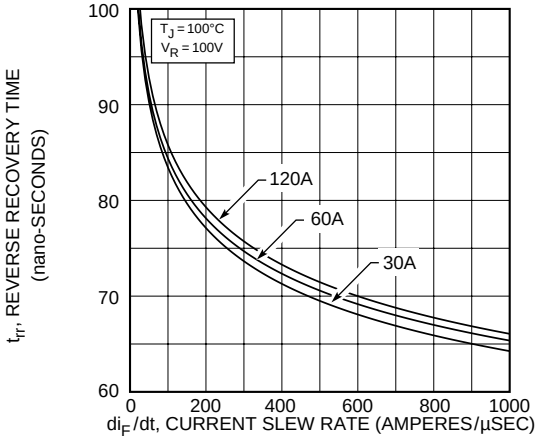



**Figure 6, Reverse Recovery Time vs Current Slew Rate**

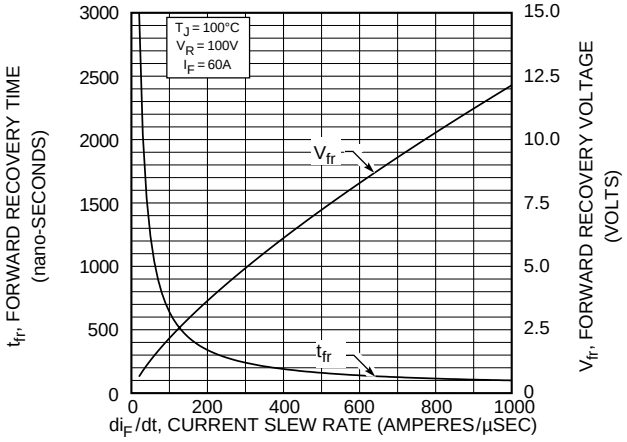



**Figure 7, Forward Recovery Voltage/Time vs Current Slew Rate**

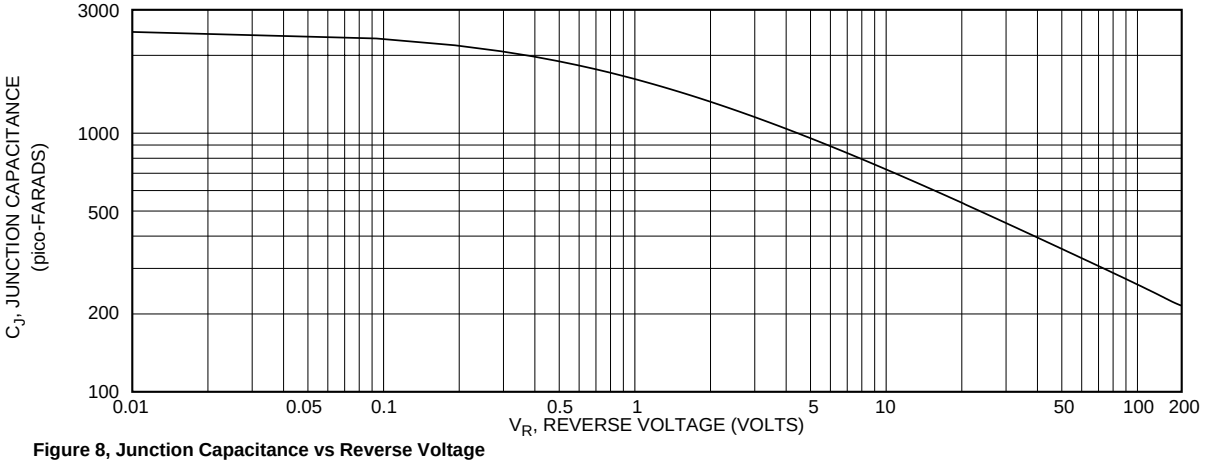



**Figure 8, Junction Capacitance vs Reverse Voltage**

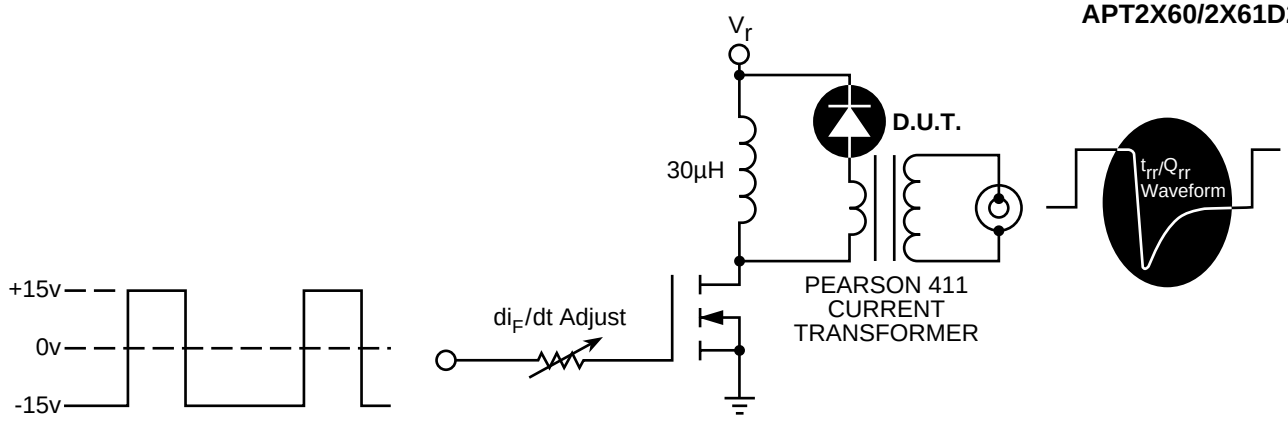



**Figure 9, Diode Reverse Recovery Test Circuit and Waveforms**

1. $I_F$ - Forward Conduction Current
2. $di_F/dt$ - Current Slew Rate, Rate of Forward Current Change Through Zero Crossing.
3. $I_{RRM}$ - Peak Reverse Recovery Current.
4. $t_{rr}$ - Reverse Recovery Time Measured from Point of $I_F$ Current Falling Through Zero to a Tangent Line {6 diM/dt} Extrapolated Through Zero Defined by 0.75 and 0.50 $I_{RRM}$.
5. $Q_{rr}$ - Area Under the Curve Defined by $I_{RRM}$ and $t_{rr}$.
6. diM/dt - Maximum Rate of Current Change During the Trailing Portion of $t_{rr}$.

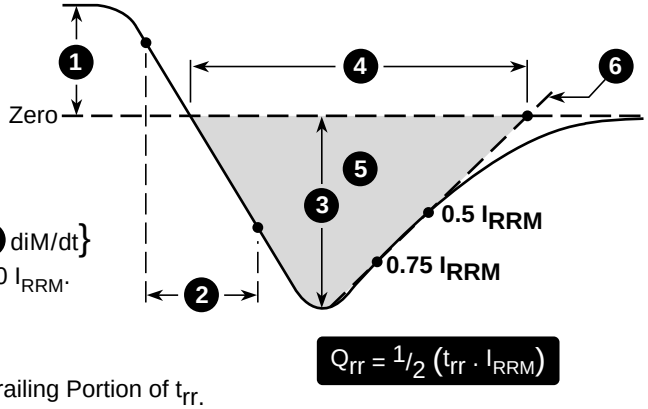
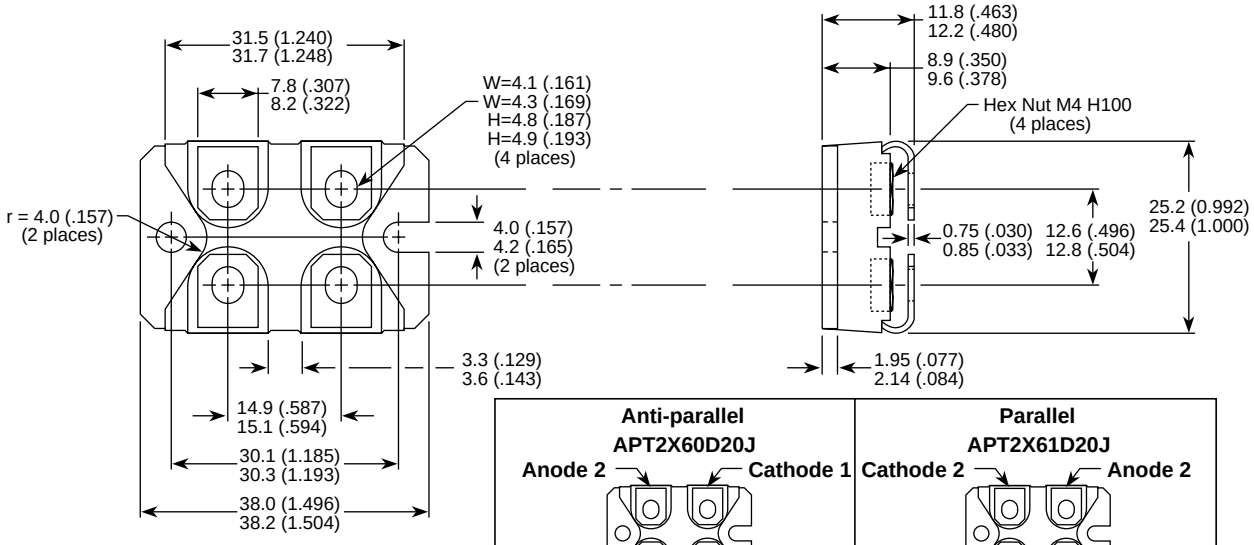



**Figure 10, Diode Reverse Recovery Waveform and Definitions**



## SOT-227 Package Outline




Dimensions in Millimeters and (Inches)