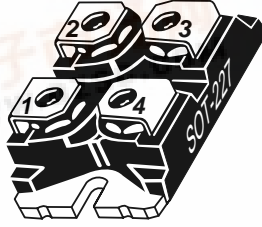
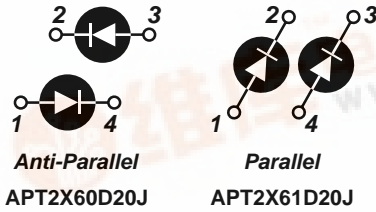


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**ADVANCED  
POWER  
TECHNOLOGY®**

APT2X60D20J 200V 60A  
APT2X61D20J 200V 60A

## DUAL DIE ISOTOP® PACKAGE

### ULTRAFAST SOFT RECOVERY DUAL RECTIFIER DIODES

| PRODUCT APPLICATIONS   | PRODUCT FEATURES  | PRODUCT BENEFITS  |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Anti-Parallel Diode                             <ul style="list-style-type: none"> <li>-Switchmode Power Supply</li> <li>-Inverters</li> </ul> </li> <li>• Free Wheeling Diode                             <ul style="list-style-type: none"> <li>-Motor Controllers</li> <li>-Converters</li> </ul> </li> <li>• Snubber Diode</li> <li>• Uninterruptible Power Supply (UPS)</li> <li>• Induction Heating</li> <li>• High Speed Rectifiers</li> </ul> | <ul style="list-style-type: none"> <li>• Ultrafast Recovery Times</li> <li>• Soft Recovery Characteristics</li> <li>• Popular SOT-227 Package</li> <li>• Low Forward Voltage</li> <li>• High Blocking Voltage</li> <li>• Low Leakage Current</li> </ul> | <ul style="list-style-type: none"> <li>• Low Losses</li> <li>• Low Noise Switching</li> <li>• Cooler Operation</li> <li>• Higher Reliability Systems</li> <li>• Increased System Power Density</li> </ul> |

#### MAXIMUM RATINGS

All Ratings:  $T_C = 25^\circ\text{C}$  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 ( $T_C = 100^\circ\text{C}$ , Duty Cycle = 0.5) | 60               | Amps  |
| $I_F(RMS)$     | RMS Forward Current   | 100              |       |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)        | 600              |       |
| $T_J, T_{STG}$ | Operating and Storage Temperature 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                        |     |     | 1.15   | Volts         |
|          |  |     |     | $I_F = 60\text{A}$                                 |               |
|          |  |     |     | $I_F = 120\text{A}$                                |               |
| $I_{RM}$ | Maximum Reverse Leakage Current                |     |     | 0.93   | $\mu\text{A}$ |
|          |  |     |     | $V_R = V_R \text{ Rated}$                          |               |
| $I_{RM}$ | Maximum Reverse Leakage Current                |     |     | 250  | $\mu\text{A}$ |
|          |  |     |     | $V_R = V_R \text{ Rated}, T_J = 125^\circ\text{C}$ |               |
| $C_T$    | Junction Capacitance, $V_R = 200\text{V}$      |     | 215 |  | pF            |
| $L_s$    | Series Inductance (Lead to Lead 5mm from Base) |     | 10  |  | nH            |

APT Website - <http://www.advancedpower.com>

405 S.W. Columbia Street

Bend, Oregon 97702-1035

Phone: (541) 382-8028

FAX: (541) 388-0364

USA

EUROPE

Avenue J.F. Kennedy, Bât B4 Parc Cadéra Nord

F-33700 Mérignac - France

Phone: (33) 5 57 92 15 15 FAX: (33) 5 56 47 97 61

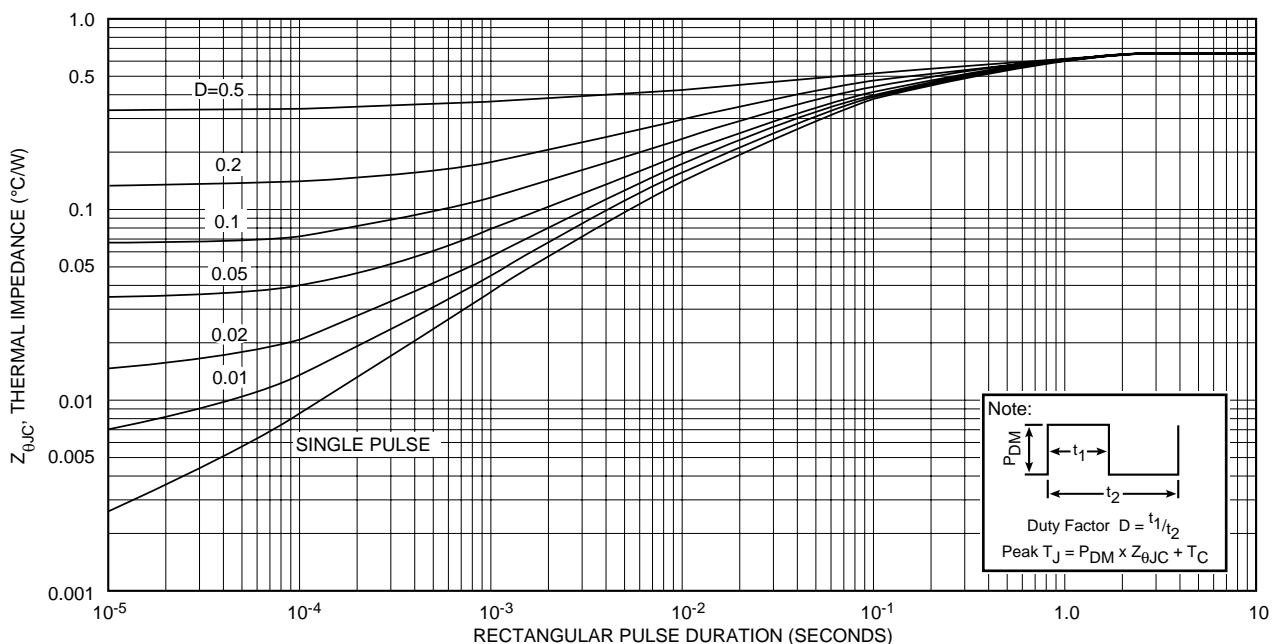
### DYNAMIC CHARACTERISTICS

APT2X60/2X61D20J

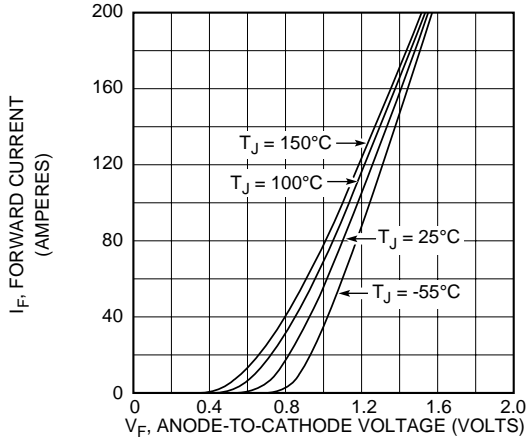
| Symbol     | Characteristic  | MIN  | TYP  | MAX  | UNIT       |
|------------|---|--|------|------|------------|
| $t_{rr1}$  | Reverse Recovery Time, $I_F = 1.0A$ , $di_F/dt = -15A/\mu s$ , $V_R = 30V$ , $T_J = 25^\circ C$ |  | 50   | 70   | ns         |
| $t_{rr2}$  | Reverse Recovery Time   | 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

### THERMAL AND MECHANICAL CHARACTERISTICS

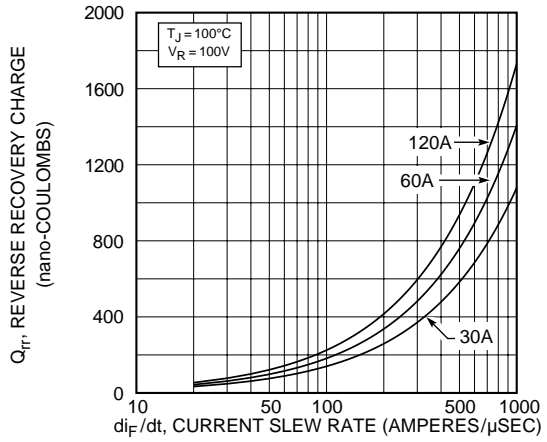
| Symbol          | Characteristic / Test Conditions  | MIN  | TYP  | MAX  | UNIT         |
|-----------------|---|------|------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance   |      |      | 0.66 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance  |      |      | 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          |



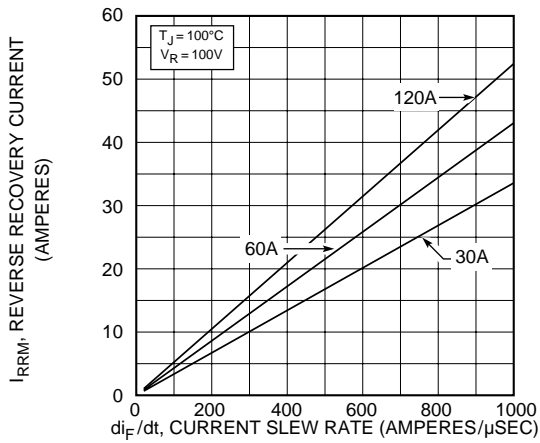
**APT2X60/2X61D20J**



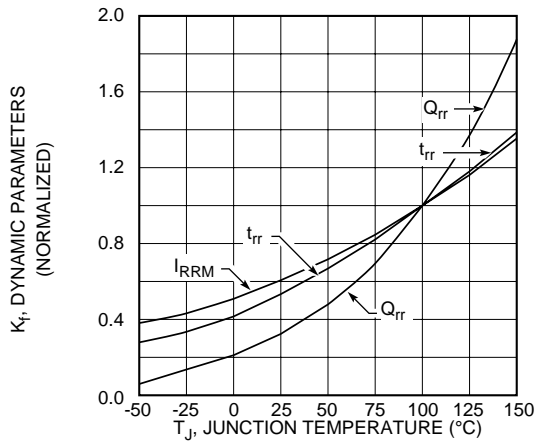
**Figure 2, Forward Voltage Drop vs Forward Current**



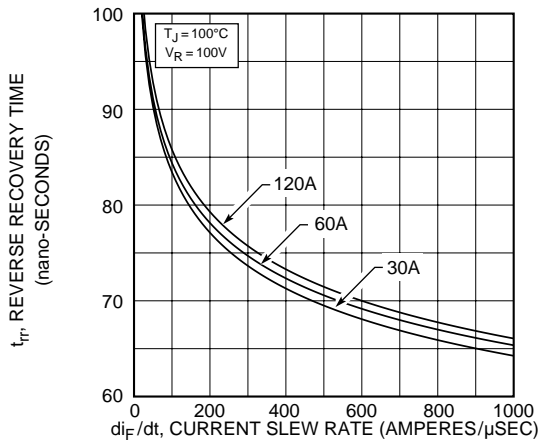
**Figure 3, Reverse Recovery Charge vs Current Slew Rate**



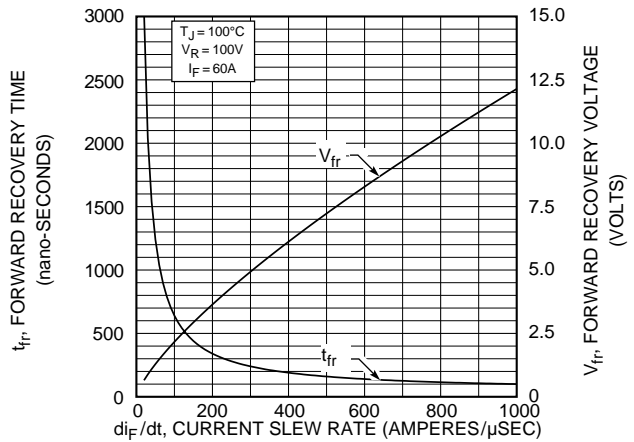
**Figure 4, Reverse Recovery Current vs Current Slew Rate**



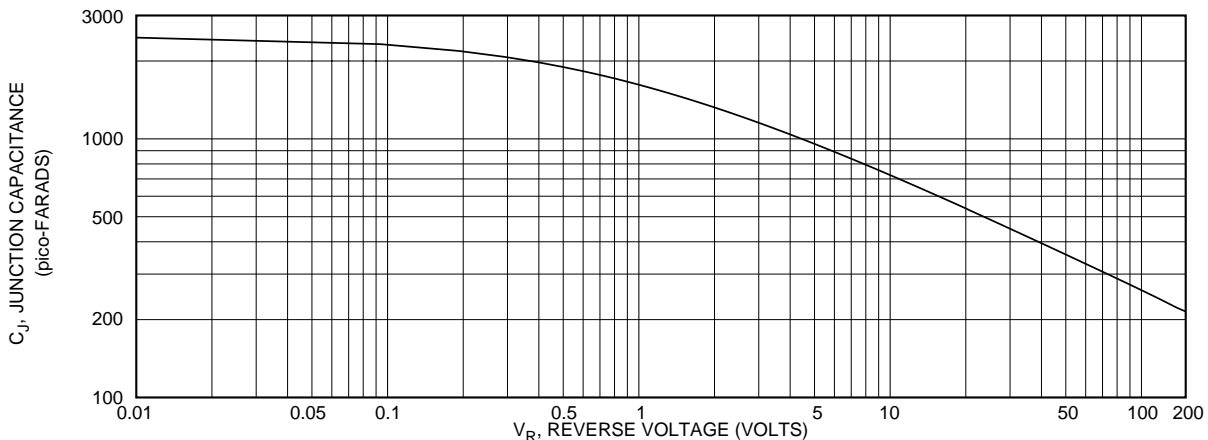
**Figure 5, Dynamic Parameters vs Junction Temperature**



**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**

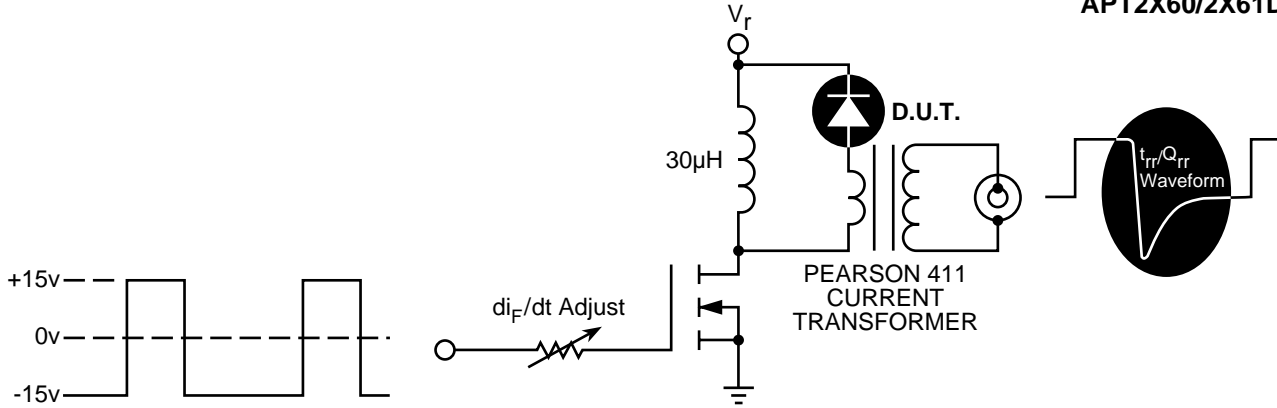


Figure 9, Diode Reverse Recovery Test Circuit and Waveforms

- 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  $di_M/dt$ } 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  $di_M/dt$  - Maximum Rate of Current Change During the Trailing Portion of  $t_{rr}$ .

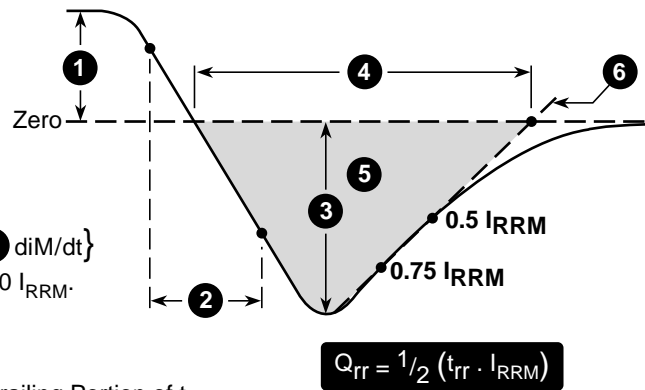


Figure 10, Diode Reverse Recovery Waveform and Definitions

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

### SOT-227 Package Outline

