

**APT2X100D100J 1000V 100A**  
**APT2X101D100J 1000V 100A**

## 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   | APT2X100/2X101D100J | UNIT  |
|----------------|--|---------------------|-------|
| $V_R$          | Maximum D.C. Reverse Voltage   |                     |       |
| $V_{RRM}$      | Maximum Peak Repetitive Reverse Voltage  | 1000                | Volts |
| $V_{RWM}$      | Maximum Working Peak Reverse Voltage   |                     |       |
| $I_F(AV)$      | Maximum Average Forward Current ( $T_C = 40^\circ\text{C}$ , Duty Cycle = 0.5) | 100                 | Amps  |
| $I_F(RMS)$     | RMS Forward Current  | 170                 |       |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)       | 1000                |       |
| $T_J, T_{STG}$ | 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                        |     |     | 2.5               | Volts   |     |
|          |  |     |     | $I_F = 100A$      |         |     |
|          |  |     |     | $I_F = 200A$      |         | 2.5 |
| $I_{RM}$ | Maximum Reverse Leakage Current                |     |     | 250               | $\mu A$ |     |
|          |  |     |     | $V_R = V_R$ Rated |         | 500 |
| $C_T$    | Junction Capacitance, $V_R = 200V$             |     | 116 |                   | pF      |     |
| $L_S$    | Series Inductance (Lead to Lead 5mm from Base) |     | 20  |                   | nH      |     |

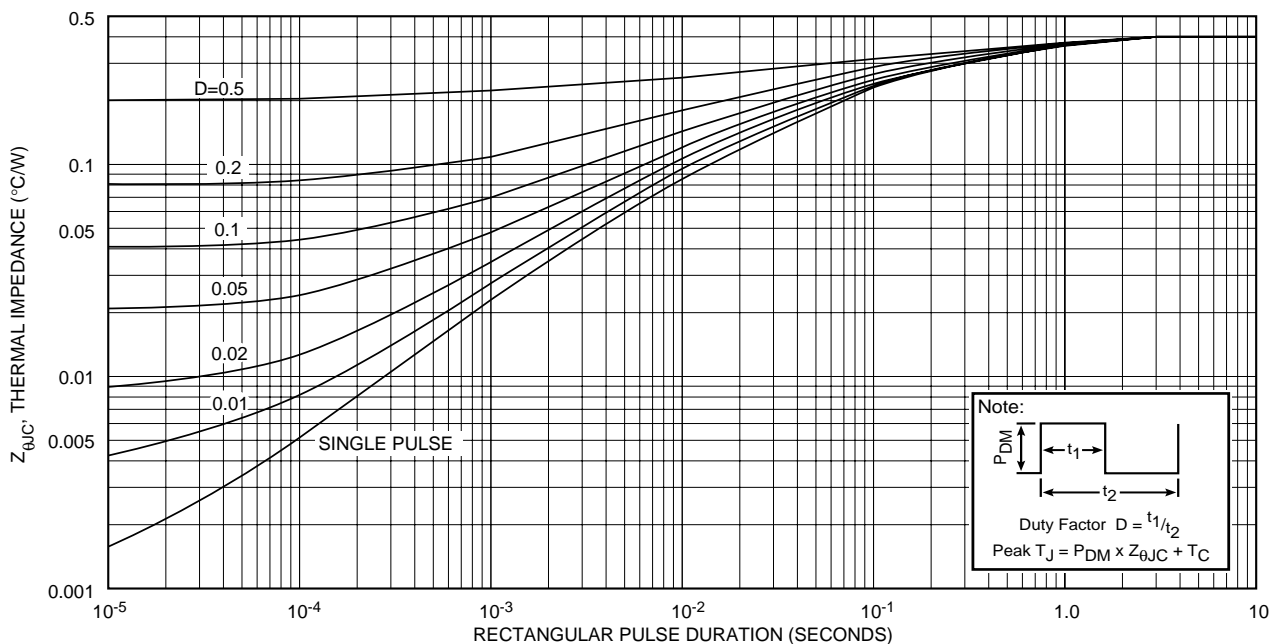
### DYNAMIC CHARACTERISTICS

APT2X100/2X101D100J

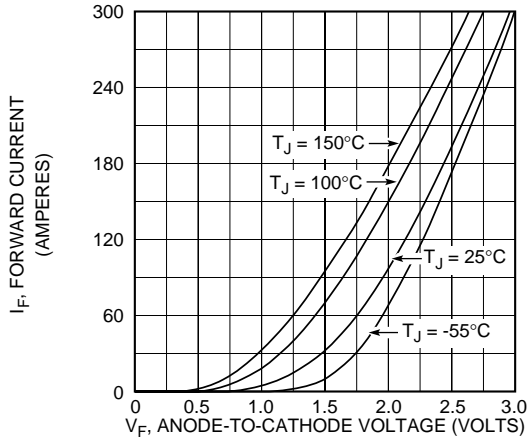
| Symbol     | Characteristic  | MIN                 | TYP  | MAX | UNIT       |
|------------|---|---------------------|------|-----|------------|
| $t_{rr1}$  | Reverse Recovery Time, $I_F = 1.0A$ , $di_F/dt = -15A/\mu s$ , $V_R = 30V$ , $T_J = 25^\circ C$ |                     | 80   | 95  | ns         |
| $t_{rr2}$  | Reverse Recovery Time   | $T_J = 25^\circ C$  | 80   |     |            |
| $t_{rr3}$  | $I_F = 100A$ , $di_F/dt = -800A/\mu s$ , $V_R = 540V$   | $T_J = 100^\circ C$ | 160  |     |            |
| $t_{fr1}$  | Forward Recovery Time   | $T_J = 25^\circ C$  | 220  |     |            |
| $t_{fr2}$  | $I_F = 100A$ , $di_F/dt = 800A/\mu s$ , $V_R = 540V$  | $T_J = 100^\circ C$ | 220  |     |            |
| $I_{RRM1}$ | Reverse Recovery Current  | $T_J = 25^\circ C$  | 28   | 38  | Amps       |
| $I_{RRM2}$ | $I_F = 100A$ , $di_F/dt = -800A/\mu s$ , $V_R = 540V$   | $T_J = 100^\circ C$ | 52   | 65  |            |
| $Q_{rr1}$  | Recovery Charge   | $T_J = 25^\circ C$  | 1120 |     | nC         |
| $Q_{rr2}$  | $I_F = 100A$ , $di_F/dt = -800A/\mu s$ , $V_R = 540V$   | $T_J = 100^\circ C$ | 4160 |     |            |
| $V_{fr1}$  | Forward Recovery Voltage  | $T_J = 25^\circ C$  | 26   |     | Volts      |
| $V_{fr2}$  | $I_F = 100A$ , $di_F/dt = 800A/\mu s$ , $V_R = 540V$  | $T_J = 100^\circ C$ | 26   |     |            |
| diM/dt     | Rate of Fall of Recovery Current  | $T_J = 25^\circ C$  | 800  |     | A/ $\mu s$ |
|            | $I_F = 100A$ , $di_F/dt = -800A/\mu s$ , $V_R = 540V$ (See Figure 10)                           | $T_J = 100^\circ C$ | 400  |     |            |

### THERMAL AND MECHANICAL CHARACTERISTICS

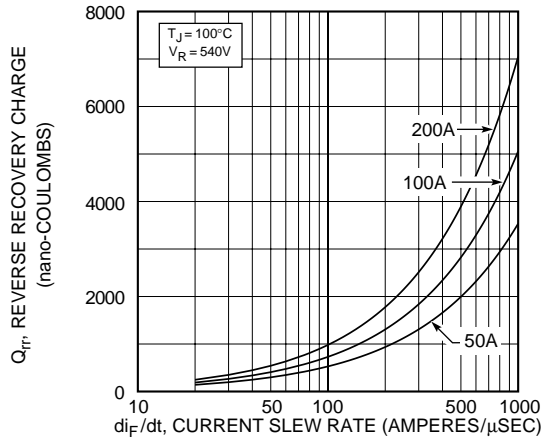
| Symbol          | Characteristic / Test Conditions  | MIN  | TYP  | MAX  | UNIT         |
|-----------------|---|------|------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance   |      |      | 0.42 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance  |      |      | 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          |



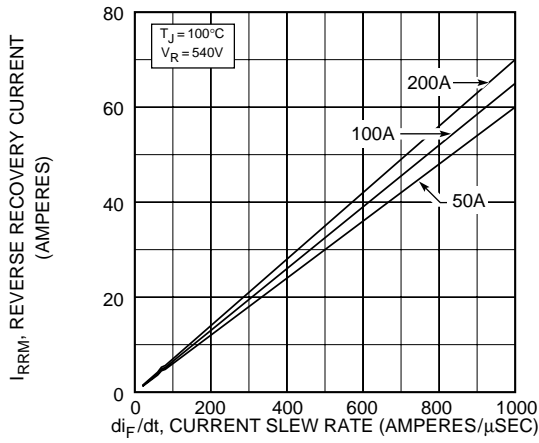
**APT2X100/2X101D100J**



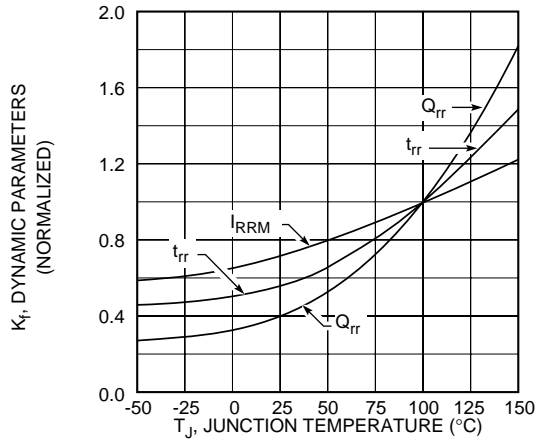
**Figure 2, Forward Voltage Drop vs Forward Current**



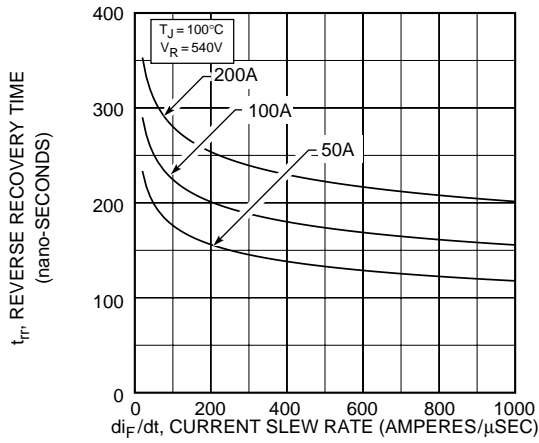
**Figure 3, Reverse Recovery Charge vs Current Slew Rate**



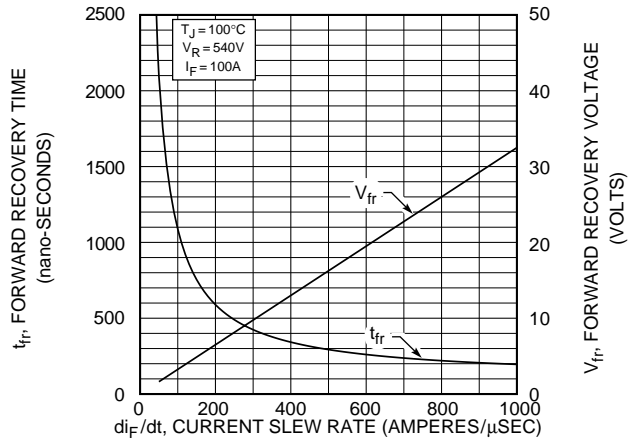
**Figure 4, Reverse Recovery Current vs Current Slew Rate**



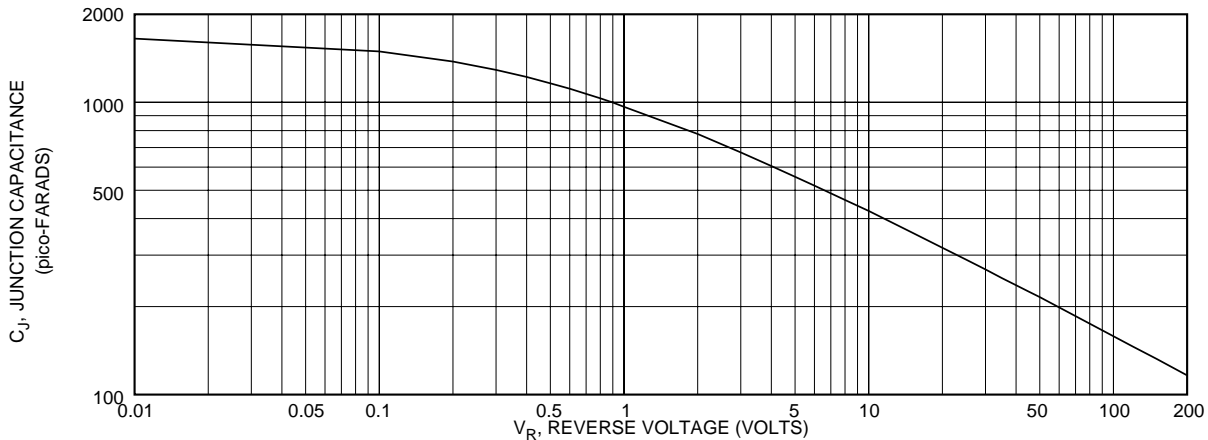
**Figure 5, Dynamic Parameters vs Junction Temperature**



**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**

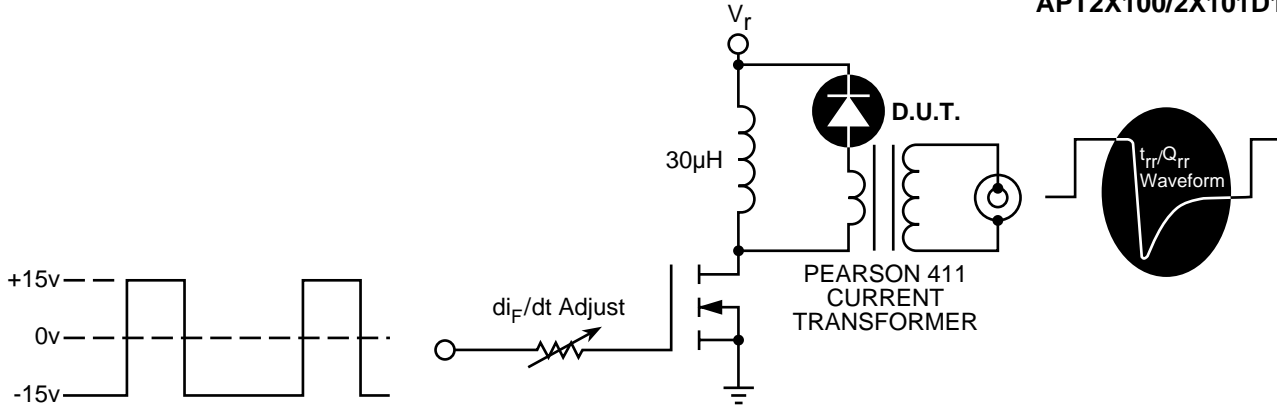


Figure 9, Diode Reverse Recovery Test Circuit and Waveforms

- 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  $t_{rr}$ .

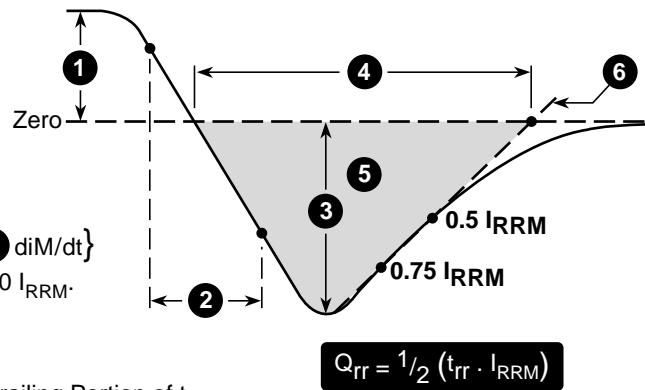


Figure 10, Diode Reverse Recovery Waveform and Definitions

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

SOT-227 Package Outline

