

**APT2X31D40J      400V      30A**  
**APT2X30D40J      400V      30A**

## DUAL DIE ISOTOP® PACKAGE

## ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

| PRODUCT APPLICATIONS   | PRODUCT FEATURES  | PRODUCT BENEFITS  |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Anti-Parallel Diode<br/>-Switchmode Power Supply<br/>-Inverters</li> <li>• Free Wheeling Diode<br/>-Motor Controllers<br/>-Converters</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  | APT2X31_30D40J | UNIT             |
|----------------|---|----------------|------------------|
| $V_R$          | Maximum D.C. Reverse Voltage  | 400            | Volts            |
| $V_{RRM}$      | Maximum Peak Repetitive Reverse Voltage   |                |                  |
| $V_{RWM}$      | Maximum Working Peak Reverse Voltage  |                |                  |
| $I_{F(AV)}$    | Maximum Average Forward Current ( $T_C = 114^\circ\text{C}$ , Duty Cycle = 0.5) | 30             | Amps             |
| $I_{F(AV)}$    | RMS Forward Current (Square wave, 50% duty)                                     | 49             |                  |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current ( $T_J = 45^\circ\text{C}$ , 8.3ms)        | 320            |                  |
| $T_J, T_{STG}$ | Operating and Storage Temperature Range   | -55 to 175     | $^\circ\text{C}$ |
| $T_L$          | Lead Temperature for 10 Sec.  | 300            |                  |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions          | MIN | TYP  | MAX | UNIT |               |
|----------|---|-----|--|-----|------|---------------|
| $V_F$    | Forward Voltage                           |     | $I_F = 30\text{A}$                           | 1.3 | 1.5  | Volts         |
|          |   |     | $I_F = 60\text{A}$                           | 1.6 |      |               |
|          |   |     | $I_F = 30\text{A}, T_J = 125^\circ\text{C}$  | 1.2 |      |               |
| $I_{RM}$ | Maximum Reverse Leakage Current           |     | $V_R = V_R$ Rated                            |     | 250  | $\mu\text{A}$ |
|          |   |     | $V_R = V_R$ Rated, $T_J = 125^\circ\text{C}$ |     | 500  |               |
| $C_T$    | Junction Capacitance, $V_R = 200\text{V}$ |     | 60   |     | pF   |               |

# DYNAMIC CHARACTERISTICS

APT2X31\_30D40J

| Symbol    | Characteristic                   | Test Conditions  | MIN | TYP | MAX | UNIT |
|-----------|----------------------------------|--|-----|-----|-----|------|
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 1A, di_F/dt = -100A/\mu s, V_R = 30V, T_J = 25^\circ C$     | -   | 22  |     | ns   |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 30A, di_F/dt = -200A/\mu s, V_R = 266V, T_C = 25^\circ C$   | -   | 32  |     |      |
| $Q_{rr}$  | Reverse Recovery Charge          |  | -   | 49  |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |  | -   | 3   | -   | Amps |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 30A, di_F/dt = -200A/\mu s, V_R = 266V, T_C = 125^\circ C$  | -   | 95  |     | ns   |
| $Q_{rr}$  | Reverse Recovery Charge          |  | -   | 360 |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |  | -   | 7   | -   | Amps |
| $t_{rr}$  | Reverse Recovery Time            | $I_F = 30A, di_F/dt = -1000A/\mu s, V_R = 266V, T_C = 125^\circ C$ | -   | 47  |     | ns   |
| $Q_{rr}$  | Reverse Recovery Charge          |  | -   | 730 |     | nC   |
| $I_{RRM}$ | Maximum Reverse Recovery Current |  | -   | 25  |     | Amps |

# THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol          | Characteristic / Test Conditions       | MIN | TYP  | MAX  | UNIT         |
|-----------------|--|-----|------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance    |     |      | 1.21 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance |     |      | 20   |              |
| $W_T$           | Package Weight                         |     | 1.03 |      | oz           |
|                 |  |     | 29.2 |      | 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.

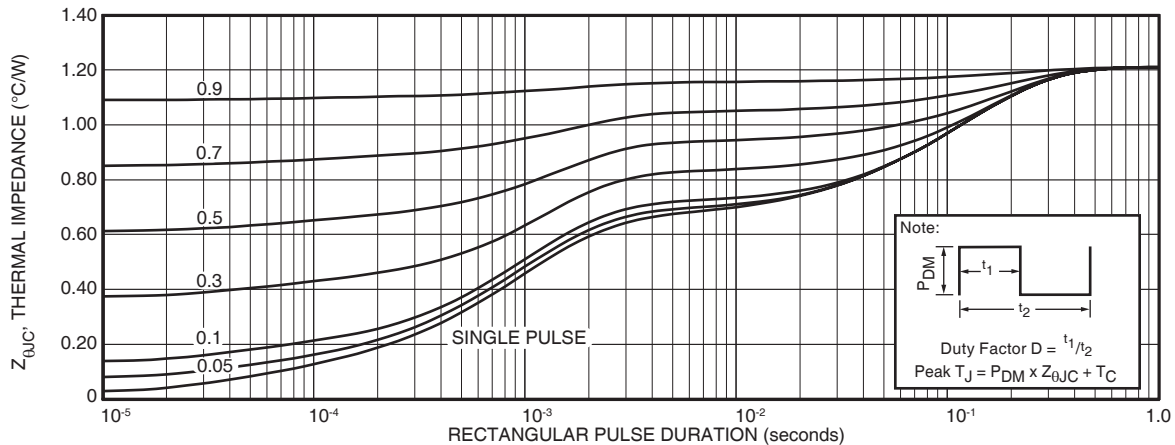


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

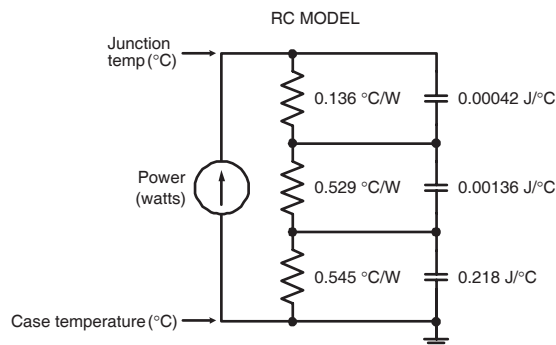


FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL

# TYPICAL PERFORMANCE CURVES

APT2X31\_30D40J

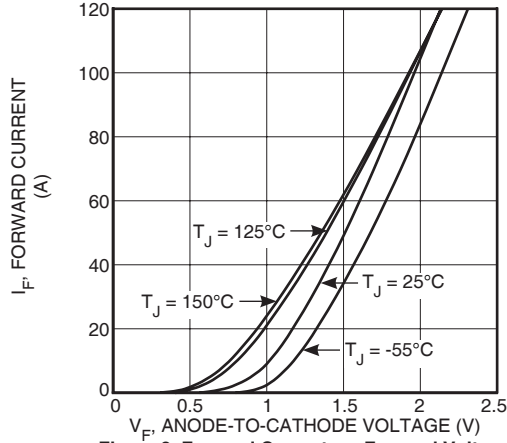


Figure 2. Forward Current vs. Forward Voltage

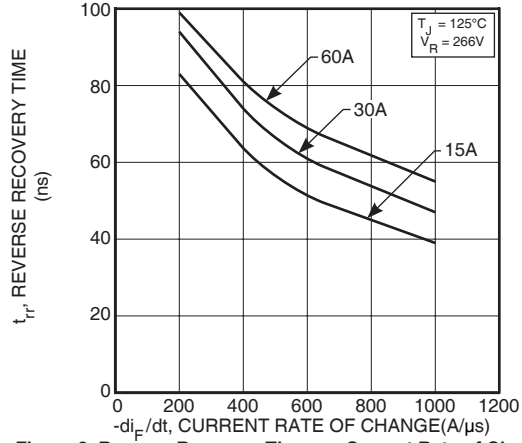


Figure 3. Reverse Recovery Time vs. Current Rate of Change

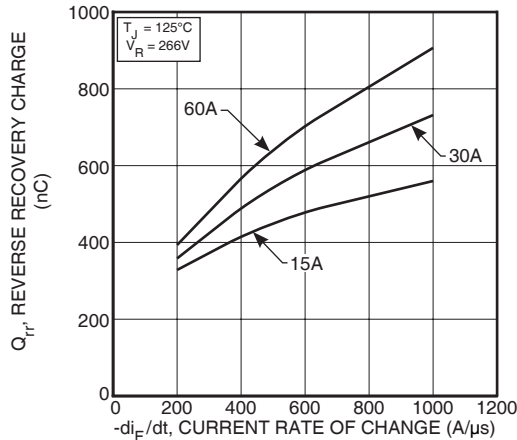


Figure 4. Reverse Recovery Charge vs. Current Rate of Change

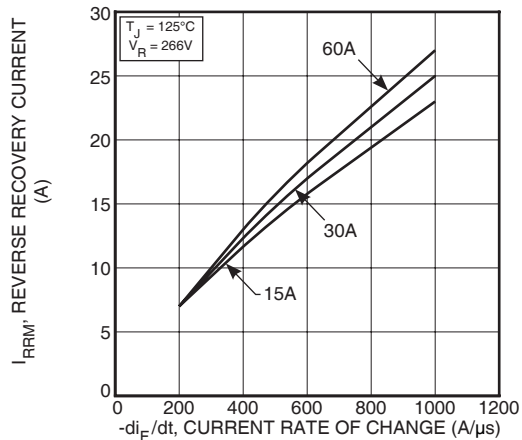


Figure 5. Reverse Recovery Current vs. Current Rate of Change

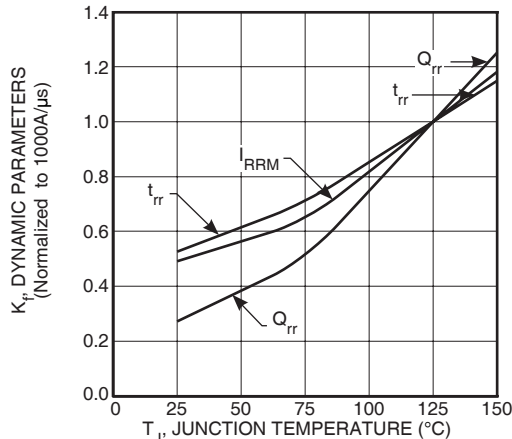


Figure 6. Dynamic Parameters vs. Junction Temperature

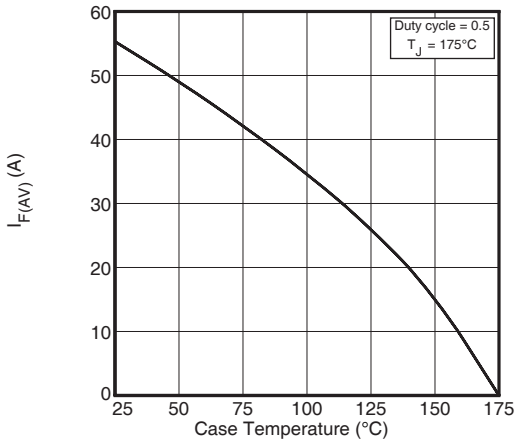


Figure 7. Maximum Average Forward Current vs. Case Temperature

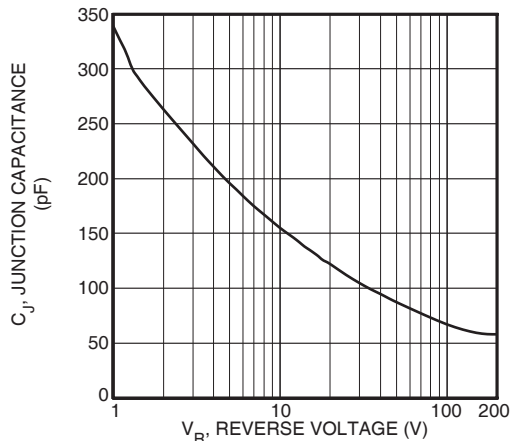


Figure 8. Junction Capacitance vs. Reverse Voltage



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