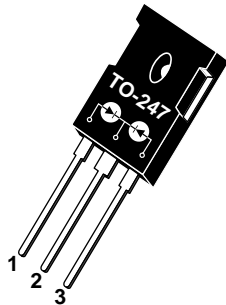


- 1 - Anode 1
- 2 - Common Cathode
- Back of Case - Cathode
- 3 - Anode 2



**APT30D40BCT 400V 2x30A**

## ULTRAFast SOFT RECOVERY RECTIFIER DIODES

| PRODUCT APPLICATIONS  | PRODUCT FEATURES   | PRODUCT BENEFITS  |
|---|--|---|
| <ul style="list-style-type: none"> <li>• 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 TO-247 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 Are Per Leg:  $T_C = 25^\circ\text{C}$  unless otherwise specified.

| Symbol         | Characteristic / Test Conditions  | APT30D40BCT | 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 ( $T_C = 105^\circ\text{C}$ , Duty Cycle = 0.5) | 30          | Amps             |
| $I_F(RMS)$     | RMS Forward Current   | 70          |                  |
| $I_{FSM}$      | 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 150  | $^\circ\text{C}$ |
| $T_L$          | 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                        | $I_F = 30\text{A}$                                 |     | 1.5 | Volts         |
|          |  | $I_F = 60\text{A}$                                 |     | 1.5 |               |
|          |  | $I_F = 30\text{A}, T_J = 150^\circ\text{C}$        |     | 1.3 |               |
| $I_{RM}$ | Maximum Reverse Leakage Current                | $V_R = V_R \text{ Rated}$                          |     | 250 | $\mu\text{A}$ |
|          |  | $V_R = V_R \text{ Rated}, T_J = 125^\circ\text{C}$ |     | 500 |               |
| $C_T$    | Junction Capacitance, $V_R = 200\text{V}$      |  | 52  |     | pF            |
| $L_S$    | Series Inductance (Lead to Lead 5mm from Base) |  | 10  |     | nH            |

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### DYNAMIC CHARACTERISTICS

APT30D40BCT

| Symbol     | Characteristic  | MIN | TYP | MAX | UNIT       |
|------------|---|-----|-----|-----|------------|
| $t_{rr1}$  | Reverse Recovery Time, $I_F = 1.0A$ , $di_F/dt = -15A/\mu s$ , $V_R = 30V$ , $T_J = 25^\circ C$ |     | 45  | 65  | ns         |
| $t_{rr2}$  | Reverse Recovery Time   |     | 45  |     |            |
| $t_{rr3}$  | $I_F = 30A$ , $di_F/dt = -240A/\mu s$ , $V_R = 240V$  |     | 70  |     |            |
| $t_{fr1}$  | Forward Recovery Time   |     | 150 |     |            |
| $t_{fr2}$  | $I_F = 30A$ , $di_F/dt = 240A/\mu s$ , $V_R = 240V$   |     | 150 |     |            |
| $I_{RRM1}$ | Reverse Recovery Current  |     | 6   | 10  | Amps       |
| $I_{RRM2}$ | $I_F = 30A$ , $di_F/dt = -240A/\mu s$ , $V_R = 240V$  |     | 10  | 18  |            |
| $Q_{rr1}$  | Recovery Charge   |     | 135 |     | nC         |
| $Q_{rr2}$  | $I_F = 30A$ , $di_F/dt = -240A/\mu s$ , $V_R = 240V$  |     | 350 |     |            |
| $V_{fr1}$  | Forward Recovery Voltage  |     | 3.2 |     | Volts      |
| $V_{fr2}$  | $I_F = 30A$ , $di_F/dt = 240A/\mu s$ , $V_R = 240V$   |     | 3.2 |     |            |
| $diM/dt$   | Rate of Fall of Recovery Current  |     | 500 |     | A/ $\mu s$ |
|            | $I_F = 30A$ , $di_F/dt = -240A/\mu s$ , $V_R = 240V$ (See Figure 10)                            |     | 500 |     |            |

### THERMAL AND MECHANICAL CHARACTERISTICS

| Symbol          | Characteristic / Test Conditions                           | MIN | TYP  | MAX  | UNIT         |
|-----------------|--|-----|------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance                        |     |      | 0.90 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance                     |     |      | 40   |              |
| $W_T$           | Package Weight   |     | 0.22 |      | oz           |
|                 |  |     | 6.1  |      | gm           |
| Torque          | Maximum Mounting Torque (Screw Type = 6-32 or 3mm Machine) |     |      | 10   | lb•in        |
|                 |  |     |      | 1.1  | N•m          |

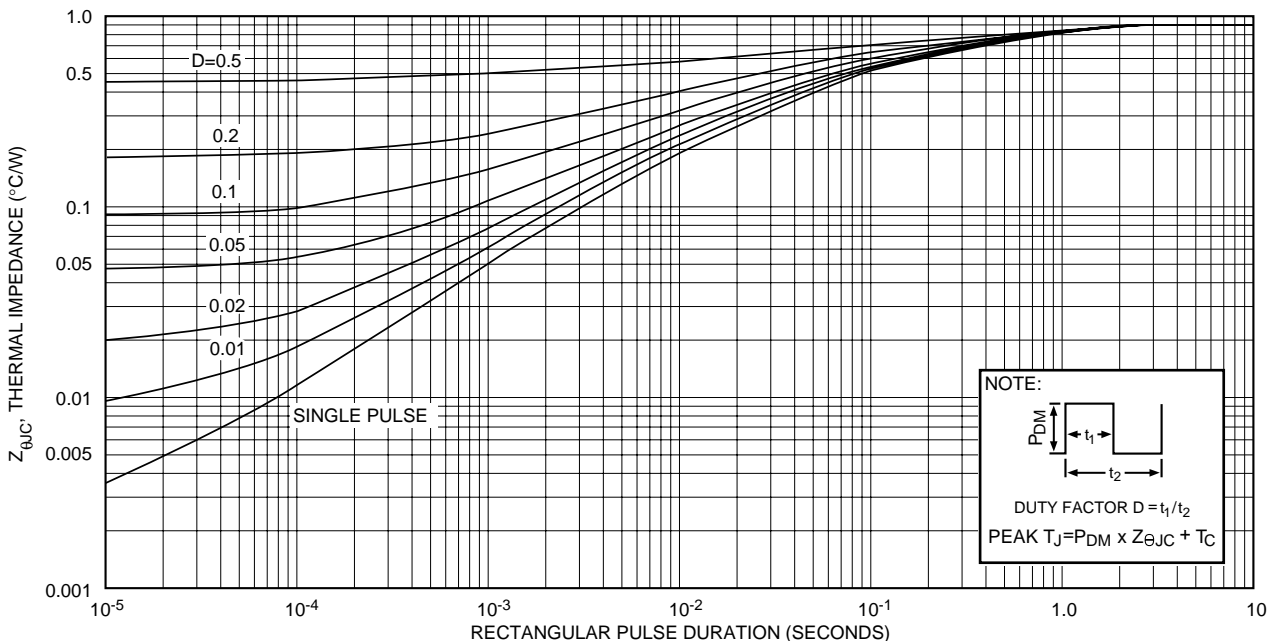
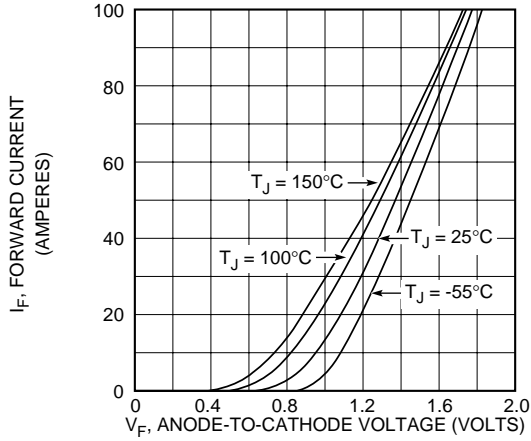
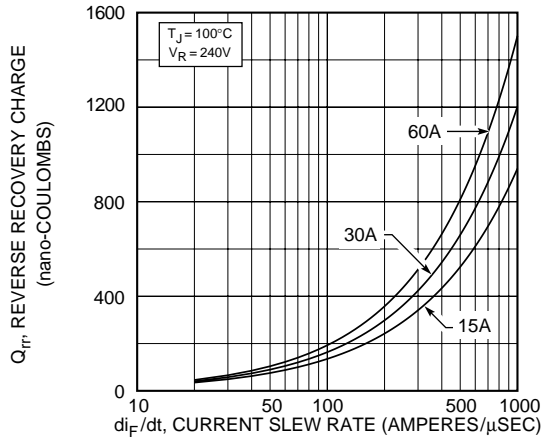


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

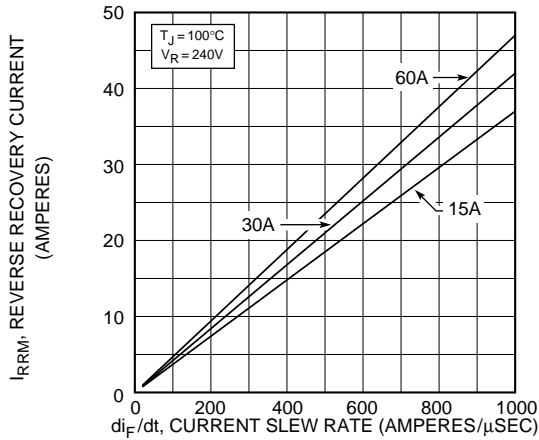
**APT30D40BCT**



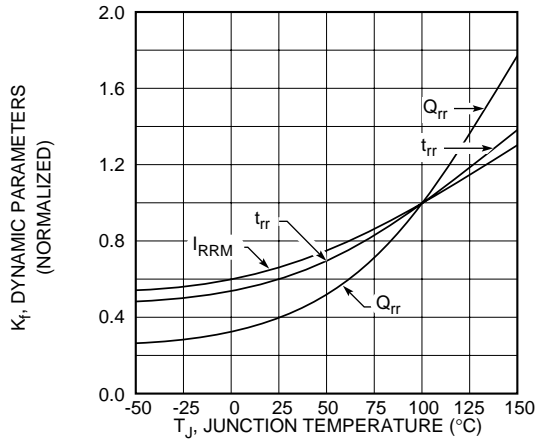
**Figure 2, Forward Voltage Drop vs Forward Current**



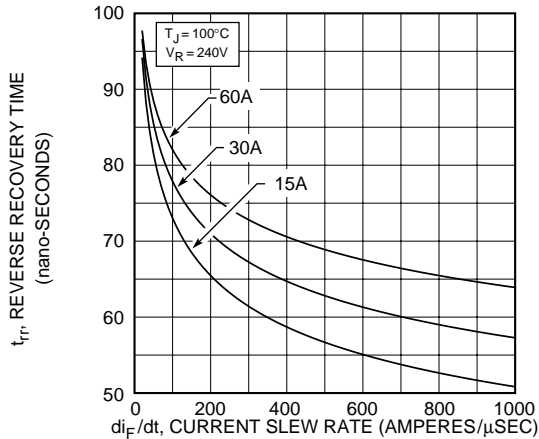
**Figure 3, Reverse Recovery Charge vs Current Slew Rate**



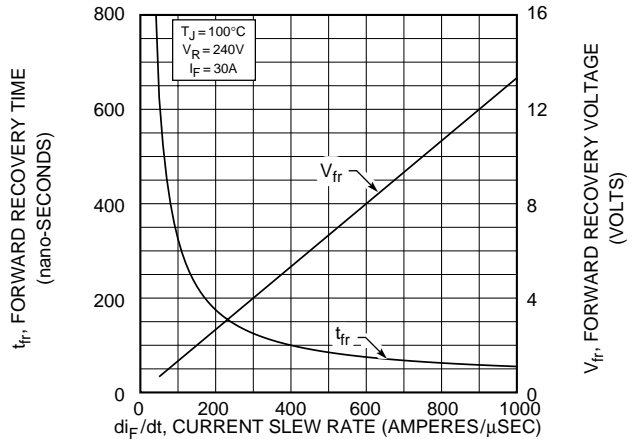
**Figure 4, Reverse Recovery Current vs Current Slew Rate**



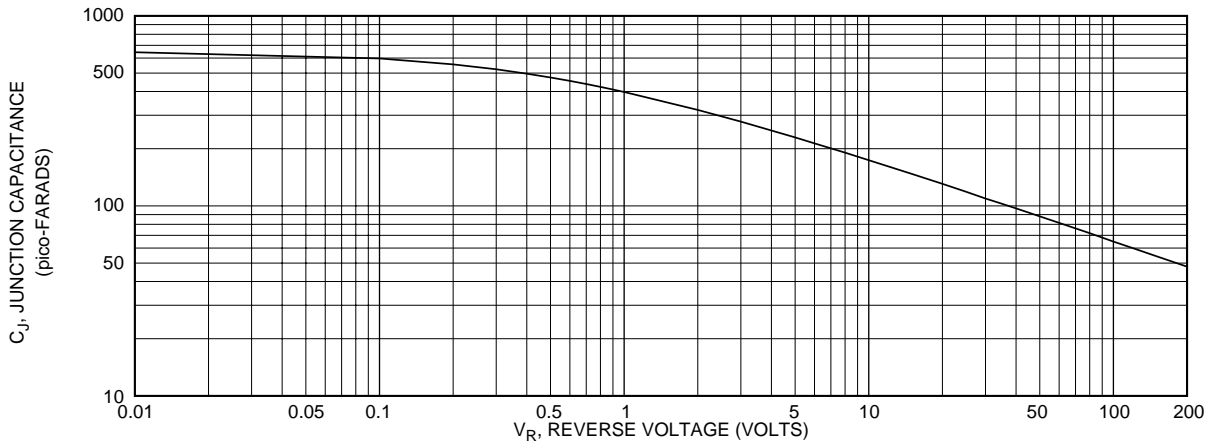
**Figure 5, Dynamic Parameters vs Junction Temperature**



**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**

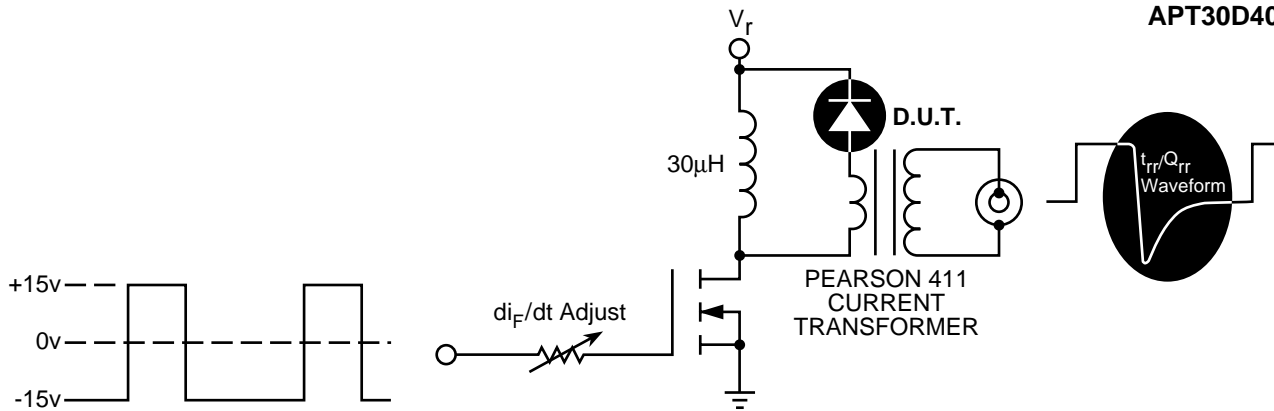


Figure 9, Diode Reverse Recovery Test Circuit and Waveforms

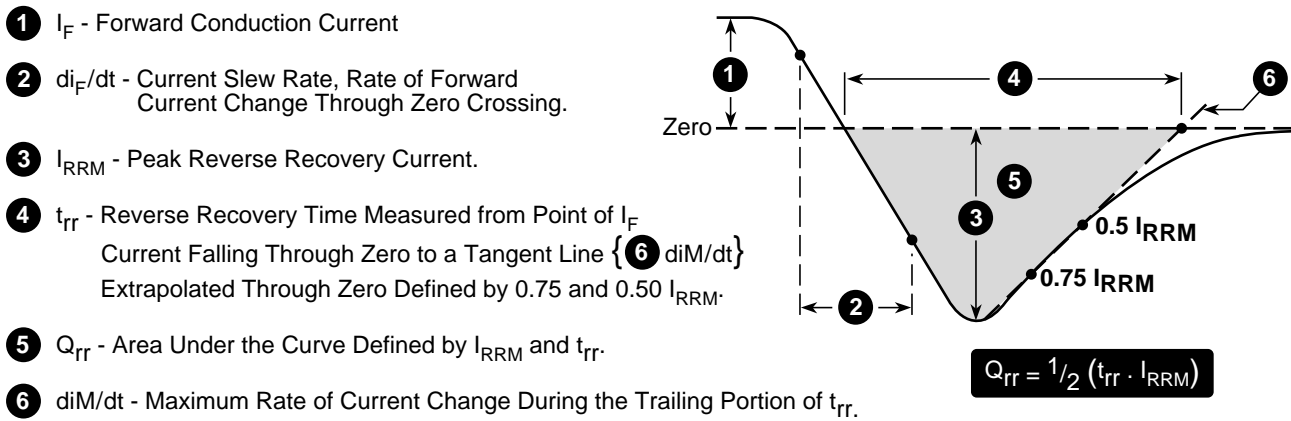
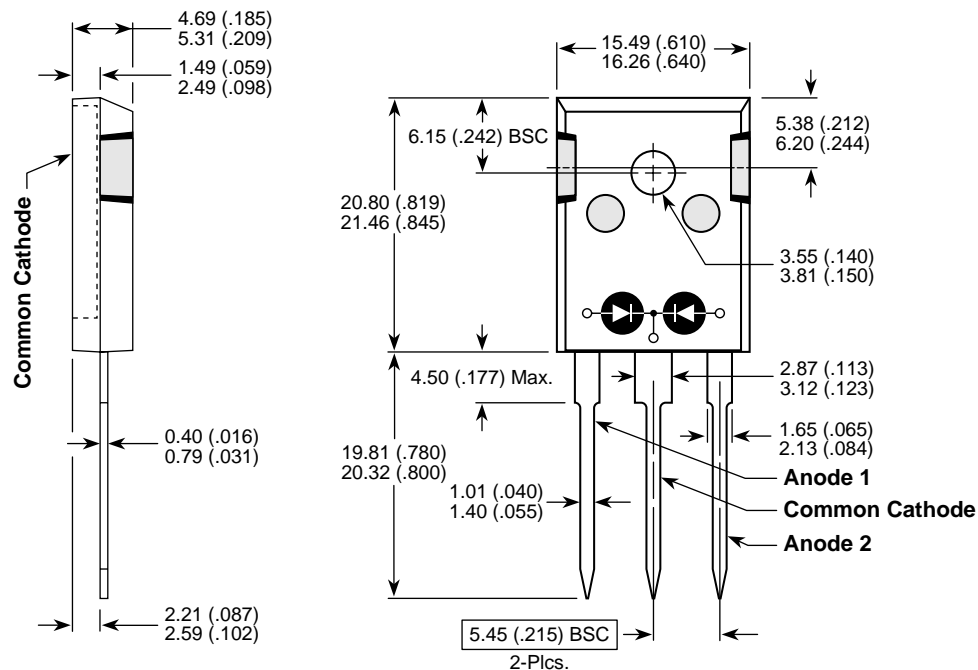


Figure 10, Diode Reverse Recovery Waveform and Definitions

### TO-247AD Package Outline



Dimensions in Millimeters and (Inches)