## Static Electrical Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Characteristic / Test Conditions</th>
<th>APT30S20BCTG</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_F$</td>
<td>Forward Voltage</td>
<td>.80</td>
<td>.85 Volts</td>
</tr>
<tr>
<td>$I_{FM}$</td>
<td>Maximum Reverse Leakage Current</td>
<td>.91</td>
<td>mA</td>
</tr>
<tr>
<td>$I_{RM}$</td>
<td>Maximum Reverse Leakage Current</td>
<td>0.5</td>
<td>mA</td>
</tr>
<tr>
<td>$V_T$</td>
<td>Junction Capacitance, $V_R = 200V$</td>
<td>150</td>
<td>pF</td>
</tr>
</tbody>
</table>

**MSCross Reference:**
- APT30S20BCTG 200V 2x45A
### Dynamic Characteristics

**Symbol** | **Characteristic** | **Test Conditions** | **MIN** | **TYP** | **MAX** | **UNIT**  
--- | --- | --- | --- | --- | --- | 
$t_{rr}$ | Reverse Recovery Time | $I_F = 30\,A$, $di/dt = -200\,A/\mu s$ $V_R = 133\,V$, $T_C = 25\,^\circ C$ | - | 55 | - | ns  
$q_{rr}$ | Reverse Recovery Charge | $I_F = 30\,A$, $di/dt = -200\,A/\mu s$ $V_R = 133\,V$, $T_C = 25\,^\circ C$ | - | 190 | - | nC  
$I_{RRM}$ | Maximum Reverse Recovery Current | | - | 6 | - | Amps  
$t_{rr}$ | Reverse Recovery Time | $I_F = 30\,A$, $di/dt = -700\,A/\mu s$ $V_R = 133\,V$, $T_C = 125\,^\circ C$ | - | 100 | - | ns  
$q_{rr}$ | Reverse Recovery Charge | $I_F = 30\,A$, $di/dt = -700\,A/\mu s$ $V_R = 133\,V$, $T_C = 125\,^\circ C$ | - | 450 | - | nC  
$I_{RRM}$ | Maximum Reverse Recovery Current | | - | 9 | - | Amps  
$t_{rr}$ | Reverse Recovery Time | | - | 70 | - | ns  
$q_{rr}$ | Reverse Recovery Charge | | - | 960 | - | nC  
$I_{RRM}$ | Maximum Reverse Recovery Current | | - | 24 | - | Amps  

### Thermal and Mechanical Characteristics

**Symbol** | **Characteristic / Test Conditions** | **MIN** | **TYP** | **MAX** | **UNIT**  
--- | --- | --- | --- | --- | 
$R_{JUC}$ | Junction-to-Case Thermal Resistance | | 0.58 | - | °C/W  
$R_{JUA}$ | Junction-to-Ambient Thermal Resistance | | 40 | - | °C/W  
$W_T$ | Package Weight | | 0.22 | - | oz  
| | | | 5.9 | - | g  
| | Maximum Mounting Torque | | 10 | - | lb•in  
| | | | 1.1 | - | N•m  

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

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

**Note:**

\[P_{DM} = P_{DM} \times Z_{JUC} \times \Delta T\]

\[\Delta T = \frac{P_{DM}}{R_{JUC}}\]

**FIGURE 1b. TRANSIENT THERMAL IMPEDANCE MODEL**
**TYPICAL PERFORMANCE CURVES**

**APT30S20BCT**

**TJ = 25°C**

**VR, ANODE-TO-CATHODE VOLTAGE (V)**

**IF, FORWARD CURRENT (A)**

**Figure 2. Forward Current vs. Forward Voltage**

**Qrr, REVERSE RECOVERY CHARGE I F, FORWARD CURRENT (nC) (A)**

**trr, REVERSE RECOVERY TIME (ns)**

**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**

**CJ, JUNCTION CAPACITANCE (pF)**

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

**Figure 7. Maximum Average Forward Current vs. Case Temperature**

**TJ = 125°C**

**VR = 133V**

**15A**

**30A**

**60A**

**TJ = 150°C**

**TJ = -55°C**

**Duty cycle = 0.5**

**Kf, DYNAMIC PARAMETERS (Normalized to 700A/µs)**

**Irrm, REVERSE RECOVERY CURRENT (A)**

**Figure 6. Dynamic Parameters vs. Junction Temperature**

**Figure 7. Maximum Average Forward Current vs. Case Temperature**
I_F - Forward Conduction Current

\( \frac{di_F}{dt} \) - Rate of Diode Current Change Through Zero Crossing.

I_RRM - Maximum Reverse Recovery Current.

\( t_{rr} \) - Reverse Recovery Time, measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through \( I_{RRM} \) and \( 0.25 \cdot I_{RRM} \) passes through zero.

\( Q_{rr} \) - Area Under the Curve Defined by \( I_{RRM} \) and \( t_{rr} \).