FFPF30UA60S

Ultrafast II Diode
30 A, 600 V

Description
The FFPF30UA60S is a ultrafast II diode with low forward voltage drop. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial application.

Features
• Ultrafast Recovery, \( t_{RR} = 90 \text{ ns} \) (@ \( I_F = 30 \text{ A} \))
• Max Forward Voltage, \( V_F = 2.2 \text{ V} \) (@ \( T_C = 25^\circ \text{C} \))
• 600 V Reverse Voltage and High Reliability
• Avalanche Energy Rated
• This Device is Pb–Free and is RoHS Compliant

Applications
• Boost Diode in PFC and SMPS
• Welder, UPS and Motor Control Application

ABSOLUTE MAXIMUM RATINGS
\( T_C = 25^\circ \text{C} \) unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{RRM} )</td>
<td>Peak Repetitive Reverse Voltage</td>
<td>600</td>
<td>V</td>
</tr>
<tr>
<td>( V_{RWM} )</td>
<td>Working Peak Reverse Voltage</td>
<td>600</td>
<td>V</td>
</tr>
<tr>
<td>( I_{F(AV)} )</td>
<td>Average Rectified Forward Current @ ( T_C = 43^\circ \text{C} )</td>
<td>30</td>
<td>A</td>
</tr>
<tr>
<td>( I_{FSM} )</td>
<td>Non–repetitive Peak Surge Current 60Hz Single Half–Sine Wave</td>
<td>180</td>
<td>A</td>
</tr>
<tr>
<td>( T_J, T_{STG} )</td>
<td>Operating Junction and Storage Temperature</td>
<td>– 65 to +175</td>
<td>°C</td>
</tr>
</tbody>
</table>

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ORDERING INFORMATION
See detailed ordering and shipping information on page 2 of this data sheet.
FFPF30UA60S

THERMAL CHARACTERISTICS \( T_C = 25^\circ C \) unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R_{\text{thJC}} )</td>
<td>Maximum Thermal Resistance, Junction to Case</td>
<td>2.5</td>
<td>( ^\circ C/\text{W} )</td>
</tr>
</tbody>
</table>

PACKAGE MARKING AND ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Top Mark</th>
<th>Package</th>
<th>Packing Method</th>
<th>Reel Size</th>
<th>Tape Width</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFPF30UA60S</td>
<td>F30UA60S</td>
<td>TO-220F-2L</td>
<td>Tube</td>
<td>N/A</td>
<td>N/A</td>
<td>50</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS \( T_C = 25^\circ C \) unless otherwise noted

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_F ) (Note 1)</td>
<td>( I_F = 30 , A )</td>
<td>( I_F = 30 , A )</td>
<td>( T_C = 25^\circ C )</td>
<td>( T_C = 125^\circ C )</td>
<td>–</td>
</tr>
<tr>
<td>( I_R ) (Note 1)</td>
<td>( V_R = 600 , V )</td>
<td>( V_R = 600 , V )</td>
<td>( T_C = 25^\circ C )</td>
<td>( T_C = 125^\circ C )</td>
<td>–</td>
</tr>
<tr>
<td>( Q_{RR} )</td>
<td>( I_F = 30 , A ), ( \frac{di_F}{dt} = 200 , A/\mu s )</td>
<td>( T_C = 25^\circ C )</td>
<td>–</td>
<td>90</td>
<td>ns</td>
</tr>
<tr>
<td>( W_{\text{AVL}} )</td>
<td>Avalanche Energy (( L = 40 , mH ))</td>
<td>20</td>
<td>–</td>
<td>–</td>
<td>mJ</td>
</tr>
</tbody>
</table>

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse: Test Pulse Width = 300 \( \mu s \), Duty Cycle = 2%

Test Circuit and Waveforms

Figure 1. Diode Reverse Recovery Test Circuit & Waveform

Figure 2. Unclamped Inductive Switching Test Circuit & Waveform
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TYPICAL PERFORMANCE CHARACTERISTICS

Figure 3. Typical Forward Voltage Drop
vs. Forward Current

Figure 4. Typical Reverse Current vs.
Reverse Voltage

Figure 5. Typical Junction Capacitance

Figure 6. Typical Reverse Recovery Time
vs. diF/dt

Figure 7. Typical Reverse Recovery
Current vs. diF/dt

Figure 8. Forward Current Derating Curve

Forward Voltage, $V_F$ [V]
Reverse Voltage, $V_R$ [V]
Forward Current, $I_F$ [A]
Reverse Current, $I_R$ [A]
Capacitance, $C_J$ [pF]
Reverse Recovery Time, $t_{RR}$ [ns]
diF/dt [A/μs]
Reverse Recovery Current, $I_{RR}$ [A]
Average Forward Current, $I_{F(AV)}$ [A]
Case Temperature, $T_C$ [°C]