80A, 1000V Ultrafast Diode

The RURG80100 is an ultrafast diode with soft recovery characteristics ($t_{rr} < 125$ns). It has low forward voltage drop and is of silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as a freewheeling/clamping diode and rectifier in a variety of switching power supplies and other power switching applications. Its low stored charge and ultrafast recovery with soft recovery characteristic minimizes ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Formerly developmental type TA09887.

Ordering Information

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>PACKAGE</th>
<th>BRAND</th>
</tr>
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<tbody>
<tr>
<td>RURG80100</td>
<td>TO-247</td>
<td>RURG80100</td>
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</tbody>
</table>

NOTE: When ordering, use the entire part number.

Symbol

Absolute Maximum Ratings $T_C = 25^\circ C$, Unless Otherwise Specified

<table>
<thead>
<tr>
<th>RURG80100</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>$V_{RRM}$</td>
<td>1000  V</td>
</tr>
<tr>
<td>$V_{RWM}$</td>
<td>1000  V</td>
</tr>
<tr>
<td>$V_R$</td>
<td>1000  V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>80  A</td>
</tr>
<tr>
<td>$I_{FRM}$</td>
<td>160  A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>500  A</td>
</tr>
<tr>
<td>$P_D$</td>
<td>180  W</td>
</tr>
<tr>
<td>$E_{AVL}$</td>
<td>50  mJ</td>
</tr>
<tr>
<td>$T_{STG}, T_J$</td>
<td>-65 to 175  °C</td>
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Electrical Specifications  $T_C = 25^\circ C$, Unless Otherwise Specified

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>TEST CONDITION</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_F$</td>
<td>$I_F = 80A$</td>
<td>-</td>
<td>-</td>
<td>1.9</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>$I_F = 80A, T_C = 150^\circ C$</td>
<td>-</td>
<td>-</td>
<td>1.7</td>
<td>V</td>
</tr>
<tr>
<td>$I_R$</td>
<td>$V_R = 1000V$</td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>$\mu A$</td>
</tr>
<tr>
<td></td>
<td>$V_R = 1000V, T_C = 150^\circ C$</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>mA</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>$I_F = 1A, dl/dt = 100A/\mu s$</td>
<td>-</td>
<td>-</td>
<td>125</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>$I_F = 80A, dl/dt = 100A/\mu s$</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>ns</td>
</tr>
<tr>
<td>$t_a$</td>
<td>$I_F = 80A, dl/dt = 100A/\mu s$</td>
<td>-</td>
<td>90</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$t_b$</td>
<td>$I_F = 80A, dl/dt = 100A/\mu s$</td>
<td>-</td>
<td>65</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>$R_{\theta JC}$</td>
<td></td>
<td>-</td>
<td>-</td>
<td>0.83</td>
<td>$^\circ C/W$</td>
</tr>
</tbody>
</table>

DEFINITIONS

$V_F$ = Instantaneous forward voltage ($pw = 300\mu s, D = 2\%$).

$I_R$ = Instantaneous reverse current.

$t_{rr}$ = Reverse recovery time (See Figure 6), summation of $t_a + t_b$.

$t_a$ = Time to reach peak reverse current (See Figure 6).

$t_b$ = Time from peak $I_{RM}$ to projected zero crossing of $I_{RM}$ based on a straight line from peak $I_{RM}$ through 25% of $I_{RM}$ (See Figure 6).

$R_{\theta JC}$ = Thermal resistance junction to case.

$pw$ = Pulse width.

$D$ = Duty cycle.

Typical Performance Curves

*FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE*

*FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE*
Typical Performance Curves (Continued)

**FIGURE 3.** $t_{\text{rr}}$, $t_a$, and $t_b$ CURVES vs FORWARD CURRENT

**FIGURE 4.** CURRENT DERATING CURVE

**Test Circuits and Waveforms**

**FIGURE 5.** $t_{\text{rr}}$ TEST CIRCUIT

**FIGURE 6.** $t_{\text{rr}}$ WAVEFORMS AND DEFINITIONS

**FIGURE 7.** AVALANCHE ENERGY TEST CIRCUIT

**FIGURE 8.** AVALANCHE CURRENT AND VOLTAGE WAVEFORMS
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QS™
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PRODUCT STATUS DEFINITIONS

Definition of Terms

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<th>Product Status</th>
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