**30 A, 1200 V, Hyperfast Diode**

The RHRG30120 is a hyperfast diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ion implanted epitaxial planar construction. These devices are intended to be used as freewheeling/ clamping diodes and diodes in a variety of switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

**Ordering Information**

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>PACKAGE</th>
<th>BRAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHRG30120</td>
<td>TO-247-2L</td>
<td>RHRG30120</td>
</tr>
</tbody>
</table>

NOTE: When ordering, use the entire part number.

**Features**

- Hyperfast Recovery $t_r = 85$ ns (@ $I_F = 30$ A)
- Max Forward Voltage, $V_F = 3.2$ V (@ $T_C = 25^\circ$C)
- 1200 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

**Applications**

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

**Packaging**

JEDEC STYLE TO-247

**Symbol**

K

A

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Repetitive Reverse Voltage</td>
<td></td>
<td>$V_{RRM}$</td>
<td>1200</td>
</tr>
<tr>
<td>Working Peak Reverse Voltage</td>
<td></td>
<td>$V_{RWM}$</td>
<td>1200</td>
</tr>
<tr>
<td>DC Blocking Voltage</td>
<td></td>
<td>$V_R$</td>
<td>1200</td>
</tr>
<tr>
<td>Average Rectified Forward Current</td>
<td></td>
<td>$I_{F(AV)}$</td>
<td>30</td>
</tr>
<tr>
<td>Repetitive Peak Surge Current</td>
<td></td>
<td>$I_{FRM}$</td>
<td>60</td>
</tr>
<tr>
<td>Nonrepetitive Peak Surge Current</td>
<td></td>
<td>$I_{FSM}$</td>
<td>300</td>
</tr>
<tr>
<td>Maximum Power Dissipation</td>
<td></td>
<td>$P_D$</td>
<td>125</td>
</tr>
<tr>
<td>Avalanche Energy (See Figures 10 and 11)</td>
<td></td>
<td>$E_{AVL}$</td>
<td>30</td>
</tr>
<tr>
<td>Operating and Storage Temperature</td>
<td></td>
<td>$T_{STG}, T_J$</td>
<td>-65  to 175</td>
</tr>
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</table>
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>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_F )</td>
<td>( I_F = 30 \ A )</td>
<td>-</td>
<td>-</td>
<td>3.2</td>
<td>V</td>
</tr>
<tr>
<td>( I_F = 30 \ A, T_C = 150^\circ C )</td>
<td>-</td>
<td>-</td>
<td>2.6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>( I_R )</td>
<td>( V_R = 1200 \ V )</td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>( \mu A )</td>
</tr>
<tr>
<td>( V_R = 1200 \ V, T_C = 150^\circ C )</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>( I_{RT} )</td>
<td>( I_F = 1 \ A, d_i f/dt = 100 \ A/\mu s )</td>
<td>-</td>
<td>-</td>
<td>65</td>
<td>ns</td>
</tr>
<tr>
<td>( I_F = 30 \ A, d_i f/dt = 100 \ A/\mu s )</td>
<td>-</td>
<td>-</td>
<td>85</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>( t_a )</td>
<td>( I_F = 30 \ A, d_i f/dt = 100 \ A/\mu s )</td>
<td>-</td>
<td>48</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>( t_b )</td>
<td>( I_F = 30 \ A, d_i f/dt = 100 \ A/\mu s )</td>
<td>-</td>
<td>22</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>( R_{\theta JC} )</td>
<td>-</td>
<td>-</td>
<td>1.2</td>
<td>( ^\circ C/W )</td>
<td></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**
Typical Performance Curves  (Continued)

FIGURE 3. Trr, t_a AND t_b CURVES vs FORWARD CURRENT

Test Circuits and Waveforms

VGE AMPLITUDE AND R_G CONTROL $\frac{diF}{dt}$
t_1 AND t_2 CONTROL I_F

FIGURE 5. Trr TEST CIRCUIT

$I_{MAX} = 1.225A$
$L = 40mH$
$R < 0.1\,\Omega$
$E_{AVL} = \frac{1}{2}L^2 \left[ \frac{V_{R(AVL)}}{V_{R(AVL)} - V_{DD}} \right]$
$Q_1 = IGBT (BV_{CES} > DUT \, V_{R(AVL)})$

FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

$Q_1$ CURRENT SENSE
$V_{DD}$

FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

$V_{AVL}$

$I_L$
$t_0 \rightarrow t_1 \rightarrow t_2 \rightarrow t$

$E_{AVL} = \frac{1}{2}L^2 \left[ \frac{V_{R(AVL)}}{V_{R(AVL)} - V_{DD}} \right]$

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Mechanical Dimensions

TO247-2L

Figure 9. TO-247, Molded, 2LD, Jede Option AB

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PRODUCT STATUS DEFINITIONS

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<th>Product Status</th>
<th>Definition</th>
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<tbody>
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<td>Formative / In Design</td>
<td>Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.</td>
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