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Data Sheet

November 2013

## 30 A, 1200 V, Hyperfast Diode

The RHRP30120 is a hyperfast diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ionimplanted 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**

PART NUMBER	PACKAGE	BRAND	
RHRP30120	TO-220AC	RHR30120	

NOTE: When ordering, use the entire part number.

Absolute Maximum Ratings T<sub>C</sub> = 25 °C

### Symbol



#### **Features**

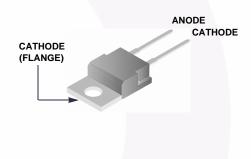
- Hyperfast Recovery t<sub>rr</sub> = 85 ns (@ I<sub>F</sub> = 30 A)
- Max Forward Voltage, V<sub>F</sub> = 3.2 V (@ T<sub>C</sub> = 25°C)
- 1200 V Reverse Voltage and High Reliability
- · Avalanche Energy Rated
- RoHS Compliant

### **Applications**

- Switching Power Supplies
- · Power Switching Circuits
- General Purpose

### Packaging

JEDEC TO-220AC



	RHRP30120	UNIT	
Peak Repetitive Reverse VoltageV <sub>RRM</sub>	1200	V	
Working Peak Reverse Voltage	1200	V	
DC Blocking VoltageV <sub>R</sub>	1200	V	
Average Rectified Forward Current $I_{F(AV)}$ $(T_C = 78^{\circ}C)$	30	Α	
Repetitive Peak Surge Current	60	Α	
Nonrepetitive Peak Surge Current	300	^	
(Halfwave, 1 Phase, 60 Hz)	300	۸	
Maximum Power Dissipation	125	W	

Avalanche Energy (See Figures 7 and 8) ...... E<sub>AVI</sub>

mJ

οС

30

-65 to 175

**Electrical Specifications**  $T_C = 25^{\circ}C$ , Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
V <sub>F</sub>	I <sub>F</sub> = 30 A	-	-	3.2	V
	I <sub>F</sub> = 30 A, T <sub>C</sub> = 150 °C	-	-	2.6	V
I <sub>R</sub>	V <sub>R</sub> = 1200 V	-	-	250	μΑ
	V <sub>R</sub> = 1200 V, T <sub>C</sub> = 150 °C	-	-	1	mA
t <sub>rr</sub>	$I_F = 1 A$ , $d i_F/dt = 100 A/\mu s$	-	-	65	ns
	$I_F = 3.0$ A , d i $_F/dt = 100$ A/ $\mu s$	-	-	85	ns
t <sub>a</sub>	$I_F = 3.0$ A, di <sub>F</sub> /dt = 100 A/ $\mu$ s	-	48	-	ns
t <sub>b</sub>	$I_F = 3.0$ A , d i $_F/dt = 100$ A/ $\mu s$	-	22	-	ns
$R_{ heta JC}$		-	-	1.2	°C/W

#### **DEFINITIONS**

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

I<sub>R</sub> = Instantaneous reverse current.

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

t<sub>a</sub> = 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**

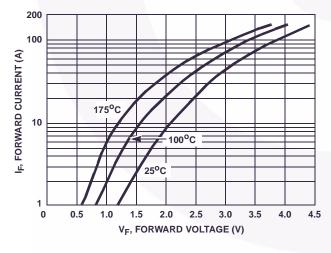


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

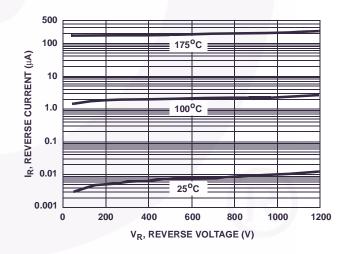


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

### Typical Performance Curves (Continued)

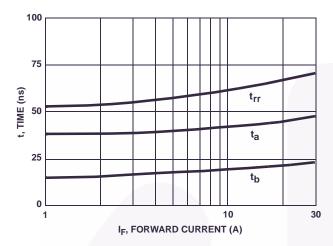


FIGURE 3. t<sub>rr</sub>, t<sub>a</sub> AND t<sub>b</sub> CURVES vs FORWARD CURRENT

#### Test Circuits and Waveforms

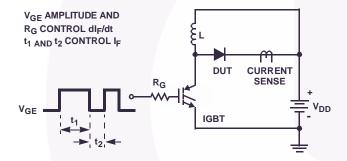


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

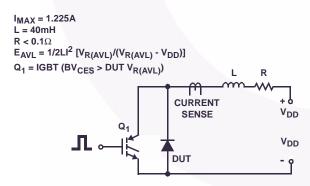


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

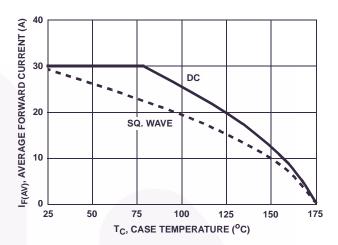


FIGURE 4. CURRENT DERATING CURVE

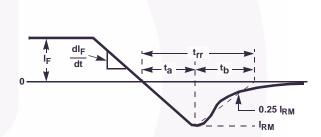


FIGURE 6. t<sub>rr</sub> WAVEFORMS AND DEFINITIONS

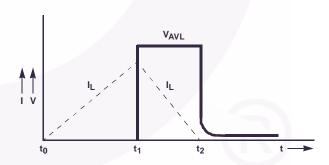
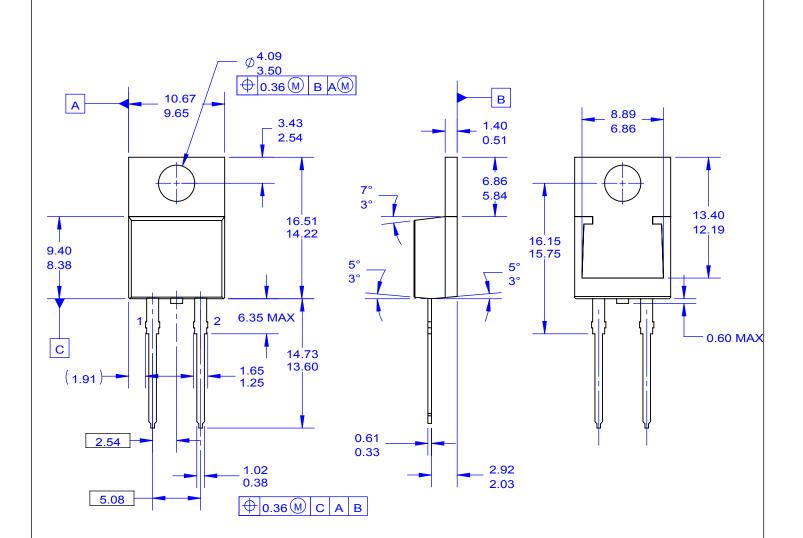
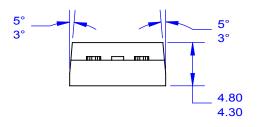


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS







#### **NOTES**:

- A. PACKAGE REFERENCE: JEDEC TO220,ISSUE K, VARIATION AC,DATED APRIL 2002.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
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