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Data Sheet

#### November 2013

### 8 A, 1200 V, Hyperfast Diode

The RHRP8120 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 transistors.

#### **Ordering Information**

# PART NUMBERPACKAGEBRANDRHRP8120TO-220AC-2LRHRP8120

NOTE: When ordering, use the entire part number.

#### Symbol



#### Features

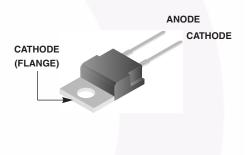
- Hyperfast Recovery  $t_{rr}$  = 70 ns (@ I<sub>F</sub>= 8 A)
- Max Forward Voltage,  $V_F$  = 3.2 V (@  $T_C$  = 25°C)
- 1200 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

#### **Applications**

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

#### Packaging





#### Absolute Maximum Ratings T<sub>C</sub> = 25<sup>o</sup>C, Unless Otherwise Specified

	RHRP8120	UNIT
Peak Repetitive Reverse Voltage	1200	V
Working Peak Reverse Voltage V <sub>RWM</sub>	1200	V
DC Blocking Voltage	1200	V
Average Rectified Forward Current	8	A
Repetitive Peak Surge Current I <sub>FRM</sub> (Square Wave, 20 kHz)	16	A
Nonrepetitive Peak Surge Current I <sub>FSM</sub> (Halfwave, 1 Phase, 60 Hz)	100	А
Maximum Power Dissipation	75	W
Avalanche Energy (See Figures 10 and 11) E <sub>AVL</sub>	20	mJ
Operating and Storage Temperature	-65 to 175	°C

SYMBOL	TEST CONDITION	MIN	ТҮР	MAX	UNIT
V <sub>F</sub>	I <sub>F</sub> = 8 A	-	-	3.2	V
	I <sub>F</sub> = 8 A, T <sub>C</sub> = 150 <sup>o</sup> C	-	-	2.6	V
I <sub>R</sub>	V <sub>R</sub> = 1200 V	-	-	100	μΑ
	$V_{\rm R} = 1200 \text{ V}, \text{ T}_{\rm C} = 150^{\rm O} \text{C}$	-	-	500	μΑ
t <sub>rr</sub>	I <sub>F</sub> = 1 A, dI <sub>F</sub> /dt = 200 A/μs	-	-	55	ns
	I <sub>F</sub> = 8 A, dI <sub>F</sub> /dt = 200 A/μs	-	-	70	ns
t <sub>a</sub>	I <sub>F</sub> = 8 A, dI <sub>F</sub> /dt = 200 A/μs	-	30	-	ns
t <sub>b</sub>	I <sub>F</sub> = 8 A, dI <sub>F</sub> /dt = 200 A/μs	-	20	-	ns
Q <sub>rr</sub>	I <sub>F</sub> = 8 A, dI <sub>F</sub> /dt = 200 A/μs	-	165	-	nC
CJ	V <sub>R</sub> = 10 V, I <sub>F</sub> = 0 A	-	25	-	pF
R <sub>θJC</sub>		-	-	2	°C/W

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

DEFINITIONS

 $V_F$  = Instantaneous forward voltage (pw = 300 µs, D = 2%).

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

 $T_{rr}$  = Reverse recovery time (See Figure 9), summation of  $t_a + t_b$ .

 $t_a$  = Time to reach peak reverse current (See Figure 9).

t<sub>b</sub> = Time from peak I<sub>RM</sub> to projected zero crossing of I<sub>RM</sub> based on a straight line from peak I<sub>RM</sub> through 25% of I<sub>RM</sub> (See Figure 9).

Q<sub>rr</sub> = Reverse Recovery Charge.

C<sub>J</sub> = Junction Capacitance.

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

pw = Pulse Width.

D = Duty Cycle.

#### Typical Performance Curves

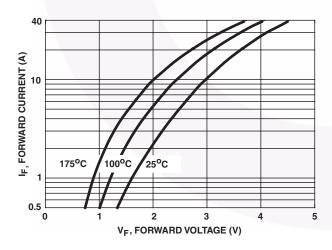
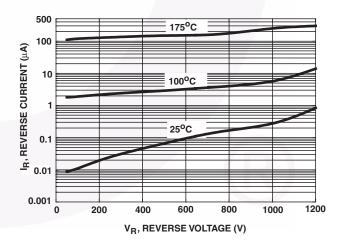


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE



#### FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

#### Typical Performance Curves (Continued)

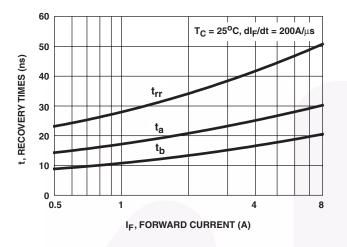
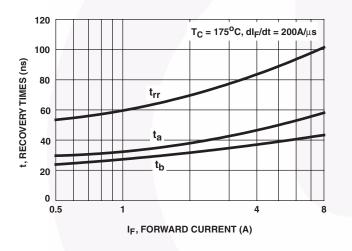


FIGURE 3. t<sub>rr</sub>, t<sub>a</sub> AND t<sub>b</sub> CURVES vs FORWARD CURRENT





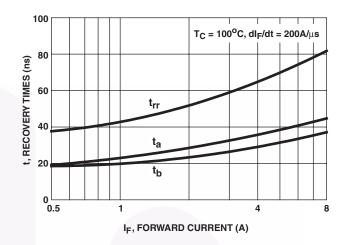


FIGURE 4. trr, ta AND tb CURVES vs FORWARD CURRENT

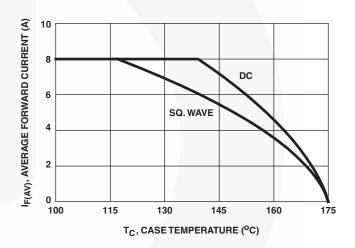


FIGURE 6. CURRENT DERATING CURVE

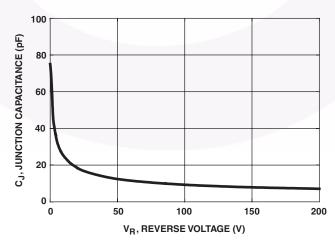
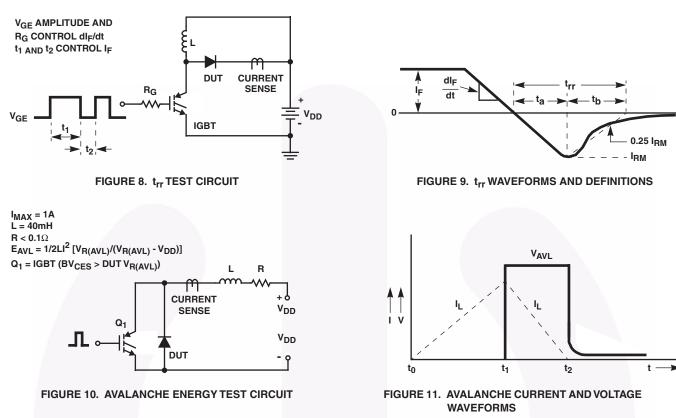


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

#### Test Circuits and Waveforms



Ø 4.09 3.50 ⊕ 0.36 M B A M 10.67 В Α 9.65 8.89 3.43 1.40 6.86 2.54 0.51 6.86 **7**° 5.84 3° T 13.40 16.51 12,19 14,22 16.15 9.40 15,75 8.38 **5**° **5**° 3° 3° 6.35 MAX 2 1 0.60 MAX С 14.73 13,60 1.65 (1.91)1.25 F Т 0.61 2.54 0.33 1.02 2.92 0.38 2.03 5.08 ⊕ 0.36 M C A B **5° 5°** 3° 3° ..... -...... FAIRCHILD ... 4.80 4.30

#### NOTES:

- A. PACKAGE REFERENCE: JEDEC TO220,ISSUE K, VARIATION AC,DATED APRIL 2002.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DRAWING FILE NAME: TO220A02REV5

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