

April 1995

8A, 1200V Hyperfast Dual Diode

Features

- Hyperfast with Soft Recovery <55ns
- Operating Temperature +175°C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Description

The RHRP8120CC (TA49096) is a hyperfast dual diode with soft recovery characteristics ($t_{RR} < 55\text{ns}$). It has half the recovery time of ultrafast diodes and is silicon nitride passivated ion-implanted epitaxial planar construction.

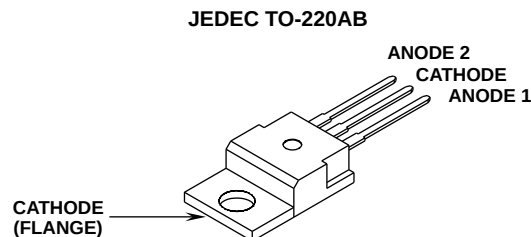
This device is intended for use as a freewheeling/clamping diode and rectifier in a variety of switching power supplies and other power switching applications. Its low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss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

PACKAGING AVAILABILITY

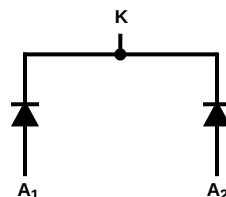
PART NUMBER	PACKAGE	BRAND
RHRP8120CC	TO-220AB	RHR8120C

NOTE: When ordering, use the entire part number.

Package



Symbol



Absolute Maximum Ratings (per leg) $T_C = +25^\circ\text{C}$, Unless Otherwise Specified

	RHRP8120CC	UNITS
Peak Repetitive Reverse Voltage V_{RRM}	1200	V
Working Peak Reverse Voltage V_{RWM}	1200	V
DC Blocking Voltage V_R	1200	V
Average Rectified Forward Current $I_{F(AV)}$ ($T_C = +140^\circ\text{C}$)	8	A
Repetitive Peak Surge Current I_{FSM} (Square Wave, 20kHz)	16	A
Nonrepetitive Peak Surge Current I_{FSM} (Halfwave, 1 Phase, 60Hz)	100	A
Maximum Power Dissipation P_D	75	W
Avalanche Energy (See Figures 10 and 11) E_{AVL}	20	mj
Operating and Storage Temperature T_{STG}, T_J	-65 to +175	°C

Specifications RHRP8120CC

Electrical Specifications (per leg) $T_C = +25^\circ\text{C}$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	LIMITS			UNITS
		MIN	TYP	MAX	
V_F	$I_F = 8\text{A}$, $T_C = +25^\circ\text{C}$	-	-	3.2	V
	$I_F = 8\text{A}$, $T_C = +150^\circ\text{C}$	-	-	2.6	V
I_R	$V_R = 1200\text{V}$, $T_C = +25^\circ\text{C}$	-	-	100	μA
	$V_R = 1200\text{V}$, $T_C = +150^\circ\text{C}$	-	-	500	μA
t_{RR}	$I_F = 1\text{A}$, $dI_F/dt = 200\text{A}/\mu\text{s}$	-	-	55	ns
	$I_F = 8\text{A}$, $dI_F/dt = 200\text{A}/\mu\text{s}$	-	-	65	ns
t_A	$I_F = 8\text{A}$, $dI_F/dt = 200\text{A}/\mu\text{s}$	-	30	-	ns
t_B	$I_F = 8\text{A}$, $dI_F/dt = 200\text{A}/\mu\text{s}$	-	20	-	ns
Q_{RR}	$I_F = 8\text{A}$, $dI_F/dt = 200\text{A}/\mu\text{s}$	-	165	-	nC
C_J	$V_R = 10\text{V}$, $I_F = 0\text{A}$	-	25	-	pF
$R_{\theta JC}$		-	-	2	$^\circ\text{C}/\text{W}$

DEFINITIONS

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

I_R = Instantaneous reverse current.

t_{RR} = Reverse recovery time (See Figure 2), summation of $t_A + t_B$.

t_A = Time to reach peak reverse current (See Figure 2).

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 2).

Q_{RR} = Reverse recovery charge.

C_J = Junction Capacitance.

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

E_{AVL} = Controlled avalanche energy. (See Figures 10 and 11).

pw = pulse width.

D = duty cycle.

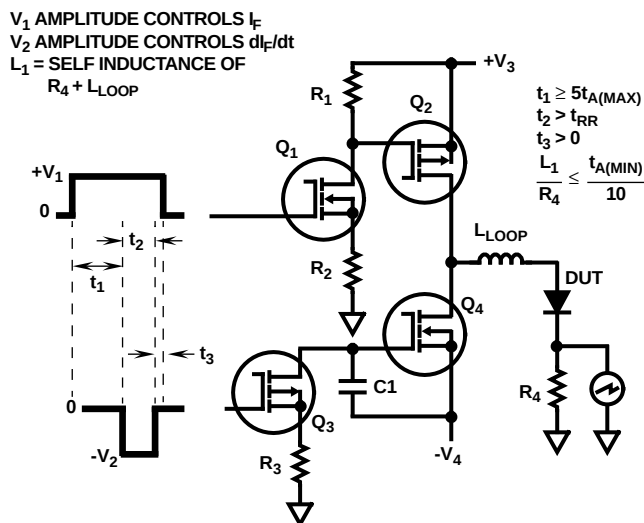


FIGURE 1. t_{RR} TEST CIRCUIT

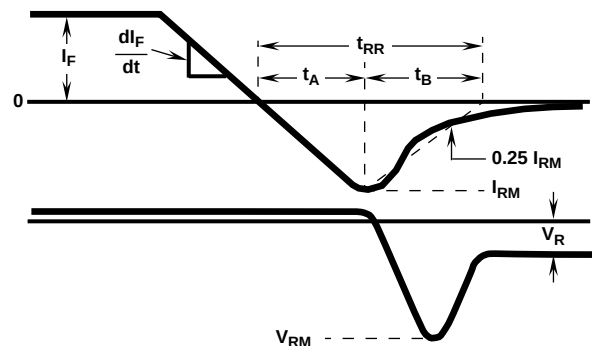


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

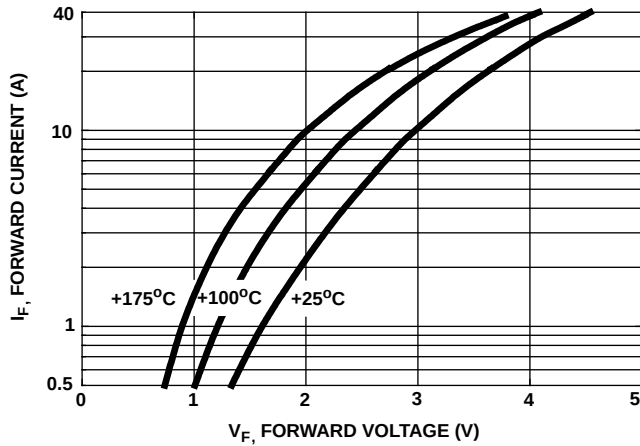


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

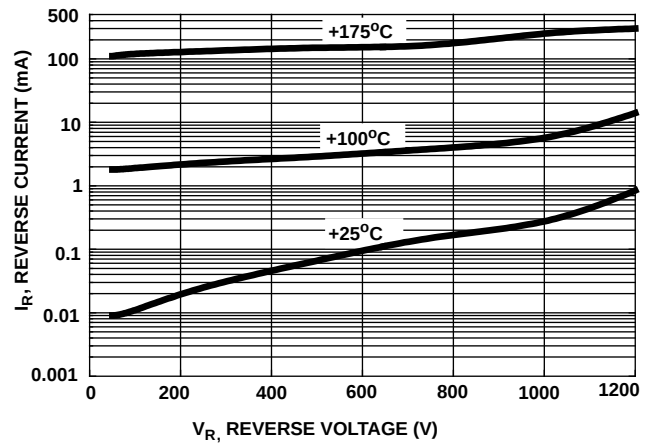


FIGURE 4. TYPICAL REVERSE CURRENT vs REVERSE VOLTAGE

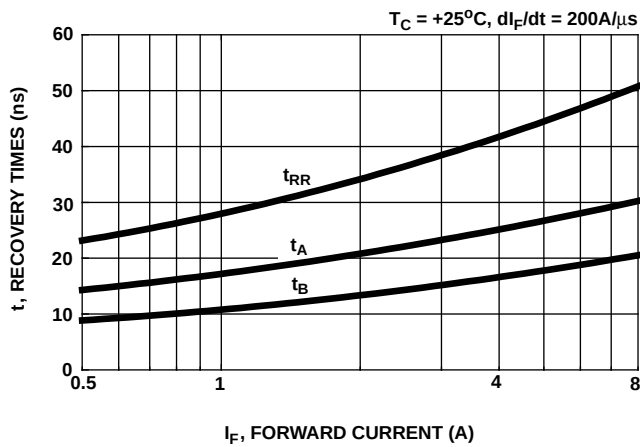


FIGURE 5. TYPICAL t_{RR} , t_A AND t_B CURVES vs FORWARD CURRENT AT +25°C

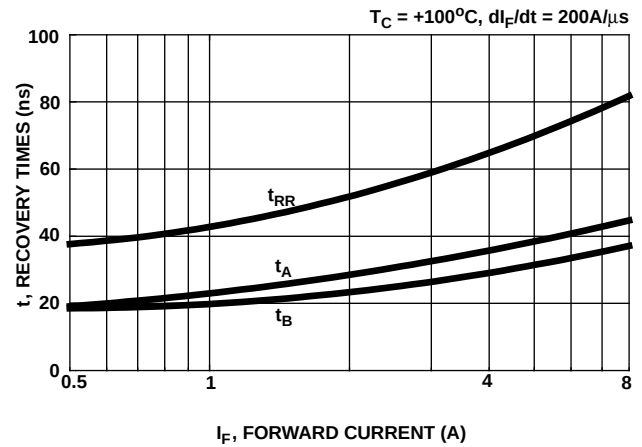


FIGURE 6. TYPICAL t_{RR} , t_A AND t_B CURVES vs FORWARD CURRENT AT +100°C

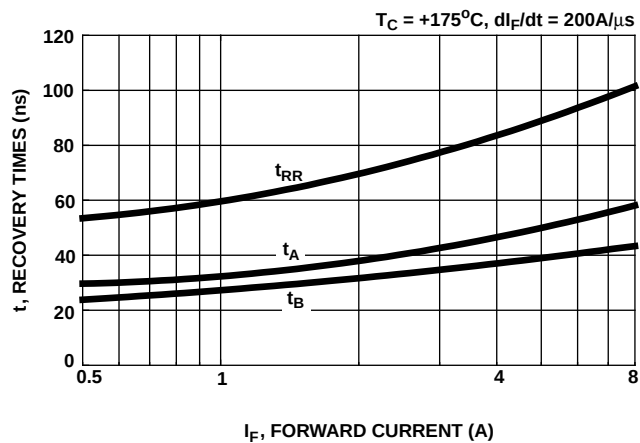


FIGURE 7. TYPICAL t_{RR} , t_A AND t_B CURVES vs FORWARD CURRENT AT +175°C

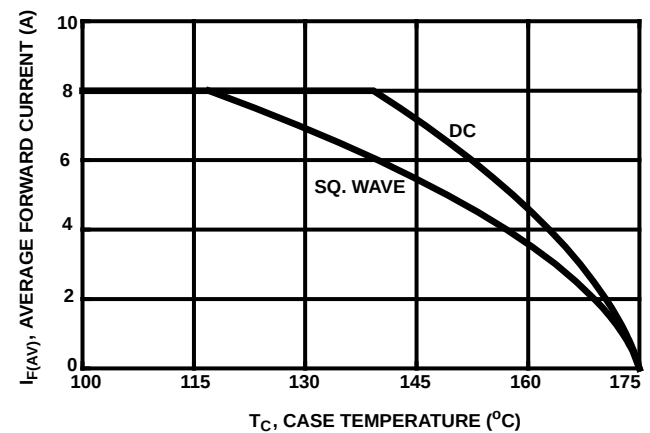


FIGURE 8. CURRENT DERATING CURVE

Typical Performance Curves (Continued)

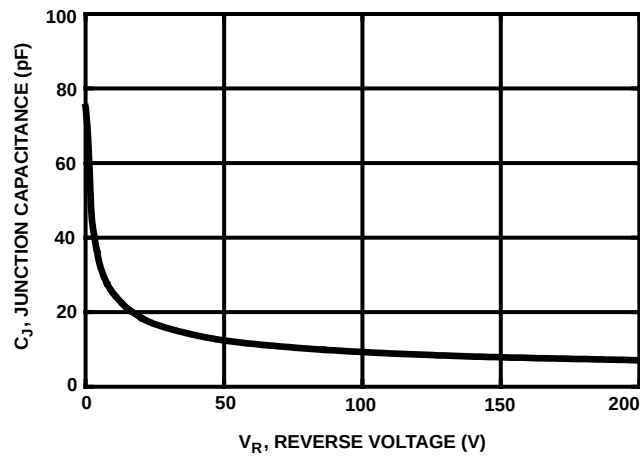


FIGURE 9. TYPICAL JUNCTION CAPACITANCE vs REVERSE VOLTAGE

I_{MAX} = 1A

L = 40mH

R < 0.1Ω

E_{AVL} = 1/2LI² [V_{AVL} / (V_{AVL} - V_{DD})]

Q₁ AND Q₂ ARE 1000V MOSFETs

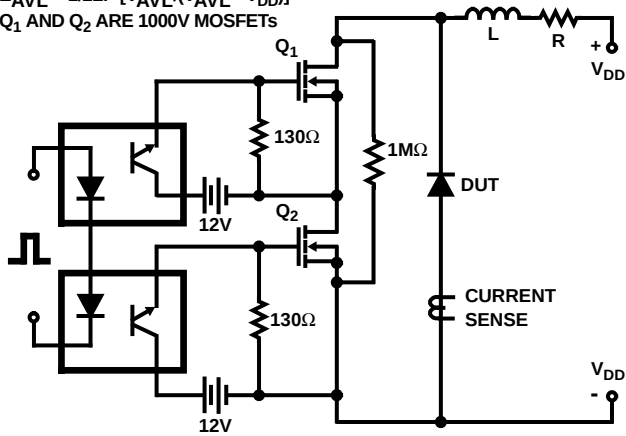


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

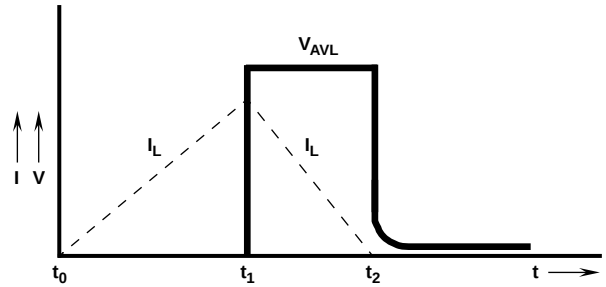


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS