

April 1995

150A, 900V - 1000V Hyperfast Diodes

Features

- Hyperfast with Soft Recovery<90ns
- Operating Temperature+175°C
- Reverse Voltage Up To1000V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Description

RHRU15090 and RHRU150100 (TA49072) are hyperfast diodes with soft recovery characteristics ($t_{RR} < 90\text{ns}$). They have half the recovery time of ultrafast diodes and are silicon nitride passivated ion-implanted epitaxial planar construction.

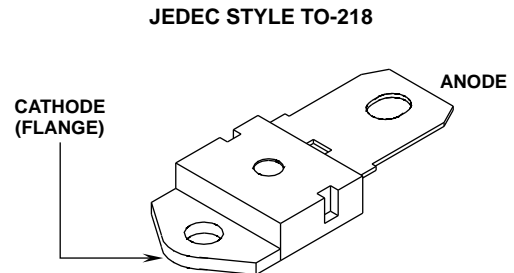
These devices are intended for use as freewheeling/clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
RHRU15090	TO-218	RHRU15090
RHRU150100	TO-218	RHR150100

NOTE: When ordering, use the entire part number.

Package



Symbol



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

	RHRU15090	RHRU150100	UNITS
Peak Repetitive Reverse Voltage	V_{RRM} 900	1000	V
Working Peak Reverse Voltage	V_{RWM} 900	1000	V
DC Blocking Voltage	V_R 900	1000	V
Average Rectified Forward Current	$I_{F(AV)}$ 150	150	A
($T_C = +42^\circ\text{C}$)			
Repetitive Peak Surge Current	I_{FSM} 300	300	A
(Square Wave, 20kHz)			
Nonrepetitive Peak Surge Current	I_{FSM} 1500	1500	A
(Halfwave, 1 Phase, 60Hz)			
Maximum Power Dissipation	P_D 375	375	W
Avalanche Energy ($L = 40\text{mH}$)	E_{AVL} 50	50	mj
Operating and Storage Temperature	T_{STG}, T_J -65 to +175	-65 to +175	°C

Specifications RHRU15090, RHRU150100

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

SYMBOL	TEST CONDITION	LIMITS						UNITS
		RHRU15090			RHRU150100			
		MIN	TYP	MAX	MIN	TYP	MAX	
V_F	$I_F = 150\text{A}$, $T_C = +25^\circ\text{C}$	-	-	3.0	-	-	3.0	V
V_F	$I_F = 150\text{A}$, $T_C = +150^\circ\text{C}$	-	-	2.5	-	-	2.5	V
I_R	$V_R = 900\text{V}$, $T_C = +25^\circ\text{C}$	-	-	500	-	-	-	μA
	$V_R = 1000\text{V}$, $T_C = +25^\circ\text{C}$	-	-	-	-	-	500	μA
I_R	$V_R = 900\text{V}$, $T_C = +150^\circ\text{C}$	-	-	3.0	-	-	-	mA
	$V_R = 1000\text{V}$, $T_C = +150^\circ\text{C}$	-	-	-	-	-	3.0	mA
t_{RR}	$I_F = 1\text{A}$, $di_F/dt = 100\text{A}/\mu\text{s}$	-	-	90	-	-	90	ns
	$I_F = 150\text{A}$, $di_F/dt = 100\text{A}/\mu\text{s}$	-	-	100	-	-	100	ns
t_A	$I_F = 150\text{A}$, $di_F/dt = 100\text{A}/\mu\text{s}$	-	65	-	-	65	-	ns
t_B	$I_F = 150\text{A}$, $di_F/dt = 100\text{A}/\mu\text{s}$	-	30	-	-	30	-	ns
$R_{\theta JC}$		-	-	0.4	-	-	0.4	$^\circ\text{C}/\text{W}$

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).

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

E_{AVL} = Controlled avalanche energy (See Figures 7 and 8).

pw = pulse width.

D = duty cycle.

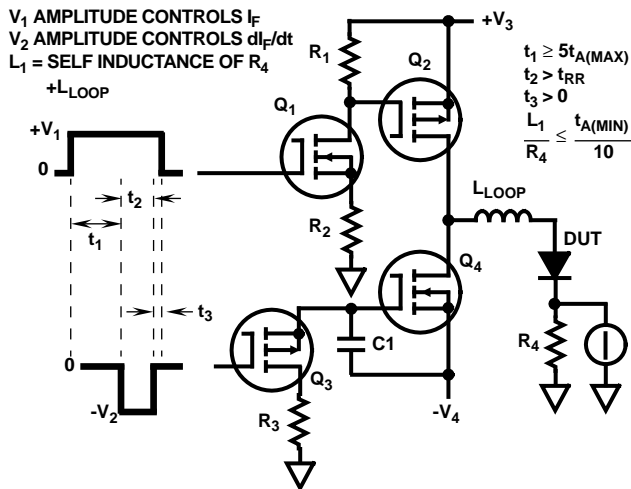


FIGURE 1. t_{RR} TEST CIRCUIT

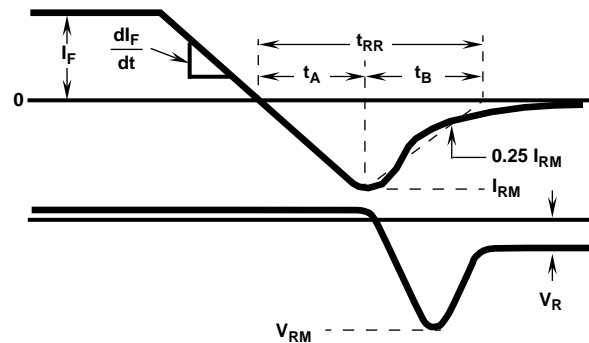


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

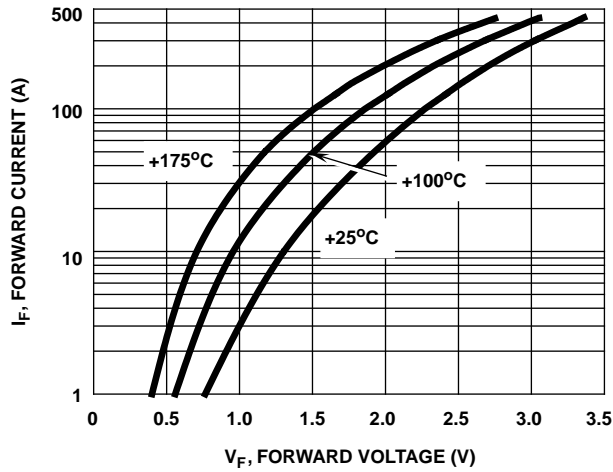


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

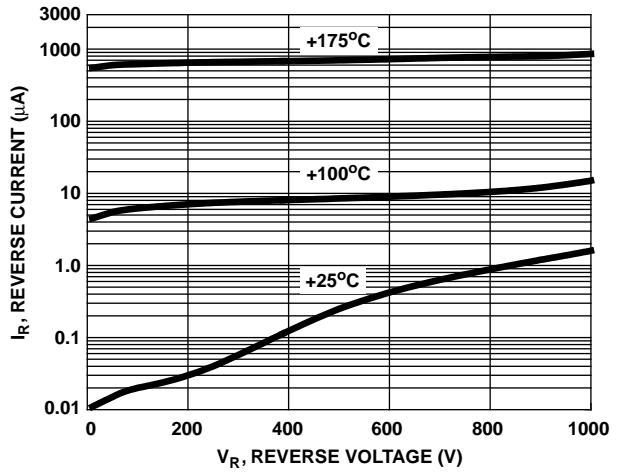


FIGURE 4. TYPICAL REVERSE CURRENT vs REVERSE VOLTAGE

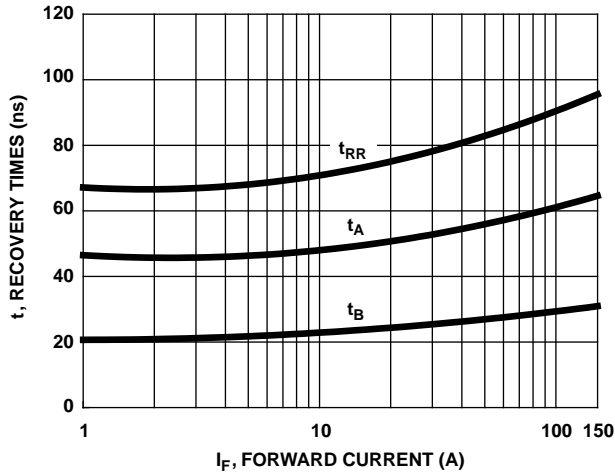


FIGURE 5. TYPICAL t_{RR} , t_A AND t_B CURVES vs FORWARD CURRENT

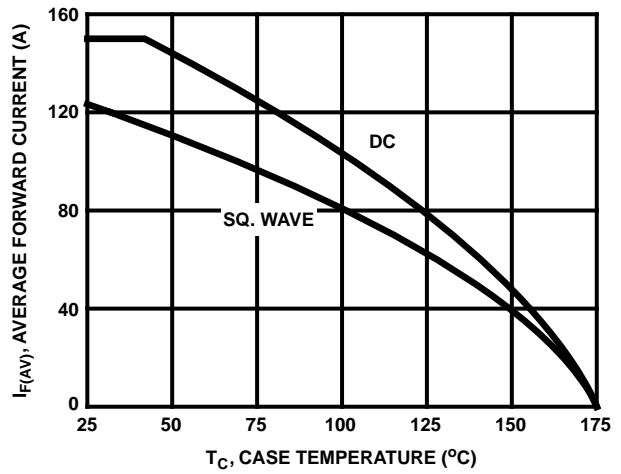


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

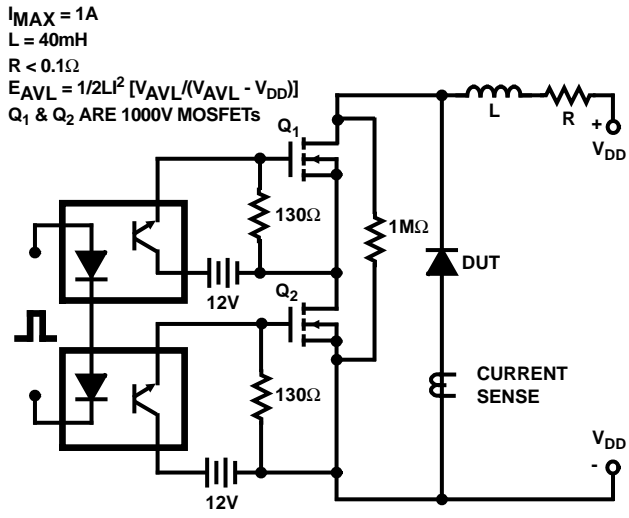


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

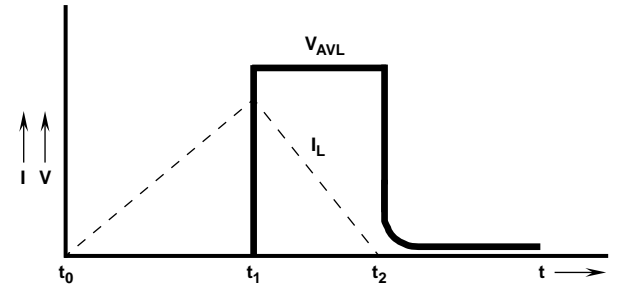


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS