

April 1995

## 150A, 900V - 1000V Hyperfast Diodes

### Features

- Hyperfast with Soft Recovery ..... <90ns
- Operating Temperature ..... +175°C
- Reverse Voltage Up To ..... 1000V
- 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 ( $t_{RR} < 90ns$ ). 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.

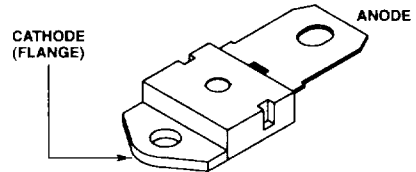
#### PACKAGING AVAILABILITY

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

NOTE: When ordering, use the entire part number.

### Package

JEDEC STYLE TO-218



### Symbol



### Absolute Maximum Ratings $T_C = +25^\circ C$ , 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 ..... $I_{F(AV)}$ ( $T_C = +42^\circ C$ )	150	150	A
Repetitive Peak Surge Current ..... $I_{FSM}$ (Square Wave, 20kHz)	300	300	A
Nonrepetitive Peak Surge Current ..... $I_{FSM}$ (Halfwave, 1 Phase, 60Hz)	1500	1500	A
Maximum Power Dissipation ..... $P_D$	375	375	W
Avalanche Energy (L = 40mH) ..... $E_{AVL}$	50	50	mj
Operating and Storage Temperature ..... $T_{STG}, T_J$	-65 to +175	-65 to +175	$^\circ C$

## 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	-	-	-	$\mu\text{A}$
	$V_R = 1000\text{V}, T_C = +25^\circ\text{C}$	-	-	-	-	-	500	$\mu\text{A}$
$I_R$	$V_R = 900\text{V}, T_C = +150^\circ\text{C}$	-	-	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 ( $p_w = 300\mu\text{s}$ ,  $D = 2\%$ ).

$I_R$  = 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).

$p_w$  = pulse width.

$D$  = duty cycle.

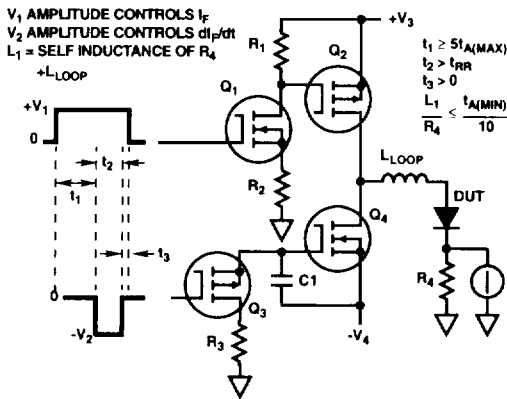


FIGURE 1.  $t_{RR}$  TEST CIRCUIT

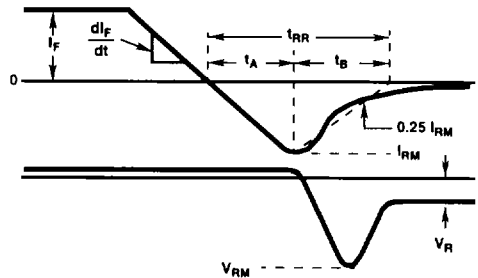


FIGURE 2.  $t_{RR}$  WAVEFORMS AND DEFINITIONS

Typical Performance Curves

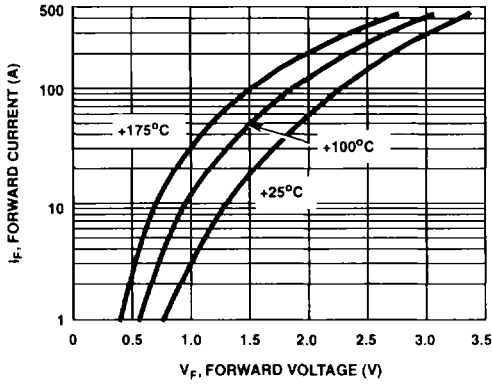


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

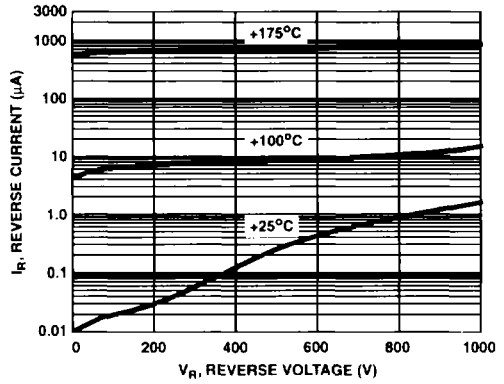


FIGURE 4. TYPICAL REVERSE CURRENT vs REVERSE VOLTAGE

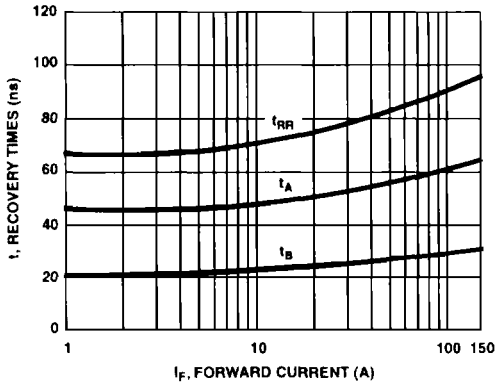


FIGURE 5. TYPICAL  $t_{RR}$ ,  $t_A$  AND  $t_B$  CURVES vs FORWARD CURRENT

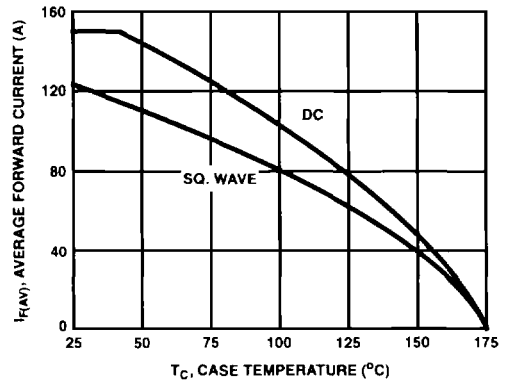


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

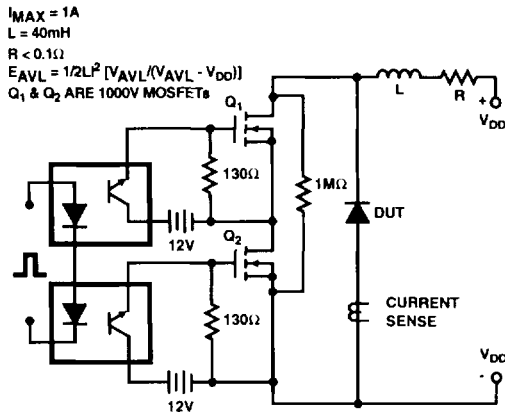


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

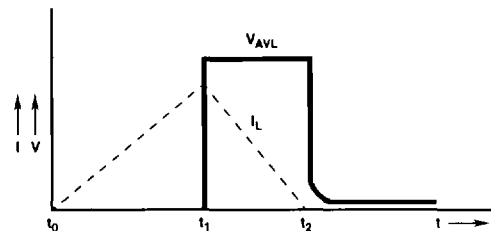


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS