

April 1995

## 75A, 1200V Hyperfast Diode

### Features

- Hyperfast with Soft Recovery . . . . . <85ns
- Operating Temperature . . . . . +175°C
- Reverse Voltage . . . . . 1200V
- Avalanche Energy Rated
- Planar Construction

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Description

The RHRU75120 (TA49042) is a hyperfast diode with soft recovery characteristics ( $t_{RR} < 85\text{ns}$ ). 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 high frequency 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.

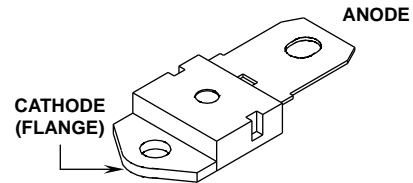
#### PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
RHRU75120	TO-218	RHRU75120

NOTE: When ordering, use the entire part number.

### Package

JEDEC STYLE TO-218



### Symbol



### Absolute Maximum Ratings $T_C = +25^\circ\text{C}$

	RHRU75120	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 . . . . . $I_{F(AV)}$ ( $T_C = +46^\circ\text{C}$ )	75	A
Repetitive Peak Surge Current . . . . . $I_{FSM}$ (Square Wave, 20kHz)	150	A
Nonrepetitive Peak Surge Current . . . . . $I_{FSM}$ (Halfwave, 1Phase, 60Hz)	500	A
Maximum Power Dissipation . . . . . $P_D$	190	W
Avalanche Energy . . . . . $E_{AVL}$ ( $L = 40\text{mH}$ )	50	mj
Operating and Storage Temperature . . . . . $T_{STG}, T_J$	-65 to +175	°C

# Specifications RHRU75120

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

SYMBOL	TEST CONDITION		LIMITS			UNITS
			MIN	TYP	MAX	
$V_F$	$I_F = 75\text{A}$		-	-	3.2	V
$V_F$	$I_F = 75\text{A}$	$T_C = +150^\circ\text{C}$	-	-	2.6	V
$I_R$	$V_R = 1200\text{V}$		-	-	500	$\mu\text{A}$
$I_R$	$V_R = 1200\text{V}$	$T_C = +150^\circ\text{C}$	-	-	2	mA
$t_{RR}$	$I_F = 1\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		-	-	85	ns
$t_{RR}$	$I_F = 75\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		-	-	100	ns
$t_A$	$I_F = 75\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		-	60	-	ns
$t_B$	$I_F = 75\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		-	25	-	ns
$R_{\theta JC}$			-	-	0.8	$^\circ\text{C}/\text{W}$

### DEFINITIONS

$V_F$  = Instantaneous forward voltage (pw = 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 at (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.

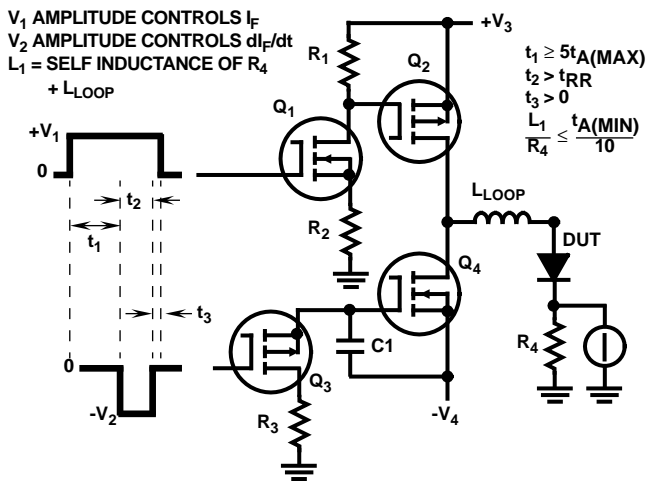


FIGURE 1.  $t_{RR}$  TEST CIRCUIT

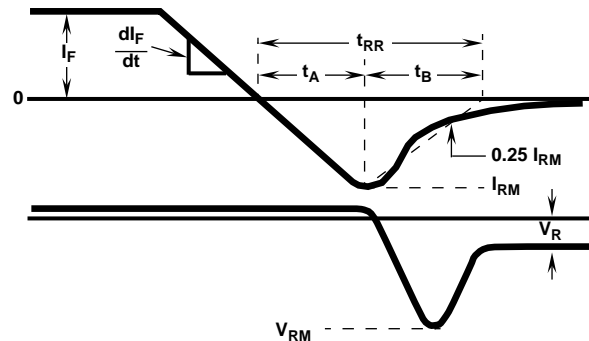


FIGURE 2.  $t_{RR}$  WAVEFORMS AND DEFINITIONS

Typical Performance Curves

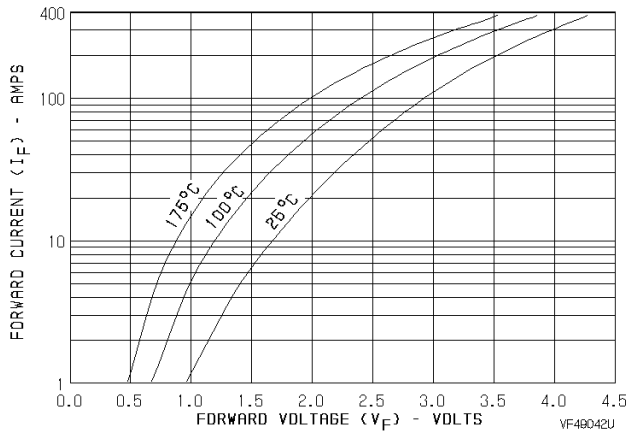


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

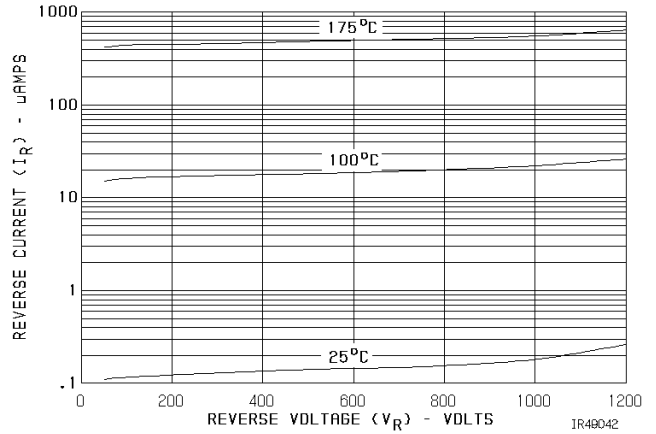


FIGURE 4. TYPICAL REVERSE CURRENT vs VOLTAGE

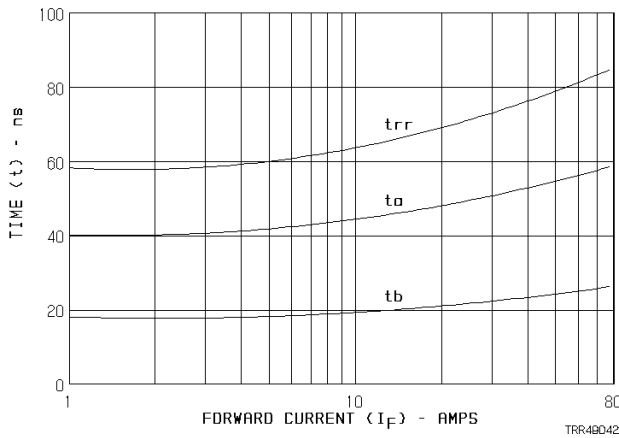


FIGURE 5. TYPICAL  $t_{RR}$ ,  $t_A$  AND  $t_B$  CURVES vs FORWARD CURRENT

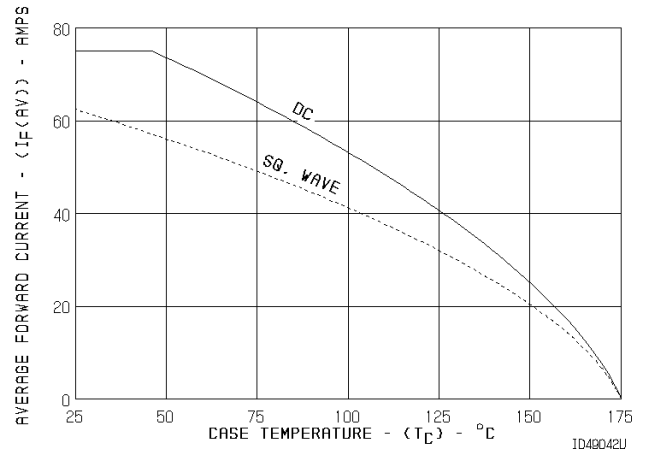


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

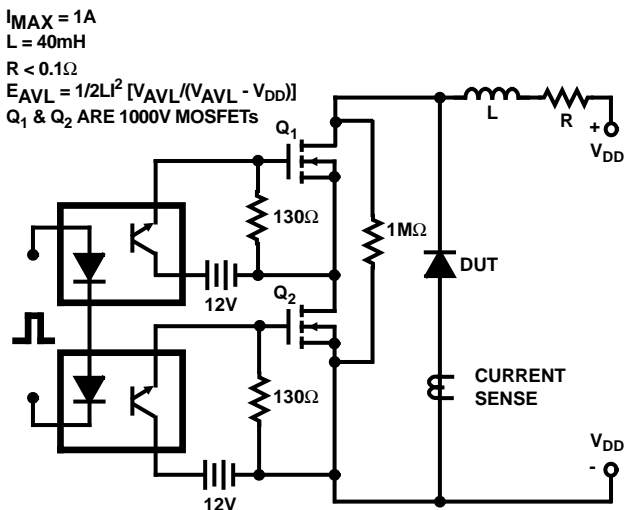


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

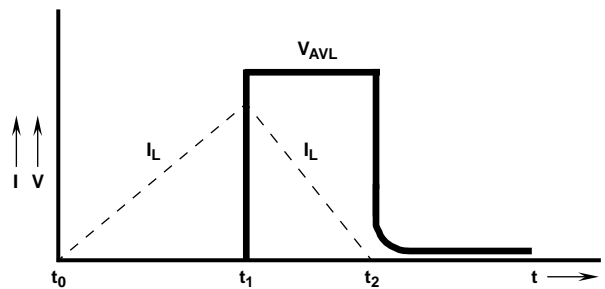


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS