Data Sheet | January 2000 | File Number 4049.1

150A, 1200V Hyperfast Diode

The RHRU150120 is a hyperfast diode with soft recovery characteristics (t_{rr} < 100ns). It has half the recovery time of ultrafast diodes and is of 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, thus reducing power loss in the switching transistors.

Formerly developmental type TA49074.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRU150120	TO-218	RHR150120

NOTE: When ordering, use the entire part number.

Symbol

Features

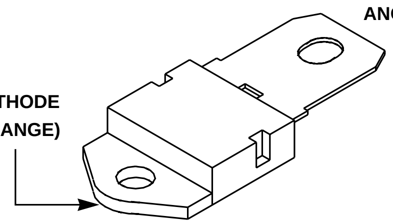
- Hyperfast with Soft Recovery . . . . <100ns
- Operating Temperature. . . . . 175^{o}C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplier
- Power Switching Circuits
- General Purpose

Packaging

SINGLE LEAD JEDEC STYLE TO-218



Absolute Maximum Ratings T_C = 25^{o}C, Unless Otherwise Specified

		RHRU150120	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 T_C = 37.5^{o}C	$I_{F(AV)}$	150	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	300	A
Nonrepetitive Peak Surge Current (Halfwave, 1 phase, 60Hz)	I_{FSM}	1500	A
Maximum Power Dissipation	P_D	375	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	50	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	^{o}C

Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	I_F = 150A	-	-	3.2	V
	I_F = 150A, $T_C = 150^oC$	-	-	2.6	V
I_R	V_R = 1200V	-	-	250	μA
	V_R = 1200V, $T_C = 150^oC$	-	-	3.0	mA
t_{rr}	I_F = 1A, dI_F/dt = 200A/μs	-	-	100	ns
	I_F = 150A, dI_F/dt = 200A/μs	-	-	125	ns
t_a	I_F = 150A, dI_F/dt = 200A/μs	-	70	-	ns
t_b	I_F = 150A, dI_F/dt = 200A/μs	-	40	-	ns
Q_{RR}	I_F = 150A, dI_F/dt = 200A/μs	-	460	-	nC
C_J	V_R = 10V, I_F = 0A	-	420	-	pF
$R_{\theta JC}$		-	-	0.4	$^oC/W$

DEFINITIONS

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

I_R = 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_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 9).

Q_{RR} = Reverse recovery charge.

C_J = Junction Capacitance.

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

pw = Pulse width.

D = Duty cycle.

Typical Performance Curves

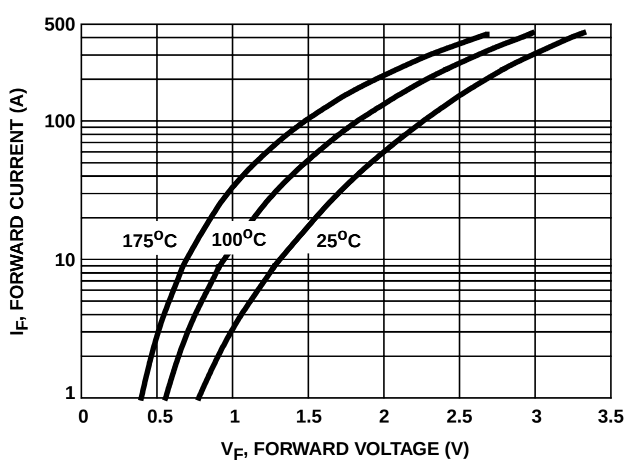


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

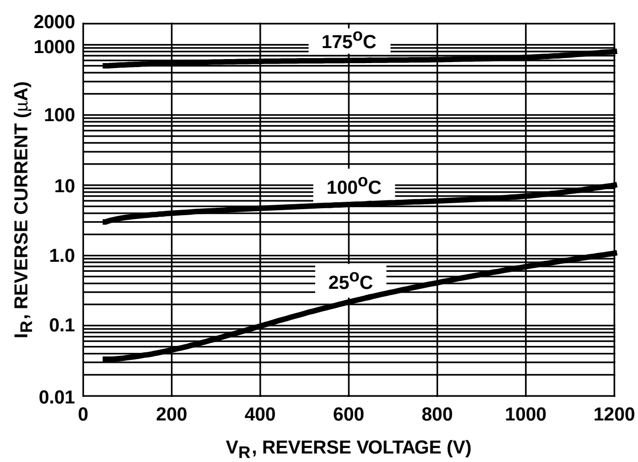


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

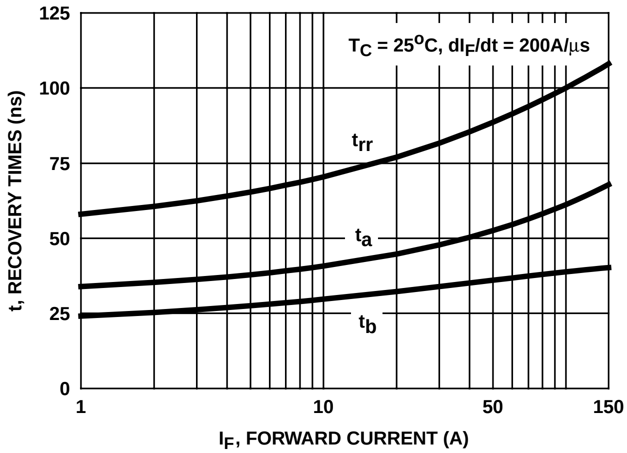


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

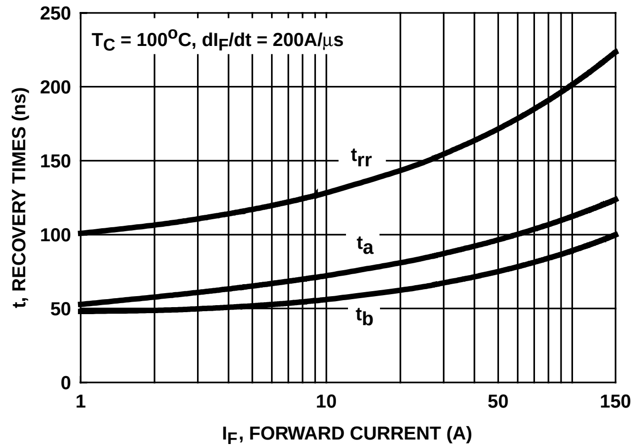


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

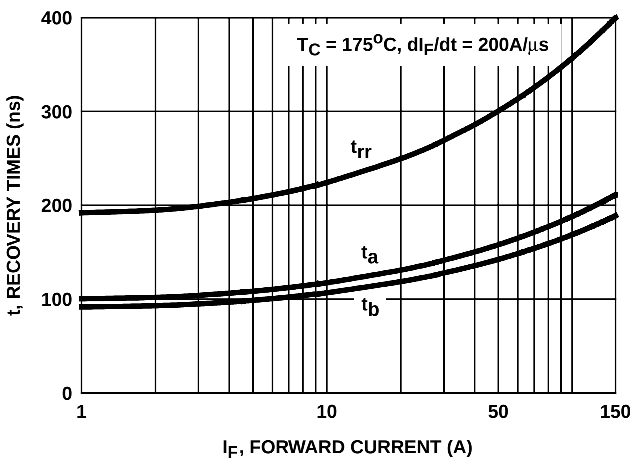


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

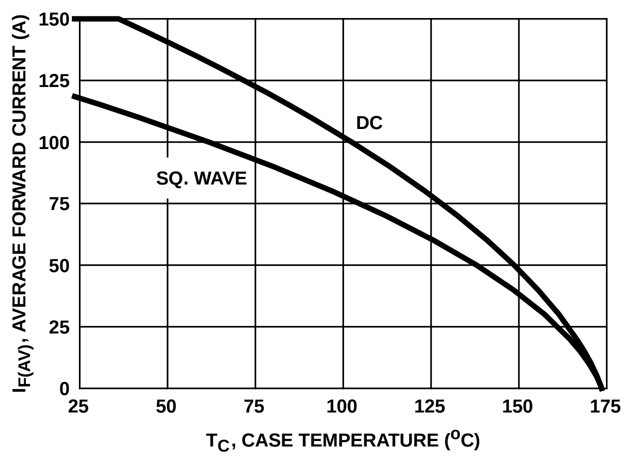


FIGURE 6. CURRENT DERATING CURVE

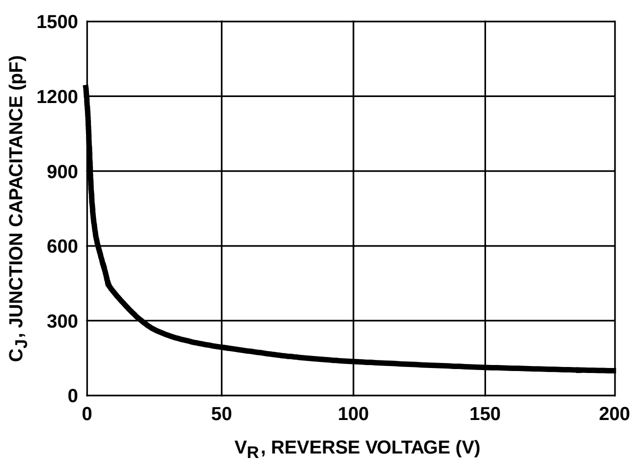


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

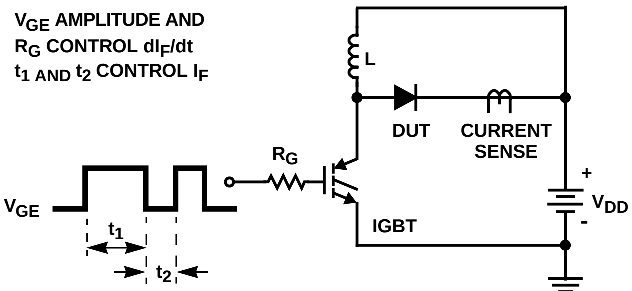


FIGURE 8. t_{rr} TEST CIRCUIT

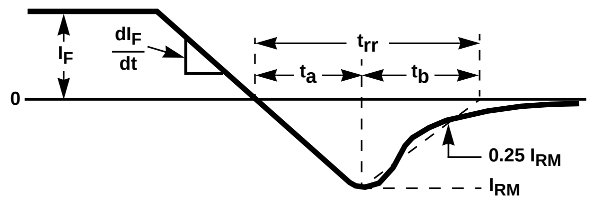


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

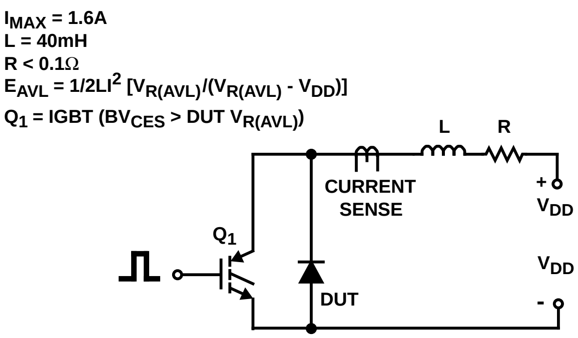


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

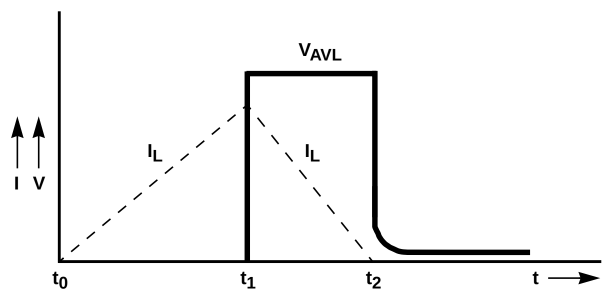


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS