50A, 1200V Hyperfast Diode

The RHRU50120 (TA49100) are hyperfast diodes with soft recovery characteristics (t_{RR} < 85ns). 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.

Ordering Information

PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
RHRU50120	TO-218	RHRU50120

NOTE: When ordering, use the entire part number.

Features

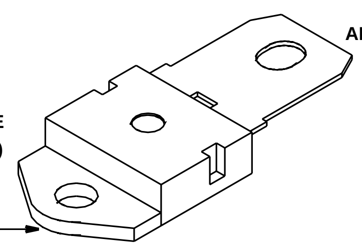
- **Hyperfast with Soft Recovery . . . . <85ns**
- **Operating Temperature . . . . +175°C**
- **Reverse Voltage 1200V**
- **Avalanche Energy Rated**
- **Planar Construction**

Applications

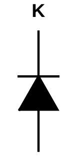
- **Switching Power Supplies**
- **Power Switching Circuits**
- **General Purpose**

Package

SINGLE LEAD JEDEC STYLE TO-218



Symbol



Absolute Maximum Ratings T_C = +25°C, Unless Otherwise Specified

	RHRU50120	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 = 50°C)	50	A
Repetitive Peak Surge Current. . . . . I_{FSM} (Square Wave, 20kHz)	100	A
Nonrepetitive Peak Surge Current . . . . I_{FSM} (Halfwave, 1 Phase, 60Hz)	500	A
Maximum Power Dissipation . . . . P_D	150	W
Avalanche Energy (See Figures 10 and 11). . . . . E_{AVL}	50	mj
Operating and Storage Temperature . . . . T_{STG}, T_J	-65 to +175	°C

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

SYMBOL	TEST CONDITION	RHRU50120 LIMITS MIN	TYP	MAX	UNITS
V_F	I_F = 50A, $T_C = +25^oC$	-	-	3.2	V
	I_F = 50A, $T_C = +150^oC$	-	-	2.6	V
I_R	V_R = 1200V, $T_C = +25^oC$	-	-	500	µA
	V_R = 1200V, $T_C = +150^oC$	-	-	1.0	mA
t_{RR}	I_F = 1A, dI_F/dt = 100A/µs	-	-	85	ns
	I_F = 50A, dI_F/dt = 100A/µs	-	-	100	ns
t_A	I_F = 50A, dI_F/dt = 100A/µs	-	50	-	ns
t_B	I_F = 50A, dI_F/dt = 100A/µs	-	40	-	ns
Q_{RR}	I_F = 50A, dI_F/dt = 100A/µs	-	240	-	nC
C_J	V_R = 10V, I_F = 0A	-	150	-	pF
$R_{\theta JC}$		-	-	1.0	$^oC/W$

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300µs, 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.

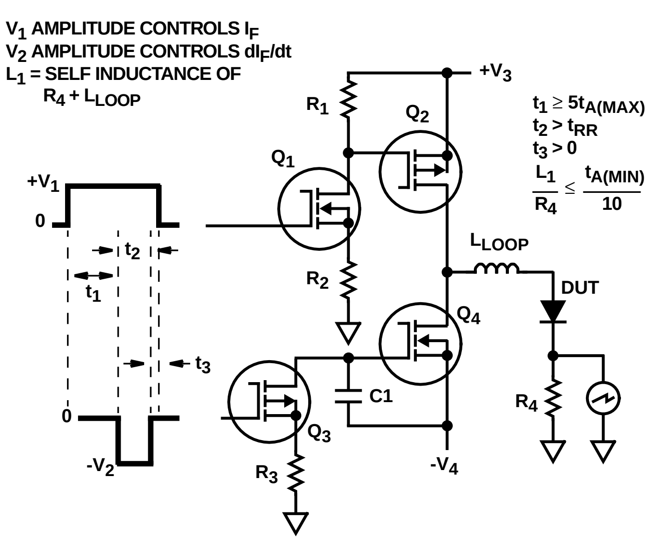


FIGURE 1. t_{RR} TEST CIRCUIT

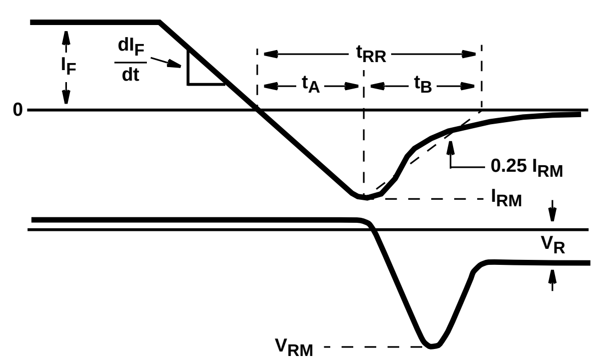


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

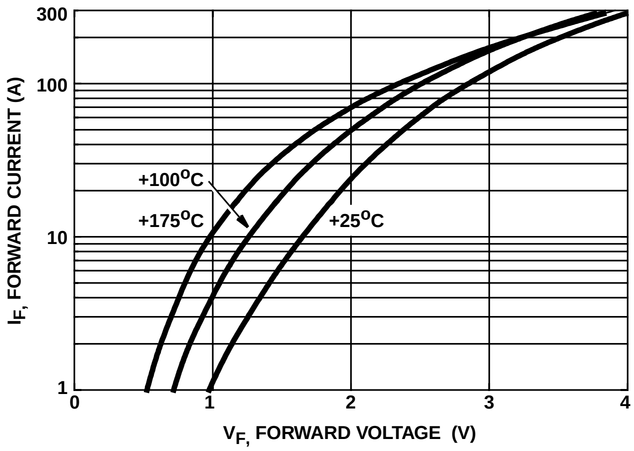


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

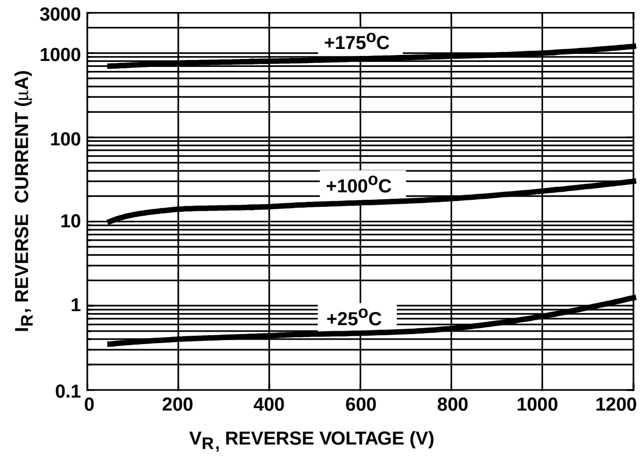


FIGURE 4. TYPICAL REVERSE CURRENT vs REVERSE VOLTAGE

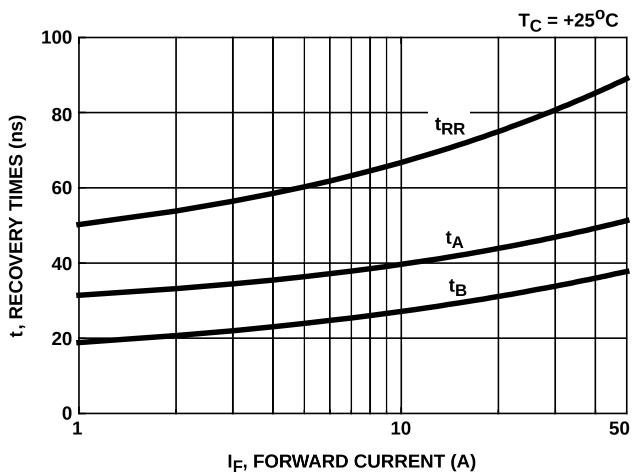


FIGURE 5. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +25^{O}C

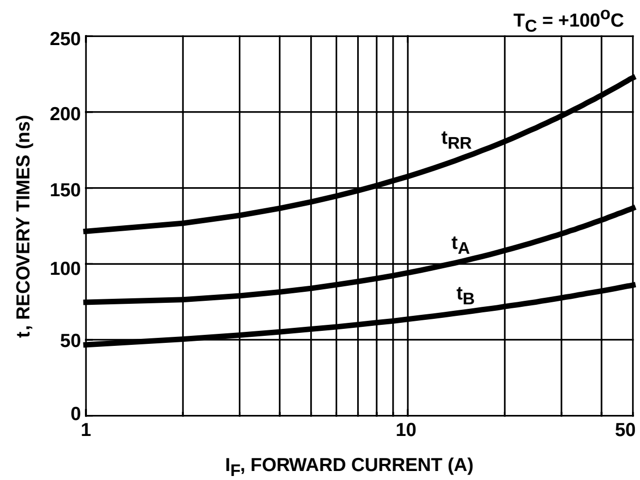


FIGURE 6. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +100^{O}C

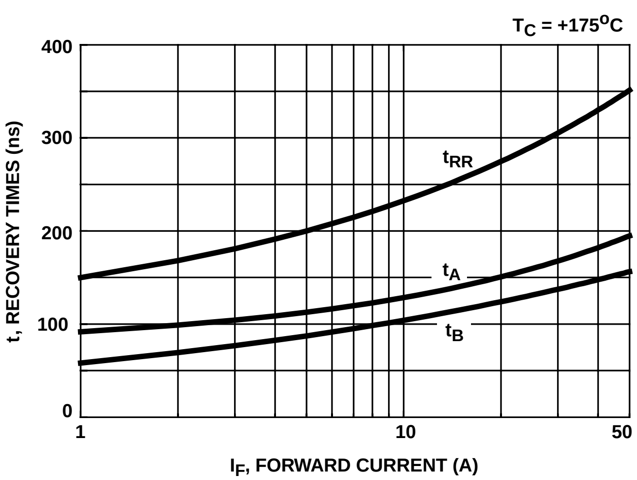


FIGURE 7. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +175^{O}C

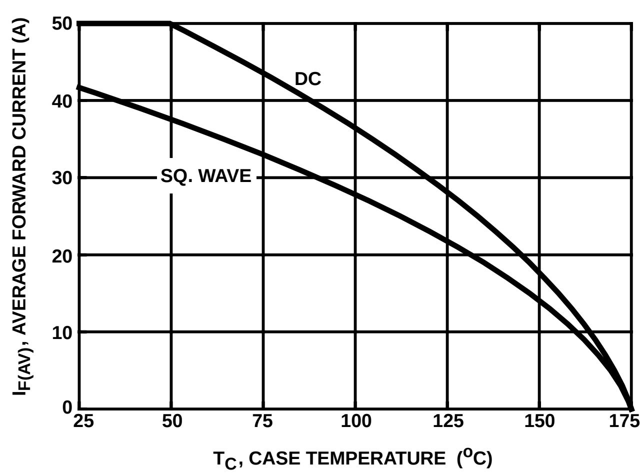


FIGURE 8. CURRENT DERATING CURVE

Typical Performance Curves (Continued)

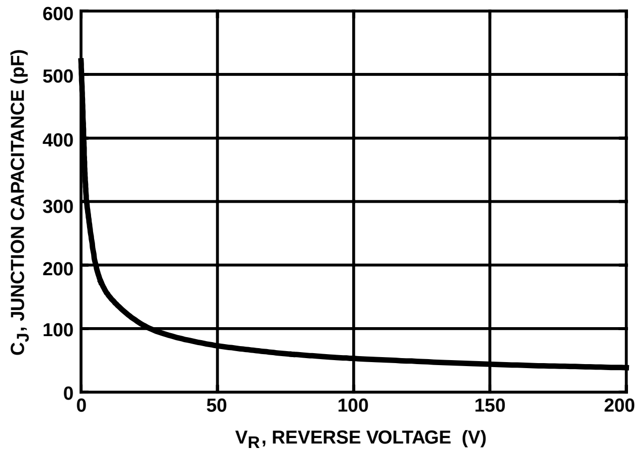


FIGURE 9. TYPICAL JUNCTION CAPACITANCE vs REVERSE VOLTAGE

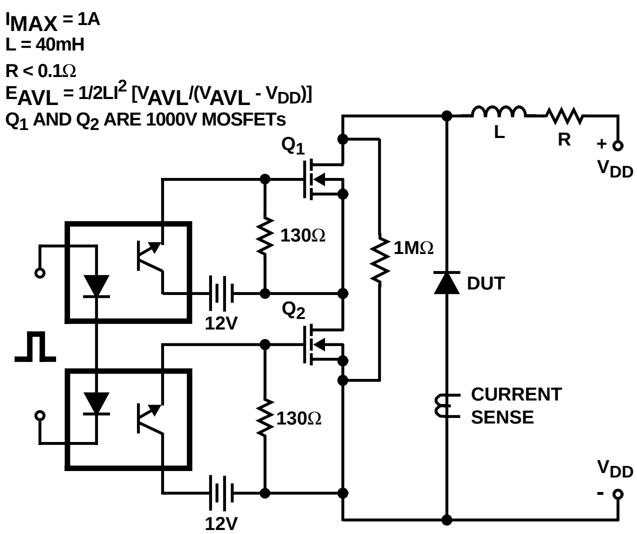


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

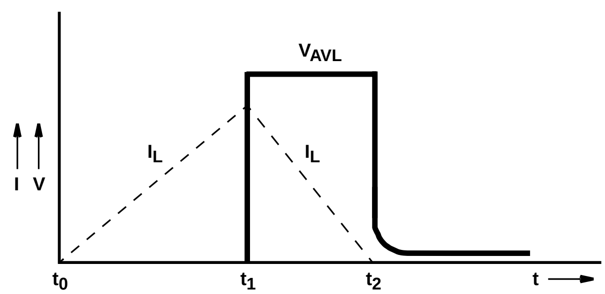


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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