6A, 1200V Hyperfast Diodes

The RHRD6120 and RHRD6120S are hyperfast diodes with soft recovery characteristics (t_{rr} < 55ns). 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.

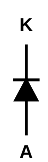
Formerly development type TA49058.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRD6120	TO-251	HR6120
RHRD6120S	TO-252	HR6120

NOTE: When ordering, use the entire part number. Add the suffix 9A to obtain the TO-252 variant in tape and reel, i.e., RHRD6120S9A.

Symbol



Features

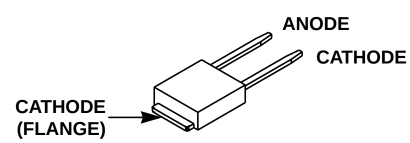
- Hyperfast with Soft Recovery . . . . <55ns
- Operating Temperature. . . . . .175^{o}C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

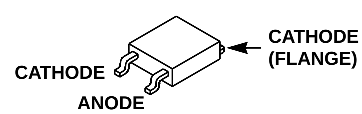
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC STYLE TO-251



JEDEC STYLE TO-252



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

		RHRD6120, RHRD6120S	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 = 130^{o}C)	$I_{F(AV)}$	6	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	12	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	60	A
Maximum Power Dissipation	P_D	50	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	10	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	^{o}C
Maximum Lead Temperature for Soldering			
(Leads at 0.063 in. (1.6mm) from case for 10s)	T_L	300	^{o}C
Package Body for 10s, see Tech Brief 334	T_{PKG}	260	^{o}C

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	$I_F = 6A$	-	-	3.2	V
	$I_F = 6A$, $T_C = 150^oC$	-	-	2.6	V
I_R	$V_R = 1200V$	-	-	100	μA
	$V_R = 1200V$, $T_C = 150^oC$	-	-	500	μA
t_{rr}	$I_F = 1A$, $dI_F/dt = 200A/\mu s$	-	-	55	ns
	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	-	65	ns
t_a	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	33	-	ns
t_b	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	22	-	ns
Q_{RR}	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	210	-	nC
C_J	$V_R = 10V$, $I_F = 0A$	-	22	-	pF
$R_{\theta JC}$		-	-	3	$^oC/W$

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

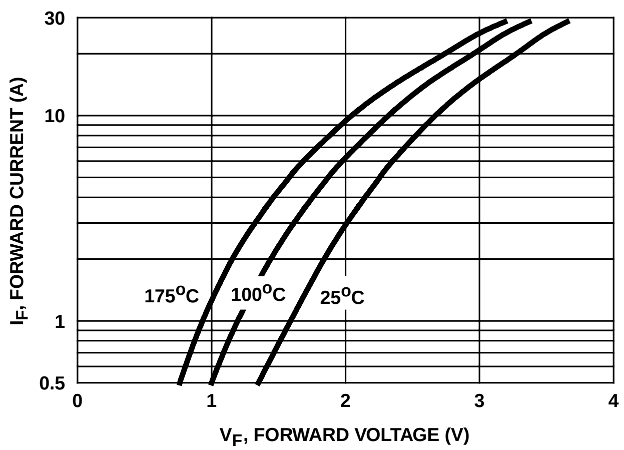


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

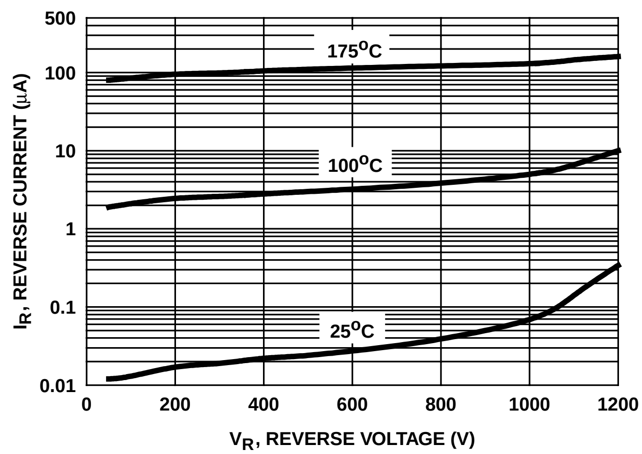


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

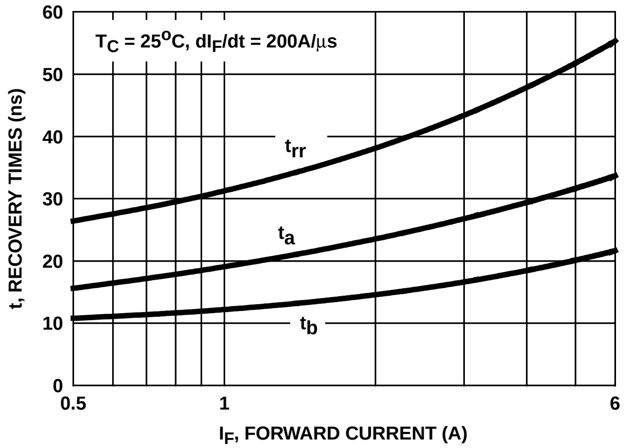


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

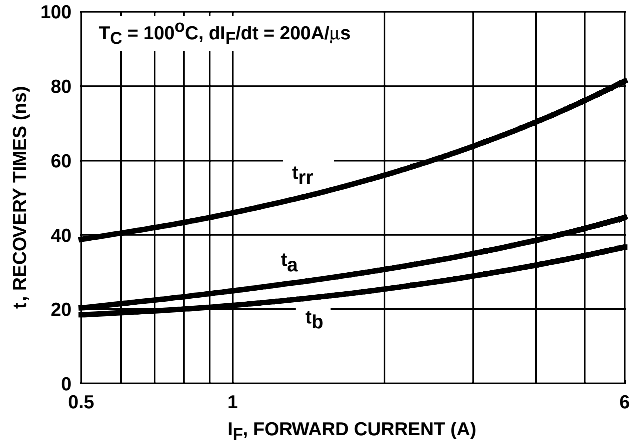


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

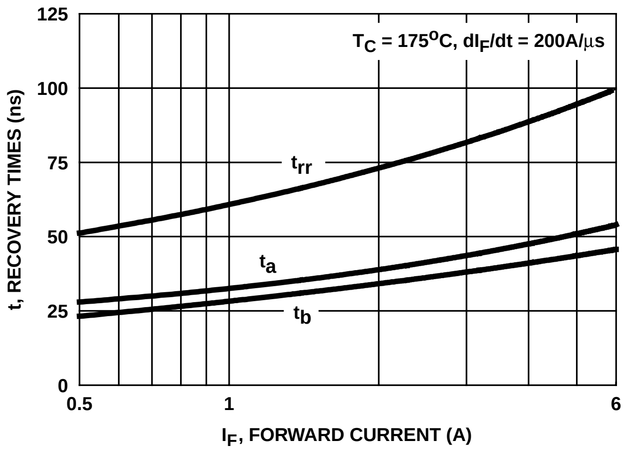


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

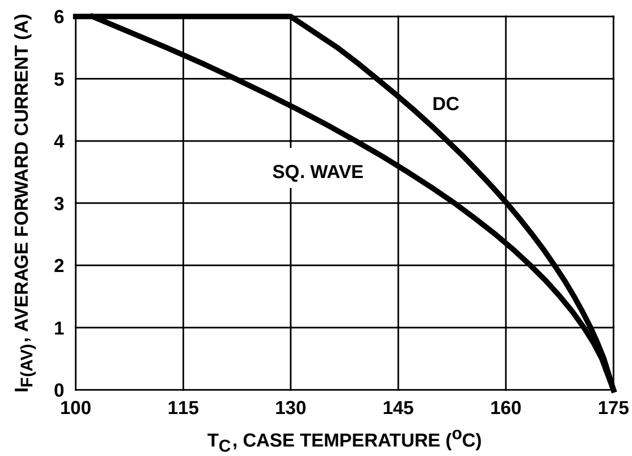


FIGURE 6. CURRENT DERATING CURVE

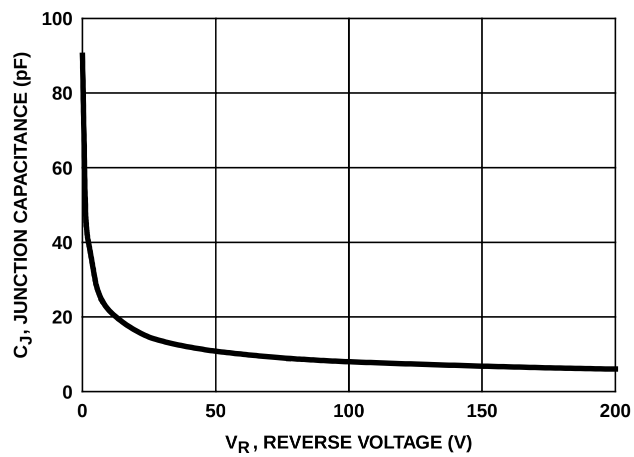


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

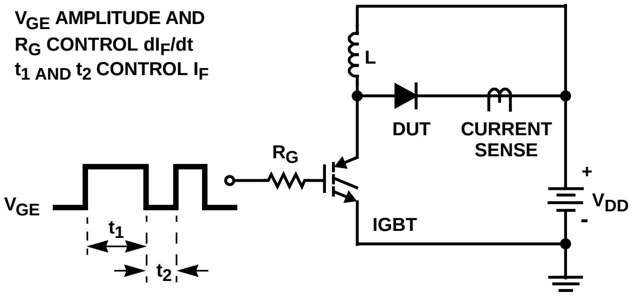


FIGURE 8. t_{rr} TEST CIRCUIT

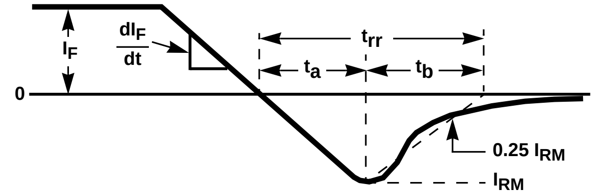


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

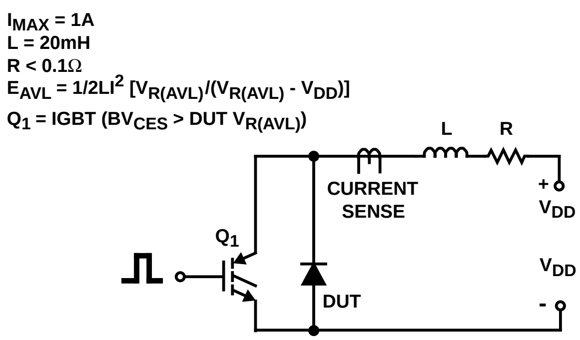


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

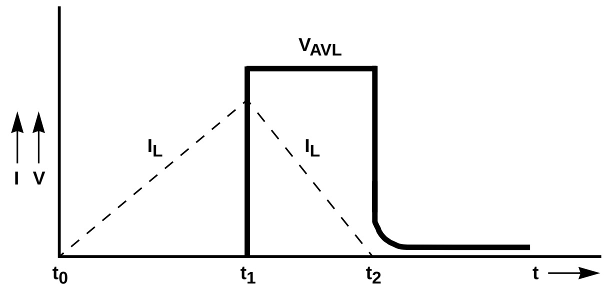


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS