

Data Sheet January 2002

15A, 400V - 600V Hyperfast Diodes

The RHRP1540 and RHRP1560 are hyperfast diodes with soft recovery characteristics ($t_{rr} < 35 \text{ns}$). 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 developmental type TA49061.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRP1540	TO-220AC	RHRP1540
RHRP1560	TO-220AC	RHRP1560

NOTE: When ordering, use the entire part number.

Symbol



Features

•	Hyperfast with Soft Recovery<35ns
•	Operating Temperature
•	Reverse Voltage Up To
•	Avalanche Energy Rated

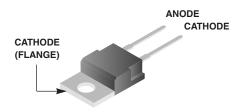
Planar Construction

Applications

- Switching Power Supplies
- · Power Switching Circuits
- · General Purpose

Packaging

JEDEC TO-220AC



Absolute Maximum Ratings T _C = 25°C, Unless Otherwise Specified			
	RHRP1540	RHRP1560	UNITS
Peak Repetitive Reverse Voltage	400	600	V
Working Peak Reverse Voltage	400	600	V
DC Blocking VoltageV _R	400	600	V
Average Rectified Forward Current	15	15	Α
Repetitive Peak Surge CurrentI _{FRM} (Square Wave, 20kHz)	30	30	Α
Nonrepetitive Peak Surge Current	200	200	Α
Maximum Power Dissipation	100	100	W
Avalanche Energy (See Figures 10 and 11)	20	20	mJ
Operating and Storage Temperature	-65 to 175	-65 to 175	οС

RHRP1540, RHRP1560

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

			RHRP1540		RHRP1560			
SYMBOL	TEST CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
V _F	I _F = 15A	-	-	2.1	-	-	2.1	V
	I _F = 15A, T _C = 150°C	-	-	1.7	-	-	1.7	V
I _R	V _R = 400V	-	-	100	-	-	-	μА
	V _R = 600V	-	-	-	-	-	100	μА
	V _R = 400V, T _C = 150°C	-	-	500	-	-	-	μА
	V _R = 600V, T _C = 150°C	-	-	-	-	-	500	μА
t _{rr}	$I_F = 1A$, $dI_F/dt = 100A/\mu s$	-	-	35	-	-	35	ns
	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	-	40	-	-	40	ns
t _a	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	20	-	-	20	-	ns
t _b	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	15	-	-	15	-	ns
Q _{RR}	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	40	-	-	40	-	nC
СЈ	V _R = 10V, I _F = 0A	-	60	-	-	60	-	pF
$R_{ heta JC}$		-	-	1.5	-	-	1.5	°C/W

DEFINITIONS

 V_F = Instantaneous forward voltage (pw = 300 μ s, 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 Change.

 C_J = Junction Capacitance.

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

pw = Pulse Width.

D = Duty Cycle.

Typical Performance Curves

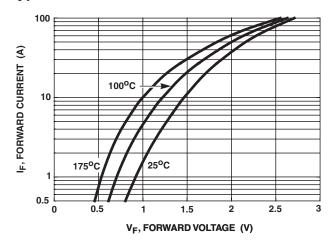


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

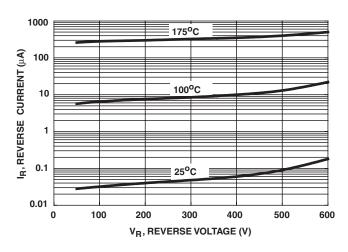


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

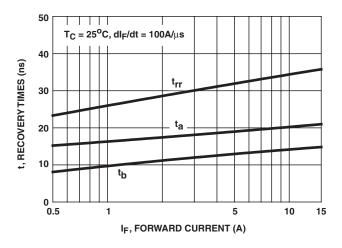


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

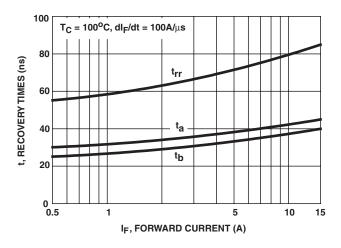


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

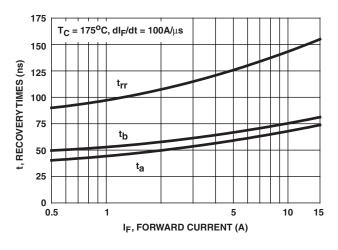


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

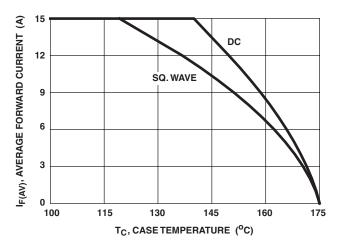


FIGURE 6. CURRENT DERATING CURVE

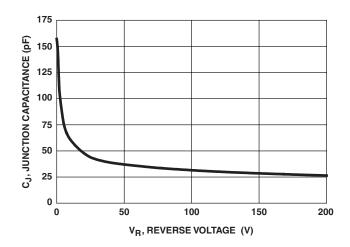


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

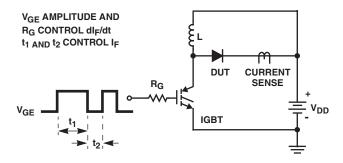


FIGURE 8. t_{rr} TEST CIRCUIT

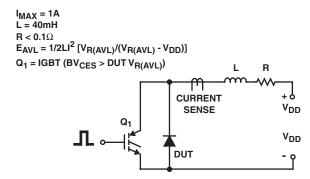


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

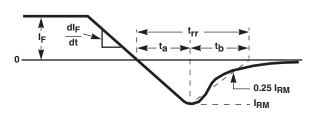


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

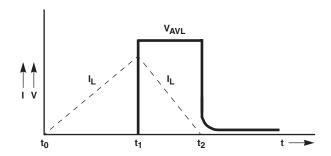


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
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