

# RHRP3060

## 30A, 600V Hyperfast Diodes

### Features

- Hyperfast with Soft Recovery ..... <40ns
- Operating Temperature ..... 175°C
- Reverse Voltage Up To ..... 600V
- Avalanche Energy Rated
- Planar Construction

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Ordering Informations

Part Number	Package	Brand
RHRP3060	TO-220AC	RHRP3060

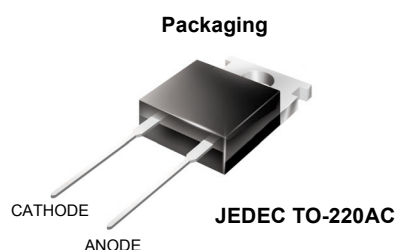
Note: When ordering, use the entire part number.

### Description

The RHRP3060 are hypersast diodes with soft recovery characteristics ( $t_{rr} < 40ns$ ). They have half the recovery time of ultrafast diodes and are of 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, thus reducing power loss in the switching transistors.

Formerly developmental type TA49063.



### Symbol



### Absolute Maximum Ratings

Symbol	Parameter	RHRP3060	Units
$V_{RRM}$	Peak Repetitive Reverse Voltage	600	V
$V_{RWM}$	Working Peak Reverse Voltage	600	V
$V_R$	DC Blocking Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current ( $T_C = 120^\circ C$ )	30	A
$I_{FRM}$	Repetitive Peak Surge Current (Square Wave, 20KHz)	70	A
$I_{FSM}$	Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	325	A
$P_D$	Maximum Power Dissipation	125	W
$E_{AVL}$	Avalanche Energy (See Figures 10 and 11)	20	mJ
$T_J, T_{STG}$	Operating and Storage Temperature	-65 to 175	$^\circ C$

# Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Test Conditions	RHRP3060			Units
		Min.	Typ.	Max.	
$V_F$	$I_F = 30\text{A}$	-	-	2.1	V
	$I_F = 30\text{A}, T_C = 150^\circ\text{C}$	-	-	1.7	V
$I_R$	$V_R = 400\text{V}$	-	-	-	$\mu\text{A}$
	$V_R = 600\text{V}$	-	-	250	$\mu\text{A}$
	$V_R = 400\text{V}, T_C = 150^\circ\text{C}$	-	-	-	mA
	$V_R = 600\text{V}, T_C = 150^\circ\text{C}$	-	-	1.0	mA
$t_{rr}$	$I_F = 1\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$	-	-	40	ns
	$I_F = 30\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$	-	-	45	ns
$t_a$	$I_F = 30\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$	-	22	-	ns
$t_b$	$I_F = 30\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$	-	18	-	ns
$Q_{RR}$	$I_F = 30\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$	-	100	-	nC
$C_J$	$V_R = 600\text{V}, I_F = 0\text{A}$	-	85	-	pF
$R_{\theta JC}$		-	-	1.2	$^\circ\text{C}/\text{W}$

## DEFINITIONS

$V_F$  = Instantaneous forward voltage ( $p_w = 300\mu\text{s}$ ,  $D = 2\%$ )

$I_R$  = 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 charge.

$C_J$  = Junction Capacitance.

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

$p_w$  = pulse width.

$D$  = Duty cycle.

# Typical Performance Characteristics

Figure 1. Forward Current vs Forward Voltage

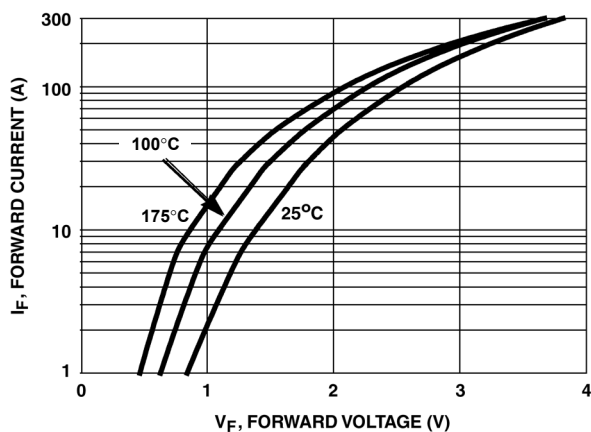


Figure 2. Reverse Currnt vs Reverse Voltage

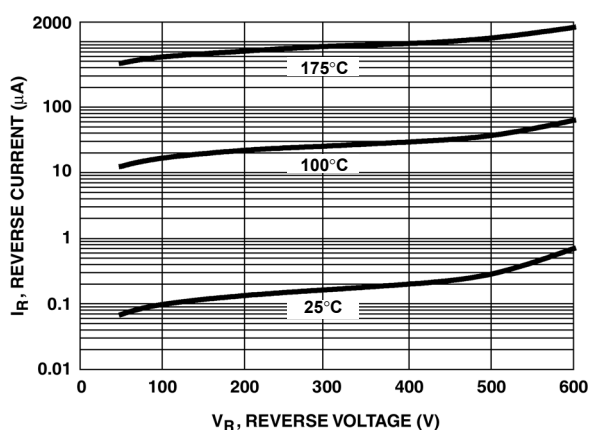


Figure 3.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs Forward Current

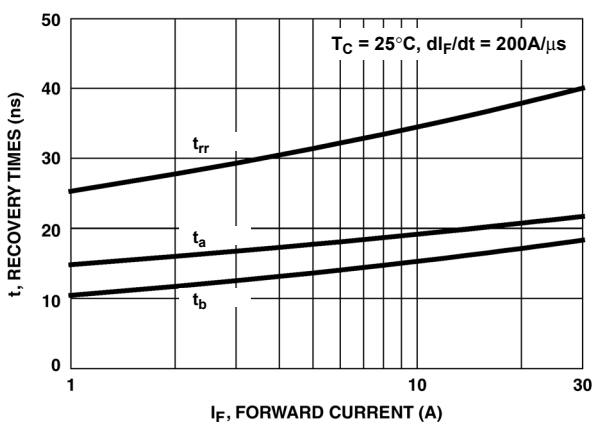


Figure 4.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs Forward Current

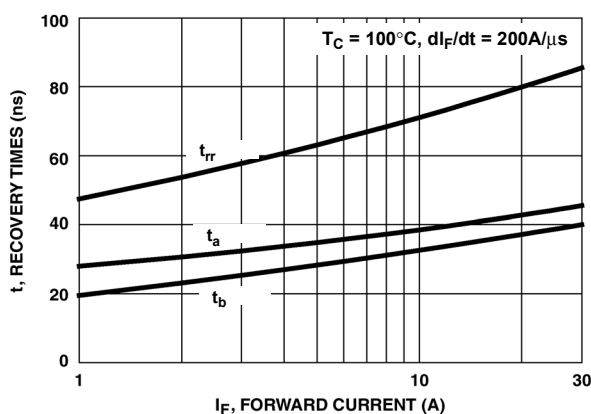


Figure 5.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs Forward Current

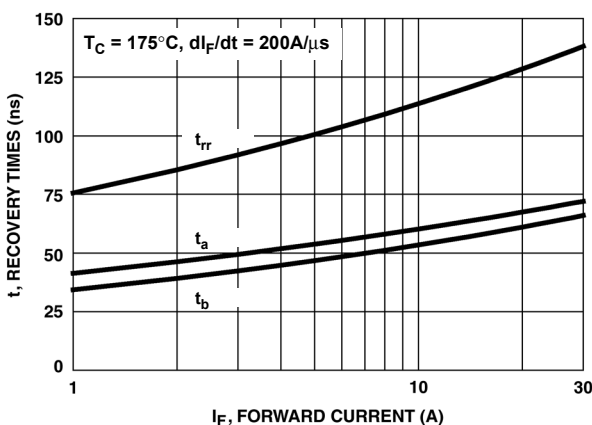
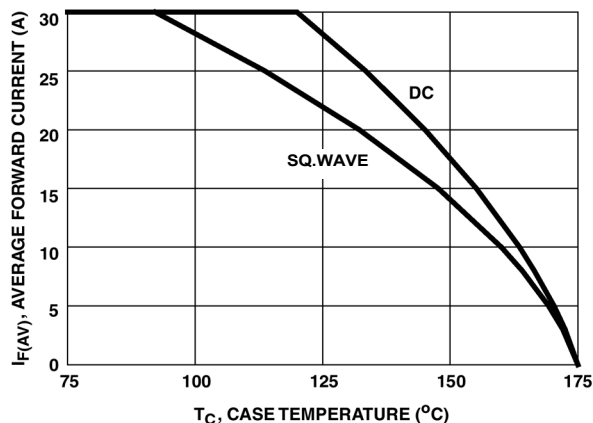
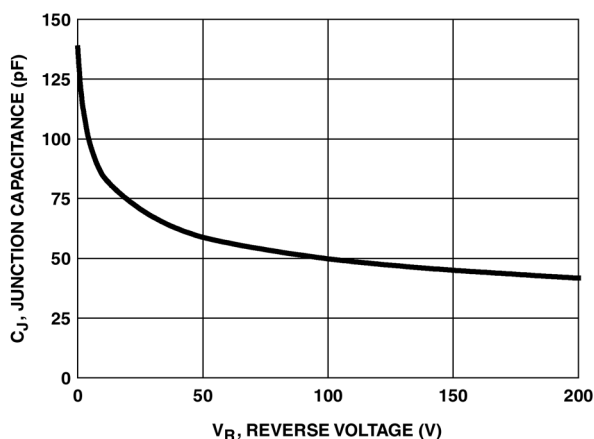


Figure 6. Current Derating Curve



## Typical Performance Characteristics (Continued)

Figure 7. Junction Capacitance vs Reverse Voltage



## Test Circuit and Waveforms

Figure 8.  $t_{rr}$  Test Circuit

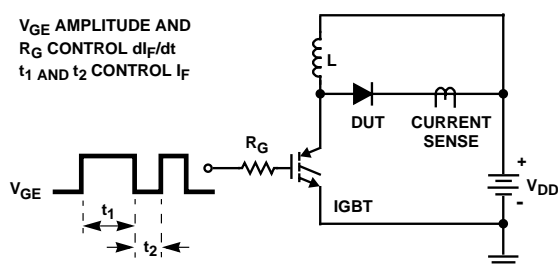


Figure 9.  $t_{rr}$  Waveforms and Definitions

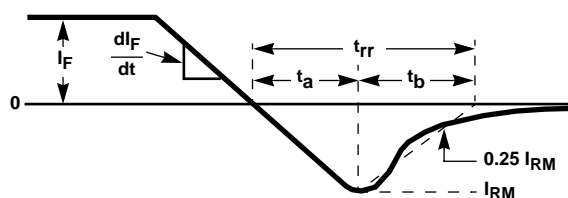


Figure 10. Avalanche Energy Test Circuit

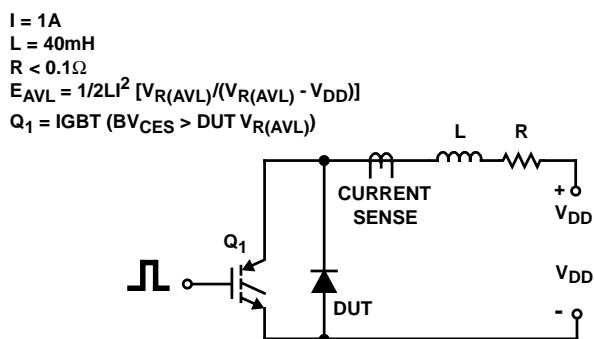
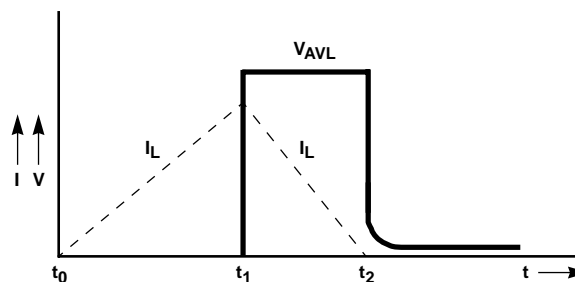


Figure 11. Avalanche Current and Voltage Waveforms



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