April 2005

FAIRCHILD SEMICONDUCTOR®

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 opdering, use the entire part number.

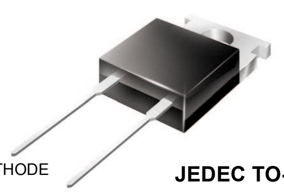
Description

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.

Packaging



JEDEC TO-220AC

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°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	°C

Electrical Characteristics T_C = 25°C unless otherwise noted

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

Figure 1. Forward Current vs Forward Voltage

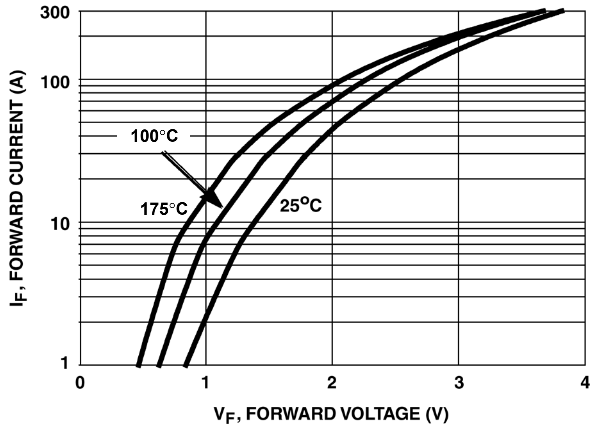


Figure 2. Reverse Currnt vs Reverse Voltage

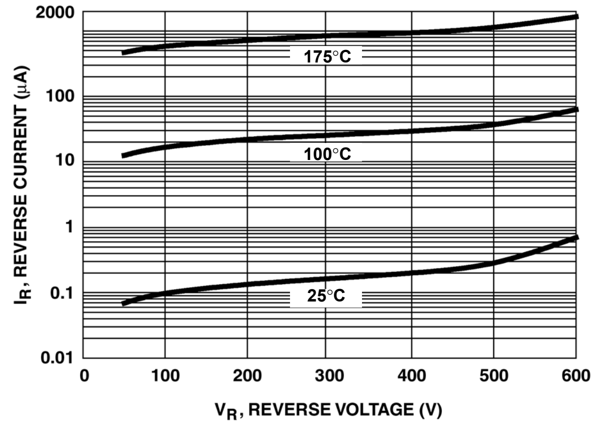


Figure 3. t_{rr}, t_a and t_b Curves vs Forward Current

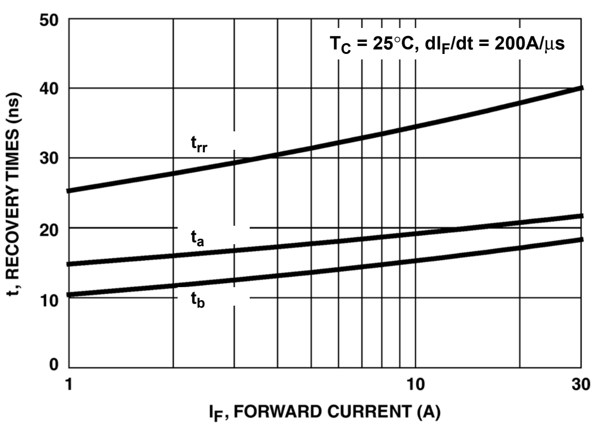


Figure 4. t_{rr}, t_a and t_b Curves vs Forward Current

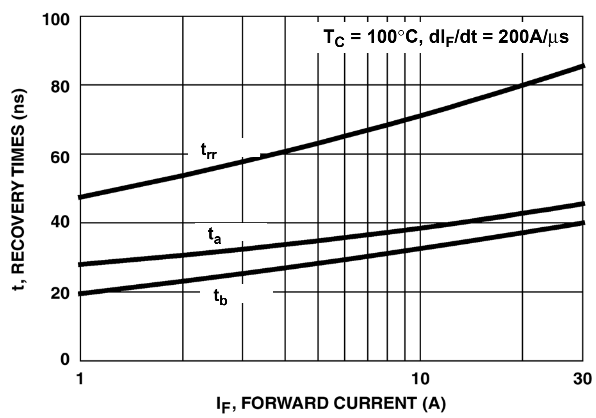


Figure 5. t_{rr}, t_a and t_b Curves vs Forward Current

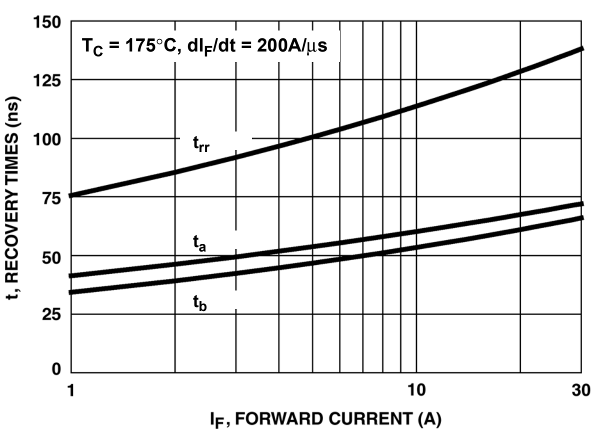
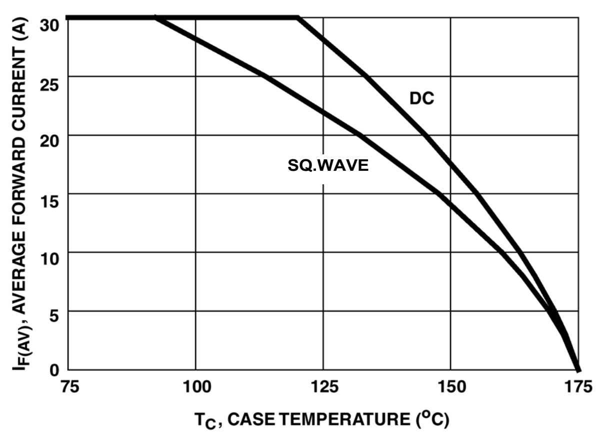
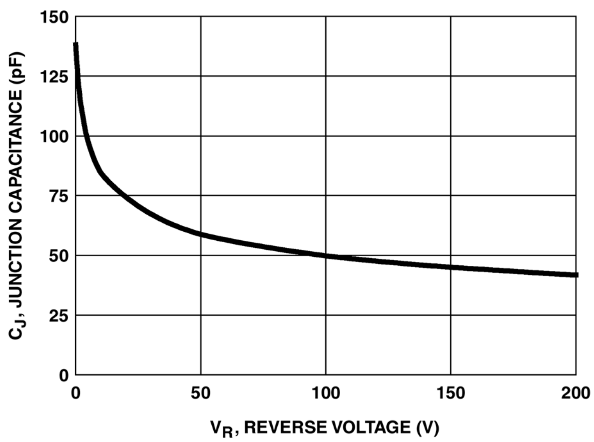


Figure 6. Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Junction Capacitance vs Reverse Voltage



Test Circuit and Waveforms

Figure 8. t_{rr} Test Circuit

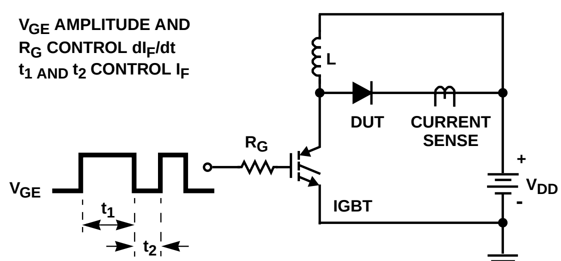


Figure 9. t_{rr} Waveforms and Definitions

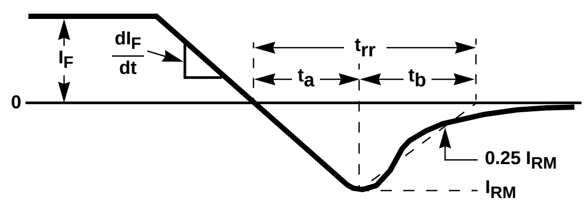


Figure 10. Avalanche Energy Test Circuit

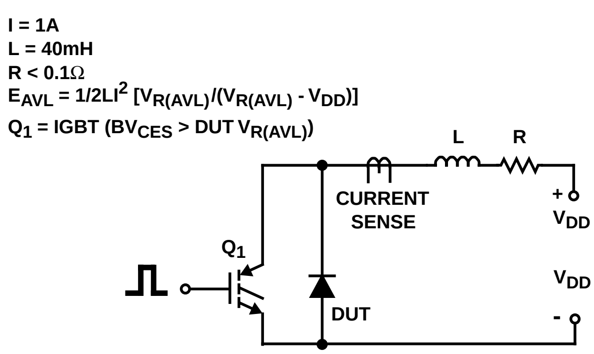
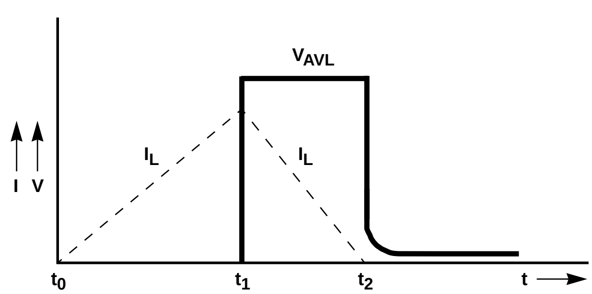


Figure 11. Avalanche Current and Voltage Waveforms



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FACT Quiet Series™		OCXPro™	RapidConnect™	UHC™
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