ON Semiconductor

Is Now

To learn more about onsemi™, please visit our website at
www.onsemi.com

ON Semiconductor®

RHRP3060

30 A, 600 V Hyperfast Diodes

Features

- Hyperfast Recovery t_{rr} = 45 ns (@ I_F = 30 A)
- Max Forward Voltage, V_F = 2.1 V (@ T_C = 25°C)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Description

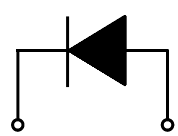
The RHRP3060 is a hyperfast diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ion-implanted epitaxial planar construction. These devices are intended to be used as freewheeling clamping diodes and diodes in a variety of switching 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 Informations

Part Number	Package	Brand
RHRP3060	TO-220AC 2L	RHRP3060

Pin Assignments

1 2 TO-220



1. Cathode 2. Anode

Absolute Maximum Ratings

Symbol	Parameter	RHRP3060	Unit
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			Unit
		Min.	Typ.	Max.	
V_F	I_F = 30 A	-	-	2.1	V
	I_F = 30 A, T_C = 150°C	-	-	1.7	V
I_R	V_R = 400 V	-	-	-	μA
	V_R = 600 V	-	-	250	μA
	V_R = 400 V, T_C = 150°C	-	-	-	mA
	V_R = 600 V, T_C = 150°C	-	-	1.0	mA
t_{rr}	I_F = 1 A, dI_F/dt = 200 A/μs	-	-	40	ns
	I_F = 30 A, dI_F/dt = 200 A/μs	-	-	45	ns
t_a	I_F = 30 A, dI_F/dt = 200 A/μs	-	22	-	ns
t_b	I_F = 30 A, dI_F/dt = 200 A/μs	-	18	[illegible]	ns
Q_{RR}	I_F = 30 A, dI_F/dt = 200 A/μs	-	100	-	nC
C_J	V_R = 600 V, I_F = 0 A	-	[illegible]	[illegible]	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

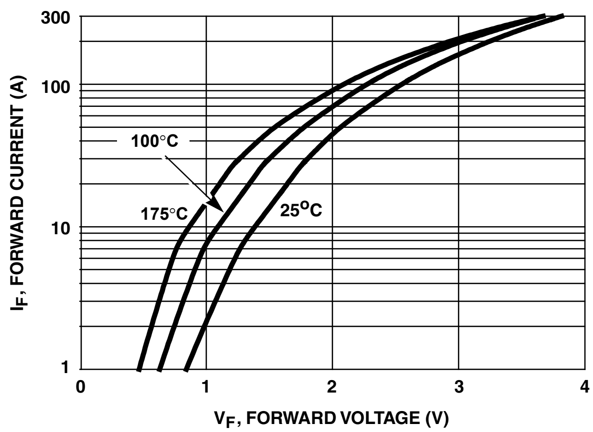


Figure 2. Reverse Currnt vs Reverse Voltage

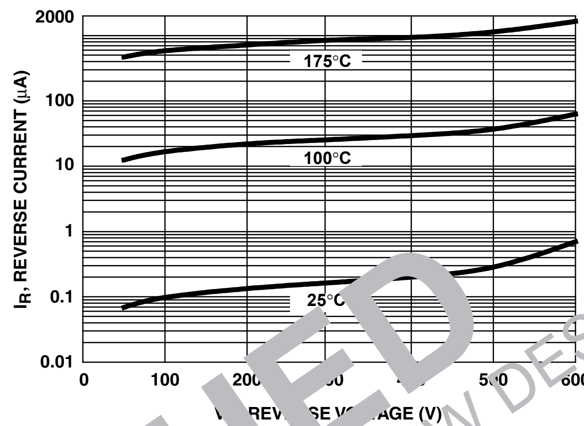


Figure 3. t_{rr}, t_a and t_b Curves vs Forward Current

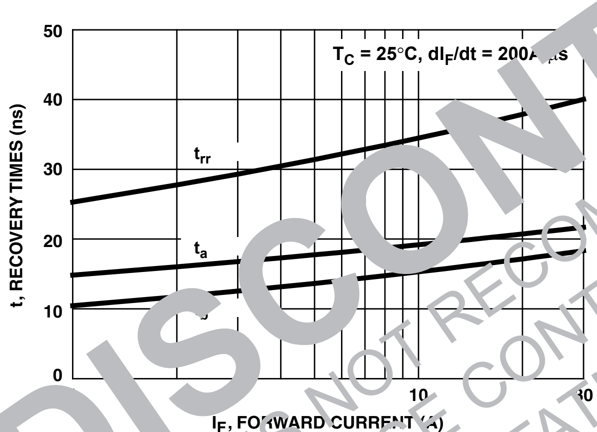


Figure 4. t_{rr}, t_a and t_b Curves vs Forward Current

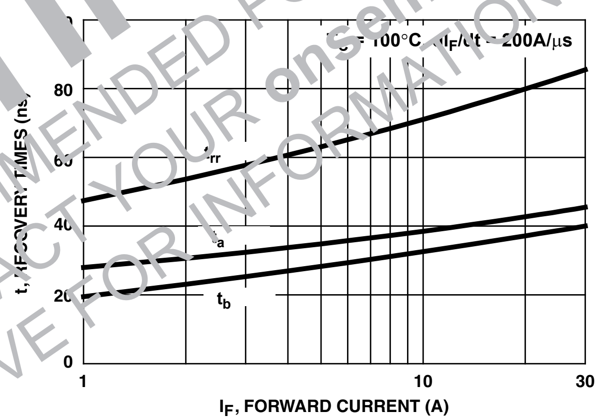


Figure 5. t_{rr}, t_a and t_b Curves vs Forward Current

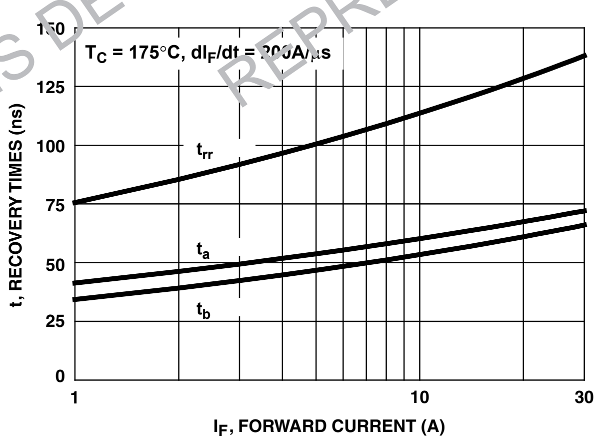
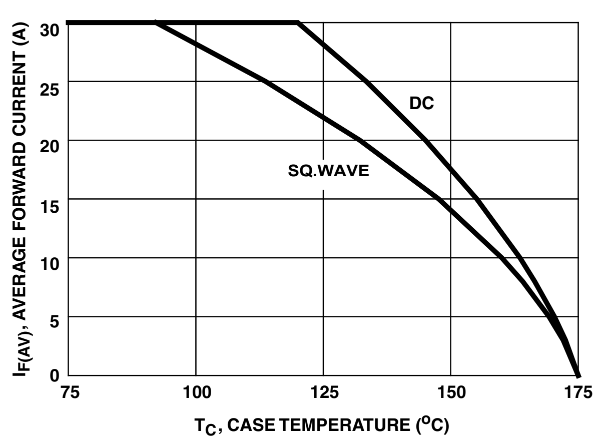
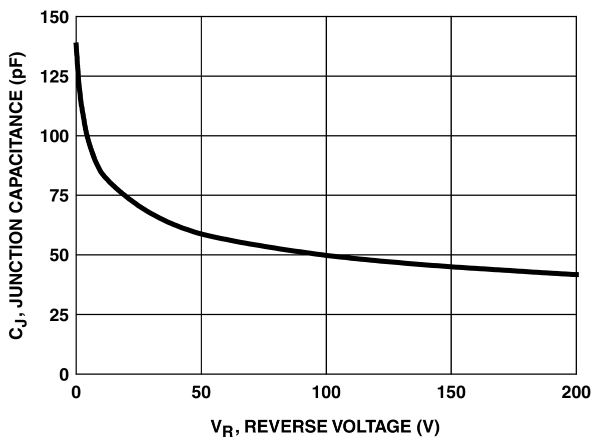


Figure 6. Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Junction Capacitance vs Reverse Voltage



Test Circuit and Waveforms

Figure 8. t_{rr} Test Circuit

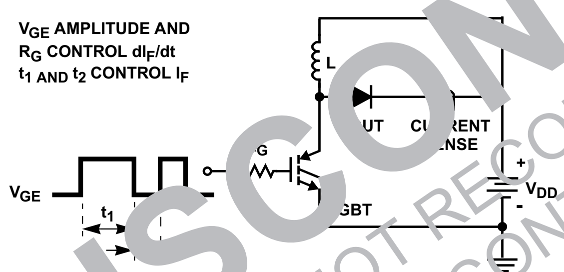


Figure 9. t_{rr} Waveforms and Definitions

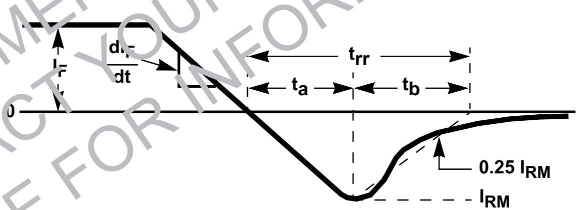


Figure 10. Avalanche Energy Test Circuit

I = 1A
L = 40mH
R < 0.1Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

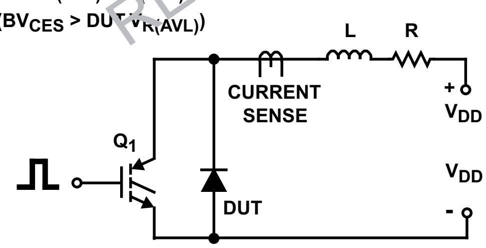
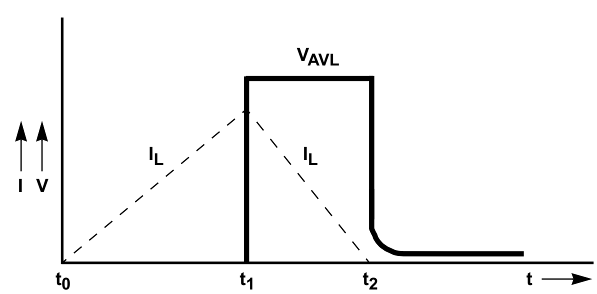


Figure 11. Avalanche Current and Voltage Waveforms



PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative