FAIRCHILD SEMICONDUCTOR®

RHRD660S

Data Sheet **November 2013**

6 A, 600 V, Hyperfast Diode

The RHRD660S9A is a hyperfast diodes with soft recovery characteristics. It has the half recovery time of Ultrafast diodes and is silicon nitride passivated ionimplanted 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.

Features

- Hyperfast Recovery t_{rr} = 35 ns (@ I_F = 6 A)
- Max Forward Voltage, V_F = 2.6 V (@ T_C = 25°C)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS compliant

Applications

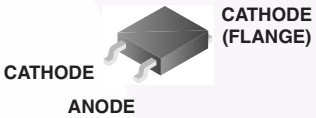
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRD660S	TO-252-3L	RHR660

Packaging

JEDEC STYLE TO-252



Symbol

Absolute Maximum Ratings T_C = 25°C, Unless Otherwise Specified

		RATING	UNIT
Peak Repetitive Reverse Voltage	V_{RRM}	600	V
Working Peak Reverse Voltage	V_{RWM}	600	V
DC Blocking Voltage	V_R	600	V
Average Rectified Forward Current (T_C = 152°C)	$I_{F(AV)}$	6	A
Repetitive Peak Surge Current (Square Wave, 20 kHz)	I_{FRM}	12	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60 Hz)	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	°C
Maximum Lead Temperature for Soldering (Leads at 0.063 in. (1.6 mm) from case for 10 s)	T_L	300	°C
Package Body for 10s, see Tech Brief 334	T_{PKG}	260	°C

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
V_F	I_F = 6 A	-	-	2.1	V
	I_F = 6 A, $T_C = 150^oC$	-	-	1.7	V
I_R	V_R = 600 V	-	-	100	μA
	V_R = 600 V, $T_C = 150^oC$	-	-	500	μA
t_{rr}	I_F = 1 A, dI_F/dt = 200 A/μs	-	-	30	ns
	I_F = 6 A, dI_F/dt = 200 A/μs	-	-	35	ns
t_a	I_F = 6 A, dI_F/dt = 200 A/μs	-	16	-	ns
t_b	I_F = 6 A, dI_F/dt = 200 A/μs	-	8.5	-	ns
Q_{rr}	I_F = 6 A, dI_F/dt = 200 A/μs	-	45	-	nC
C_J	V_R = 10 V, I_F = 0 A	-	20	-	pF
$R_{\theta JC}$		-	-	3	$^oC/W$

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300 μs, 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

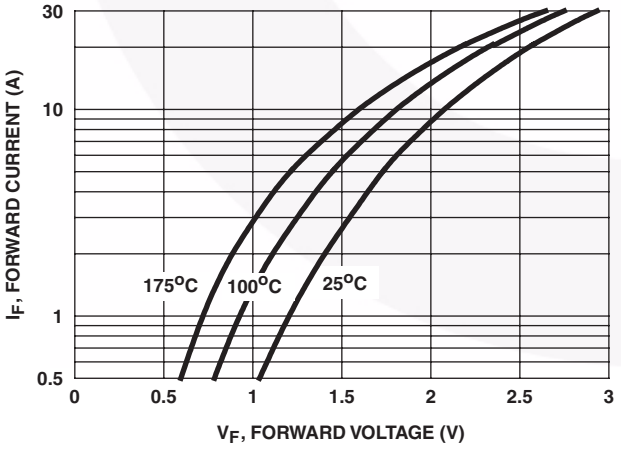


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

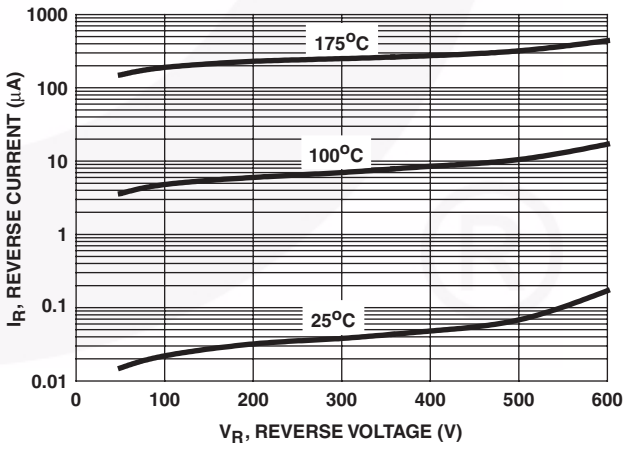


FIGURE 2. REVERSE CURRENT vs REVERSE

Typical Performance Curves (Continued)

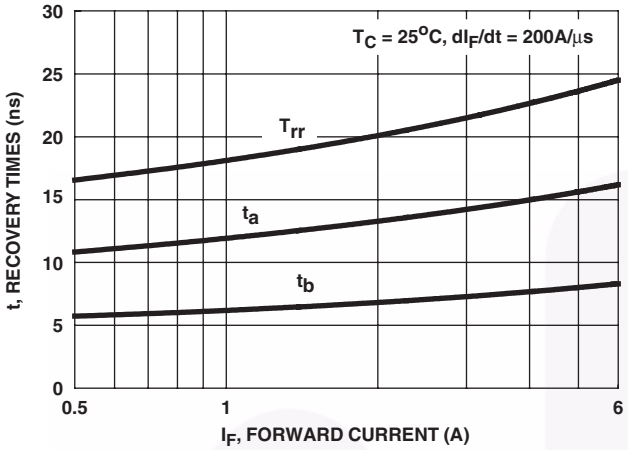


FIGURE 3. T_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

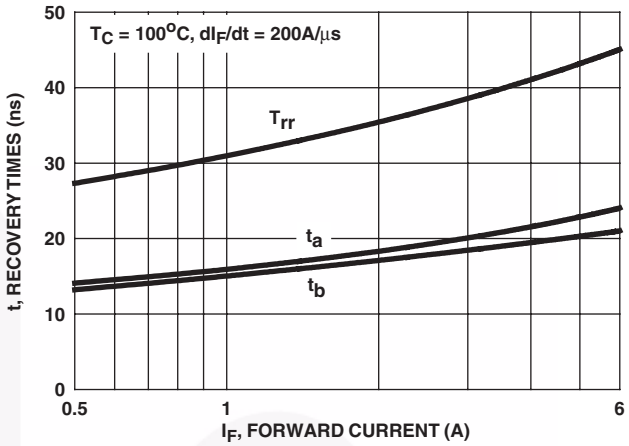


FIGURE 4. T_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

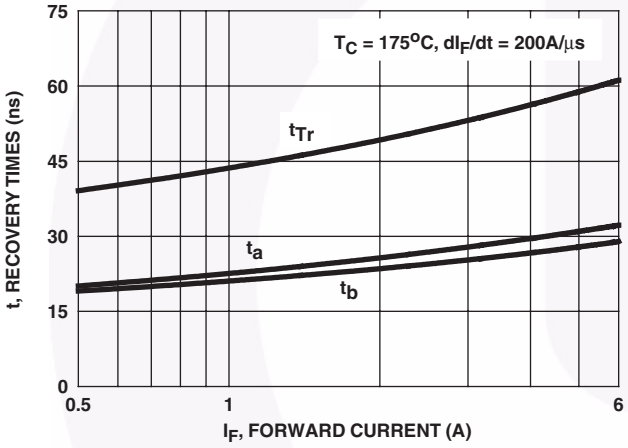


FIGURE 5. T_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

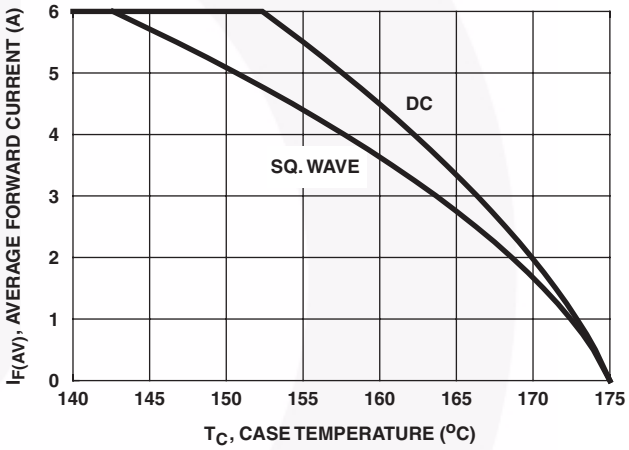


FIGURE 6. CURRENT DERATING CURVE

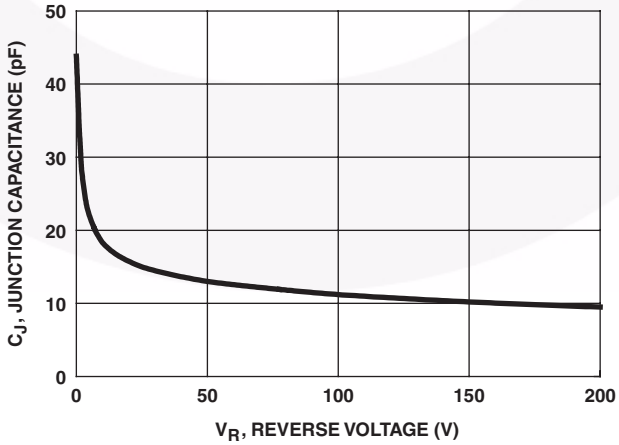


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

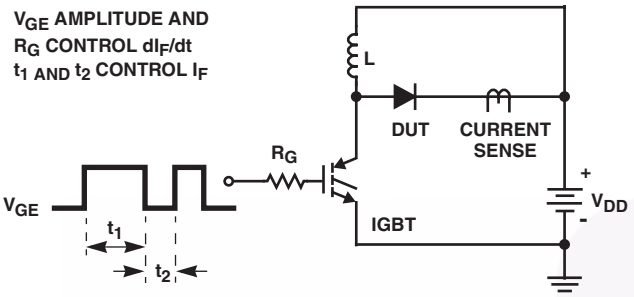


FIGURE 8. T_{rr} TEST CIRCUIT

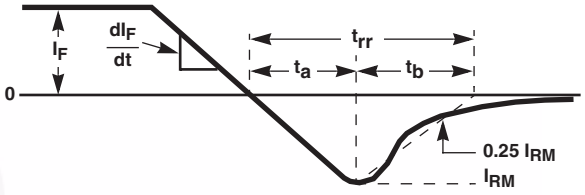


FIGURE 9. T_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 20mH
R < 0.1Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

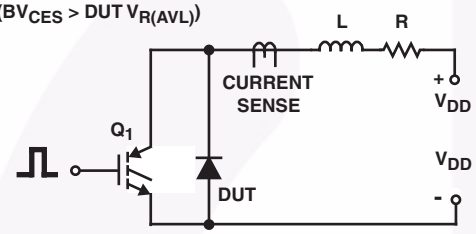


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

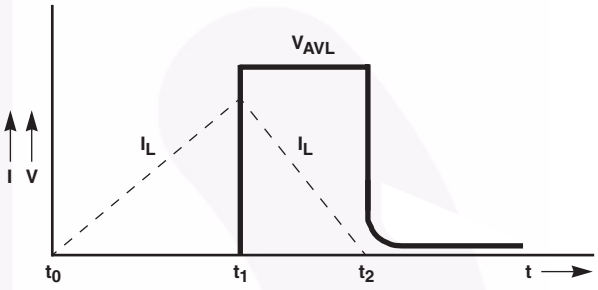


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

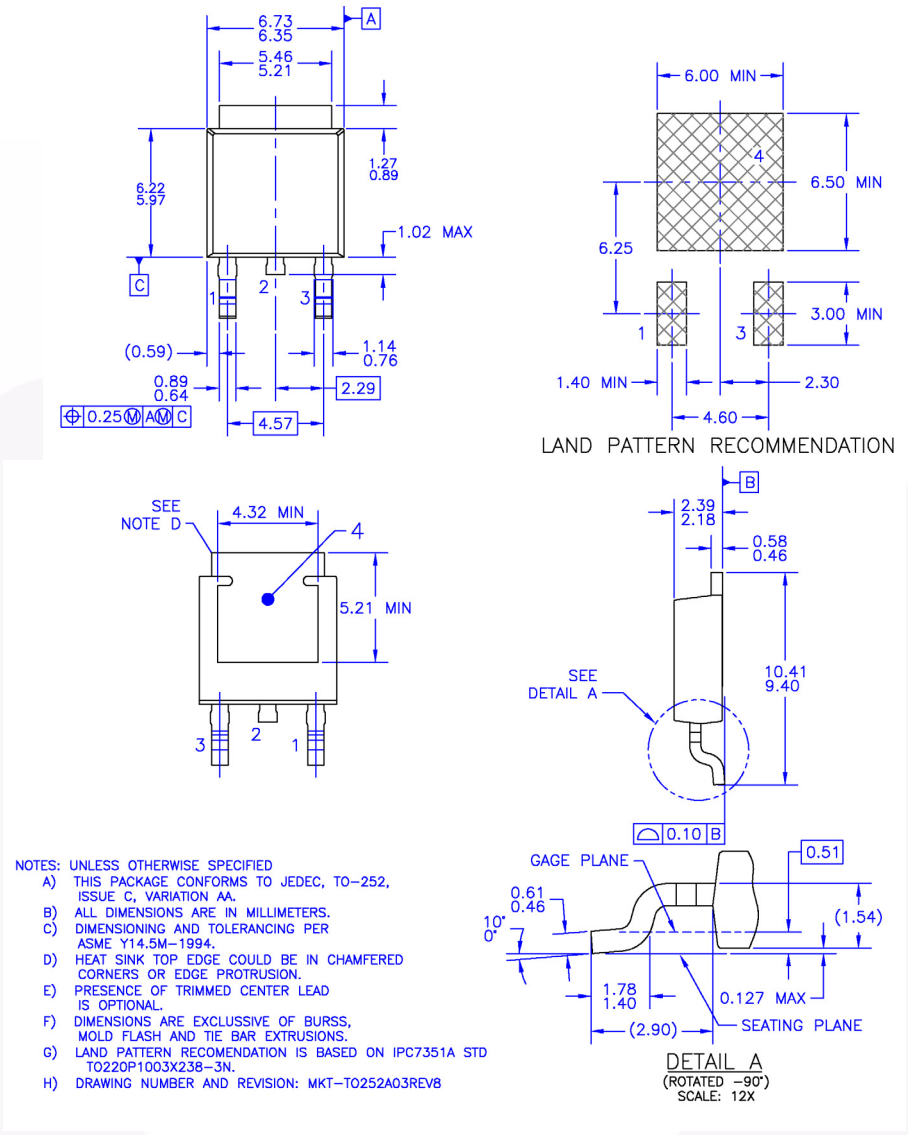


Figure 12. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD,OPTION AA&AB

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