ON Semiconductor®

RHRD660S9A-F085

Data Sheet *May 2013*

6A, 600V Hyperfast Diodes

The RHRD660S9A-F085 is hyperfast diodes with soft recovery characteristics (t_{rr} < 30ns). It has half the recovery time of ultrafast diodes and are silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as freewheeling/ clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Its 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 TA49057.

Features

- Hyperfast with Soft Recovery . . . . <30ns
- Operating Temperature . . . . 175°C
- Reverse Voltage Up To 600V
- Avalanche Energy Rated
- Planar Construction
- Qualified to AEC Q101
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

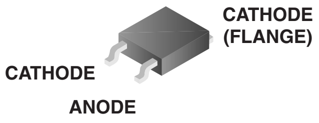
Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRD660S9A-F085	TO-252	RHR660

Symbol

Packaging

JEDEC STYLE TO-252



Absolute Maximum Ratings $T_C = 25^oC$, Unless Otherwise Specified

		RHRD660S9A-F085	UNITS
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 ($T_C = 152^oC$)	$I_{F(AV)}$	6	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	12	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	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	-55 to 175	°C
Maximum Lead Temperature for Soldering			
(Leads at 0.063 in. (1.6mm) from case for 10s)	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	UNITS
V_F	$I_F = 6A$	-	-	2.1	V
	$I_F = 6A$, $T_C = 150^oC$	-	-	1.7	V
I_R	$V_R = 600V$	-	-	100	μA
	$V_R = 600V$, $T_C = 150^oC$	-	-	500	μA
t_{rr}	$I_F = 1A$, $dI_F/dt = 200A/\mu s$	-	-	30	ns
	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	-	35	ns
t_a	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	16	-	ns
t_b	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	8.5	-	ns
Q_{RR}	$I_F = 6A$, $dI_F/dt = 200A/\mu s$	-	45	-	nC
C_J	$V_R = 10V$, $I_F = 0A$	-	20	-	pF
$R_{\theta JC}$		-	-	3	$^oC/W$

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 Curves

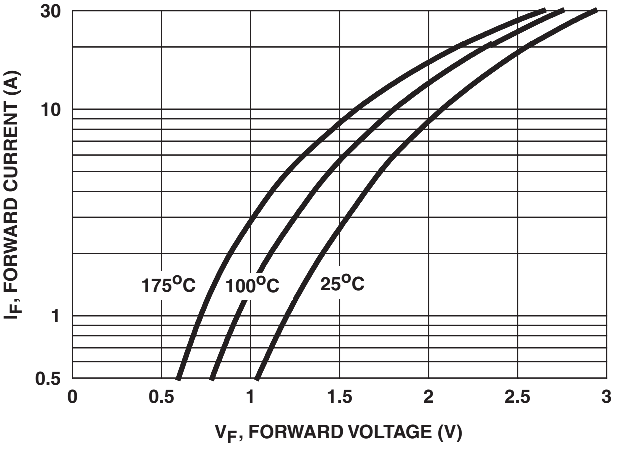


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

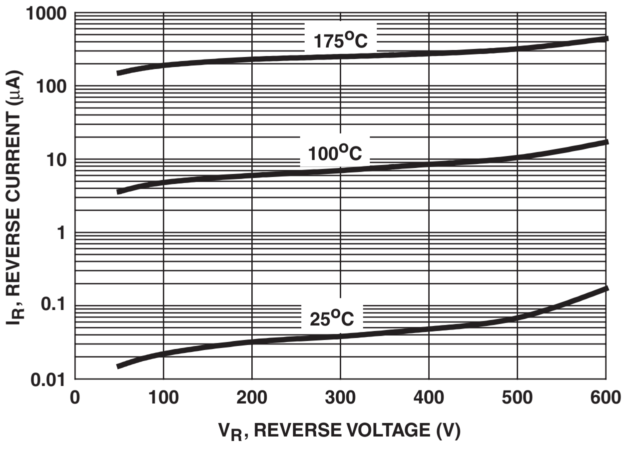


FIGURE 2. REVERSE CURRENT vs REVERSE

Typical Performance Curves (Continued)

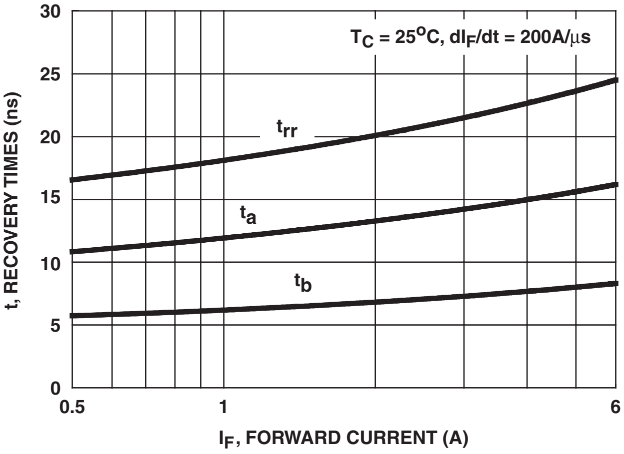


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

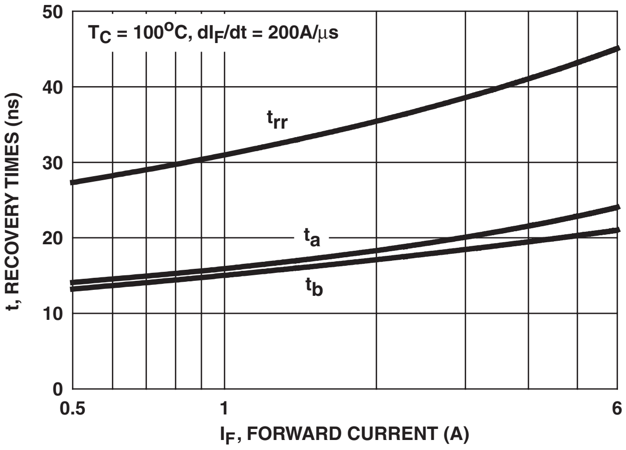


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

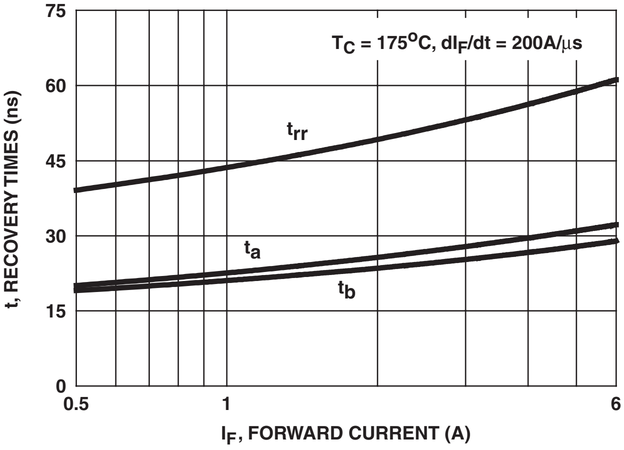


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

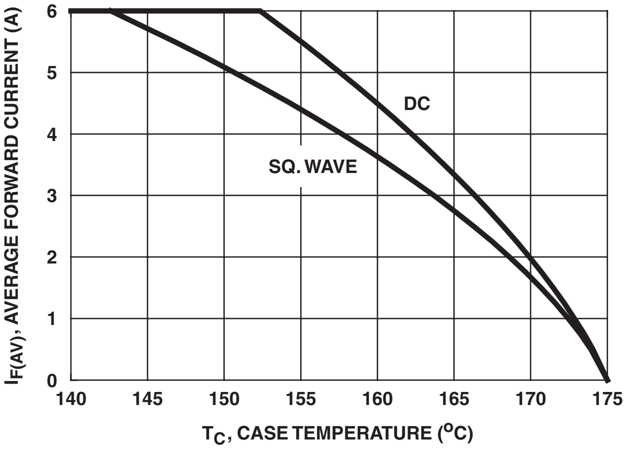


FIGURE 6. CURRENT DERATING CURVE

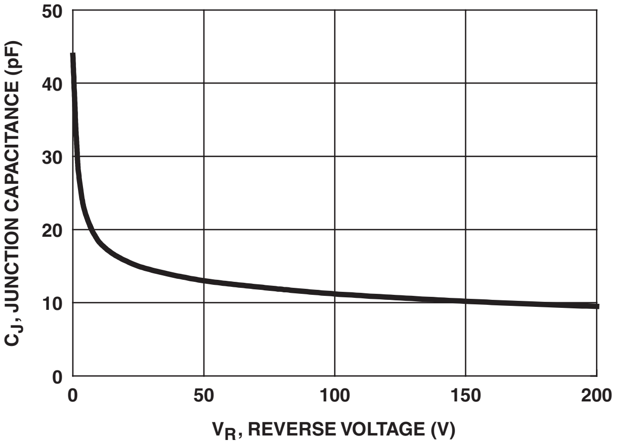


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

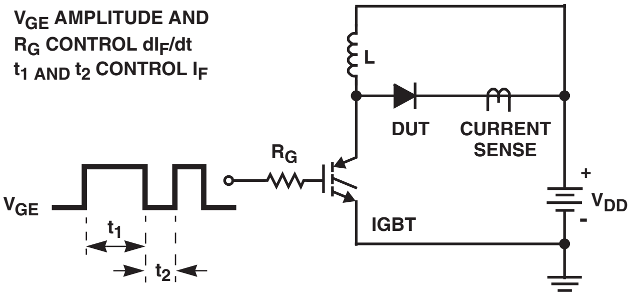


FIGURE 8. t_{rr} TEST CIRCUIT

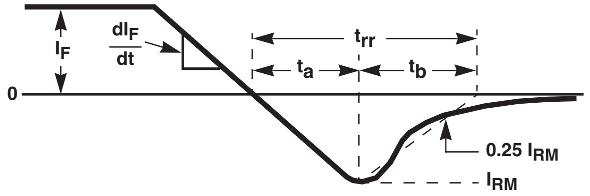


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

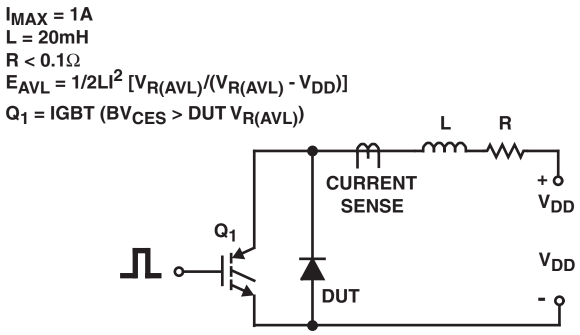


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

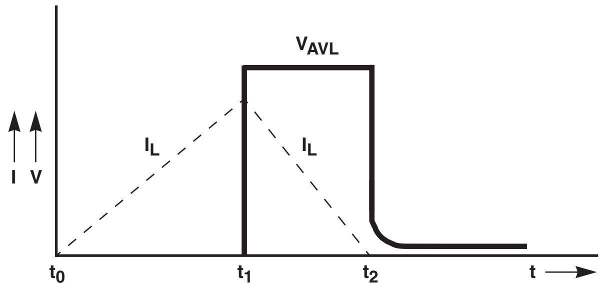


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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