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6A, 600V Hyperfast Diodes

The RHRD660S9A-F085 is hyperfast diodes with soft recovery characteristics (trr < 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

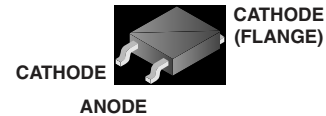
Table with 3 columns: PART NUMBER, PACKAGE, BRAND. Row 1: RHRD660S9A-F085, TO-252, RHR660

Symbol



Packaging

JEDEC STYLE TO-252



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

Table with 4 columns: Parameter, Symbol, RHRD660S9A-F085, UNITS. Rows include Peak Repetitive Reverse Voltage, Working Peak Reverse Voltage, DC Blocking Voltage, Average Rectified Forward Current, Repetitive Peak Surge Current, Nonrepetitive Peak Surge Current, Maximum Power Dissipation, Avalanche Energy, Operating and Storage Temperature, Maximum Lead Temperature for Soldering.

Electrical Specifications $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

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

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 Curves

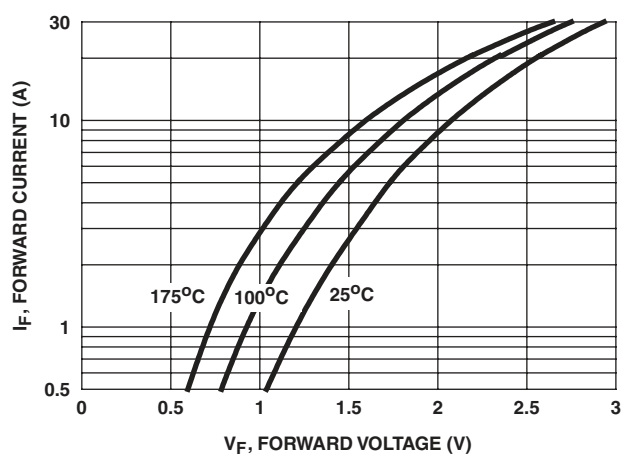


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

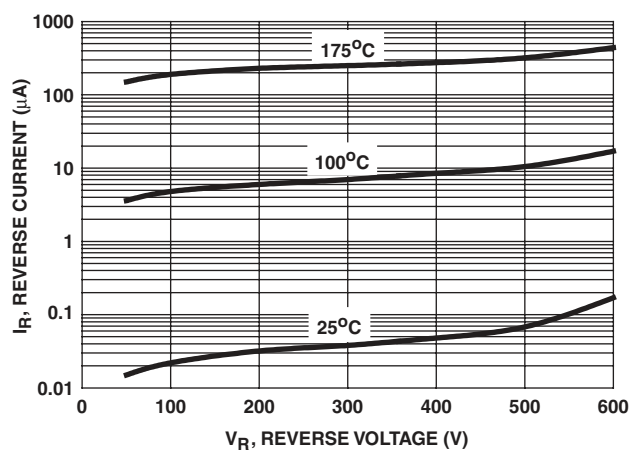


FIGURE 2. REVERSE CURRENT vs REVERSE

Typical Performance Curves (Continued)

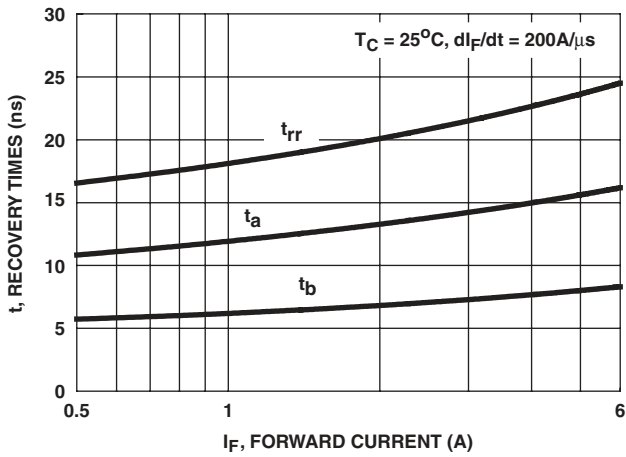


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

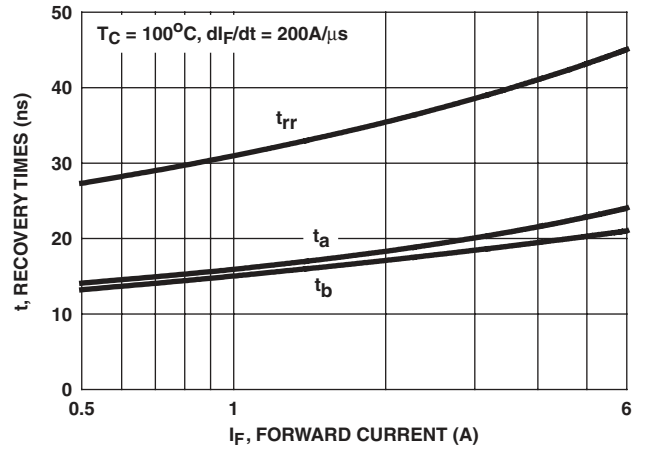


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

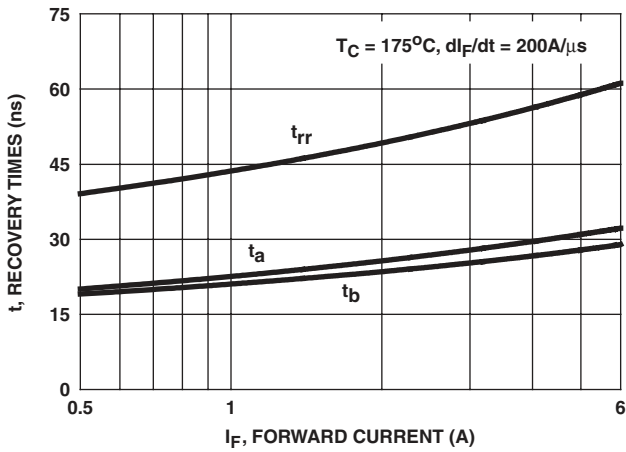


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

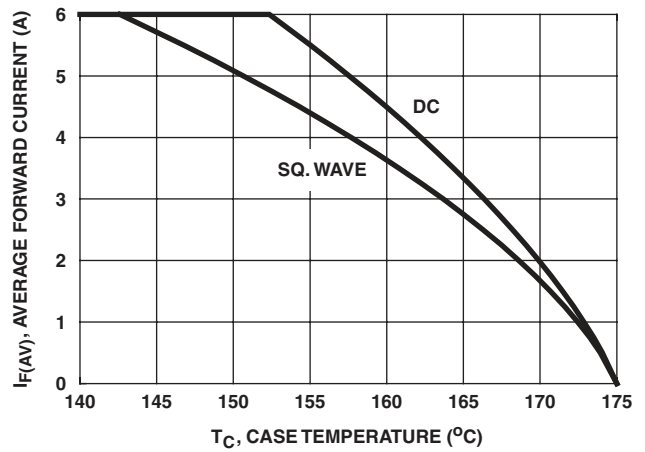


FIGURE 6. CURRENT DERATING CURVE

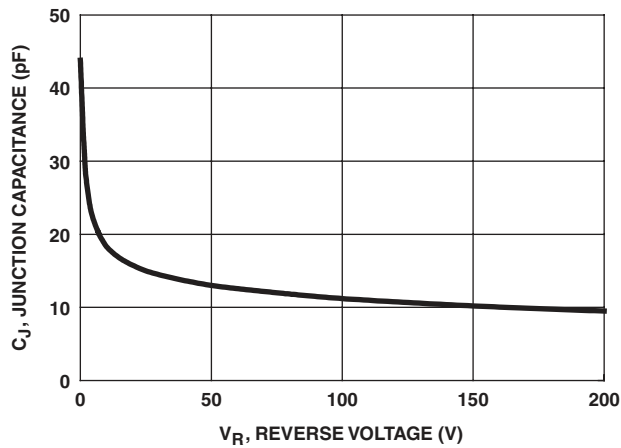


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

V_{GE} AMPLITUDE AND
 R_G CONTROL di_F/dt
 t_1 AND t_2 CONTROL I_F

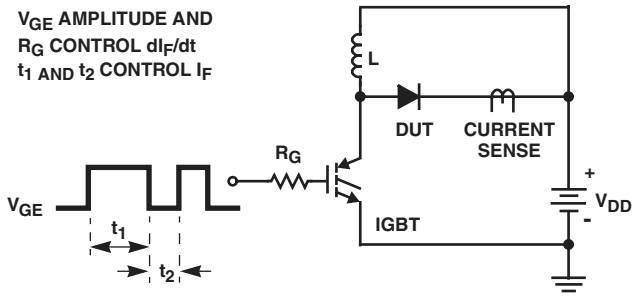


FIGURE 8. t_{rr} TEST CIRCUIT

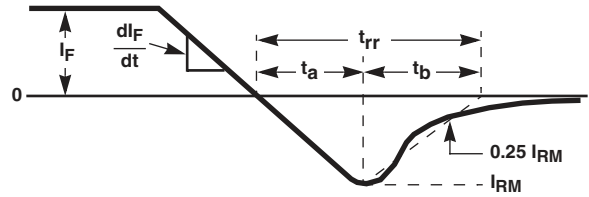


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

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

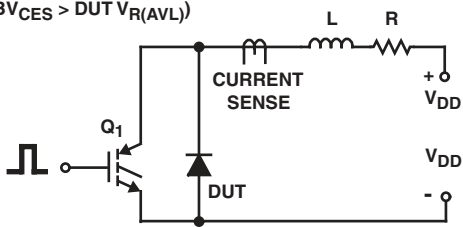


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

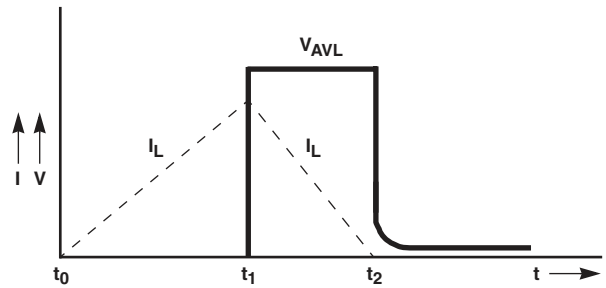


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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