RHRD440CC, RHRD460CC, RHRD440CCS, RHRD460CCS

Data Sheet | **January 2000** | **File Number 4498.1**

4A, 400V - 600V Hyperfast Dual Diodes

The RHRD440CC, RHRD460CC, RHRD440CCS and RHRD460CCS are hyperfast dual diodes with soft recovery characteristics (t_{rr} < 30ns). They have half the recovery time of ultrafast diodes and are 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 reducing power loss in the switching transistors.

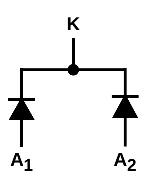
Formerly developmental type TA49055.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRD440CC	TO-251AA	HR440C
RHRD460CC	TO-251AA	HR460C
RHRD440CCS	TO-252AA	HR440C
RHRD460CCS	TO-252AA	HR460C

NOTE: When ordering, use the entire part number. Add the suffix 9A to obtain the TO-252 variant in tape and reel, e.g. RHRD460CCS9A.

Symbol



Features

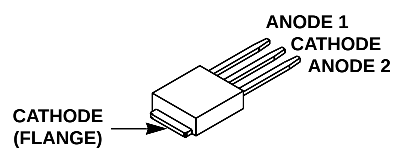
- Hyperfast with Soft Recovery . . . . <30ns
- Operating Temperature. . . . . .175°C
- Reverse Voltage Up To 600V
- Avalanche Energy Rated
- Planar Construction
- Related Literature
  - TB334 "Guidelines for Soldering Surface Mount Components to PC Boards"

Applications

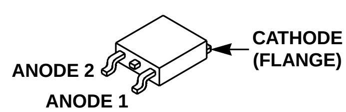
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-251AA



JEDEC TO-252AA



Absolute Maximum Ratings (Per Leg) T_C = 25°C, Unless Otherwise Specified

		RHRD440CC, RHRD440CCS	RHRD460CC, RHRD460CCS	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	400	600	V
Working Peak Reverse Voltage	V_{RWM}	400	600	V
DC Blocking Voltage	V_R	400	600	V
Average Rectified Forward Current T_C = 155°C	$I_{F(AV)}$	4	4	A
Repetitive Peak Surge Current Square Wave, 20kHz	I_{FRM}	8	8	A
Nonrepetitive Peak Surge Current Halfwave, 1 Phase, 60Hz	I_{FSM}	40	40	A
Maximum Power Dissipation	P_D	50	50	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	10	10	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	-65 to 175	°C
Maximum Temperature for Soldering				
Leads at 0.063in (1.6mm) from Case for 10s	T_L	300	300	°C
Package Body for 10s, see Tech Brief 334	T_{pkg}	260	260	°C

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Electrical Specifications (Per Leg) $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	RHRD440CC, RHRD440CCS			RHRD460CC, RHRD460CCS			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
V_F	I_F = 4A	-	-	2.1	-	-	2.1	V
	I_F = 4A, T_C = 150^{o}C	-	-	1.7	-	-	1.7	V
I_R	V_R = 400V	-	-	100	-	-	-	µA
	V_R = 600V	-	-	-	-	-	100	µA
	V_R = 400V, T_C = 150^{o}C	-	-	500	-	-	-	µA
	V_R = 600V, T_C = 150^{o}C	-	-	-	-	-	500	µA
t_{rr}	I_F = 1A, dI_F/dt = 200A/µs	-	-	30	-	-	30	ns
	I_F = 4A, dI_F/dt = 200A/µs	-	-	35	-	-	35	ns
t_a	I_F = 4A, dI_F/dt = 200A/µs	-	16	-	-	16	-	ns
t_b	I_F = 4A, dI_F/dt = 200A/µs	-	7	-	-	7	-	ns
Q_{RR}	I_F = 4A, dI_F/dt = 200A/µs	-	45	-	-	45	-	nC
C_J	V_R = 10V, I_F = 0A	-	15	-	-	15	-	pf
$R_{\theta JC}$		-	-	3	-	-	3	^{o}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 Curves Unless Otherwise Specified

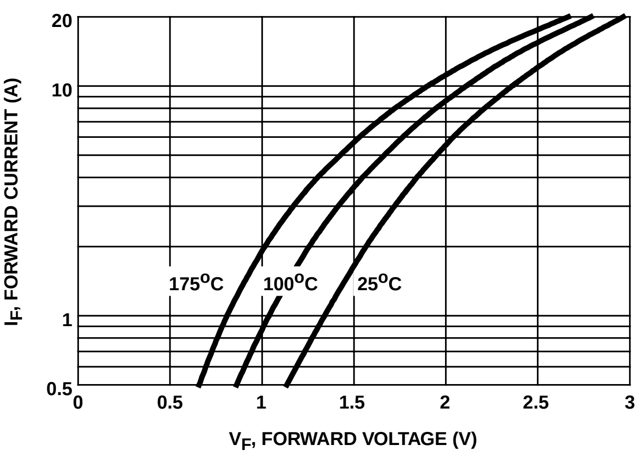

FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

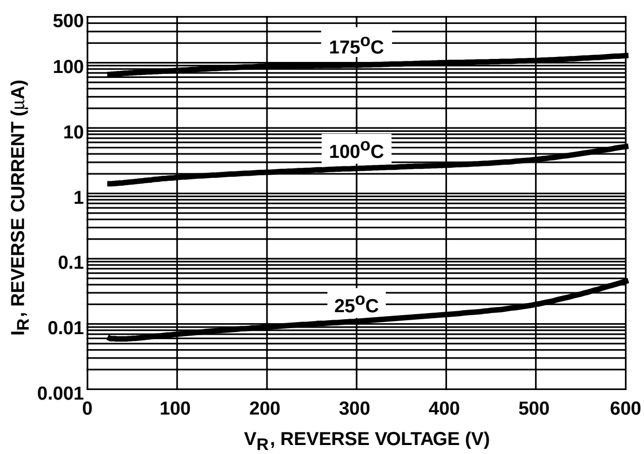

FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves Unless Otherwise Specified **(Continued)**

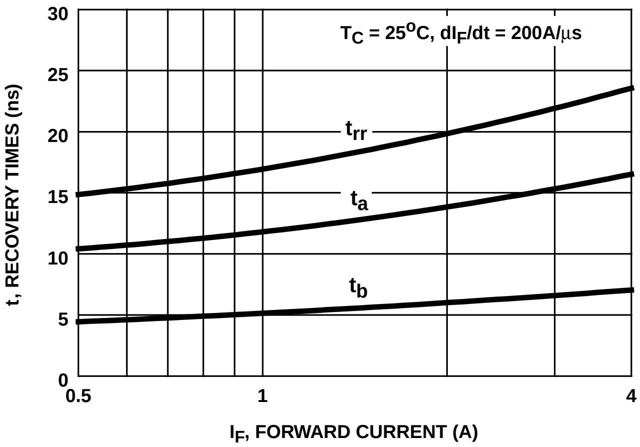

FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

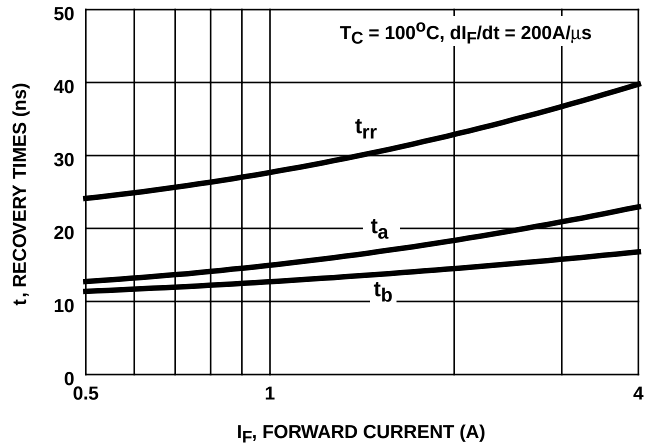

FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

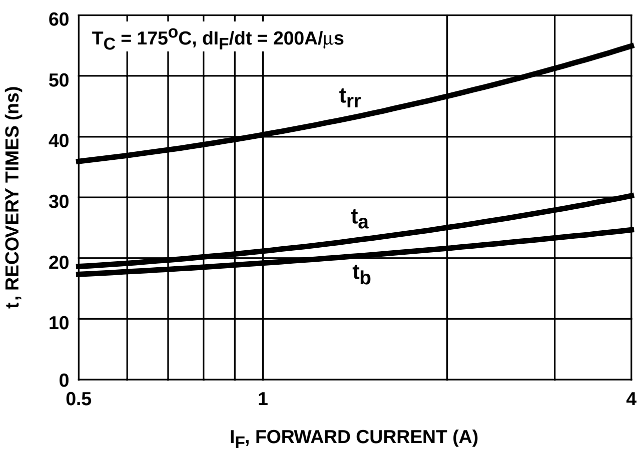

FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

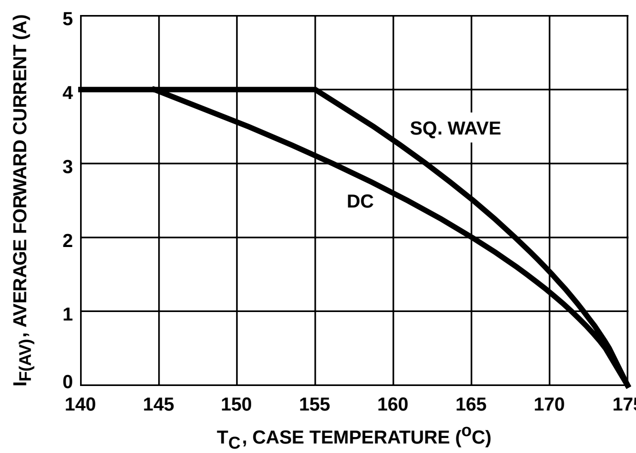

FIGURE 6. CURRENT DERATING CURVE

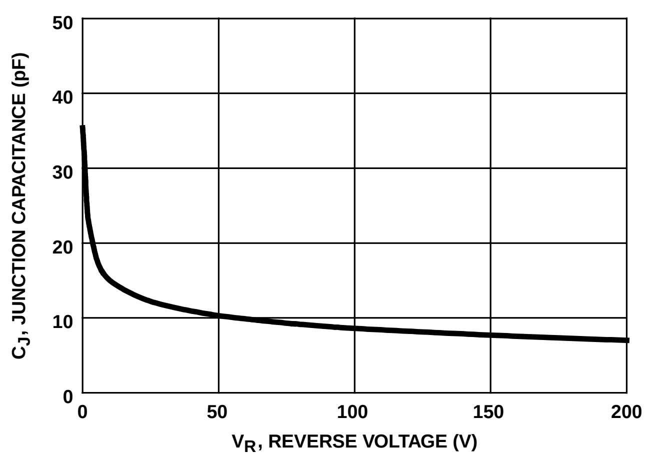

FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

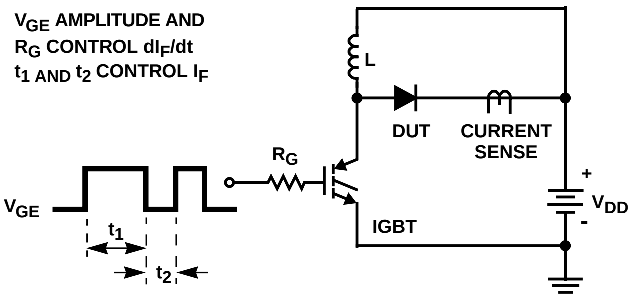

FIGURE 8. t_{rr} TEST CIRCUIT

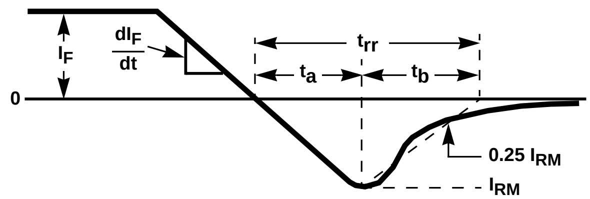

FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

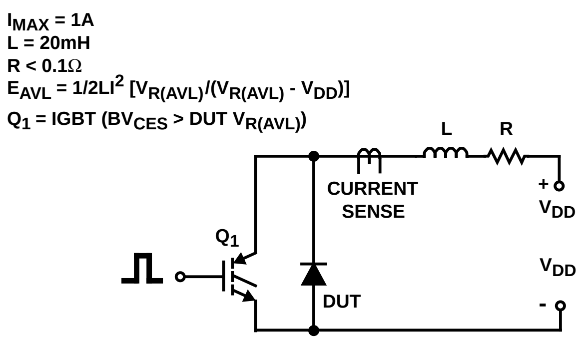

FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

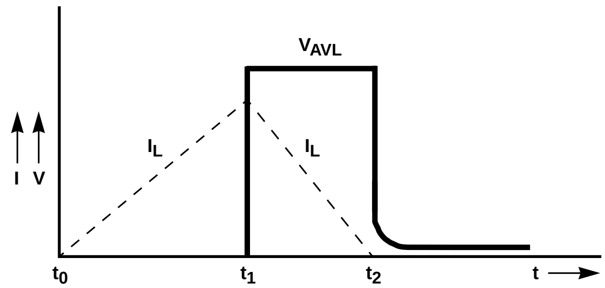

FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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