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4A, 1200V Ultrafast Diodes

The RURD4120S9A_F085 are ultrafast diodes with soft recovery characteristics (t_{rr} < 70ns). They have low forward voltage drop 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 ultrafast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Formerly developmental type TA49036.

Features

- Ultrafast with Soft Recovery . . . . . <70ns
- Operating Temperature . . . . . 175°C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction
- Qualified to ACE Q101
- RoHS Compliant

Applications

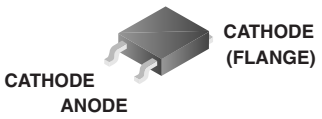
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Ordering Information

PART NUMBER	PACKAGE	BRAND	PACKING TYPE	QUANTITY
RURD4120S9A_F085	TO-252	UR4120	Tape and Reel	2500

Packaging

JEDEC STYLE TO-252



Symbol



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

		RURD4120S9A_F085	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Working Peak Reverse Voltage	V_{RWM}	1200	V
DC Blocking Voltage	V_R	1200	V
Average Rectified Forward Current (T_C = 152°C)	$I_{F(AV)}$	4	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	8	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	40	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

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	$I_F = 4A$	-	-	2.1	V
	$I_F = 4A$, $T_C = 150^oC$	-	-	1.9	V
I_R	$V_R = 1200V$	-	-	100	μA
	$V_R = 1200V$, $T_C = 150^oC$	-	-	500	μA
t_{rr}	$I_F = 1A$, $dI_F/dt = 200A/\mu s$	-	-	70	ns
	$I_F = 4A$, $dI_F/dt = 200A/\mu s$	-	-	90	ns
t_a	$I_F = 4A$, $dI_F/dt = 200A/\mu s$	-	40	-	ns
t_b	$I_F = 4A$, $dI_F/dt = 200A/\mu s$	-	28	-	ns
Q_{RR}	$I_F = 4A$, $dI_F/dt = 200A/\mu s$	-	335	-	nC
C_J	$V_R = 10V$, $I_F = 0A$	-	15	-	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 time.

C_J = Junction capacitance.

$R_{\theta JC}$ = Thermal resistance junction to case.

pw = Pulse width.

D = Duty cycle.

Typical Performance Curves

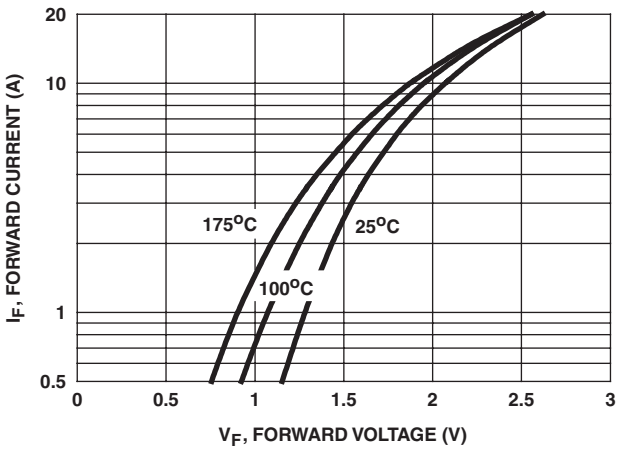


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

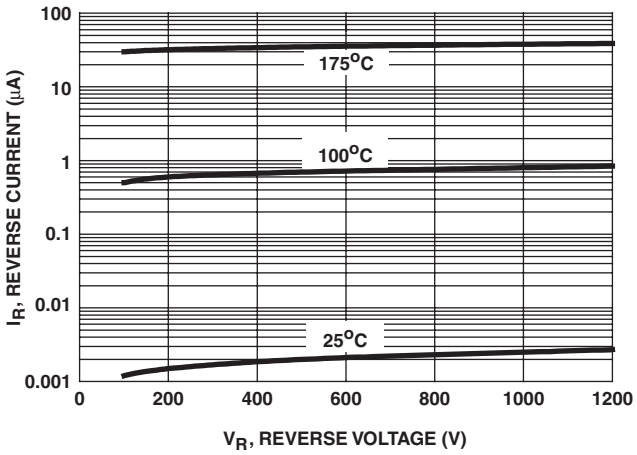


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

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Typical Performance Curves (Continued)

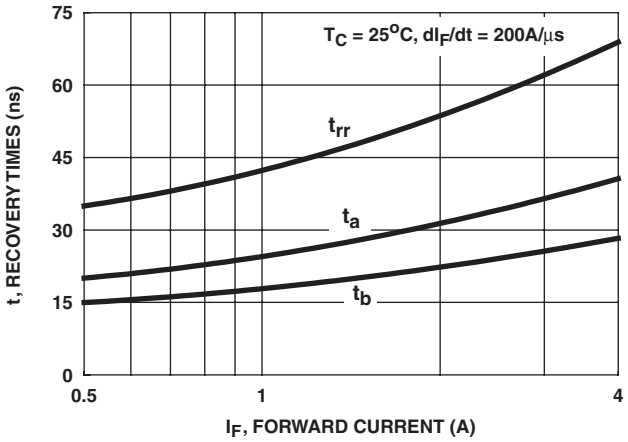


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

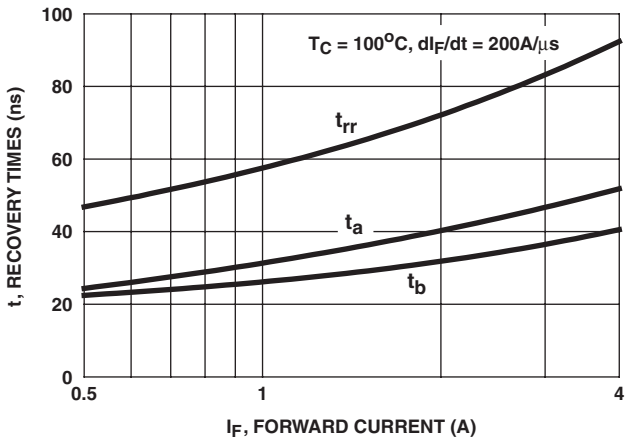


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

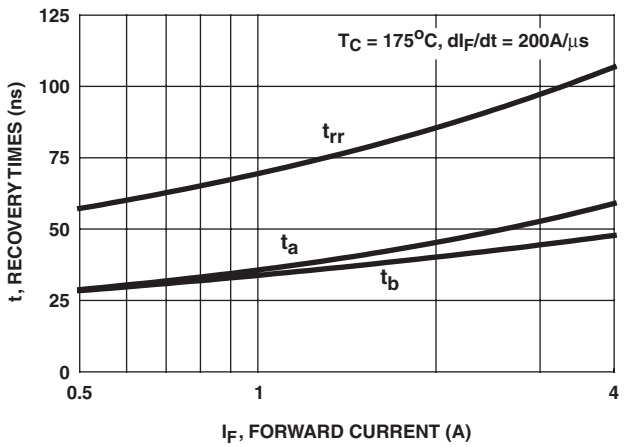


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

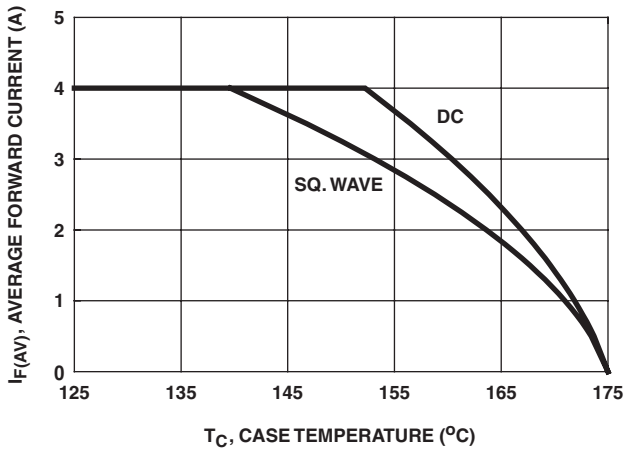


FIGURE 6. CURRENT DERATING CURVE

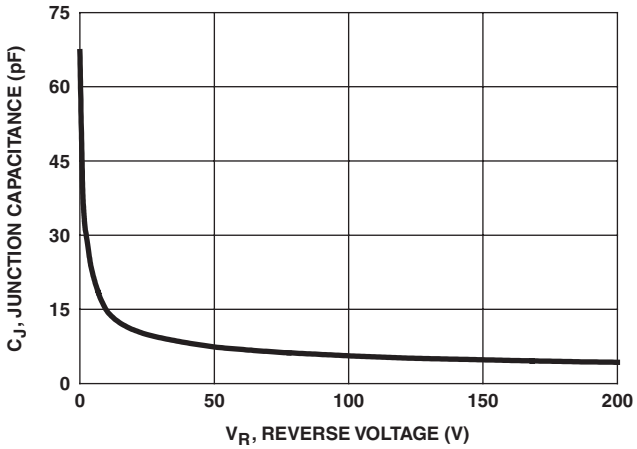


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

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Test Circuits and Waveforms

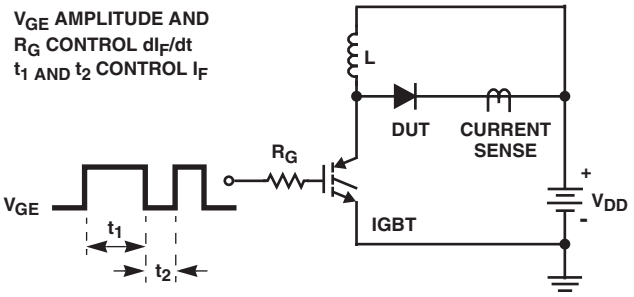


FIGURE 8. t_{rr} TEST CIRCUIT

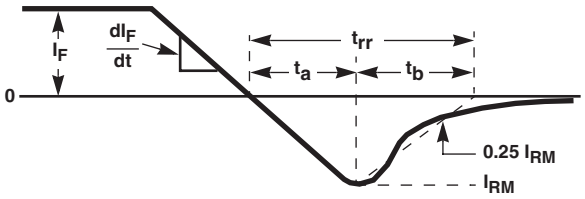


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

I = 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 $V_{R(AVL)}$)

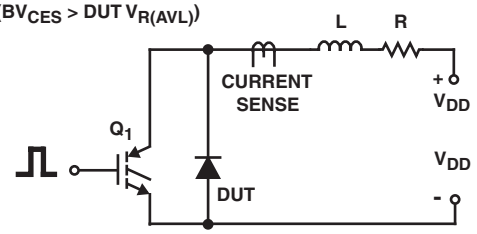


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

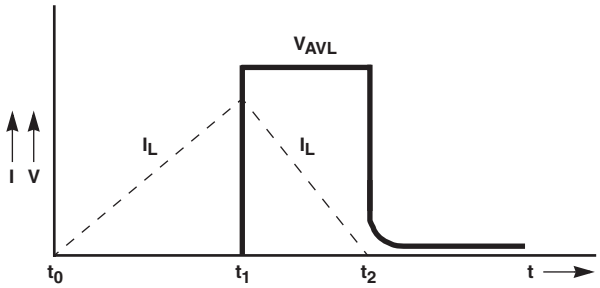


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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