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FAIRCHILD SEMICONDUCTOR®

RURD420S

Data Sheet **January 2002**

4A, 200V Ultrafast Diodes

The RURD420S is an ultrafast diode with soft recovery characteristics (t_{rr} < 30ns). It has low forward voltage drop and has ion-implanted epitaxial planar construction.

This device is intended for use as a freewheeling/clamping diode and rectifier in a variety of switching power supplies and other power switching applications. It's low stored charge and ultrafast soft recovery minimize ringing and electrical noise in many power switching circuits, reducing power loss in the switching transistors.

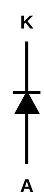
Formerly developmental type TA49034.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RURD420S	TO-252	RUR420

NOTE: When ordering, use the entire part number. Add the suffix 9A to obtain the TO-252 variant in tape and reel, i.e., RURD420S9A.

Symbol



Features

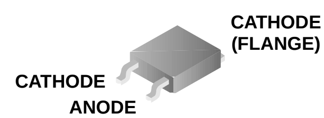
- Ultrafast with Soft Recovery . . . . <30ns
- Operating Temperature . . . . 175^{o}C
- Reverse Voltage 200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC STYLE TO-252



Absolute Maximum Ratings T_C = 25^{o}C, Unless Otherwise Specified

		RURD420S	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	200	V
Working Peak Reverse Voltage	V_{RWM}	200	V
DC Blocking Voltage	V_R	200	V
Average Rectified Forward Current (T_C = 159^{o}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	30	W
Avalanche Energy (See Figures 9 and 10)	E_{AVL}	10	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	^{o}C
Maximum Lead Temperature for Soldering			
(Leads at 0.063 in. (1.6mm) from case for 10s)	T_L	300	^{o}C
Package Body for 10s, see Tech Brief 334	T_{PKG}	260	^{o}C

Electrical Specifications T_C = 25^{o}C, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	I_F = 4A	-	-	1.0	V
	I_F = 4A, T_C = 150^{o}C	-	-	0.83	V

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
I_R	$V_R = 200V$	-	-	100	µA
	$V_R = 200V$, $T_C = 150^oC$	-	-	500	µA
t_{rr}	$I_F = 1A$, $dI_F/dt = 100A/\mu s$	-	-	30	ns
	$I_F = 4A$, $dI_F/dt = 100A/\mu s$	-	-	35	ns
t_a	$I_F = 4A$, $dI_F/dt = 100A/\mu s$	-	11	-	ns
t_b	$I_F = 4A$, $dI_F/dt = 100A/\mu s$	-	9	-	ns
Q_{RR}	$I_F = 4A$, $dI_F/dt = 100A/\mu s$	-	12	-	nC
C_J	$V_R = 10V$, $I_F = 0A$	-	15	-	pF
$R_{\theta JC}$		-	-	5	$^oC/W$

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300µs, D = 2%).

I_R = Instantaneous reverse current.

t_{rr} = Reverse recovery time (See Figure 8), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current (See Figure 8).

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 8).

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

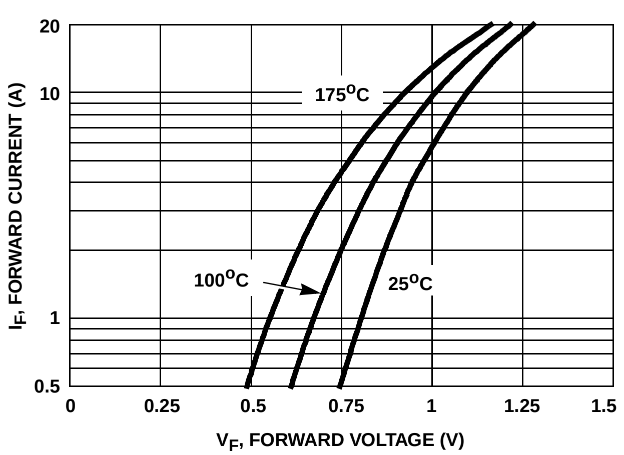


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

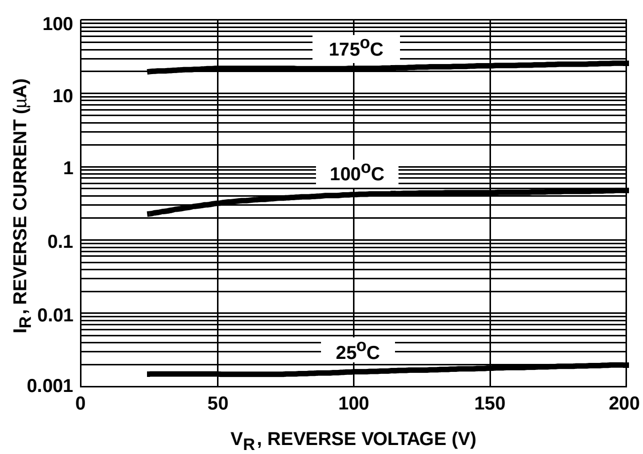


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

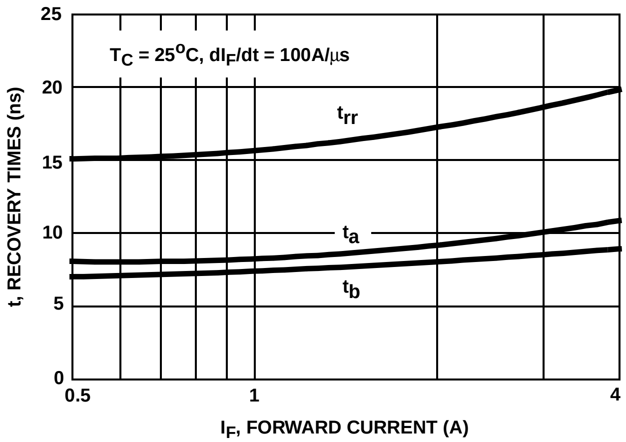


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

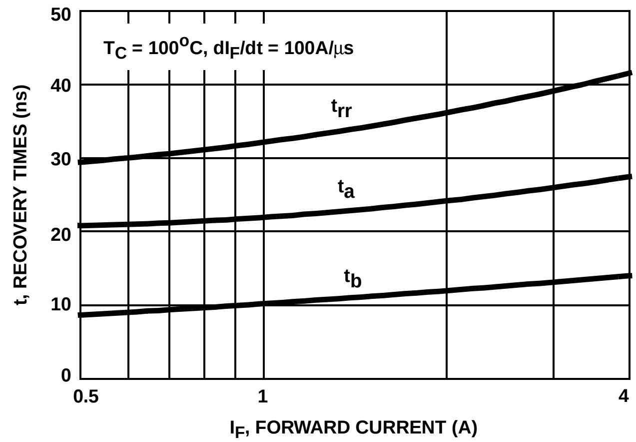


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

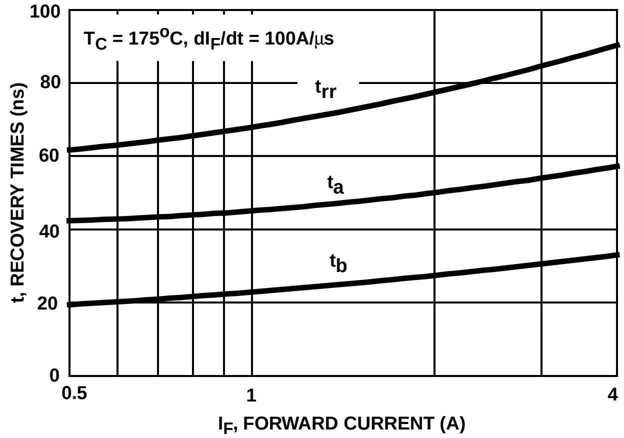


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

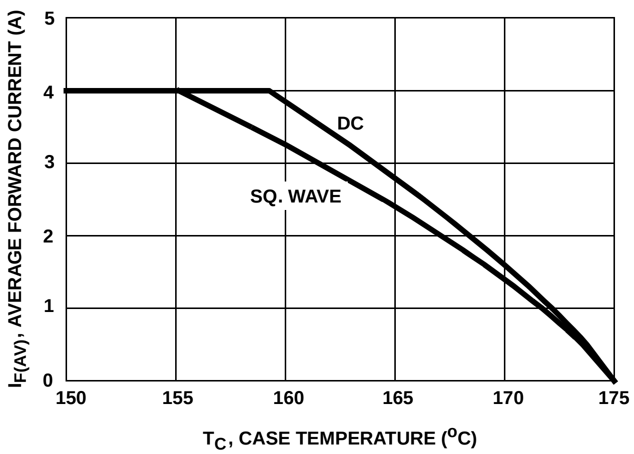


FIGURE 6. CURRENT DERATING CURVE

Test Circuits and Waveforms

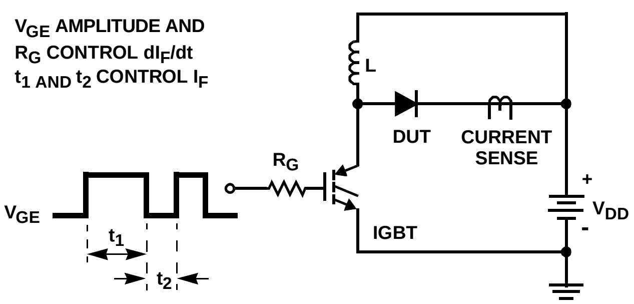


FIGURE 7. t_{rr} TEST CIRCUIT

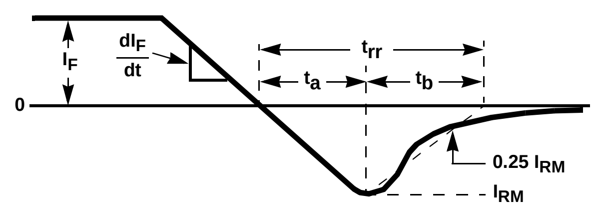


FIGURE 8. t_{rr} WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

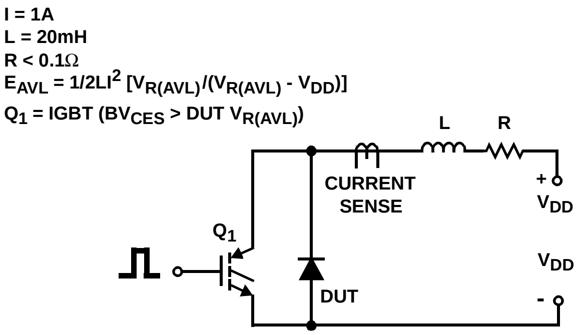


FIGURE 9. AVALANCHE ENERGY TEST CIRCUIT

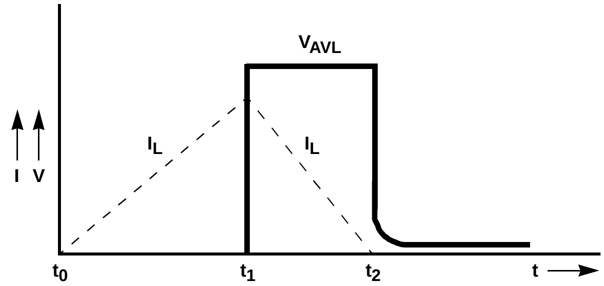


FIGURE 10. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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