RUR3070/3080, RUR3090/30100

30A Ultrafast Diode With Soft Recovery Characteristic

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Features

- Ultrafast with Soft Recovery Characteristic (t_{rr} < 110ns)
- +175°C Rated Junction Temperature
- Reverse Voltage Up to 1000V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

Description

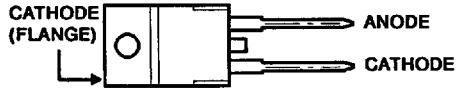
RUR3070, RUR3080, RUR3090, RUR30100 are ultrafast diodes with soft recovery characteristics (t_{rr} < 110ns). They have a low forward voltage drop and are silicon nitride passivated, ion-implanted, epitaxial construction.

These devices are intended for use as flywheel/clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and ultrafast recovery with soft recovery characteristics minimizes ringing and electrical noise in many power switching circuits thus reducing power loss in the switching transistor.

All are supplied in TO-220AC packages.

Package

TO-220AC
TOP VIEW



Symbol

Absolute Maximum Ratings (T_C = +25°C)

	RUR3070	RUR3080	RUR3090	RUR30100
Peak Repetitive Reverse Voltage ..... V_{RRM}	700V	800V	900V	1000V
Working Peak Reverse Voltage ..... V_{RWM}	700V	800V	900V	1000V
DC Blocking Voltage ..... V_R	700V	800V	900V	1000V
Average Rectified Forward Current ..... $I_{F(AV)}$ (T_C = +121°C)	30A	30A	30A	30A
Peak Forward Repetitive Current ..... I_{FRM} (Square wave 20kHZ)	60A	60A	60A	60A
Nonrepetitive Peak Surge Current ..... I_{FSM} (Surge applied at rated load condition halfwave 1phase 60Hz)	300A	300A	300A	300A
Maximum Power Dissipation ..... P_D	125W	125W	125W	125W
Operating and Storage Temperature ..... T_{STG}, T_J	-65°C to +175°C	-65°C to +175°C	-65°C to +175°C	-65°C to +175°C

File Number 2877.1

Electrical Characteristics (T_C = +25°C) Unless Otherwise Specified.

SYMBOL	TEST CONDITION	LIMITS												UNITS
		RUR3070			RUR3080			RUR3090			RUR30100			
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_F	I_F = 30A, T_C = +150°C	-	-	1.60	-	-	1.60	-	-	1.60	-	-	1.60	V
	I_F = 30A, T_C = +25°C	-	-	1.80	-	-	1.80	-	-	1.80	-	-	1.8	V
I_R @ T_C = +150°C	V_R = 700V	-	-	1	-	-	-	-	-	-	-	-	-	mA
	V_R = 800V	-	-	-	-	-	1	-	-	-	-	-	-	mA
	V_R = 900V	-	-	-	-	-	-	-	-	1	-	-	-	mA
	V_R = 1000V	-	-	-	-	-	-	-	-	-	-	-	1	mA
I_R @ T_C = +25°C	V_R = 700V	-	-	100	-	-	-	-	-	-	-	-	-	µA
	V_R = 800V	-	-	-	-	-	100	-	-	-	-	-	-	µA
	V_R = 900V	-	-	-	-	-	-	-	-	100	-	-	-	µA
	V_R = 1000V	-	-	-	-	-	-	-	-	-	-	-	100	µA
t_{rr}	I_F = 1A	-	-	110	-	-	110	-	-	110	-	-	110	ns
	I_F = 30A	-	-	150	-	-	150	-	-	150	-	-	150	ns
t_a	I_F = 30A	-	90	-	-	90	-	-	90	-	-	90	-	ns
t_b	I_F = 30A	-	45	-	-	45	-	-	45	-	-	45	-	ns
$R_{\Theta JC}$		-	-	1.2	-	-	1.2	-	-	1.2	-	-	1.2	°C/W
W_{avl}		-	-	20	-	-	20	-	-	20	-	-	20	mj

Definitions

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

I_R = Instantaneous reverse current (pw = 300µs, D = 2%).

t_{rr} = Reverse recovery time at dI_F/dt = 100A/µs, summation of $t_a + t_b$.

t_a = Time to reach peak reverse current at dI_F/dt = 100A/µs (See Figure 2).

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 2)

$R_{\Theta jc}$ = Thermal resistance junction to case.

W_{avl} = Controlled avalanche energy (See Figures 7 & 8).

pw = pulse width.

D = duty cycle.

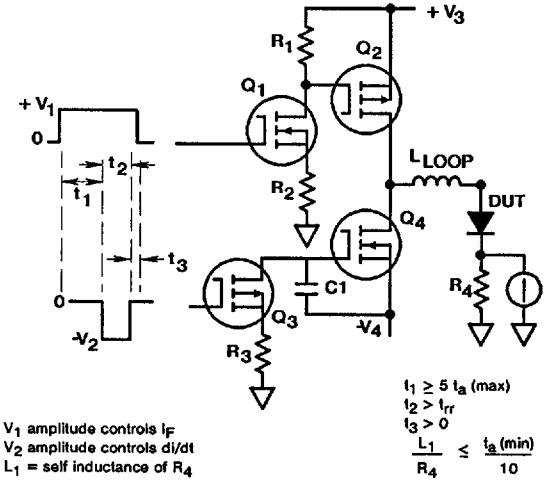


FIGURE 1. t_{rr} TEST CIRCUIT

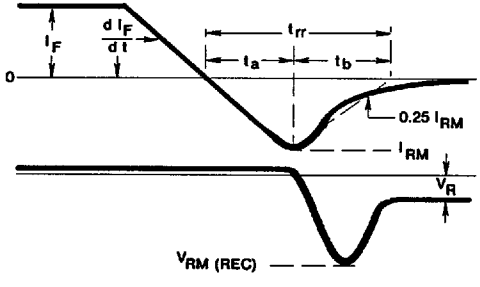


FIGURE 2. DEFINITIONS OF t_{rr}, t_a AND t_b

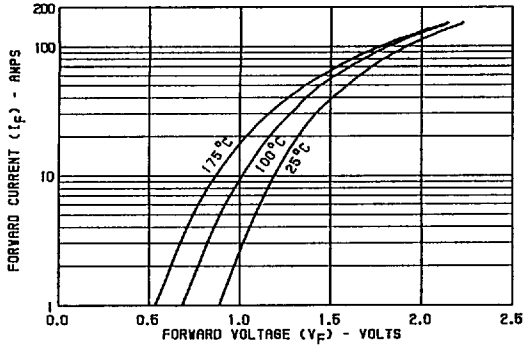


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

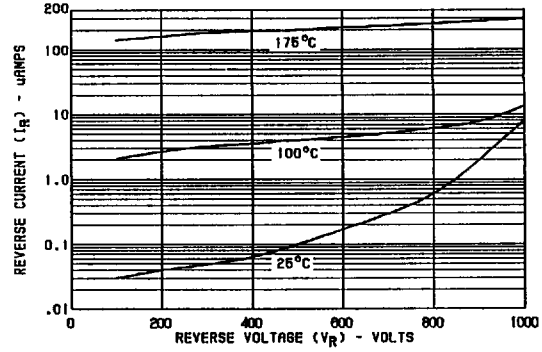


FIGURE 4. TYPICAL REVERSE CURRENT vs VOLTAGE

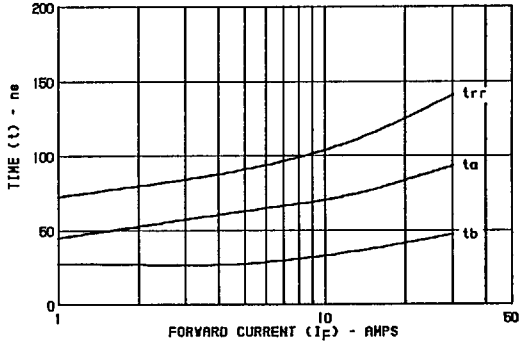


FIGURE 5. TYPICAL t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

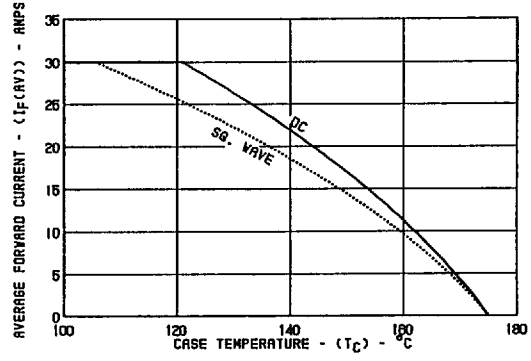


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

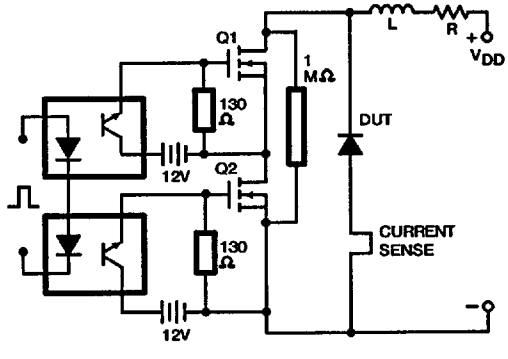


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

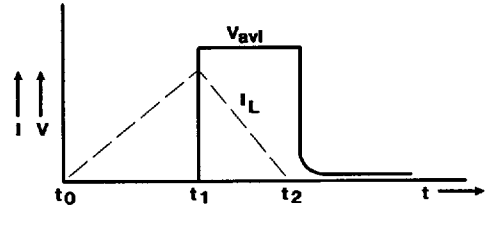


FIGURE 8. AVALANCHE CURRENT & VOLTAGE WAVEFORM

$I_L$peak = 1A, L = 40mH, R < 0.1Ω, $W_{avl} = (1/2)\ LI^2[V_{avl}/(V_{avl}-V_{dd})]$
Q1 and Q2 are 1000V MOSFETs