



# RURU15070, RURU15080, RURU15090, RURU150100

April 1995

150A, 700V - 1000V Ultrafast Diodes

## Features

- Ultrafast with Soft Recovery . . . . . <125ns
- Operating Temperature . . . . . +175°C
- Reverse Voltage Up To . . . . . 1000V
- Avalanche Energy Rated
- Planar Construction

## Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

## Description

RURU15070, RURU15080 and RURU15090 and RURU150100 are ultrafast diodes with soft recovery characteristics ( $t_{RR} < 125ns$ ). 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 recovery with soft recovery characteristic minimizes ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

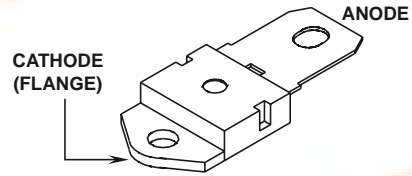
### PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
RURU15070	TO-218	RURU15070
RURU15080	TO-218	RURU15080
RURU15090	TO-218	RURU15090
RURU150100	TO-218	RUR150100

NOTE: When ordering, use the entire part number.

## Package

JEDEC STYLE SINGLE LEAD TO-218



## Symbol



## Absolute Maximum Ratings $T_C = +25^\circ C$ , Unless Otherwise Specified

	RURU15070	RURU15080	RURU15090	RURU150100	UNITS
Peak Repetitive Reverse Voltage . . . . . $V_{RRM}$	700	800	900	1000	V
Working Peak Reverse Voltage . . . . . $V_{RWM}$	700	800	900	1000	V
DC Blocking Voltage . . . . . $V_R$	700	800	900	1000	V
Average Rectified Forward Current . . . . . $I_{F(AV)}$ ( $T_C = +65^\circ C$ )	150	150	150	150	A
Repetitive Peak Surge Current . . . . . $I_{FSM}$ (Square Wave, 20kHz)	300	300	300	300	A
Nonrepetitive Peak Surge Current . . . . . $I_{FSM}$ (Halfwave, 1 Phase, 60Hz)	1500	1500	1500	1500	A
Maximum Power Dissipation . . . . . $P_D$	375	375	375	375	W
Avalanche Energy (L = 40mH) . . . . . $E_{AVL}$	50	50	50	50	mJ
Operating and Storage Temperature . . . . . $T_{STG}, T_J$	-65 to +175	-65 to +175	-65 to +175	-65 to +175	$^\circ C$

## Specifications RURU15070, RURU15080, RURU15090, RURU150100

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

SYMBOL	TEST CONDITION	LIMITS												UNITS
		RURU15070			RURU15080			RURU15090			RURU150100			
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
$V_F$	$I_F = 150\text{A}, T_C = +25^\circ\text{C}$	-	-	1.9	-	-	1.9	-	-	1.9	-	-	1.9	V
$V_F$	$I_F = 150\text{A}, T_C = +150^\circ\text{C}$	-	-	1.7	-	-	1.7	-	-	1.7	-	-	1.7	V
$I_R$	$V_R = 700\text{V}, T_C = +25^\circ\text{C}$	-	-	500	-	-	-	-	-	-	-	-	-	$\mu\text{A}$
	$V_R = 800\text{V}, T_C = +25^\circ\text{C}$	-	-	-	-	-	500	-	-	-	-	-	-	$\mu\text{A}$
	$V_R = 900\text{V}, T_C = +25^\circ\text{C}$	-	-	-	-	-	-	-	-	500	-	-	-	$\mu\text{A}$
	$V_R = 1000\text{V}, T_C = +25^\circ\text{C}$	-	-	-	-	-	-	-	-	-	-	-	500	$\mu\text{A}$
$I_R$	$V_R = 700\text{V}, T_C = +150^\circ\text{C}$	-	-	3.0	-	-	-	-	-	-	-	-	-	mA
	$V_R = 800\text{V}, T_C = +150^\circ\text{C}$	-	-	-	-	-	3.0	-	-	-	-	-	-	mA
	$V_R = 900\text{V}, T_C = +150^\circ\text{C}$	-	-	-	-	-	-	-	-	3.0	-	-	-	mA
	$V_R = 1000\text{V}, T_C = +150^\circ\text{C}$	-	-	-	-	-	-	-	-	-	-	-	3.0	mA
$t_{RR}$	$I_F = 1\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$	-	-	125	-	-	125	-	-	125	-	-	125	ns
	$I_F = 150\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$	-	-	200	-	-	200	-	-	200	-	-	200	ns
$t_A$	$I_F = 150\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$	-	100	-	-	100	-	-	100	-	-	100	-	ns
$t_B$	$I_F = 150\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$	-	75	-	-	75	-	-	75	-	-	75	-	ns
$R_{\theta JC}$		-	-	0.4	-	-	0.4	-	-	0.4	-	-	0.4	$^\circ\text{C}/\text{W}$

### 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 2), summation of  $t_A + t_B$ .

$t_A$  = Time to reach peak reverse current (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.

$E_{AVL}$  = Controlled avalanche energy (See Figures 7 and 8).

$p_w$  = pulse width.

$D$  = duty cycle.

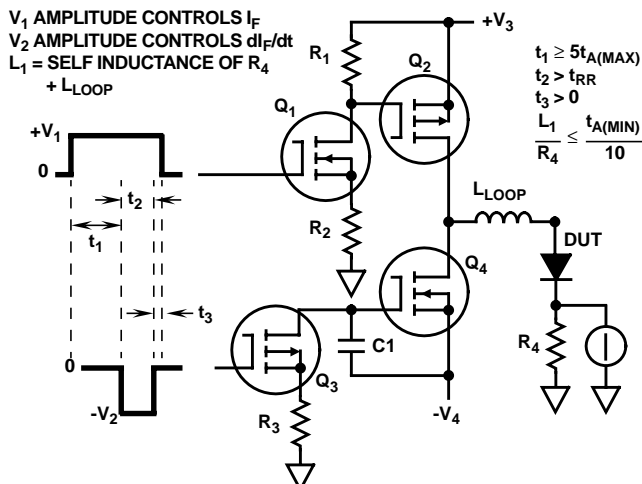


FIGURE 1.  $t_{RR}$  TEST CIRCUIT

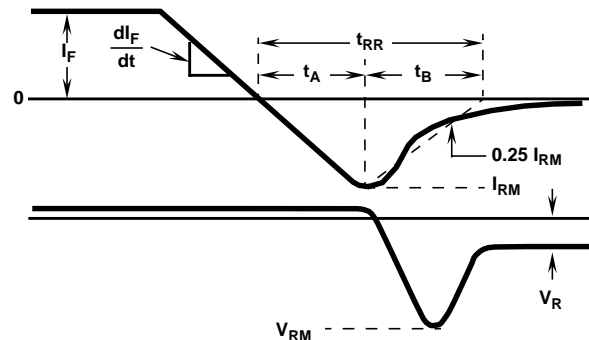


FIGURE 2.  $t_{RR}$  WAVEFORMS AND DEFINITIONS

RURU15070, RURU15080, RURU15090, RURU150100

Typical Performance Curves

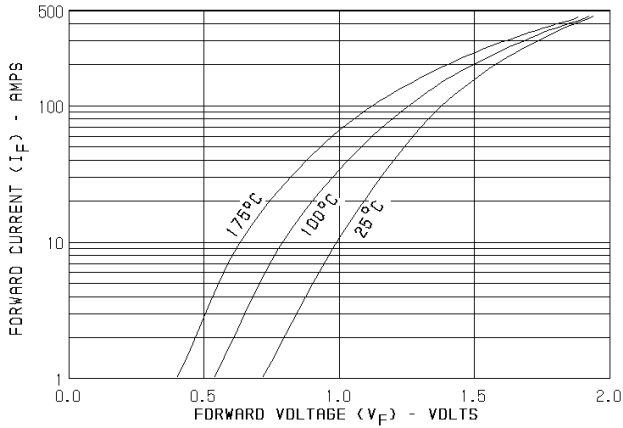


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

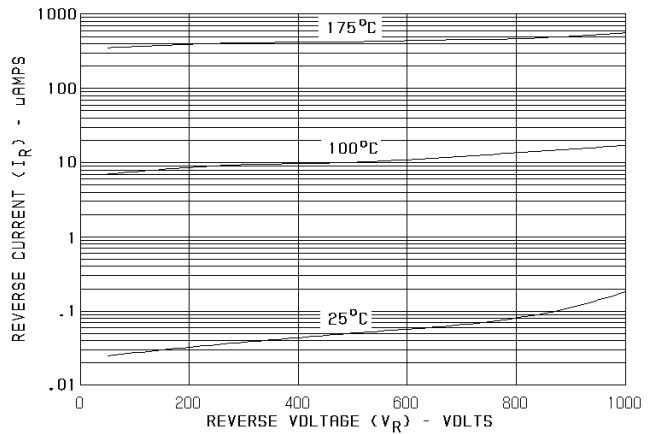


FIGURE 4. TYPICAL REVERSE CURRENT vs VOLTAGE

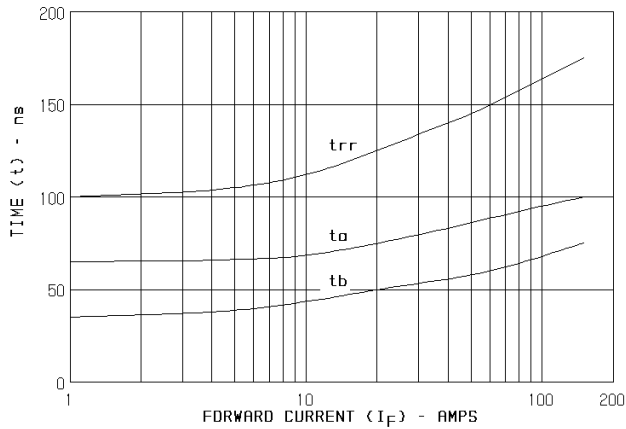


FIGURE 5. TYPICAL  $t_{RR}$ ,  $t_A$  AND  $t_B$  CURVES vs FORWARD CURRENT

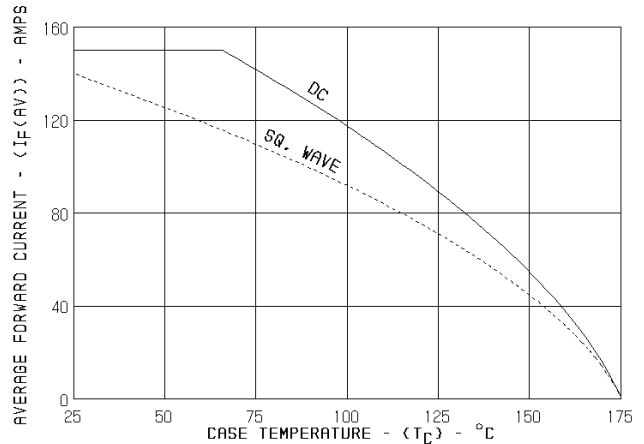


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

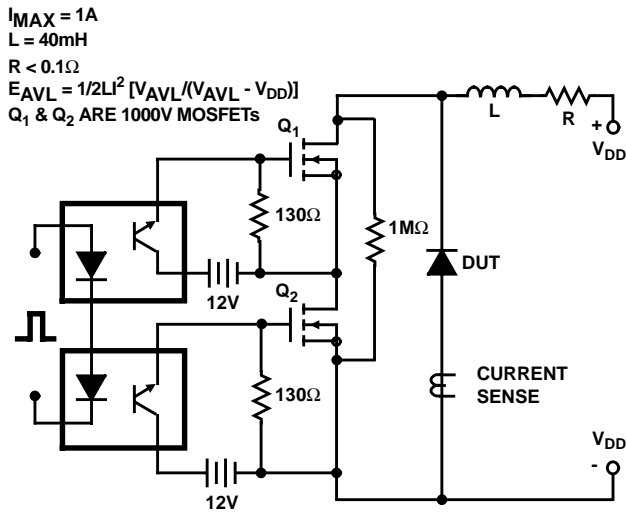


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

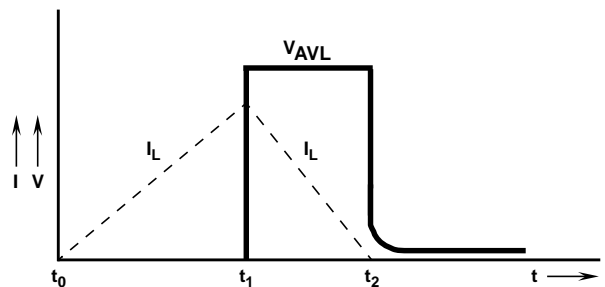


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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