

# RURG3070CC, RURG3080CC, RURG3090CC, RURG30100CC

April 1995

30A, 700V - 1000V Ultrafast Dual Diodes

## Features

- Ultrafast with Soft Recovery . . . . . <110ns
- Operating Temperature . . . . . +175°C
- Reverse Voltage Up to . . . . . 1000V
- Avalanche Energy Rated
- Planar Construction

## Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

## Description

RURG3070CC, RURG3080CC, RURG3090CC and RURG30100CC are ultrafast dual diodes with soft recovery characteristics ( $t_{RR} < 110ns$ ). They have low forward voltage drop and are silicon nitride passivated ion-implanted epitaxial planar construction.

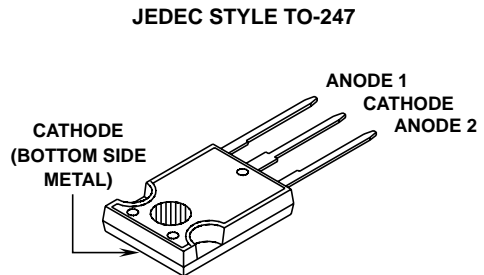
These devices are intended for use as freewheel/clamping diode and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and ultrafast recovery with soft recovery characteristic minimizes ringing and electrical noise in many power switching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

### PACKAGING AVAILABILITY

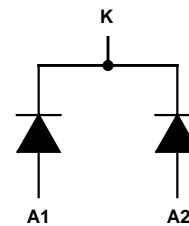
PART NUMBER	PACKAGE	BRAND
RURG3070CC	TO-247	RURG3070C
RURG3080CC	TO-247	RURG3080C
RURG3090CC	TO-247	RURG3090C
RURG30100CC	TO-247	URG30100C

NOTE: When ordering, use the entire part number.

## Package



## Symbol



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

	RURG3070CC	RURG3080CC	RURG3090CC	RURG30100CC	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 (Per Leg) . . . . . $I_{F(AV)}$ ( $T_C = +117^\circ C$ )	30	30	30	30	A
Repetitive Peak Surge Current . . . . . $I_{FSM}$ (Square Wave, 20kHz)	60	60	60	60	A
Nonrepetitive Peak Surge Current . . . . . $I_{FSM}$ (Halfwave, 1 Phase, 60Hz)	300	300	300	300	A
Maximum Power Dissipation . . . . . $P_D$	125	125	125	125	W
Operating and Storage Temperature . . . . . $T_{STG}, T_J$	-65 to +175	-65 to +175	-65 to +175	-65 to +175	°C

# Specifications RURG3070CC, RURG3080CC, RURG3090CC, RURG30100CC

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

SYMBOL	TEST CONDITION	LIMITS												UNITS
		RURDG3070CC			RURG3080CC			RURG3090CC			RURG30100CC			
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
$V_F$	$I_F = 30\text{A}$ $T_C = +150^\circ\text{C}$	-	-	1.50	-	-	1.50	-	-	1.50	-	-	1.50	V
	$I_F = 30\text{A}$ $T_C = +25^\circ\text{C}$	-	-	1.80	-	-	1.80	-	-	1.80	-	-	1.80	V
$I_R$ at $T_C = +150^\circ\text{C}$	$V_R = 700\text{V}$	-	-	1	-	-	-	-	-	-	-	-	-	mA
	$V_R = 800\text{V}$	-	-	-	-	-	1	-	-	-	-	-	-	mA
	$V_R = 900\text{V}$	-	-	-	-	-	-	-	-	1	-	-	-	mA
	$V_R = 1000\text{V}$	-	-	-	-	-	-	-	-	-	-	-	1	mA
$I_R$ at $T_C = +25^\circ\text{C}$	$V_R = 700\text{V}$	-	-	500	-	-	-	-	-	-	-	-	-	$\mu\text{A}$
	$V_R = 800\text{V}$	-	-	-	-	-	500	-	-	-	-	-	-	$\mu\text{A}$
	$V_R = 900\text{V}$	-	-	-	-	-	-	-	-	500	-	-	-	$\mu\text{A}$
	$V_R = 1000\text{V}$	-	-	-	-	-	-	-	-	-	-	-	500	$\mu\text{A}$
$t_{RR}$	$I_F = 1\text{A}$	-	-	110	-	-	110	-	-	110	-	-	110	ns
	$I_F = 30\text{A}$	-	-	150	-	-	150	-	-	150	-	-	150	ns
$t_A$	$I_F = 30\text{A}$	-	90	-	-	90	-	-	90	-	-	90	-	ns
$t_B$	$I_F = 30\text{A}$	-	45	-	-	45	-	-	45	-	-	45	-	ns
$R_{\theta JC}$		-	-	1.2	-	-	1.2	-	-	1.2	-	-	1.2	$^\circ\text{C/W}$
$E_{AVL}$		-	-	30	-	-	30	-	-	30	-	-	30	mJ

### 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), at  $di_F/dt = 100\text{A}/\mu\text{s}$  summation of  $t_A + t_B$ .

$t_A$  = Time to reach peak reverse current at  $di_F/dt = 100\text{A}/\mu\text{s}$  (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.

$p_w$  = pulse width.

$D$  = duty cycle.

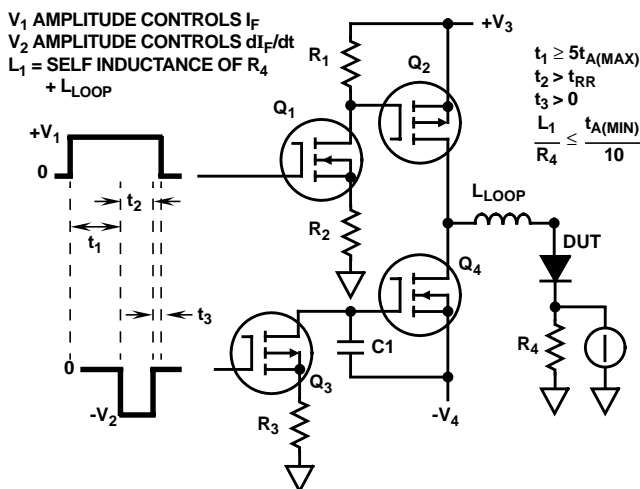


FIGURE 1.  $t_{RR}$  TEST CIRCUIT

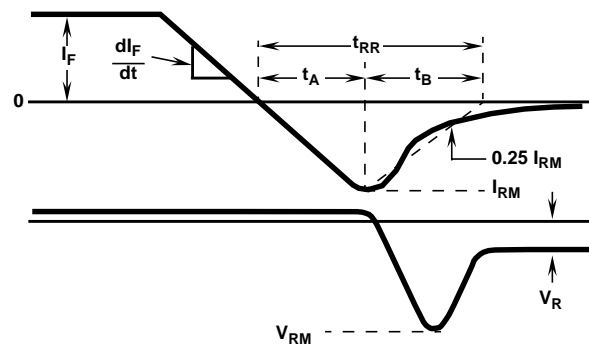


FIGURE 2.  $t_{RR}$  WAVEFORMS AND DEFINITIONS

Typical Performance Curves

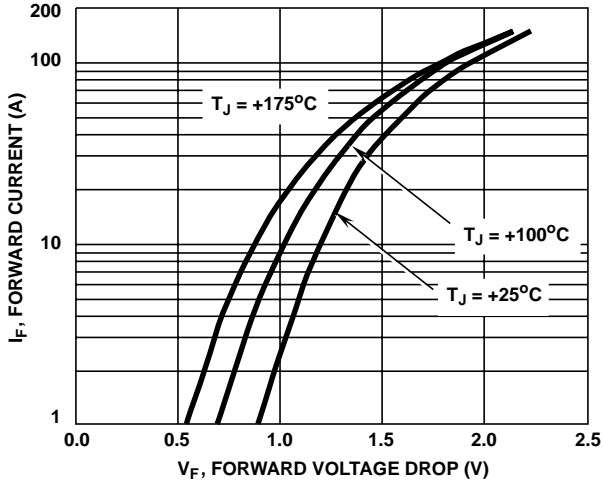


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

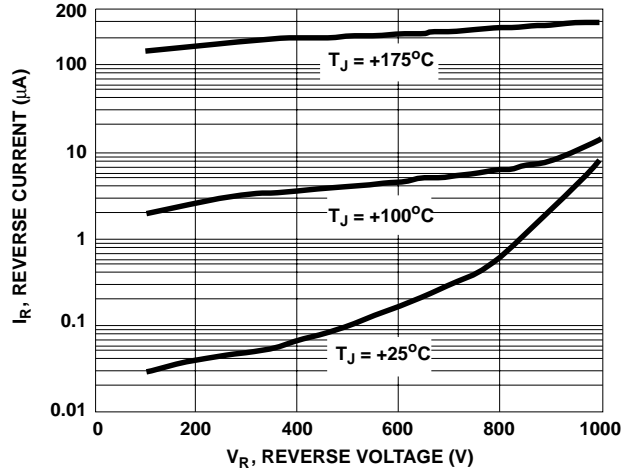


FIGURE 4. TYPICAL REVERSE CURRENT vs VOLTAGE

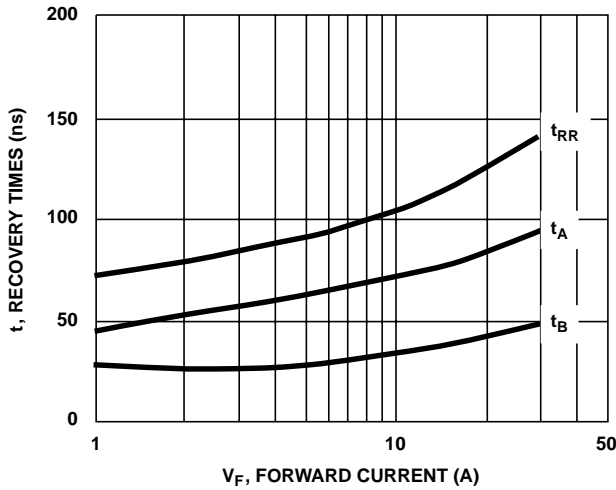


FIGURE 5. TYPICAL  $t_{RR}$ ,  $t_A$  AND  $t_B$  CURVES vs FORWARD CURRENT

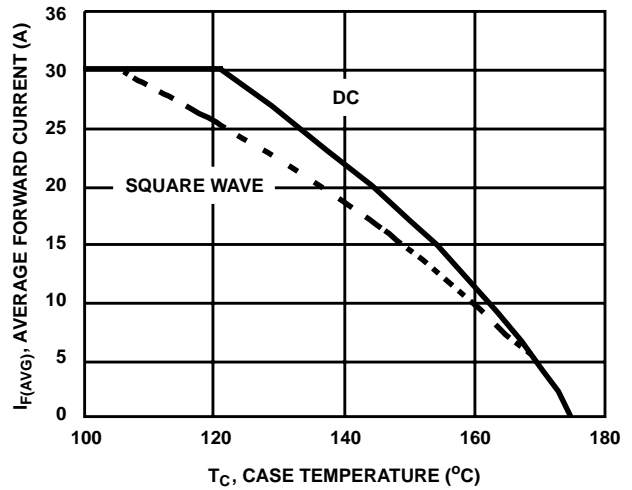


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

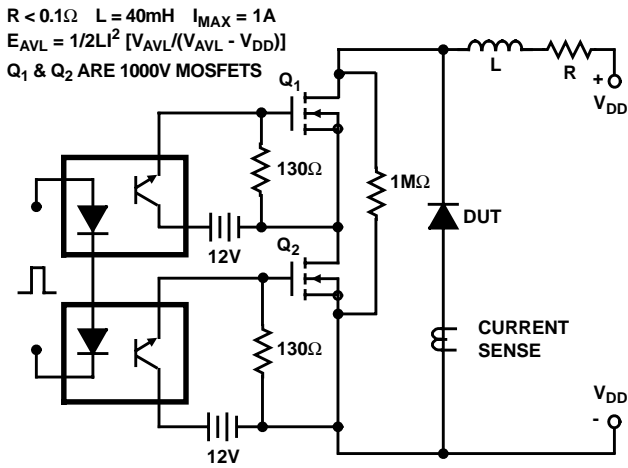


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

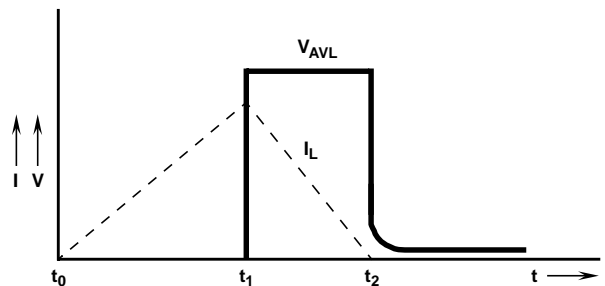


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS