

April 1995

15A, 400V - 600V Ultrafast Dual Diodes

Features

- Ultrafast with Soft Recovery <55ns
- Operating Temperature +175°C
- Reverse Voltage Up to 600V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Description

RURG1540CC, RURG1550CC and RURG1560CC (TA9905) are ultrafast dual diodes with soft recovery characteristics ($t_{RR} < 55\text{ns}$). They have low forward voltage drop and are silicon nitride passivated ion-implanted epitaxial planar construction.

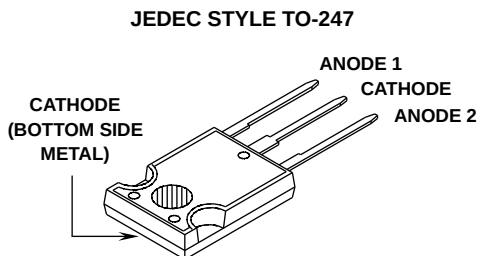
These devices are intended for use as freewheeling/clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and ultrafast recovery with soft recovery characteristic minimize ringing and electrical noise in many power switching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

PACKAGING AVAILABILITY

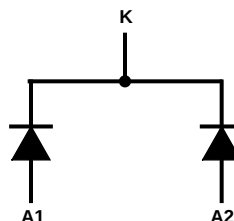
PART NUMBER	PACKAGE	BRAND
RURG1540CC	TO-247	RURG1540C
RURG1550CC	TO-247	RURG1550C
RURG1560CC	TO-247	RURG1560C

NOTE: When ordering, use the entire part number.

Package



Symbol



Absolute Maximum Ratings $T_C = +25^\circ\text{C}$

	RURG1540CC	RURG1550CC	RURG1560CC
Peak Repetitive Reverse Voltage V_{RRM}	400V	500V	600V
Working Peak Reverse Voltage V_{RWM}	400V	500V	600V
DC Blocking Voltage V_R	400V	500V	600V
Average Rectified Forward Current (Per Leg) $I_{F(AV)}$ ($T_C = +145^\circ\text{C}$)	15A	15A	15A
Repetitive Peak Surge Current I_{FSM} (Square Wave, 20kHz)	30A	30A	30A
Nonrepetitive Peak Surge Current I_{FSM} (Halfwave, 1 Phase, 60Hz)	200A	200A	200A
Maximum Power Dissipation P_D	100W	100W	100W
Avalanche Energy E_{AVL} ($L = 40\text{mH}$)	20mj	20mj	20mj
Operating and Storage Temperature T_{STG}, T_J	-65°C to +175°C	-65°C to +175°C	-65°C to +175°C

Specifications RURG1540CC, RURG1550CC, RURG1560CC

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

SYMBOL	TEST CONDITION	RURG1540CC LIMITS			RURG1550CC LIMITS			RURG1560CC LIMITS			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_F	$I_F = 15\text{A}$	-	-	1.5	-	-	1.5	-	-	1.5	V
V_F	$I_F = 15\text{A}$ $T_C = +150^{\circ}\text{C}$	-	-	1.3	-	-	1.3	-	-	1.3	V
I_R	$V_R = 400\text{V}$	-	-	100	-	-	-	-	-	-	μA
	$V_R = 500\text{V}$	-	-	-	-	-	100	-	-	-	μA
	$V_R = 600\text{V}$	-	-	-	-	-	-	-	-	100	μA
I_R	$V_R = 400\text{V}$ $T_C = +150^{\circ}\text{C}$	-	-	500	-	-	-	-	-	-	μA
	$V_R = 500\text{V}$ $T_C = +150^{\circ}\text{C}$	-	-	-	-	-	500	-	-	-	μA
	$V_R = 600\text{V}$ $T_C = +150^{\circ}\text{C}$	-	-	-	-	-	-	-	-	500	μA
t_{RR}	$I_F = 1\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	55	-	-	55	-	-	55	ns
t_{RR}	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	60	-	-	60	-	-	60	ns
t_A	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	30	-	-	30	-	-	30	-	ns
t_B	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	17	-	-	17	-	-	17	-	ns
$R_{\theta JC}$		-	-	1.5	-	-	1.5	-	-	1.5	$^{\circ}\text{C}/\text{W}$

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.

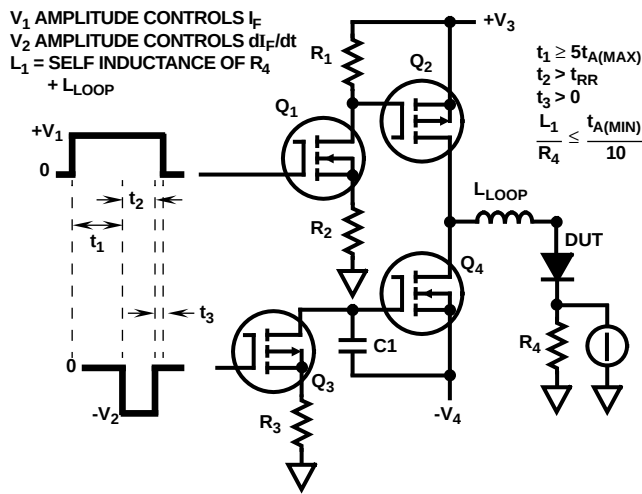


FIGURE 1. t_{RR} TEST CIRCUIT

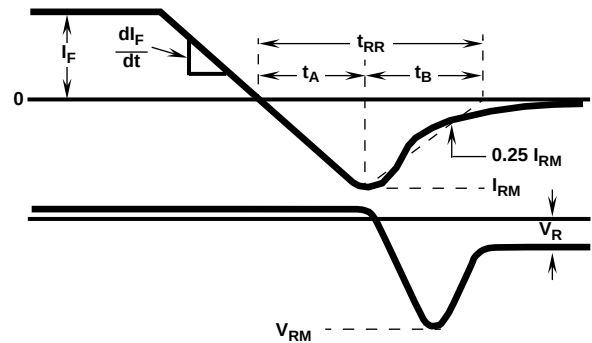


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

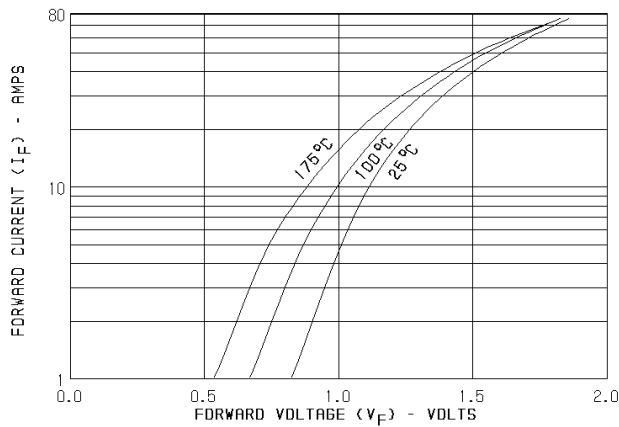


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

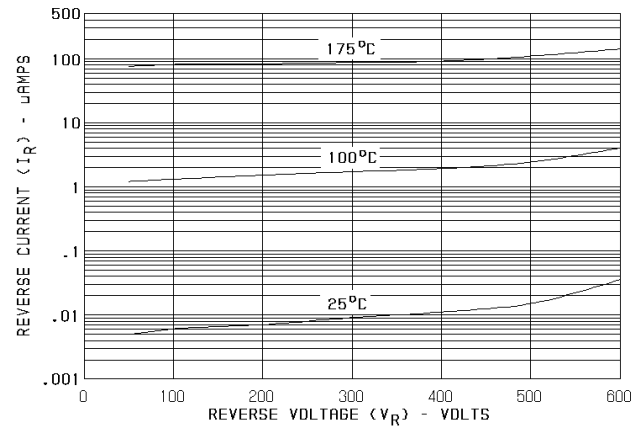


FIGURE 4. TYPICAL REVERSE CURRENT vs VOLTAGE

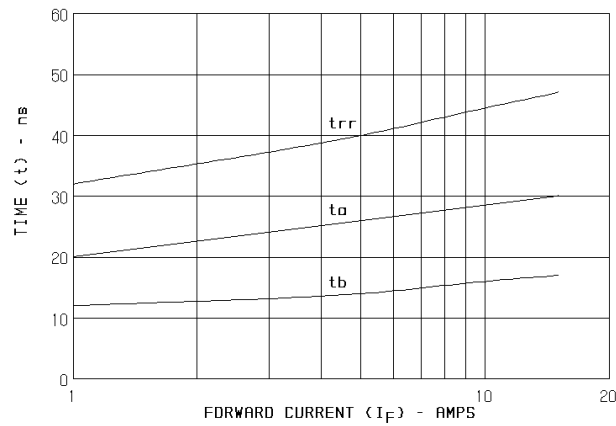


FIGURE 5. TYPICAL t_{RR} , t_A AND t_B CURVES vs FORWARD CURRENT

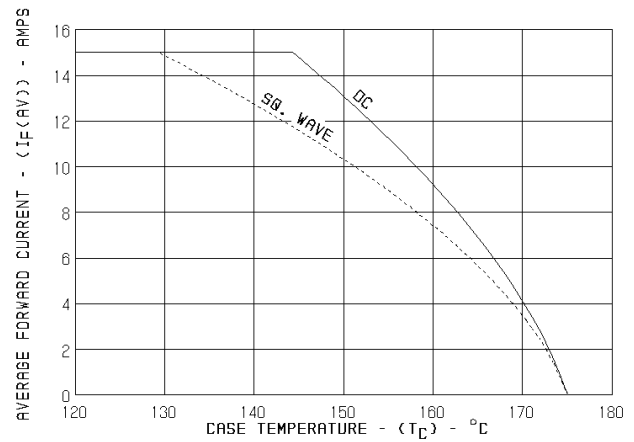


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

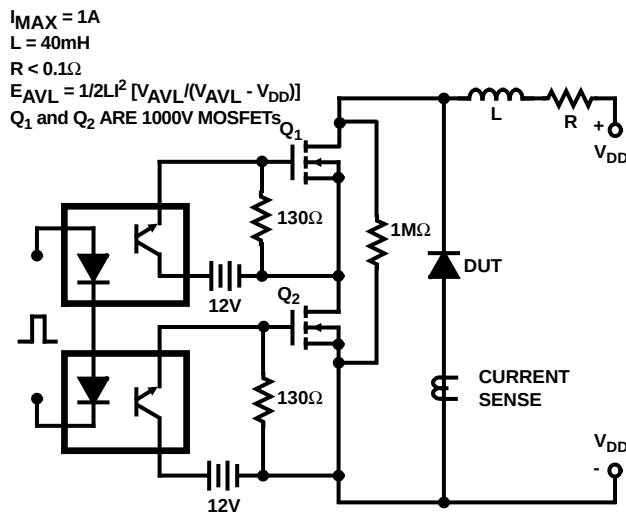


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

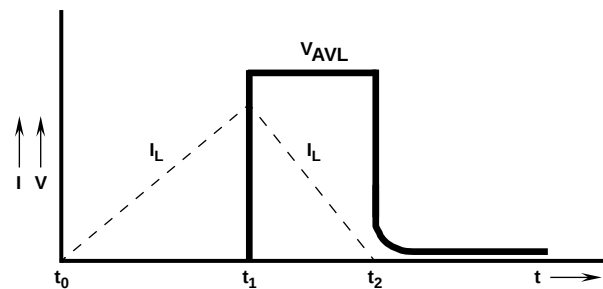


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS