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## 60 A, 400 V - 600 V, Ultrafast Dual Diode

### Description

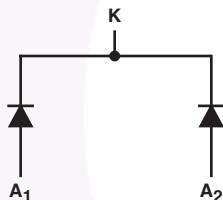
The RURG3040CC, RURG3060CC is an ultrafast dual diode with low forward voltage drop. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial application.

### Ordering Information

PART NUMBER	PACKAGE	BRAND
RURG3040CC	TO-247-3L	RURG3040C
RURG3060CC	TO-247-3L	RURG3060C

NOTE: When ordering, use the entire part number.

### Symbol



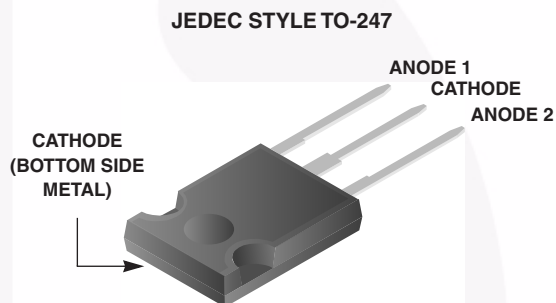
### Features

- Ultrafast Recovery  $t_{rr} = 60$  ns (@  $I_F = 30$  A)
- Max Forward Voltage,  $V_F = 1.5$  V (@  $T_C = 25^\circ\text{C}$ )
- 400 V, 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Packaging



### Absolute Maximum Ratings (Per Leg) $T_C = 25^\circ\text{C}$

	RURG3040CC	RURG3060CC	UNIT
Peak Repetitive Reverse Voltage . . . . .	$V_{RRM}$ 400	600	V
Working Peak Reverse Voltage . . . . .	$V_{RWM}$ 400	600	V
DC Blocking Voltage . . . . .	$V_R$ 400	600	V
Average Rectified Forward Current . . . . . ( $T_C = 130^\circ\text{C}$ )	$I_{F(AV)}$ 30	30	A
Repetitive Peak Surge Current . . . . . (Square Wave, 20kHz)	$I_{FRM}$ 70	70	A
Nonrepetitive Peak Surge Current . . . . . (Halfwave, 1 Phase, 60Hz)	$I_{FSM}$ 325	325	A
Maximum Power Dissipation . . . . .	$P_D$ 125	125	W
Avalanche Energy (See Figures 7 and 8) . . . . .	$E_{AVL}$ 20	20	mJ
Operating and Storage Temperature . . . . .	$T_{STG}, T_J$ -65 to 175	-65 to 175	$^\circ\text{C}$

**Electrical Specifications** (Per Leg)  $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
$V_F$	$I_F = 30\text{ A}$	-	-	1.5	-	-	1.5	V
	$I_F = 30\text{ A}$ , $T_C = 150^\circ\text{C}$	-	-	1.3	-	-	1.3	V
$I_R$	$V_R = 400\text{ V}$	-	-	250	-	-	-	$\mu\text{A}$
	$V_R = 600\text{ V}$	-	-	-	-	-	250	$\mu\text{A}$
	$V_R = 400\text{ V}$ , $T_C = 150^\circ\text{C}$	-	-	1.0	-	-	-	mA
	$V_R = 600\text{ V}$ , $T_C = 150^\circ\text{C}$	-	-	-	-	-	1.0	mA
$T_{rr}$	$I_F = 1\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	55	-	-	55	ns
$t_{rr}$	$I_F = 30\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	60	-	-	60	ns
$t_a$	$I_F = 30\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	30	-	-	30	-	ns
$t_b$	$I_F = 30\text{ A}$ , $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	20	-	-	20	-	ns
$R_{\theta JC}$		-	-	1.2	-	-	1.2	$^\circ\text{C}/\text{W}$

**DEFINITIONS**

$V_F$  = Instantaneous forward voltage (pw = 300  $\mu\text{s}$ , D = 2%).

$I_R$  = Instantaneous reverse current.

$T_{rr}$  = Reverse recovery time (See Figure 6), summation of  $t_a + t_b$ .

$t_a$  = Time to reach peak reverse current (See Figure 6).

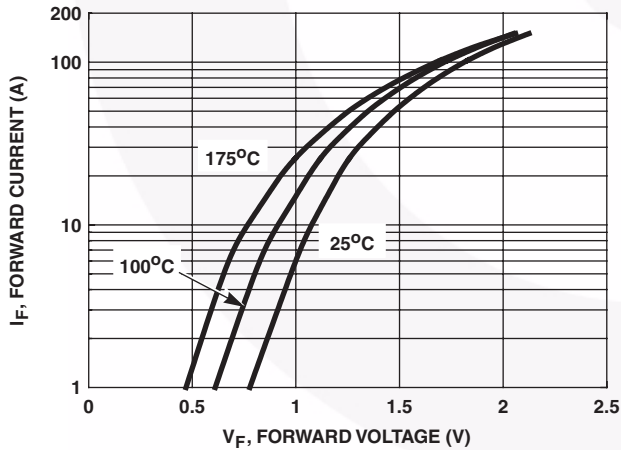
$t_b$  = Time from peak  $I_{RM}$  to projected zero crossing of  $I_{RM}$  based on a straight line from peak  $I_{RM}$  through 25% of  $I_{RM}$  (See Figure 6).

$R_{\theta JC}$  = Thermal resistance junction to case.

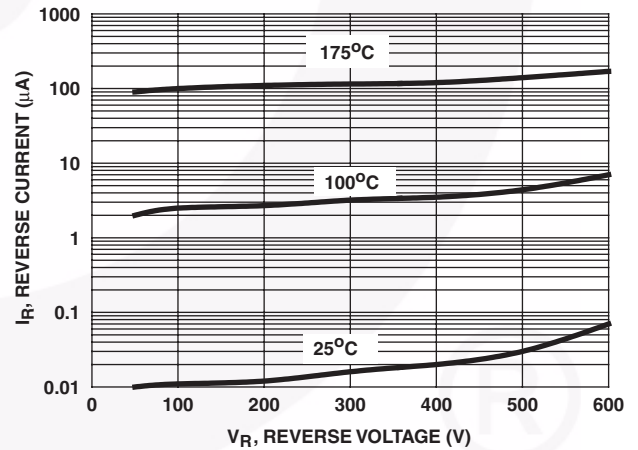
pw = Pulse width.

D = Duty cycle.

**Typical Performance Curves**



**FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE**



**FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE**

## Typical Performance Curves (Continued)

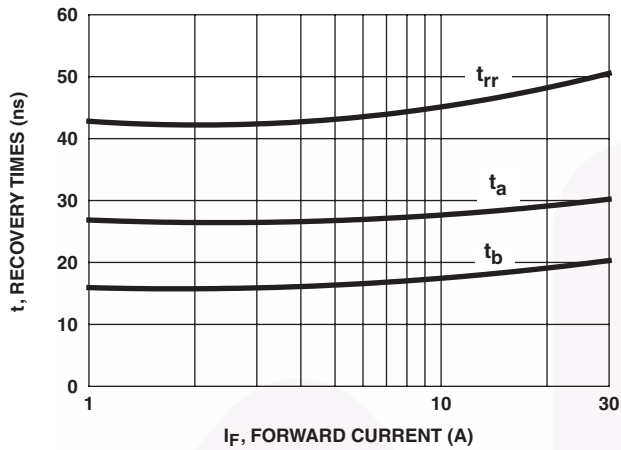


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

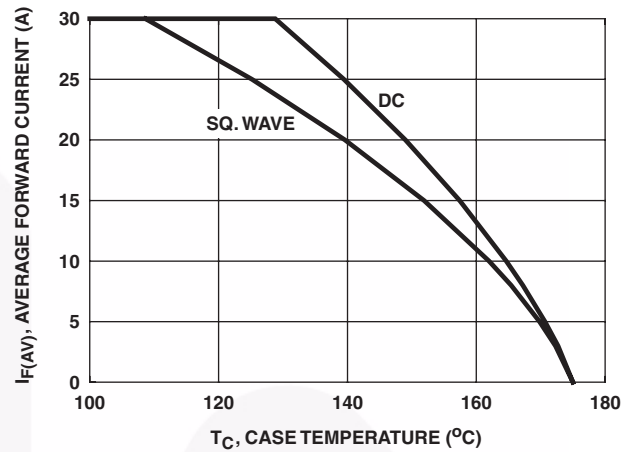


FIGURE 4. CURRENT DERATING CURVE

## Test Circuits and Waveforms

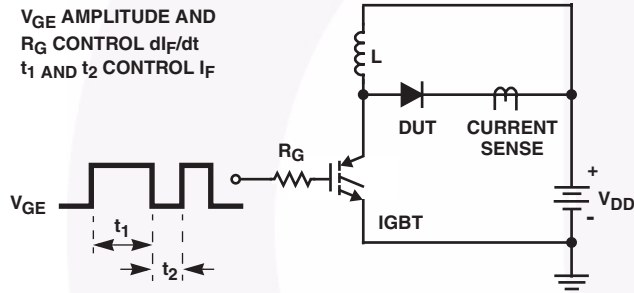


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

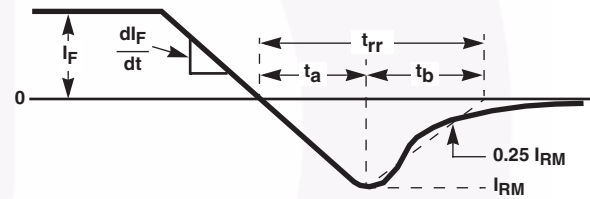


FIGURE 6.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

$I = 1A$   
 $L = 40mH$   
 $R < 0.1\Omega$   
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q_1 = IGBT (BV_{CES} > DUT V_{R(AVL)})$

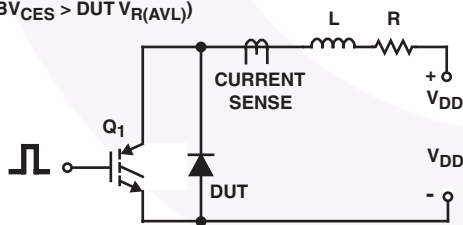


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

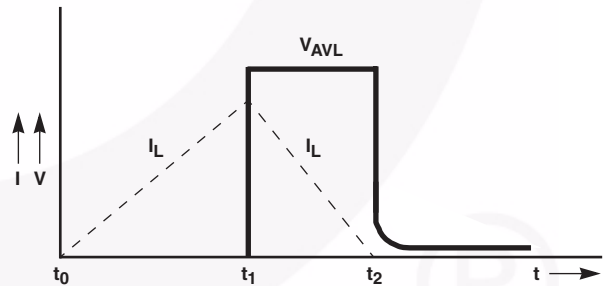
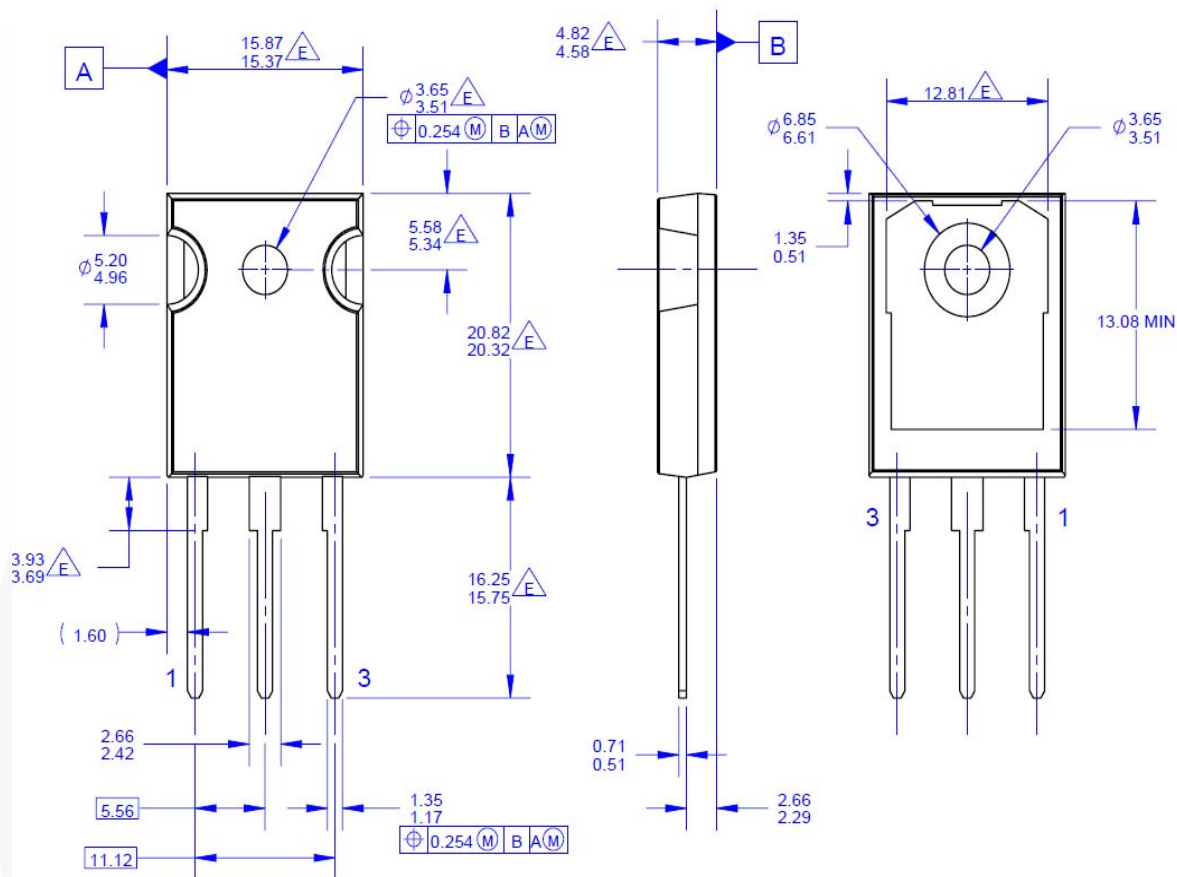


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## TO247-3L



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- D. DRAWING CONFORMS TO ASME Y14.5 - 1994

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**Figure 9. TO-247, Molded, 3LD, Jedec Option AB**

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