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## 50 A, 600 V, Ultrafast Diode

### Description

The RURG5060 is an ultrafast 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
RURG5060	TO-247-2L	RURG5060

NOTE: When ordering, use the entire part number.

### Symbol



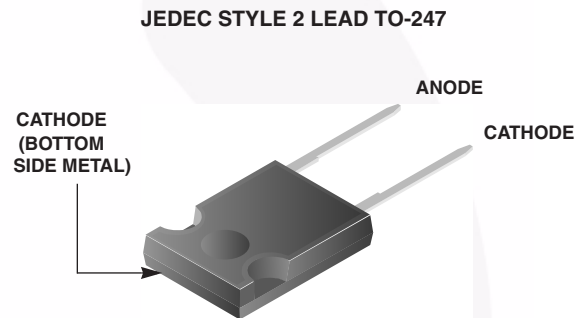
### Features

- Ultrafast Recovery  $t_{rr} = 75 \text{ ns}$  (@  $I_F = 50 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.6 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- 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 $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

	RURG5060	UNIT
Peak Repetitive Reverse Voltage .....	600	V
Working Peak Reverse Voltage .....	600	V
DC Blocking Voltage .....	600	V
Average Rectified Forward Current .....	50	A
( $T_C = 102^\circ\text{C}$ )		
Repetitive Peak Surge Current .....	100	A
(Square Wave, 20kHz)		
Nonrepetitive Peak Surge Current .....	500	A
(Halfwave, 1 Phase, 60Hz)		
Maximum Power Dissipation .....	150	W
Avalanche Energy (See Figures 7 and 8) .....	40	mJ
Operating and Storage Temperature .....	-65 to 175	$^\circ\text{C}$

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
$V_F$	$I_F = 50\text{ A}$	-	-	1.6	V
	$I_F = 50\text{ A}, T_C = 150^\circ\text{C}$	-	-	1.4	V
$I_R$	$V_R = 600\text{ V}$	-	-	250	$\mu\text{A}$
	$V_R = 600\text{ V}, T_C = 150^\circ\text{C}$	-	-	1.5	mA
$t_{rr}$	$I_F = 1\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	65	ns
	$I_F = 50\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	75	ns
$t_a$	$I_F = 50\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	30	-	ns
$t_b$	$I_F = 50\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	20	-	ns
$R_{\theta JC}$		-	-	1	$^\circ\text{C}/\text{W}$

**DEFINITIONS**

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

$I_R$  = Instantaneous reverse current.

$T_{rr}$  = Reverse recovery time at  $dI_F/dt = 100\text{A}/\mu\text{s}$  (See Figure 6), 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 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.

$p_w$  = Pulse width.

$D$  = Duty cycle.

**Typical Performance Curves**

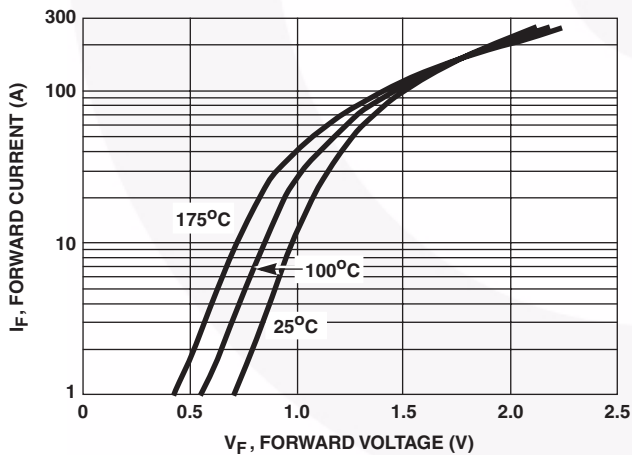


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

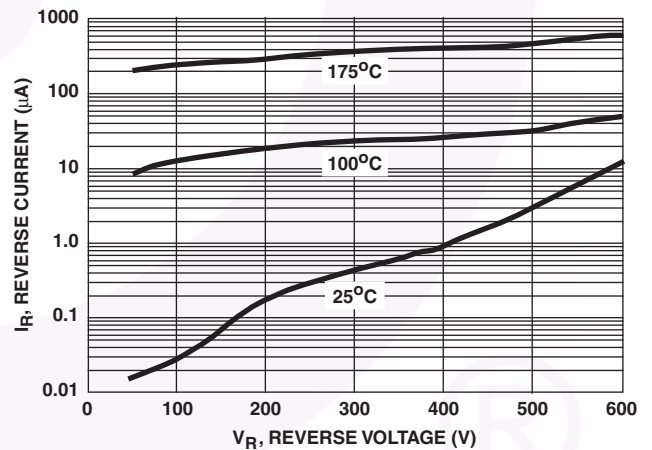


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

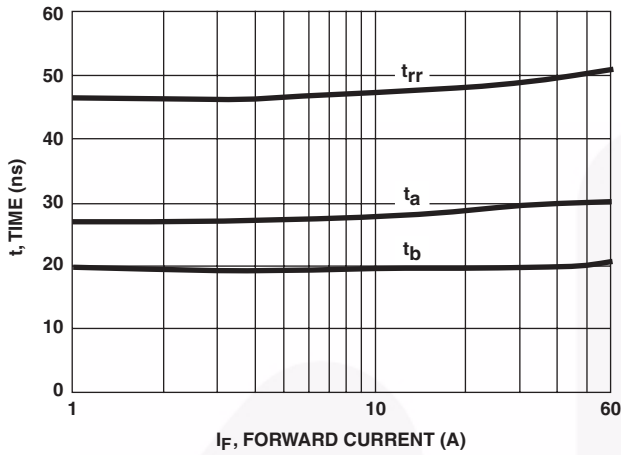


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

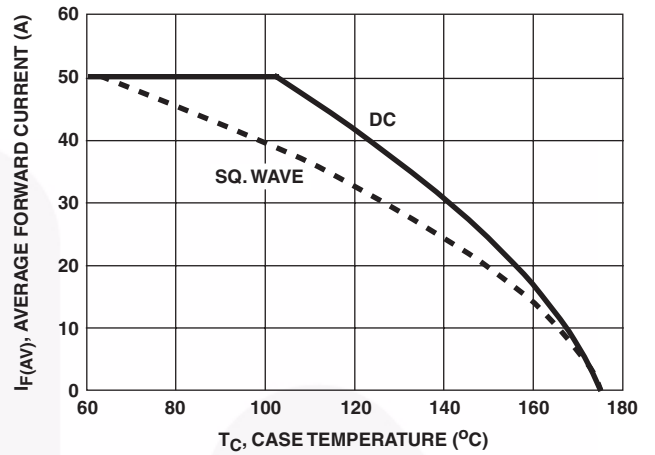


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

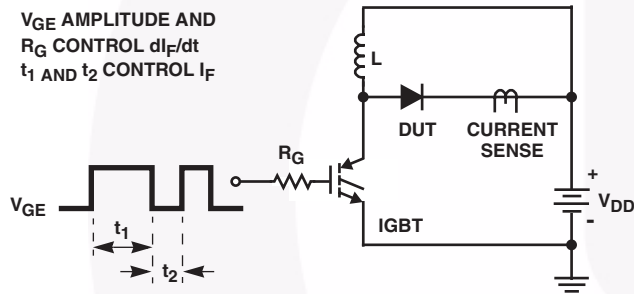


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

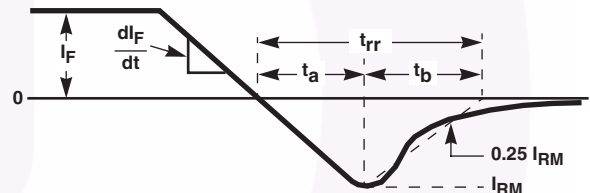


FIGURE 6.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

$I = 1.4A$   
 $L = 40mH$   
 $R < 0.1\Omega$   
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q_1 = IGBT (BV_{CES} > DUT V_{R(AVL)})$

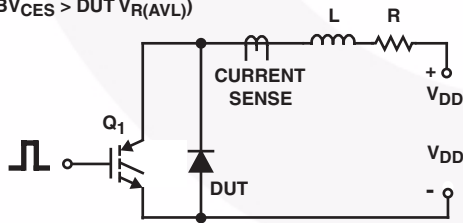


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

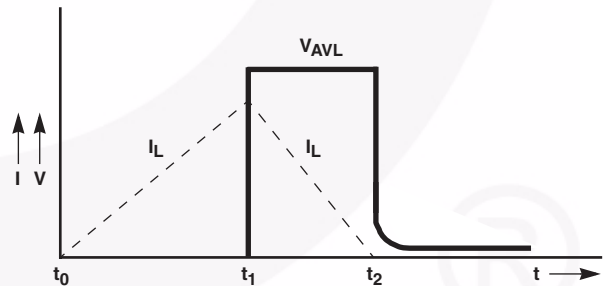


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions

## TO247-2L

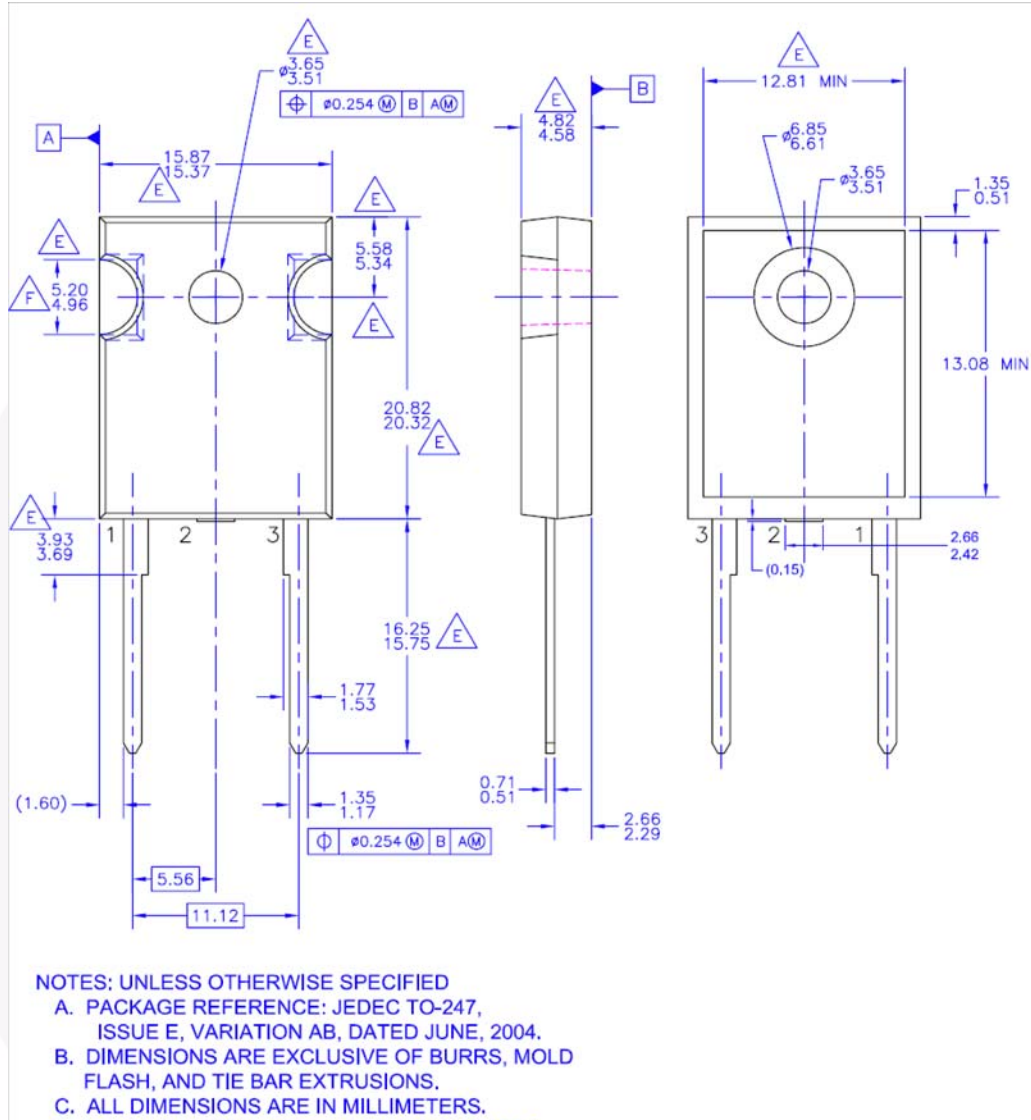


Figure 9. TO-247, Molded, 2LD, Jedec Option AB

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