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## 30 A, 600 V, Ultrafast Diode

### Description

The RURG3060 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    |
|-------------|-----------|----------|
| RURG3060    | TO-247-2L | RURG3060 |

NOTE: When ordering, use the entire part number.

### Symbol



### Features

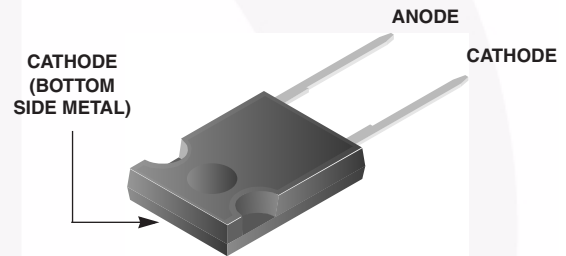
- Ultrafast Recovery  $t_{rr} = 60$  ns (@  $I_F = 30$  A)
- Max Forward Voltage,  $V_F = 1.5$  V (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Packaging

JEDEC STYLE 2 LEAD TO-247



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

|                                              | RURG3060                  | UNIT             |
|----------------------------------------------|---------------------------|------------------|
| Peak Repetitive Reverse Voltage .....        | $V_{RRM}$ 600             | V                |
| Working Peak Reverse Voltage .....           | $V_{RWM}$ 600             | V                |
| DC Blocking Voltage .....                    | $V_R$ 600                 | V                |
| Average Rectified Forward Current .....      | $I_{F(AV)}$ 30            | A                |
| ( $T_C = 130^\circ\text{C}$ )                |                           |                  |
| Repetitive Peak Surge Current .....          | $I_{FRM}$ 70              | A                |
| (Square Wave, 20 kHz)                        |                           |                  |
| Nonrepetitive Peak Surge Current .....       | $I_{FSM}$ 325             | A                |
| (Halfwave, 1 Phase, 60 Hz)                   |                           |                  |
| Maximum Power Dissipation .....              | $P_D$ 125                 | W                |
| Avalanche Energy (See Figures 7 and 8) ..... | $E_{AVL}$ 20              | mJ               |
| Operating and Storage Temperature .....      | $T_{STG}, T_J$ -65 to 175 | $^\circ\text{C}$ |

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

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

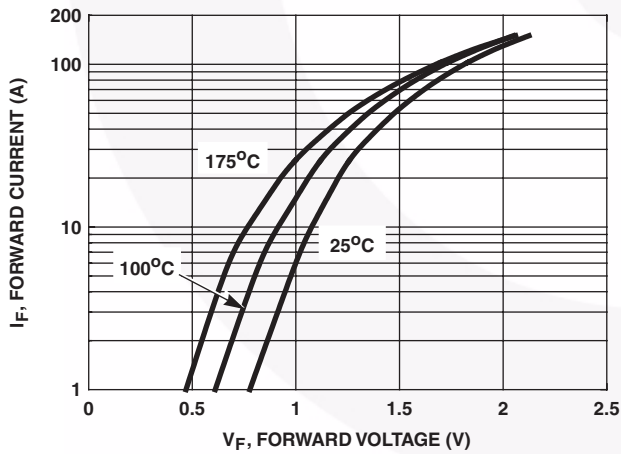


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

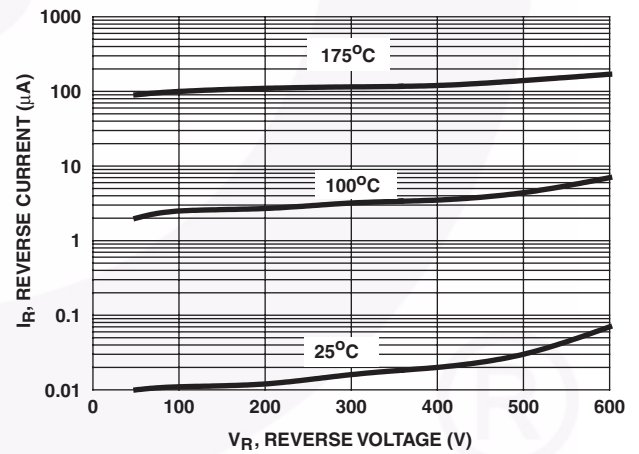


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

## Typical Performance Curves (Continued)

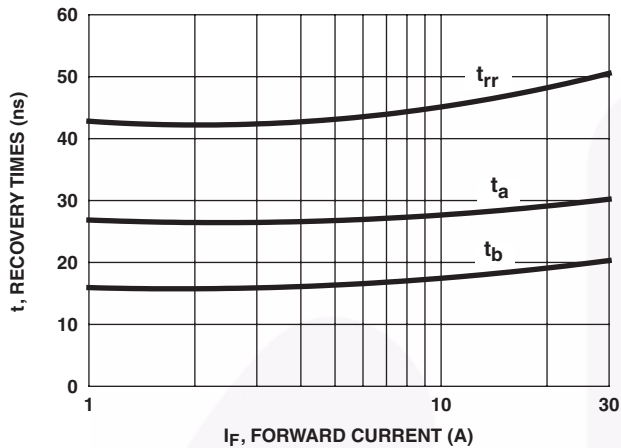


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

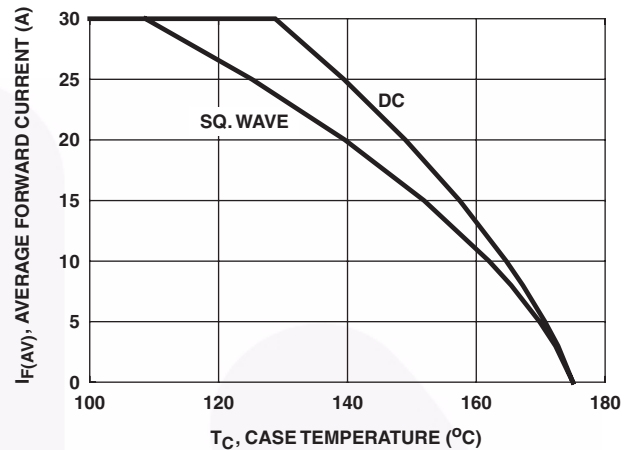


FIGURE 4. CURRENT DERATING CURVE

## Test Circuits and Waveforms

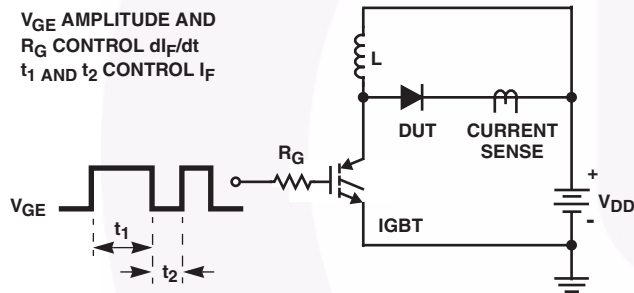


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

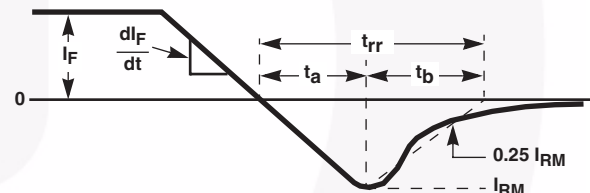


FIGURE 6.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

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

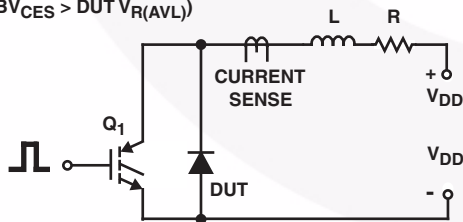


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

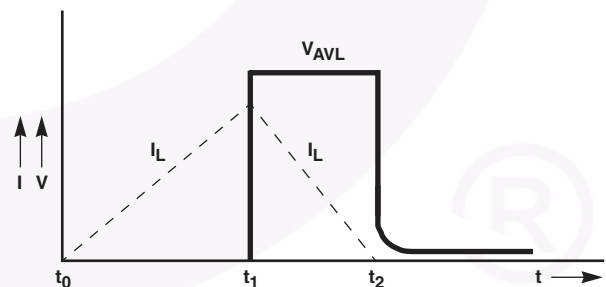
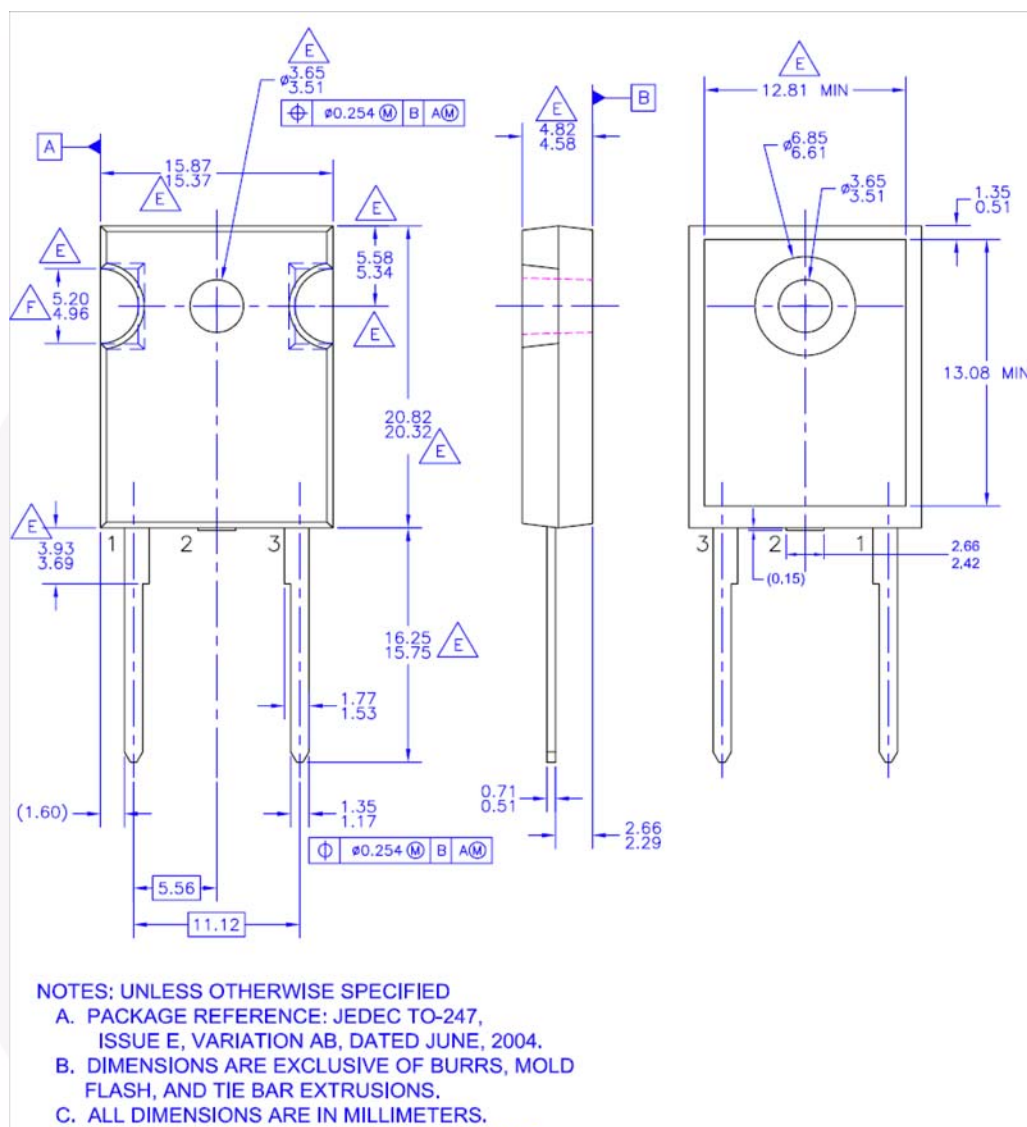


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions

TO247-2L



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

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| Fairchild®                                                                        | MicroPak2™                                      | SuperSOT™-3                           | UHC®                                                                                |
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| FETBench™                                                                         | OPTOPLANAR®                                     |                                       | XS™                                                                                 |
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