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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



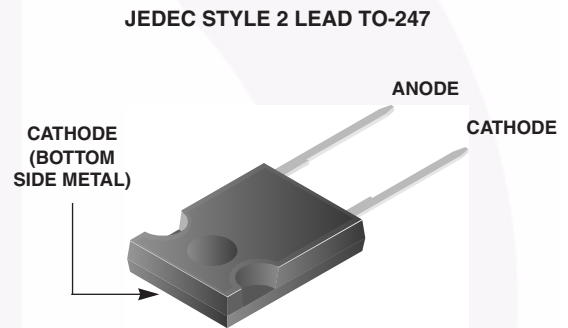
Features

- 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



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 | μA |
| | $V_R = 600\text{ V}, T_C = 150^\circ\text{C}$ | - | 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 ($p_w = 300\ \mu\text{s}$, $D = 2\%$).

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.

p_w = Pulse width.

D = Duty cycle.

Typical Performance Curves

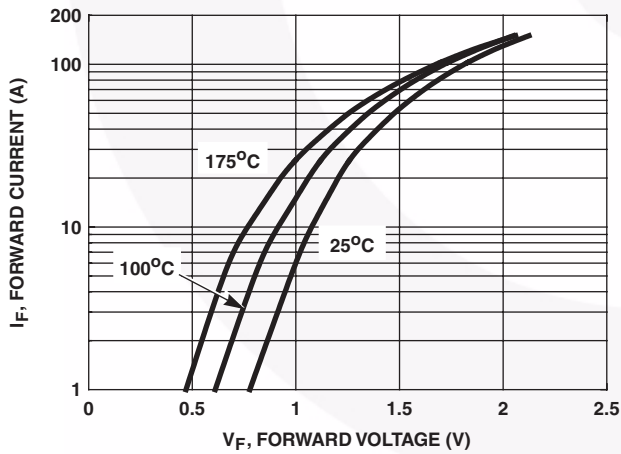


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

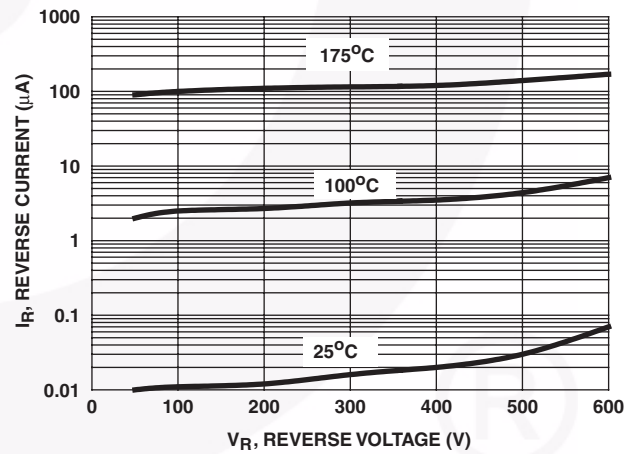


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

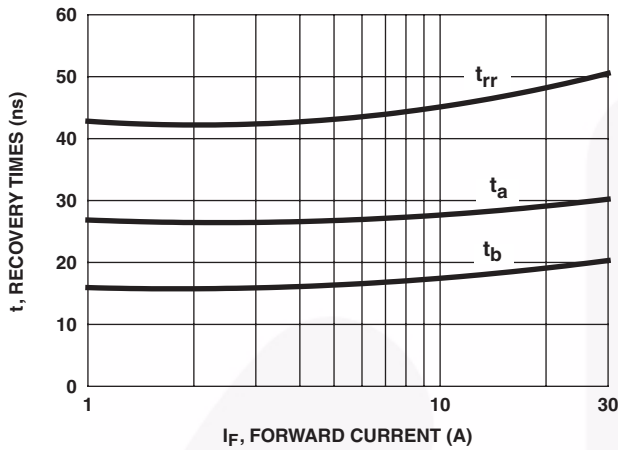


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

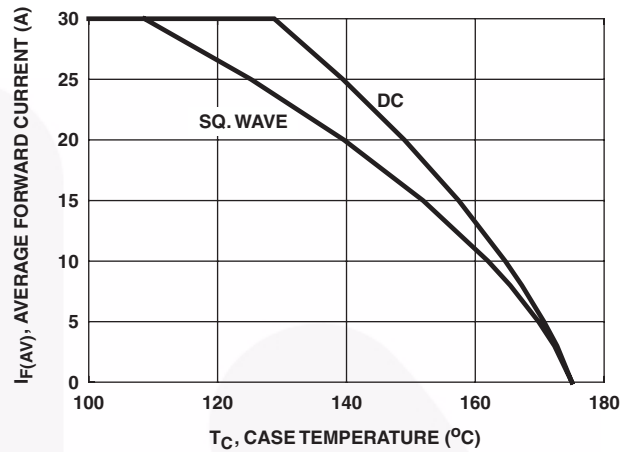


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

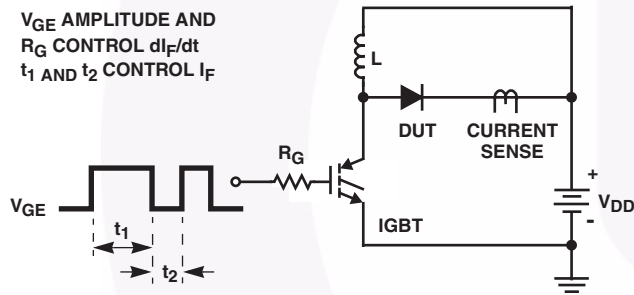


FIGURE 5. t_{rr} TEST CIRCUIT

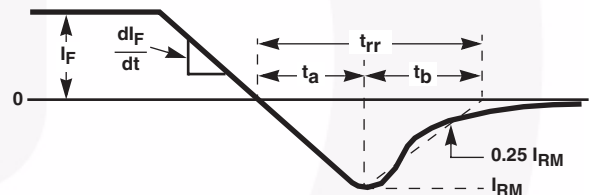


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

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

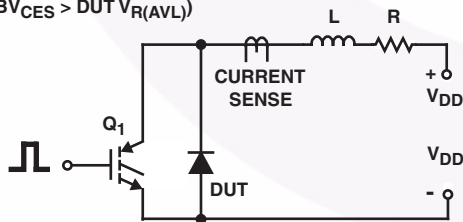


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

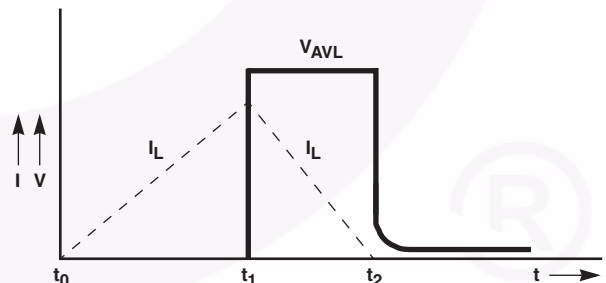


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

TO247-2L

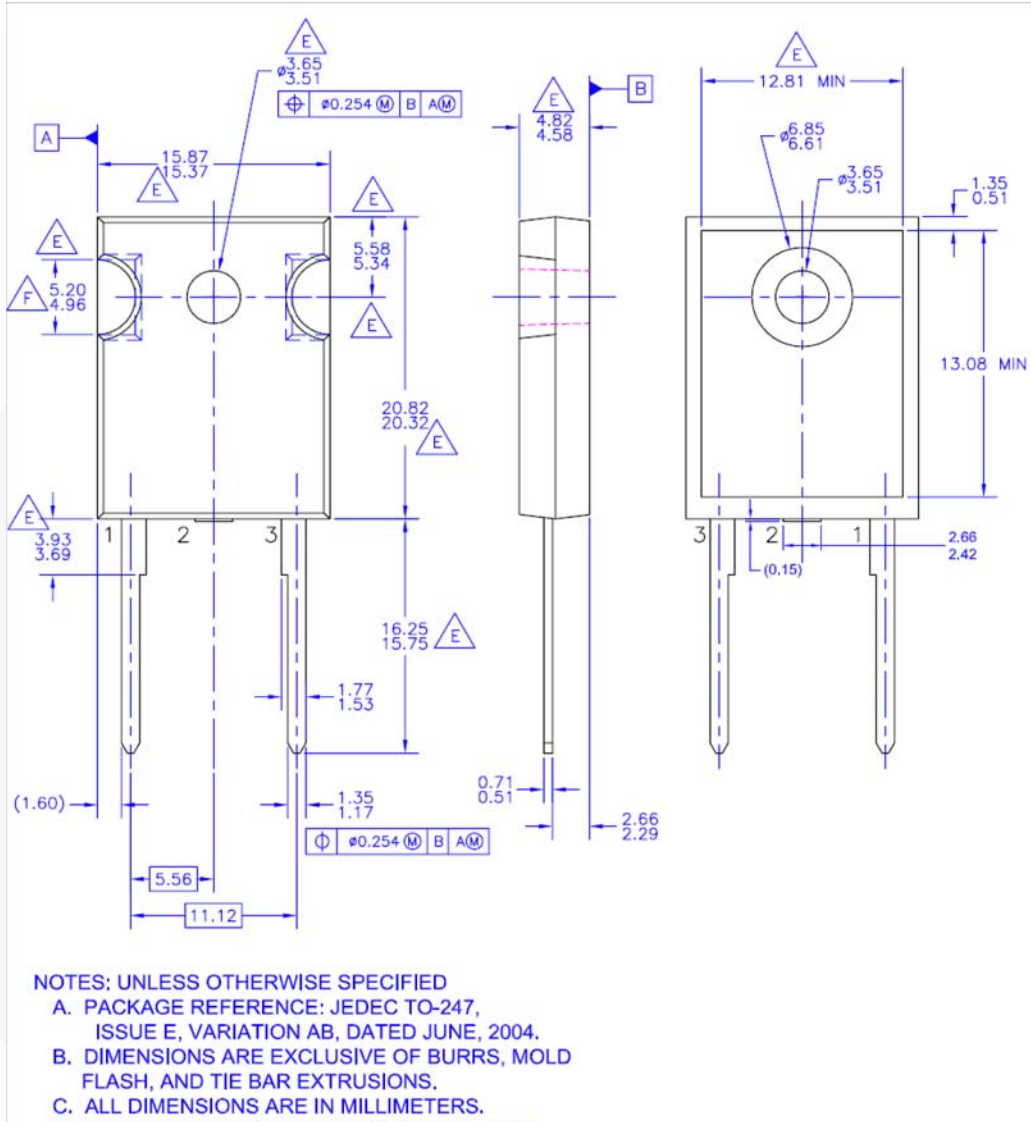


Figure 9. TO-247, Molded, 2LD, Jedec Option AB

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