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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.

## Features

- Ultrafast Recovery $t_{rr}$ = 75 ns (@ $I_F$ = 50 A)
- Max Forward Voltage, $V_F$ = 1.6 V (@ $T_C$ = 25°C)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

## Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

## Ordering Information

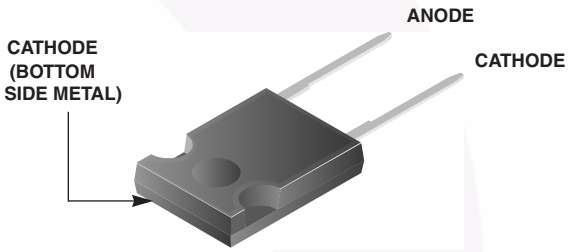
| PART NUMBER | PACKAGE | BRAND |
|---|---|---|
| RURG5060 | TO-247-2L | RURG5060 |

NOTE: When ordering, use the entire part number.

## Symbol


## Packaging

JEDEC STYLE 2 LEAD TO-247




## Absolute Maximum Ratings $T_C$ = 25°C, Unless Otherwise Specified

| | | RURG5060 | 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 ($T_C$ = 102°C) | $I_{F(AV)}$ | 50 | A |
| Repetitive Peak Surge Current (Square Wave, 20kHz) | $I_{FRM}$ | 100 | A |
| Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz) | $I_{FSM}$ | 500 | A |
| Maximum Power Dissipation | $P_D$ | 150 | W |
| Avalanche Energy (See Figures 7 and 8) | $E_{AVL}$ | 40 | mJ |
| Operating and Storage Temperature | $T_{STG}$, $T_J$ | -65 to 175 | °C |

## Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

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

DEFINITIONS

$V_F$ = Instantaneous forward voltage (pw = 300μs, D = 2%).

$I_R$ = Instantaneous reverse current.

$T_{rr}$ = Reverse recovery time at $dI_F/dt$ = 100A/μs (See Figure 6), summation of $t_a + t_b$.

$t_a$ = Time to reach peak reverse current at $dI_F/dt$ = 100A/μs (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*

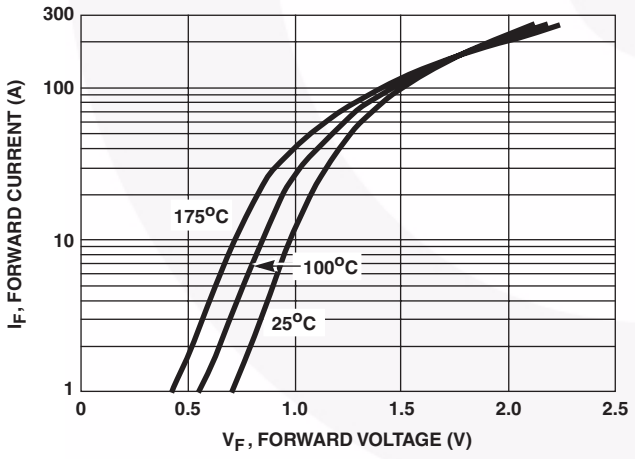



**FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE**

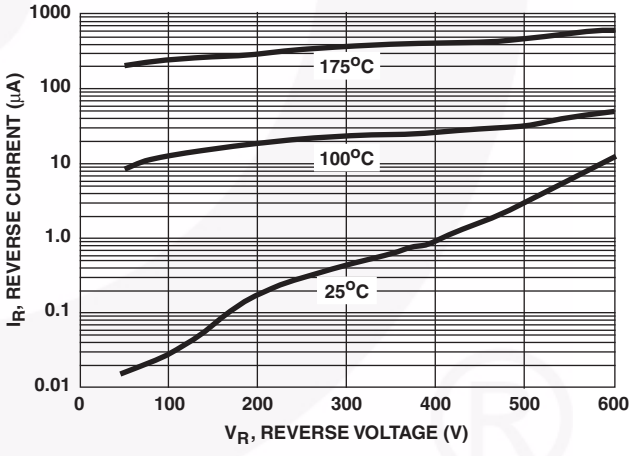



**FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE**

## Typical Performance Curves (Continued)

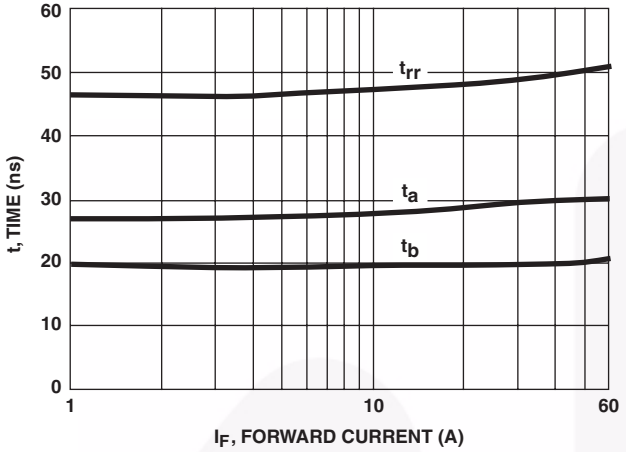



FIGURE 3. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

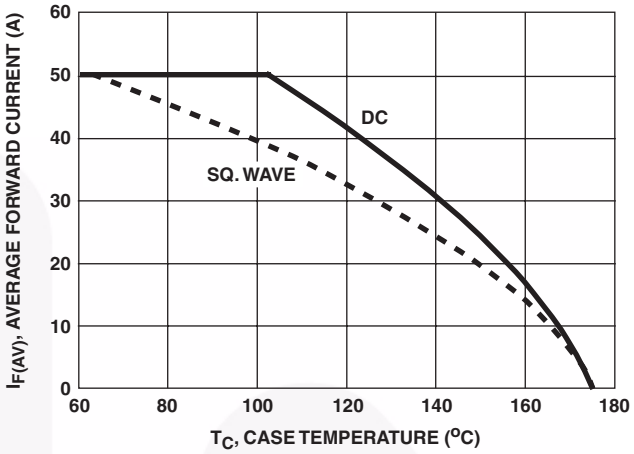



FIGURE 4. CURRENT DERATING CURVE

## Test Circuits and Waveforms

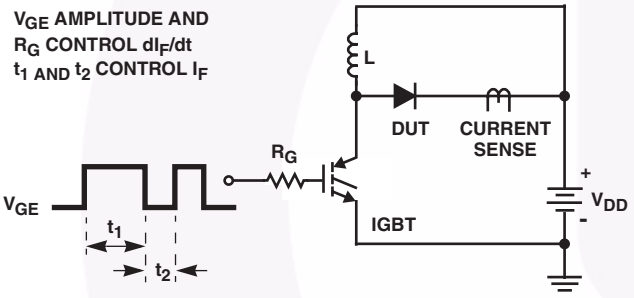



FIGURE 5. $t_{rr}$ TEST CIRCUIT

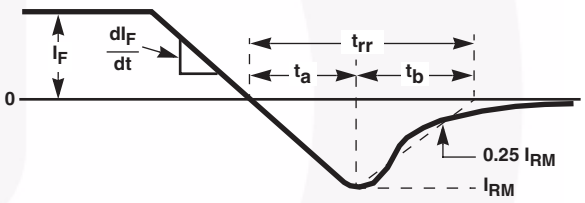



FIGURE 6. $t_{rr}$ WAVEFORMS AND DEFINITIONS

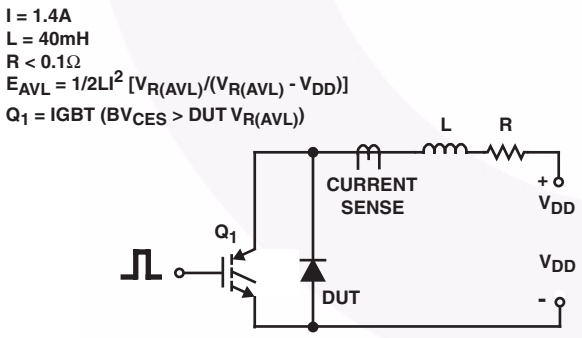



FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

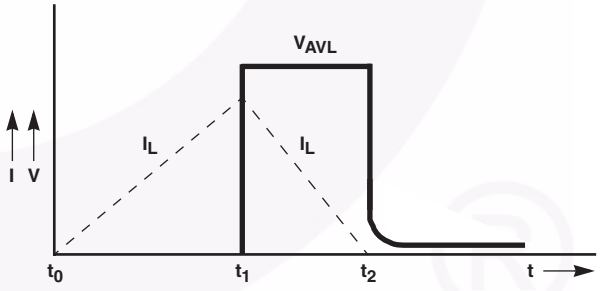



FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions

# TO247-2L

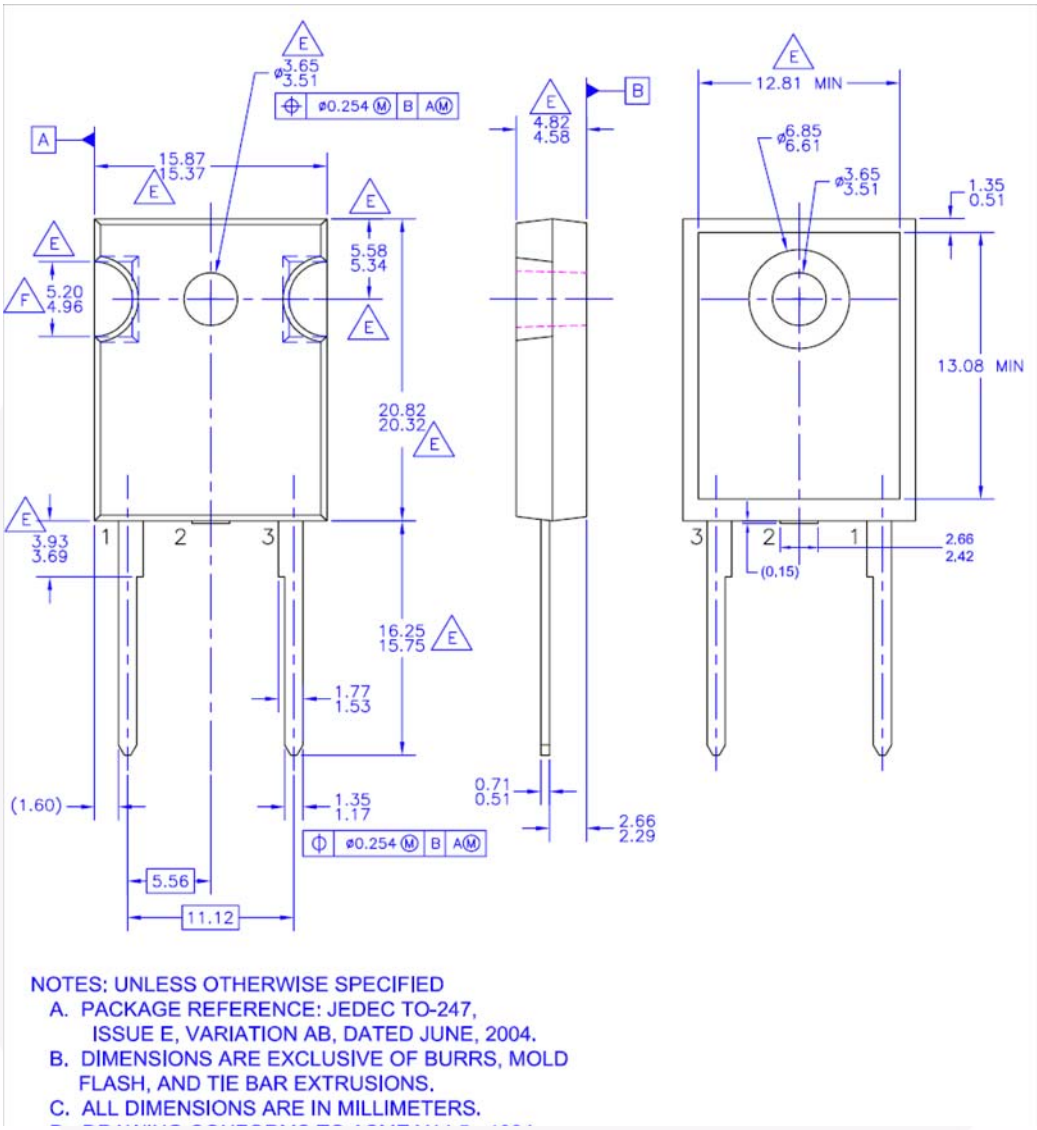



**Figure 9. TO-247,Molded, 2LD, Jedec Option AB**

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