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4 A, 600 V, Ultrafast Diode

The RURD460, RURD460S 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 $t_{rr} = 60 \text{ ns}$ ($@I_F = 4 \text{ A}$)
- Max Forward Voltage, $V_F = 1.5 \text{ V}$ ($@ T_C = 25^\circ\text{C}$)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Ordering Information

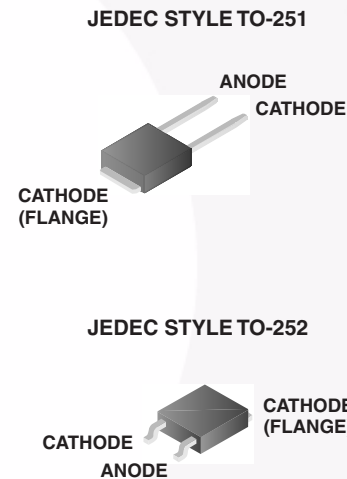
| PART NUMBER | PACKAGE | BRAND |
|-------------|-----------|--------|
| RURD460 | TO-251-2L | RUR460 |
| RURD460S | TO-252-3L | RUR460 |

NOTE: When ordering, use the entire part number. Add suffix 9A to obtain the TO-252 variant in tape and reel, i.e., RURD460S9A.

Symbol



Packaging



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

| | RURD460 | RURD460S | UNIT |
|--|------------|------------|------------------|
| Peak Repetitive Reverse Voltage | 600 | 600 | V |
| Working Peak Reverse Voltage | 600 | 600 | V |
| DC Blocking Voltage | 600 | 600 | V |
| Average Rectified Forward Current ($T_C = 160^\circ\text{C}$) | 4 | 4 | A |
| Repetitive Peak Surge Current (Square Wave, 20 kHz) | 8 | 8 | A |
| Nonrepetitive Peak Surge Current (Halfwave, 1 phase, 60 Hz) | 40 | 40 | A |
| Maximum Power Dissipation | 50 | 50 | W |
| Avalanche Energy (See Figures 9 and 10) | 10 | 10 | mJ |
| Operating and Storage Temperature | -65 to 175 | -65 to 175 | $^\circ\text{C}$ |
| Maximum Lead Temperature for Soldering | | | |
| Leads at 0.063 in. (1.6mm) from case for 10s | 300 | 300 | $^\circ\text{C}$ |
| Package Body for 10s, see Tech Brief 334. | 260 | 260 | $^\circ\text{C}$ |

RURD460, RURD460S

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

| SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|-----------------|--|-----|-----|-----|---------------------------|
| V_F | $I_F = 4\text{ A}$ | - | - | 1.5 | V |
| | $I_F = 4\text{ A}, T_C = 150^\circ\text{C}$ | - | - | 1.2 | V |
| I_R | $V_R = 600\text{ V}$ | - | - | 100 | μA |
| | $V_R = 600\text{ V}, T_C = 150^\circ\text{C}$ | - | - | 500 | μA |
| t_{rr} | $I_F = 1\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | - | 55 | ns |
| | $I_F = 4\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | - | 60 | ns |
| t_a | $I_F = 4\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | 32 | - | ns |
| t_b | $I_F = 4\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | 15 | - | ns |
| Q_{rr} | $I_F = 4\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | 50 | - | nC |
| C_J | $V_R = 10\text{ V}, I_F = 0\text{ A}$ | - | 15 | - | pF |
| $R_{\theta JC}$ | | - | - | 3 | $^\circ\text{C}/\text{W}$ |

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 8), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current (See Figure 8).

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 8).

Q_{rr} = Reverse recovery time.

C_J = Junction capacitance.

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

p_w = Pulse width.

D = Duty cycle.

Typical Performance Curves

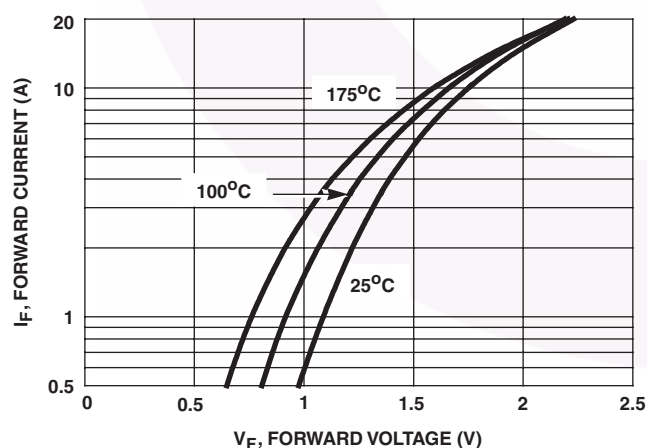


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

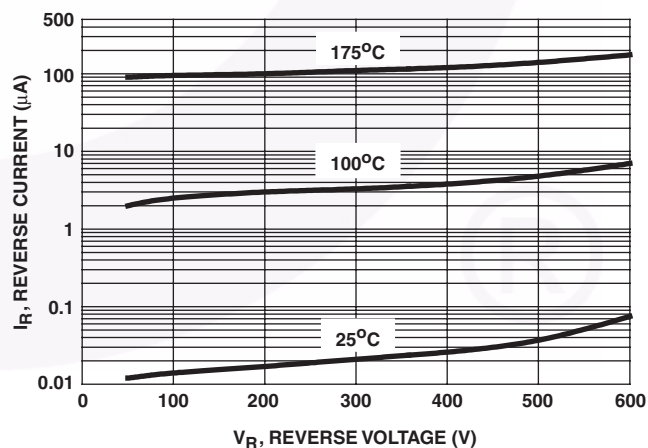


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

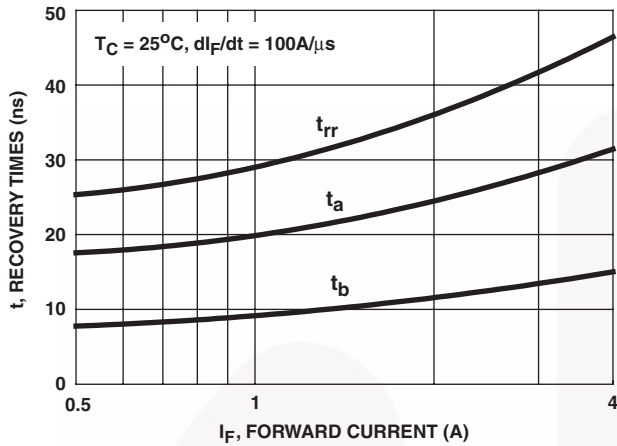


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

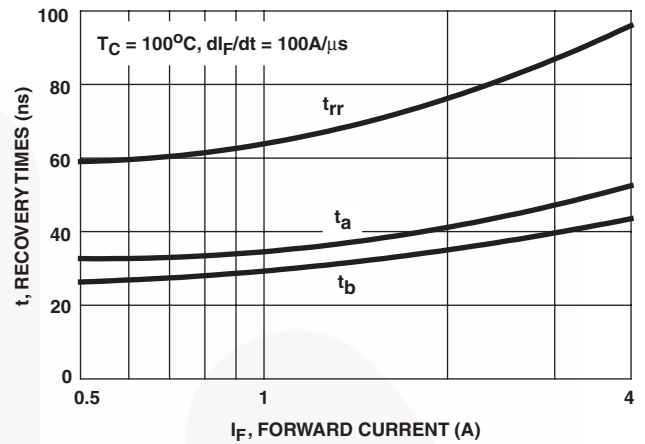


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

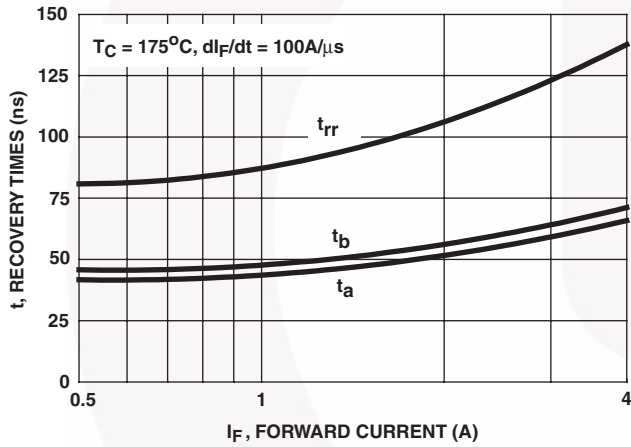


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

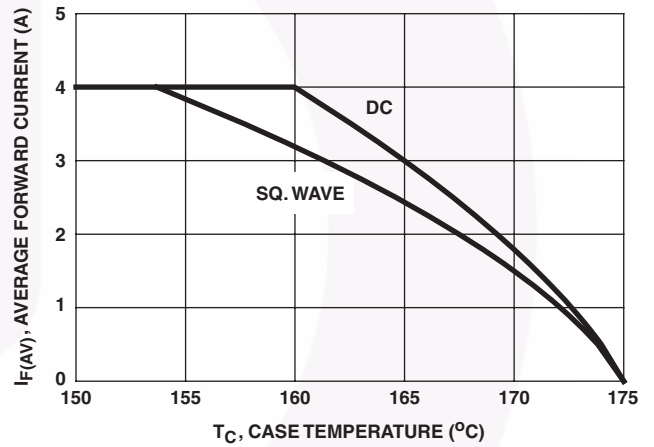


FIGURE 6. CURRENT DERATING CURVE

Test Circuits and Waveforms

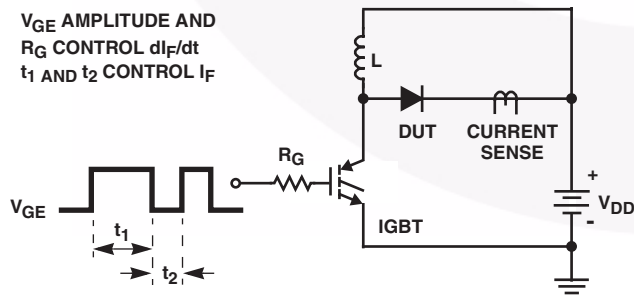


FIGURE 7. t_{rr} TEST CIRCUIT

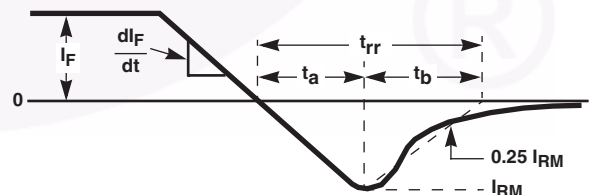


FIGURE 8. t_{rr} WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

$I = 1\text{A}$
 $L = 20\text{mH}$
 $R < 0.1\Omega$
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 $Q_1 = \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)})$

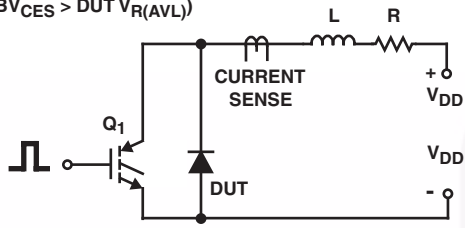


FIGURE 9. AVALANCHE ENERGY TEST CIRCUIT

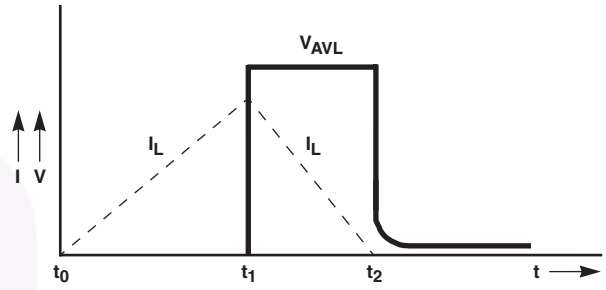


FIGURE 10. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

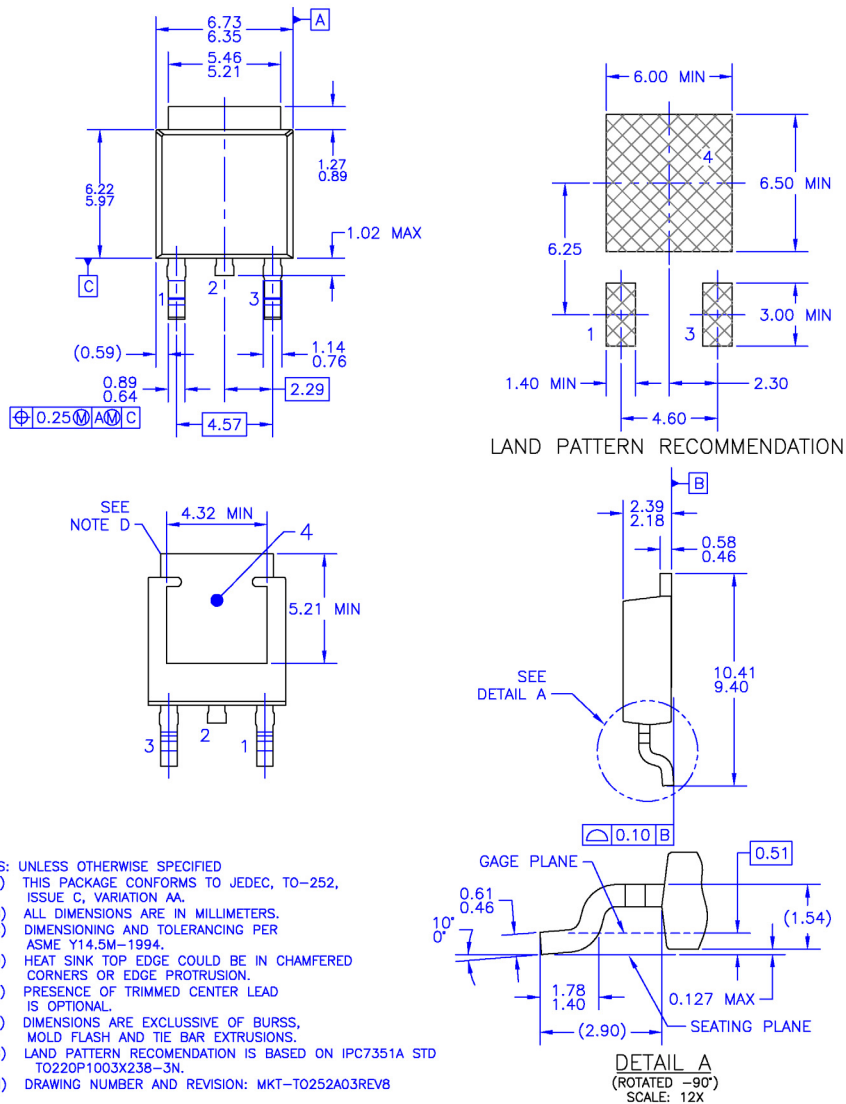


Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD, OPTION AA&AB

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