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# 6 A, 600 V, Ultrafast Diode

The RURD660, RURD660S 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 ns (@ $I_F$ = 6 A)
- Max Forward Voltage, $V_F$ = 1.5 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 |
|---|---|---|
| RURD660 | TO-251-2L | RUR660 |
| RURD660S | TO-252-3L | RUR660 |

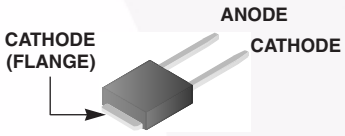
NOTE: When ordering, use the entire part number. Add the suffix 9A to obtain the TO-252 variant in the tape and reel, i.e., RURD660S9A.

## Symbol

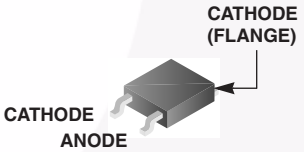



## Packaging

JEDEC STYLE TO-251




JEDEC STYLE TO-252




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

| | | RURD660 RURD660S | 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 ($T_C$ = 155°C) | $I_{F(AV)}$ | 6 | A |
| Repetitive Peak Surge Current (Square Wave, 20 kHz) | $I_{FRM}$ | 12 | A |
| Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60 Hz) | $I_{FSM}$ | 60 | A |
| Maximum Power Dissipation | $P_D$ | 50 | W |
| Avalanche Energy (See Figures 10 and 11) | $E_{AVL}$ | 10 | mJ |
| Operating and Storage Temperature | $T_{STG}$, $T_J$ | -65 to 175 | °C |
| Maximum Lead Temperature for Soldering | | | |
| Leads at 0.063 in. (1.6mm) from case for 10s | $T_L$ | 300 | °C |
| Package Body for 10s, see Tech Brief 334 | $T_{PKG}$ | 260 | °C |

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

| SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $V_F$ | $I_F$ = 6 A | - | - | 1.5 | V |
| | $I_F$ = 6 A, $T_C = 150^oC$ | - | - | 1.2 | V |
| $I_R$ | $V_R$ = 600 V | - | - | 100 | μA |
| | $V_R$ = 600 V, $T_C = 150^oC$ | - | - | 500 | μA |
| $t_{rr}$ | $I_F$ = 1 A, $dI_F/dt$ = 200 A/μs | - | - | 55 | ns |
| | $I_F$ = 6 A, $dI_F/dt$ = 200 A/μs | - | - | 60 | ns |
| $t_a$ | $I_F$ = 6 A, $dI_F/dt$ = 200 A/μs | - | 28 | - | ns |
| $t_b$ | $I_F$ = 6 A, $dI_F/dt$ = 200 A/μs | - | 16 | - | ns |
| $Q_{RR}$ | $I_F$ = 6 A, $dI_F/dt$ = 200 A/μs | - | 150 | - | nC |
| $C_J$ | $V_R$ = 10 V, $I_F$ = 0 A | - | 25 | - | pF |
| $R_{\theta JC}$ | | - | - | 3 | $^oC/W$ |

DEFINITIONS

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

$I_R$ = Instantaneous reverse current.

$t_{rr}$ = Reverse recovery time (See Figure 9), summation of $t_a + t_b$.

$t_a$ = Time to reach peak reverse current (See Figure 9).

$t_b$ = 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 9).

$Q_{RR}$ = Reverse recovery charge.

$C_J$ = Junction capacitance.

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

pw = Pulse width.

D = Duty cycle.

## *Typical Performance Curves*

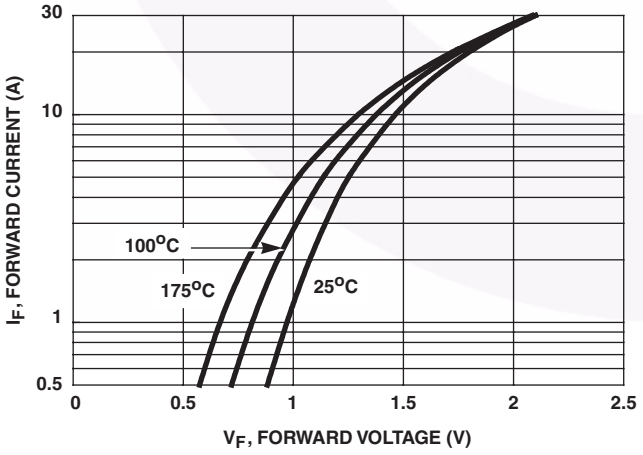



FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

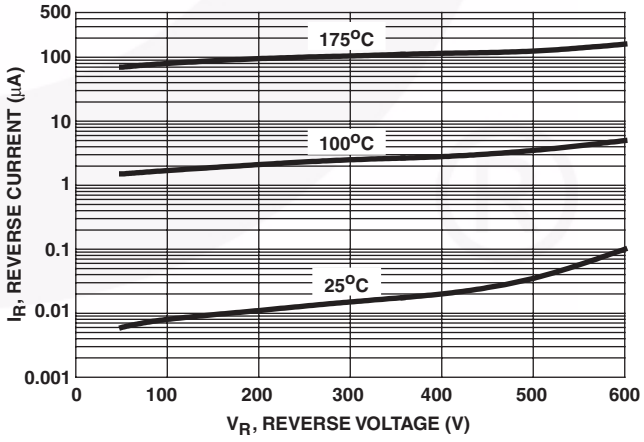



FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

## Typical Performance Curves (Continued)

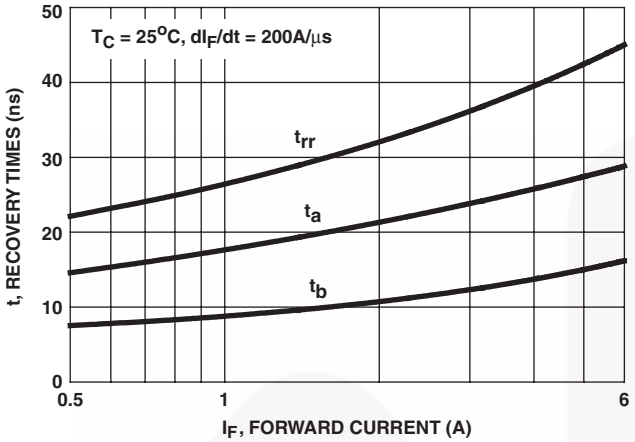



FIGURE 3. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

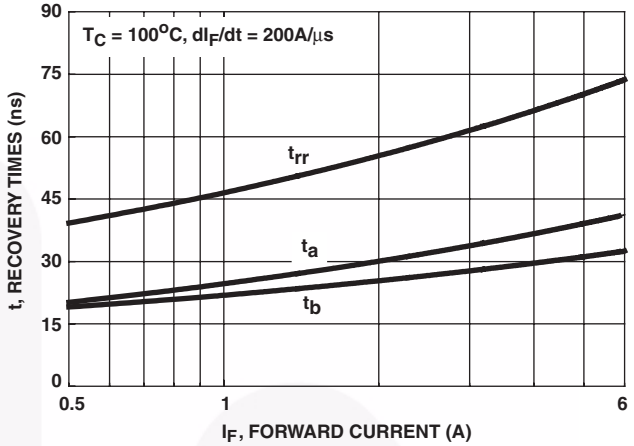



FIGURE 4. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

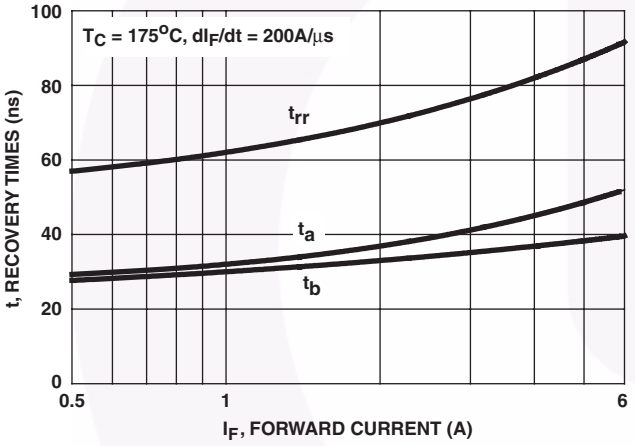



FIGURE 5. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

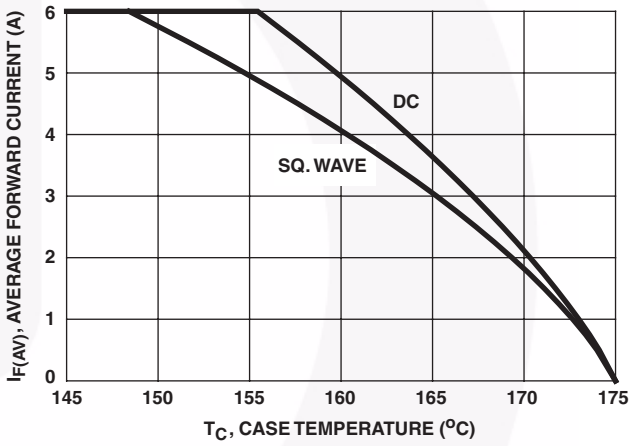



FIGURE 6. CURRENT DERATING CURVE

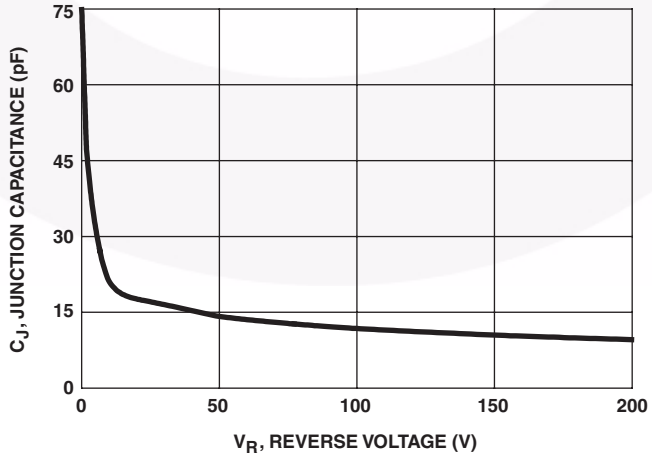



FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

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## Test Circuits and Waveforms

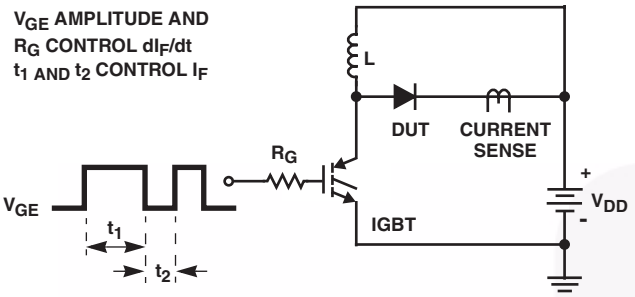



FIGURE 8. $t_{rr}$ TEST CIRCUIT

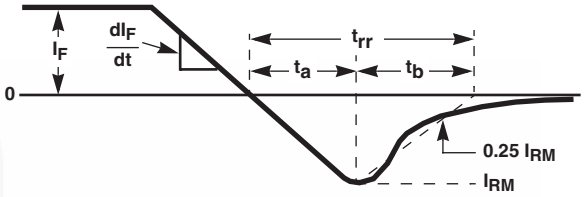



FIGURE 9. $t_{rr}$ WAVEFORMS AND DEFINITIONS

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

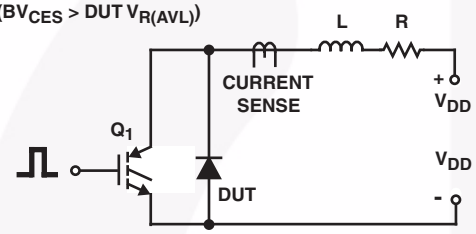



FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

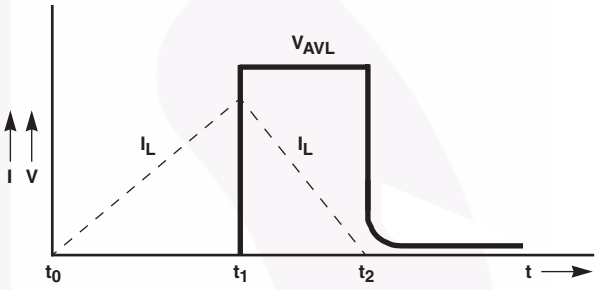



FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions

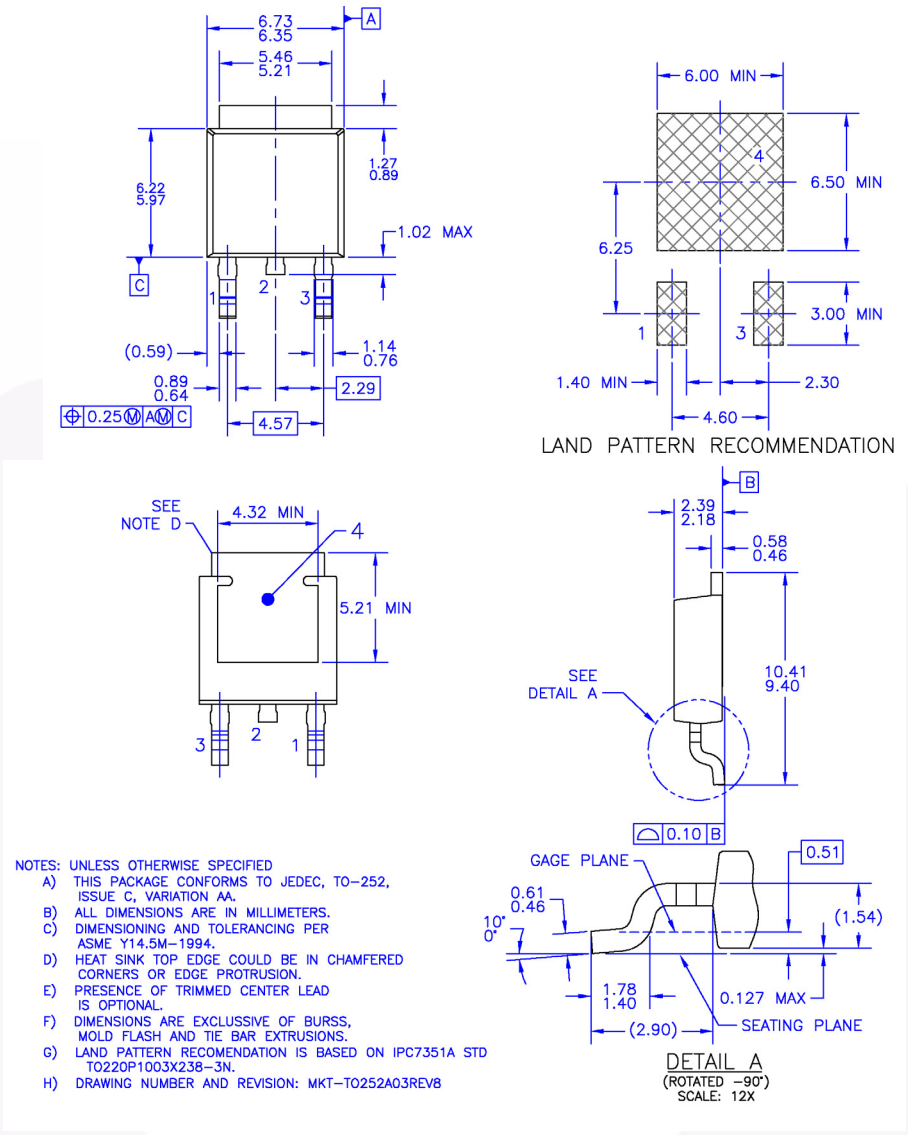



**Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD,OPTION AA&AB**

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