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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

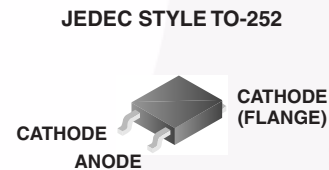
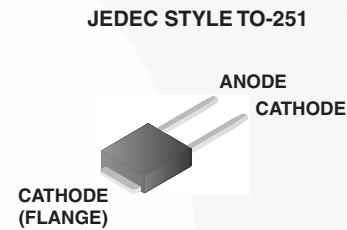
PART NUMBER	PACKAGE	BRAND
RURD460	TO-251-2L	RUR460
RURD460S	TO-252-3L	RUR460

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	$\mu\text{A}$
	$V_R = 600\text{ V}, T_C = 150^\circ\text{C}$	-	-	500	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	-	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

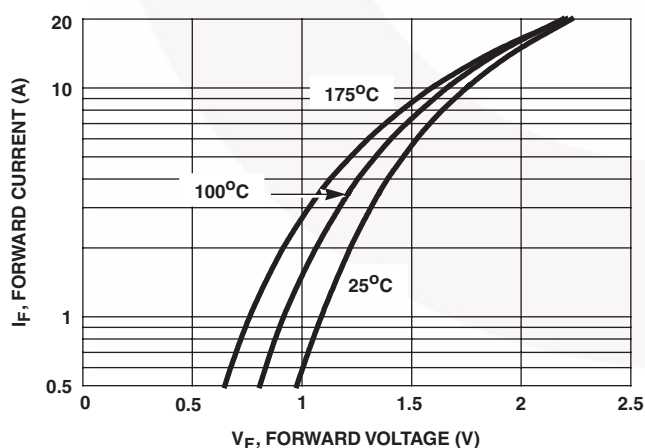


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

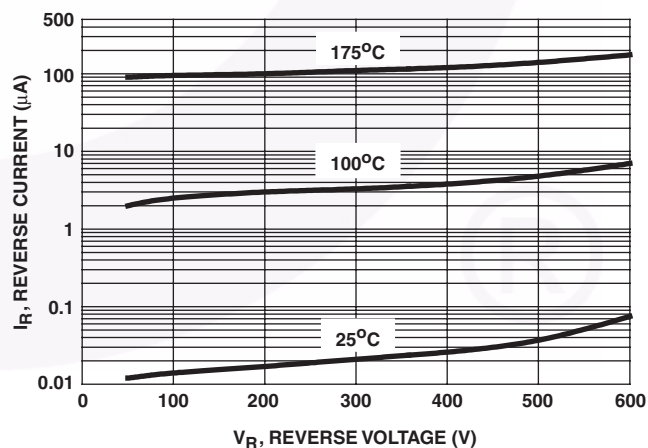


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

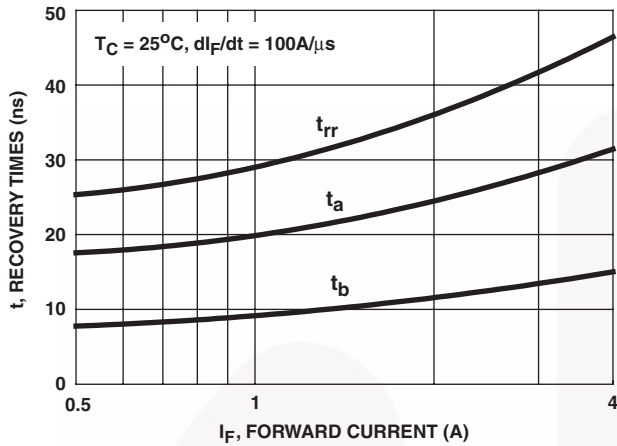


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

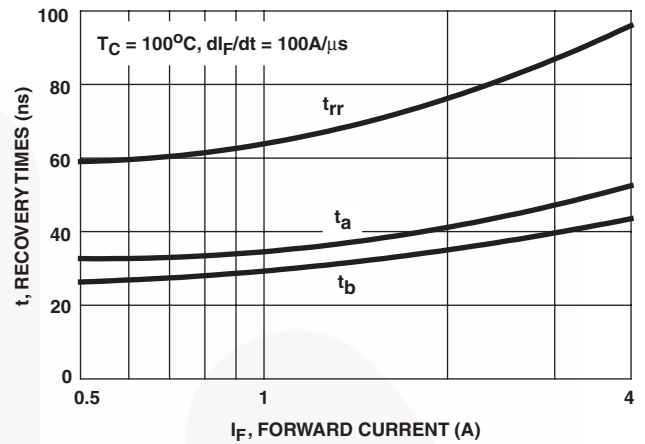


FIGURE 4.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

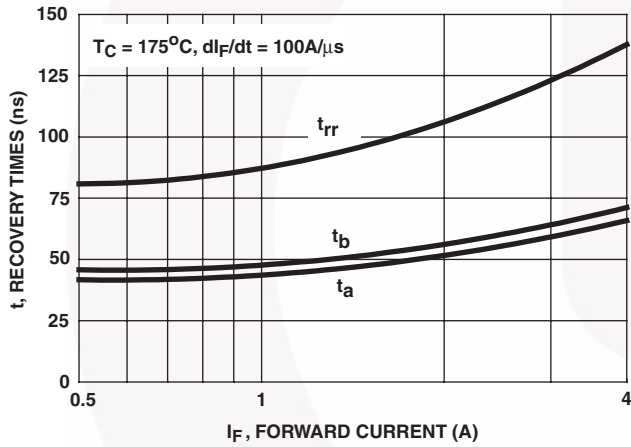


FIGURE 5.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

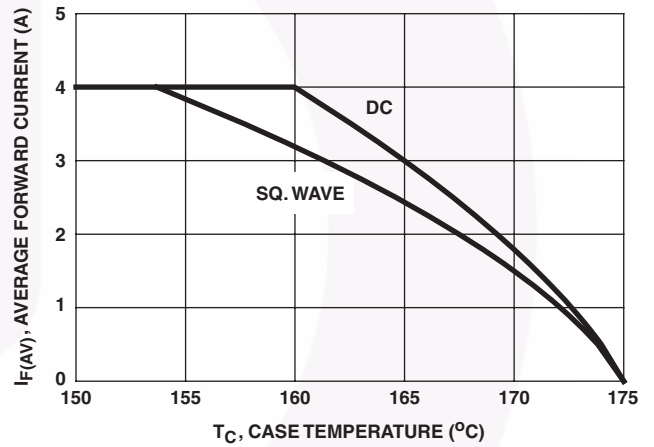


FIGURE 6. CURRENT DERATING CURVE

Test Circuits and Waveforms

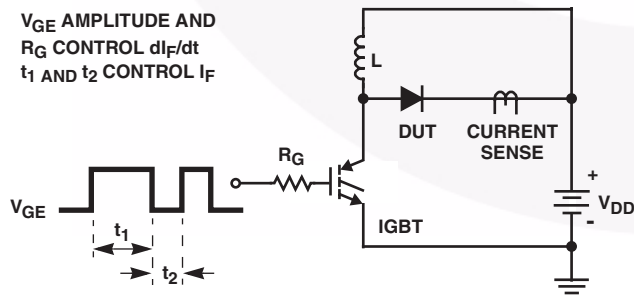


FIGURE 7.  $t_{rr}$  TEST CIRCUIT

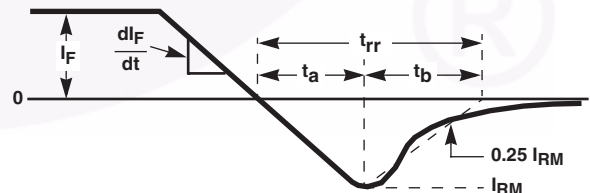


FIGURE 8.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

**Test Circuits and Waveforms** (Continued)

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

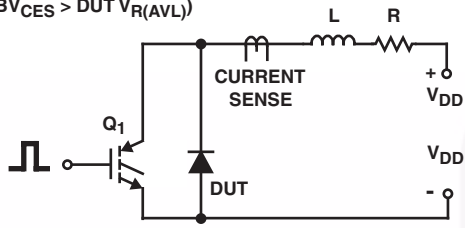


FIGURE 9. AVALANCHE ENERGY TEST CIRCUIT

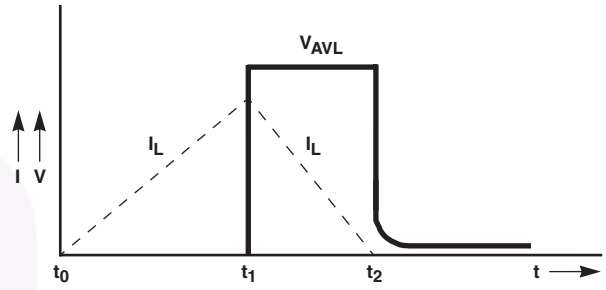
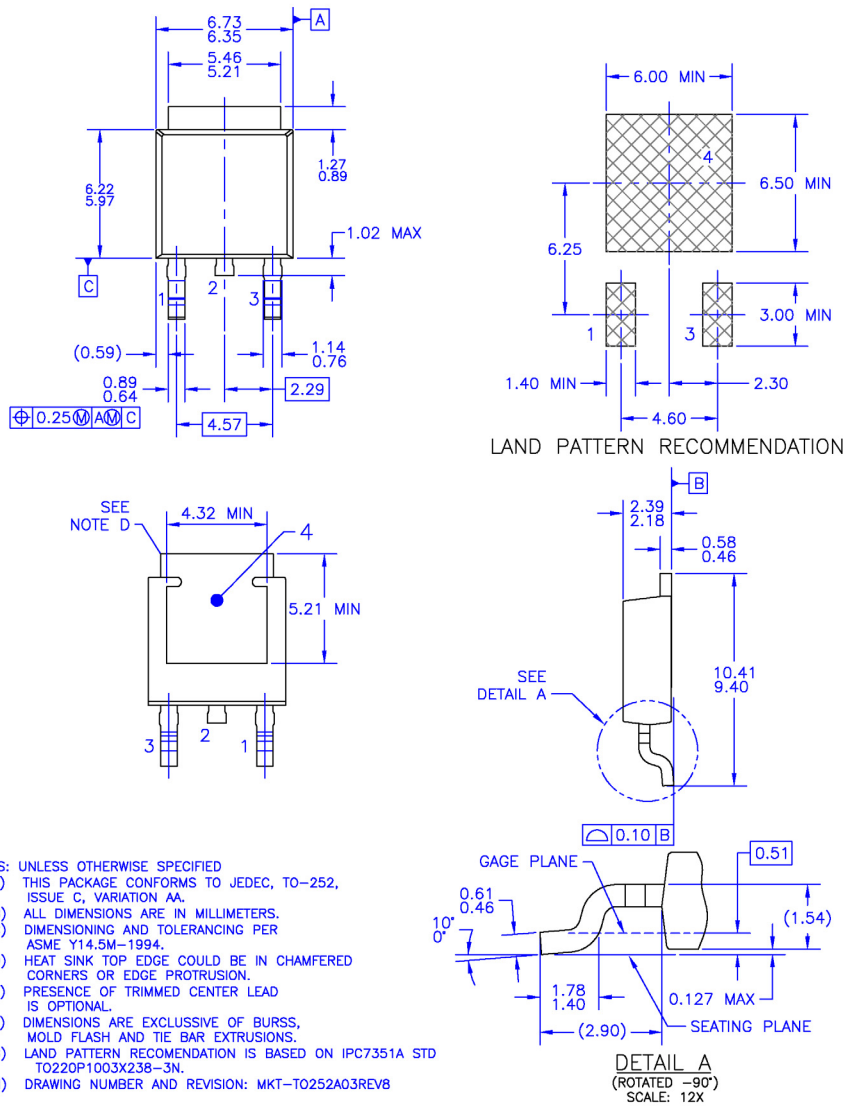


FIGURE 10. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions



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

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