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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.

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



Features

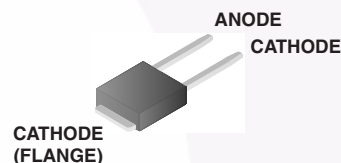
- Ultrafast Recovery $t_{rr} = 60$ ns (@ $I_F = 4$ A)
- Max Forward Voltage, $V_F = 1.5$ V (@ $T_C = 25^\circ\text{C}$)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

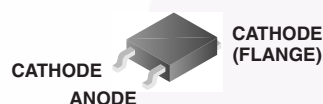
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC STYLE TO-251



JEDEC STYLE TO-252



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	$^\circ\text{C}$

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

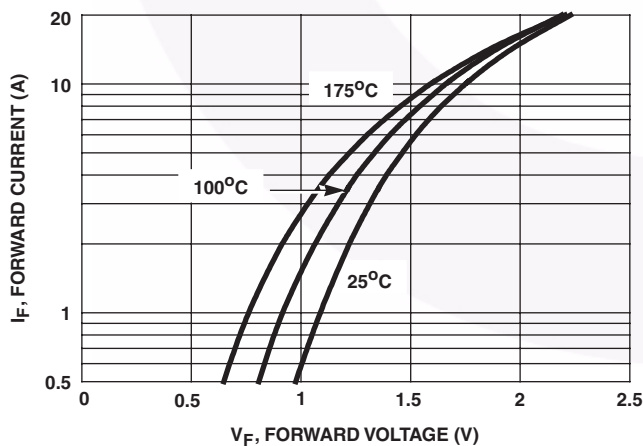


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

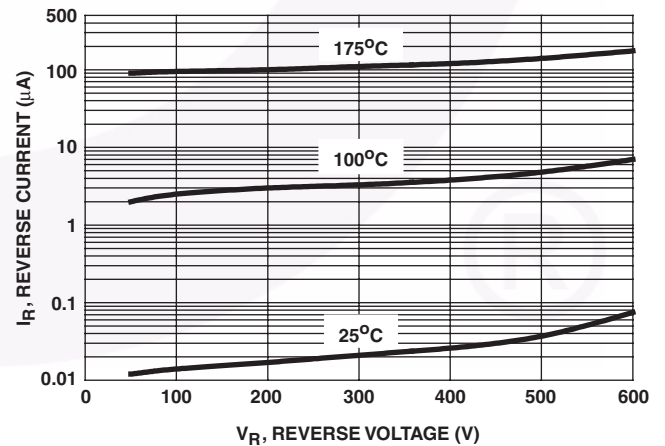


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

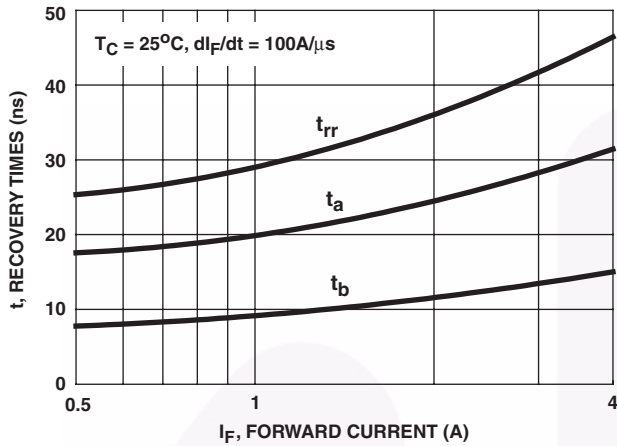


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

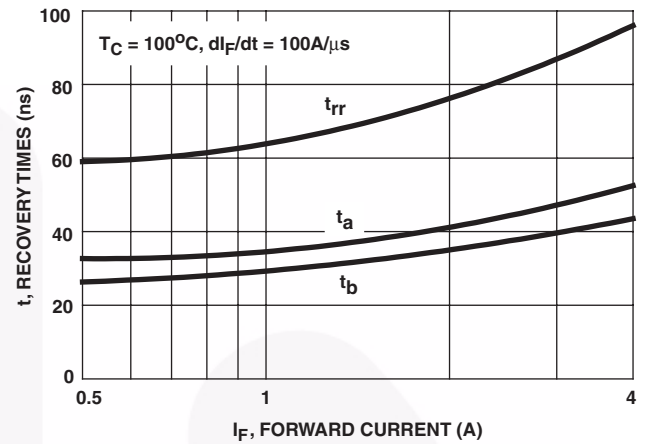


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

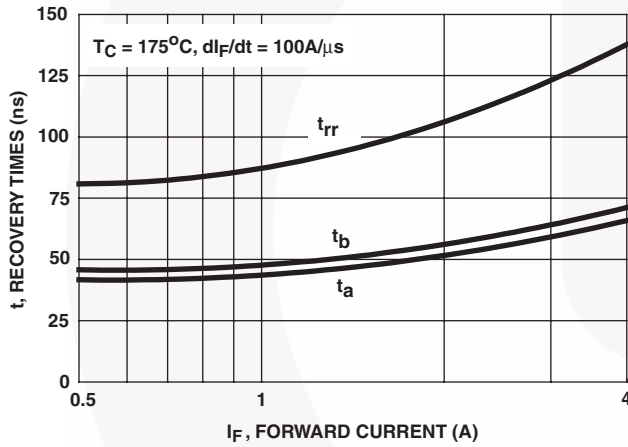


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

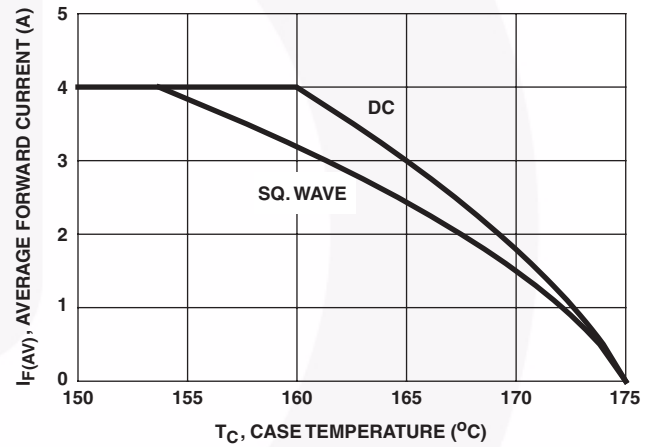


FIGURE 6. CURRENT DERATING CURVE

Test Circuits and Waveforms

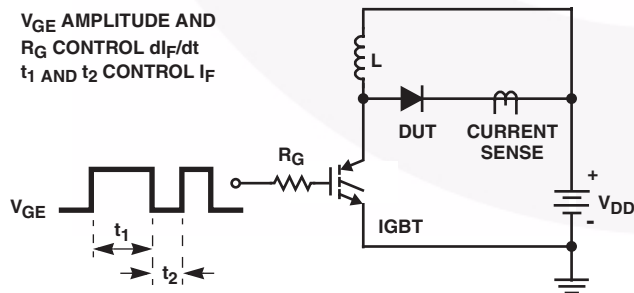


FIGURE 7. t_{rr} TEST CIRCUIT

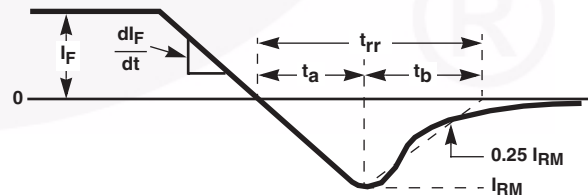


FIGURE 8. t_{rr} WAVEFORMS AND DEFINITIONS

Test Circuits and Waveforms (Continued)

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

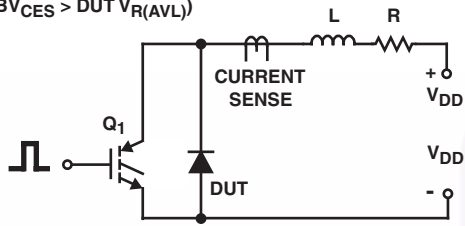


FIGURE 9. AVALANCHE ENERGY TEST CIRCUIT

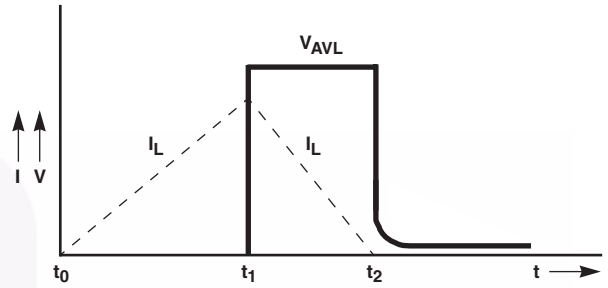


FIGURE 10. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

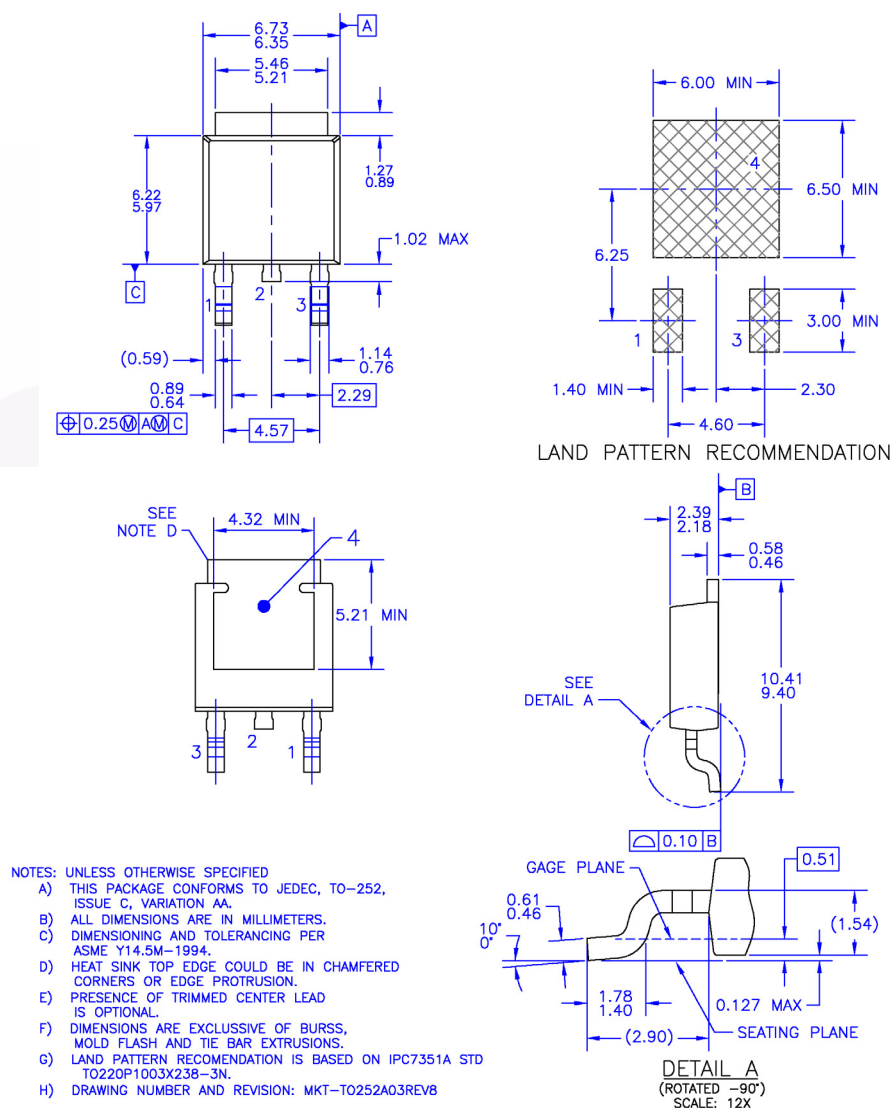


Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD, OPTION AA&AB

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