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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.

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



Features

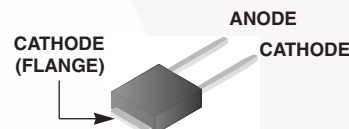
- Ultrafast Recovery $t_{rr} = 60$ ns (@ $I_F = 6$ A)
- Max Forward Voltage, $V_F = 1.5$ V (@ $T_C = 25^\circ\text{C}$)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

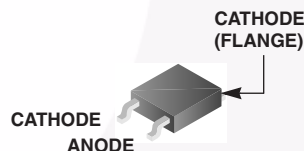
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC STYLE TO-251



JEDEC STYLE TO-252



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

	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 ($T_C = 155^\circ\text{C}$)	$I_{F(AV)}$	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	$^\circ\text{C}$
Maximum Lead Temperature for Soldering			
Leads at 0.063 in. (1.6mm) from case for 10s	T_L	300	$^\circ\text{C}$
Package Body for 10s, see Tech Brief 334.	T_{PKG}	260	$^\circ\text{C}$

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
V_F	$I_F = 6\text{ A}$	-	-	1.5	V
	$I_F = 6\text{ A}$, $T_C = 150^\circ\text{C}$	-	-	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}	$I_F = 1\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	-	-	55	ns
	$I_F = 6\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	-	-	60	ns
t_a	$I_F = 6\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	-	28	-	ns
t_b	$I_F = 6\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	-	16	-	ns
Q_{RR}	$I_F = 6\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	-	150	-	nC
C_J	$V_R = 10\text{ V}$, $I_F = 0\text{ A}$	-	25	-	pF
$R_{\theta JC}$		-	-	3	$^\circ\text{C}/\text{W}$

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

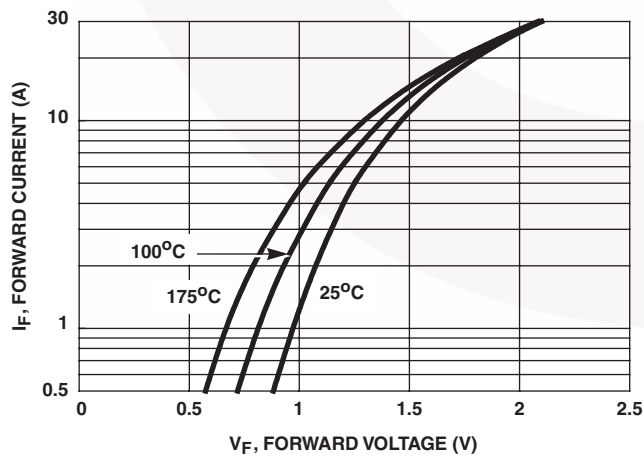


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

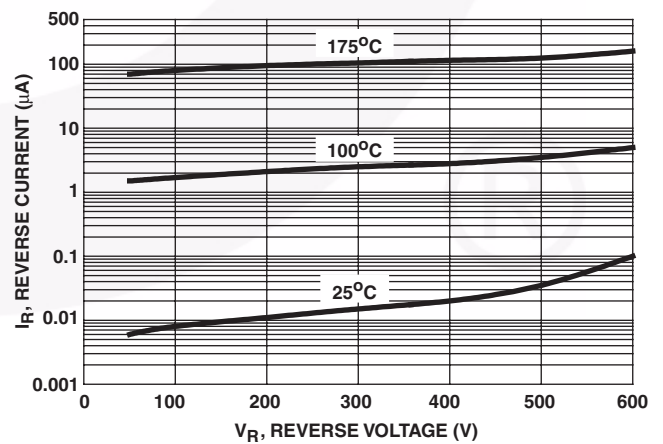


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

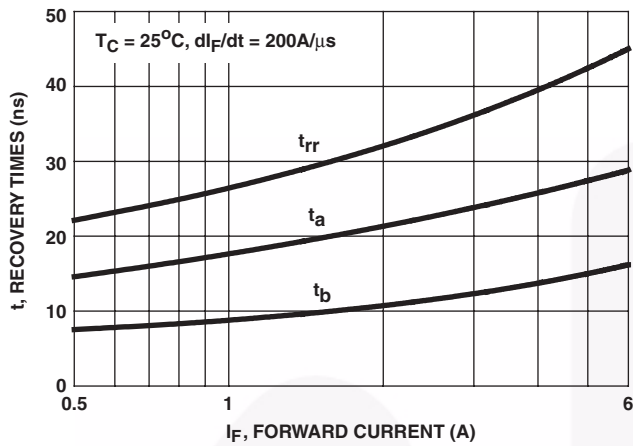


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

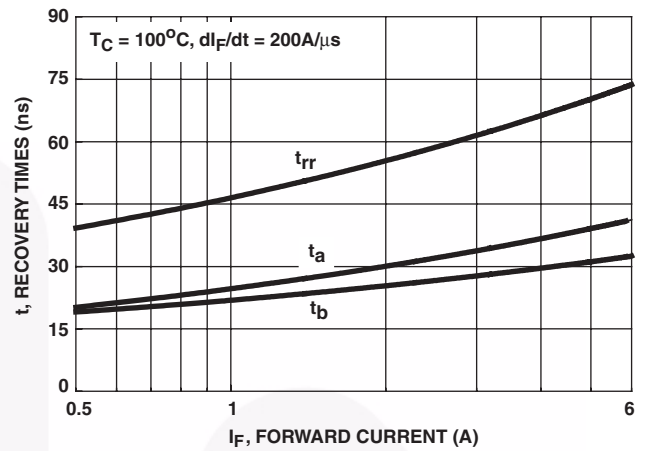


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

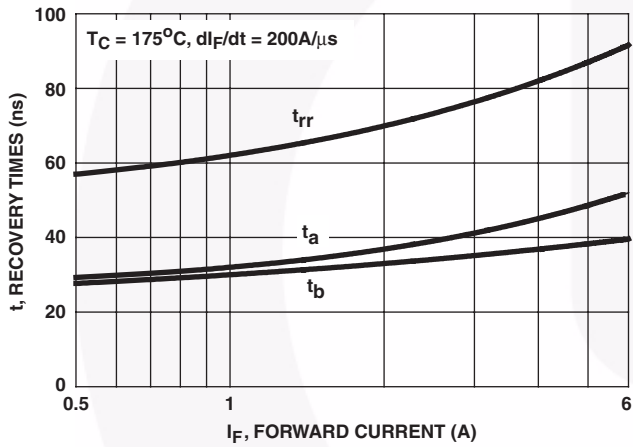


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

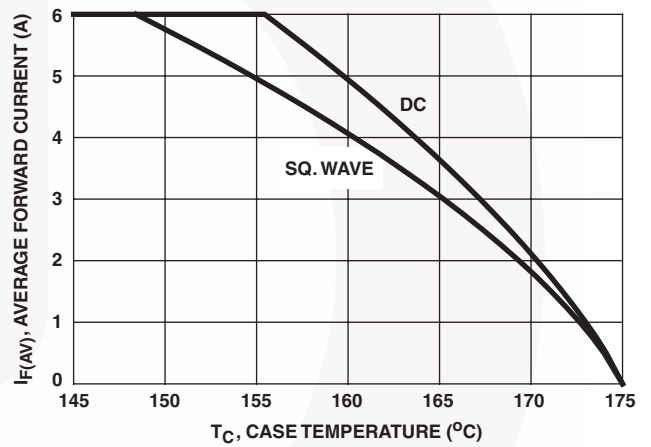


FIGURE 6. CURRENT DERATING CURVE

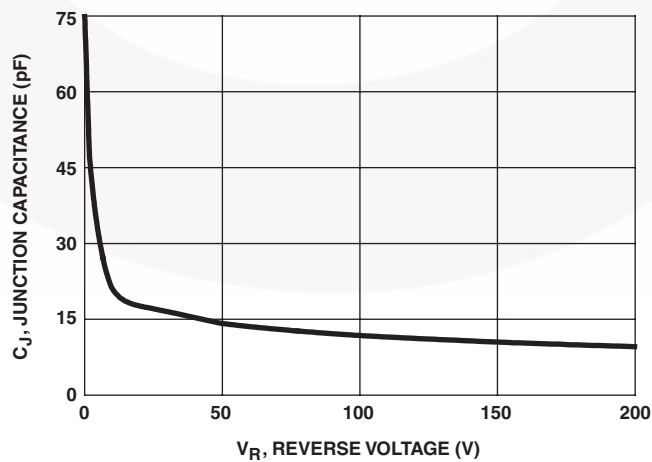


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

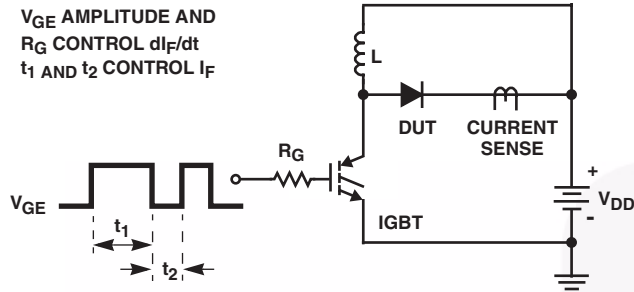


FIGURE 8. t_{rr} TEST CIRCUIT

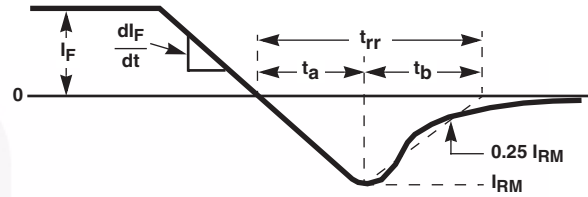


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

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

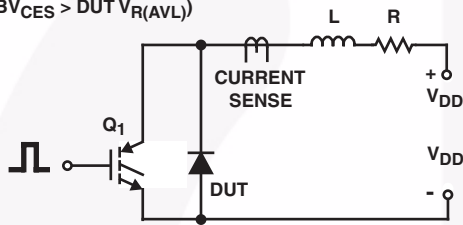


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

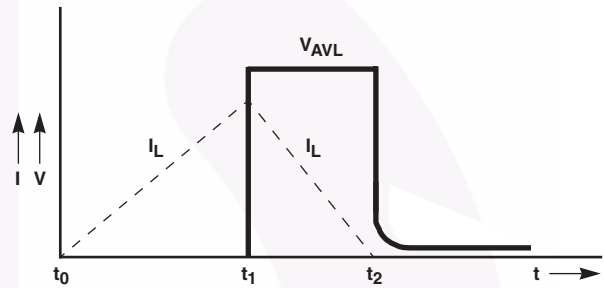


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions

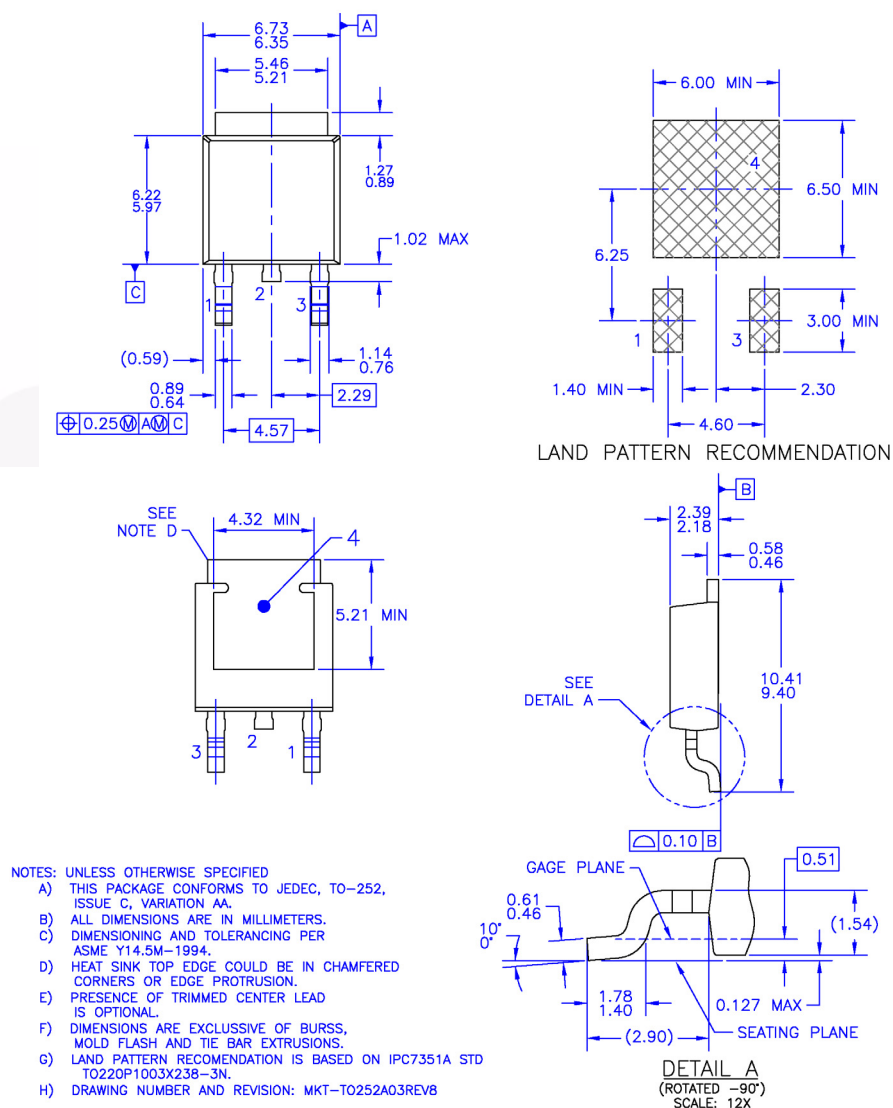


Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD, OPTION AA&AB

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