

## 12 A, 200 V, Ultrafast Dual Diode

The RURD620CCS9A is an ultrafast dual 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  $t_{rr} = 30 \text{ ns}$  (@  $I_F = 6 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.0 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage,  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

### Applications

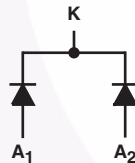
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### Ordering Information

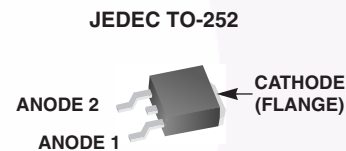
PART NUMBER	PACKAGE	BRAND
RURD620CCS9A	TO-252-3L	UR620C

NOTE: When ordering, use the entire part number. Add the suffix, 9A, to obtain the TO-252 variant in tape and reel, i.e., RURD620CCS9A.

### Symbol



### Packaging



### Absolute Maximum Ratings (Per Leg) $T_C = 25^\circ\text{C}$ Unless Otherwise Specified

	RURD620CCS9A	UNIT
Peak Repetitive Reverse Voltage	200	V
Working Peak Reverse Voltage	200	V
DC Blocking Voltage	200	V
Average Rectified Forward Current $T_C = 160^\circ\text{C}$	6	A
Repetitive Peak Surge Current Square Wave, 20 kHz	12	A
Nonrepetitive Peak Surge Current Halfwave, 1 phase, 60 Hz	60	A
Maximum Power Dissipation	45	W
Avalanche Energy (See Figures 10 and 11)	10	mJ
Operating and Storage Temperature	-65 to 175	$^\circ\text{C}$

# RURD620CCS9A

## Electrical Specifications (Per Leg) $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
$V_F$	$I_F = 6\text{ A}$	-	-	1.0	V
	$I_F = 6\text{ A}, T_C = 150^\circ\text{C}$	-	-	0.83	V
$I_R$	$V_R = 200\text{ V}$	-	-	100	$\mu\text{A}$
	$V_R = 200\text{ V}, T_C = 150^\circ\text{C}$	-	-	500	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	-	25	ns
	$I_F = 6\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	-	30	ns
$t_a$	$I_F = 6\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	13	-	ns
$t_b$	$I_F = 6\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	6.5	-	ns
$Q_{rr}$	$I_F = 6\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	20	-	nC
$C_J$	$V_R = 10\text{ V}, I_F = 0\text{ A}$	-	30	-	pF
$R_{\theta JC}$		-	-	3.5	$^\circ\text{C}/\text{W}$

### DEFINITIONS

$V_F$  = Instantaneous forward voltage (pw = 300  $\mu\text{s}$ , 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

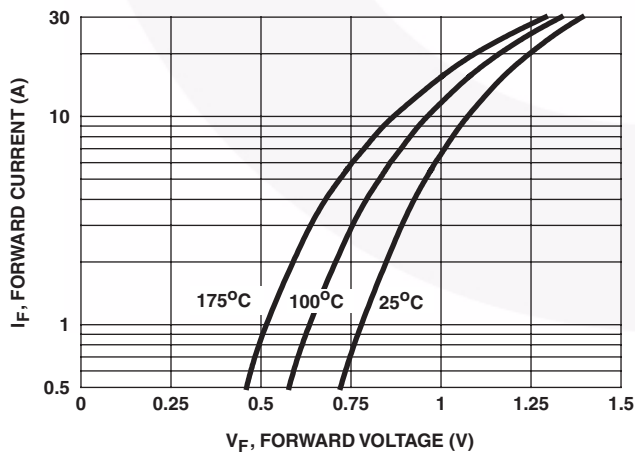


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

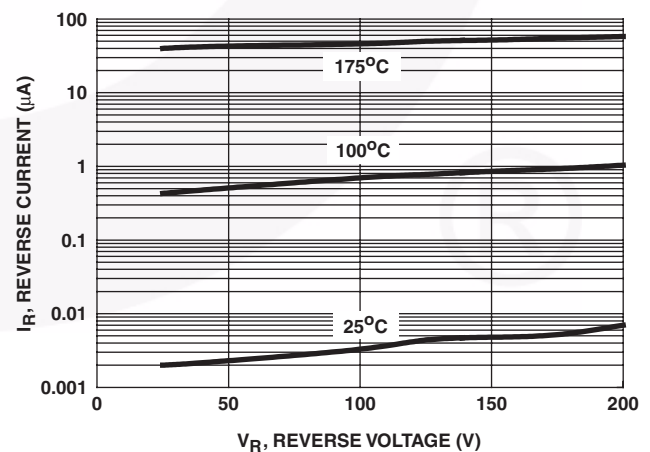


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

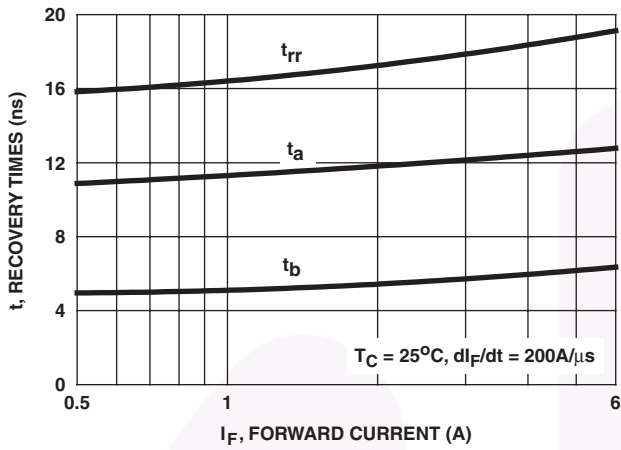


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

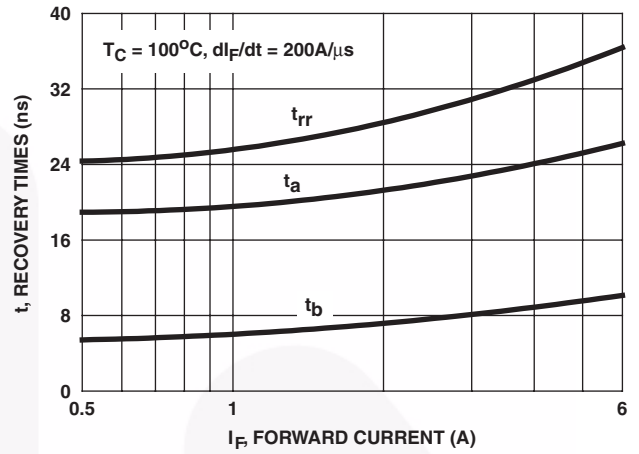


FIGURE 4.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

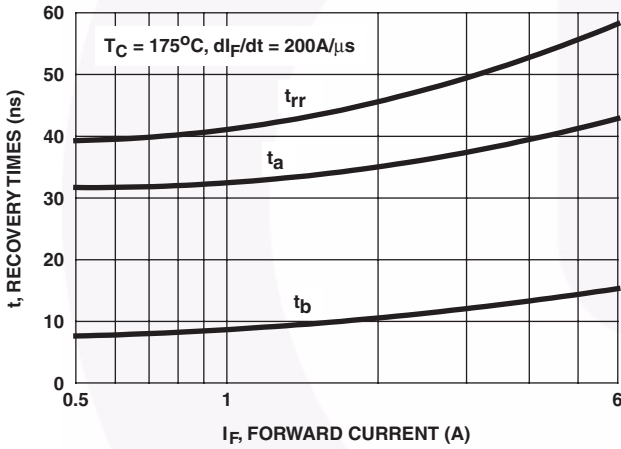


FIGURE 5.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

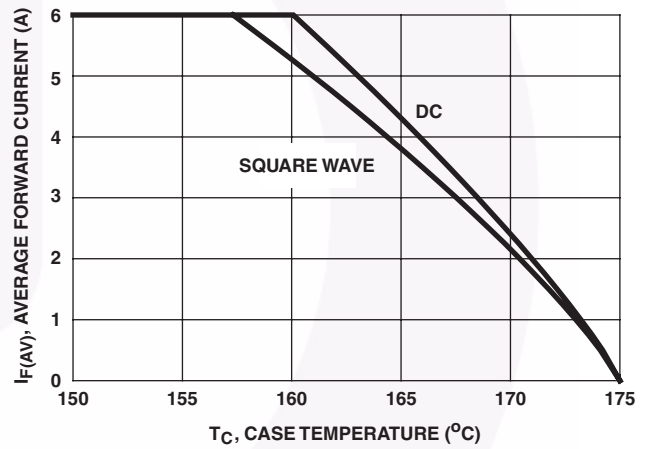


FIGURE 6. CURRENT DERATING CURVE

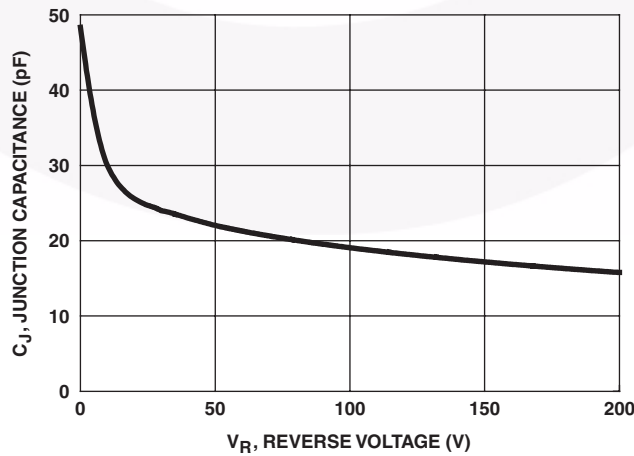


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

**Test Circuits and Waveforms**

$V_{GE}$  AMPLITUDE AND  
 $R_G$  CONTROL  $di_F/dt$   
 $t_1$  AND  $t_2$  CONTROL  $I_F$

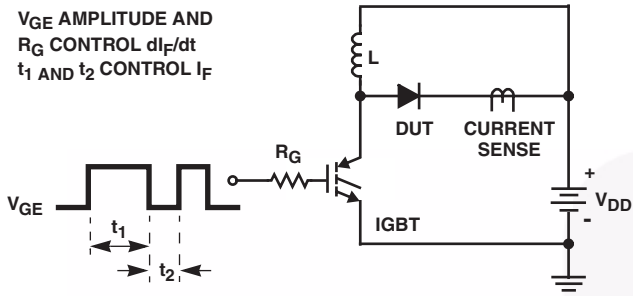


FIGURE 8.  $t_{rr}$  TEST CIRCUIT

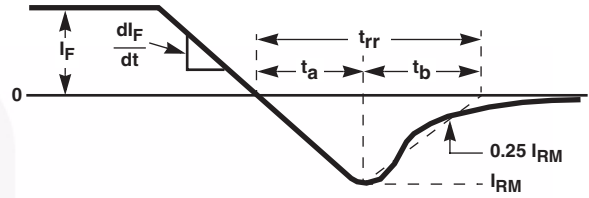


FIGURE 9.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

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

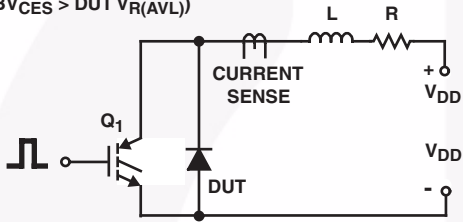


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

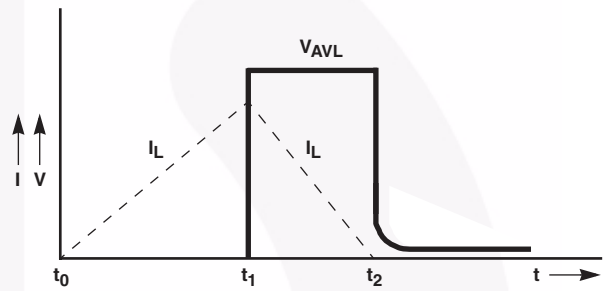
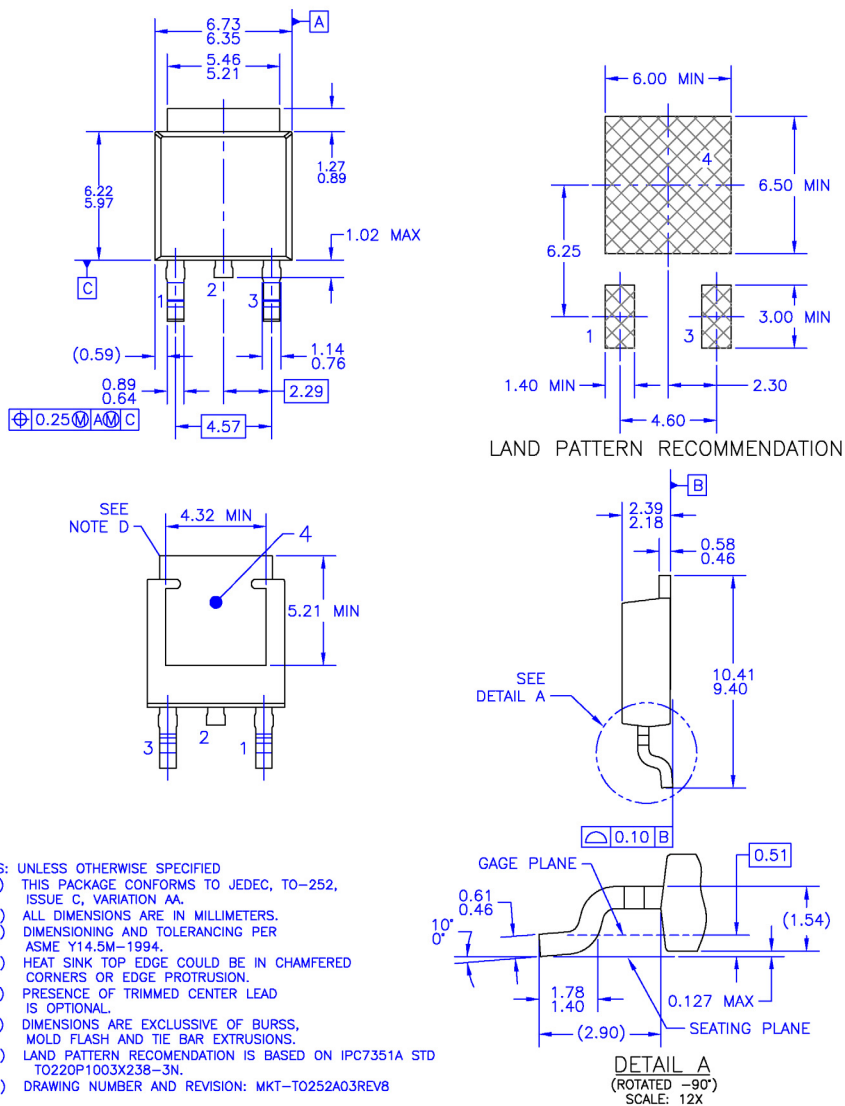


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

### Mechanical Dimensions



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

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Rev. I66

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