

# Ultrafast Dual Diode

12 A, 200 V

## RURD620CCS9A

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

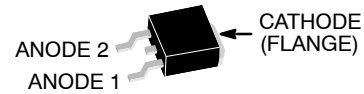
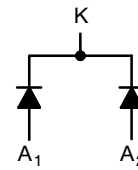
### ABSOLUTE MAXIMUM RATINGS (Per Leg)

( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Rating	Value	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	200	V
$V_{RWM}$	Working Peak Reverse Voltage	200	V
$V_R$	DC Blocking Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current $T_C = 160^\circ\text{C}$	6	A
$I_{FRM}$	Repetitive Peak Surge Current Square Wave, 20 kHz	12	A
$I_{FSM}$	Nonrepetitive Peak Surge Current Halfwave, 1 Phase, 60 Hz	60	A
$P_D$	Maximum Power Dissipation	45	W
$E_{AVL}$	Avalanche Energy (See Figures 10 and 11)	10	mJ
$T_{STG}, T_J$	Operating and Storage Temperature	-65 to 175	$^\circ\text{C}$

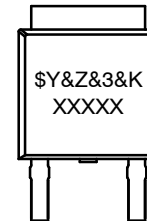
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### SYMBOL



DPAK3 (TO-252 3 LD)  
JEDEC  
CASE 369AS

### MARKING DIAGRAM



- \$Y = onsemi Logo
- &Z = Assembly Plant Code
- &3 = 3-Digit Date Code
- &K = 2-Digits Lot Run Traceability Code
- XXXXX = Device Code (UR620C, RURD620)

### ORDERING INFORMATION

Part Number	Package	Brand
RURD620CCS9A	TO-252-3L	UR620C
RURD620CCS9A-F085	TO-252-3L	RURD620

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

# RURD620CCS9A

## ELECTRICAL CHARACTERISTICS (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	$^\circ\text{C}/\text{W}$

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

### 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

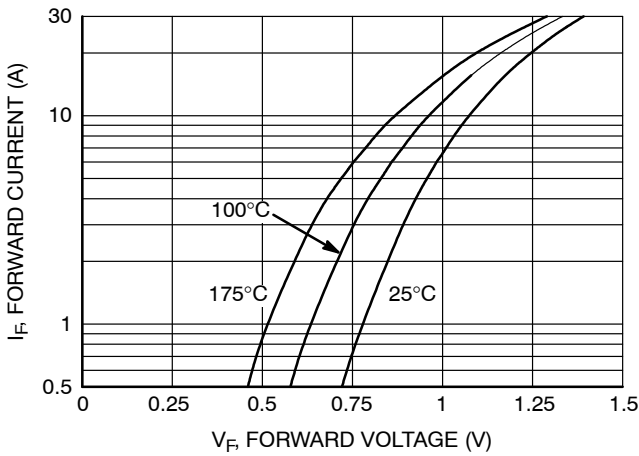


Figure 1. Forward Current vs. Forward Voltage

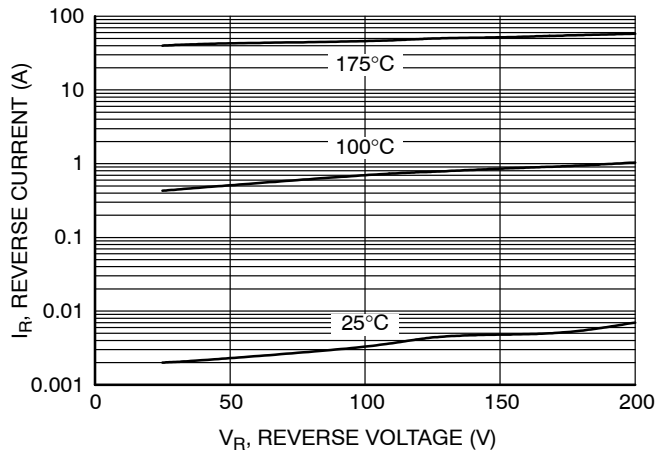


Figure 2. Reverse Current vs. Reverse Voltage

TYPICAL PERFORMANCE CURVES (Continued)

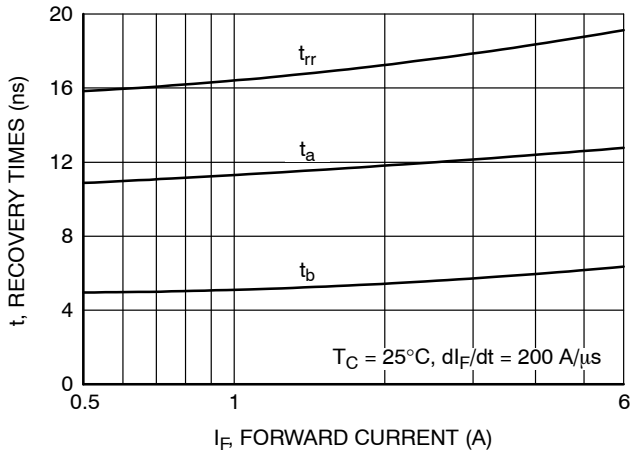


Figure 3.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

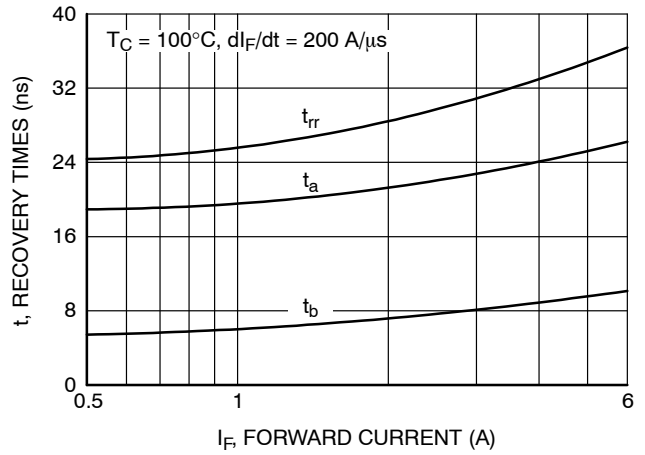


Figure 4.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

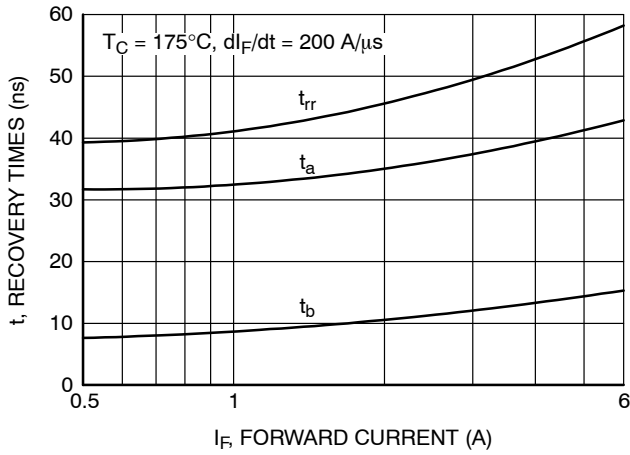


Figure 5.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

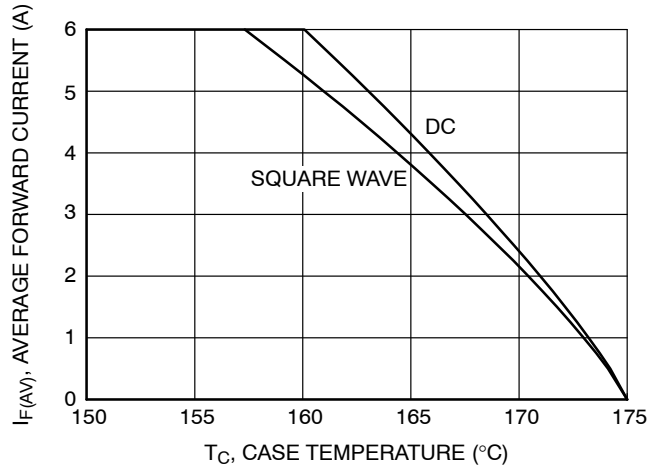


Figure 6. Current Derating Curve

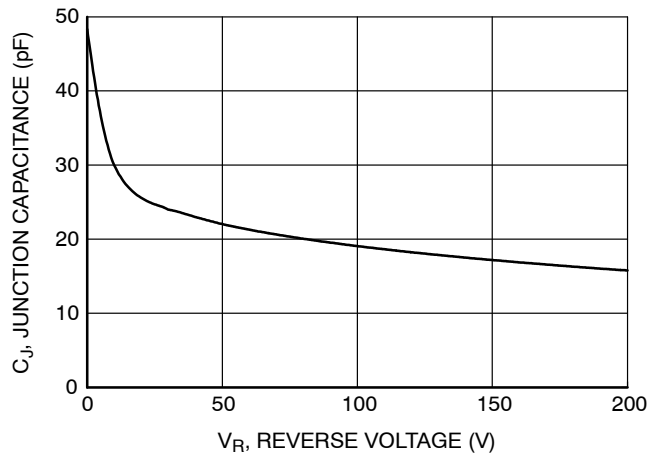


Figure 7. Junction Temperature vs. Reverse Voltage

TEST CIRCUITS AND WAVEFORMS

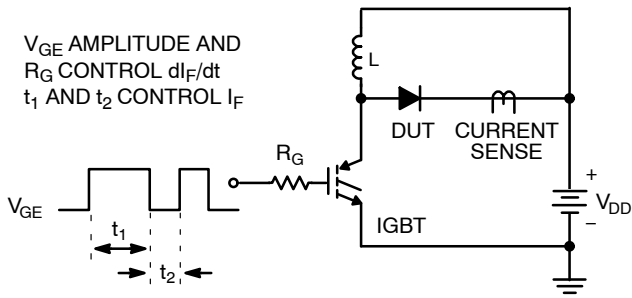


Figure 8.  $t_{rr}$  Test Circuit

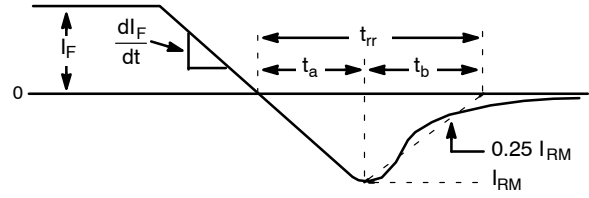


Figure 9.  $t_{rr}$  Waveforms and Definitions

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

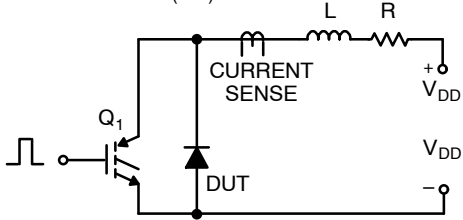


Figure 10. Avalanche Energy Test Circuit

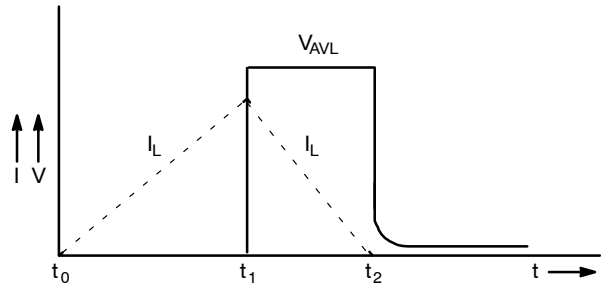


Figure 11. Avalanche Current and Voltage Waveforms

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



## DPAK3 6.10x6.54x2.29, 4.57P CASE 369AS ISSUE B

DATE 20 DEC 2023



- NOTES: UNLESS OTHERWISE SPECIFIED
- A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE F, VARIATION AA.
  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2018.
  - D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
  - E) FOR DIODE PRODUCTS, L4 IS 0.25 MM MAX PLASTIC BODY STUB WITHOUT CENTER LEAD.
  - F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
  - G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TD228P991X239-3N.



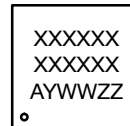
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	2.18	2.29	2.39
A1	0.00	-	0.127
b	0.64	0.77	0.89
b2	0.76	0.95	1.14
b3	5.21	5.34	5.46
c	0.45	0.53	0.61
c2	0.45	0.52	0.58
D	5.97	6.10	6.22
D1	5.21	---	---
E	6.35	6.54	6.73
E1	4.32	---	---
e	2.286 BSC		
e1	4.572 BSC		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L1	2.90 REF		
L2	0.51 BSC		
L3	0.89	1.08	1.27
L4	---	---	1.02
theta	0°	---	10°



### LAND PATTERN RECOMMENDATION

\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

### GENERIC MARKING DIAGRAM\*



\*This information is generic. Please refer to device data sheet for actual part marking. Pb-free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

XXXX = Specific Device Code  
 A = Assembly Location  
 Y = Year  
 WW = Work Week  
 ZZ = Assembly Lot Code

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