

# 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

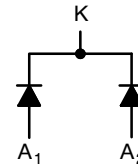
### ABSOLUTE MAXIMUM RATINGS (Per Leg)

( $T_C = 25^\circ\text{C}$  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<br>$T_C = 160^\circ\text{C}$ | 6          | A                |
| $I_{FRM}$      | Repetitive Peak Surge Current<br>Square Wave, 20 kHz           | 12         | A                |
| $I_{FSM}$      | Nonrepetitive Peak Surge Current<br>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 | $^\circ\text{C}$ |

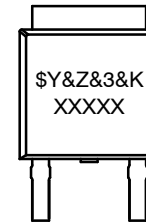
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### 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

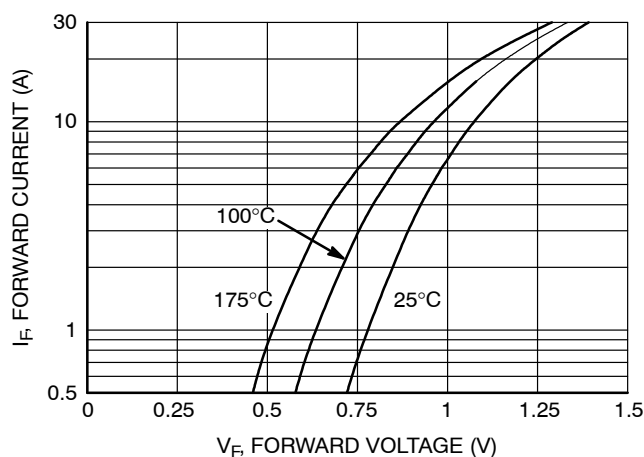


Figure 1. Forward Current vs. Forward Voltage

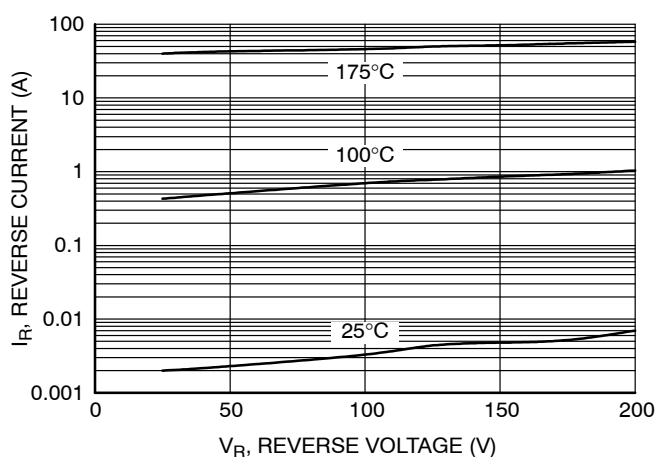


Figure 2. Reverse Current vs. Reverse Voltage

TYPICAL PERFORMANCE CURVES (Continued)

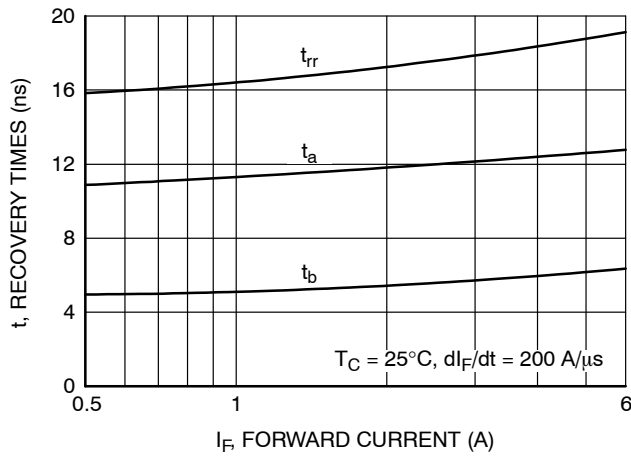


Figure 3.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

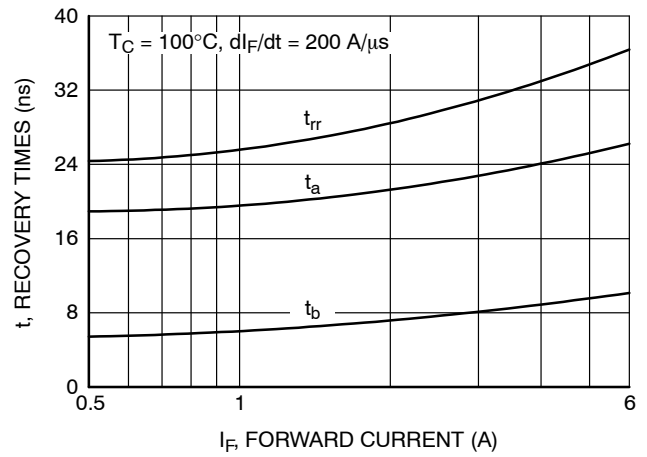


Figure 4.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

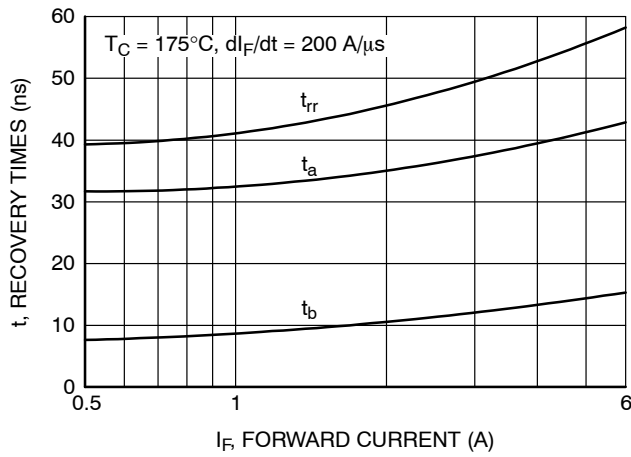


Figure 5.  $t_{rr}$ ,  $t_a$  and  $t_b$  Curves vs. Forward Current

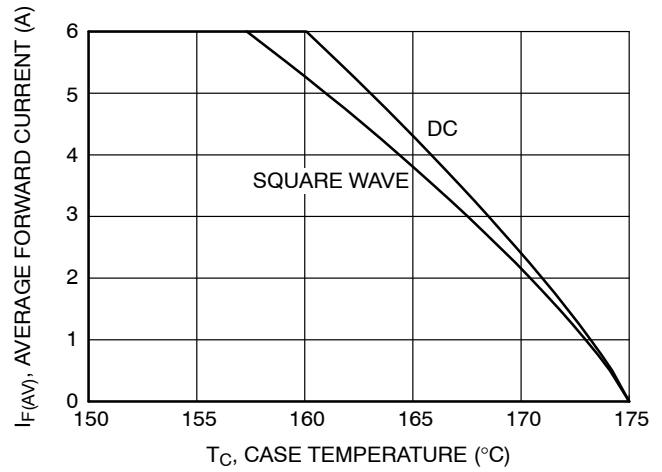


Figure 6. Current Derating Curve

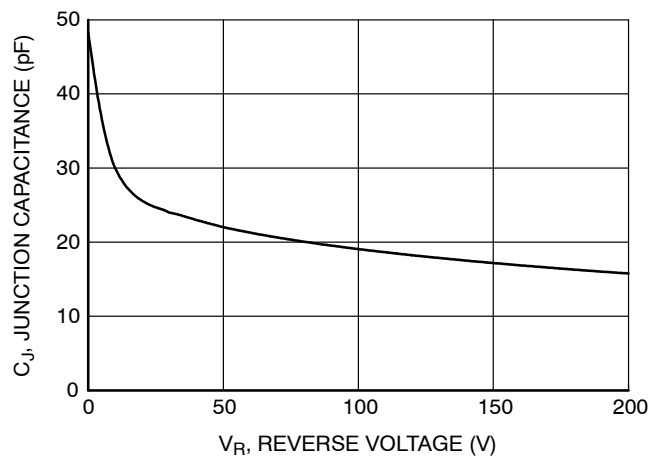


Figure 7. Junction Temperature vs. Reverse Voltage

TEST CIRCUITS AND WAVEFORMS

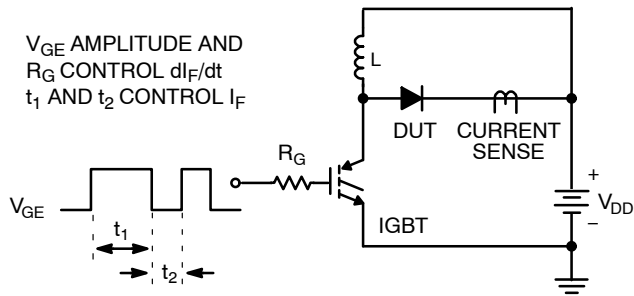


Figure 8.  $t_{rr}$  Test Circuit

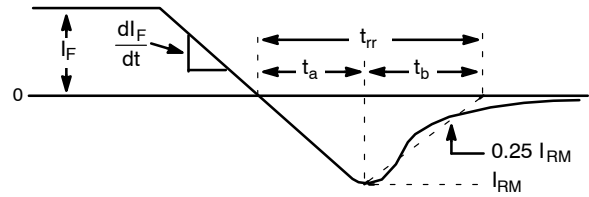


Figure 9.  $t_{rr}$  Waveforms and Definitions

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

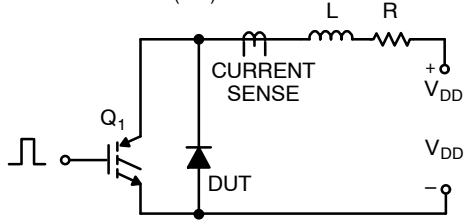


Figure 10. Avalanche Energy Test Circuit

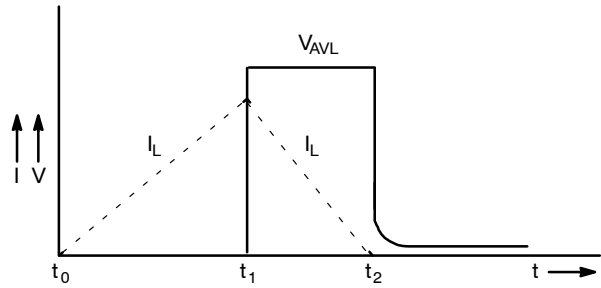


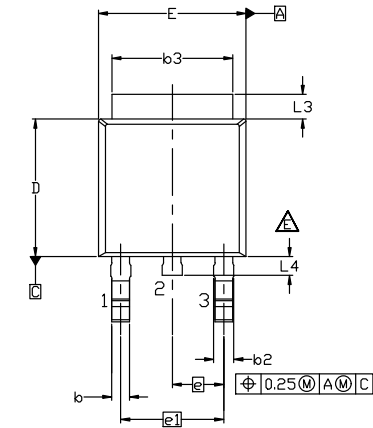
Figure 11. Avalanche Current and Voltage Waveforms

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



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

DATE 20 DEC 2023



NON-DIODE PRODUCTS VERSION



NON-DIODE PRODUCTS VERSION



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.

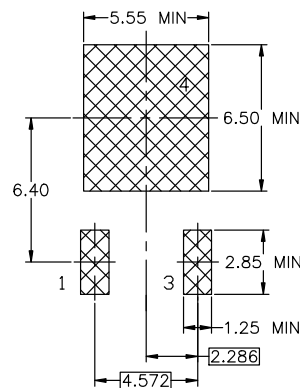
E) FOR DIODE PRODUCTS, L4 IS 0.25 MM MAX PLASTIC BODY STUB WITHOUT CENTER LEAD.

F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TQ228P991X239-3N.



| DIM | MILLIMETERS |      |       |
|-----|-------------|------|-------|
|     | MIN.        | NDM. | 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  |
| θ   | 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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