

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

## Applications

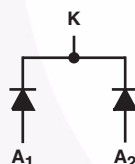
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

## Ordering Information

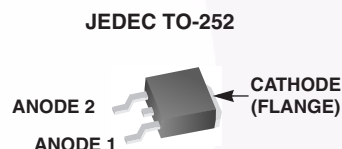
| PART NUMBER  | PACKAGE   | BRAND  |
|--------------|-----------|--------|
| RURD620CCS9A | TO-252-3L | UR620C |

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

**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).

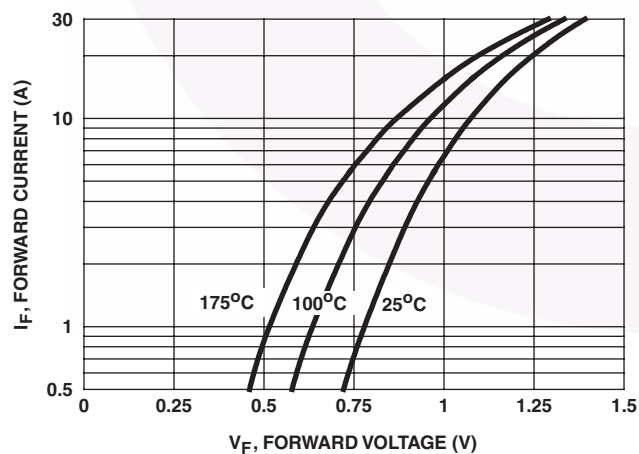
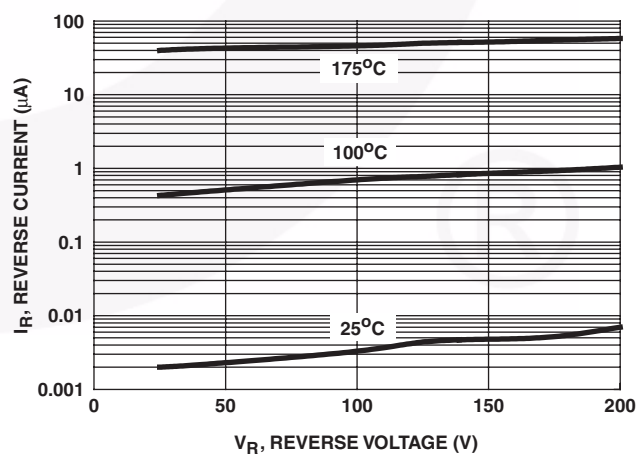
$Q_{rr}$  = Reverse recovery charge.

$C_J$  = 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)

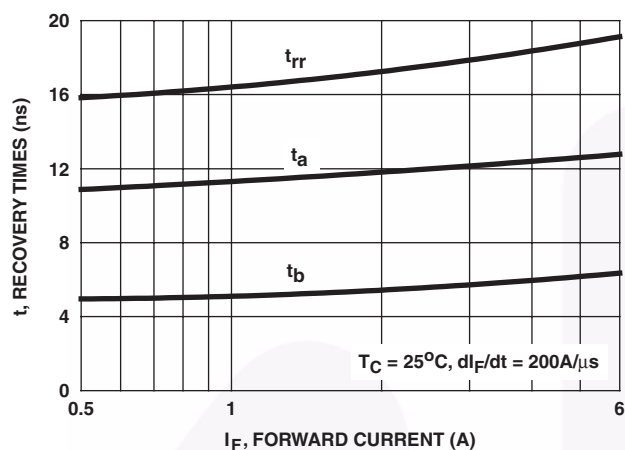


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

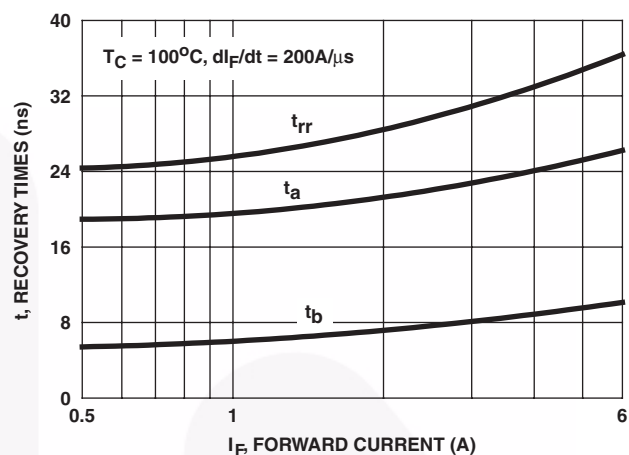


FIGURE 4.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

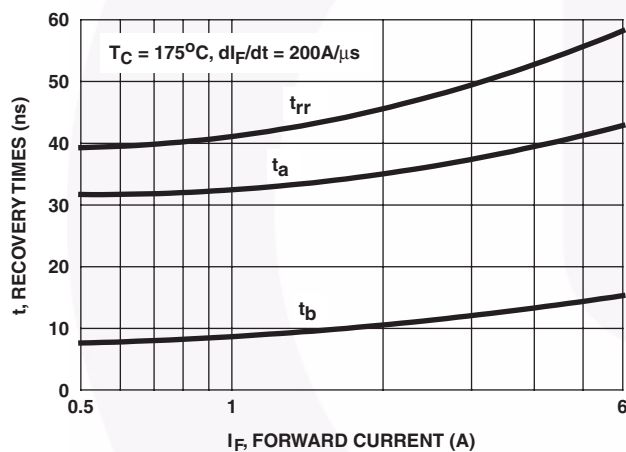


FIGURE 5.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

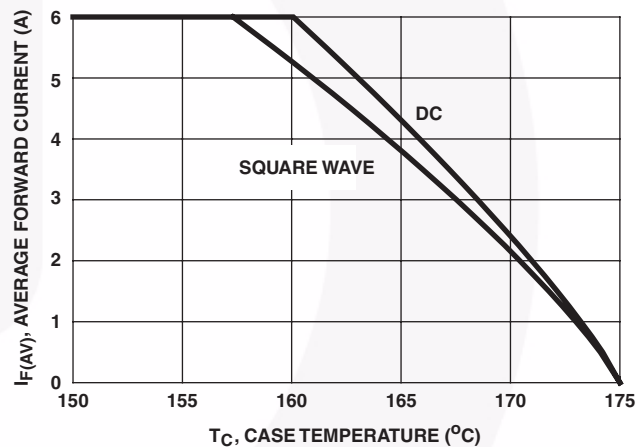


FIGURE 6. CURRENT DERATING CURVE

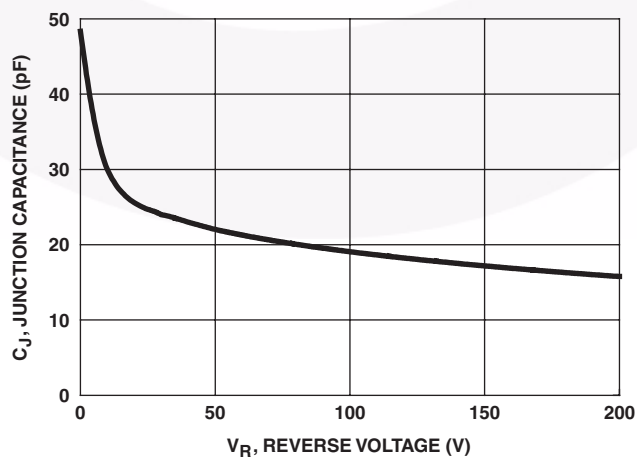
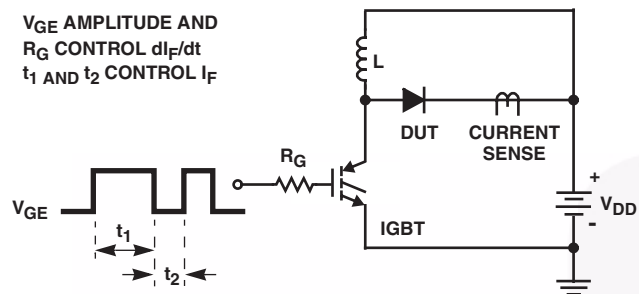
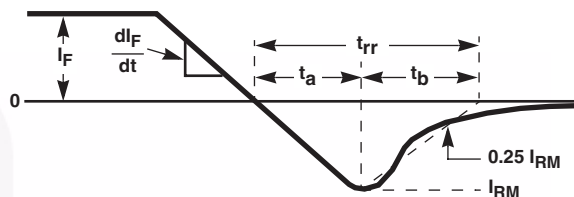


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

## Test Circuits and Waveforms

FIGURE 8.  $t_{rr}$  TEST CIRCUITFIGURE 9.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

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

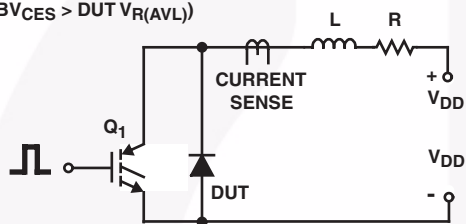


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

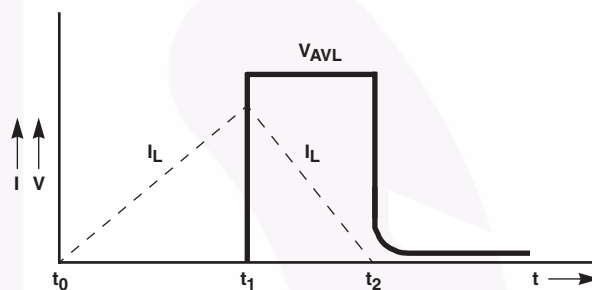


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Mechanical Dimensions

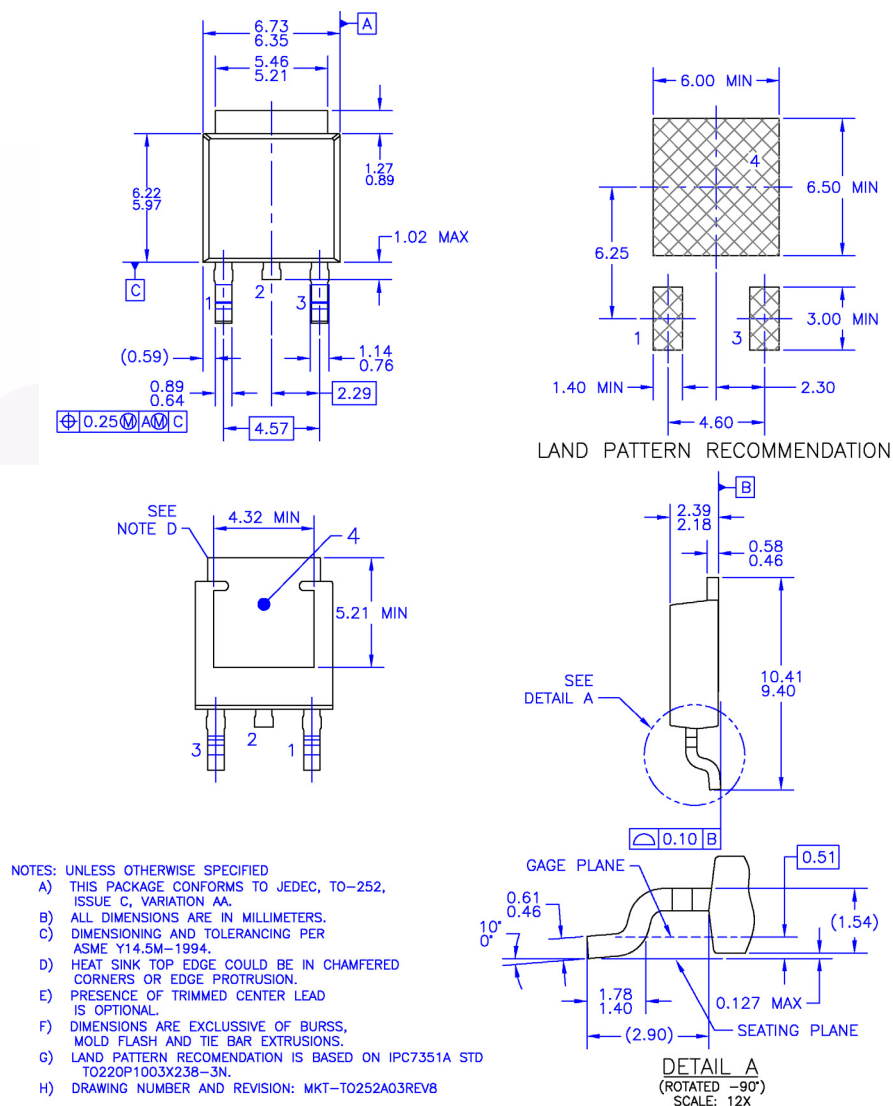


Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD, OPTION AA&amp;AB

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| BitSiC™                                                                           | Global Power ResourceSM                         | Programmable Active Droop™ | TinyBoost®                                                                          |
| Build it Now™                                                                     | GreenBridge™                                    | QFET®                      | TinyBuck®                                                                           |
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| FAST®                                                                             | OptoHiT™                                        |                            | VisualMax™                                                                          |
| FastvCore™                                                                        | OPTOLOGIC®                                      |                            | VoltagePlus™                                                                        |
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