

## 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

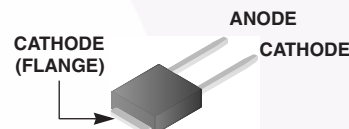
- Ultrafast Recovery  $t_{rr} = 60$  ns (@  $I_F = 6$  A)
- Max Forward Voltage,  $V_F = 1.5$  V (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

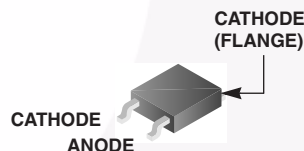
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

### 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<br>( $T_C = 155^\circ\text{C}$ ) | $I_{F(AV)}$    | 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                                          | $P_D$          | 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 | $\mu\text{A}$             |
|                 | $V_R = 600\text{ V}$ , $T_C = 150^\circ\text{C}$          | -   | -   | 500 | $\mu\text{A}$             |
| $t_{rr}$        | $I_F = 1\text{ A}$ , $dI_F/dt = 200\text{ A}/\mu\text{s}$ | -   | -   | 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  $\mu\text{s}$ , 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.

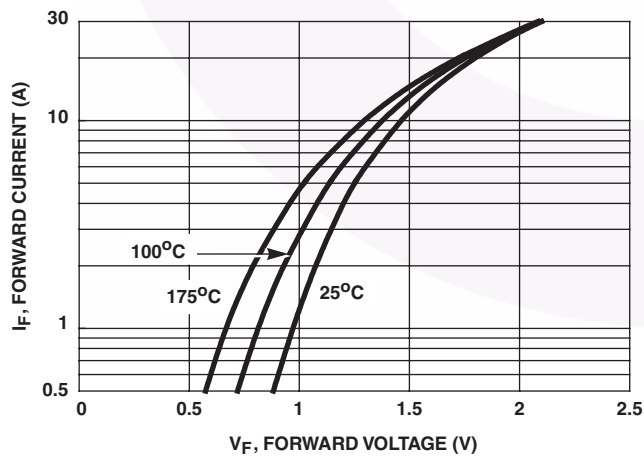
$C_J$  = Junction capacitance.

$R_{\theta JC}$  = Thermal resistance junction to case.

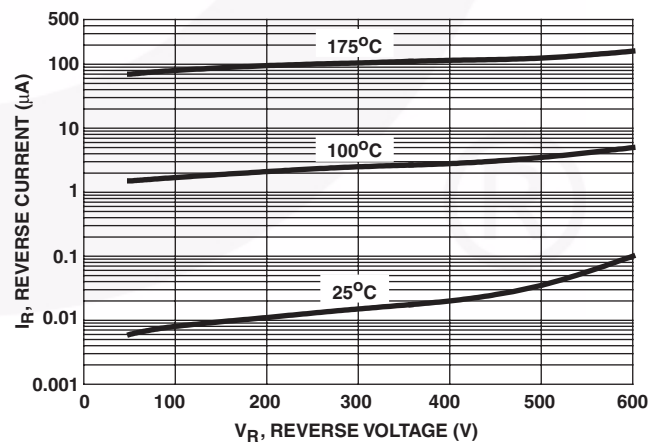
pw = Pulse width.

D = Duty cycle.

**Typical Performance Curves**



**FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE**



**FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE**

Typical Performance Curves (Continued)

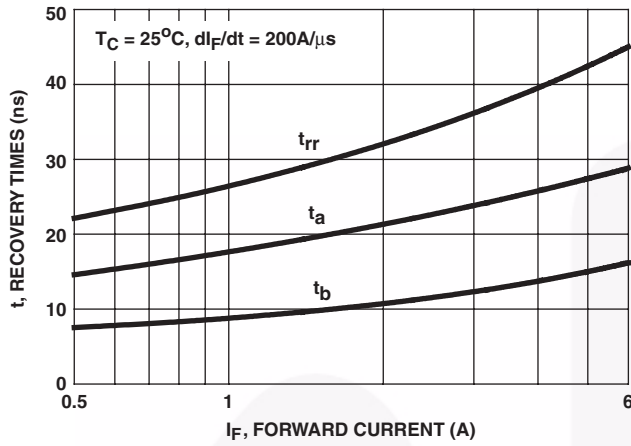


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

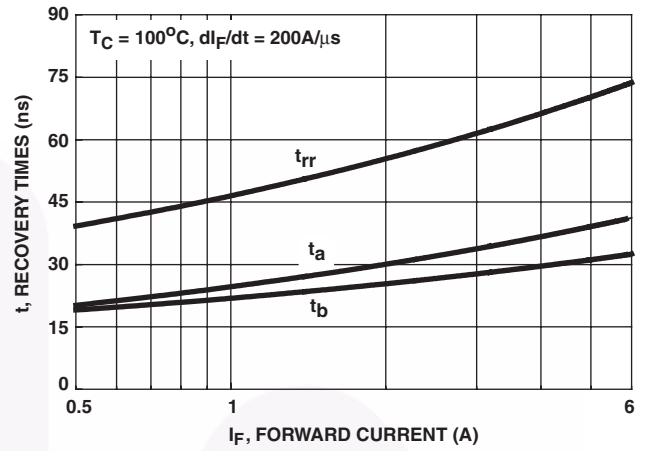


FIGURE 4.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

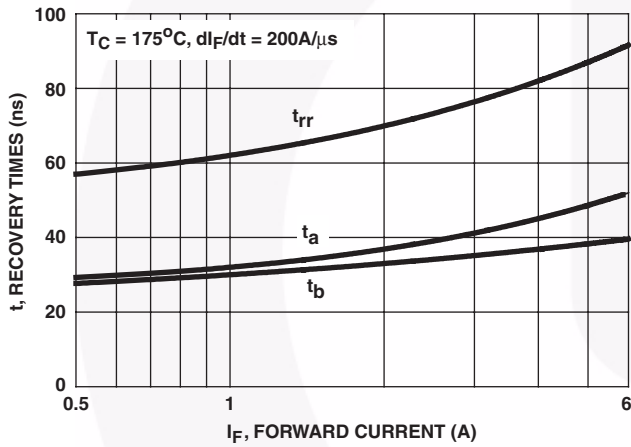


FIGURE 5.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

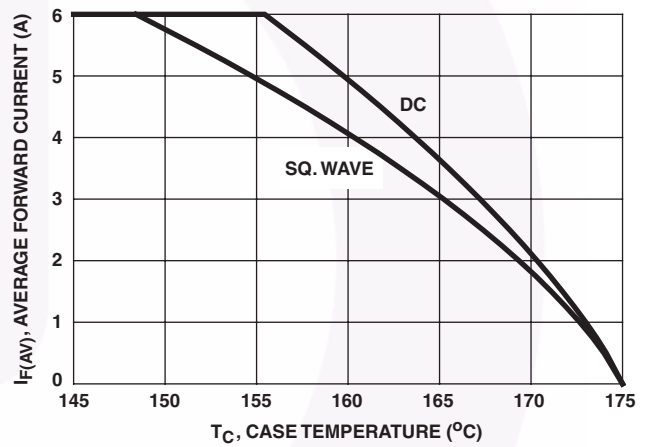


FIGURE 6. CURRENT DERATING CURVE

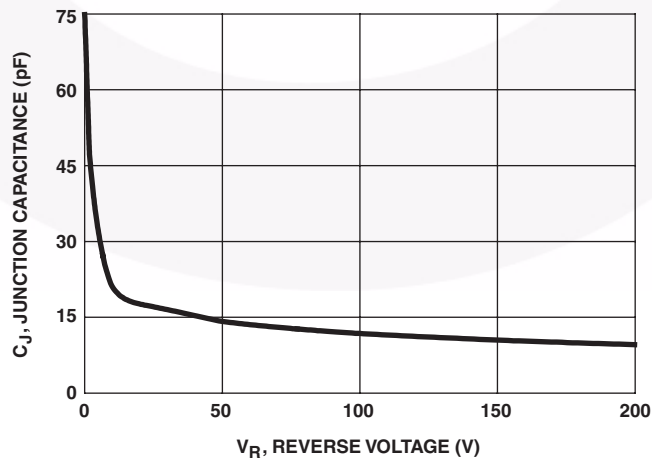


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

## Test Circuits and Waveforms

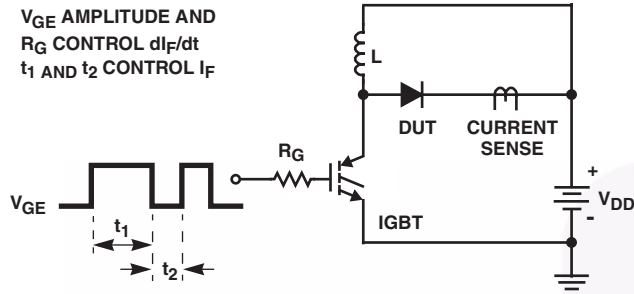


FIGURE 8.  $t_{rr}$  TEST CIRCUIT

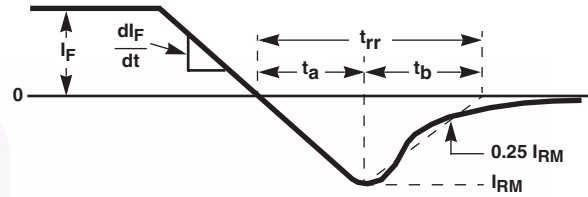


FIGURE 9.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

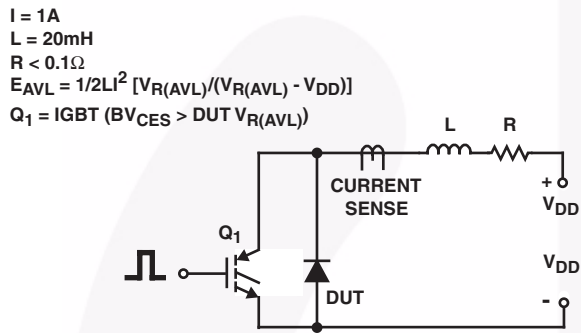


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

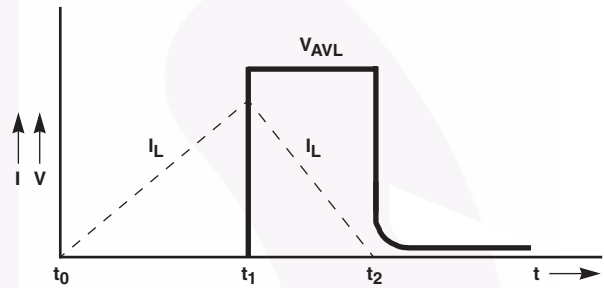
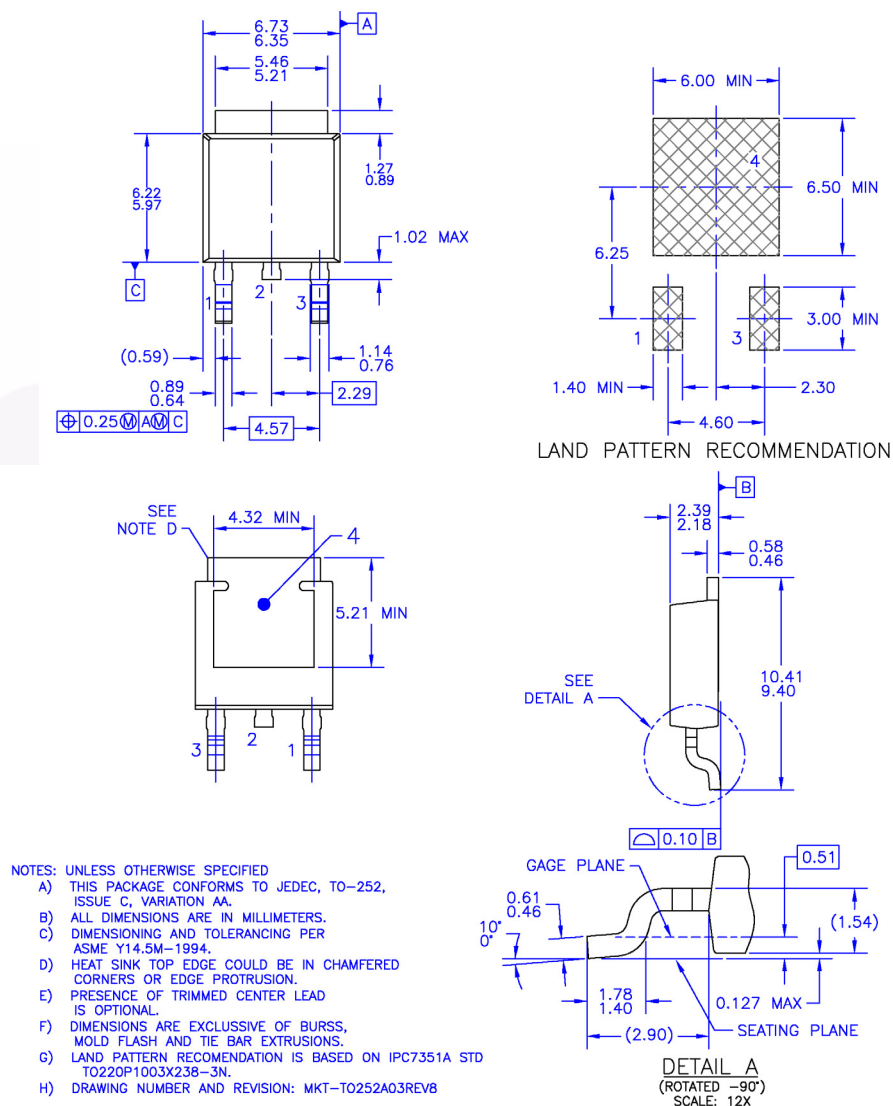


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

# Mechanical Dimensions



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

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| Build it Now™                                                                     | GreenBridge™                                    | QFET®                      | TinyBuck®                                                                           |
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| ESBC™                                                                             | MicroFET™                                       |                            | μSerDes™                                                                            |
|  | MicroPak™                                       |                            |  |
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| Fairchild Semiconductor®                                                          | MillerDrive™                                    |                            | Ultra FRFET™                                                                        |
| FACT Quiet Series™                                                                | MotionMax™                                      |                            | UniFET™                                                                             |
| FACT®                                                                             | mWSaver®                                        |                            | VCX™                                                                                |
| FAST®                                                                             | OptoHit™                                        |                            | VisualMax™                                                                          |
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