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## 8 A, 1000 V Ultrafast Diodes

The MUR8100E, RUR8100 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.

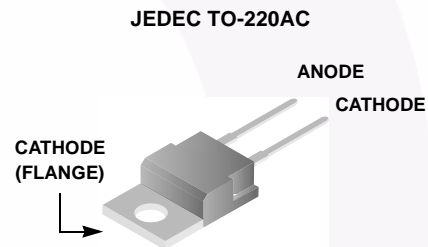
### Features

- Ultrafast Recovery  $t_{rr} = 100$  ns (@  $I_F = 8$  A)
- Max Forward Voltage,  $V_F = 1.8$  V (@  $T_C = 25^\circ\text{C}$ )
- 1000 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

### Packaging



### Ordering Information

| PART NUMBER | PACKAGE  | BRAND    |
|-------------|----------|----------|
| MUR8100E    | TO-220AC | MU8100   |
| RURP8100    | TO-220AC | RURP8100 |

NOTE: When ordering, use entire part number.

### Symbol



### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

|                                                                    | MUR8100E<br>RURP8100 | UNIT             |
|--------------------------------------------------------------------|----------------------|------------------|
| Peak Repetitive Reverse Voltage                                    | 1000                 | V                |
| Working Peak Reverse Voltage                                       | 1000                 | V                |
| DC Blocking Voltage                                                | 1000                 | V                |
| Average Rectified Forward Current<br>( $T_C = 155^\circ\text{C}$ ) | 8                    | A                |
| Repetitive Peak Surge Current<br>(Square Wave 20kHz)               | 16                   | A                |
| Nonrepetitive Peak Surge Current<br>(Halfwave 1 Phase 60Hz)        | 100                  | A                |
| Maximum Power Dissipation                                          | 75                   | W                |
| Avalanche Energy (See Figures 10 and 11)                           | 20                   | mJ               |
| Operating and Storage Temperature                                  | -55 to 175           | $^\circ\text{C}$ |

# MUR8100E, RURP8100

## Electrical Specifications $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified.

| SYMBOL          | TEST CONDITION                                         | MIN | TYP | MAX | UNIT                      |
|-----------------|--------------------------------------------------------|-----|-----|-----|---------------------------|
| $V_F$           | $I_F = 8\text{ A}$                                     | -   | -   | 1.8 | V                         |
|                 | $I_F = 8\text{ A}, T_C = 150^\circ\text{C}$            | -   | -   | 1.5 | V                         |
| $I_R$           | $V_R = 1000\text{ V}$                                  | -   | -   | 100 | $\mu\text{A}$             |
|                 | $V_R = 1000\text{ V}, T_C = 150^\circ\text{C}$         | -   | -   | 500 | $\mu\text{A}$             |
| $t_{rr}$        | $I_F = 1\text{ A}$                                     | -   | -   | 85  | ns                        |
|                 | $I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$ | -   | -   | 100 | ns                        |
| $t_a$           | $I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$ | -   | 50  | -   | ns                        |
| $t_b$           | $I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$ | -   | 30  | -   | ns                        |
| $Q_{RR}$        | $I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$ | -   | 500 | -   | nC                        |
| $C_J$           | $V_R = 10\text{ V}, I_F = 0\text{ A}$                  | -   | 30  | -   | pF                        |
| $R_{\theta JC}$ |                                                        | -   | -   | 2.0 | $^\circ\text{C}/\text{W}$ |

### DEFINITIONS

$V_F$  = Instantaneous forward voltage (pw = 300  $\mu\text{s}$ , D = 2%).

$I_R$  = Instantaneous reverse current.

$T_{rr}$  = Reverse recovery time at  $dI_F/dt = 100\text{A}/\mu\text{s}$  (See Figure 9), summation of  $t_a + t_b$ .

$t_a$  = Time to reach peak reverse current at  $dI_F/dt = 100\text{A}/\mu\text{s}$  (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

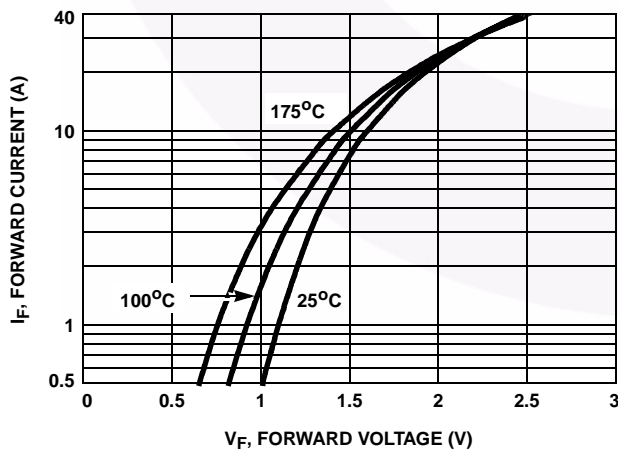


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

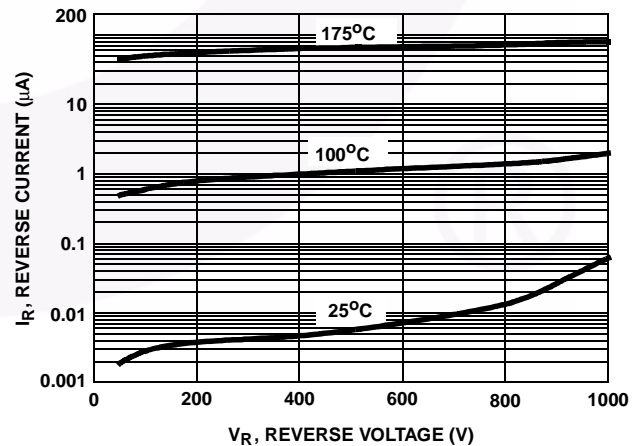


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

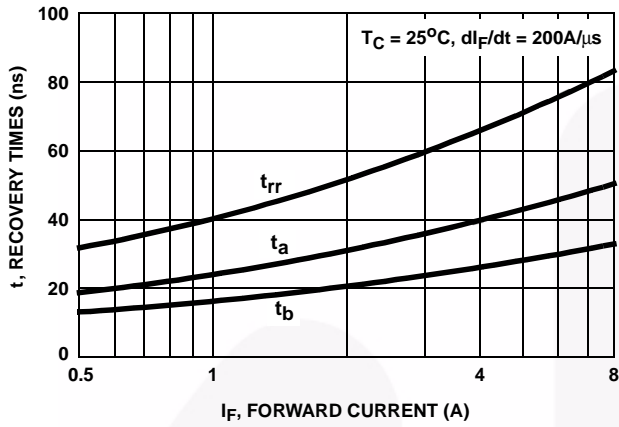


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

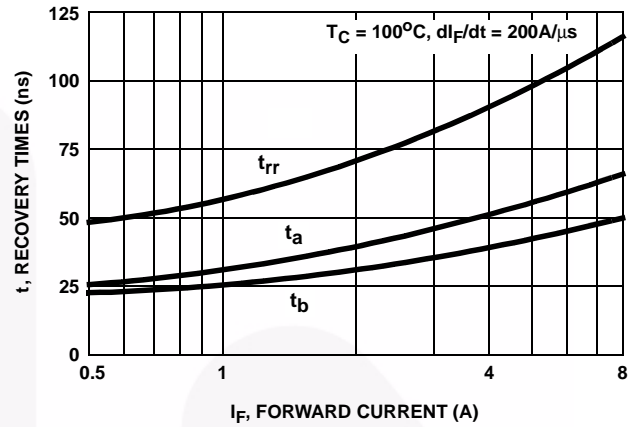


FIGURE 4.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

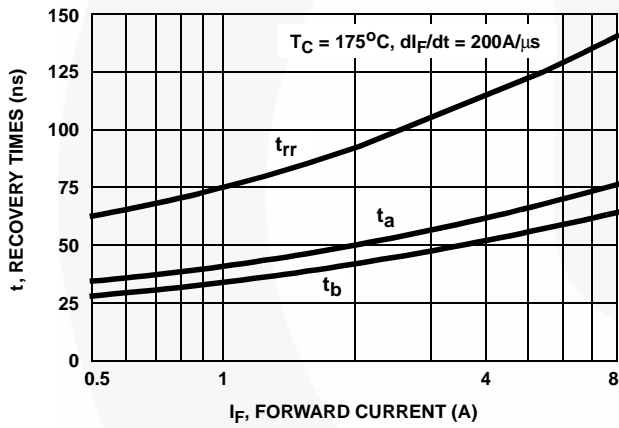


FIGURE 5.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

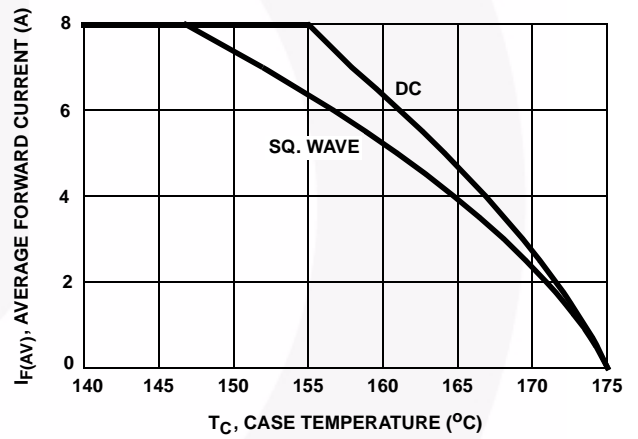


FIGURE 6. CURRENT DERATING CURVE

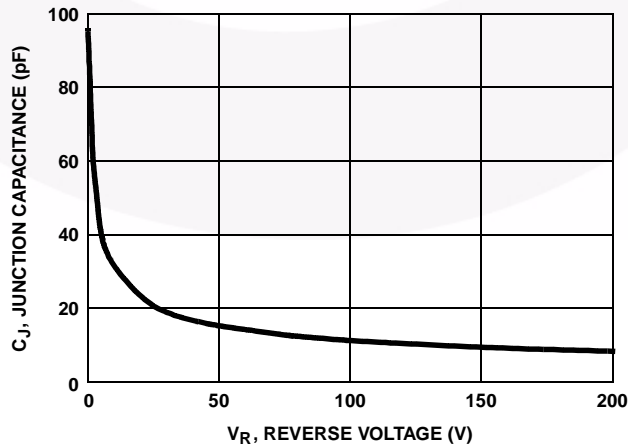


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

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

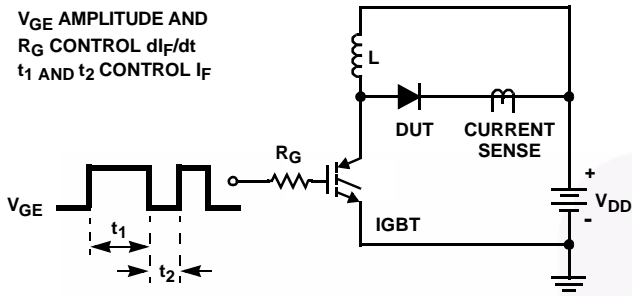


FIGURE 8.  $t_{rr}$  TEST CIRCUIT

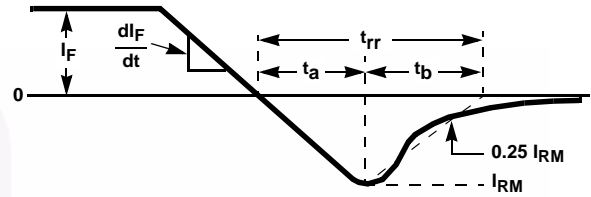


FIGURE 9.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

$I = 1A$   
 $L = 40mH$   
 $R < 0.1\Omega$   
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q_1 = IGBT (BV_{CES} > DUT V_{R(AVL)})$

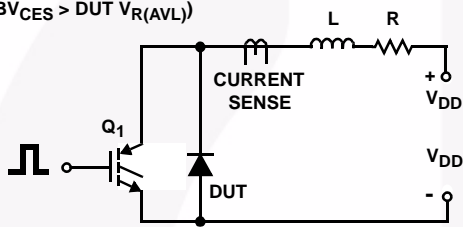


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

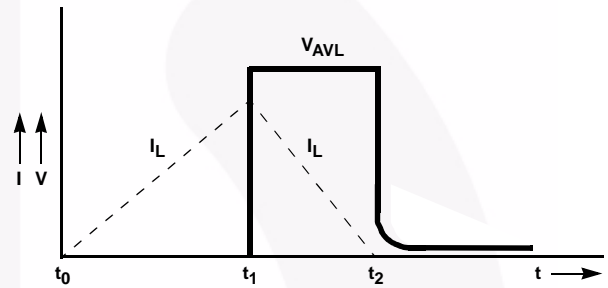
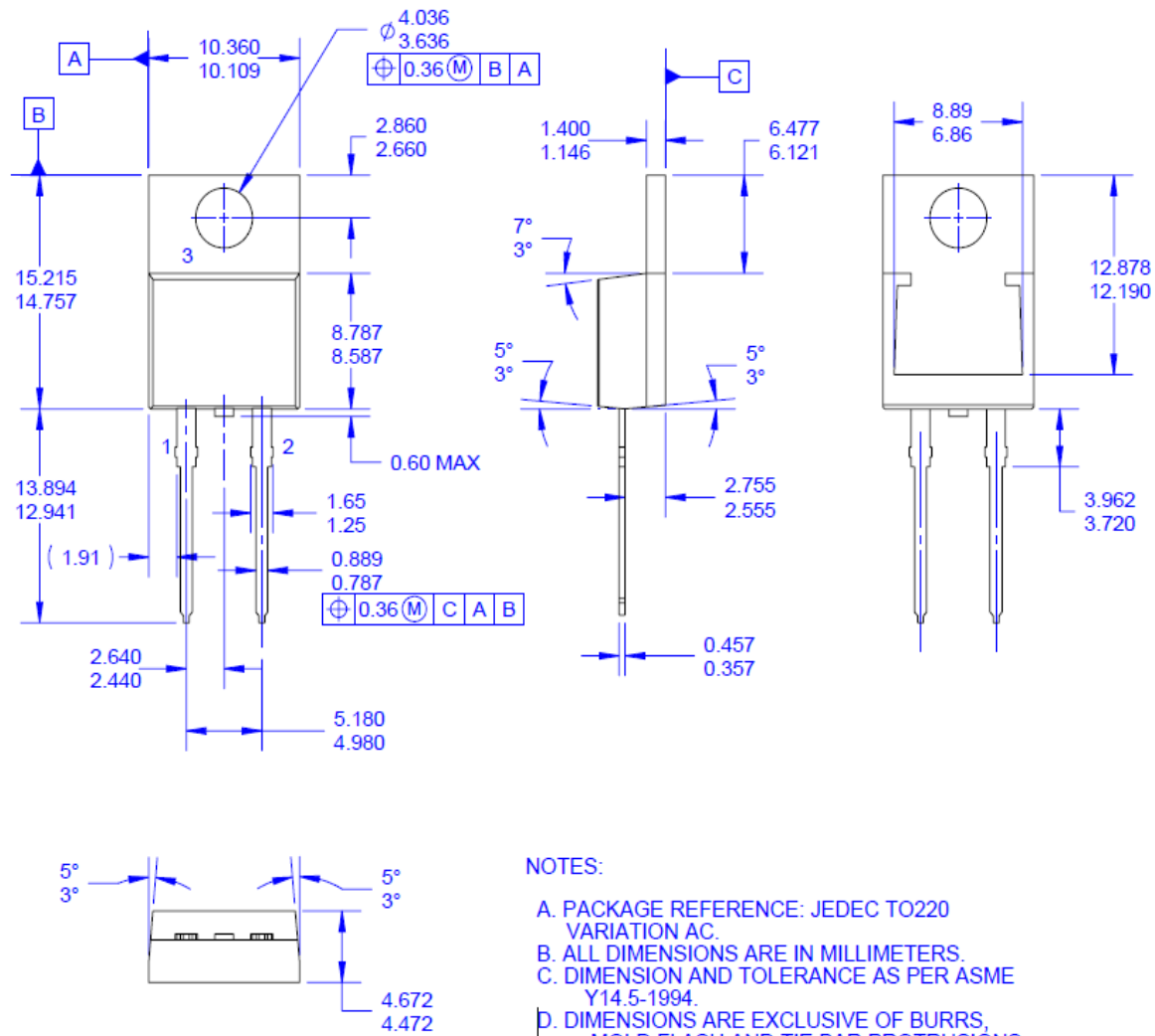


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

### Mechanical Dimensions



**NOTES:**

- A. PACKAGE REFERENCE: JEDEC TO220 VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
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- E. THIS PACKAGE IS FSSZ INTERNAL PRODUCTION AND INTENDED FOR DELTA CUSTOMER ONLY.
- F. DRAWING FILE NAME: TO220B02REV4

**Figure 12. TO-220 2L - TO-220, MOLDED, 2LD**

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