# 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°C)
- 1000 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

## Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

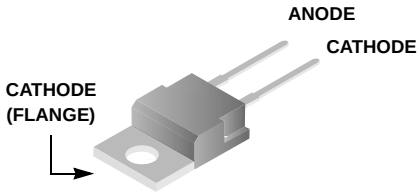
## Ordering Information

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

NOTE: When ordering, use entire part number.

## Packaging

**JEDEC TO-220AC**




## Symbol


## Absolute Maximum Ratings $T_C$ = 25°C, Unless Otherwise Specified

| | | MUR8100E RURP8100 | UNIT |
|---|---|---|---|
| Peak Repetitive Reverse Voltage | $V_{RRM}$ | 1000 | V |
| Working Peak Reverse Voltage | $V_{RWM}$ | 1000 | V |
| DC Blocking Voltage | $V_R$ | 1000 | V |
| Average Rectified Forward Current ($T_C$ = 155°C) | $I_{F(AV)}$ | 8 | A |
| Repetitive Peak Surge Current (Square Wave 20kHz) | $I_{FRM}$ | 16 | A |
| Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60Hz) | $I_{FSM}$ | 100 | A |
| Maximum Power Dissipation | $P_D$ | 75 | W |
| Avalanche Energy (See Figures 10 and 11) | $E_{AVL}$ | 20 | mJ |
| Operating and Storage Temperature | $T_{STG}$, $T_J$ | -55 to 175 | °C |

**Electrical Specifications** $T_C = 25^oC$, Unless Otherwise Specified.

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

DEFINITIONS

$V_F$ = Instantaneous forward voltage (pw = 300 μs, D = 2%).

$I_R$ = Instantaneous reverse current.

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

$t_a$ = Time to reach peak reverse current at $dI_F/dt$ = 100A/μs (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*

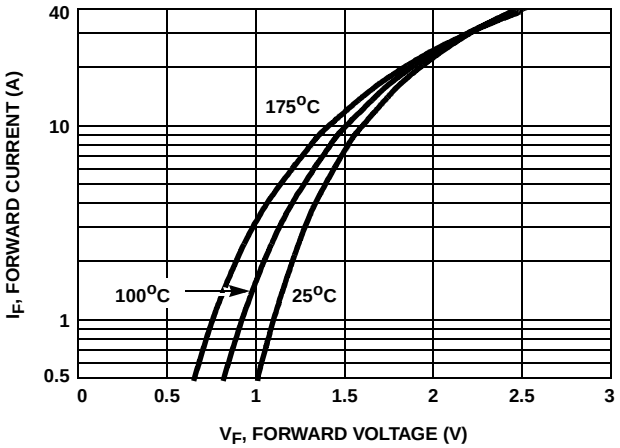



**FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE**

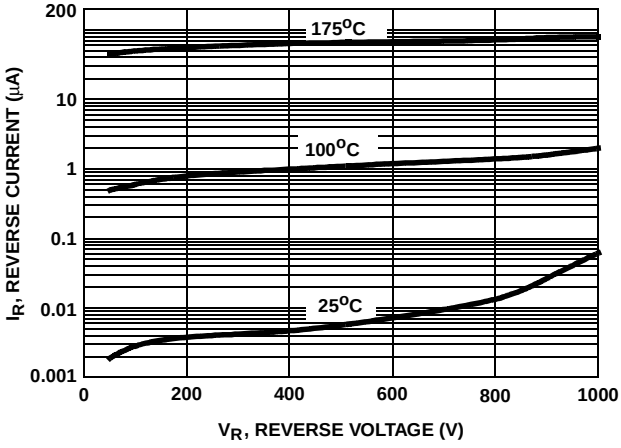



**FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE**

## Typical Performance Curves (Continued)

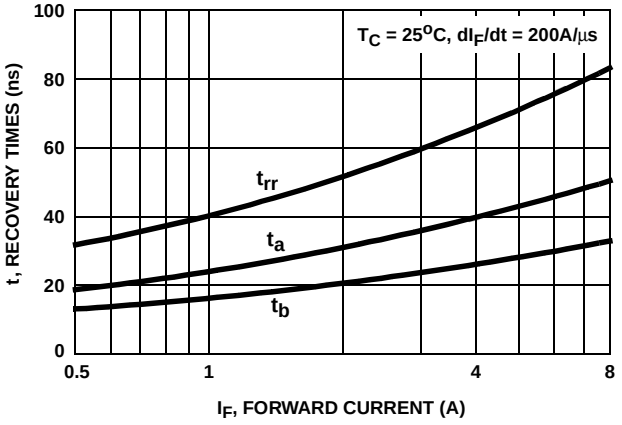



FIGURE 3. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

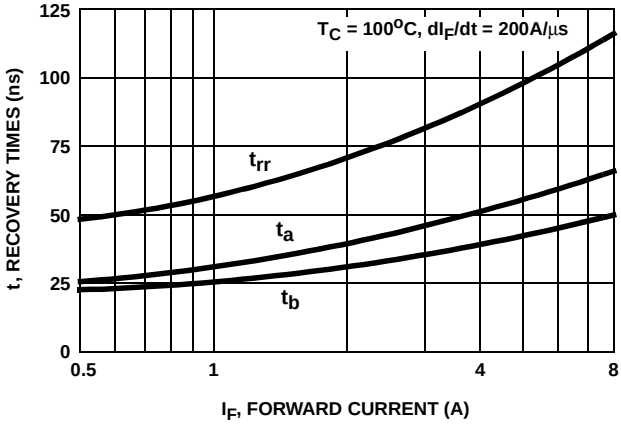



FIGURE 4. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

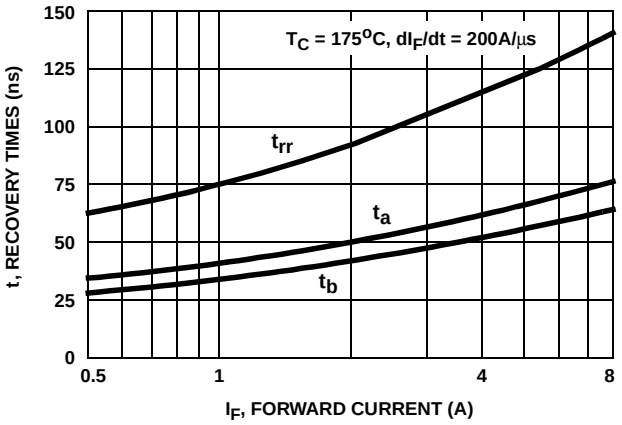



FIGURE 5. $t_{rr}$, $t_a$ AND $t_b$ CURVES vs FORWARD CURRENT

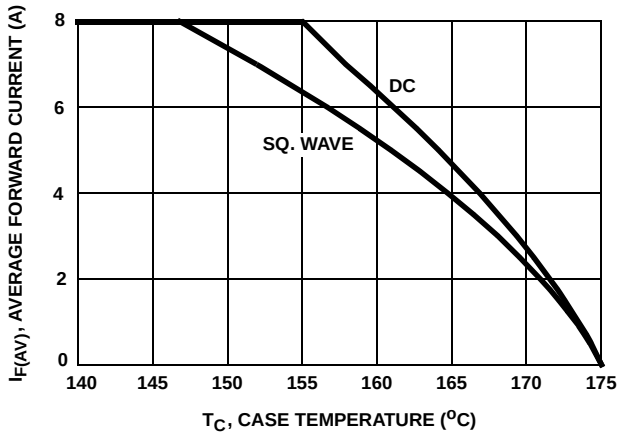



FIGURE 6. CURRENT DERATING CURVE

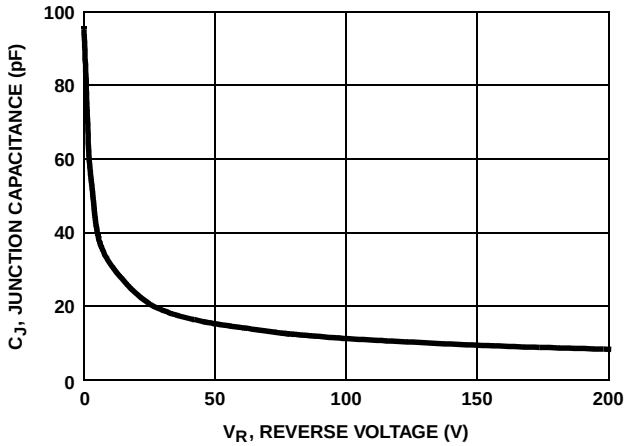



FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

## Test Circuits and Waveforms

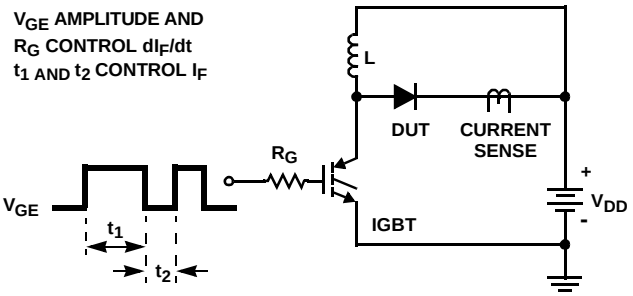



FIGURE 8. $t_{rr}$ TEST CIRCUIT

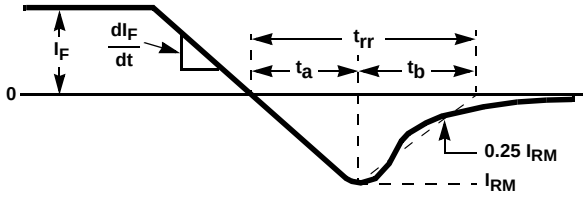



FIGURE 9. $t_{rr}$ WAVEFORMS AND DEFINITIONS

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

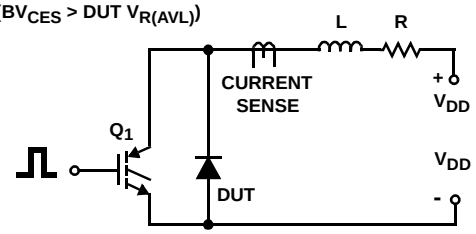



FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

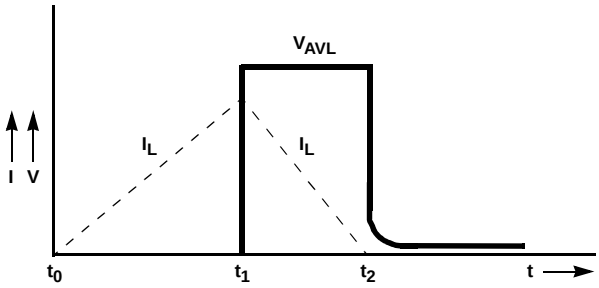



FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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