

Data Sheet December 2002

## 8A, 1000V Ultrafast Diodes

The MUR8100E and RUR8100 are ultrafast diodes ( $t_{rr} < 75$ ns) with soft recovery characteristics. They have a low forward voltage drop and are of planar, silicon nitride passivated, ion-implanted, epitaxial construction.

These devices are intended for use as energy steering/ clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and ultrafast recovery with soft recovery characteristics minimize ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistor.

Formerly developmental type TA09617.

## **Ordering Information**

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

NOTE: When ordering, use entire part number.

## Symbol



### **Features**

•	Ultrafast with Soft Recovery<75ns
•	Operating Temperature
•	Reverse Voltage
	A

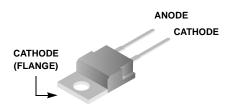
- Avalanche Energy Rated
- Planar Construction

## **Applications**

- · Switching Power Supply
- · Power Switching Circuits
- · General Purpose

## **Packaging**

**JEDEC TO-220AC** 



## Absolute Maximum Ratings T<sub>C</sub> = 25°C, Unless Otherwise Specified

	MUR8100E RURP8100	UNITS
Peak Repetitive Reverse VoltageV <sub>RRM</sub>	1000	V
Working Peak Reverse Voltage	1000	V
DC Blocking VoltageV <sub>R</sub>	1000	V
Average Rectified Forward Current $I_{F(AV)}$ ( $T_C = 155^{\circ}C$ )	8	А
Repetitive Peak Surge Current	16	А
Nonrepetitive Peak Surge Current	100	А
Maximum Power Dissipation	75	W
Avalanche Energy (See Figures 10 and 11)	20	mJ
Operating and Storage Temperature	-55 to 175	oC

# MUR8100E, RURP8100

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V <sub>F</sub>	I <sub>F</sub> = 8A	-	-	1.8	V
	$I_F = 8A, T_C = 150^{\circ}C$	-	-	1.5	V
I <sub>R</sub>	V <sub>R</sub> = 1000V	-	-	100	μΑ
	V <sub>R</sub> = 1000V, T <sub>C</sub> = 150 <sup>o</sup> C	-	-	500	μΑ
t <sub>rr</sub>	I <sub>F</sub> = 1A	-	-	85	ns
	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	-	100	ns
ta	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	50	-	ns
t <sub>b</sub>	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	30	-	ns
Q <sub>RR</sub>	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	500	-	nC
СЈ	V <sub>R</sub> = 10V, I <sub>F</sub> = 0A	-	30	-	pF
$R_{ heta JC}$		-	-	2.0	oC/W

#### **DEFINITIONS**

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

 $I_R$  = Instantaneous reverse current.

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

 $t_a$  = Time to reach peak reverse current at  $dI_F/dt$  = 100A/ $\mu$ 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

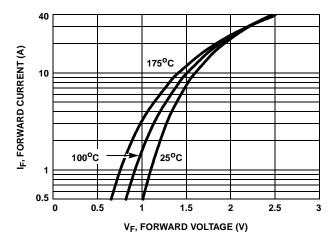


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

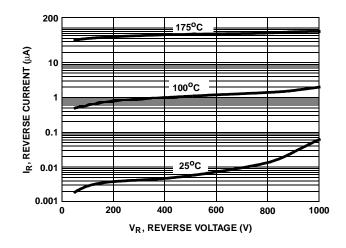


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

## Typical Performance Curves (Continued)

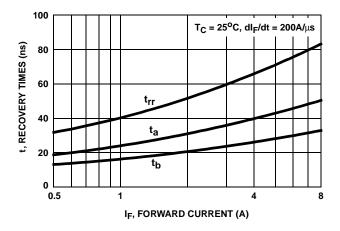


FIGURE 3.  $t_{rr}$ ,  $t_a$  and  $t_b$  curves vs forward current

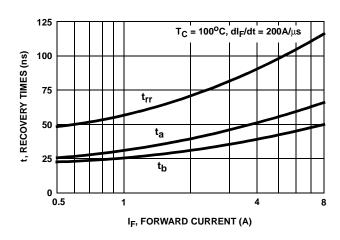


FIGURE 4.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

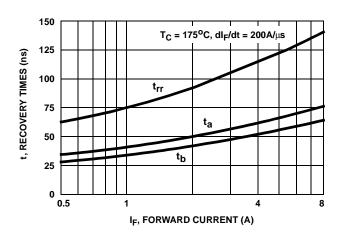


FIGURE 5.  $t_{rr}$ ,  $t_a$  and  $t_b$  curves vs forward current

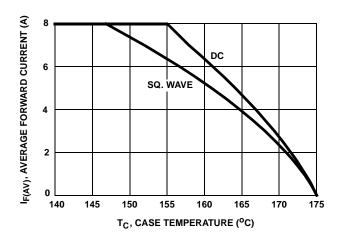


FIGURE 6. CURRENT DERATING CURVE

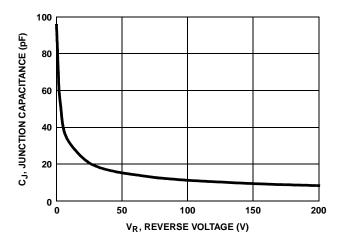


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

©2002 Fairchild Semiconductor Corporation MUR8100E, RURP8100 Rev. B1

## Test Circuits and Waveforms

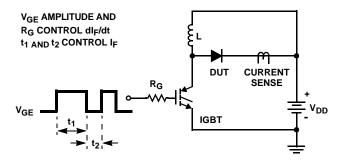


FIGURE 8.  $t_{rr}$  TEST CIRCUIT

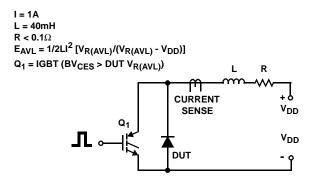


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

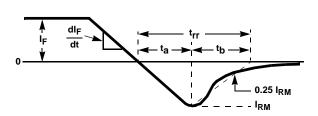


FIGURE 9.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

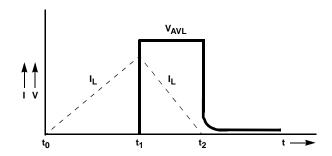


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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