MUR8100E, RURP8100

Data Sheet | **January 2002**

8A, 1000V Ultrafast Diodes

The MUR8100E and RUR8100 are ultrafast diodes (t_{rr} < 75ns) 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	MUR8100
RURP8100	TO-220AC	RURP8100

NOTE: When ordering, use entire part number.

Symbol

Features

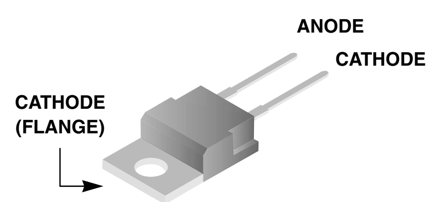
- Ultrafast with Soft Recovery . . . . <75ns
- Operating Temperature. . . . . .175^{o}C
- Reverse Voltage 1000V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AC



Absolute Maximum Ratings T_C = 25^{o}C, Unless Otherwise Specified

		MUR8100E RURP8100	UNITS
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^{o}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	^{o}C

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

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

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300μs, 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

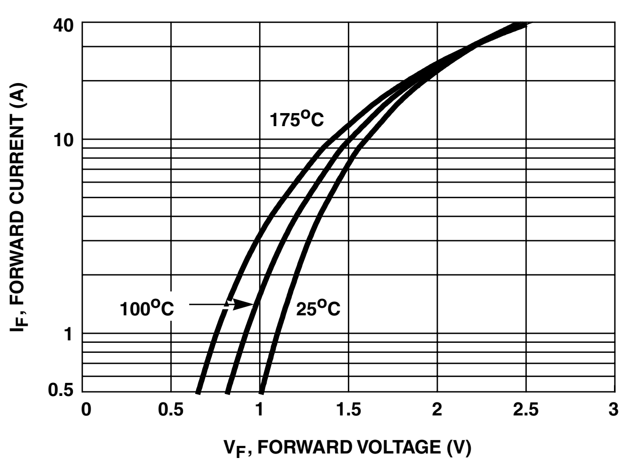


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

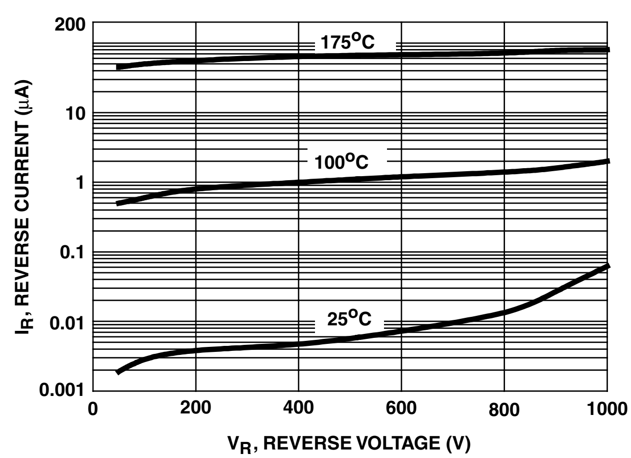


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

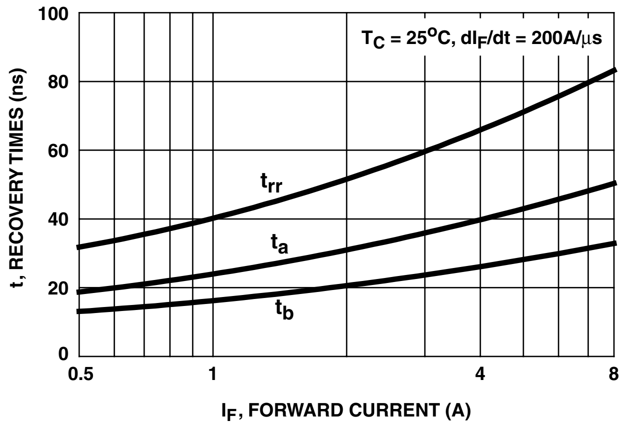


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

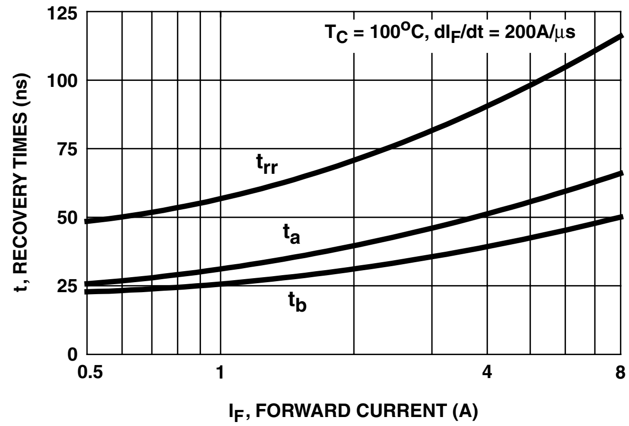


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

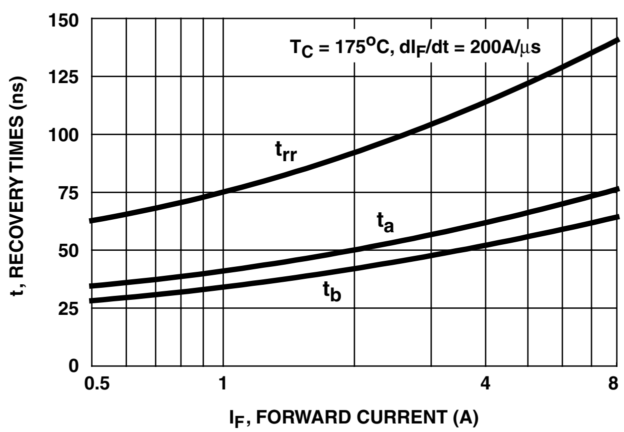


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

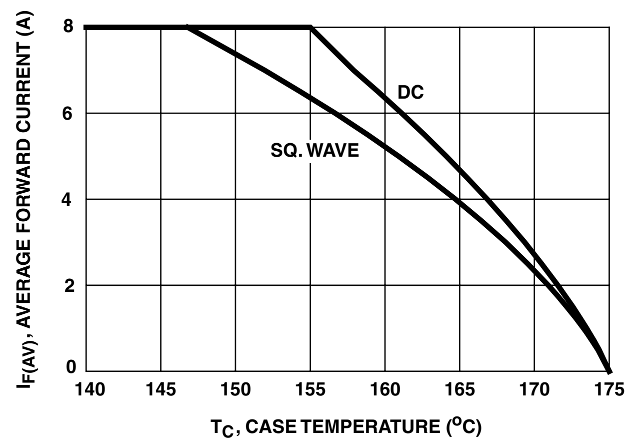


FIGURE 6. CURRENT DERATING CURVE

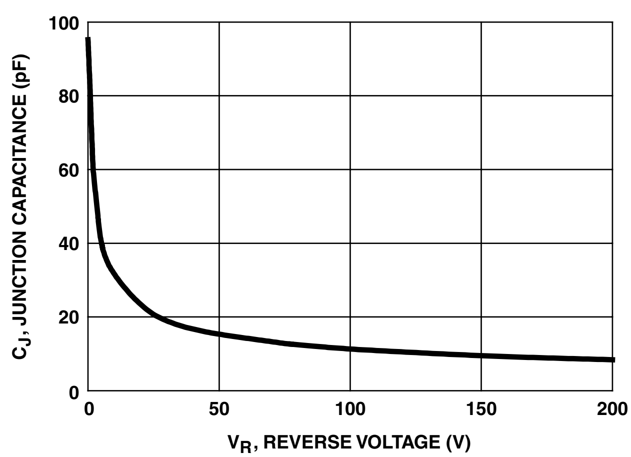


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

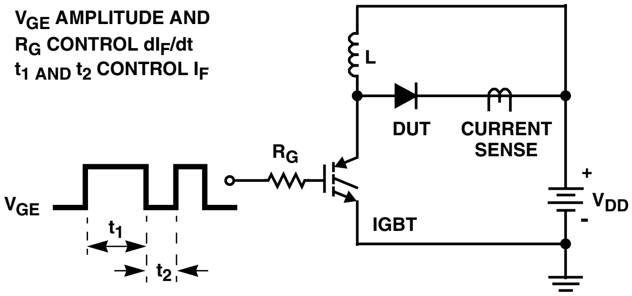


FIGURE 8. t_{rr} TEST CIRCUIT

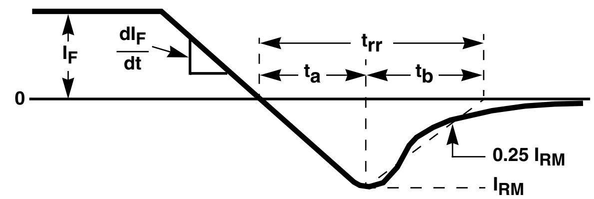


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

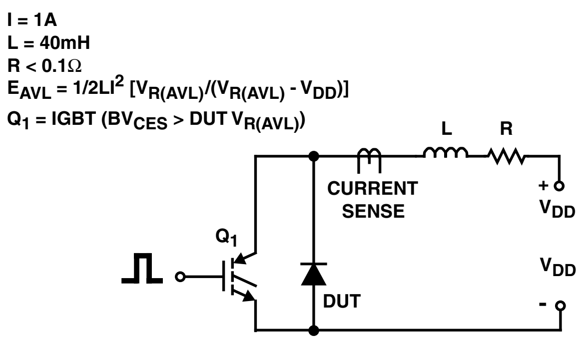


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

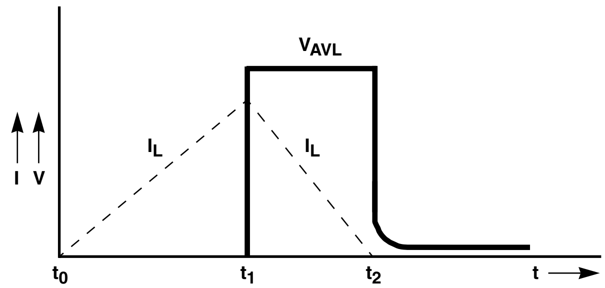


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™
Bottomless™
CoolFET™
CROSSVOLT™
DenseTrench™
DOME™
EcoSPARK™
E²CMOS™
EnSigna™
FACT™
FACT Quiet Series™
FAST ®
FASTr™
FRFET™
GlobalOptoisolator™
GTO™
HiSeC™
ISOPLANAR™
LittleFET™
MicroFET™
MicroPak™
MICROWIRE™
OPTOLOGIC™
OPTOPLANAR™
PACMAN™
POP™
Power247™
PowerTrench®
QFET™
QS™
QT Optoelectronics™
Quiet Series™
SILENT SWITCHER®
SMART START™
STAR*POWER™
Stealth™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SyncFET™
TinyLogic™
TruTranslation™
UHC™
UltraFET®
VCX™

STAR*POWER is used under license

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.