FAIRCHILD SEMICONDUCTOR™

MUR8100E, RURP8100

Data Sheet January 2000 File Number 2780.4

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

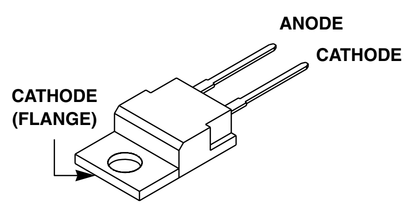
- Ultrafast with Soft Recovery . . . . <75ns
- Operating Temperature . . . . 175°C
- Reverse Voltage 1000V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AC



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

	Symbol	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°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	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

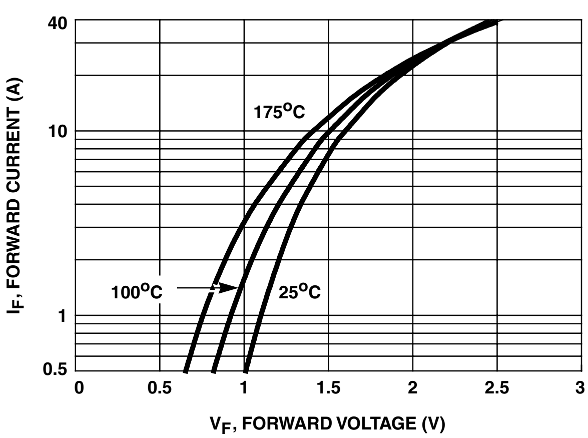


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

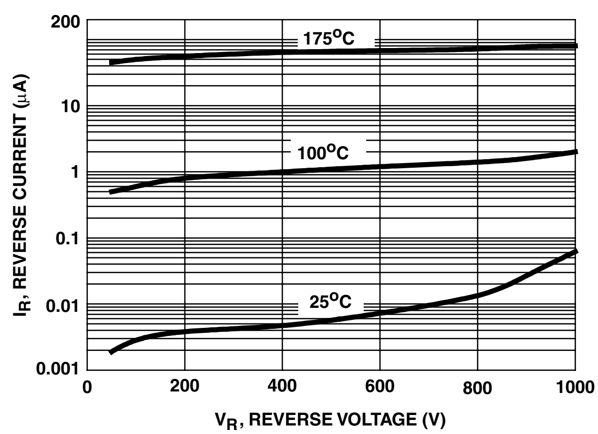


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

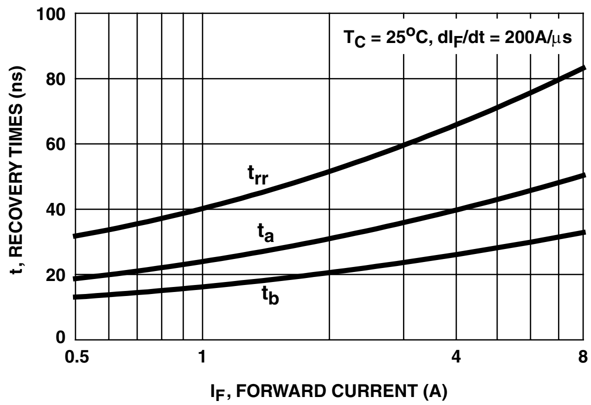


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

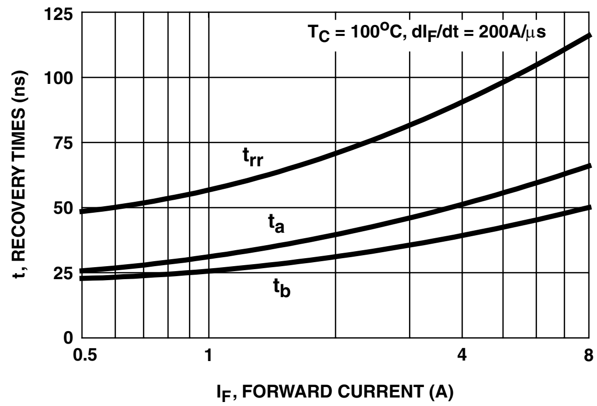


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

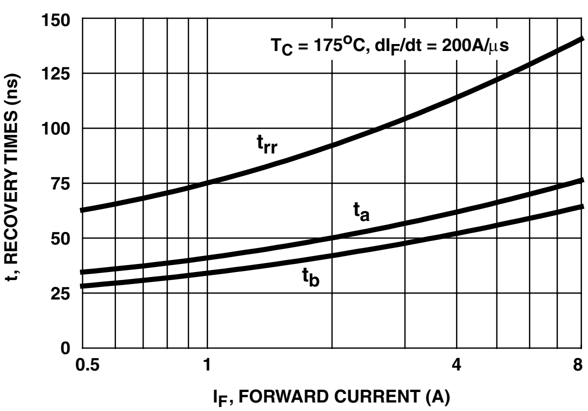


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

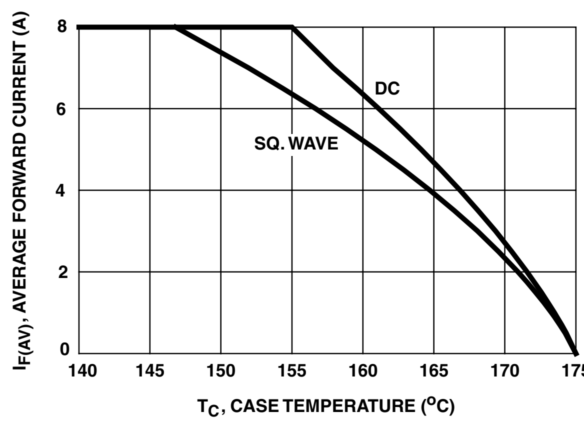


FIGURE 6. CURRENT DERATING CURVE

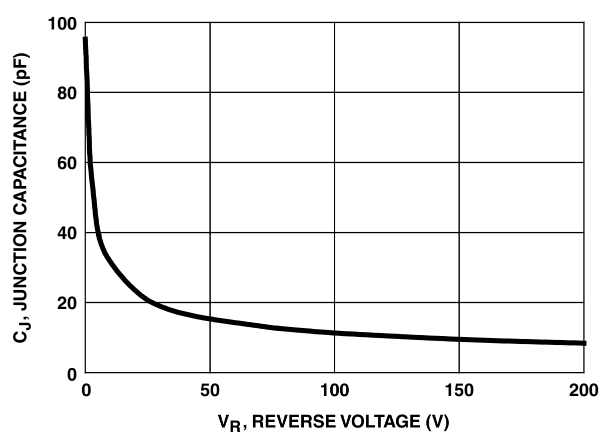


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

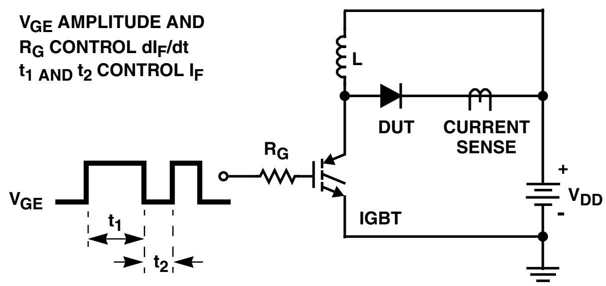


FIGURE 8. t_{rr} TEST CIRCUIT

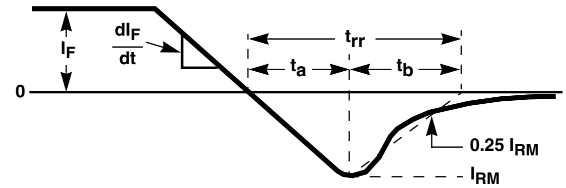


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

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

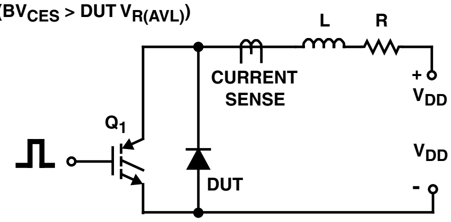


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

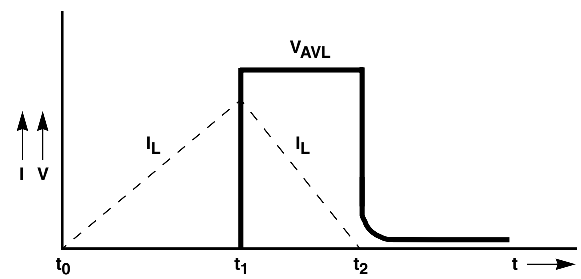


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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DenseTrench™	HiSeC™	QS™	TinyLogic™
DOME™	ISOPLANAR™	QT Optoelectronics™	UHC™
EcoSPARK™	LittleFET™	Quiet Series™	UltraFET™
E^2CMOS™	MicroFET™	SILENT SWITCHER ®	VCX™
EnSigna™	MICROWIRE™	SMART START™	
FACT™	OPTOLOGIC™	Star* Power™	
FACT Quiet Series™	OPTOPLANAR™	Stealth™	

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