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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.

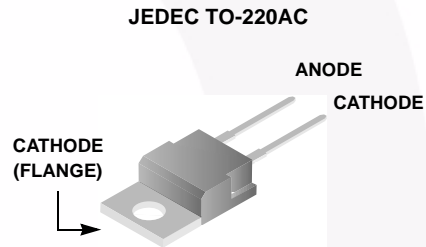
Features

- 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 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 ($T_C = 155^\circ\text{C}$)	$I_{F(AV)}$ 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	$^\circ\text{C}$

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	μA
	$V_R = 1000\text{ V}, T_C = 150^\circ\text{C}$	-	-	500	μA
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 μs , 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

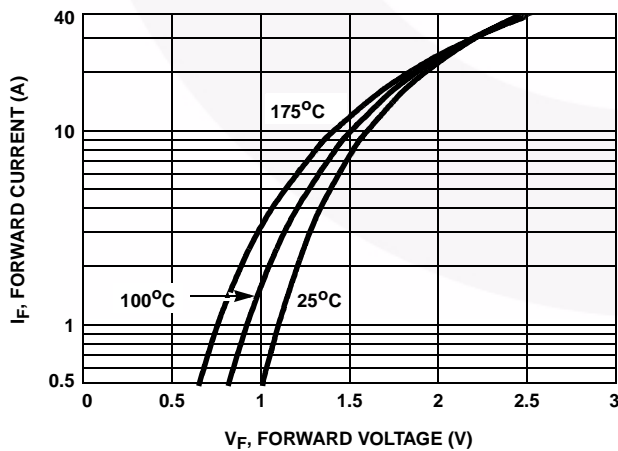


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

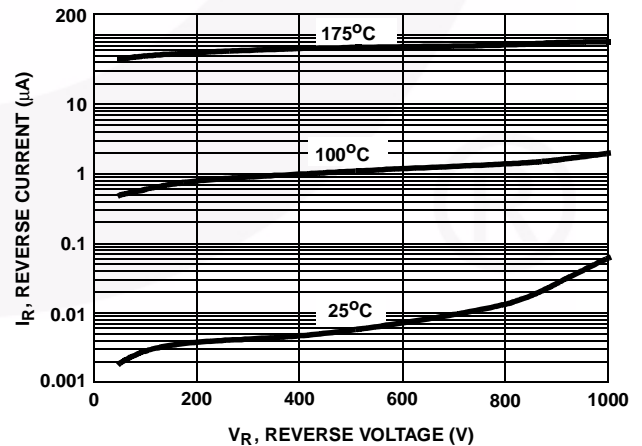


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

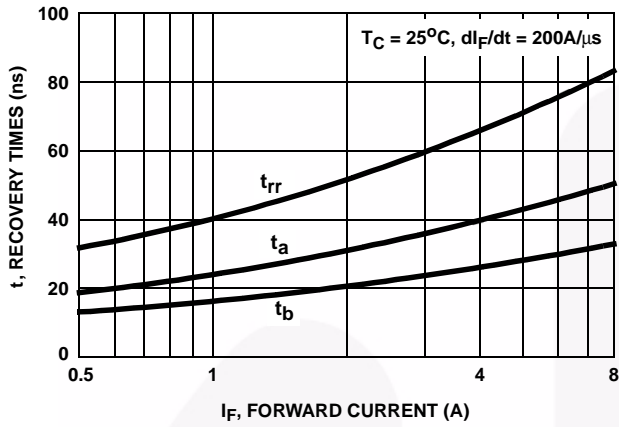


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

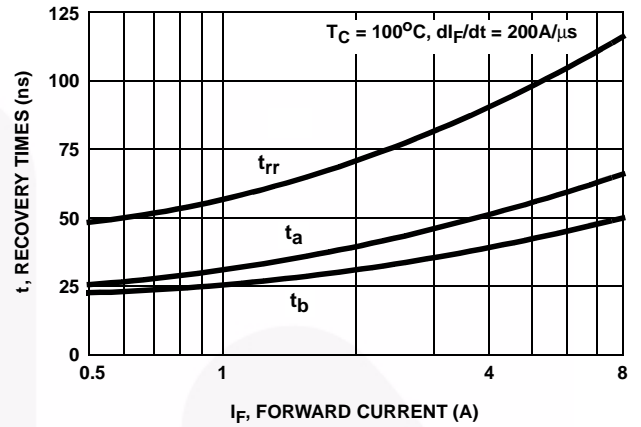


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

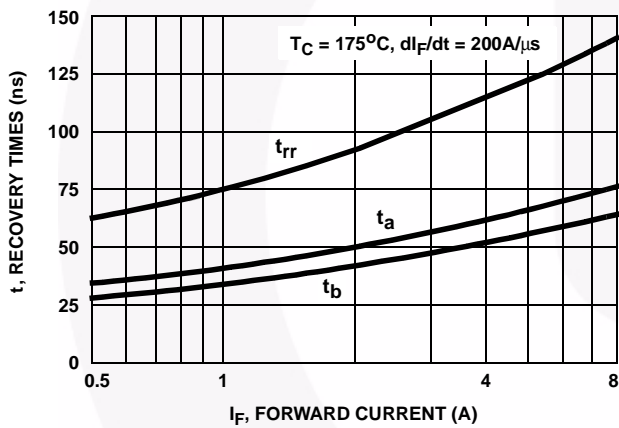


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

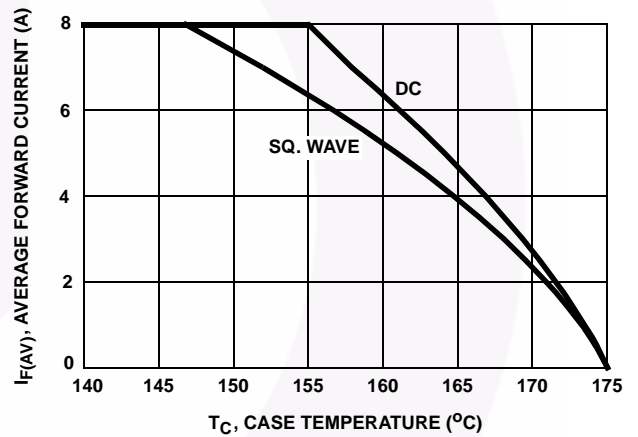


FIGURE 6. CURRENT DERATING CURVE

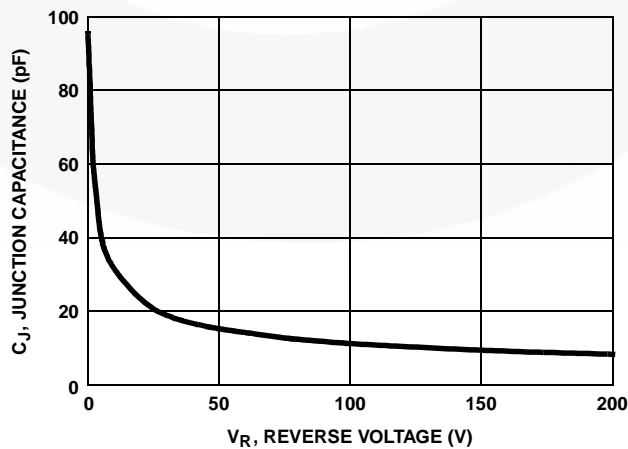


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

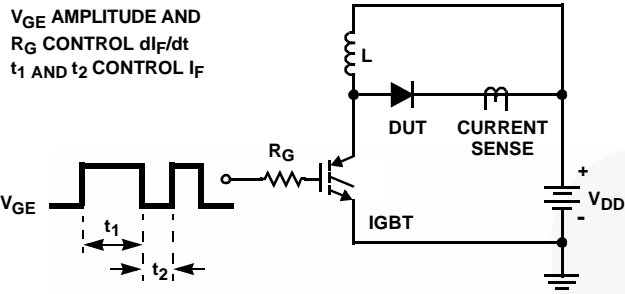


FIGURE 8. t_{rr} TEST CIRCUIT

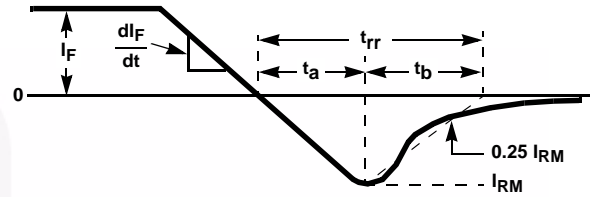


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

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

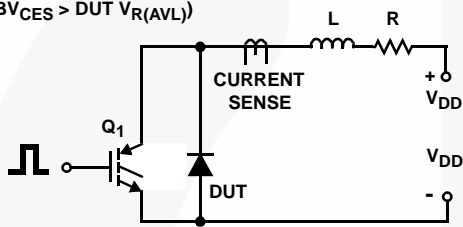


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

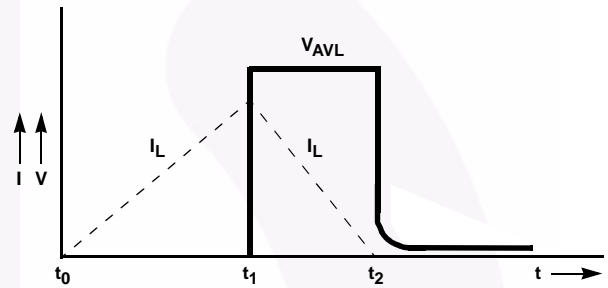
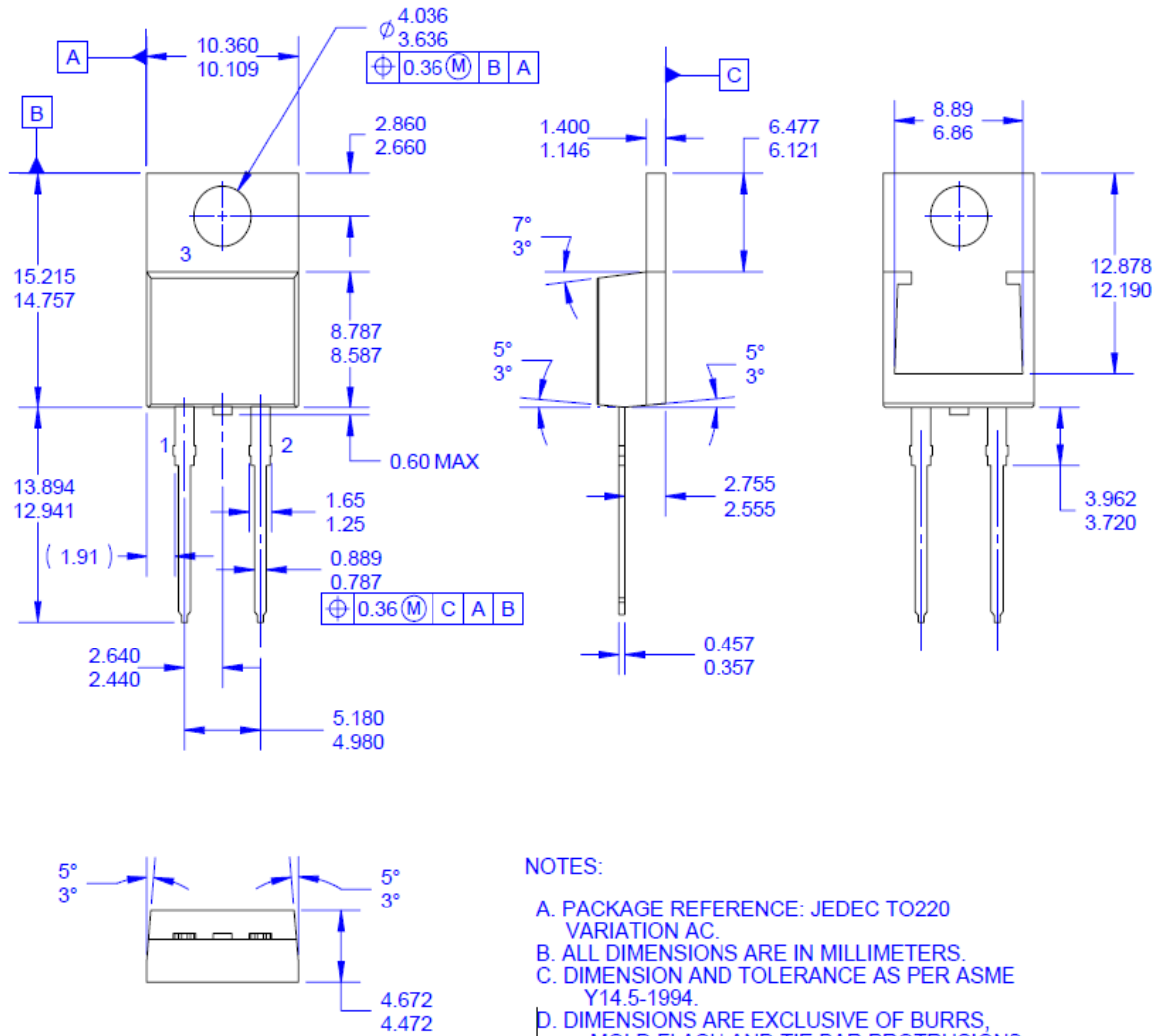


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS



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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