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8 A, 400 V - 600 V, Ultrafast Diodes

Description

The MUR840, MUR860, RURP840, RURP860 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.

Ordering Information

PART NUMBER	PACKAGE	BRAND
MUR840	TO-220AC-2L	MUR840
RURP840	TO-220AC-2L	RURP840
MUR860	TO-220AC-2L	MUR860
RURP860	TO-220AC-2L	RURP860

NOTE: When ordering, use the entire part number.

Symbol



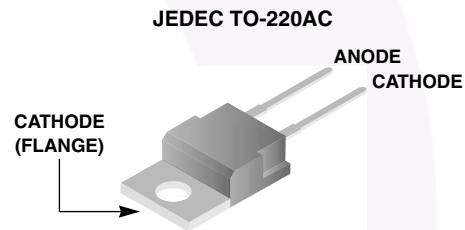
Features

- Ultrafast Recovery $t_{rr} = 70$ ns (@ $I_F = 8$ A)
- Max Forward Voltage, $V_F = 1.5$ V (@ $T_C = 25^\circ\text{C}$)
- 400 V, 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

	MUR840 RURP840	MUR860 RURP860	UNIT
Peak Repetitive Reverse Voltage	400	600	V
Working Peak Reverse Voltage	400	600	V
DC Blocking Voltage	400	600	V
Average Rectified Forward Current ($T_C = 155^\circ\text{C}$)	8	8	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	16	16	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	100	100	A
Maximum Power Dissipation	75	75	W
Avalanche Energy (See Figures 10 and 11)	20	20	mJ
Operating and Storage Temperature	-65 to 175	-65 to 175	$^\circ\text{C}$
Maximum Lead Temperature for Soldering			
Leads at 0.063 in. (1.6mm) from case for 10s	300	300	$^\circ\text{C}$
Package Body for 10s, see Tech Brief 334.	260	260	$^\circ\text{C}$

MUR840, MUR860, RURP840, RURP860

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

SYMBOL	TEST CONDITION	MUR840, RURP840			MUR860, RURP860			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
V_F	$I_F = 8\text{ A}$	-	-	1.3	-	-	1.5	V
	$I_F = 8\text{ A}, T_C = 150^\circ\text{C}$	-	-	1.0	-	-	1.2	V
I_R	$V_R = 400\text{ V}$	-	-	100	-	-	-	μA
	$V_R = 600\text{ V}$	-	-	-	-	-	100	μA
	$V_R = 400\text{ V}, T_C = 150^\circ\text{C}$	-	-	500	-	-	-	μA
	$V_R = 600\text{ V}, T_C = 150^\circ\text{C}$	-	-	-	-	-	500	μA
t_{rr}	$I_F = 1\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	-	60	-	-	60	ns
	$I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	-	70	-	-	70	ns
t_a	$I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	32	-	-	32	-	ns
t_b	$I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	21	-	-	21	-	ns
Q_{rr}	$I_F = 8\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$	-	195	-	-	195	-	nC
C_J	$V_R = 10\text{ V}, I_F = 0\text{ A}$	-	25	-	-	25	-	pF
$R_{\theta JC}$		-	-	2	-	-	2	$^\circ\text{C}/\text{W}$

DEFINITIONS

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

I_R = Instantaneous reverse current.

T_{rr} = Reverse recovery time (See Figure 9), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current (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

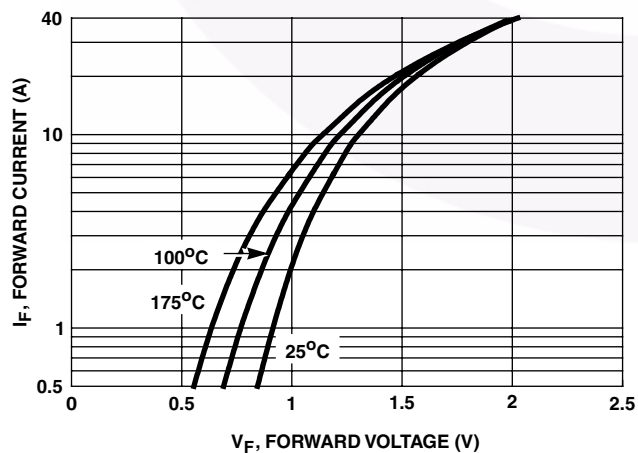


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

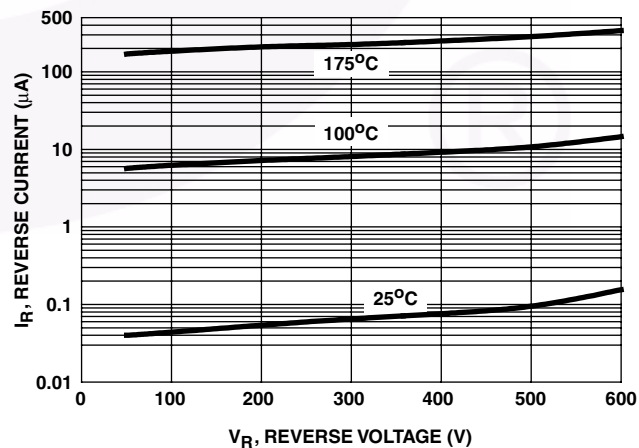


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

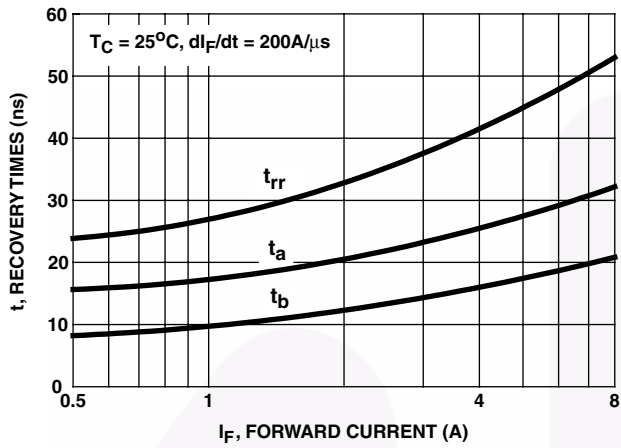


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

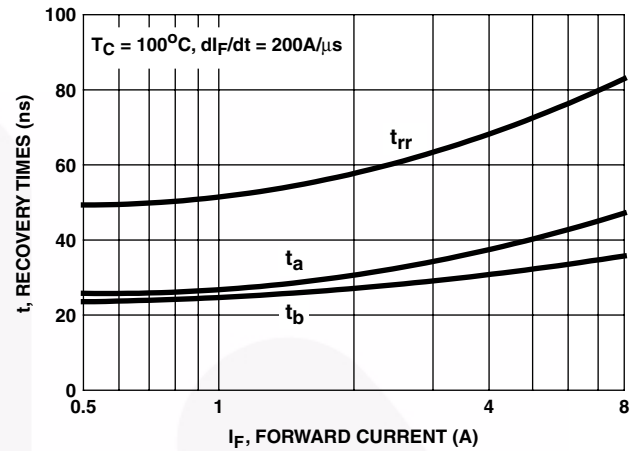


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

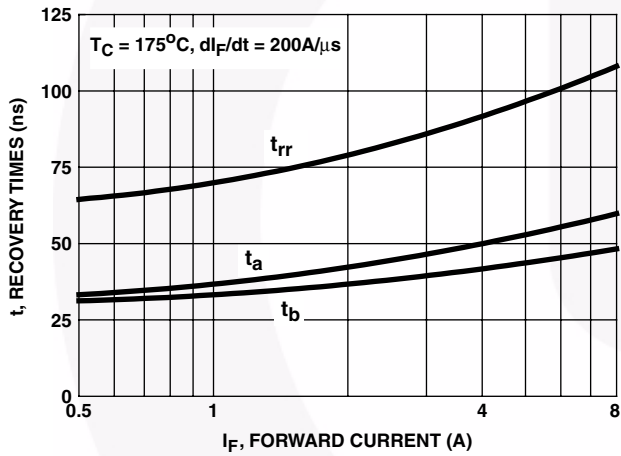


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

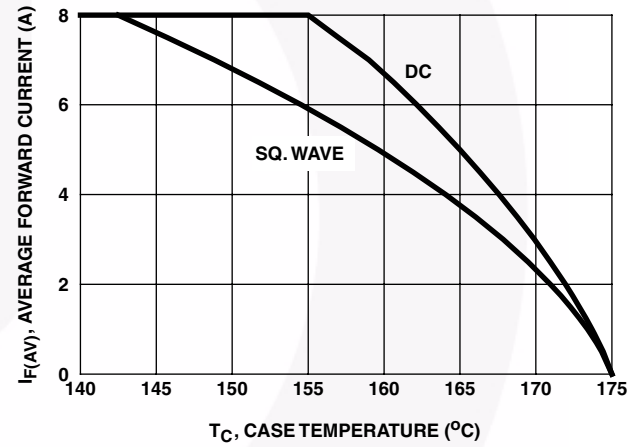


FIGURE 6. CURRENT DERATING CURVE

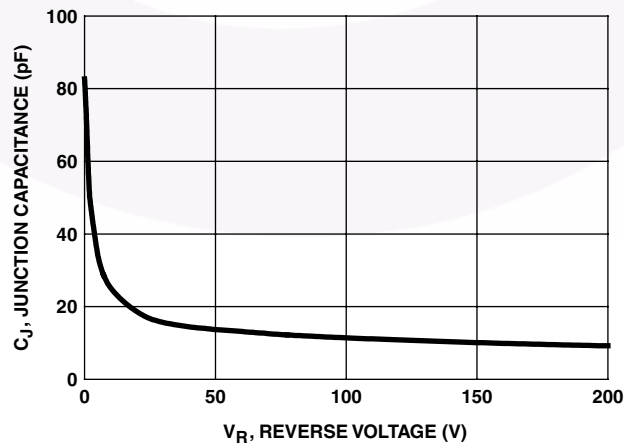


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

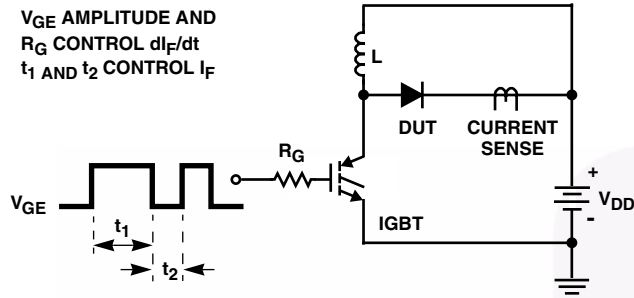


FIGURE 8. t_{rr} TEST CIRCUIT

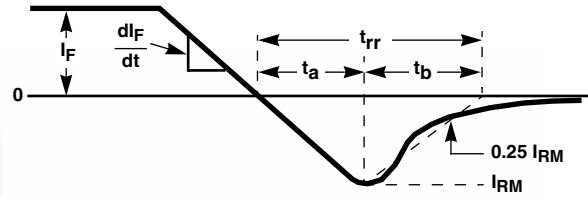


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

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

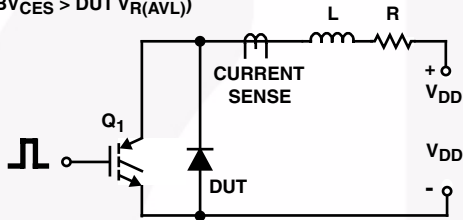


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

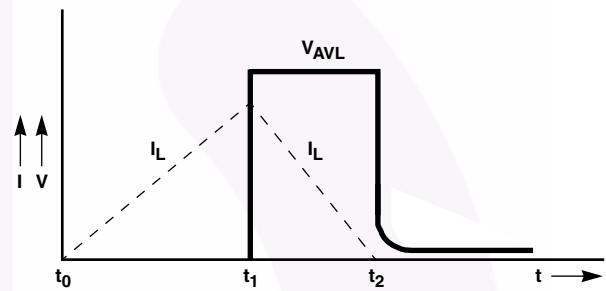
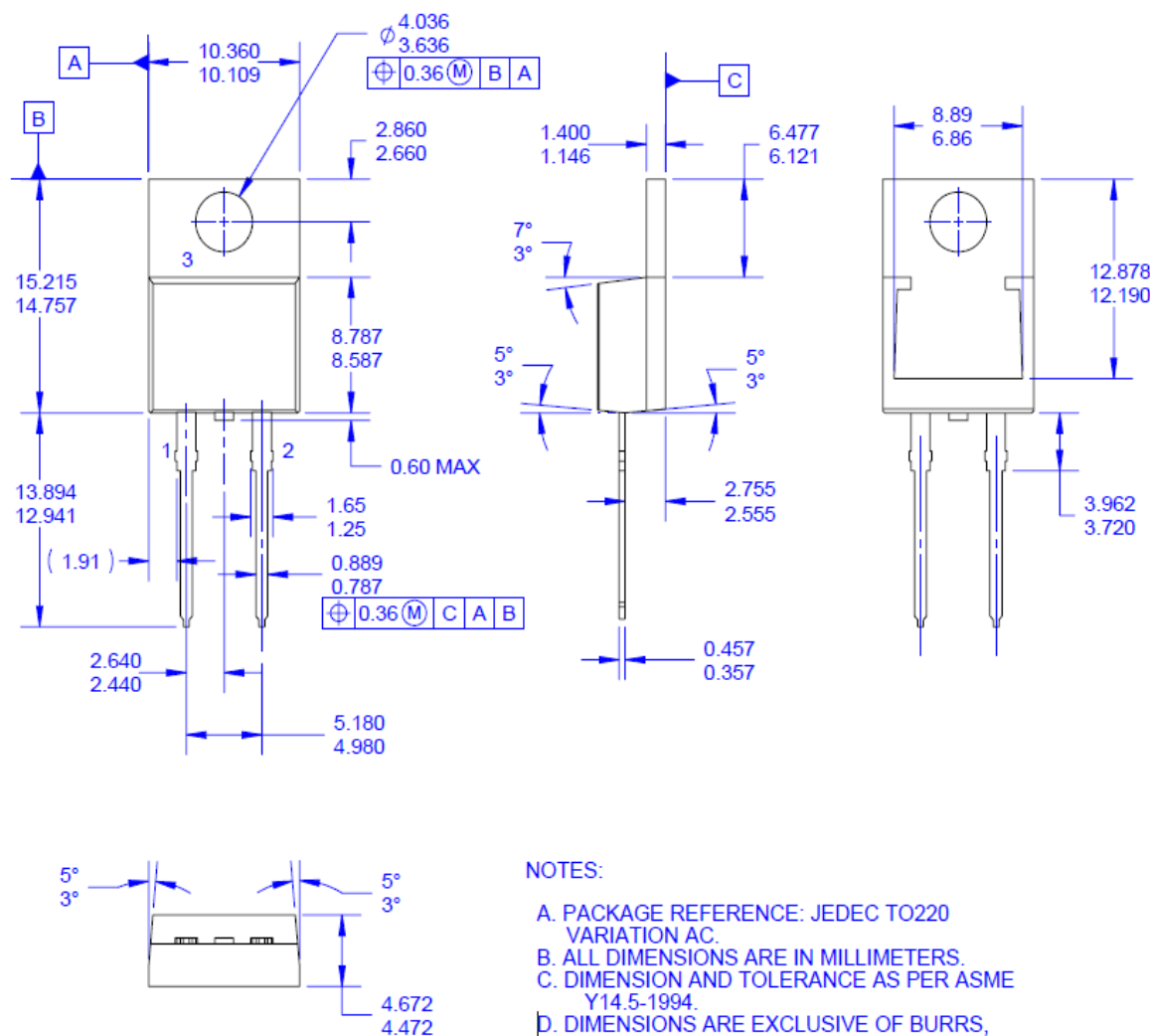


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Mechanical Dimensions



NOTES:

- PACKAGE REFERENCE: JEDEC TO220 VARIATION AC.
- ALL DIMENSIONS ARE IN MILLIMETERS.
- DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- THIS PACKAGE IS FSSZ INTERNAL PRODUCTION AND INTENDED FOR DELTA CUSTOMER ONLY.
- DRAWING FILE NAME: TO220B02REV4

Figure 12. TO-220 2L - TO-220, MOLDED, 2LD

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