FAIRCHILD SEMICONDUCTOR®

MUR840, MUR860, RURP840, RURP860

Data Sheet **March 2001**

8 A, 400 V - 600 V, Ultrafast Diodes

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.

Features

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

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

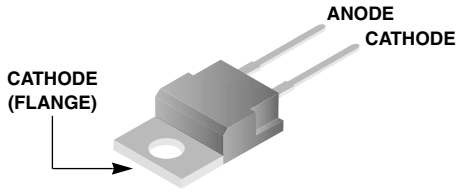
Ordering Information

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

NOTE: When ordering, use the entire part number.

Packaging

JEDEC TO-220AC



Symbol

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

		MUR840 RURP840	MUR860 RURP860	UNIT
Peak Repetitive Reverse Voltage	V_{RRM}	400	600	V
Working Peak Reverse Voltage	V_{RWM}	400	600	V
DC Blocking Voltage	V_R	400	600	V
Average Rectified Forward Current (T_C = 155°C)	$I_{F(AV)}$	8	8	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	16	16	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	100	100	A
Maximum Power Dissipation	P_D	75	75	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	20	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	-65 to 175	°C
Maximum Lead Temperature for Soldering				
Leads at 0.063 in. (1.6mm) from case for 10s	T_L	300	300	°C
Package Body for 10s, see Tech Brief 334	T_{PKG}	260	260	°C

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

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

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

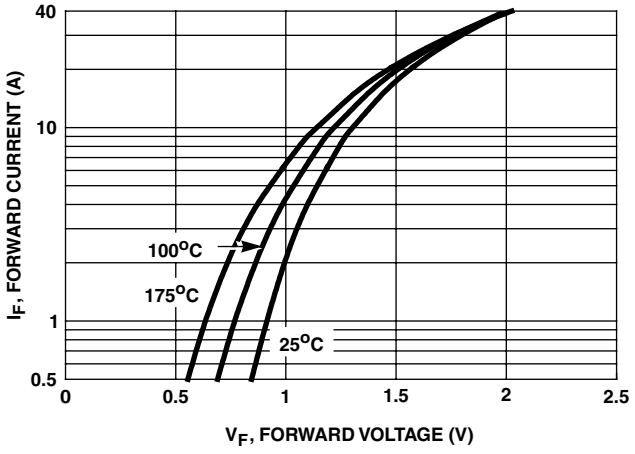


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

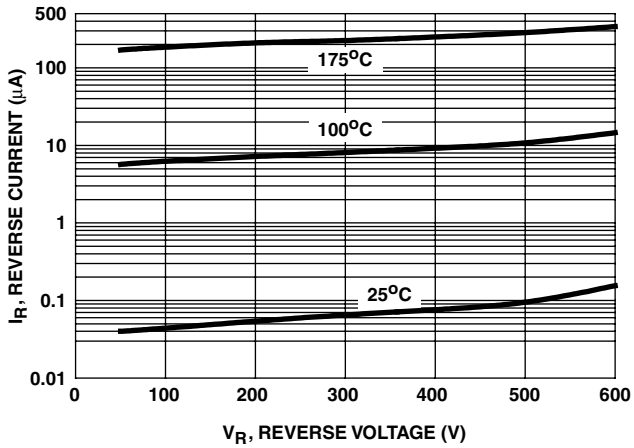


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

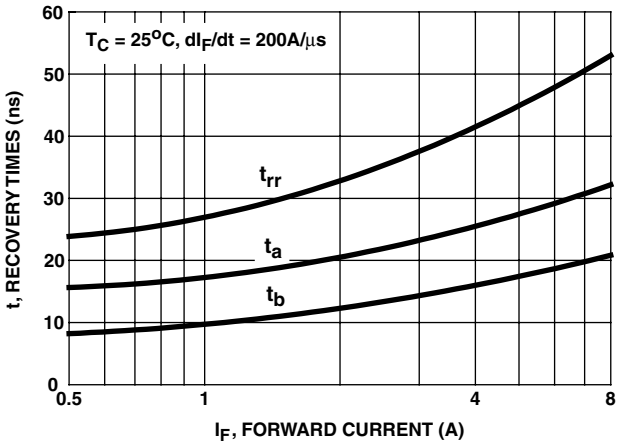


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

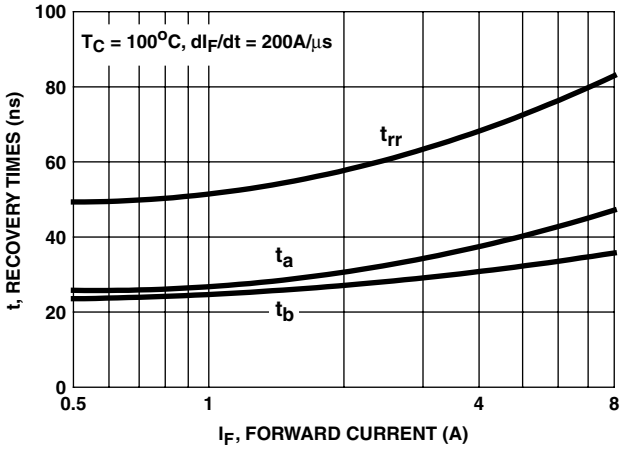


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

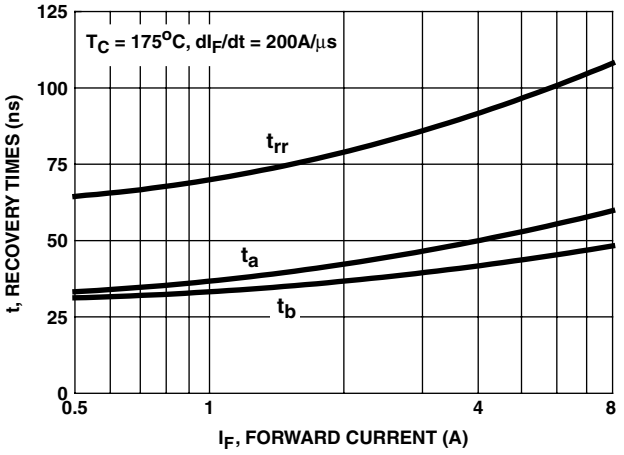


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

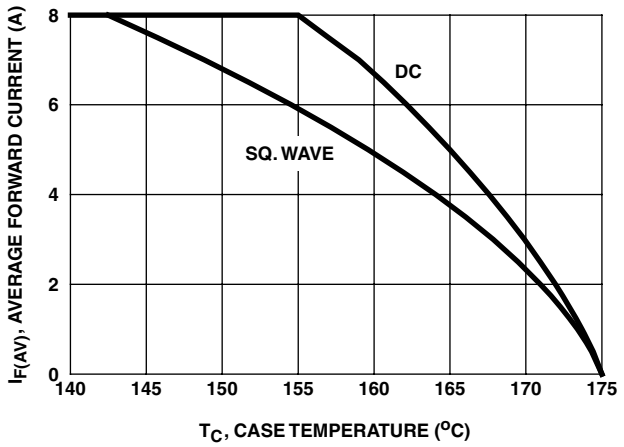


FIGURE 6. CURRENT DERATING CURVE

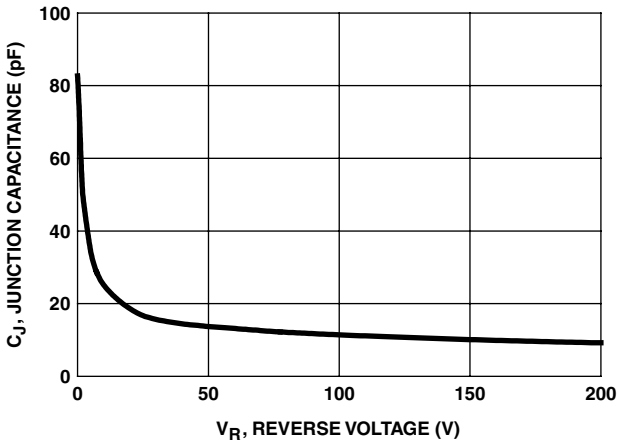


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

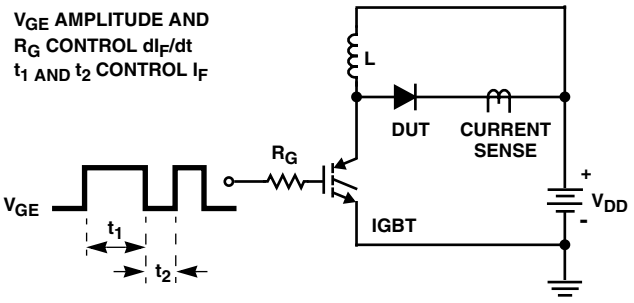


FIGURE 8. t_{rr} TEST CIRCUIT

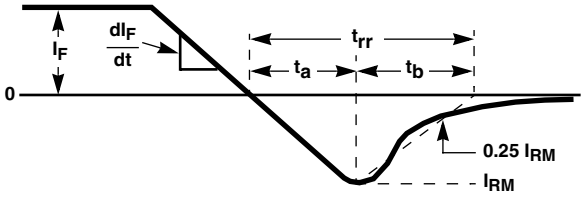


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

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

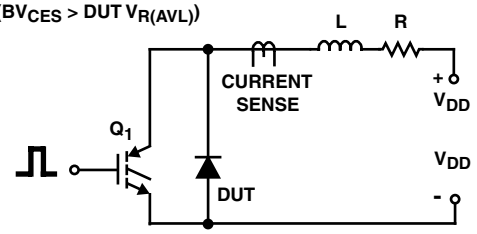


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

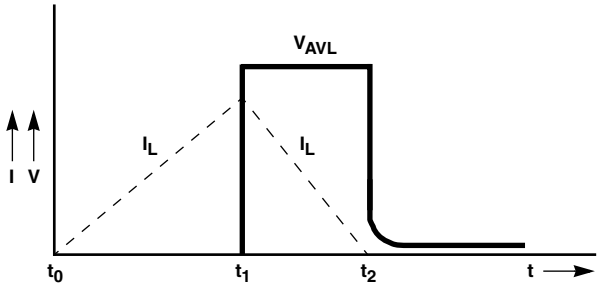


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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