

Data Sheet January 2000 File Number 2091.4

## 8A, 400V - 600V Ultrafast Diodes

The MUR840, MUR860, RURP840 and RURP860 are low forward voltage drop ultrafast recovery rectifiers ( $t_{rr}$  < 60ns). They use a glass-passivated ion-implanted, epitaxial construction.

These devices are intended for use as output rectifiers and flywheel diodes in a variety of high-frequency pulse-width modulated switching regulators. Their low stored charge and attendant fast reverse-recovery behavior minimize electrical noise generation and in many circuits markedly reduce the turn-on dissipation of the associated power switching transistors.

Formerly developmental type TA09616.

#### **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.

# Symbol



#### **Features**

	Ultrafast with Soft Recovery <60ns
•	Operating Temperature
•	Reverse Voltage

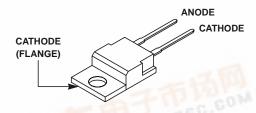
- Avalanche Energy Rated
- · Planar Construction

# **Applications**

- · Switching Power Supplies
- Power Switching Circuits
- General Purpose

## **Packaging**

JEDEC TO-220AC



#### **Absolute Maximum Ratings** T<sub>C</sub> = 25°C, Unless Otherwise Specified

	MUR840 RURP840	MUR860 RURP860	UNITS
Peak Repetitive Reverse VoltageVRRM	400	600	V
Working Peak Reverse Voltage	400	600	V
DC Blocking VoltageV <sub>R</sub>	400	600	V
Average Rectified Forward Current	8	8	Α
Repetitive Peak Surge Current IFRM (Square Wave, 20kHz)	16	16	Α
Nonrepetitive Peak Surge Current	100	100	Α
Max <mark>imum Power Dissipation</mark>	75	75	W
Avalanche Energy (See Figures 10 and 11)	20	20	mJ
Operating and Storage Temperature	-65 to 175	-65 to 175	οС
Maximum Lead Temperature for Soldering			
Leads at 0.063 in. (1.6mm) from case for 10s	300	300	°С
Package Body for 10s, see Tech Brief 334TPKG	260	260	°C

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

		MUR840, RURP840		MUR860, RURP860				
SYMBOL	TEST CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
V <sub>F</sub>	I <sub>F</sub> = 8A	-	-	1.3	-	-	1.5	V
	$I_F = 8A, T_C = 150^{\circ}C$	-	-	1.0	-	-	1.2	V
I <sub>R</sub>	V <sub>R</sub> = 400V	-	-	100	-	-	-	μА
	V <sub>R</sub> = 600V	-	-	-	-	-	100	μА
	$V_R = 400V, T_C = 150^{\circ}C$	-	-	500	-	-	-	μА
	$V_R = 600V, T_C = 150^{\circ}C$	-	-	-	-	-	500	μА
t <sub>rr</sub>	$I_F = 1A$ , $dI_F/dt = 200A/\mu s$	-	-	60	-	-	60	ns
	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	-	70	-	-	70	ns
t <sub>a</sub>	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	32	-	-	32	-	ns
t <sub>b</sub>	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	21	-	-	21	-	ns
Q <sub>RR</sub>	$I_F = 8A$ , $dI_F/dt = 200A/\mu s$	-	195	-	-	195	-	nC
СЈ	V <sub>R</sub> = 10V, I <sub>F</sub> = 0A	-	25	-	-	25	-	pF
$R_{\theta JC}$		-	-	2	-	-	2	°C/W

#### **DEFINITIONS**

 $V_F$  = Instantaneous forward voltage (pw =  $300\mu s,\,D$  = 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).

 $t_b = \text{Time from peak I}_{RM} \text{ to projected zero crossing of I}_{RM} \text{ based on a straight line from peak I}_{RM} \text{ through 25\% of I}_{RM} \text{ (See Figure 9)}.$ 

Q<sub>RR</sub> = Reverse recovery charge.

C<sub>J</sub> = Junction Capacitance.

 $R_{\theta JC}$  = Thermal resistance junction to case.

pw = pulse width.

D = duty cycle.

# **Typical Performance Curves**

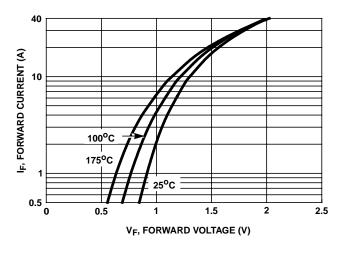


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

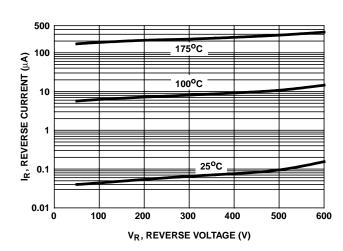


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

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## Typical Performance Curves (Continued)

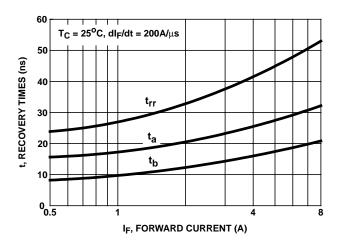


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

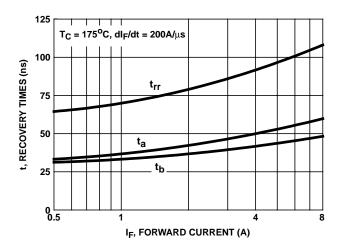


FIGURE 5.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

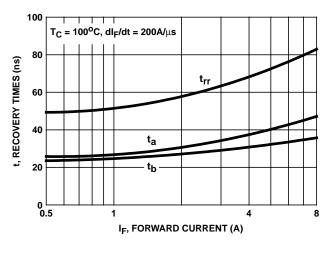


FIGURE 4.  $t_{rr}$ ,  $t_a$  and  $t_b$  curves vs forward current

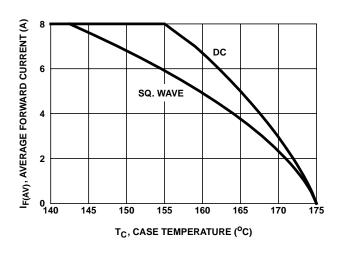


FIGURE 6. CURRENT DERATING CURVE

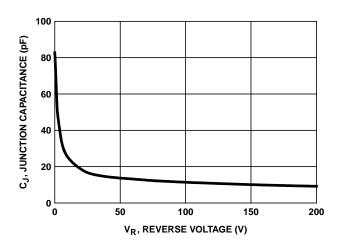


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

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#### Test Circuits and Waveforms

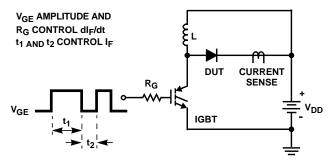


FIGURE 8. t<sub>rr</sub> TEST CIRCUIT

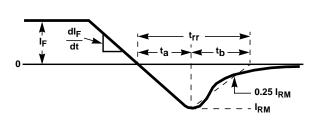


FIGURE 9. t<sub>rr</sub> WAVEFORMS AND DEFINITIONS

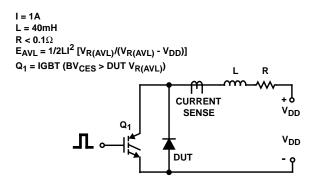


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

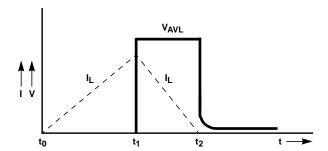


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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