

JEDEC TO-220AC

## 8-A, High Speed, High Voltage, High Efficiency Epitaxial Silicon Rectifiers

### Features:

- Ultra fast recovery time ( $< 50$  ns)
- Low forward voltage
- Low thermal resistance
- Hard glass passivation
- Wire-bonded construction

### Applications:

- General Purpose
- Power switching circuits to 100 kHz
- Output rectification in switching power supplies

The RCA MUR-840, MUR-850, and MUR-860\* are low forward voltage drop ultra fast-recovery rectifiers ( $t_{rr} < 50$  ns). They use a glass passivated ion-implanted epitaxial construction.

These devices are intended for use as output rectifiers and fly wheel diodes in a variety of high-frequency pulse-width modulated and 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.

All are supplied in TO-220AC plastic packages.

\* Formerly RCA Dev. No. TA9616.

### MAXIMUM RATINGS, Absolute-Maximum Values:

	MUR-840	MUR-850	MUR-860	UNIT
Peak Repetitive Reverse Voltage, $V_{RRM}$ .....	400	500	600	V
Working Peak Reverse Voltage, $V_{RWM}$				
DC Blocking Voltage, $V_R$				
Average Rectified Forward Current, $I_{F(AV)}$ .....		8		A
Total Device, (Rated $V_R$ ), $T_C = 150^\circ\text{C}$				
Peak Repetitive Forward Current, $I_{FM}$ .....		16		A
(Rated $V_R$ , Square Wave, 20 kHz), $T_C = 150^\circ\text{C}$				
Nonrepetitive Peak Surge Current, $I_{FSM}$ .....		100		A
(Surge applied at rated load conditions halfwave, single phase, 60 Hz)				
Operating Junction Temperature and Storage Temperature, $T_J, T_{stg}$ .....		-65 to +175		$^\circ\text{C}$
Lead Temperature During Soldering, $T_L$				
At distance $> 1/8$ in. (3.17 mm) from case for 10 s max. ....		260		$^\circ\text{C}$

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File Number 2091

ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	TEST CONDITIONS			LIMITS						UNITS
	T <sub>J</sub> °C	V <sub>R</sub> V	I <sub>F</sub> A	MUR-840		MUR-850		MUR-860		
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
i <sub>R</sub>	25	400		—	10	—	—	—	—	μA
		500		—	—	—	10	—	—	
		600		—	—	—	—	—	10	
	150	400		—	500	—	—	—	—	
		500		—	—	—	500	—	—	
		600		—	—	—	—	—	500	
V <sub>F</sub>	25		8	—	1.3	—	1.5	—	1.5	V
	150		8	—	1.0	—	1.2	—	1.2	
t <sub>rr</sub>	25		1 *	—	60	—	60	—	60	ns
			0.5 **	—	50	—	50	—	50	
R <sub>θJC</sub>				—	2	—	2	—	2	°C/W

\* di/dt = 50 A/μs

\*\* i<sub>R</sub> = 1.0A, I<sub>REC</sub> = 0.25 A

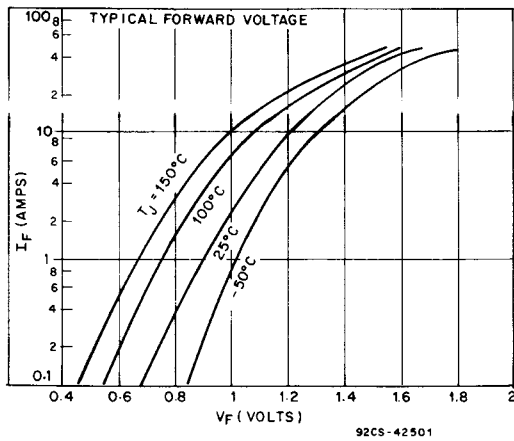


Fig. 1 - Typical forward voltage - MUR-840.

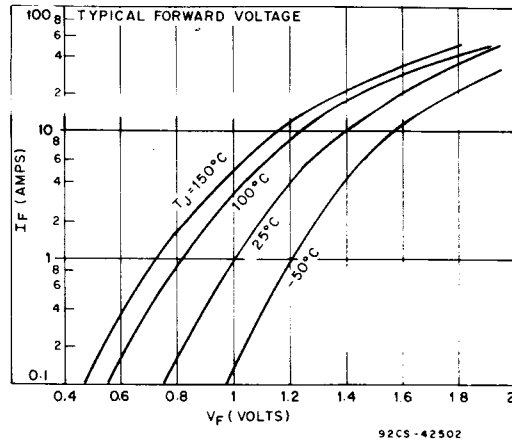


Fig. 2 - Typical forward voltage - MUR-850 and MUR-860.

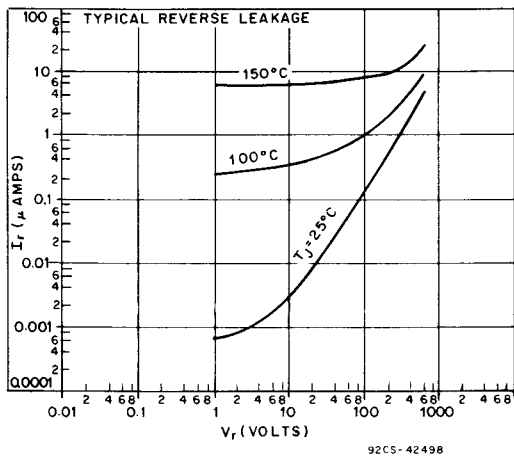


Fig. 3 - Typical reverse leakage - MUR-840.

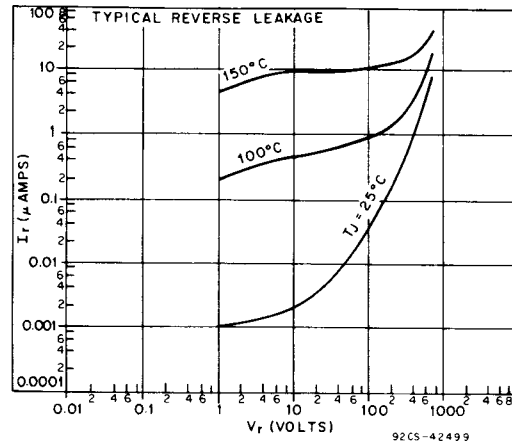


Fig. 4 - Typical reverse leakage - MUR-850 and MUR-860.

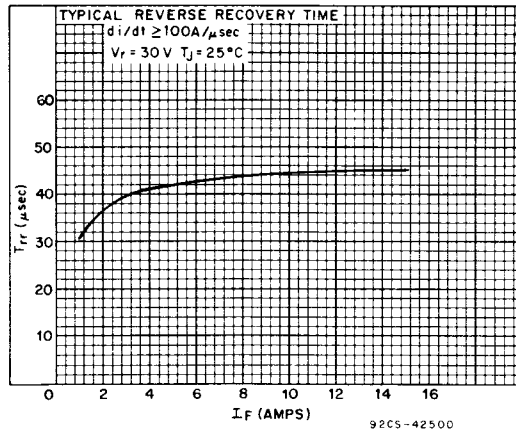
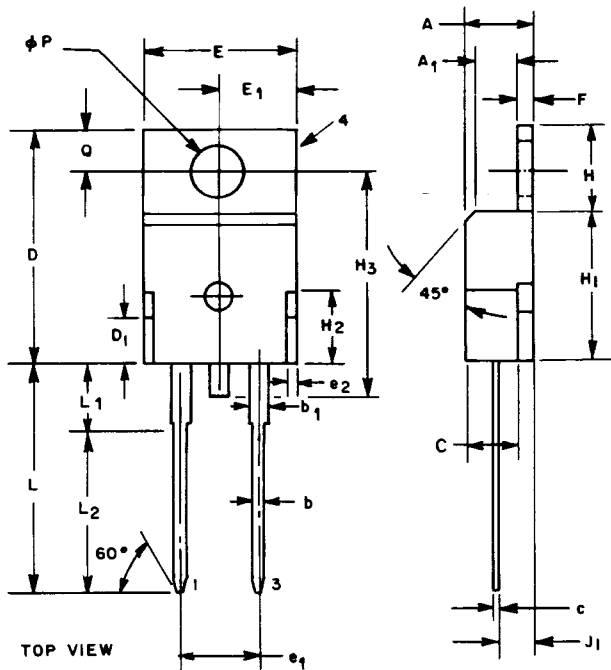


Fig. 5 - Typical reverse recovery time - all types.

**DIMENSIONAL OUTLINE**

**TO-220AC  
VERSAWATT**



SYMBOL	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.140	0.190	3.56	4.82
A <sub>1</sub>	0.080	0.085	2.03	2.16
b	0.020	0.045	0.51	1.14
b <sub>1</sub>	0.045	0.070	1.14	1.77
C	—	0.125	—	3.18
c	0.015	0.025	0.38	0.63
D	0.560	0.625	14.23	15.87
D <sub>1</sub>	—	0.100	—	2.54
E	0.380	0.420	9.66	10.66
e <sub>1</sub>	0.190	0.210	4.83	5.33
e <sub>2</sub>	—	0.030	—	0.76
F	0.045	0.055	1.14	1.39
H	0.230	0.270	5.85	6.85
H <sub>1</sub>	0.355	0.370	9.02	9.40
H <sub>2</sub>	—	0.160	—	4.06
H <sub>3</sub>	—	0.600	—	15.24
J <sub>1</sub>	0.080	0.115	2.04	2.92
L	0.500	0.562	12.70	14.27
L <sub>1</sub>	—	0.250	—	6.35
L <sub>2</sub>	0.400	0.410	10.16	10.41
phi P	0.139	0.161	3.531	4.089
Q	0.100	0.120	2.54	3.04

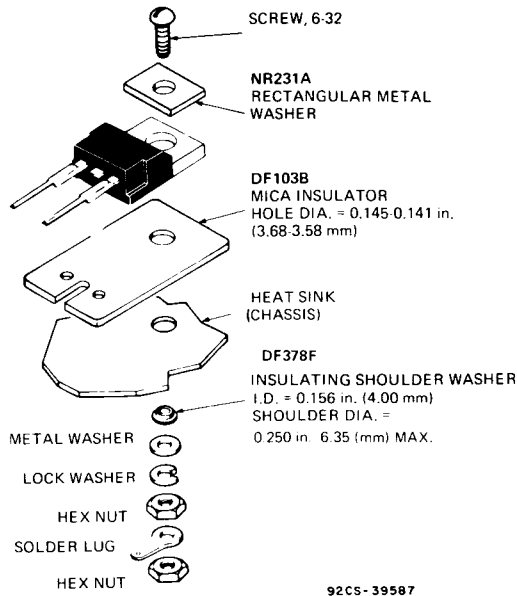
**NOTES:**

1. Position of lead to be measured 0.250-0.255 in. (6.350-6.477 mm) from case.

92CS-34830R1

**TERMINAL CONNECTIONS  
JEDEC TO-220AC**

- Terminal No. 1 — Cathode
- Terminal No. 3 — Anode
- Terminal No. 4 — Cathode



NOTE: MAXIMUM TORQUE APPLIED TO MOUNTING  
FLANGE IS 8 in. lb. (0.09 kgf. m)

*Suggested mounting hardware for JEDEC TO-220AC.*

**SYMBOLS**

$di_F/dt$	Rate of change of forward current	$R\theta_{JC}$	Thermal resistance, junction-to-case
$i_F$	Instantaneous forward current	$T_J$	Junction temperature
$I_F$	Forward current	$T_L$	Lead temperature
$I_{FSM}$	Peak surge (non-repetitive) forward current	$t_p$	Pulse duration
$i_R$	Instantaneous reverse current	$t_{rr}$	Reverse recovery time
$I_R$	Reverse current	$T_{stg}$	Storage temperature
$I_{RM}(rec)$	Maximum peak reverse recovery current	$V_F$	Instantaneous forward voltage drop
$I_{RR}$	Reverse recovery current	$V_{RM}$	Maximum (peak) reverse voltage
$R\theta_{JA}$	Thermal resistance, junction-to-air	$Z\theta_{JC}$	Thermal impedance, junction-to-case

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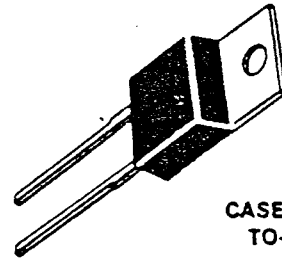
**HARRIS**Semiconductor GmbH  
Zeppelinstr. 35/1 · 7302 Ostfildern 4  
Telefon (0711) 45 40 01-04**SWITCHMODE POWER RECTIFIERS**

... designed for use in switching power supplies, inverters and as free wheeling diodes, these state-of-the-art devices have the following features:

- Ultrafast 25, 50 and 75 Nanosecond Recovery Time
- 175°C Operating Junction Temperature
- Popular TO-220 Package
- Epoxy meets UL94, V<sub>0</sub> @ 1/8"
- Low Forward Voltage
- Low Leakage Current
- High Temperature Glass Passivated Junction
- Reverse Voltage to 1000 Volts

**ULTRAFAST RECTIFIERS**

8 AMPERES  
50-1000 VOLTS

CASE 2218-02  
TO-220AC

**MUR810**  
**MUR815**  
**MUR820**

**MUR850**  
**MUR860**  
**MUR870**  
**MUR880**  
**MUR890**  
**MUR8100**

**MAXIMUM RATINGS**

Rating	Symbol	MUR											Unit
		810	815	820	840	850	860	870	880	890	8100		
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>VRWM</sub> V <sub>R</sub>	100	150	200	400	500	600	700	800	900	1000	Volts	
Average Rectified Forward Current Total Device, (Rated V <sub>R</sub> ), T <sub>C</sub> = 150°C	I <sub>F(AV)</sub>	8.0											Amps
Peak Repetitive Forward Current (Rated V <sub>R</sub> , Square Wave, 20 kHz), T <sub>C</sub> = 150°C	I <sub>FM</sub>	16											Amps
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I <sub>FSM</sub>	100											Amps
Operating Junction Temperature and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	-65 to +175											°C

**THERMAL CHARACTERISTICS**

Maximum Thermal Resistance, Junction to Case	R <sub>θJC</sub>	3.0	2.0	°C/W

**ELECTRICAL CHARACTERISTICS**

Maximum Instantaneous Forward Voltage (1) (I <sub>F</sub> = 8.0 Amp, T <sub>C</sub> = 150°C) (I <sub>F</sub> = 8.0 Amp, T <sub>C</sub> = 25°C)	V <sub>F</sub>	0.895 0.975	1.00 1.30	1.20 1.50	1.5 1.8	Volts
Maximum Instantaneous Reverse Current (1) (Rated dc Voltage, T <sub>C</sub> = 150°C) (Rated dc Voltage, T <sub>C</sub> = 25°C)	I <sub>R</sub>	250 5.0	500 10	500 10	500 25	μA
Maximum Reverse Recovery Time (I <sub>F</sub> = 1.0 Amp, di/dt = 50 Amp/μs) (I <sub>F</sub> = 0.5 Amp, i <sub>R</sub> = 1.0 Amp, I <sub>REC</sub> = 0.25 Amp)	t <sub>rr</sub>	35 25		60 50	100 75	ns

(1) Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%  
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