

SWITCHMODE™

Soft Recovery Power Rectifier

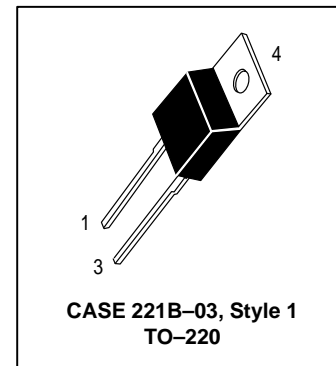
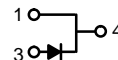
Plastic TO-220 Package

MSR860

**SOFT RECOVERY
POWER RECTIFIER
8.0 AMPERES
600 VOLTS**

Designed for use as free wheeling diodes in variable speed motor control applications and other average frequency switching power supplies. These state-of-the-art devices have the following features:

- Soft Recovery with Guaranteed Low Reverse Recovery Charge (Q_{RR}) and Peak Reverse Recovery Current (I_{RRM})
- 150°C Operating Junction Temperature
- Popular TO-220 Package
- Epoxy meets UL94, $V_0 @ 1/8''$
- Low Forward Voltage
- Low Leakage Current
- High Temperature Glass Passivated Junction



Mechanical Characteristics:

- Case: Molded Epoxy
- Weight: 1.9 Grams (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Shipped in 50 Units per Plastic Tube
- Marking: MSR860

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	600	V
Average Rectified Forward Current (At Rated V_R , $T_C = 125^\circ\text{C}$)	I_O	8.0	A
Peak Repetitive Forward Current (At Rated V_R , Square Wave, 20 kHz, $T_C = 125^\circ\text{C}$)	I_{FRM}	16	A
Non-Repetitive Peak Surge Current (Surge applied at rated load conditions, halfwave, single phase, 60 Hz)	I_{FSM}	100	A
Storage / Operating Case Temperature	T_{stg}, T_C	- 65 to 150	$^\circ\text{C}$
Operating Junction Temperature	T_J	- 65 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance — Junction-to-Case	$R_{\theta JC}$	1.6	$^\circ\text{C/W}$
Thermal Resistance — Junction-to-Ambient	$R_{\theta JA}$	72.8	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (1) ($I_F = 8.0 \text{ A}$) <i>Typical</i>	V_F	$T_J = 25^\circ\text{C}$	$T_J = 150^\circ\text{C}$	V
		1.7 1.4	1.3 1.1	
Maximum Instantaneous Reverse Current ($V_R = 600 \text{ V}$) <i>Typical</i>	I_R	$T_J = 25^\circ\text{C}$	$T_J = 150^\circ\text{C}$	μA
		10 2.0	1000 80	
Maximum Reverse Recovery Time (2) ($V_R = 400 \text{ V}$, $I_F = 8.0 \text{ A}$, $di/dt = 200 \text{ A}/\mu\text{s}$) <i>Typical</i>	t_{rr}	$T_J = 25^\circ\text{C}$	$T_J = 125^\circ\text{C}$	ns
		120 95	190 125	
Typical Recovery Softness Factor ($V_R = 400 \text{ V}$, $I_F = 8.0 \text{ A}$, $di/dt = 200 \text{ A}/\mu\text{s}$)	$s = t_b/t_a$	2.5	3.0	
Maximum Peak Reverse Recovery Current ($V_R = 400 \text{ V}$, $I_F = 8.0 \text{ A}$, $di/dt = 200 \text{ A}/\mu\text{s}$)	I_{RRM}	5.8	8.3	A
Maximum Reverse Recovery Charge ($V_R = 400 \text{ V}$, $I_F = 8.0 \text{ A}$, $di/dt = 200 \text{ A}/\mu\text{s}$)	Q_{RR}	350	700	nC

(1) Pulse Test: Pulse Width $\leq 380 \mu\text{s}$, Duty Cycle $\leq 2\%$

(2) T_{RR} measured projecting from 25% of I_{RRM} to zero current

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TYPICAL ELECTRICAL CHARACTERISTICS

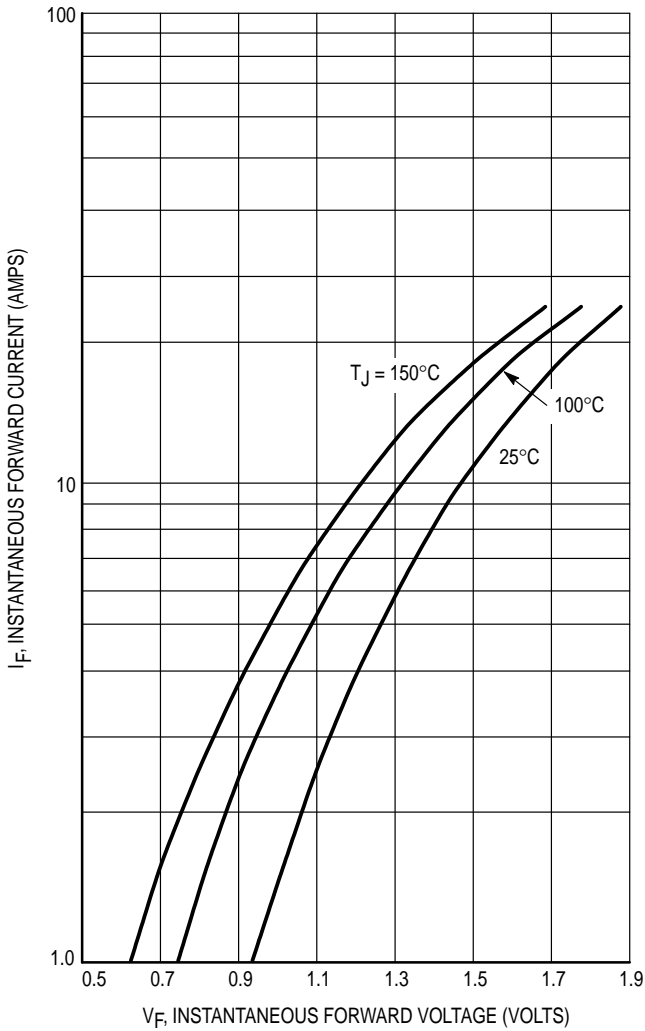


Figure 1. Typical Forward Voltage

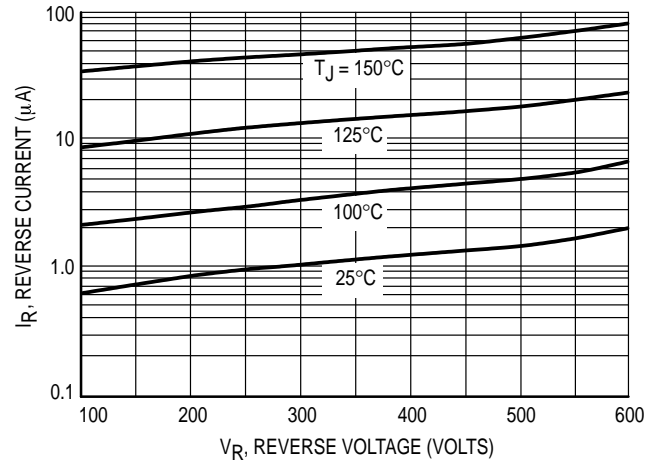


Figure 2. Typical Reverse Current

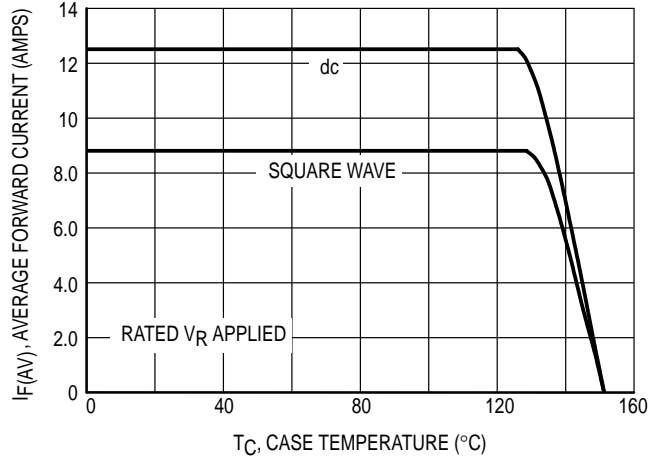


Figure 3. Current Derating, Case

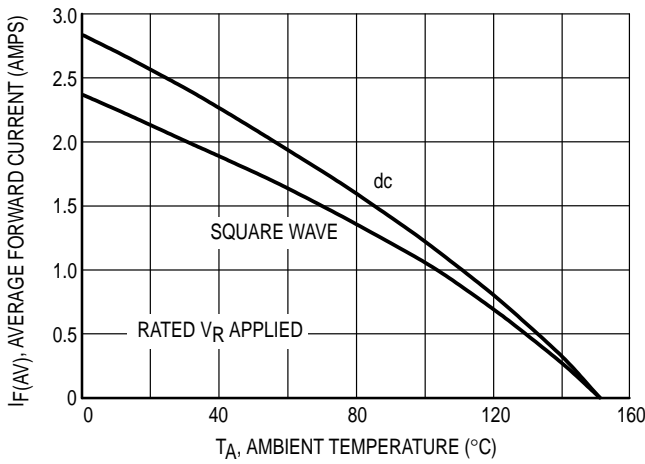


Figure 4. Current Derating, Ambient

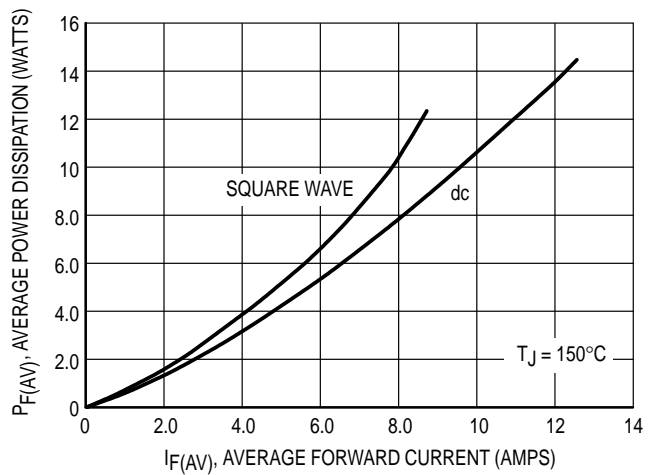


Figure 5. Power Dissipation

TYPICAL ELECTRICAL CHARACTERISTICS

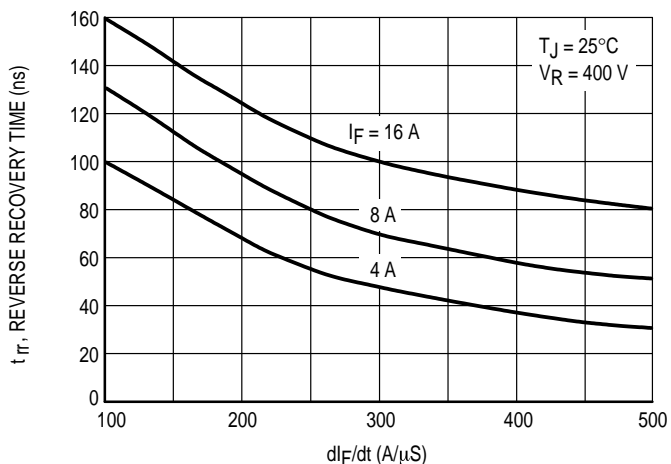


Figure 6. Typical Reverse Recovery Time

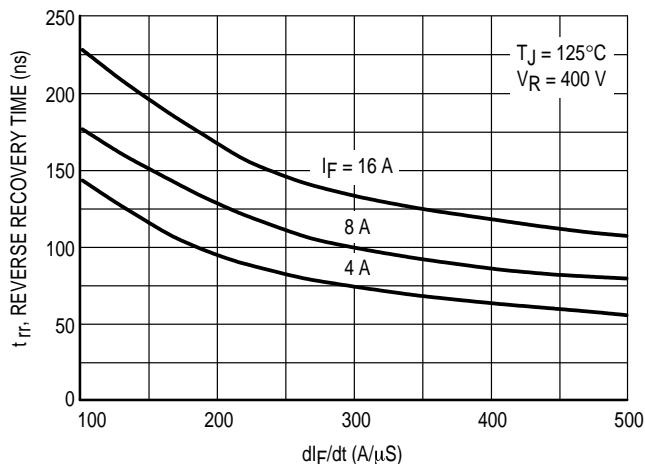


Figure 7. Typical Reverse Recovery Time

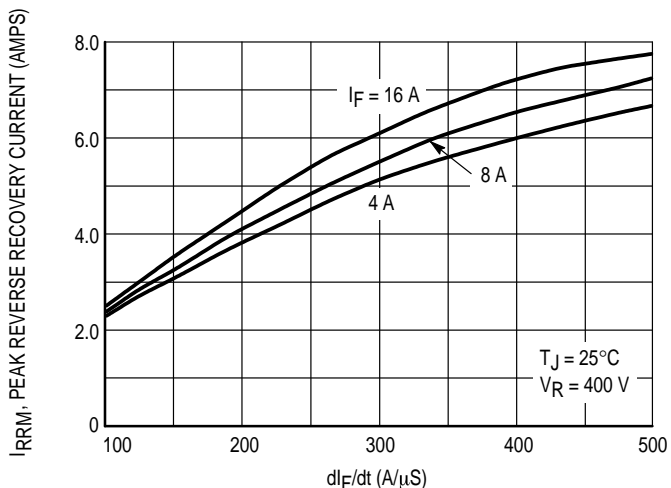


Figure 8. Typical Peak Reverse Recovery Current

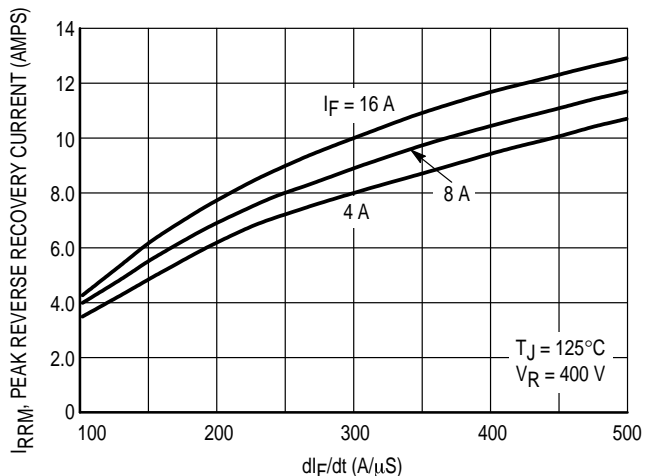


Figure 9. Typical Peak Reverse Recovery Current

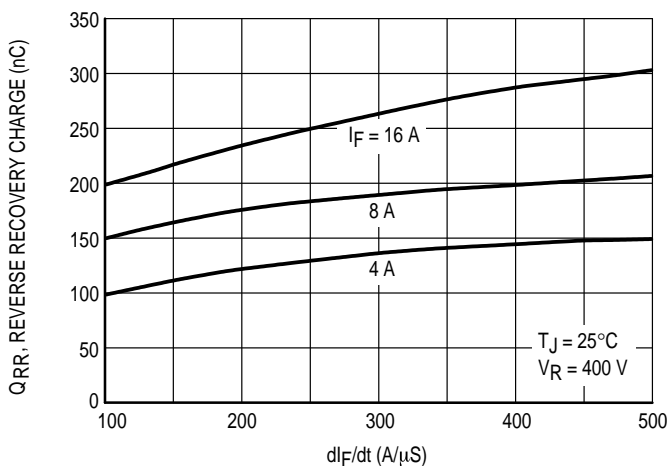


Figure 10. Typical Reverse Recovery Charge

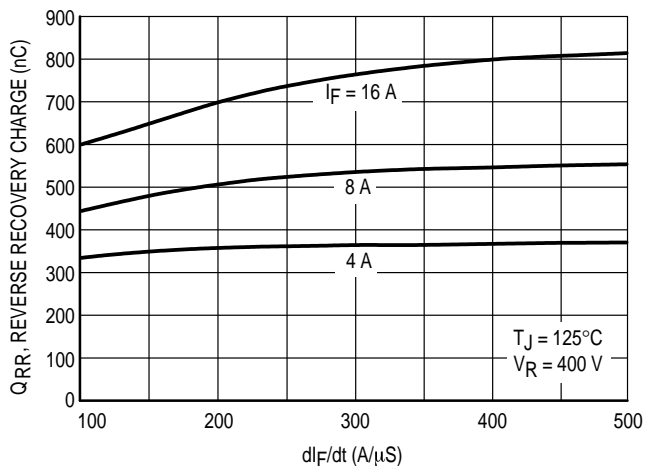


Figure 11. Typical Reverse Recovery Charge

MSR860

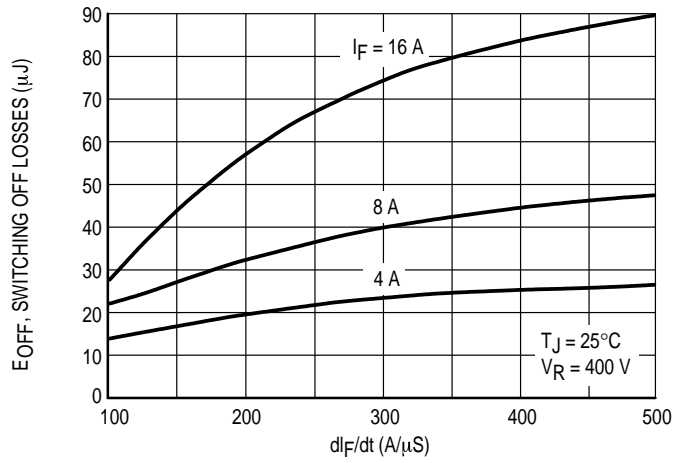


Figure 12. Typical Switching Off Losses

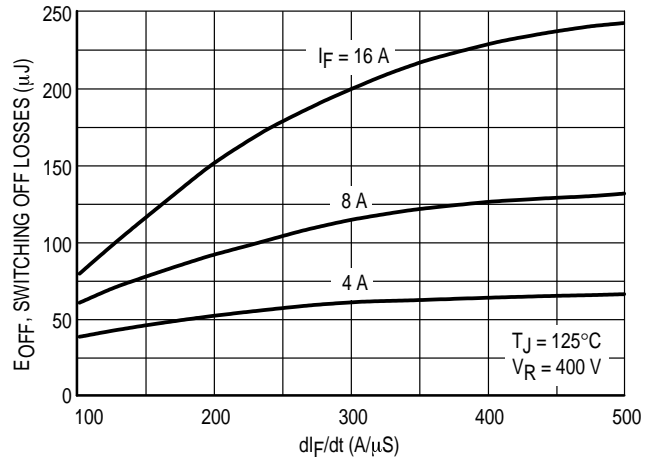


Figure 13. Typical Switching Off Losses

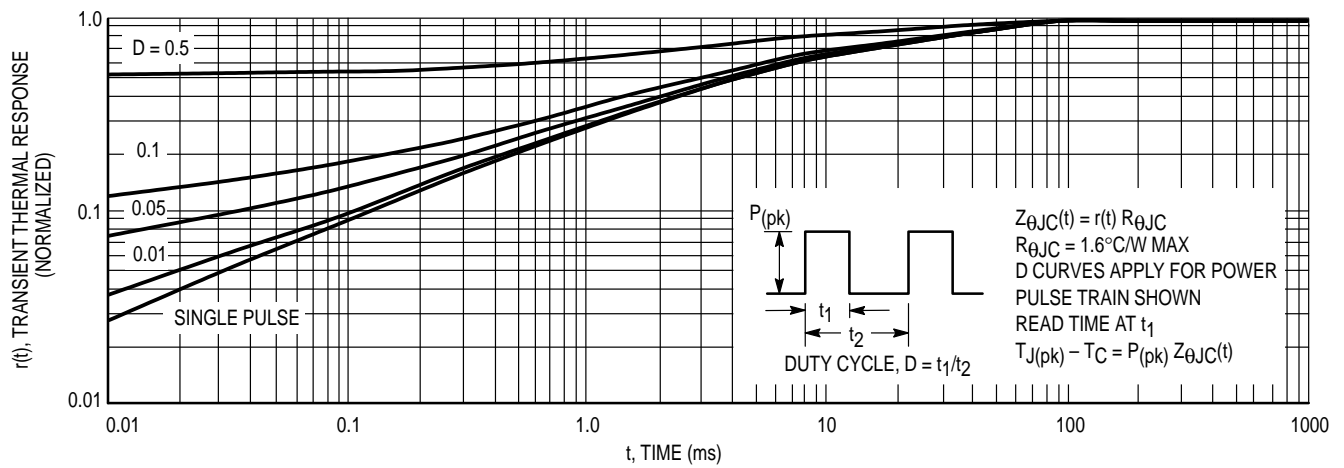
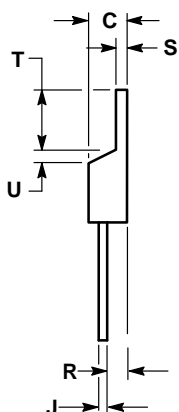
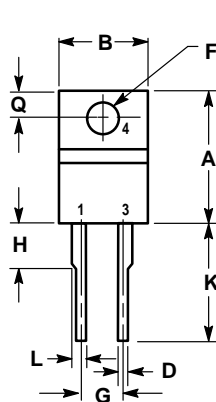


Figure 14. Thermal Response

PACKAGE DIMENSIONS



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.595	0.620	15.11	15.75
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.82
D	0.025	0.035	0.64	0.89
F	0.142	0.147	3.61	3.73
G	0.190	0.210	4.83	5.33
H	0.110	0.130	2.79	3.30
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.14	1.52
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.14	1.39
T	0.235	0.255	5.97	6.48
U	0.000	0.050	0.00	1.27

STYLE 1:

1. CATHODE
2. N/A
3. ANODE
4. CATHODE

**CASE 221B-03
ISSUE B**

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