

MSR860

SWITCHMODE™ Soft Recovery Power Rectifier

Plastic TO-220 Package

Designed for use as free wheeling diodes in variable speed motor control applications and 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, $V_O @ 1/8''$
- 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 Range	T_{stg}, T_C	-65 to +150	°C
Operating Junction Temperature Range	T_J	-65 to +150	°C

THERMAL CHARACTERISTICS

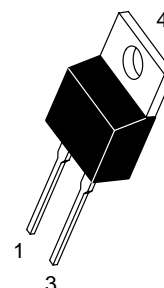
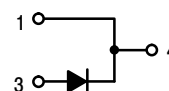
Thermal Resistance – Junction-to-Case	$R_{\theta JC}$	1.6	°C/W
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	72.8	



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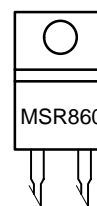
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**SOFT RECOVERY
POWER RECTIFIER
8.0 AMPERES
600 VOLTS**



TO-220AC
CASE 221B
STYLE 1

MARKING DIAGRAM



MSR860 = Device Code

ORDERING INFORMATION

Device	Package	Shipping
MSR860	TO-220	50 Units/Rail

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value		Unit
		T _J = 25°C	T _J = 150°C	
Maximum Instantaneous Forward Voltage (Note 1.) (I _F = 8.0 A) <i>Typical</i>	V _F	1.7 1.4	1.3 1.1	V
Maximum Instantaneous Reverse Current (V _R = 600 V) <i>Typical</i>	I _R	10 2.0	1000 80	μA
Maximum Reverse Recovery Time (Note 2.) (V _R = 400 V, I _F = 8.0 A, di/dt = 200 A/μs) <i>Typical</i>	t _{rr}	120 95	190 125	ns
Typical Recovery Softness Factor (V _R = 400 V, I _F = 8.0 A, di/dt = 200 A/μs)	s = t _b /t _a	2.5	3.0	
Maximum Peak Reverse Recovery Current (V _R = 400 V, I _F = 8.0 A, di/dt = 200 A/μs)	I _{RRM}	5.8	8.3	A
Maximum Reverse Recovery Charge (V _R = 400 V, I _F = 8.0 A, di/dt = 200 A/μs)	Q _{RR}	350	700	nC

1. Pulse Test: Pulse Width ≤ 380 μs, Duty Cycle ≤ 2%
2. T_{RR} measured projecting from 25% of I_{RRM} to zero current

TYPICAL ELECTRICAL CHARACTERISTICS

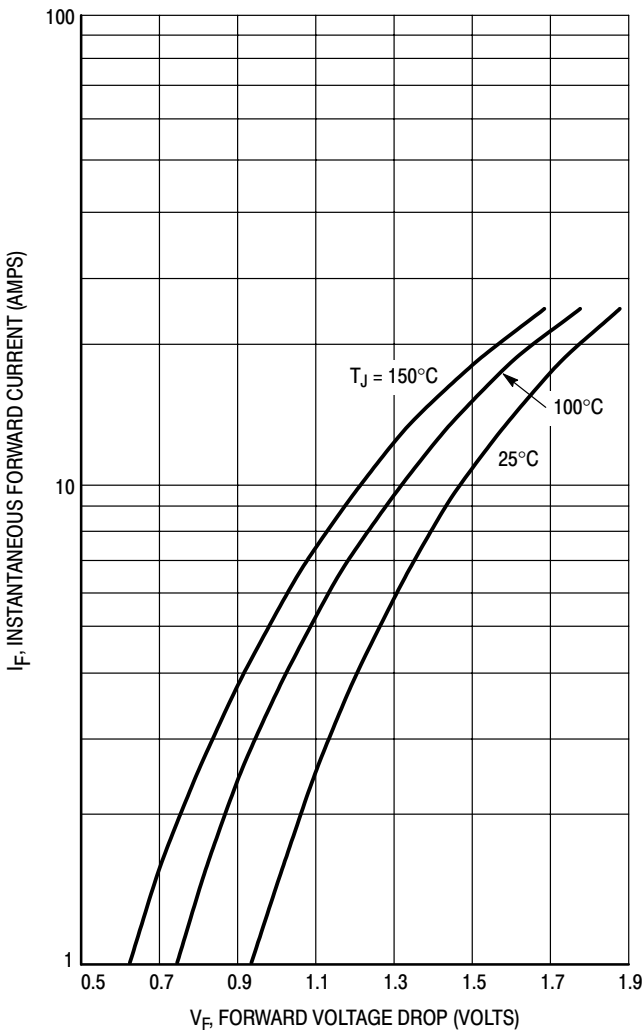


Figure 1. Typical Forward Voltage

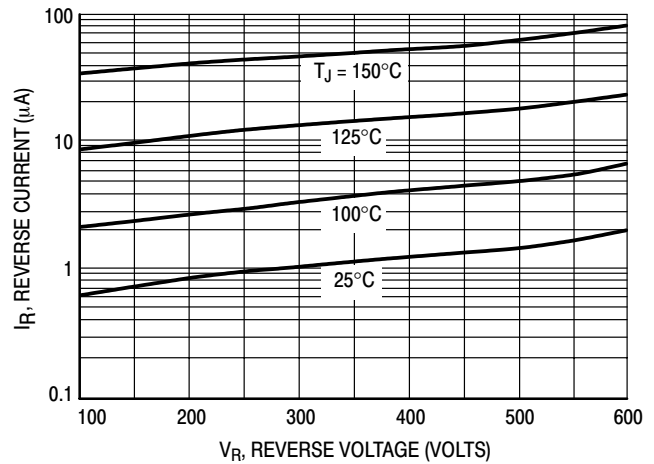


Figure 2. Typical Reverse Current

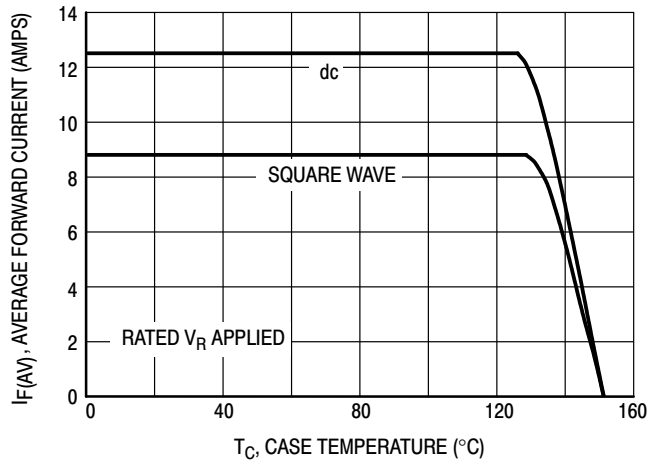


Figure 3. Current Derating, Case

TYPICAL ELECTRICAL CHARACTERISTICS

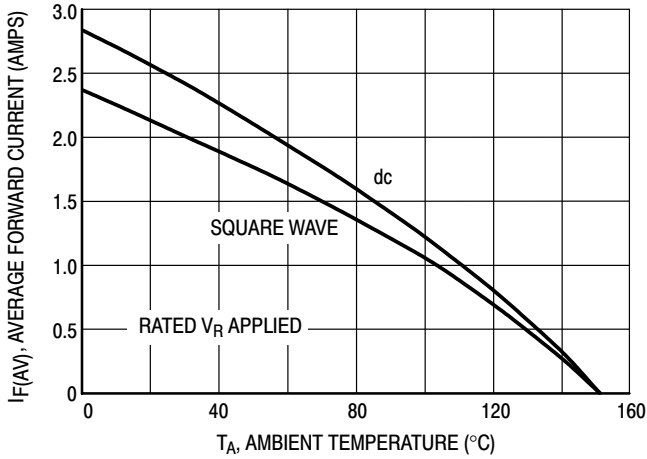


Figure 4. Current Derating, Ambient

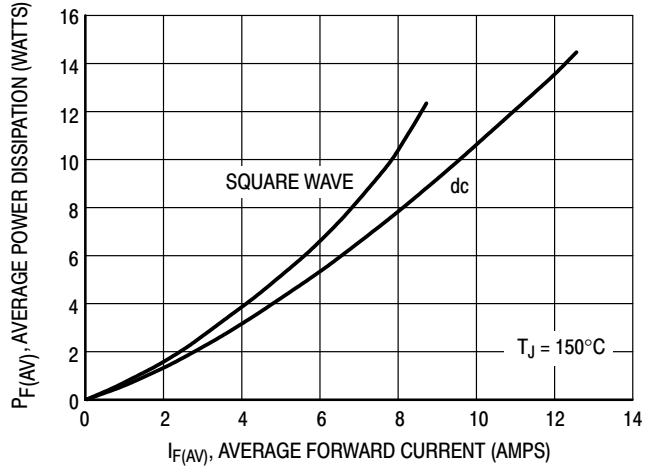


Figure 5. Power Dissipation

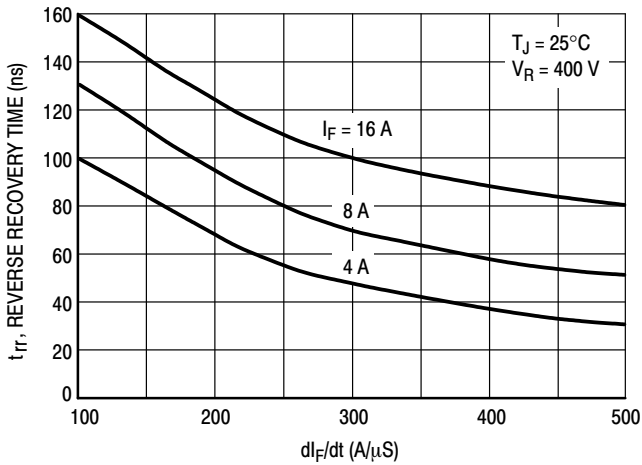


Figure 6. Typical Reverse Recovery Time

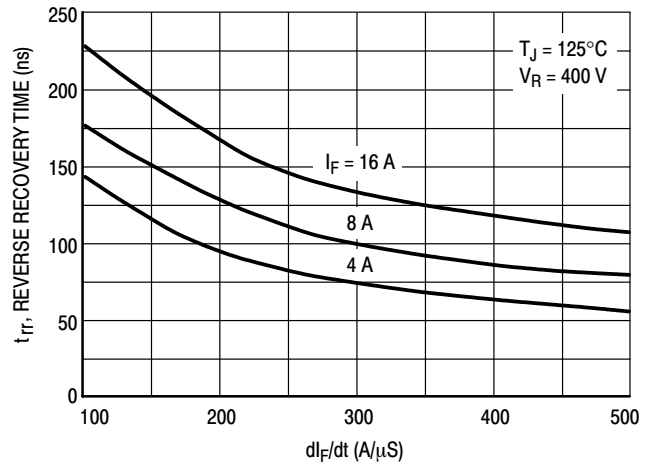


Figure 7. Typical Reverse Recovery Time

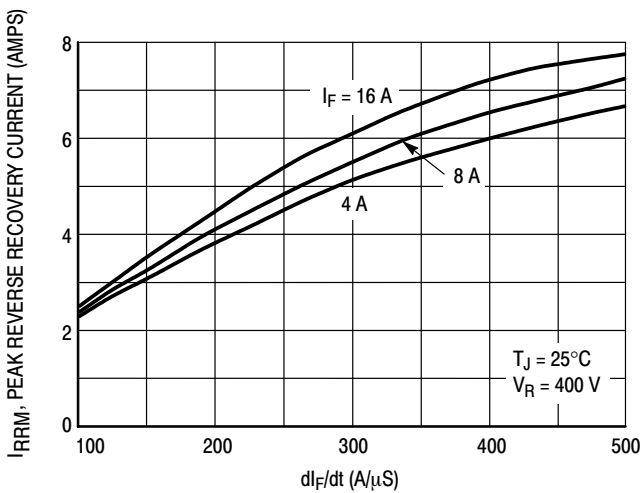


Figure 8. Typical Peak Reverse Recovery Current

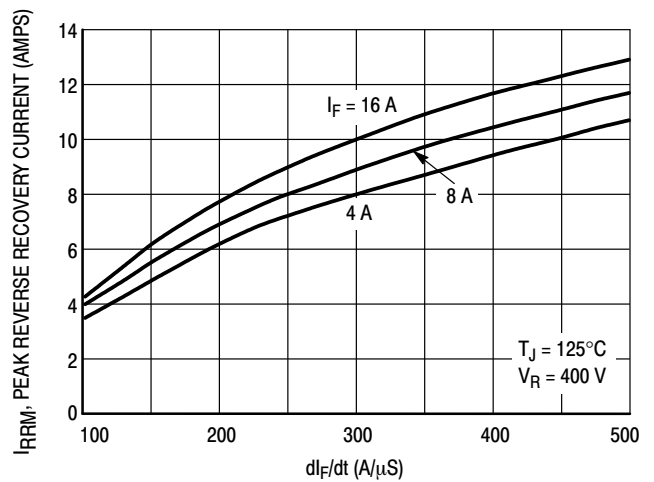


Figure 9. Typical Peak Reverse Recovery Current

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TYPICAL ELECTRICAL CHARACTERISTICS

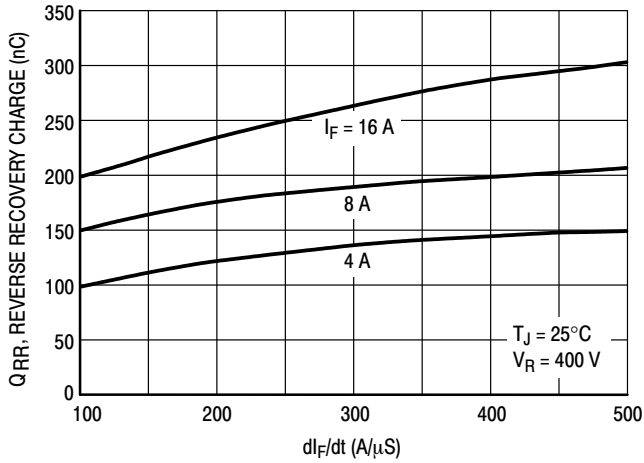


Figure 10. Typical Reverse Recovery Charge

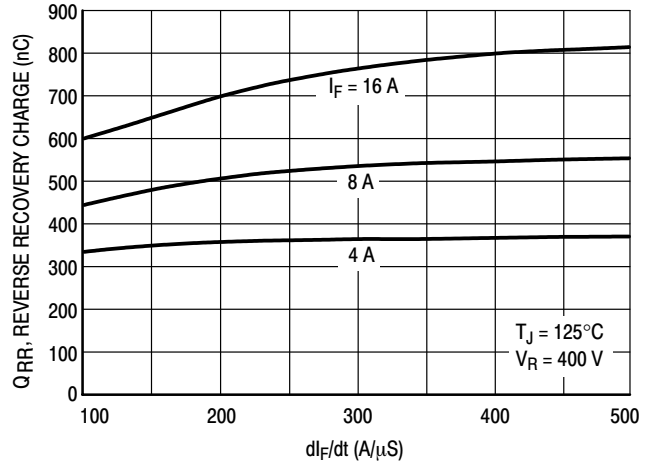


Figure 11. Typical Reverse Recovery Charge

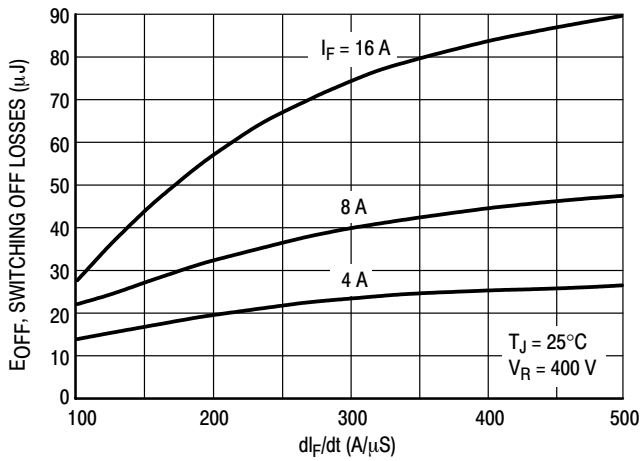


Figure 12. Typical Switching Off Losses

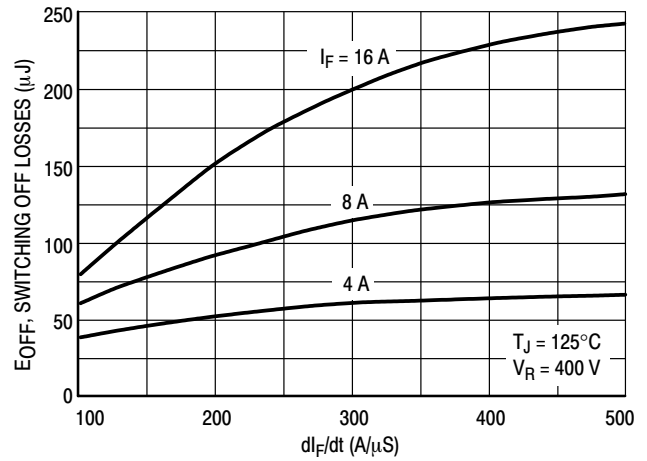


Figure 13. Typical Switching Off Losses

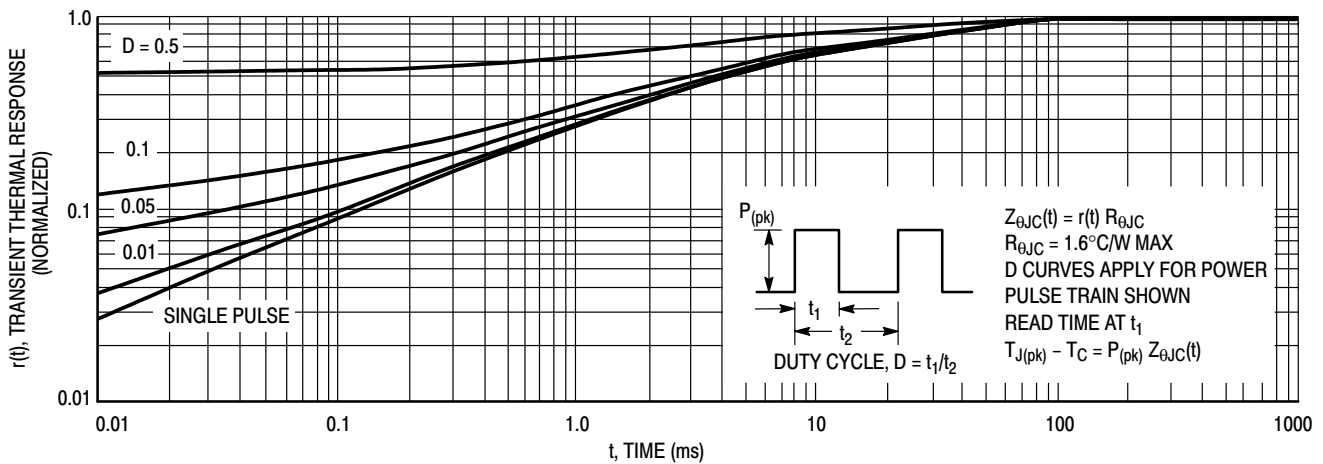
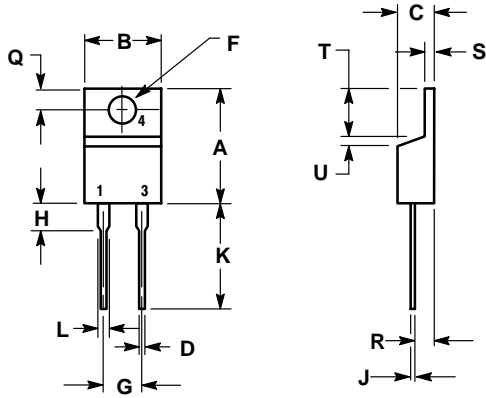


Figure 14. Thermal Response

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PACKAGE DIMENSIONS

TO-220 TWO-LEAD CASE 221B-04 ISSUE D



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	0.000	1.27


STYLE 1:

- PIN 1. CATHODE
- N/A
- ANODE
- CATHODE

Notes

Notes

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