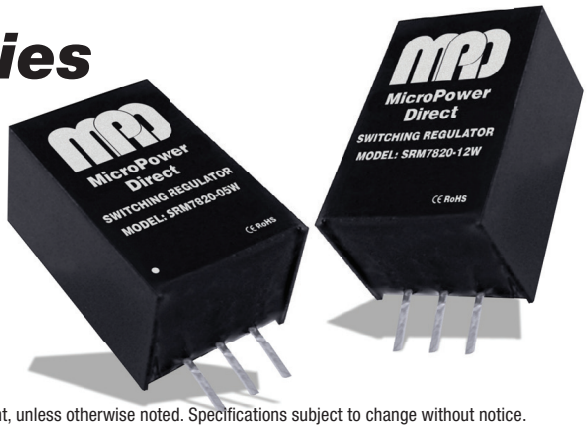
MSR7820W Series

2A, Single Output Non-Isolated, Wide Input POL Switching Regulators



Key Features:

- Efficiency to 96%
- 2.0A Output Current
- Meets EN 62368
- Short Circuit Protected
- LM78xx Replacement
- Wide Input Range
- Meets EN 55032
- -40ºC to +85ºC Operation
- Low Noise

Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
No-Load Input Current	Positive Output		0.1	1.0	mA
Input Filter	Capacitor Filter				
Reverse Polarity Input	Not Allowed, Could Damage the Unit				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	3.3 VOUT Model		±2.0	±4.0	%
	All Other Models		±2.0	±3.0	
Line Regulation	Full Load, VIN = Min to Max		±0.4	±0.8	%
Load Regulation	Nom Input, IOUT = 10% to 100%		±0.5	±1.5	%
Ripple & Noise (20 MHz)	See Note 2		30	75	mV P - P
Temperature Coefficient				0.03	%/°C
Transient Recovery Time, See Note 3	25% Load Step Change		0.2	1.0	mS
Transient Response Deviation			50	150	mV
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Not Isolated				
Switching Frequency			400		kHz

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Note 4	EN 55032		B
Conducted Emissions, See Note 4	EN 55032		B
ESD	EN 61000-4-2	B	±6 kV Contact
RS	EN 61000-4-3	A	10V/m
EFT, See Note 5	EN 61000-4-4	B	±1 kV
Surge, See Note 5	EN 61000-4-5	B	±1 kV L-L
CS	EN61000-4-6	A	3V rms

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Storage Temperature Range		-55		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram (Page 4)
Case Material	Non-Conductive Black Plastic (UL-94V0)
Weight	0.133 Oz (3.8g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2.0			MHours
Lead Temperature	1.5 mm From Case For 10 Sec			260	°C

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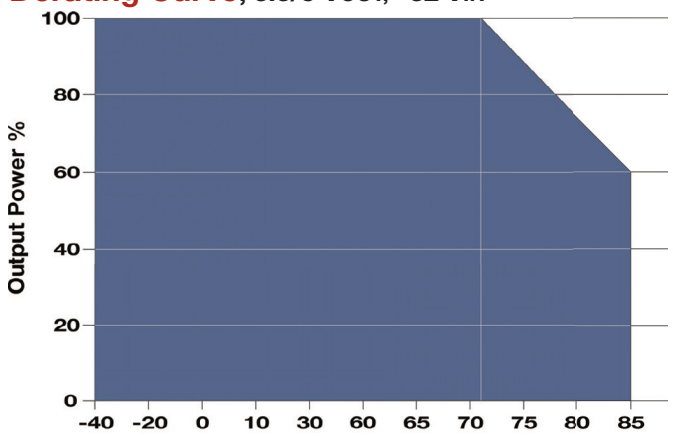
Model Selection Guide

Model Number	Input Voltage (VDC)		Output		Efficiency (%, Typ)		Capacitive Load (µF, Max)
	Nom.	Range	Voltage (VDC)	Current (mA, Max)	Min VIN	Max VIN	
MSR7820-03W	24	6.00 - 36.0	3.3	2,000.0	87	83	1,800
MSR7820-05W	24	8.00 - 36.0	5.0	2,000.0	90	87	1,000
MSR7820-09W	24	13.0 - 36.0	9.0	2,000.0	93	90	680
MSR7820-12W	24	16.0 - 36.0	12.0	2,000.0	94	92	470
MSR7820-15W	24	18.0 - 36.0	15.0	2,000.0	95	93	470

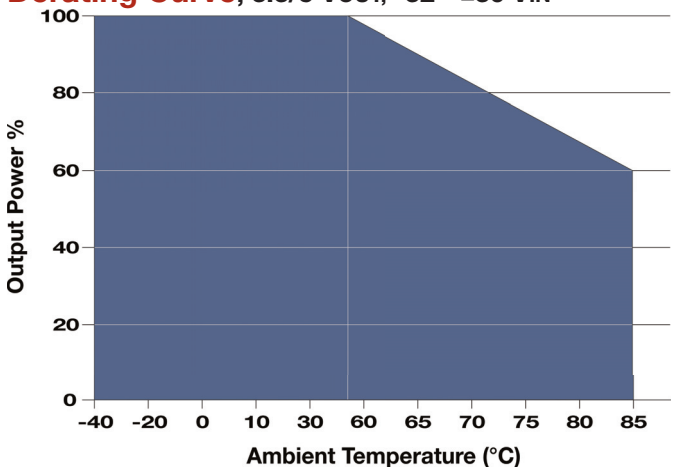
Notes:

1. An external input capacitor and output capcitor are required to meet specifications See the typical application circuit on page 3.
2. Output ripple is measured with nominal input and 100% load. For a load range of 20% to 100%, output ripple is no more than 100 mV Pk-Pk. At 0% to 20% load, it is no more than 180 mV Pk-Pk.
3. Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
4. The unit may not meet emissions to class B without the addition of external components as shown in the EMC application circuit diagram on page 4.
5. The unit meets EFT & surge EMS specifications with the addition of external components as shown in the EMC application circuit diagram on page 4.
6. Soldering temperature is measured 1.5 mm from the pins. Soldering time should not exceed 10S.
7. This regulator is not designed to be used in parallel with another unit to increase output power.
8. A reverse polarity connection on the input could damage the unit.
9. The input should not exceed the range given in the model selection chart. Exceeding this limit could damage the unit.
10. It is recommended that an external fuse be used. The fuse should be selected based upon the actual input current of the application. For more information please call the factory.

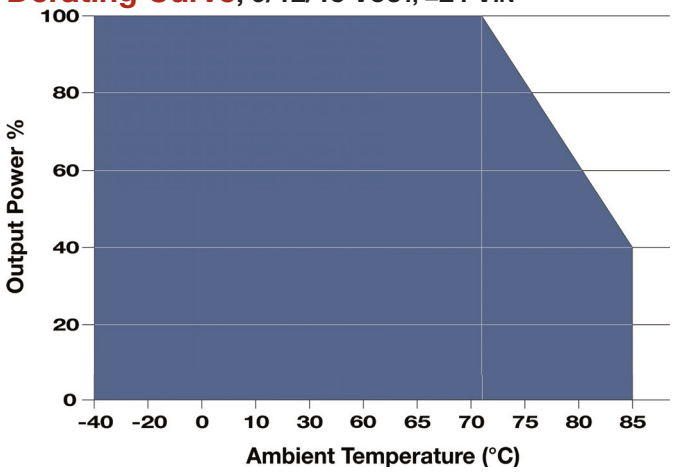
Derating Curve, 3.3/5 VOUT, ≤32 VIN



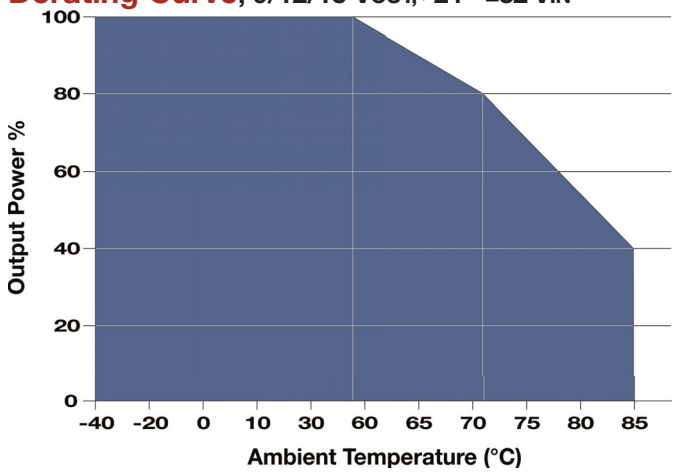
Derating Curve, 3.3/5 VOUT, >32 - ≤36 VIN



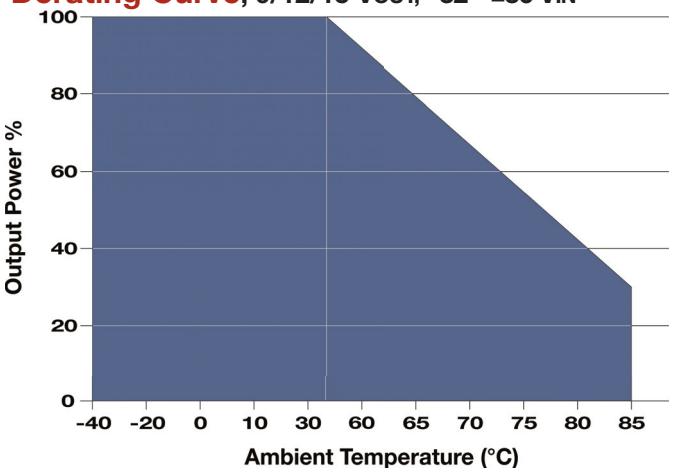
Derating Curve, 9/12/15 VOUT, ≤24 VIN



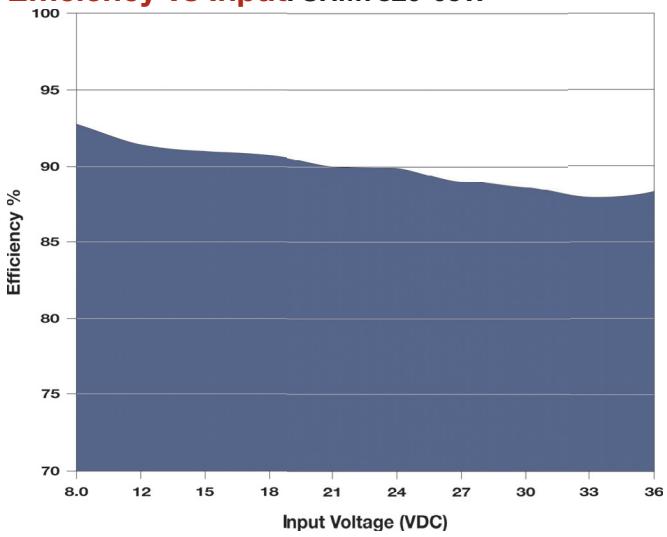
Derating Curve, 9/12/15 VOUT, >24 - ≤32 VIN



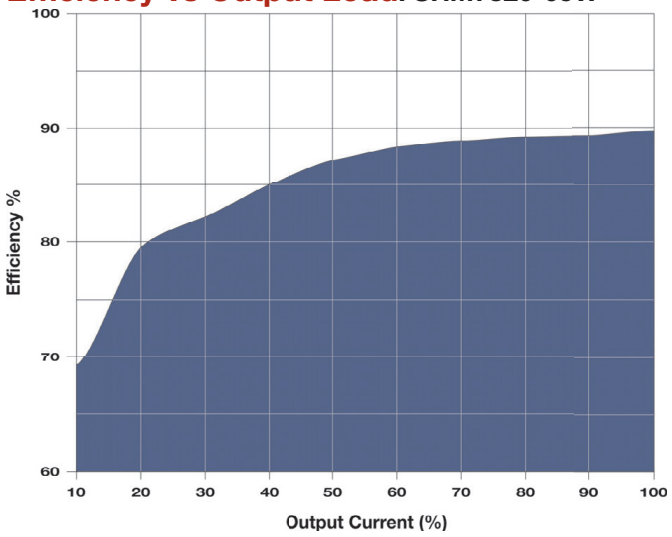
Derating Curve, 9/12/15 VOUT, >32 - ≤36 VIN



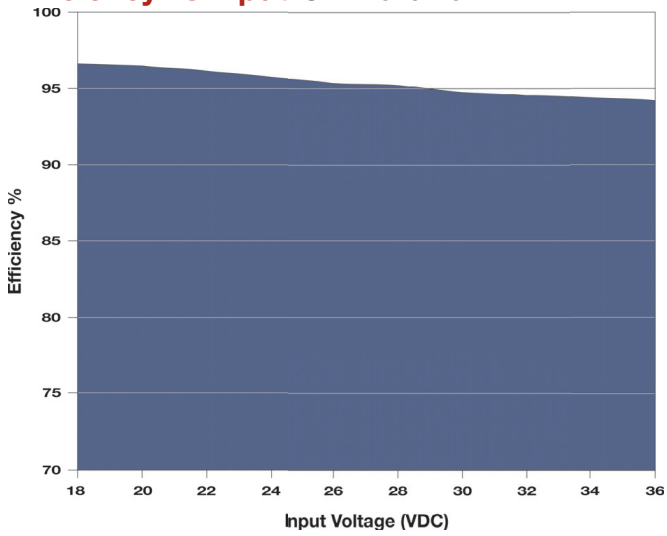
Efficiency vs Input: SRM7820-05W



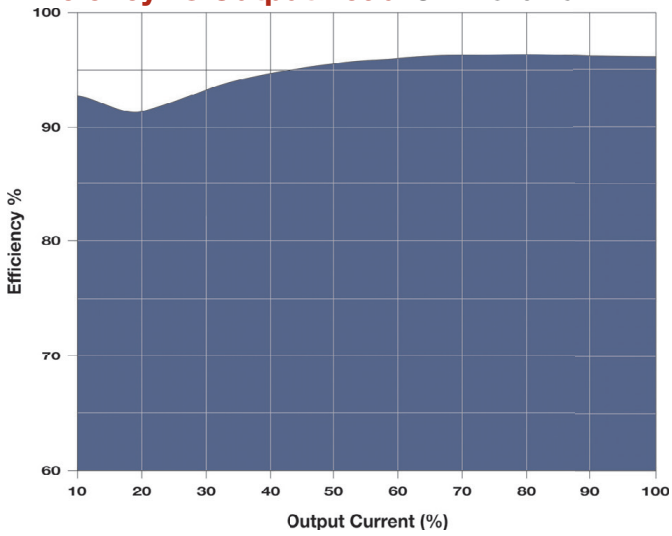
Efficiency vs Output Load: SRM7820-05W



Efficiency vs Input: SRM7820-15W



Efficiency vs Output Load: SRM7820-15W

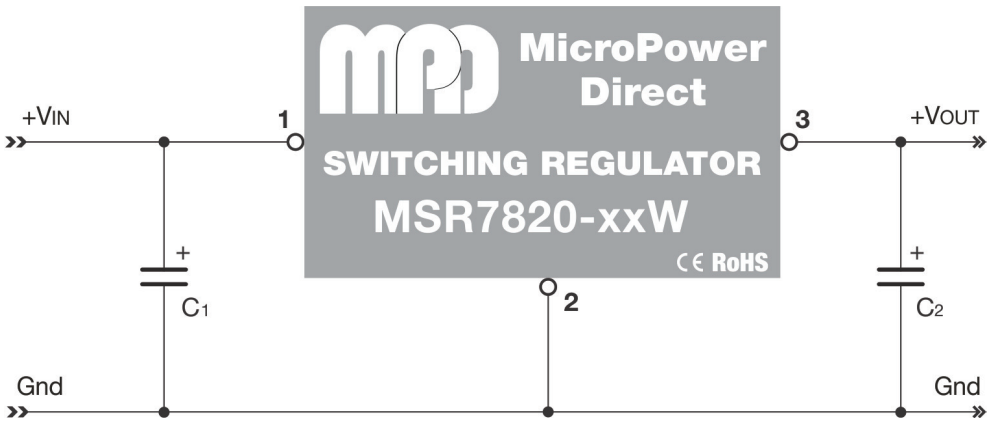


Typical Application Circuit

A typical connection is shown at right. Capacitors C_1 & C_2 are required to meet specified operation. The input capacitor (C1) improves stability over the input voltage range (and over the operating temperature range). Capacitor C2 is added to reduce the output ripple.

The suggested values for these capacitors are given in the table to the right of the diagram. The capacitors are ceramic and should be placed as close to the unit as possible. Tantalum or low ESR electrolytic capacitors may also be used.

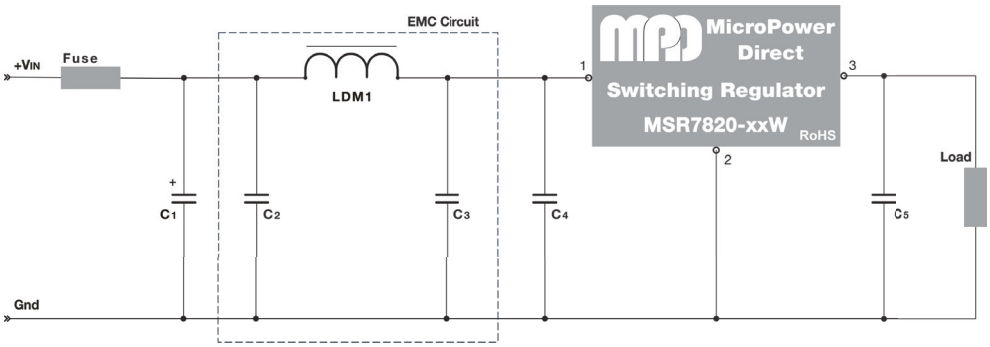
If very low noise is required, an LC filter may be added to the output. For suggested component values contact the factory. To meet EMI standards, see the EMC circuit diagram on page 4.



Model Number	C_1	C_2
SRM7820-03W	22 µF/50V	22 µF/10V
SRM7820-05W	22 µF/50V	22 µF/10V
SRM7820-09W	22 µF/50V	22 µF/16V

Model Number	C_1	C_2
SRM7820-12W	22 µF/50V	22 µF/25V
SRM7820-15W	22 µF/50V	22 µF/25V

EMC Application Circuit

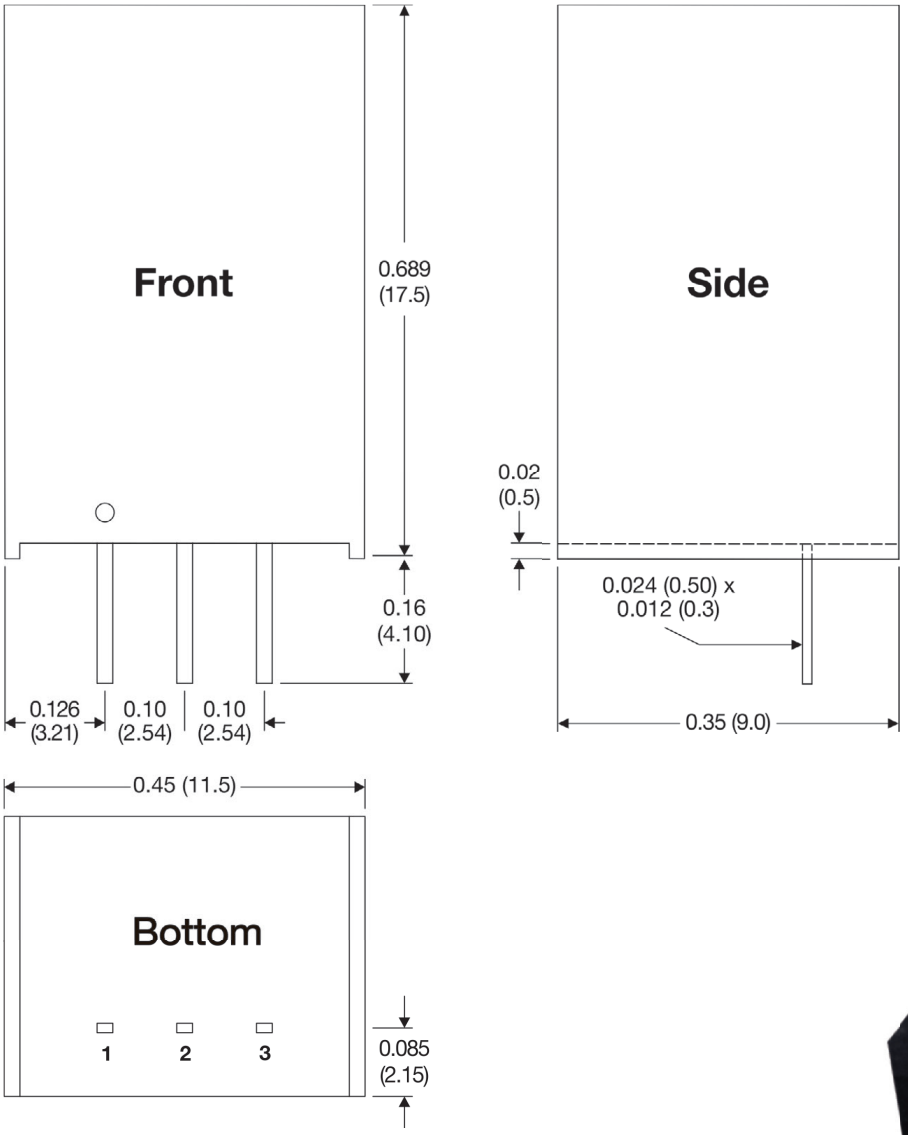


The diagram above illustrates a typical connection of the **MSR7820W** series for applications that require meeting EMC standards. Some notes on this diagram (starting with the input circuit) are:

1. It is recommended that an external fuse be used. The fuse should be selected based upon the actual input current of the application. Contact the factory for more information.
2. All of the input components comprise an EMS circuit. The portion within the dashed lines is for EMI filtering. The input components can be added based on the application requirements.
3. Recommended values for components are:

Component	Value	Component	Value
C_1	100 µF/100V	C_3	10 µF/50V
LDM_1	22 µH	C_4	680 µF/50V
C_2	10 µF/50V	C_5	22 µF/50V

Mechanical Dimensions



Pin Connection

Pin	Function
1	+VIN
2	GND
3	VOUT

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.01 (±0.25)
- Pin 1 is marked by a "dot" or indentation on the front of the unit

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