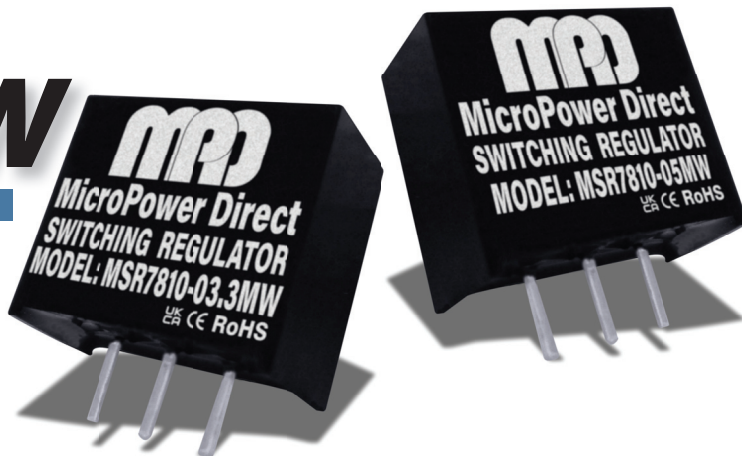


MSR7810MW

Compact, 1A Output Very Wide Input Range Switching Regulators



Key Features:

- Very Wide Input Range
- High Efficiency
- 1.0A Output Current
- Very Wide Input Range
- Tight Line/Load Regulation
- Short Circuit Protected
- Compact SIP3 Case
- LM78xx Pin Compatible
- Low No Load Current
- Wide Temperature Range
- Low Noise
- Negative Output Capability
- Industry Standard Pin-Out

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
Input Filter	Capacitor Filter				
Start Up Time			10		mS
Input Reflected Ripple Current	See Note 1		35		mA P - P
Reverse Polarity Input	Not Allowed, Could Damage the Unit				
Input Surge Voltage	100 mS			30	VDC

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±3.0	%
Line Regulation	Full Load, V_{IN} = Min to Max			±1.0	%
Load Regulation	Nom Input, I_{OUT} = 10% to 100%			±1.5	%
Ripple & Noise (20 MHz)	See Note 2			100	mV P - P
Temperature Coefficient			±0.02		%/°C
Transient Recovery Time	With Nominal V_{IN} & 25% Load Change		250		μS
Transient Response Deviation			±3.0		%
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Not Isolated				
Switching Frequency			330		kHz

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Note 3	EN 55032		B
Conducted Emissions, See Note 3	EN 55032		B
ESD	EN 61000-4-2	A	±8 kV Air ±6 kV Indirect
RS	EN 61000-4-3	A	10V/m
EFT, See Note 4	EN 61000-4-4	A	±2 kV
Surge, See Note 4	EN 61000-4-5	A	±2 kV
CS	EN 61000-4-6	A	10Vrms
PFMF	EN 61000-4-8	A	100A/m

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Max Case Temperature				+105	°C
Storage Temperature Range		-55		+125	°C
Thermal Impedance		56.5			°C/W
Cooling	Natural Convection, 30 to 65 LFM				
Humidity	RH, Non-condensing			95	%

Physical

Case Size & Weight	See Mechanical Diagram (Page 4)				
Case Material	Non-Conductive Black Plastic (UL-94V0)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3.8			MHours
Lead Temperature	1.5 mm From Case For 10 Sec			260	°C



MicroPower Direct

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Easton, MA 02375
USA

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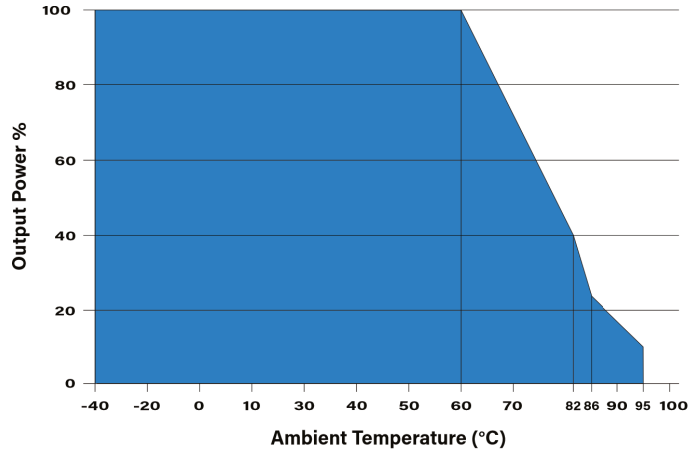
www.micropowerdirect.com

Model Number	Input Voltage Range (VDC)	Input Current (Full Load mA)			Output Voltage (VDC)	Output Current		Efficiency (% Typ)		Capacitive Load (μF, Max)	Input Fuse Rating Slow-Blow (A)
		No Load	Full Load (mA, Typ)								
		(mA, Typ)	Min VIN	Max VIN		Min. Load (mA)	Max. Load (mA)	Min VIN	Max VIN		
MSR7810-03.3MW	7.0 - 28.0	1.5	529.70	143.73	3.3	100.0	1,000.0	89	82	220	1.0
MSR7810-05MW	8.0 - 28.0	1.5	672.04	205.25	5.0	100.0	1,000.0	93	87	220	1.4

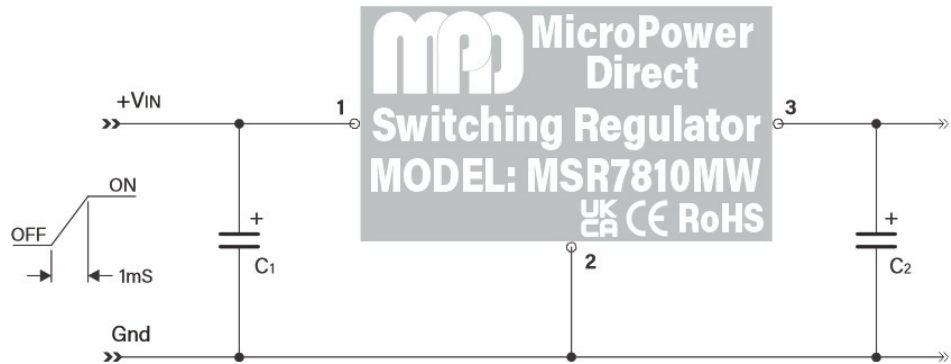
Notes:

1. Input reflected ripple current is measured with a simulated source inductance of 12 μH.
2. Output ripple is measured with a nominal input and is specified for a load range of 10% to 100%. When measuring output ripple, two external capacitors (1 μF and 10 μF) must be placed from the Vout to the Gnd pins. Output noise will rise when the load is less than 10%.
3. The unit may not meet emissions to class B without the addition of external components as shown in the typical circuit diagram on page 3.
4. The unit meets EFT & Surge EMS specifications with the addition of external components as shown in the typical circuit diagram on page 3.
5. Soldering temperature is measured 1.5 mm from the pins. Soldering time should not exceed 10S.
6. This regulator is not designed to be used in parallel with another unit to increase output power.
7. A reverse polarity connection on the input could damage the unit.
8. The input should not exceed the range given in the model selection chart. Exceeding this limit could damage the unit.
9. It is recommended that an external fuse be used. The fuse should be selected based upon the actual input current of the application. Suggested fuse ratings are given in the model selection guide above.

Temperature Derating Curves:



Typical Application Circuit

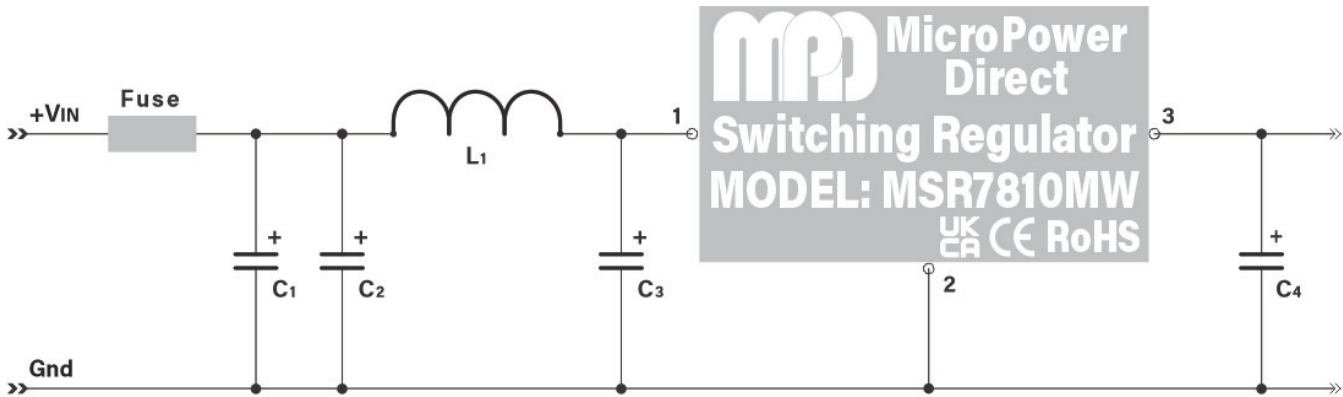


For many applications, the MSR7810MW can be used with a minimum of external components. A typical connection is shown at left.

To help protect the unit during start-up, it is suggested that a soft start (1mS) be used. C1 has been added to improve stability over the input range (and over the operating temperature range). Capacitor C2 is added to reduce the output ripple.

Suggested values for these capacitors are 22 μF/ 100V for C1 and 47 μF for C2. These capacitors are ceramic and should be placed as close to the unit as possible. Tantalum or low ESR electrolytic capacitors may also be used.

EMC Application Circuit



The diagram above illustrates a typical connection of the MSR7810MW series for applications that require meeting EFT and Surge standards. Some notes on this diagram (starting with the input circuit) are:

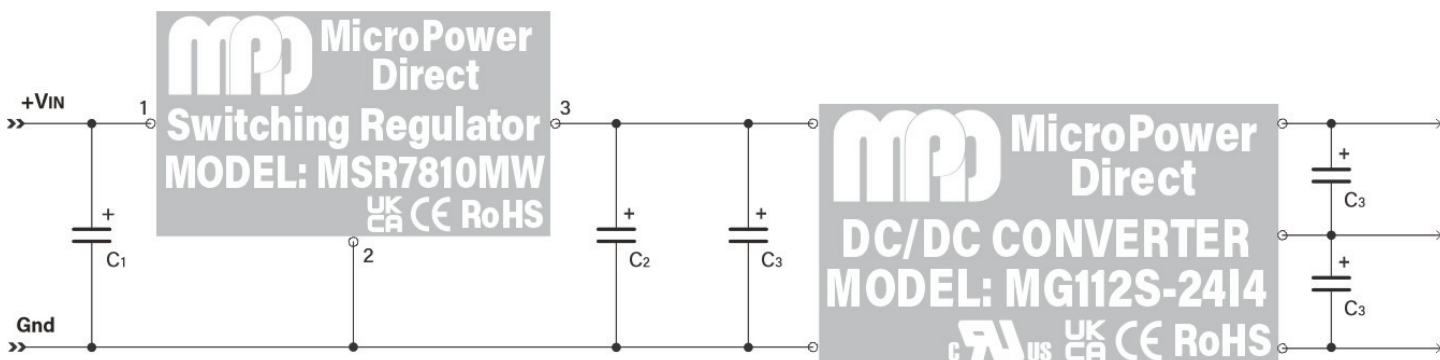
1. It is recommended that an external fuse be used. The fuse should be selected based upon

the actual input current of the application. Contact the factory for more information.

4. The values for the input filter C1, C2, C3 and L1 are given in the table at right.
5. The output capacitor C4 is not required, but is used to reduce output ripple.

6. Recommended values for components are:

Component	Value
C1	330 μF/100V
L1	22 μH
C2	10 μF/50V
C3	10 μF/50V
C4	47 μF/50V



The diagram above illustrates a typical application where the regulator is driving a DC/DC converter. In this example, the DC/DC is an **MG112S-2414**. This DC/DC is a 1W unit that has a 12VDC input ($\pm 10\%$) and a single regulated output of 24 VDC. The capacitors are for decoupling.

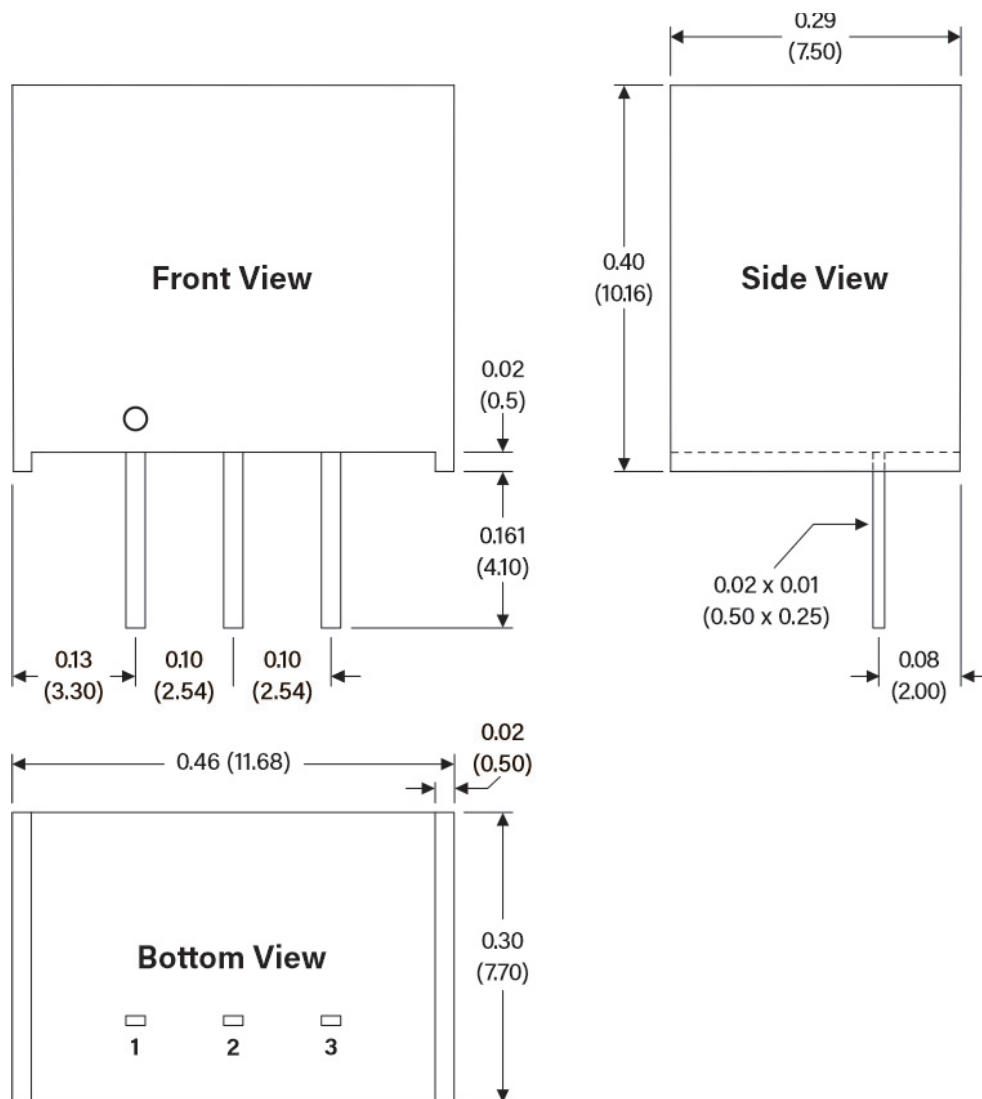
If required, it is also possible to connect a DC/DC in front of the regulator. This could provide input isolation, a wider input range and/or tighter regulation.

The combination of the units results in a low cost circuit that provides:

1. Wide Input Range
2. Up to 6 kV I/O isolation
3. Dual Outputs
4. Output regulation
5. Low Cost

This type of application flexibility makes the **MSR7810MW** series a useful tool for a very wide variety of applications

Mechanical Dimensions



Pin Connection

Pin	Function
1	+VIN
2	GND
3	+VOUT

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ± 0.02 (± 0.50)
- Pin 1 is marked by a "dot" or indentation on the front of the unit
- Weight = 0.074 Oz (2.1g)