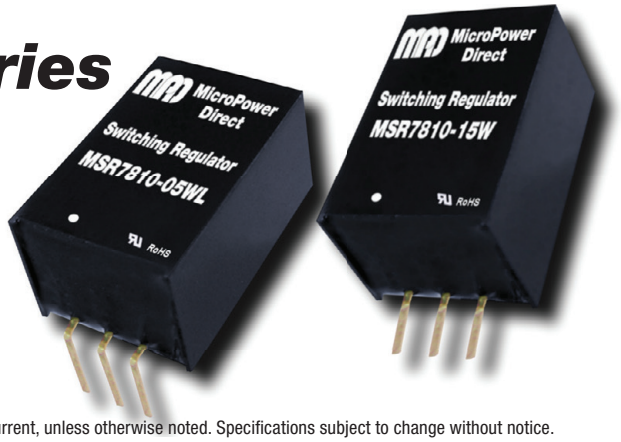
MSR7810W Series

Low Cost, Non-isolated Wide Input, Single Output POL Switching Regulators



Key Features:

- Efficiency to 96%
- 1.0A Output Current
- EN 60950 Approved
- Short Circuit Protected
- Right Angle Pins Available
- LM78xx Replacement
- Wide Input Range
- Negative Output Capability
- -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		±0.2	±0.4	%
Load Regulation	Nom Input, IOUT = 10% to 100%		±0.4	±0.6	%
Ripple & Noise (20 MHz)	See Note 2		20	75	mV P - P
Temperature Coefficient				0.03	%/°C
Transient Recovery Time, See Note 3	25% Load Step Change		0.1	1.0	mS
Transient Response Deviation			50	300	mV
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Not Isolated				
Switching Frequency	MSR7810-033W/MSR7810-05W	420	520	620	kHz
	All Other Models	580	680	780	

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Note 4	EN 55022		B
Conducted Emissions, See Note 4	EN 55022		B
ESD	EN 61000-4-2	B	±4 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
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
Lead Temperature	1.5 mm From Case For 10 Sec			260	°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
Safety Approvals	UL 60950, EN 60950				

MicroPower Direct
292 Page Street
Suite D
Stoughton, MA 02072
USA

T: (781) 344-8226
F: (781) 344-8481
E: sales@micropowerdirect.com
W: www.micropowerdirect.com

Model Selection Guide

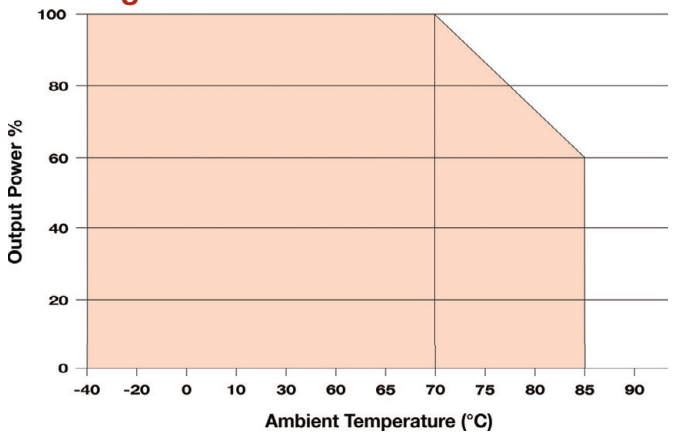
Model Number	Input Voltage (VDC)		Output		Efficiency (%, Typ)		Capacitive Load (µF, Max)
	Nom.	Range	Voltage (VDC)	Current (mA, Max)	Min VIN	Max VIN	
MSR7810-033W(L)	24	6.00 - 36.0	3.3	1,000.0	90	81	680
MSR7810-05W(L)	24	8.00 - 36.0	5.0	1,000.0	93	86	680
	12	8.00 - 27.0	-5.0	-500.0	86	82	330
MSR7810-09W(L)	24	13.0 - 36.0	9.0	1,000.0	95	90	680
MSR7810-12W(L)	24	16.0 - 36.0	12.0	1,000.0	96	93	680
	12	8.00 - 20.0	-12.0	-300.0	89	88	330
MSR7810-15W(L)	24	20.0 - 36.0	15.0	1,000.0	96	94	680
	12	8.00 - 18.0	-15.0	-300.0	89	89	330

For "Right Angle" pins add the L to the part number: **MSR7810-05WL**

Notes:

1. For many applications, no external components are required. If the input is over 30V, a 22 µF/50V input capacitor (C1) is required. See the typical application note below.
2. Output ripple is measured with a nominal input and is specified for a load range of 20% to 100%. When measuring output ripple, two external capacitors (1 µF and 10 µF) must be placed from the VOUT to the Gnd pins.
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 typical circuit 4 diagram on page 4.
5. The unit meets EFT & surge EMS specifications with the addition of external components as shown in the typical circuit 4 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



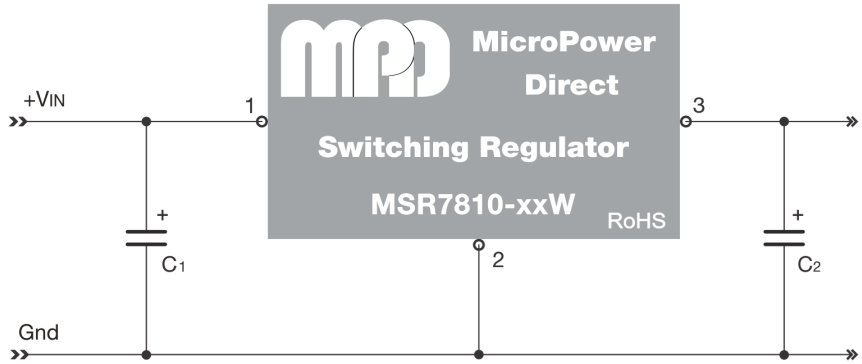
Typical Application Circuit 1, Positive Output

For many applications, the **MSR7810-xxW** can be used without external components. However, if the application requires meeting EMC/EMI standards or operation at inputs over 30V, a minimum of external components is needed.

A typical connection (for a positive output voltage) is shown at right. Here, 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.

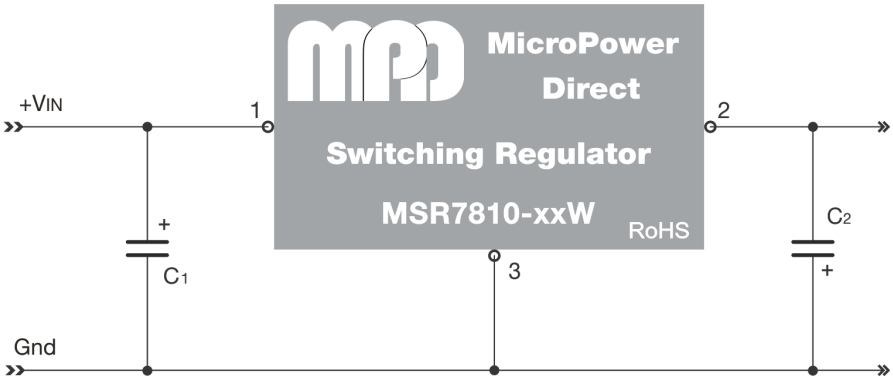
Suggested values for these capacitors are given in the "Component Values" table below. These capacitors are ceramic and should be placed as close to the unit as possible. Tantalum or low ESR electrolytic capacitors may also be used.

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 typical circuit 4 diagram on page 4.



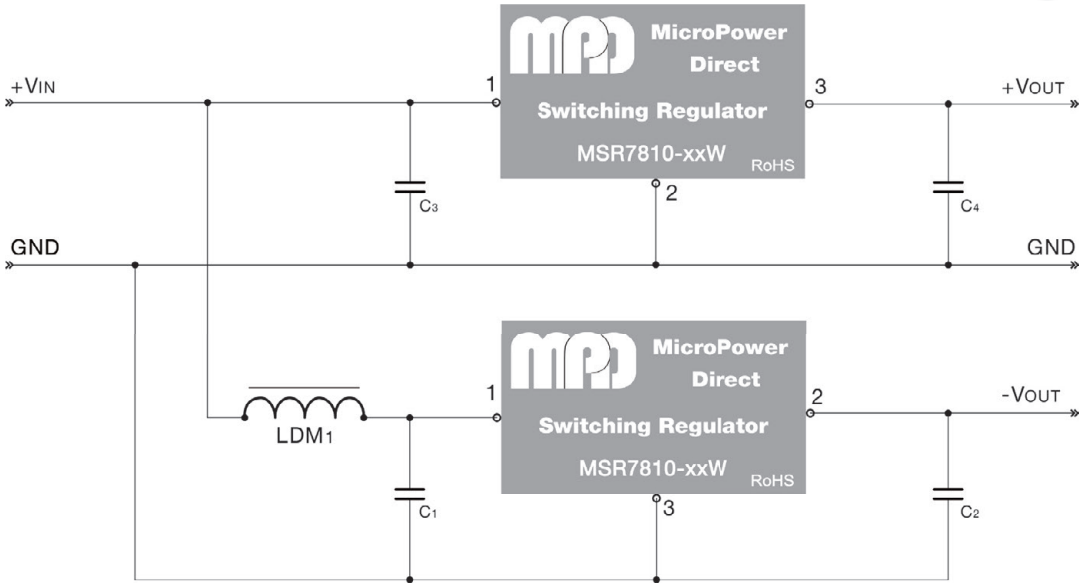
Model Number	C1	C2
MSR7810-033W(L)	10 µF/50V	22 µF/10V
MSR7810-05W(L)	10 µF/50V	22 µF/10V
MSR7810-09W(L)	10 µF/50V	22 µF/16V
MSR7810-12W(L)	10 µF/50V	22 µF/25V
MSR7810-15W(L)	10 µF/50V	22 µF/25V

Typical Application Circuit 2, Negative Output



To produce a negative output, connect the output to pin 2 and ground to pin 3, as shown in the diagram above.

Typical Application Circuit 3, Pos/Neg Output

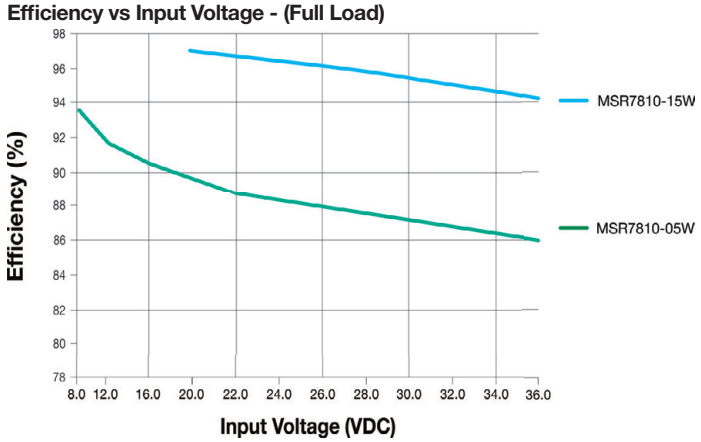


Typical application circuit 3 shows two units configured with a common input connection to produce positive and negative outputs. The inductor LDM1 is added to reduce interference between the units. The recommended values for all the external components are given in the table at right.

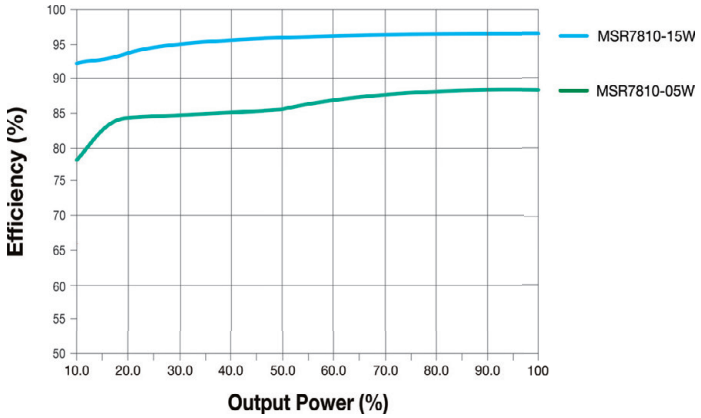
Model Number	C1/C3	C2/C4	LDM1
MSR7810-033W(L)	10 µF/50V	22 µF/10V	10 µH
MSR7810-05W(L)	10 µF/50V	22 µF/10V	10 µH
MSR7810-09W(L)	10 µF/50V	22 µF/16V	10 µH
MSR7810-12W(L)	10 µF/50V	22 µF/25V	10 µH
MSR7810-15W(L)	10 µF/50V	22 µF/25V	10 µH

Characteristic Curves, Positive Output

Efficiency vs Input Voltage - (Full Load)

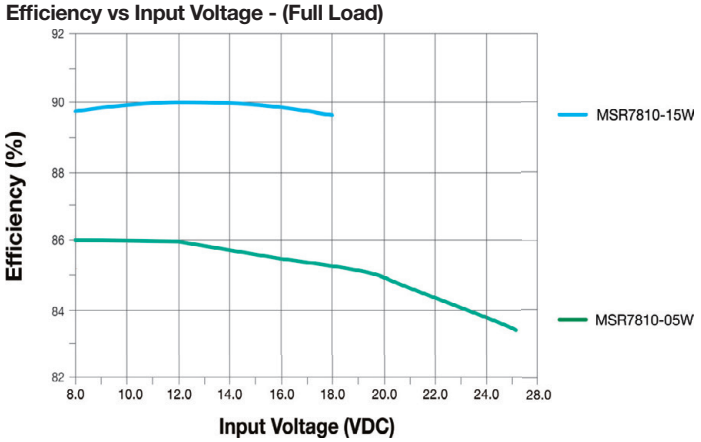


Efficiency vs Output Power - (VIN = Nominal)

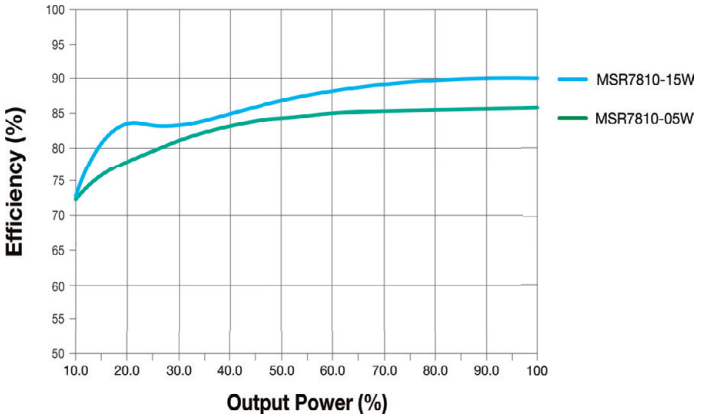


Characteristic Curves, Negative Output

Efficiency vs Input Voltage - (Full Load)

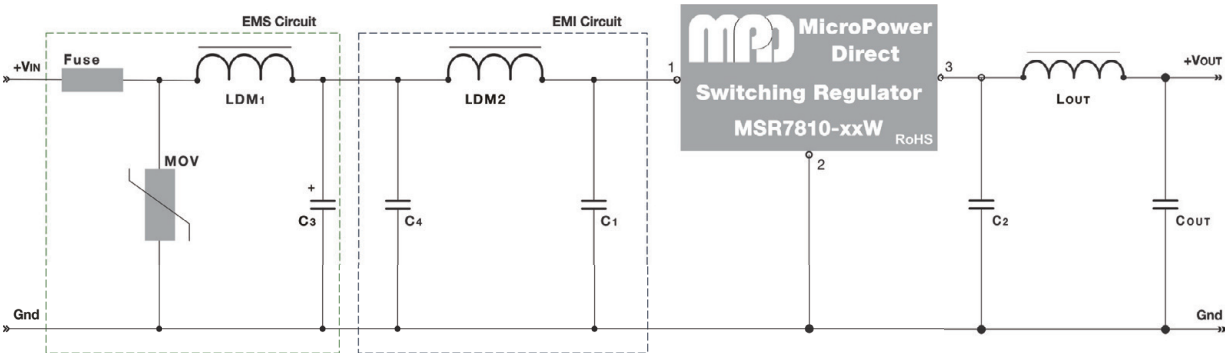


Efficiency vs Output Power - (VIN = Nominal)



Typical Application Circuit 4: External EMC Components

www.micropowerdirect.com



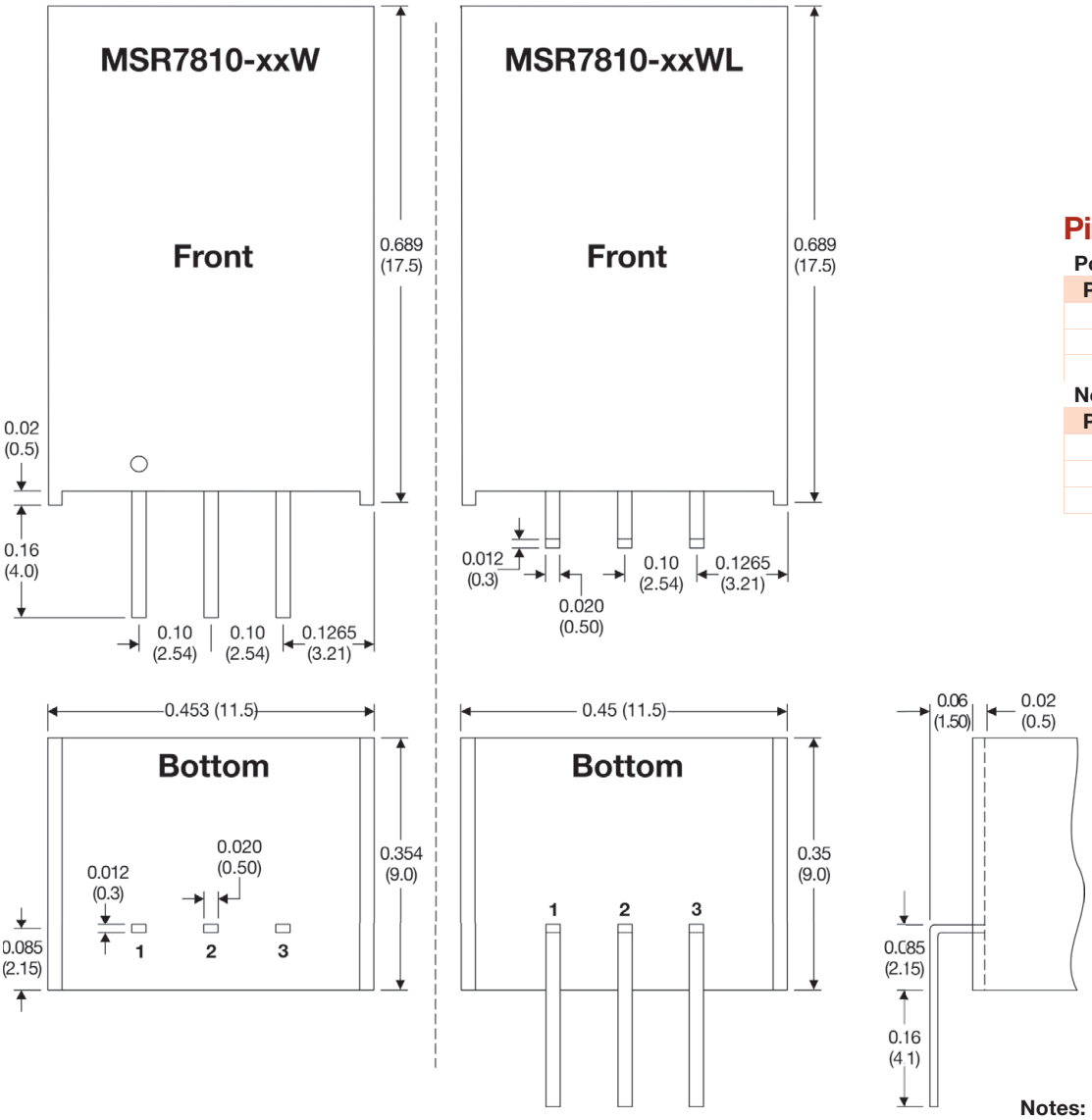
The diagram above illustrates a typical connection of the M**SR7810W(L)** series for applications that require meeting EMC standards. Some notes on this diagram (starting with the input circuit) are:

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. An external MOV is recommended on the input to protect the unit in the event of a surge. A recommended value is given in the table at right.
3. The values for C_1 and C_2 are given in the "Component Values" table on page 2.
4. The LC filter L_{OUT} & C_{OUT} is only needed if very low ripple is required. Recommended values for these components are given in the table at right.
5. Recommended values for components are:

Component	Value
MOV	S20K30
LDM_1	82 µH
C_3	680 µF/50V
C_4	4.7 µF/50V

Component	Value
LDM_2	12 µH
C_1/ C_2	See Note 4
L_{OUT}	10 - 47 µH
C_{OUT}	22 µF

Mechanical Dimensions



Pin Connection

Positive Output

Pin	Function
1	+VIN
2	GND
3	VOUT

Negative Output

Pin	Function
1	+VIN
2	VOUT
3	GND

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

MicroPower Direct
We Power Your Success - For Less!
292 Page Street Ste D Stoughton, MA 02072 • TEL: (781) 344-8226 • FAX: (781) 344-8481 • E-Mail: sales@micropowerdirect.com