

SR7805 Series

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



Key Features:

- Efficiency to 96%
- 0.5A Output Current
- Compact SIP Case
- LM78xx Replacement
- Wide Input Range
- Negative Output Capability
- Short Circuit Protected
- Thermal Shutdown
- Low Noise
- **Low Low Cost**

RoHS



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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 Power Consumption	$V_{IN} = \text{Min to Max}$		0.12	0.256	W
Input Filter	Capacitor Filter				
Reverse Polarity Input	Not Allowed, Could Damage the Unit				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±2.0	±3.0	%
Line Regulation	$V_{IN} = \text{Min to Max}$		±0.2	±0.4	%
Load Regulation	$I_{OUT} = 10\% \text{ to } 100\%$		±0.4	±0.6	%
Ripple & Noise (20 MHz), See Note 1	Positive Output		20	30	mV P - P
	Negative Output		20	35	
Thermal Shutdown	See Note 2			160	°C
Thermal Impedance			85		°C/W
Temperature Coefficient				0.02	%/°C
Transient Recovery Time, See Note 4	25% Load Step Change		0.5	1.0	mS
Transient Response Deviation			55	250	mV
Short Circuit Input Power			0.5	1.8	W
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Not Isolated				
Switching Frequency		280	330	450	kHz

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Note 5	EN 55022	B	
Conducted Emissions, See Note 5	EN 55022	B	
ESD	EN 61000-4-2	B	±4 kV Contact
RS	EN 61000-4-3	A	10V/m
EFT, See Note 6	EN 61000-4-4	B	±1 kV
Surge, See Note 6	EN 61000-4-5	B	±1 kV
CS	EN61000-4-6	A	3V rms
Voltage Dips, Shorts & Interruptions Immunity	EN 61000-4-29	B	0% - 70%

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Operating Temperature Range	Case			+100	°C
Storage Temperature Range		-55		+125	°C
Lead Temperature	1.5 mm From Case For 10 Sec			300	°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	0.07 Oz (2.0g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2.0			MHours

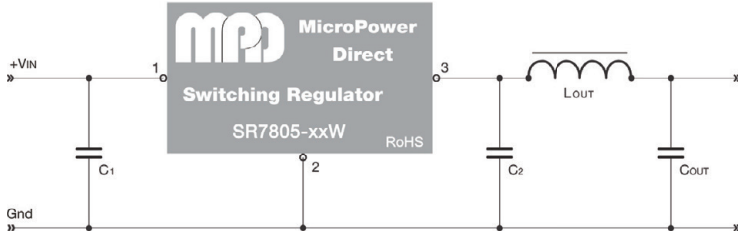
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Model Number	Input Voltage (VDC)		Output		Efficiency (% Typ)		Capacitive Load (µF, Max)	Fuse Rating Slow Blow (mA, Max)
	Nom.	Range	Voltage (VDC)	Current (mA, Max)	Min VIN	Max VIN		
SR7805-015W	12	4.75 - 28.0	1.5	500.0	77	66	1,000	500
	12	4.75 - 25.0	-1.5	-400.0	66	64	470	
SR7805-018W	12	4.75 - 28.0	1.8	500.0	81	69	1,000	1,000
	12	4.75 - 25.0	-1.8	-400.0	70	68	470	
SR7805-02W	12	4.75 - 28.0	2.5	500.0	87	76	1,000	1,000
	12	4.75 - 25.0	-2.5	-400.0	73	73	470	
SR7805-03W	24	4.75 - 28.0	3.3	500.0	91	81	1,000	1,000
	12	4.75 - 25.0	-3.3	-400.0	74	78	470	
SR7805-05W	24	6.50 - 32.0	5.0	500.0	94	86	1,000	1,000
	12	6.50 - 27.0	-5.0	-400.0	78	83	470	
SR7805-052W	24	7.00 - 32.0	5.2	500.0	94	86	1,000	1,000
	24	8.00 - 32.0	6.5	500.0	94	87	1,000	
SR7805-06W	12	6.50 - 25.0	-6.5	-300.0	82	84	470	1,000
	24	11.0 - 28.0	9.0	500.0	95	91	1,000	
SR7805-09W	12	7.00 - 23.0	-9.0	-200.0	85	86	470	1,000
	24	15.0 - 32.0	12.0	500.0	95	92	1,000	
SR7805-12W	12	7.00 - 20.0	-12.0	-200.0	83	87	470	1,000
	24	18.0 - 32.0	15.0	500.0	96	93	1,000	
SR7805-15W	12	7.00 - 17.0	-15.0	-200.0	81	83	470	1,500

Notes:

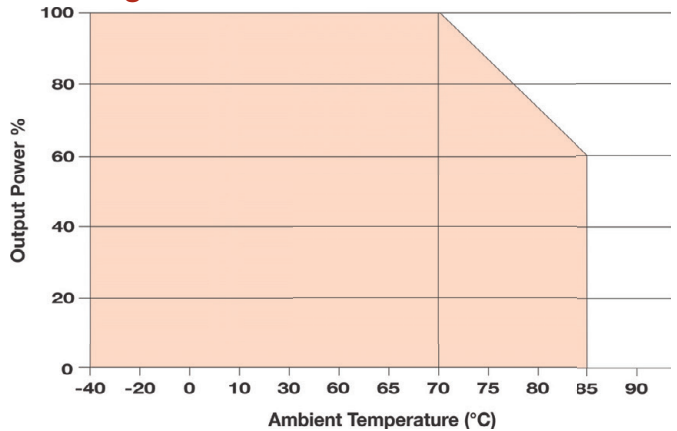
- Output ripple is measured with a nominal input and is specified for a load range of 10% to 100%. When measuring output ripple, two external capacitors (1 µF and 10 µF) must be placed from the Vout to the Gnd pins.
- Measured at an internal IC junction.
- When the product is configured to provide a negative output, capacitors C1 & C2 (see "Typical Application Circuit" below) must be used if the input is under VINMIN + 2V. For instance if the SR7805-05W is used to provide -5V, the capacitors must be added if the input is less than 6.5V + 2V = 8.5V.
- Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
- The unit may not meet emissions to class A without the addition of external capacitors (C1, C2 & C3) as shown in the typical circuit 4 diagram on page 4.
- The unit meets EFT & surge EMS specifications with the addition of external components as shown in the typical circuit 4 diagram on page 4.
- This regulator is not designed to be used in parallel with another unit to increase output power.
- A reverse polarity connection on the input could damage the unit.
- The input should not exceed the range given in the model selection chart. Exceeding this limit could damage the unit.

Typical Application Circuit 1, Positive Output



For most applications, the SR7805-xxW can be used without external components. A typical connection (for a positive output voltage) is shown above. 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, the LC filter may be added (Lout & Cout). The recommended values for these components are 10 µH - 47µH and 22 µF. To meet EMI standards, see the typical circuit 4 diagram on page 4.

Derating Curve

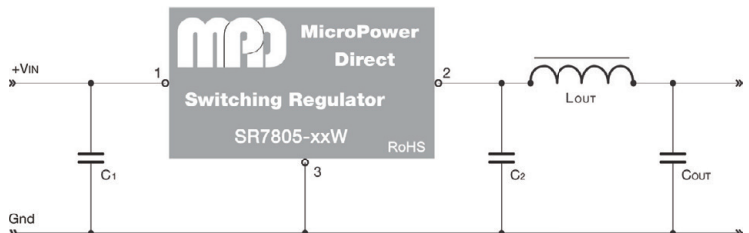


Component Values

Model Number	C1	C2	C3	C4	LDM1
SR7805-015W	10 µF/50V	10 µF/6.3V	10 µF/50V	10 µF/6.3V	10 µH
SR7805-018W	10 µF/50V	10 µF/6.3V	10 µF/50V	10 µF/6.3V	10 µH
SR7805-02W	10 µF/50V	10 µF/6.3V	10 µF/50V	10 µF/6.3V	10 µH
SR7805-03W	10 µF/50V	10 µF/6.3V	10 µF/50V	10 µF/6.3V	10 µH
SR7805-05W	10 µF/50V	10 µF/10V	10 µF/50V	10 µF/10V	10 µH
SR7805-052W	10 µF/50V	10 µF/10V	10 µF/50V	10 µF/10V	10 µH
SR7805-06W	10 µF/50V	10 µF/16V	10 µF/50V	10 µF/16V	10 µH
SR7805-09W	10 µF/50V	10 µF/16V	10 µF/50V	10 µF/16V	10 µH
SR7805-12W	10 µF/50V	10 µF/25V	10 µF/50V	10 µF/25V	10 µH
SR7805-15W	10 µF/50V	10 µF/25V	10 µF/50V	10 µF/25V	10 µH

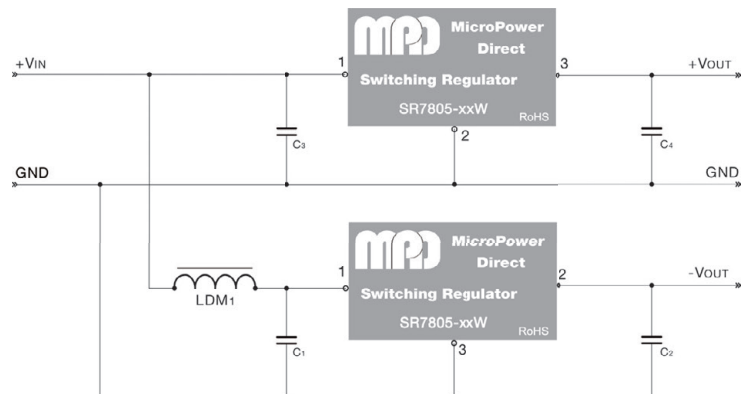
Typical application circuit 3 shows two units configured with a common input connection to produce positive and negative outputs. The inductor LDM1 is added to reduce interference between the units. The recommended values for all the external components are given in the table above.

Typical Application Circuit 2, Negative Output



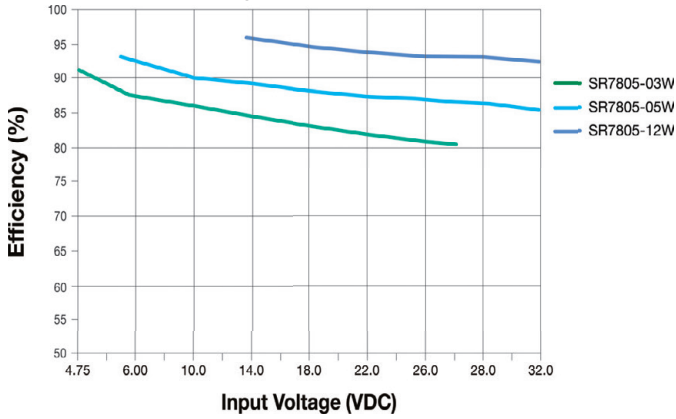
To produce a negative output, connect the output to pin 2 and ground to pin 3, as shown in the diagram above.

Typical Application Circuit 3, Pos/Neg Output

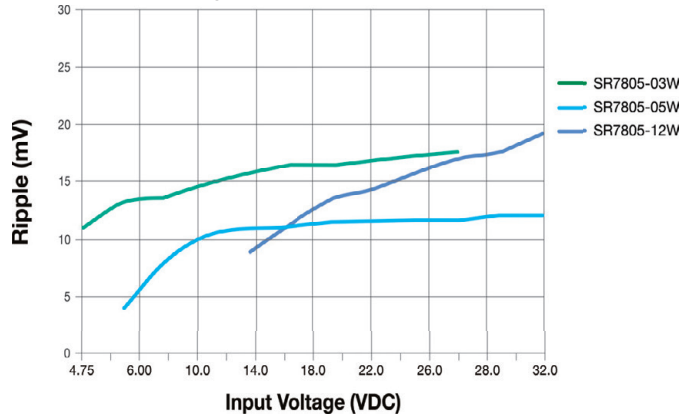


Characteristic Curves, Positive Output

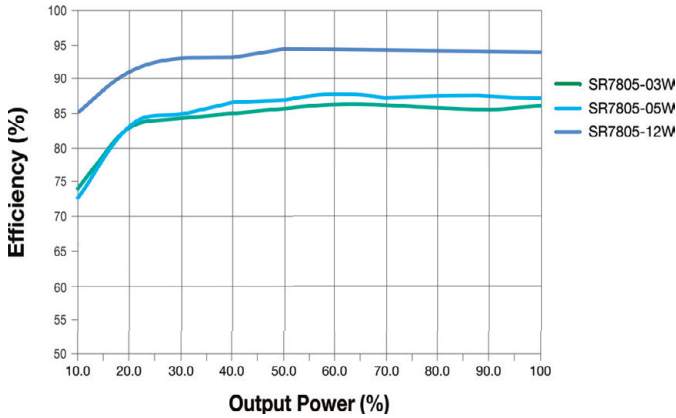
Efficiency vs Input Voltage - (Full Load)



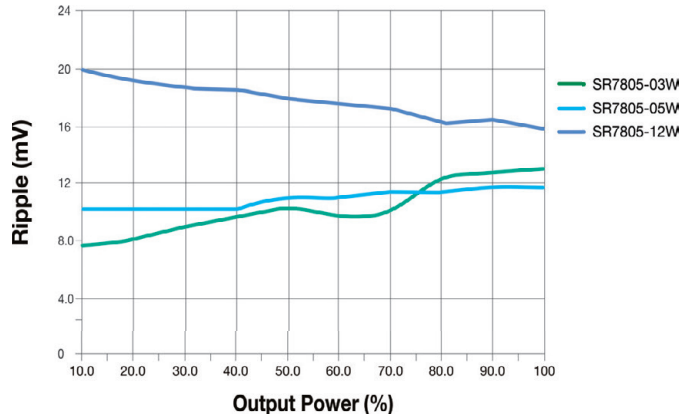
Ripple vs Input Voltage - (Full Load)



Efficiency vs Output Power - (VIN = Nominal)

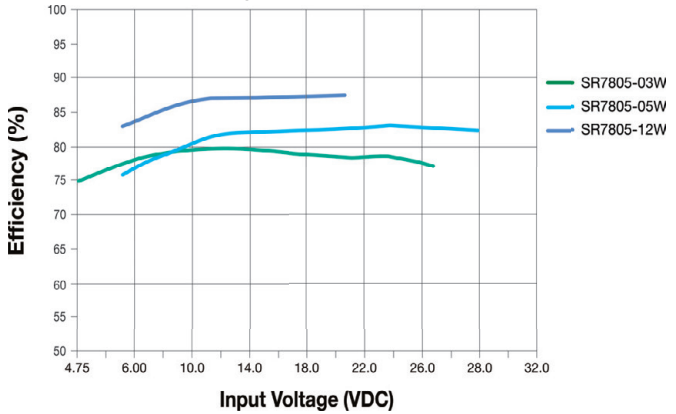


Ripple vs Output Power - (VIN = Nominal)

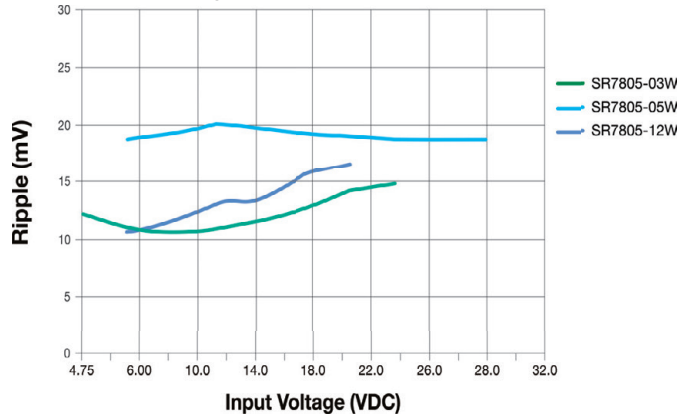


Characteristic Curves, Negative Output

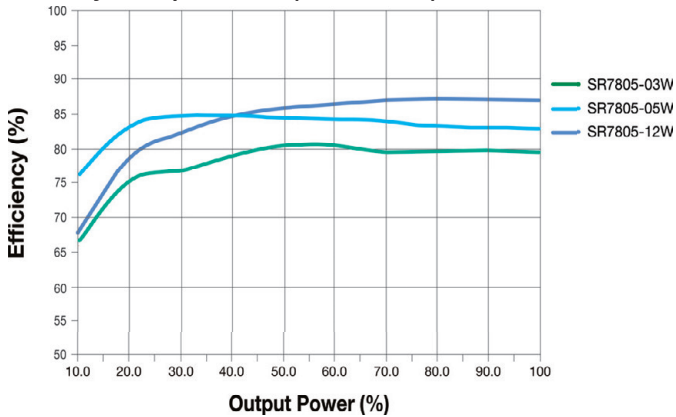
Efficiency vs Input Voltage - (Full Load)



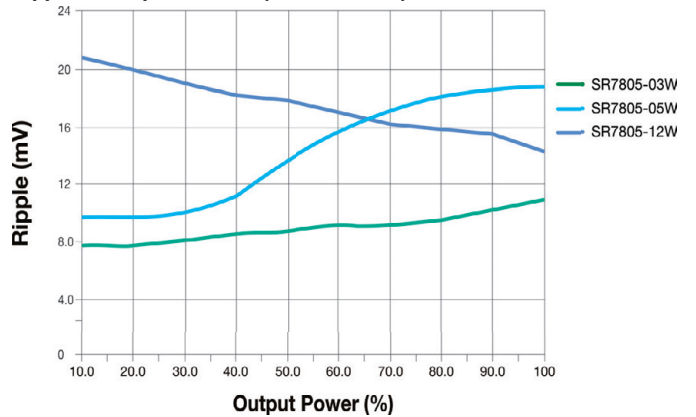
Ripple vs Input Voltage - (Full Load)

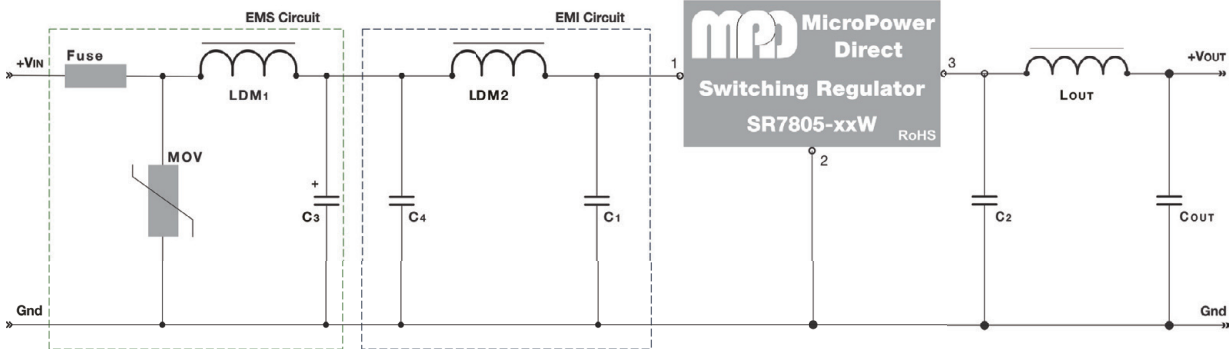


Efficiency vs Output Power - (VIN = Nominal)



Ripple vs Output Power - (VIN = Nominal)





The diagram above illustrates a typical connection of the SR7805W series for applications that require meeting EMC standards. Some notes on this diagram (starting with the input circuit) are:

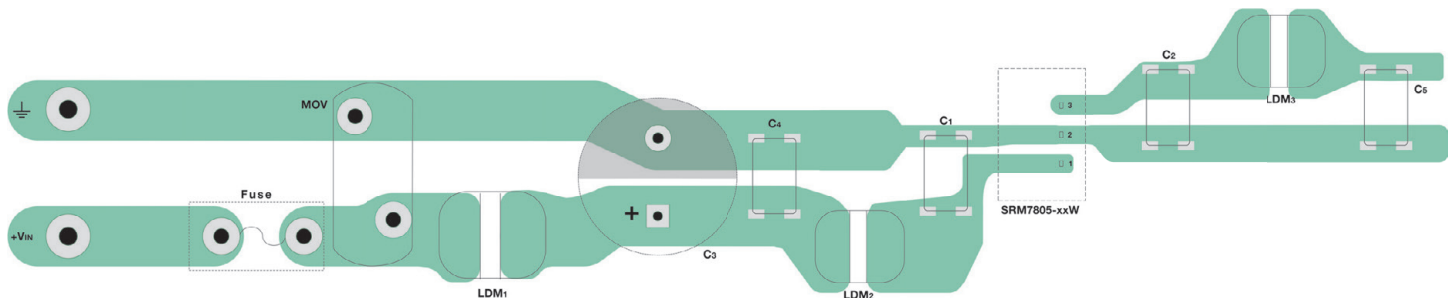
1. It is recommended that an external fuse be used. The recommended fuse is shown in the model chart on page 2.
2. An external MOV is recommended on the input to protect the unit in the event of a surge. A recommended value is given in the table at right.

3. Recommended values for components are:

Component	Value	Component	Value
MOV	S10K35	LDM2	12 μ H
LDM1	82 μ H	C1	See Note 4
C3	680 μ F/50V	C2	See Note 4
C4	4.7 μ F/50V		

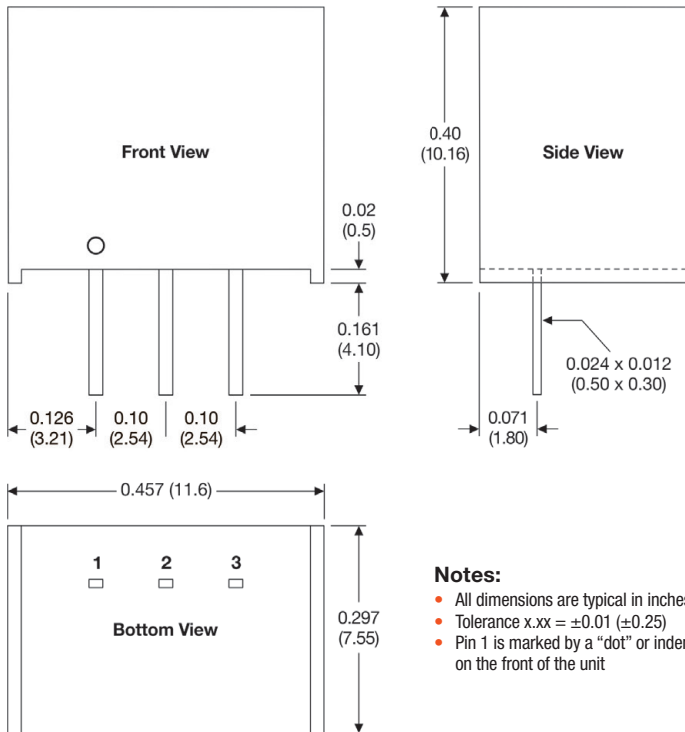
4. The values for C1 and C2 are given in the "Component Values" table on page 2.
5. The LC filter Lout & Cout is only needed if very low ripple is required. Recommended values for these components are given on page 2.

Typical Board Layout: With External EMC Components



The diagram above shows a typical board layout for the LSR7805-xxW with the recommended EMI components shown in the "Typical Connection 4" diagram. Contact the factory for more information. The board trace widths should be ≥ 3 mm, the distance between traces should be ≥ 6 mm, and the distance between traces and ground should be ≥ 6 mm.

Mechanical Dimensions



Pin Connection

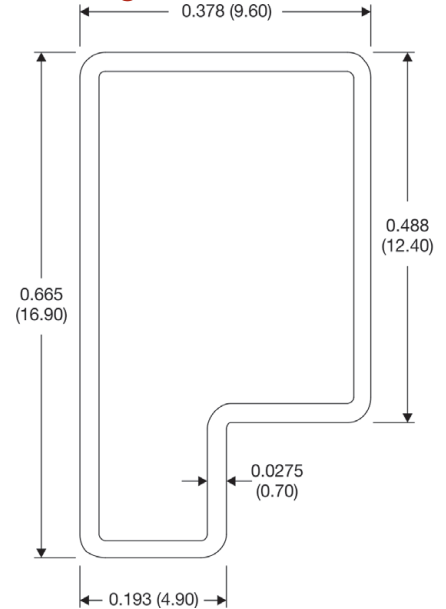
Positive Output	
Pin	Function
1	+VIN
2	GND
3	VOUT

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

Packing Tube Dimensions



Notes:

1. Tube length equals 24 in (610 mm).
2. Units per tube = 43