MPM-25SV Series

85 to 305 VAC Input, 25W Miniature PC Mount AC/DC Power Supplies



Key Features:

- 25W Output Power
- Universal 85-305 VAC Input
- EN 60950 Approved
- Seven Single Output Models
- Meets EN 55022 B
- >300 kHour MTBF
- Compact PC Mount Case

Electrical Specifications

Specifications typical @ +25°C, 230 VAC input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range		85		305	VAC
		100		430	VDC
Input Frequency		47		63	Hz
Input Current	See Model Selection Guide				
Inrush Current	115 VAC		15.0		A Pk
	230 VAC		30.0		
Leakage Current	230 VAC/50 Hz		0.3		mA rms

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage	See Model Selection Guide				
Output Current	See Model Selection Guide				
Output Trim Range				±10	%
Minimum Load		0			%
Output Voltage Accuracy			±2.0		%
Line Regulation	V_{IN} = Min to Max		±0.5		%
Load Regulation	See Note 2		±1.0		%
Ripple & Noise (20 MHz)	See Note 3		50	100	mV Pk - Pk
Hold-Up Time	115 VAC		15		mSec
	230 VAC		80		
Temperature Coefficient			±0.02		%/°C
Short Circuit Protection	Continuous (Autorecovery)				
Overload Protection	Autorecovery		110		%

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input to Output, 60S	3,000			VAC
	Input to FG, 60S	2,000			
Switching Frequency			65		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+70	°C
Storage Temperature Range		-40		+105	°C
Cooling	Free Air Convection (See Derating Curve)				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram On Page 4
Case Material	Non-Conductive Black Plastic (UL94-V0)
Weight	4.22 Oz (120g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	300			kHours
Lead Temperature, See Note 4	Wave Solder			260	°C
	Hand Solder			360	
Safety Standards	UL 60950, EN 60950				
Safety Class	Class I				

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Model Selection Guide

Model Number	Input		Output			Over Volt. Protection (VDC)	Capacitive Load (µF, Max)	Efficiency (%, Typ)
	Current (A)		Voltage (VDC)	Current (A Max.)	Power (W)			
	115 VAC	230 VAC						
MPM-25SV-03	0.60	0.34	3.3	4.10	13.5	7.5	48,000	75
MPM-25SV-05	0.60	0.34	5.0	4.10	20.5	7.5	12,240	78
MPM-25SV-09	0.60	0.34	9.0	2.50	25.0	12.0	5,600	79
MPM-25SV-12	0.60	0.34	12.0	2.10	25.0	20.0	5,400	83
MPM-25SV-15	0.60	0.34	15.0	1.60	25.0	20.0	2,400	84
MPM-25SV-24	0.60	0.34	24.0	1.10	25.0	30.0	1,440	85
MPM-25SV-48	0.60	0.34	48.0	0.50	25.0	60.0	800	87

Notes:

1. Operation at no load will not damage the units, however, they may not meet all specifications.
2. Load regulation is measured for an output change of 10% to 100% at nominal input line.
3. When measuring output ripple, it is recommended that an external 0.1 µF high frequency ceramic capacitor be placed in parallel with a 47 µF high frequency electrolytic capacitor from the +Vout pin to the -Vout pin.
4. The max lead temp for wave soldering is ±5% for a time period of 5 to 10S. For hand soldering, it is ±10% for 3 to 5S.
5. All units are rated for EN 55022 (CE/RE) class B without external components.
6. All units are rated for EN 61000-4-4 (±2 kV) with the addition of the MOV shown in the typical connection below. They will meet EN 61000-4-4 (±4 kV) with the additional input components shown in the typical connection diagram shown on page 3.
7. All units are rated for EN 61000-4-5 (±1 kV/±2 kV) with the addition of the MOV shown in the typical connection below. They will meet EN 61000-4-5 (±2 kV /±4 kV) with the input components shown in the typical connection diagram on page 3.
8. It is recommended that a fuse be used on the input of a power supply for protection. For the **MPM-25SV-xx** series, a 3.15A/300 VAC slow blow should be used.

MPD offers a wide variety of input protection and filtering modules for use with our AC & DC power modules. The **MACFM-02A** may be used with the **MPM-25SV**, as shown on page. Full datasheets for all our input modules are available on our website, or call the factory for a more help.

Typical Connection

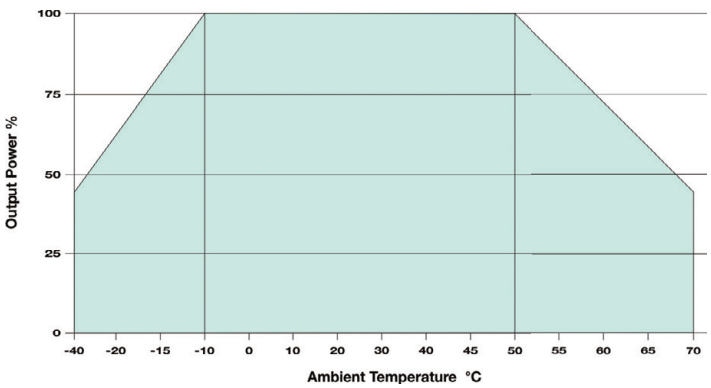


The diagram above illustrates a typical application connection of the **MPM-25SV** series. Notes on this circuit (starting with the input circuit) are:

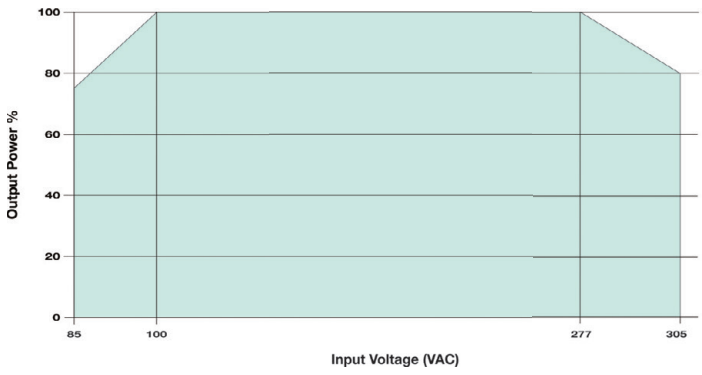
1. It is recommended that an external fuse and NTC be used. The recommended fuse is a 3.15A/300 VAC slow blow.
2. All units are rated for EN 55022 (CE/RE) class B without external components.
3. All units are rated for EN 61000-4-4 (±2 kV) with the addition of the MOV shown in the typical connection above. They will meet EN 61000-4-4 (±4 kV) with the additional input components shown in the typical connection diagram shown on page 3.
4. All units are rated for EN 61000-4-5 (±1 kV/±2 kV) with the addition of the MOV shown in the typical connection above. They will meet EN 61000-4-5 (±2 kV /±4 kV) with the input components shown in the typical connection diagram on page 3.
5. If output noise levels lower than the specified limits are required, the addition of C_1 and C_2 should be sufficient for most applications. The recommended values are shown in the table at right. The output filtering capacitor C_2 is a high frequency, low resistance electrolytic capacitor. Capacitor C_1 is ceramic. Voltage derating of capacitors should be 80% or above.
6. The TVS is added to protect circuits being powered from damage if the module fails.
7. The trim resistors (R_1 & R_2) are used to adjust the output voltage level up or down. If this is not required, the trim pin should be left open. See page 4 for details on using the trim function.

Model	C_1	C_2	TVS
MPM-25SV-03	1.0 µF/50V	330 µF/10V	SMBJ7.0A
MPM-25SV-05	1.0 µF/50V	330 µF/10V	SMBJ7.0A
MPM-25SV-09	1.0 µF/50V	330 µF/25V	SMBJ12A
MPM-25SV-12	1.0 µF/50V	330 µF/25V	SMBJ20A
MPM-25SV-15	1.0 µF/50V	330 µF/25V	SMBJ20A
MPM-25SV-24	1.0 µF/50V	120 µF/35V	SMBJ30A
MPM-25SV-48	1.0 µF/100V	68 µF/100V	SMBJ64A

Derating Curve



Input Voltage Vs Load



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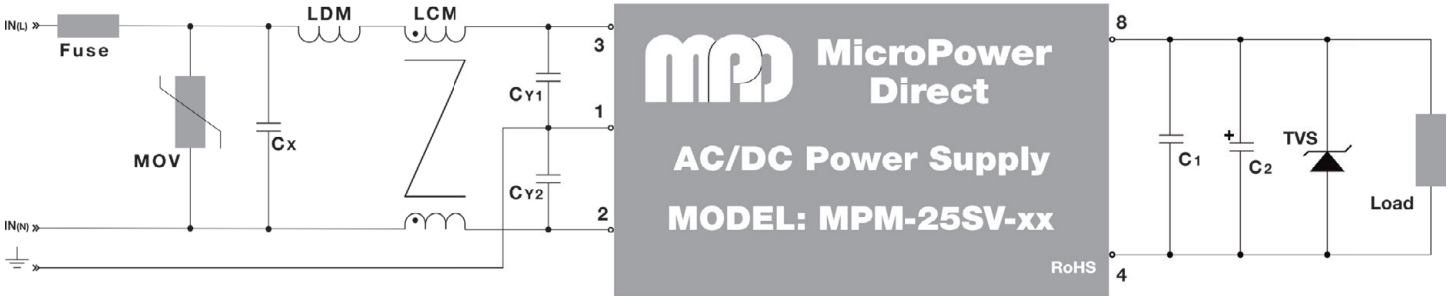
EMI Characteristics

Parameter	Conditions		Criteria	Level
Radiated Emissions		EN 55022		Class B
Conducted Emissions		EN 55022		Class B
ESD		EN 61000-4-2	B	±8 kV Air
				±6 kV Contact
RS		EN 61000-4-3	A	10V/m
EFT	EN 61000-4-4		B	±2 kV
		See Note 1	B	±4 kV
Surge	EN 61000-4-5		B	±1 kV/±2 kV
		See Note 2	B	±2 kV/±4 kV
CS		EN 61000-4-6	A	10V rms
PFM		EN 61000-4-8	A	10A/m
Voltage Dips, Short, Interruptions		EN 61000-4-11	B	0% - 70%

Notes:

1. To meet the requirements of EN 61000-4-4 (±4 kV), external components are needed. This can be done discretely (as shown below), or with the addition of the **MACFM-02A**. Contact the factory for more information.
2. To meet the requirements of EN 61000-4-5 (±2 kV/ ±4 kV), external components are needed. This can be done discretely (as shown below), or with the addition of the **MACFM-02A**. Contact the factory for more information.

Typical Connection: With Input Protection/Filtering Components



The diagram above illustrates a typical connection of the **MPM-25SV** series. The input components are required to meet the more stringent EFT/Surge levels of EN 61000-4 (see notes for EMC Characteristics table above). Some notes on these components are:

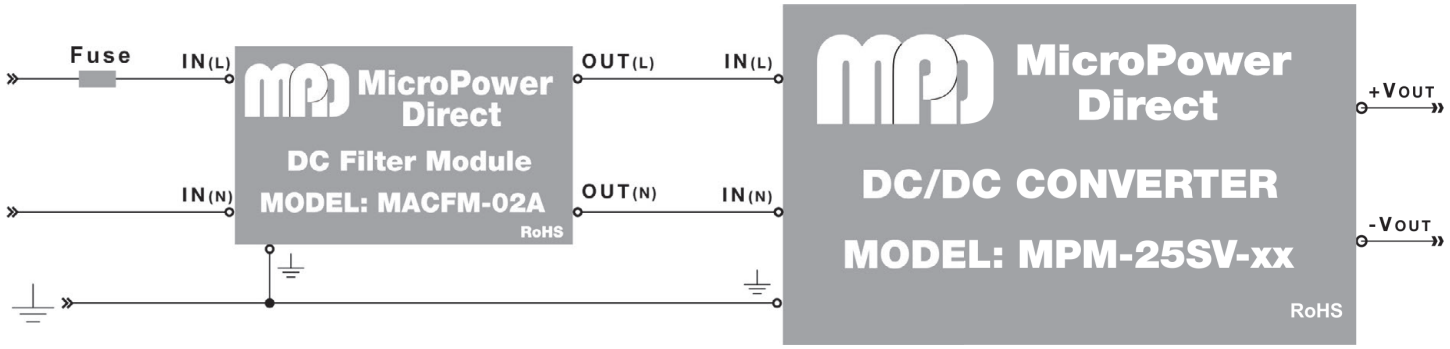
1. It is recommended that an external fuse be used. The recommended fuse size is a 3.15A/300 VAC slow blow.
2. An external MOV is recommended on the input to protect the unit in the event of a surge. A recommended value is given in the table at right.
3. The output filtering capacitors (C_1 & C_2) will reduce the output noise below specified levels. Recommended values are given in the table on page 2.
4. The TVS is added to protect circuits being powered from damage if the module fails. A recommended value for each model is given in the table on page 2.

5. Suggested component values are:

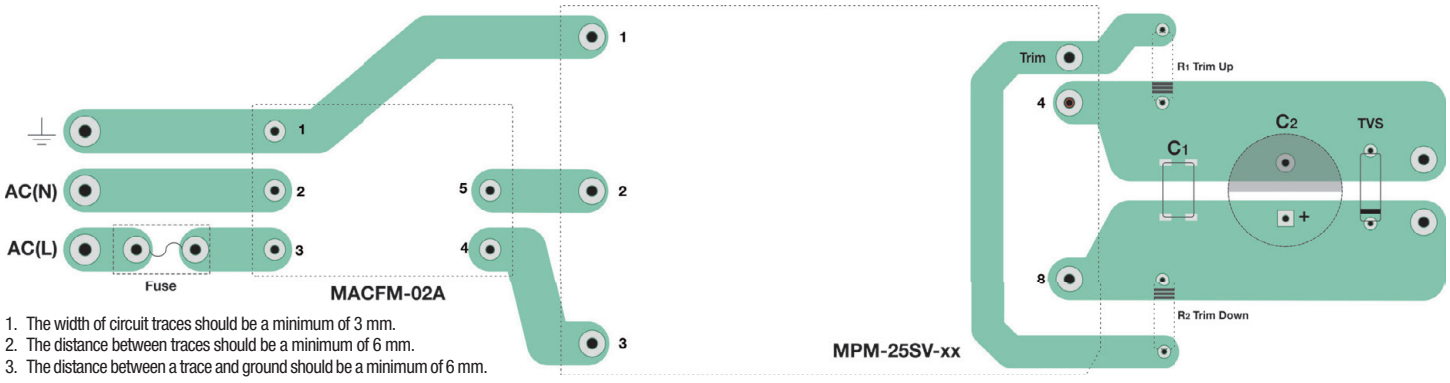
Component	MPM25SV-03	MPM25SV-05	MPM25SV-09	MPM25SV-12	MPM25SV-15	MPM25SV-24	MPM25SV-48
Fuse	3.15A/300 VAC	3.15A/300 VAC	3.15A/300 VAC	3.15A/300 VAC	3.15A/300 VAC	3.15A/300 VAC	3.15A/300 VAC
MOV	S14K350	S14K350	S14K350	S14K350	S14K350	S14K350	S14K350
Cx	0.1 µF/310V	0.1 µF/310V	0.1 µF/310V	0.1 µF/310V	0.1 µF/310V	0.1 µF/310V	0.1 µF/310V
LDM	4.7 µH/2A	4.7 µH/2A	4.7 µH/2A	4.7 µH/2A	4.7 µH/2A	4.7 µH/2A	4.7 µH/2A
LCM	10 mH	10 mH	10 mH	10 mH	10 mH	10 mH	10 mH
C_{Y1}/C_{Y2}	1,000 pF/400VAC	1,000 pF/400VAC	1,000 pF/400VAC	1,000 pF/400VAC	1,000 pF/400VAC	1,000 pF/400VAC	1,000 pF/400VAC

6. Input protection and filtering modules are available for a number of **MPD** AC/DC power supplies. For use with the **MPM-25SV** product series, the **MACFM-02A** filter module is recommended. A typical connection diagram and board layout with this module is shown in the figures below. For pricing or full technical information on the **MACFM-02A** (or any of our other modules) please contact the factory.

Typical Board Layout: With External Filter Module



Typical Board Layout: With External Filter Module

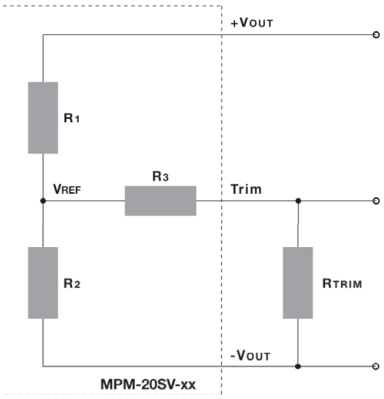


1. The width of circuit traces should be a minimum of 3 mm.
2. The distance between traces should be a minimum of 6 mm.
3. The distance between a trace and ground should be a minimum of 6 mm.

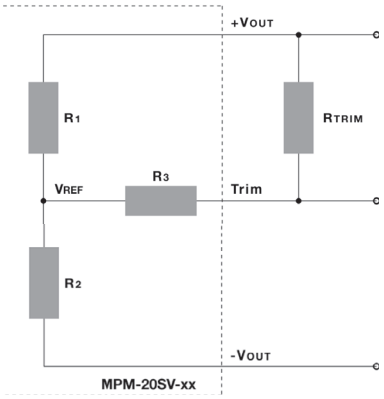
External Trim

If not used, the Trim pin should be left open. Please contact the factory for more information.

Trim Up



Trim Down



External Trim Notes:

An external resistor can be used to adjust the converter output up or down by about 10%. The connection is shown in the diagram at left. The required resistor value is calculated by the formulas:

$$\text{Trim UP} = R_{TRIM} = \frac{A \cdot R_2}{R_2 - A} - R_3 \quad \text{Where } A = \frac{V_{REF}}{V_{TRIM} - V_{REF}} \cdot R_1$$

$$\text{Trim Down} = R_{TRIM} = \frac{A \cdot R_1}{R_1 - A} - R_3 \quad \text{Where } A = \frac{V_{TRIM} - V_{REF}}{V_{REF}} \cdot R_2$$

Where:

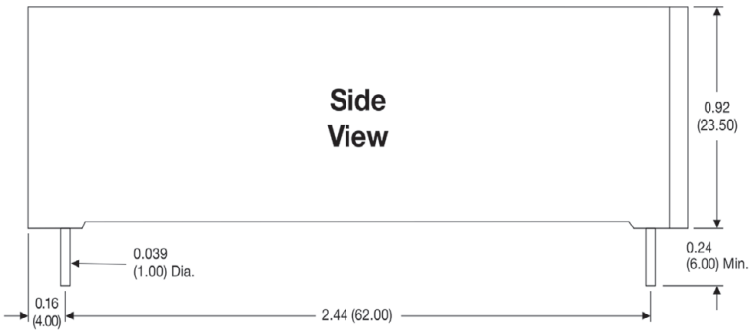
R_{TRIM} = The value of the external trim resistor

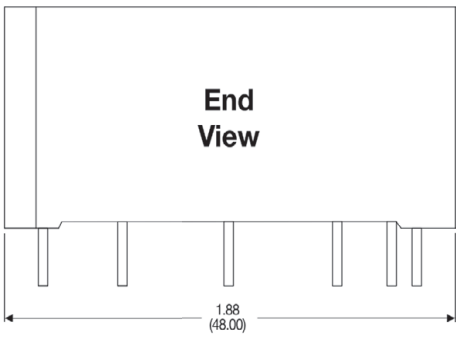
V_{TRIM} = The amount of voltage adjustment required

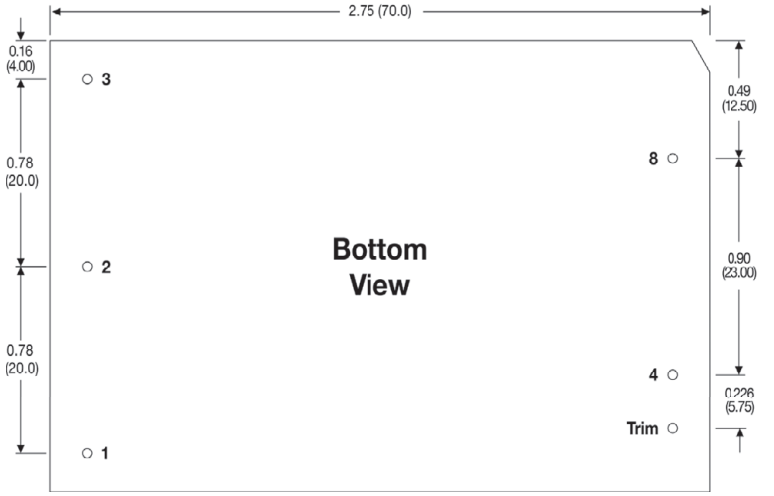
The values for R_1, R_2, R_3 and V_{REF} are given in the table below.

	Output Voltage (VDC)						
	3.3	**5.0**	**9.0**	**12**	**15**	**24**	**48**
R_1	3.30 kΩ	3.30 kΩ	7.50 kΩ	3.83 kΩ	7.50 kΩ	8.66 kΩ	68.0 kΩ
R_2)	1.98 kΩ	3.30 kΩ	2.87 kΩ	1.00 kΩ	1.50 kΩ	1.00 kΩ	3.73 kΩ
R_3	1.00 kΩ	1.00 kΩ	1.00 kΩ	1.00 kΩ	1.00 kΩ	1.00 kΩ	1.00 kΩ
V_{REF}	1.24 V	2.50 V	2.50 V	2.50 V	2.50 V	2.50 V	2.50 V

Mechanical Dimensions







Pin Connections

Pin	Function
1	AC-Ground
2	AC-Neutral
3	AC-Line
4	-VOUT
8	+VOUT
Trim	VOUT Trim

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)