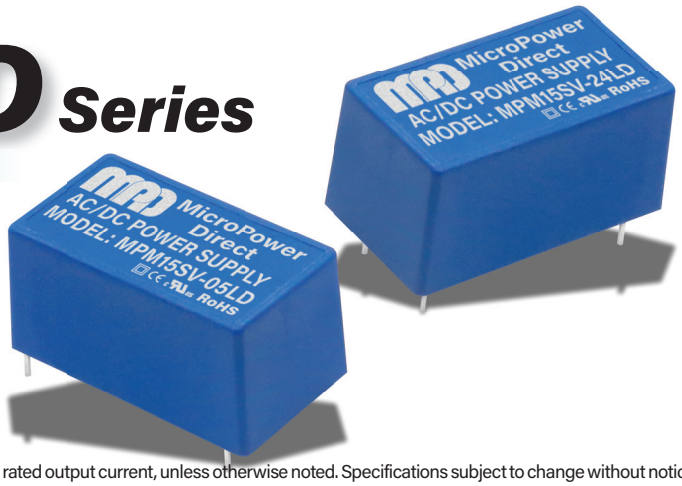
MPM-15SVLD Series

High Performance 15W, Ultra-Wide Input AC/DC Power Supplies



Key Features:

- 15W Output Power
- EN 62368 Approved (UL)
- Universal 85-305 VAC Input
- 4,000 VAC I/O Isolation
- Reinforced Insulation
- Meets EN 60601 (2xMOPP)
- Meets EN 55032 Class B
- Meets EN 55014
- Chassis Mount Available
- DIN Rail Mount Available
- Low Cost

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				
Leakage Current	277VAC/50 Hz			0.10	mA
Inrush Current	115 VAC		30.0		A Pk
	230 VAC		60.0		

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Minimum Load	See Note 1	0			%
Output Voltage Accuracy			±2.0		%
Line Regulation	See Note 2		±0.5		%
Load Regulation	I_{OUT} = 0% to 100%		±1.0		%
Ripple & Noise (20 MHz)	See Note 3		70	120	mV Pk - Pk
Standby Power Consumption	230 VAC		0.20		W
Hold-Up Time	115 VAC		10		mSec
	230 VAC		55		
Temperature Coefficient			±0.02		%/°C
Overload Protection	Autorecovery		110		%I_{OUT}
Short Circuit Protection, See Note 4	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage, See Note 5	Input to Output	4,000			VAC
Isolation Resistance	500 VDC	100			MΩ
Switching Frequency			65		kHz

Environmental

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

Physical

Case Size	See Mechanical Diagrams (Page 6, 7)
Case Material	Non-Conductive Black Plastic (UL94-V0)
Weight	See Mechanical Diagrams (Page 6, 7)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3.20			MHours
Safety Standards	UL/cUL 62368-1 recognition (UL certificate)				
	Meets EN 60335, EN 61558, EN 60601				
Design Life, 230 VAC	25 °C, 100% Load	>130 x 10^3 h			
	55 °C, 100% Load	>27 x 10^3 h			
Lead Temperature, See Note 6	Wave Solder			260	°C
	Hand Solder			360	
Safety Class	Class II (Reinforced Insulation)				

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Model Selection Guide

Model Number	Input		Output			Over Voltage Protection (VDC)	Capacitive Load (μF, Max)	Efficiency (230 VAC, %, Typ)	Fuse Rating Slow-Blow (See Note 7)
	Current (A Max)		Voltage (VDC)	Current (mA Max)	Power (W)				
	115 VAC	230 VAC							
MPM-15SV-03LD	0.45	0.30	3.3	4,000	13.2	7.50	6,600	82	2.0A/300V
MPM-15SV-05LD	0.45	0.30	5.0	3,000	15.0	7.50	5,000	85	2.0A/300V
MPM-15SV-09LD	0.45	0.30	9.0	1,670	15.0	15.0	3,000	84	2.0A/300V
MPM-15SV-12LD	0.45	0.30	12.0	1,250	15.0	20.0	2,000	85	2.0A/300V
MPM-15SV-15LD	0.45	0.30	15.0	1,000	15.0	20.0	1,500	85	2.0A/300V
MPM-15SV-24LD	0.45	0.30	24.0	625	15.0	30.0	680	86	2.0A/300V

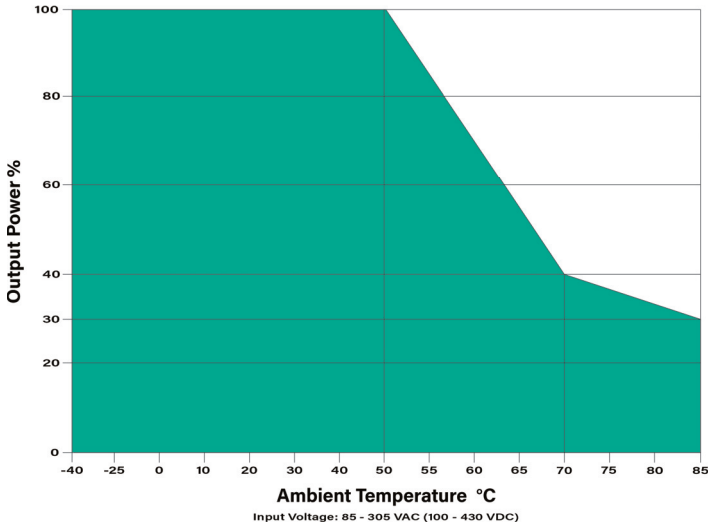
Notes:

1. Operation at no load will not damage the units, however, they may not meet all specifications.
2. Line regulation is measured with the unit at full load while the input is varied from 85 VAC to 305 VAC.
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. Output short circuit protection is provided by a "hiccup mode" circuit. The unit recovers automatically when the fault condition is removed.
5. Input-output isolation is tested for 60 seconds with a leakage current of <5 mA.
6. Lead temperature is specified for 5 to 10 seconds for wave soldering with a tolerance of ±5 °C. For manual soldering it is specified for 3 to 5 seconds with a tolerance of ±10 °C.
7. A 2A/300 VAC fuse is built into the unit. This is sufficient for most applications. If the application environment will see high voltage surges, an external 2A/300 VAC fuse is recommended. See the application circuit on page 5.

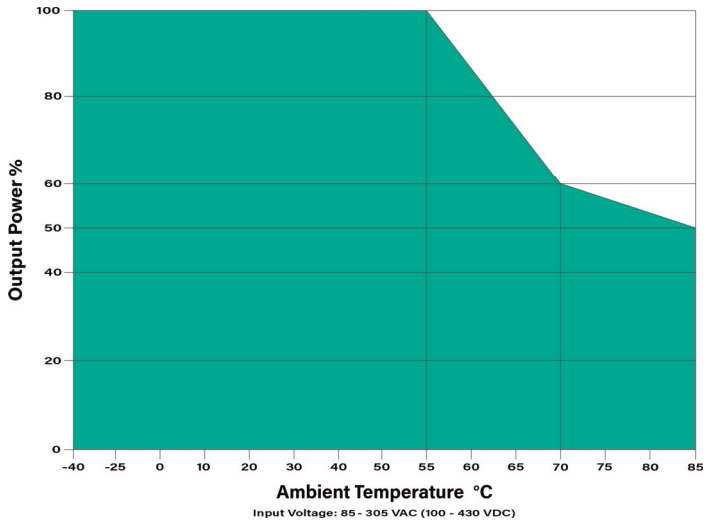
For the A2S adapter board option, add the suffix "-A2S" to the model number (i.e. **MPM-15SV-12LD-A2S**) See Page 6

For the A4S adapter board option, add the suffix "-A4S" to the model number (i.e. **MPM-15SV-05LD-A4S**) See Page 7

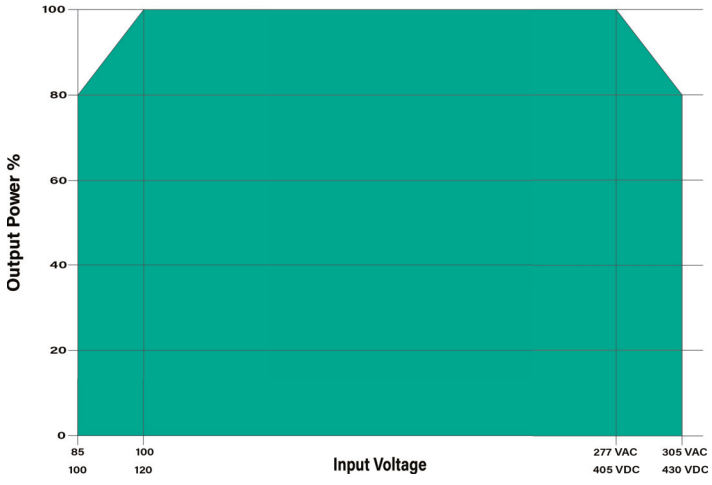
Temperature Derating: 3.3/5 VOUT



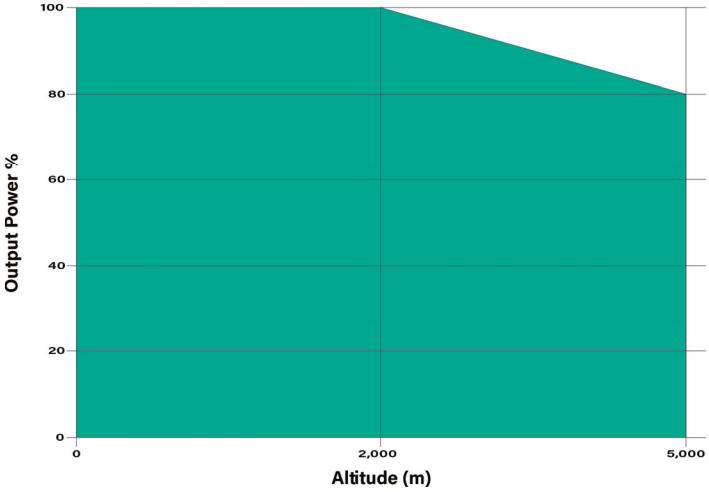
Temperature Derating: All Other Outputs



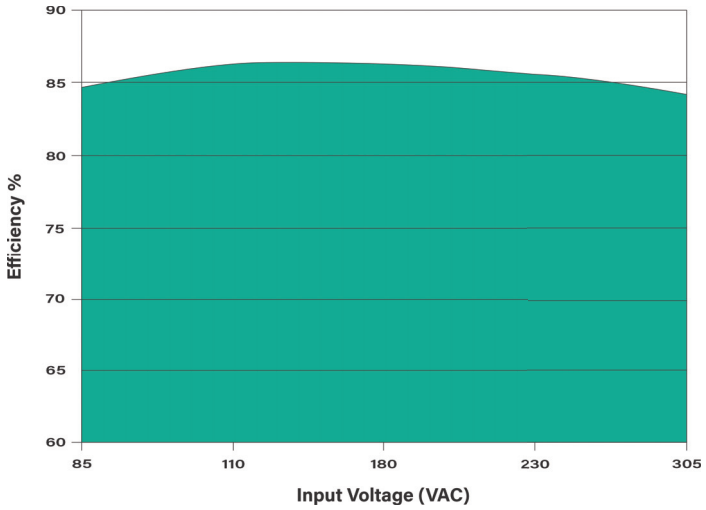
Input Voltage Derating



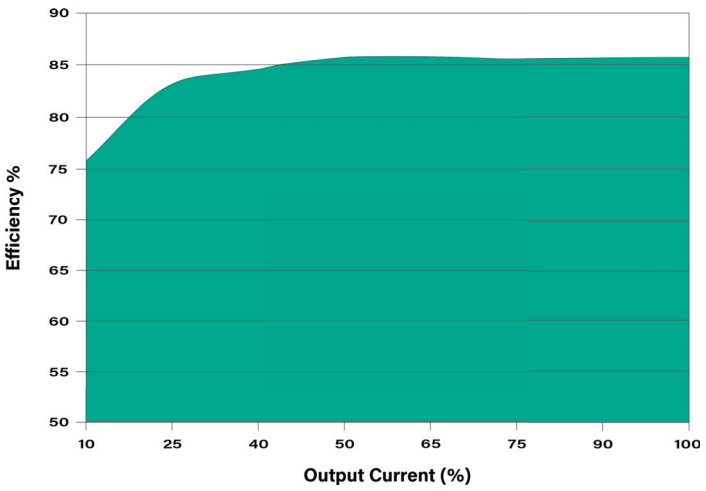
Altitude Derating



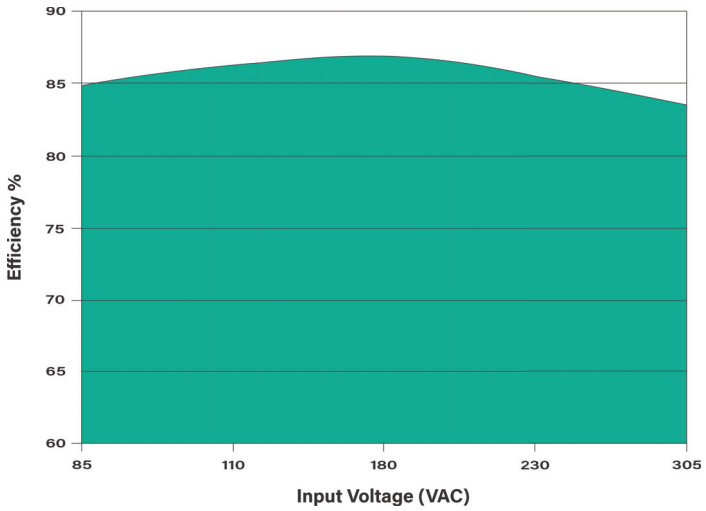
Efficiency vs Input Voltage: 5 VOUT Models



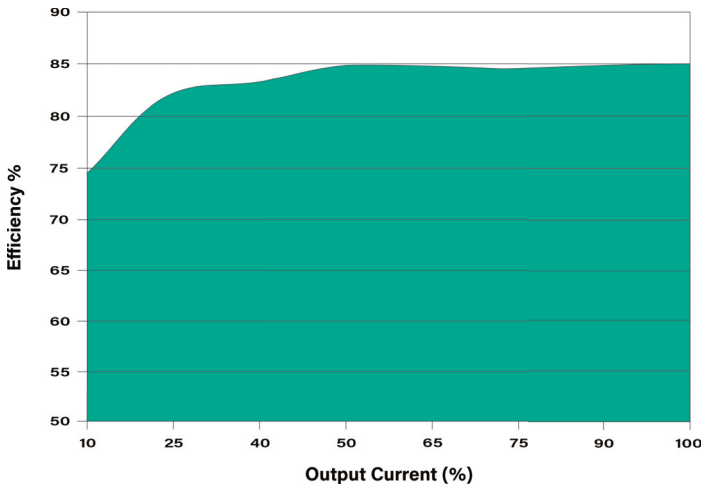
Efficiency vs Output Load: 5 VOUT Models



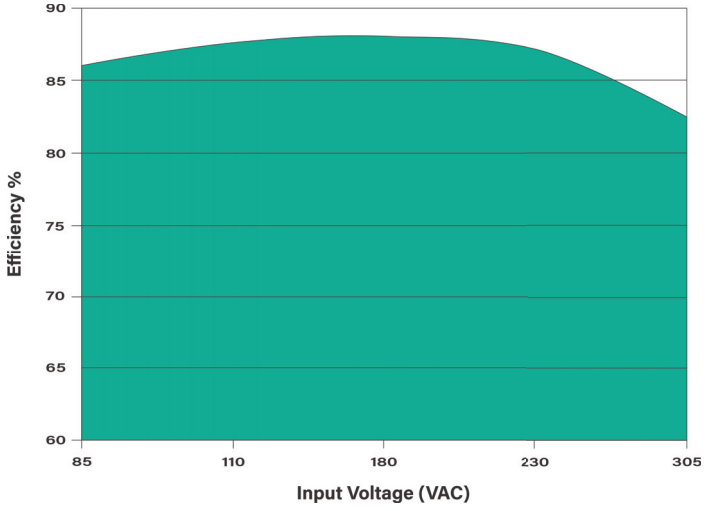
Efficiency vs Input Voltage: 12 VOUT Models



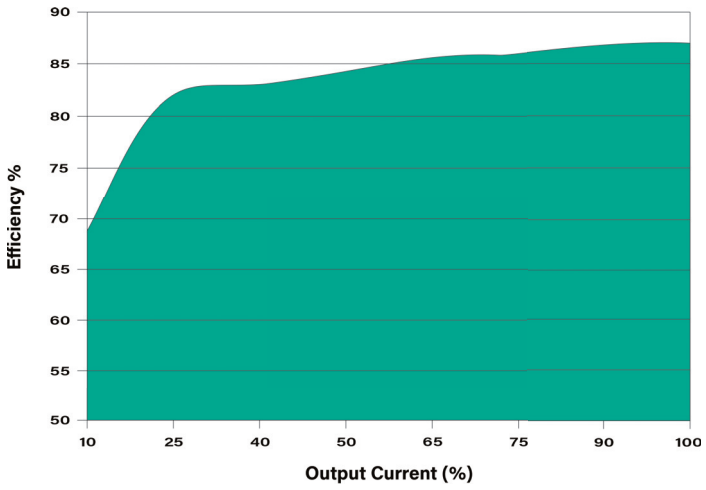
Efficiency vs Output Load: 12 VOUT Models



Efficiency vs Input Voltage: 24 VOUT Models



Efficiency vs Output Load: 24 VOUT Models



EMI Characteristics, Class II Equipment

Parameter	Conditions	Criteria	Level
Radiated Emissions, See Note 1 At Right	EN 55032		Class B
Conducted Emissions, See Note 1 At Right	EN 55032		Class B
ESD	EN 61000-4-2	B	±8 kV Air
			±6 kV Contact
RS	EN 61000-4-3	A	10V/m
EFT, See Note 2 At Right	EN 61000-4-4	B	±2 kV
			±4 kV
Surge, See Note 3 At Right	EN 61000-4-5	B	±1 kV Line to Line
Surge, See Note 4 At Right	EN 61000-4-5	B	±2 kV Line to Line
CS	EN 61000-4-6	A	10V rms
Voltage Dips, Short, Interruptions	EN 61000-4-11	B	0% - 70%

EMI Characteristics, Class I Equipment

Parameter	Conditions	Criteria	Level
Radiated Emissions, See Note 5 At Right	EN 55032		Class B
Conducted Emissions, See Note 5 At Right	EN 55032		Class B
ESD	EN 61000-4-2	B	±8 kV Air
			±6 kV Contact
RS	EN 61000-4-3	A	10V/m
EFT, See Note 6 At Right	EN 61000-4-4	B	±2 kV
			±4 kV
Surge, See Note 7 At Right	EN 61000-4-5	A	±1 kV Line to Line
			±2 kV Line to Line
CS	EN 61000-4-6	A	10V rms
Voltage Dips, Short, Interruptions	EN 61000-4-11	B	0% - 70%

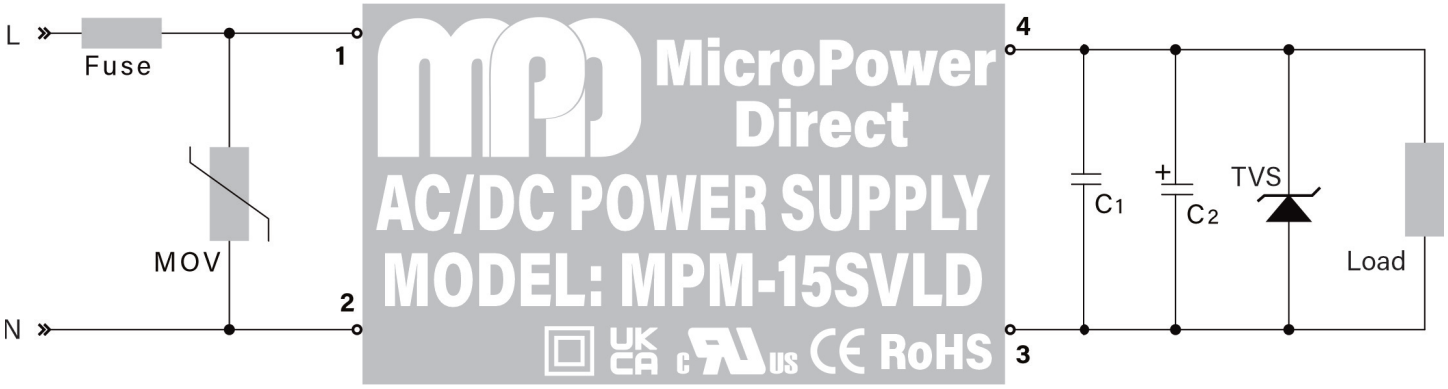
EMI Characteristics: EN 55014

Parameter	Conditions	Criteria
Radiated Emissions	EN 55014-1	
Conducted Emissions	EN 55014-1	
ESD	EN 55014-2	B
RS	EN 55014-2	A
EFT	EN 55014-2	B
Surge	EN 55014-2	B
CS	EN 55014-2	A
Voltage Dips, Short, Interruptions	EN 55014-2	B

Notes:

1. To meet the requirements of CISPER32/EN 55032 Class B, for Class II Equipment, use the "Typical Connection " shown below, or the "EMI Connection for Class II Equipment" as shown at the top of page 5. Contact the factory for more information.
2. To meet the requirements of IEC/EN 61000-4-4 (±2 kV, Criteria B), use the "Typical Connection" as shown below. To meet EN 61000-4-4 (±4 kV, Criteria B) use the "EMI Connection for Class II Equipment" as shown at the top of page page 5. Contact the factory for more information.
3. To meet the requirements of IEC/EN 61000-4-5 (±1 kV line to line, Criteria B), use the "Typical Connection" as shown below. Contact the factory for more information.
4. To meet the requirements of IEC/EN 61000-4-5 (±2 kV line to line, Criteria B), use the "EMI Connection for Class II Equipment" as shown at the top of page 5. Contact the factory for more information.
5. To meet the requirements of CISPER32/EN 55032 Class B, for Class I Equipment, use the "EMI Connection for Class I Equipment" as shown at the bottom of page 5. Contact the factory for more information.
6. To meet the requirements of IEC/EN 61000-4-4 (±4 kV, Criteria A), use the "EMI Connection for Class I Equipment" as shown at the bottom of page 5. Contact the factory for more information.
7. To meet the requirements of IEC/EN 61000-4-5 (±2 kV line to line / ±4 kV line to ground, Criteria A), use the "EMI Connection for Class I Equipment" as shown at the bottom of page 5.

Typical Connection

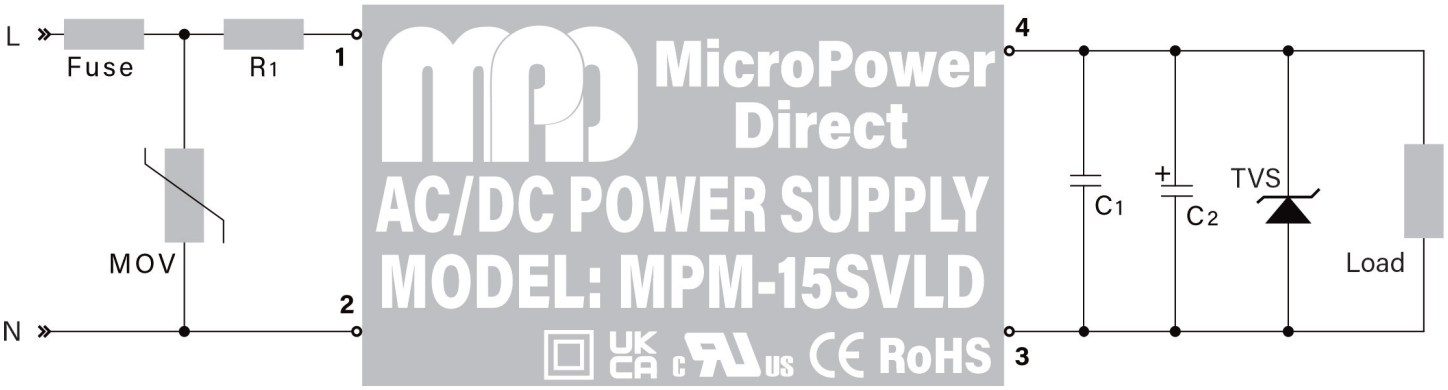


The diagram above illustrates a typical application connection of the **MPM-15SVLD** series. Notes on this circuit (starting with the input circuit) are:

1. All units are rated for EN 55032 (CE/RE) class B without external components.
2. It is recommended that an external fuse be used. The suggested fuse is a 2.0A/300 VAC slow blow.
3. The MOV connected across the input helps protects the unit from possible line surges.
4. 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.
5. The TVS is added to protect circuits being powered from damage if the module fails.

Model	Fuse	MOV	C_1	C_2	TVS
MPM-15SV-03LD	2A/300 VAC Slow Blow	S14K350	1.0 µF/50V	220 µF/16V	SMBJ7.0A
MPM-15SV-05LD				220 µF/16V	SMBJ7.0A
MPM-15SV-09LD				100 µF/25V	SMBJ12A
MPM-15SV-12LD				100 µF/25V	SMBJ20A
MPM-15SV-15LD				100 µF/25V	SMBJ20A
MPM-15SV-24LD				100 µF/35V	SMBJ30A

EMI Connection For Class II Equipment



The diagram above illustrates an EMI connection of the **MPM-15SVLD** series. Although the circuit is the same, the components are changed to meet the more stringent EFT/Surge levels of EN 61000-4 (see notes for EMC Characteristics table on page 4). Some notes on these components are:

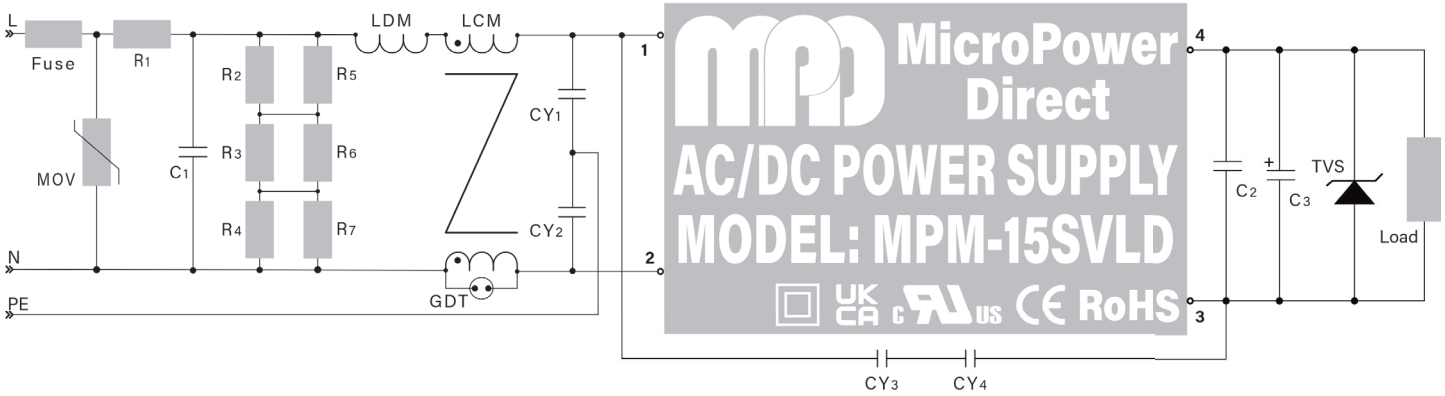
1. The suggested fuse size is a 2A/300 VAC slow blow.
2. To meet more stringent levels of EN 61000-4-4 and EN 61000-4-5, the ratings for the input MOV are changed and R_1 is added. These component values are given in the table at right.
3. The output filtering capacitors (C_1 & C_2) and TVS are discussed in the notes for the typical connection diagram on page 4.

4. Suggested component values are:

Component	3.3 VOUT	5.0 VOUT	9.0 VOUT	12 VOUT	15 VOUT	24 VOUT
Fuse	2A/300 VAC Slow Blow (Required)					
MOV	S14K350					
R_1	6.8 Ω/3W Wire Wound Resistor (Required)					
C1	1 µF/50V					
C2	220 µF/16V	220 µF/16V	100 µF/25V	100 µF/25V	100 µF/25V	100 µF/35V
TVS	SMBJ7.0A	SMBJ7.0A	SMBJ12A	SMBJ20A	SMBJ20A	SMBJ30A

5. Input protection and filtering modules are available for a number of **MPD** AC/DC power supplies. For pricing or full technical information please contact the factory.

EMI Connection For Class I Equipment

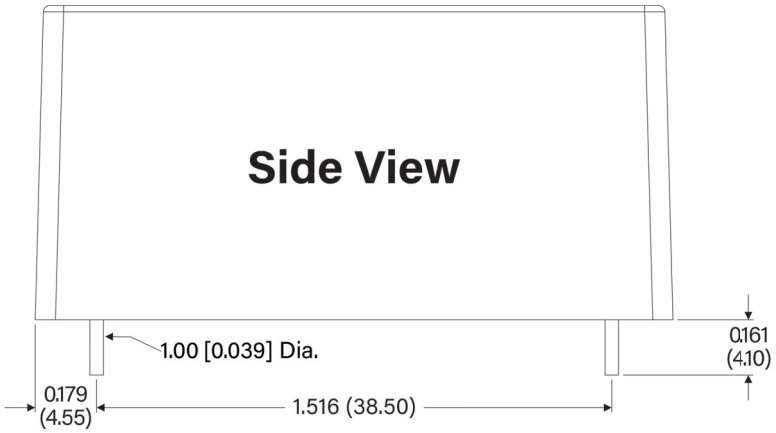


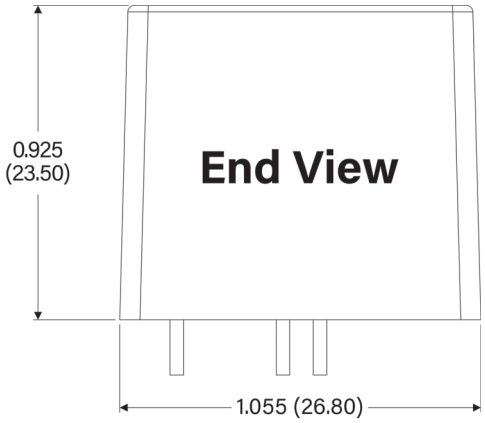
The diagram above illustrates an EMI connection for using the **MPM-15SVLD** series with Class I equipment. The Suggested component values are given in the table at right.

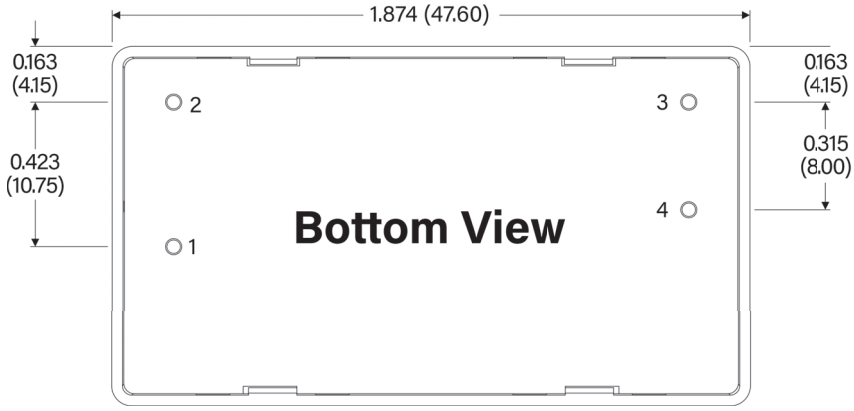
The resistors R_2 to R_7 provide a bleeder resistance for C_1. Input protection and filtering modules are available for a number of **MPD** AC/DC power supplies. For pricing or full technical information please contact the factory.

Component	3.3 VOUT	5.0 VOUT	9.0 VOUT	12 VOUT	15 VOUT	24 VOUT
Fuse	2A/300 VAC Slow Blow (Required)					
MOV	S14K350					
R_1	12 Ω/5W Wire Wound Resistor (Required)					
C1	334k/305 VAC					
R_2 to R_7	1.5 MΩ/150 VDC					
LDM	1.2 mH/0.5A					
LCM	20 mH					
GDT	300V/1kA					
C_{Y1} / C_{Y2}	2.2 nF/400 VAC					
C_{Y3} / C_{Y4}	1 nF/400 VAC					
C2	1 µF/50V					
C3	220 µF/16V	220 µF/16V	100 µF/25V	100 µF/25V	100 µF/25V	100 µF/35V
TVS	SMBJ7.0A	SMBJ7.0A	SMBJ12A	SMBJ20A	SMBJ20A	SMBJ30A

Mechanical Dimensions





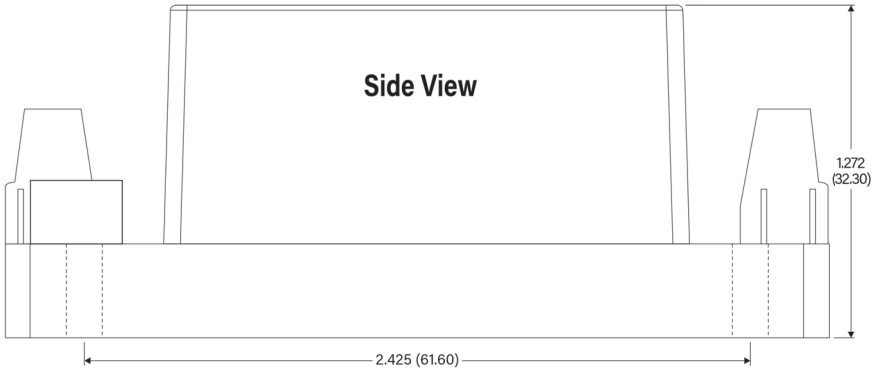


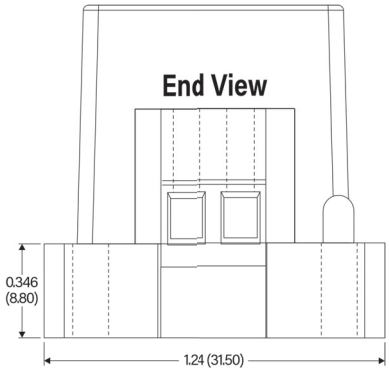
Pin Connections

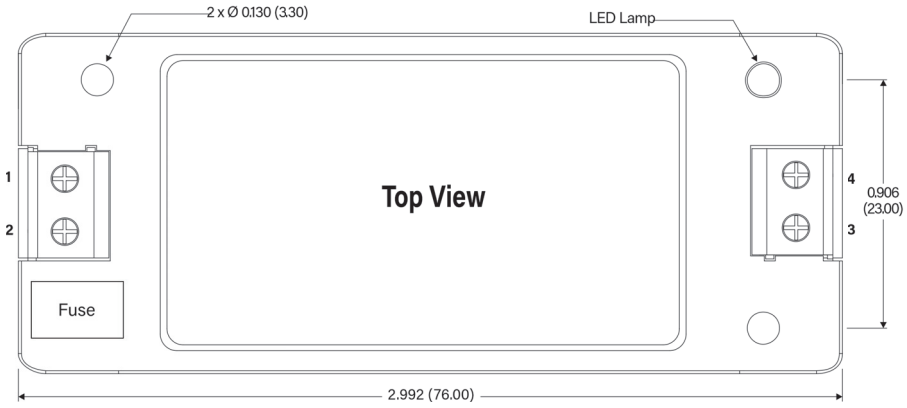
Pin	Function
1	AC-Line
2	AC-Neutral
3	-Vout
4	+Vout

Notes:
- All dimensions are typical in inches (mm)
- General Tolerance = ±0.02 (±0.50)
- Pin Tolerance = ±0.004 (±0.10)
- Recommended pin hole size (on the application PC Board) is Ø 0.059 (Ø1.50)
- Weight (Typ) = 1.692 Oz (48g)

Mechanical Dimensions: A2S Chassis Mount Adapter





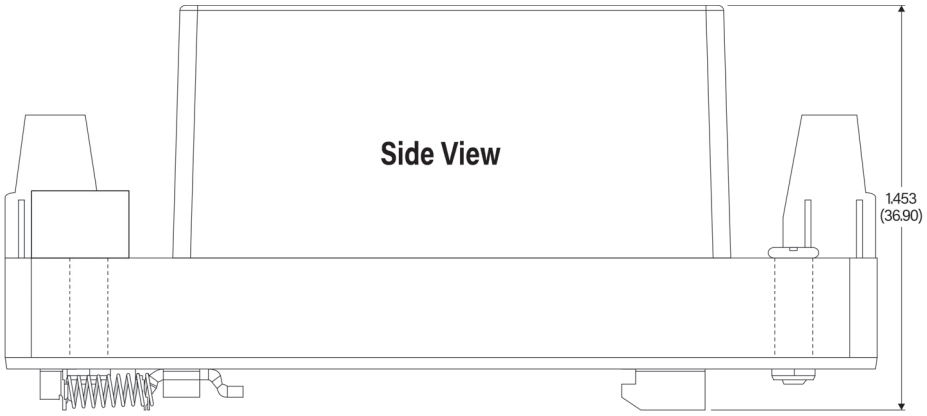


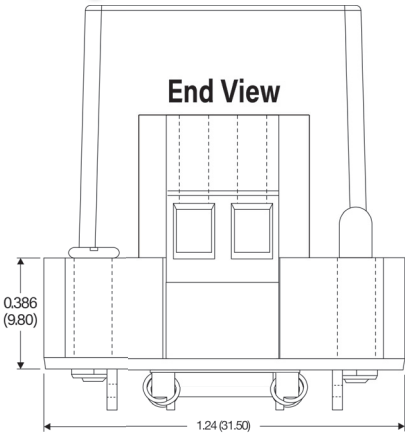
Pin Connections

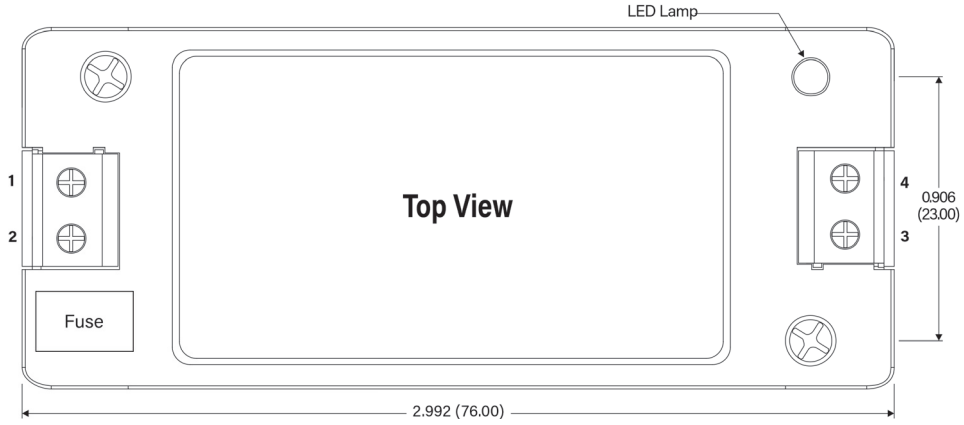
Pin	Function
1	AC-Line
2	AC-Neutral
3	-Vout
4	+Vout

Notes:
- All dimensions are typical in inches (mm)
- General Tolerance = ±0.02 (±0.50)
- Pin Tolerance = ±0.004 (±0.10)
- Recommended pin hole size (on the application PC Board) is Ø 0.059 (Ø1.50)
- Weight (Typ) = 2.39 Oz (68g)

Mechanical Dimensions: A4S DIN Rail Mount Adapter







Pin Connections

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

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance = ±0.039 (±1.00)
- Weight (Typ) = 3.103 Oz (88g)
- Wire Range: 24 - 12 AWG
- Tightening Torque: Max 0.4 N·m
- Mounting Rail: TS 35 Rail must be connected to safety ground

MPD offers a very wide range of high performance AC/DC power supplies ranging from 600W UChannel units to 1W units in miniature Single-In-Line (SIP) packages. All are designed and certified to international safety and EMC/EMI standards.
We also offer AC/DC supplies approved for use in medical equipment, DIN rail supplies, "Green" energy supplies and constant power supplies.
We also offer a wide variety of DC/DC converters, LED Drivers, POL regulators and IGBT drivers. All products are available with short lead times. Call today for complete information or product samples. Or go to our website:

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