

MPM-45SE Series



Very Compact, 45W High Performance, AC/DC Power Supplies

Key Features:

- 45W Output Power
- Compact 3.4 x 2.0 Inch Case
- Universal 85-264 VAC Input
- EN 62368 Approved (UL)
- 4,000 VAC I/O Isolation
- Meets IEC Safety Class II
- Industry Standard Pin-Out
- Meets EN 55032 Class B
- >300 kHour MTBF



MicroPower Direct



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		264	VAC
		100		370	VDC
Input Frequency		47		63	Hz
Input Current	See Model Selection Guide				
Inrush Current	115 VAC		50.0		A Pk
	230 VAC		70.0		

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage	See Model Selection Guide				
Output Current	See Model Selection Guide				
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		60	120	mV Pk - Pk
Hold-Up Time	115 VAC		8		mSec
	230 VAC		50		
Temperature Coefficient			±0.02		%/°C
Standby Power Consumption	230 VAC Input, +25 °C			0.5	W
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
Switching Frequency			65		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+70	°C
Storage Temperature Range		-40		+85	°C
Cooling	Free Air Convection (See Derating Curve)				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram (Page 5)				
Case Material	Non-Conductive Black Plastic (UL94-V0)				
Weight	See Mechanical Diagram (Page 5)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	300			kHours
Lead Temperature, See Note 6	Wave Solder			260	°C
	Hand Solder			360	
Safety Standards	UL/cUL 62368-1 recognition (UL certificate)				
Safety Class	Class II				

Model Selection Guide

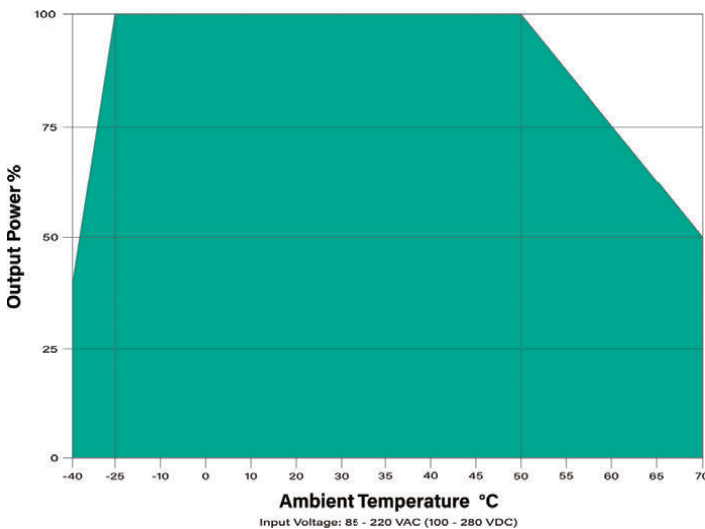
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Model Number	Input		Output		Over Voltage Protection (VDC)	Capacitive Load (µF, Max)	Efficiency (230 VAC, %, Typ)	Fuse Rating Slow-Blow
	Current (A)		Voltage (VDC)	Current (A Max.)				
	115 VAC	230 VAC						
MPM-45S-05E	1.50	0.75	5.0	8.00	9.00	30,000	81	3.15A/250V
MPM-45S-12E	1.50	0.75	12.0	3.80	16.0	6,400	84	3.15A/250V
MPM-45S-15E	1.50	0.75	15.0	3.00	24.0	5,600	85	3.15A/250V
MPM-45S-24E	1.50	0.75	24.0	1.90	35.0	2,000	86	3.15A/250V
MPM-45S-48E	1.50	0.75	48.0	0.94	56.0	600	87	3.15A/250V

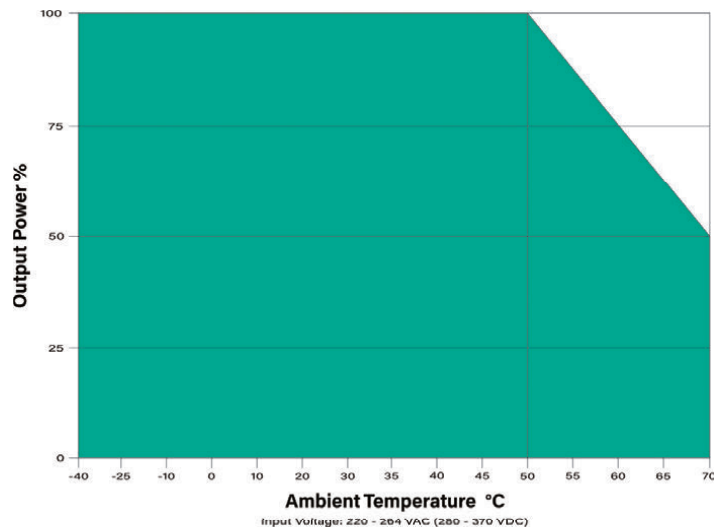
Notes:

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 264 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 sec. with a leakage current of <5 mA.
6. Lead temperature is specified for 5 to 10 seconds for wave soldering with a tolerance of $\pm 5^{\circ}\text{C}$. For manual soldering it is specified for 3 to 5 seconds with a tolerance of $\pm 10^{\circ}\text{C}$.
7. It is recommended that a fuse be used on the input of a power supply for protection. For the MPM45SE series, a 3.15A/250 VAC slow blow should be used.

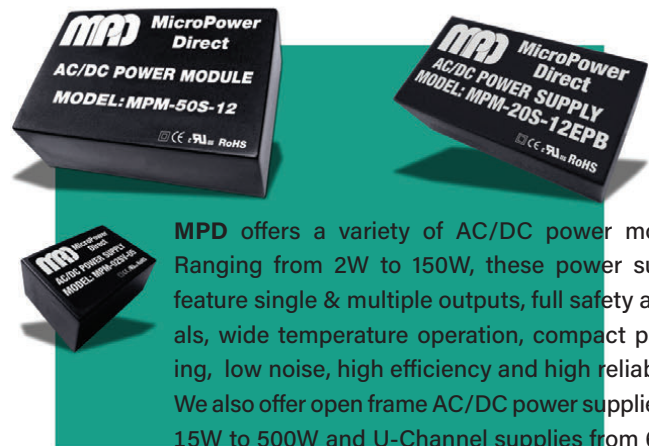
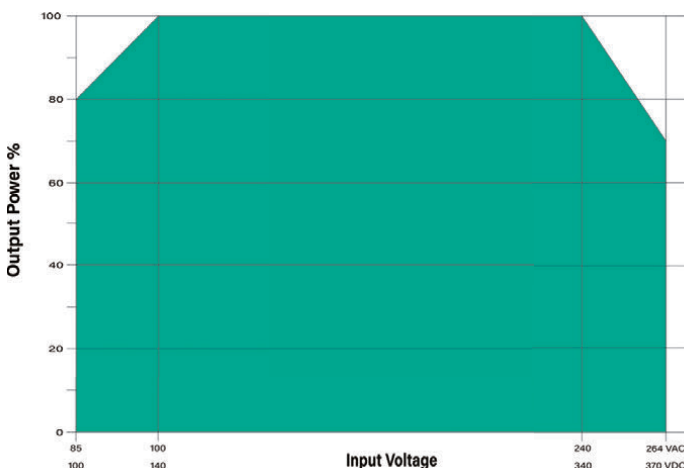
Temperature Derating: 85 VAC - 220 VAC



Temperature Derating: 220 VAC - 264 VAC



Input Voltage Derating

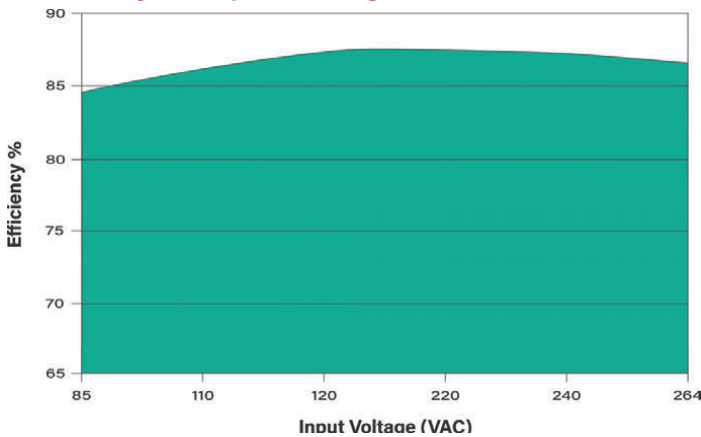


MPD offers a variety of AC/DC power modules. Ranging from 2W to 150W, these power supplies feature single & multiple outputs, full safety approvals, wide temperature operation, compact packaging, low noise, high efficiency and high reliability. We also offer open frame AC/DC power supplies from 15W to 500W and U-Channel supplies from 60W to 600W. Other models include products approved for medical equipment; DIN rail supplies, and "Green" energy supplies.

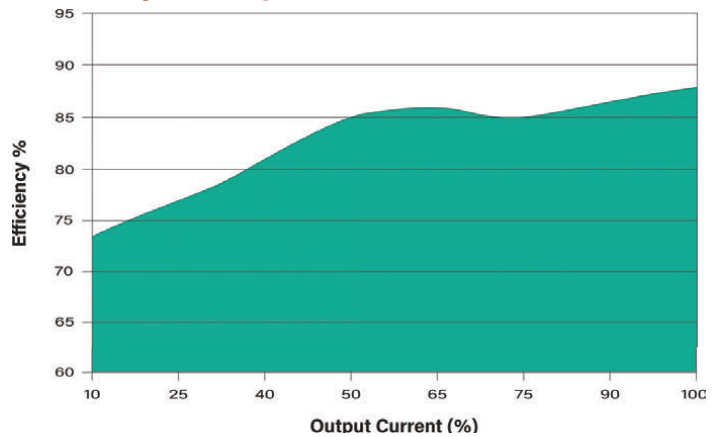
Power Derating Chart: vs Temperature & Input Voltage Range

Parameter	Output Voltage		Min	Typ	Max	Units
-40°C to -25°C	All Models	85 - 220 VAC Input	4.00			%/°C
-40°C to -25°C	All Models	85 - 220 VAC Input	0			%/°C
-50°C to +70°C	All Models		2.50			%/°C
85 VAC to 100 VAC	All Models		2.55			%/VAC
240 VAC to 264 VAC	All Models		1.25			%/VAC

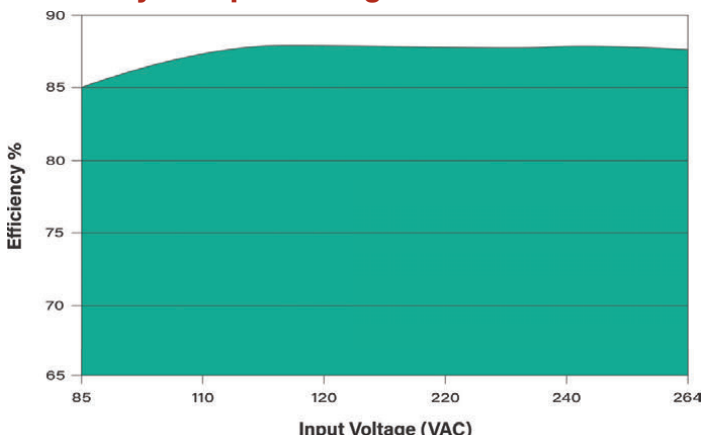
Efficiency vs Input Voltage: 12 V_{OUT} Models



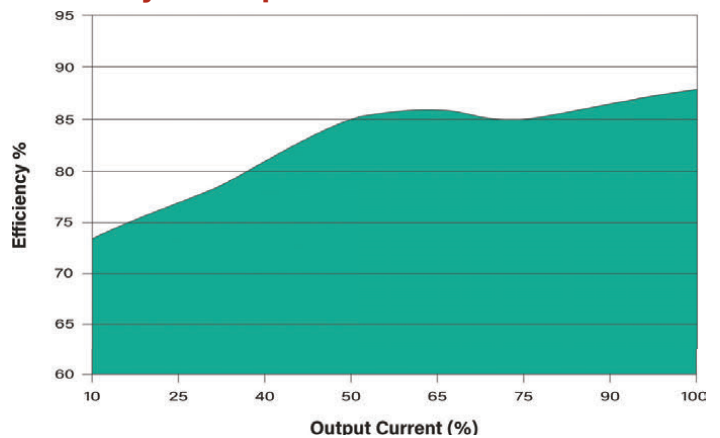
Efficiency vs Output Load: 12 V_{OUT} Models



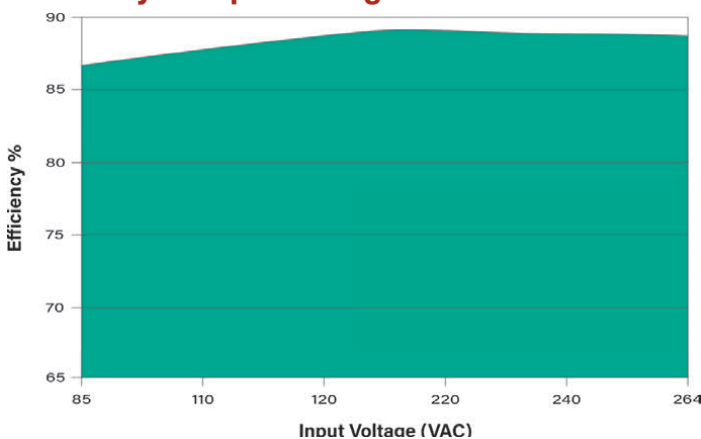
Efficiency vs Input Voltage: 15 V_{OUT} Models



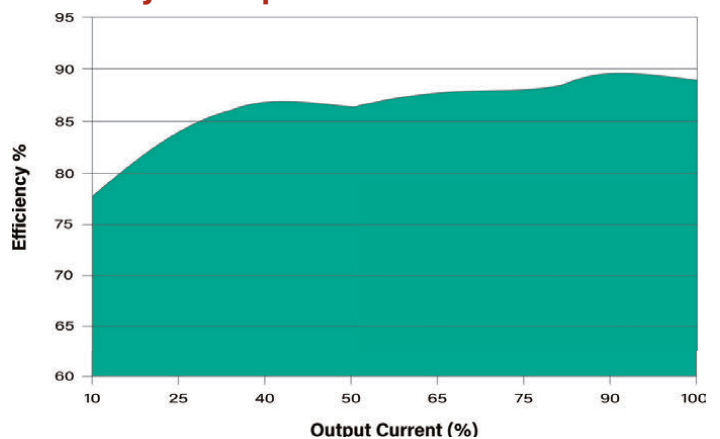
Efficiency vs Output Load: 15 V_{OUT} Models



Efficiency vs Input Voltage: 24 V_{OUT} Models



Efficiency vs Output Load: 24 V_{OUT} Models



Simple Connection



The diagram above illustrates a typical application connection of the MPM45SE series. Notes on this circuit (starting with the input circuit) are:

1. It is recommended that an external fuse be used. The suggested fuse is a 3.15A/250 VAC slow blow.
2. All units are rated for EN 55032 (CE/RE) class B without external components.
3. The MOV connected across the input protects the unit from possible line surges.
4. If output noise levels lower than the specified limits are required, the addition of C1 and C2 should be sufficient for most applications. The recommended values are shown in
5. the table at right. The output filtering capacitor C2 is a high frequency, low resistance electrolytic capacitor. Capacitor C1 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.

Model	MOV	C1	C2	TVS
MPM-45S-05E	S14K350	1.0 μ F/50V	680 μ F/16V	SMBJ7.0A
MPM-45S-12E	S14K350	1.0 μ F/50V	220 μ F/25V	SMBJ20A
MPM-45S-15E	S14K350	1.0 μ F/50V	220 μ F/25V	SMBJ20A
MPM-45S-24E	S14K350	1.0 μ F/50V	120 μ F/35V	SMBJ30A
MPM-45S-48E	S14K350	1.0 μ F/50V	100 μ F/60V	SMBJ64A

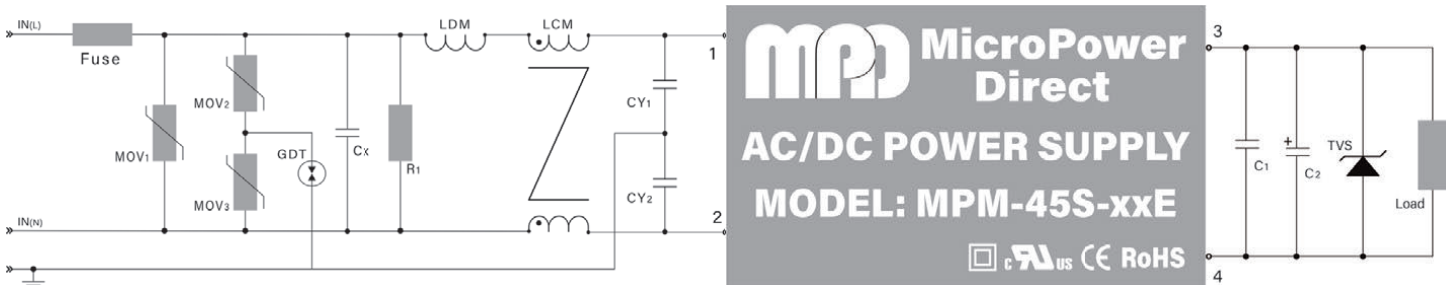
EMI Characteristics

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

Notes:

1. To meet the requirements of EN 61000-4-4 (± 4 kV), use the "Simple Connection" as shown above. Contact the factory for more information.
2. To meet the requirements of EN 61000-4-5 (± 1 kV line to line), use the "Simple Connection" as shown above. Contact the factory for more information.
3. To meet the requirements of EN 61000-4-5 (± 1 kV line to line, ± 2 kV line to Grnd), use the "Typical Connection" as shown below. Contact the factory for more information.

Typical Connection: With Input Protection/Filtering Components



The diagram above illustrates a typical connection of the MPM45SE 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's recommended that an external fuse be used. The suggested fuse size is a 3.15A/250 VAC slow blow.
2. All units are rated for EN 61000-4-4 (± 4 kV) with the addition of the MOV shown in the typical connection at the top of the page (MOV1 in the Typical Connection diagram).
3. All units are rated for EN 61000-4-5 (± 2 kV LL) with the addition of the MOV shown in the typical connection at the top of the page. They will meet EN 61000-4-5 (± 4 kV LL/ ± 6 kV LG) with the additional input components shown in the Typical Connection diagram shown above. All component values are given in the table at right.
4. The output filtering capacitors (C1 & C2) and TVS are discussed in the notes for the typical connection at the top of the page. Recommended values are given in the table above.

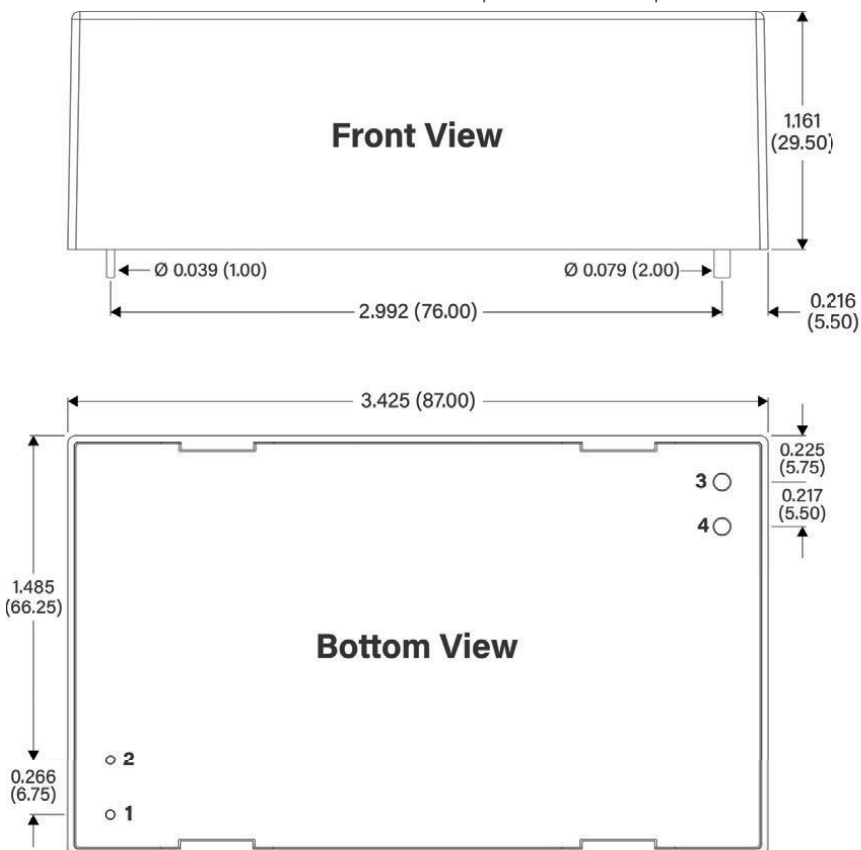
5. Suggested component values are:

Component	MPM-45S-05E	MPM-45S-12E	MPM-45S-15E	MPM-45S-24E	MPM-45S-48E
Fuse	3.15A/250 VAC	3.15A/250 VAC	3.15A/250 VAC	3.15A/250 VAC	3.15A/250 VAC
MOV1	20D471K	20D471K	20D471K	20D471K	20D471K
MOV2	10D471K	10D471K	10D471K	10D471K	10D471K
MOV3	10D471K	10D471K	10D471K	10D471K	10D471K
GDT	EM3600XS	EM3600XS	EM3600XS	EM3600XS	EM3600XS
Cx	0.22 μ F/275VAC	0.22 μ F/275VAC	0.22 μ F/275VAC	0.22 μ F/275VAC	0.22 μ F/275VAC
R1	1 M Ω /2W	1 M Ω /2W	1 M Ω /2W	1 M Ω /2W	1 M Ω /2W
LDM	4.7 μ H	4.7 μ H	4.7 μ H	4.7 μ H	4.7 μ H
LCM	2 mH	2 mH	2 mH	2 mH	2 mH
CY1/CY2	1 nF/400 VAC	1 nF/400 VAC	1 nF/400 VAC	1 nF/400 VAC	1 nF/400 VAC

6. 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.

Mechanical Dimensions

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Pin Connections

Pin	Function
1	AC-Line
2	AC-Neutral
3	+V _{OUT}
4	-V _{OUT}

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance x.xx = ±0.02 (±0.50)
- Pin DIA Tolerance x.xxx = ±0.004 (±0.100)
- Weight (Typ) = 2.28 Oz (60g)

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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