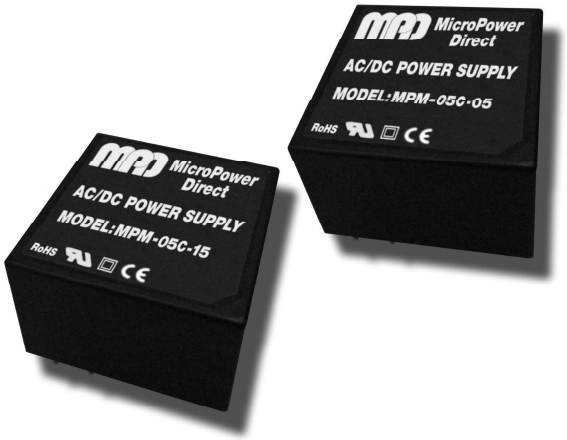
MPM-05C

5W, Compact, High Isolation AC/DC Power Supplies



Key Features:

- 5W Output Power
- 85-305 VAC Input
- 4000VAC Isolation
- Compact Size
- Efficiency to 81%
- -40°C to +85°C Temp Range
- Meets EN 55032 B
- >2600 kHour MTBF

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
Input Voltage Range	AC input	85		305	VAC
	DC input	100		430	
Input Frequency		47		63	Hz
Input Current	See Model Selection Guide				
Inrush Current (Cold start)	115 VAC		15		A
	230 VAC		25		
Leakage Current	277VAC / 50Hz			.25	mA

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	3.3V output		±3		%
	Others		±2		
Line Regulation	Full Load		±0.5		%
Load Regulation	0 to 100% Load		±1		%
Ripple & Noise, See Note 1	20MHz		50	100	mVP-P
Hold-Up Time	115 VAC		5		mSec
	230 VAC		50		
Temperature Coefficient			±0.02		%/°C
Over Voltage Protection	3.3 / 5VDC output			7.5	VDC
	9VDC output			15	
	12VDC output			16	
	15VDC output			20	
	24VDC output			30	
Over Load Protection	≥130%Io, Self-Recovery				
Short Circuit Protection	Hiccup Mode (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input to Output	4000			VAC

Environmental

Parameter	Conditions	Min.	Typ	Max.	Units
Operating Temperature Range See Note 5		-40		+85	°C
Storage Temperature Range		-40		+105	°C
Cooling, See Note 6	Free Air Convection				
Storage Humidity, See Note 9	Non condensing			95	%RH

Physical

Case Size	Horizontal package	1 in x 1 in. x 0.69 in.
	A2S chassis mounting	3 in. x 1.24 in. x 1.04 in.
	A4S Din-Rail mounting	3 in. x 1.24 in. x 1.22 in.
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Weight	Horizontal package	0.62 Oz
	A2S chassis mounting	1.34 Oz
	A4S Din-Rail mounting	2.05 Oz

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL-HDBK-217F@25°C	2.6			MHours

Absolute Maximum Ratings

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

Model Selection Guide

Model Number (See Note 4)	Input		Output			Capacitive Load (μF Max) (See Note 7)	Efficiency (230 VAC, %, Typ.)
	Current (mA Max)		Voltage (VDC)	Current (mA, Max)	Power (W)		
	115 VAC	230 VAC					
MPM-05C-03	130	70	3.3	1515	5	4000	71.5
MPM-05C-05	130	70	5	1000	5	3000	77.5
MPM-05C-09	130	70	9	555	5	1200	80.5
MPM-05C-12	130	70	12	416	5	1200	80.5
MPM-05C-15	130	70	15	333	5	680	81.5
MPM-05C-24	130	70	24	208	5	220	81.5

* Add -A2S for chassis mount option. Ex: MPM-05C-09-A2S

Typical Characteristic Curves

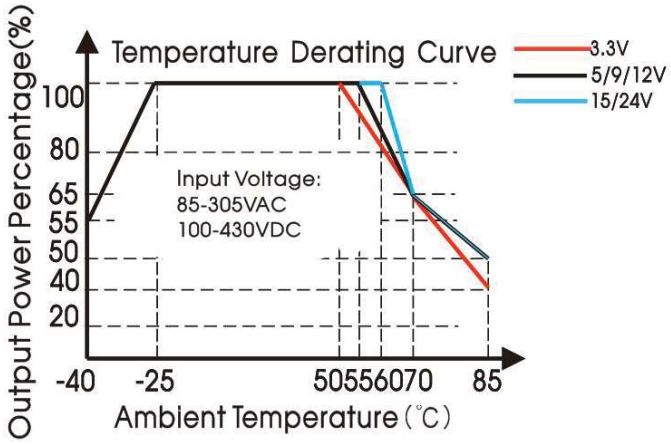


Fig. 1

Notes:

1. The "tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor.
2. When the output terminal of the product needs to be connected to PE through a Y capacitor, or close to the metal frame, please refer to the Fig. 8 for recommended circuit.
3. Unless otherwise specified, EMC performance indicators are tested according to typical application circuits (Fig. 6).
4. Use suffix "A2S" for chassis and suffix "A4S" for DIN-Rail mounting.
5. With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves.
6. This product is suitable for applications using natural air cooling.
7. We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.
8. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet.
9. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity < 75% with nominal input voltage and rated output load.
10. All index testing methods in this datasheet are based on our company corporate standards.
11. We can provide product customization service, please contact our technicians directly for specific information.
12. Products are related to laws and regulations: see "Features" and "EMC".
13. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

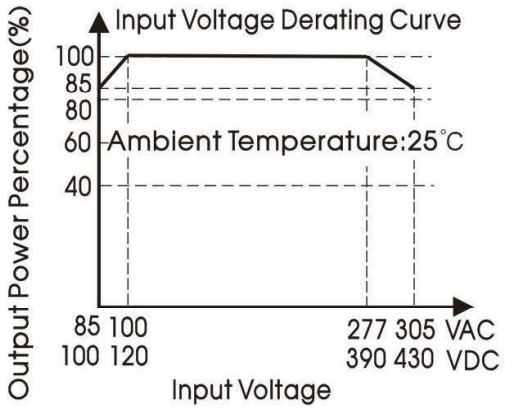


Fig. 2

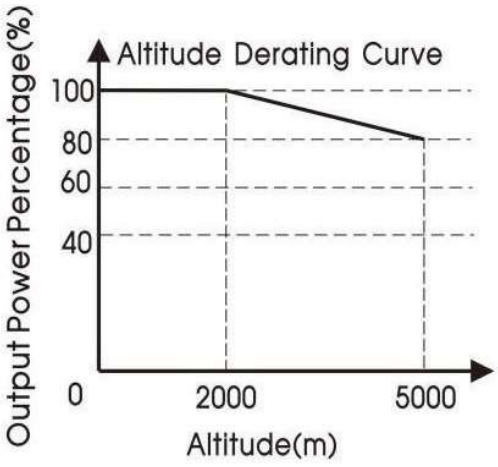


Fig. 3

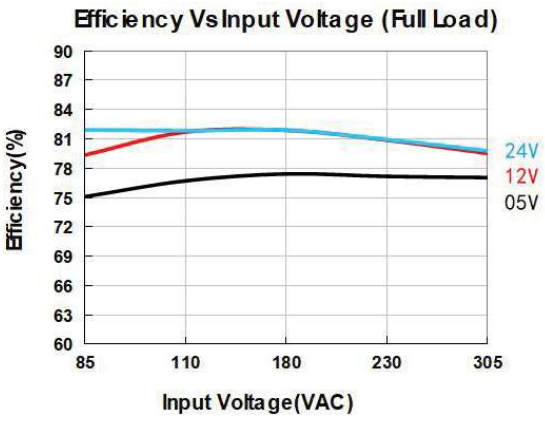


Fig. 4

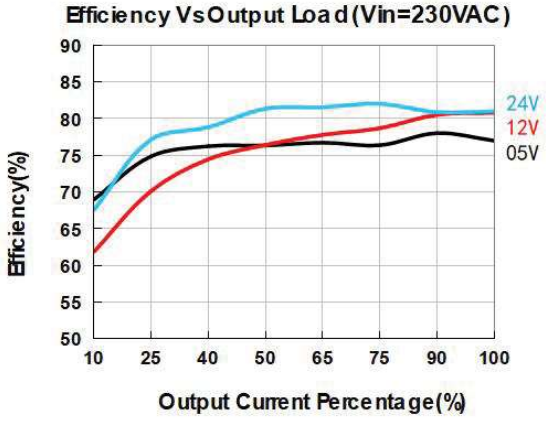


Fig. 5

Application Circuits

Typical circuit diagram

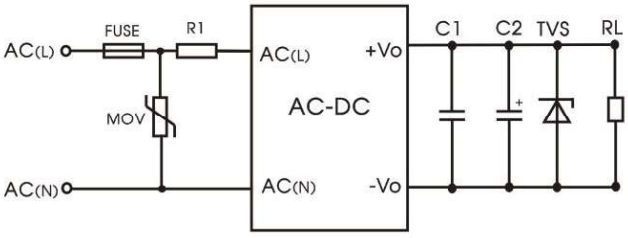


Fig. 6

Recommended Typical Circuit Parameter Value Table						
Part No.	C1(uF)	C2(uF)	FUSE	R1	TVS	MOV
MPM-05C-03	1	150	1A/300V, slow-blow, required	12Ω/3W (wire-wound resistor, required)	SMBJ7.0A	S10K350
MPM-05C-05		150			SMBJ7.0A	
MPM-05C-09		120			SMBJ12A	
MPM-05C-12		120			SMBJ20A	
MPM-05C-15		120			SMBJ20A	
MPM-05C-24		68			SMBJ30A	

EMC application circuit with higher requirements

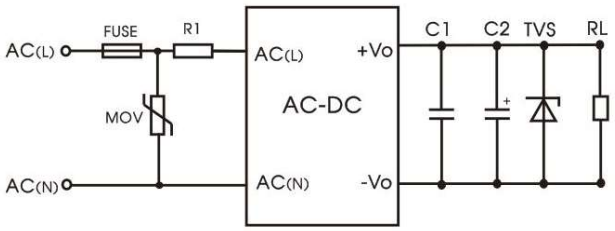


Fig. 7

EMC compliance recommended parameter Table	
Component	Recommended value
MOV	S14K350
R1	33Ω/3W (wire-wound resistor, required)
FUSE	2A/300V, slow-blow, required

Recommended circuit for class I equipment

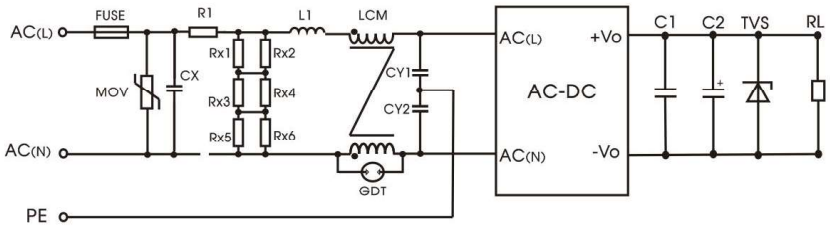


Fig. 8

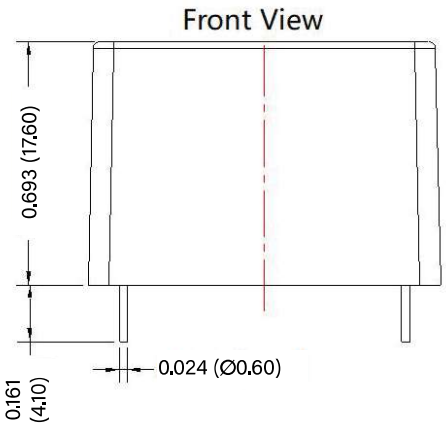
Recommended parameter value table for class I	
Component	Recommended value
FUSE	2A/300V, slow-blow, required
CX	334K/305VAC
R1	33Ω/3W (wire-wound resistor, required)
L1	1.2mH/0.3A
CY1/CY2	1nF/400VAC
GDT	300V/1KA
LCM	20 mH
Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ/150VDC.	

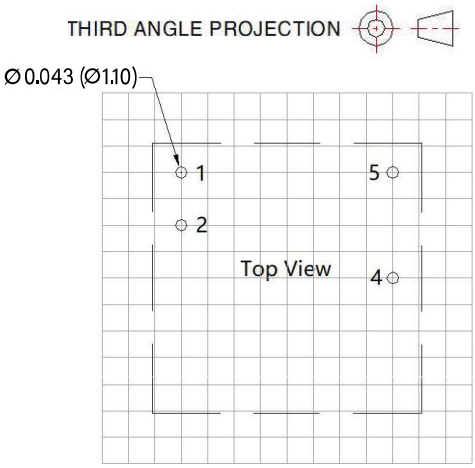
EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions (RE)	CISPR32/EN55032		B
Conducted Emissions (CE)	CISPR32/EN55032		B
ESD	IEC/EN61000-4-2	B	Contact ±6KV/Air ±8KV
RS	IEC/EN61000-4-3	A	10V/m
EFT	IEC/EN61000-4-4	B	±2KV
	IEC/EN61000-4-4	B	±4KV (See Fig. 7 for recommended circuit)
	IEC/EN61000-4-4	A	±4KV (See Fig. 8 for recommended circuit)
Surge	IEC/EN61000-4-5	B	line to line ±1KV
	IEC/EN61000-4-5	B	line to line ±2KV (See Fig. 7 for recommended circuit)
	IEC/EN61000-4-5	A	line to line ±2KV/line to PE ±4KV (See Fig. 8 for recommended circuit)
CS	IEC/EN61000-4-6	A	10Vr.m.s

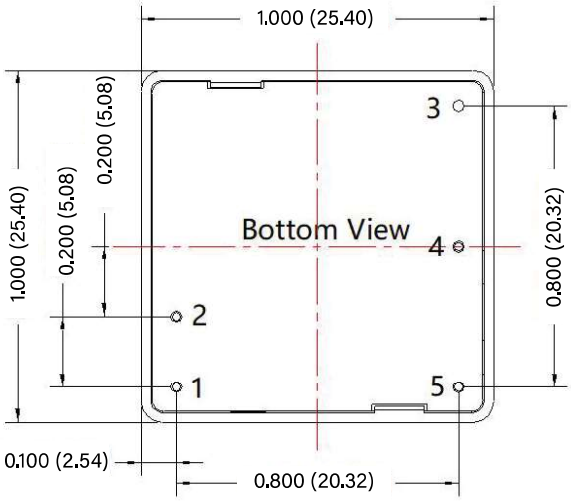
Mechanical Dimensions

Dimensions and Recommended Layout





The grid distance is 2.54 x 2.54 mm



Pin-Out	
Pin	**Function**
1	AC (N)
2	AC (L)
3	NO PIN
4	-Vo
5	+Vo

Note:
Unit: inches(mm)
Pin diameter tolerances: ±0.004 (±0.10)
General tolerances: ±0.020 (±0.50)

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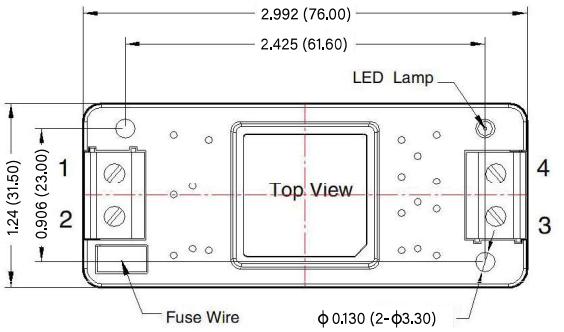
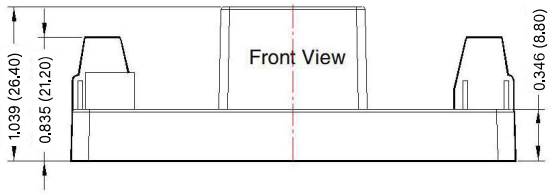
A2S Dimension



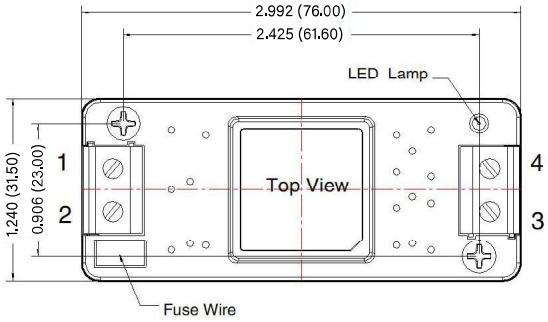


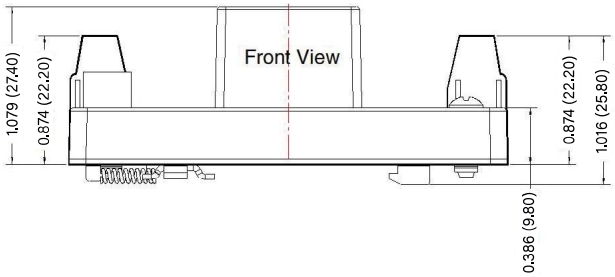
THIRD ANGLE PROJECTION

Pin-Out	
Pin	**Function**
1	AC (N)
2	AC (L)
3	-Vo
4	+Vo

Note:
Unit: inches(mm)
Wire range: 24-12 AWG Tightening torque: Max 0.4 N·m General Tolerances: ±0.039 (±1.00)

A4S Dimension





THIRD ANGLE PROJECTION

Pin-Out	
Pin	**Function**
1	AC (N)
2	AC (L)
3	-Vo
4	+Vo

Note:
Unit: inches(mm)
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m Mounting rail: TS35, rail needs to connect saftey ground
General Tolerances: ±0.039 (±1.00)