

MPM-05C

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



Key Features:

- 5W Output Power
- 85-305 VAC Input
- 4,000 VAC Isolation
- Compact Size
- Efficiency to 81.5%
- -40°C to +85°C Temp
- Meets EN 55032 B
- >2,602 kHour MBTF
- Reinforced Insulation
- UL Approval

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	VDC
Input Frequency		47		63	Hz
Inrush Current (Cold Start)	115 VAC		15		A
	230 VAC		25		
Leakage Current	277 VAC / 50Hz			0.25	mA RMS
Recommended External Input Fuse	Select based on application	1A, Slow-Blow, Required			

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 (20 MHz) - See Note 1			50	100	mV P - P
Standby Power Consumption	230 VAC		0.1		W
Hold-Up Time	115 VAC		5		ms
	230 VAC		50		
Temperature Coefficient	3.3/5VDC output		±0.02	7.5	% / °C
				15	
				16	
				20	
Over Voltage Protection	15VDC output			20	VDC
	24VDC output			30	
Over Load Protection		130			%Io
Short Circuit Protection	Hiccup Mode (Autorecovery)				
Switching Frequency			65		kHz

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	See Note 5	4,000			VAC

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Page 4	CISPR32/EN 55032		Class B
Conducted Emissions	CISPR32/EN 55032		Class B

Environmental

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

Physical

Case Size	1 x 1 x 0.69 in (See Mechanical Drawing on Page 5 & 6)				
Case Material	Flame Retardant, Non-Conductive, Black Plastic (UL94-V0)				
Weight	0.62 oz (17.5g) (See Mechanical Drawing on Page 5 & 6)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2,602			MHours
Safety Standards	UL/cUL 62368-1 Recognition (UL Certificate)				
Lead Temperature	Wave, 5 - 10s			260	°C
	Manual, 3 - 5s			360	



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Model Selection Guide

Model Number	Input		Output			Output Capacitive Load (μ F Max)	Efficiency (% Typ)
	Current (mA)		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

Notes:

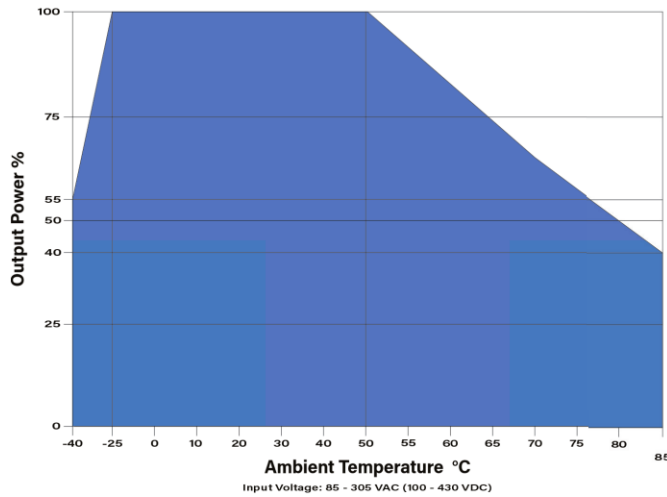
1. The "tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor.
2. Unless otherwise specified, EMC performance indicators are tested according to typical connection circuit on page 4.
3. When the output terminal of the product needs to be connected to PE through a Y capacitor, or close to the metal frame, please refer to "EMI Connection for Class I Equipment."
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. For the **MPM-05C** series, an external input fuse is required. A 1A/300 VAC slow blow is recommended, however, the actual application environment may require a different value. See the application notes on pages 4 and 5 for suggested sizes.

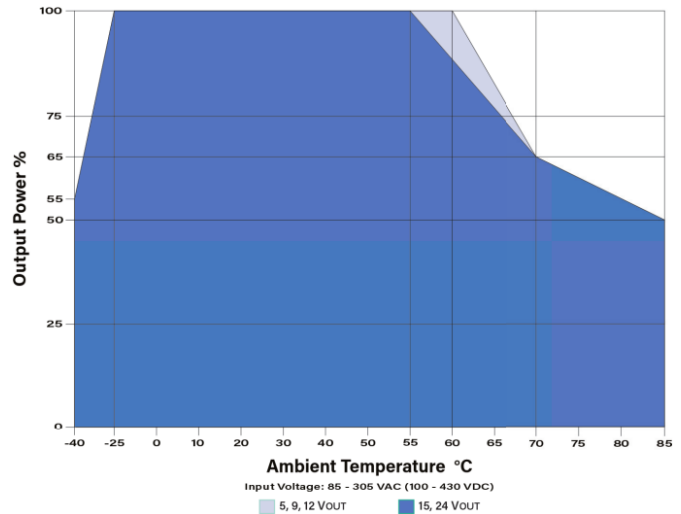
For the A2S adapter board option, add the suffix "-A2S" to the model number (i.e. **MPM-05C-03-A2S**). See Page 6.

For the A4S adapter board option, add the suffix "-A4S" to the model number (i.e. **MPM-05C-03-A4S**). See Page 6.

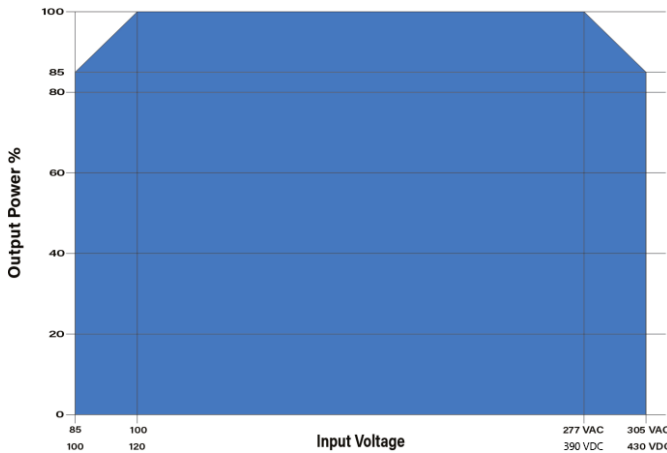
Temperature Derating: 3.3 VOUT



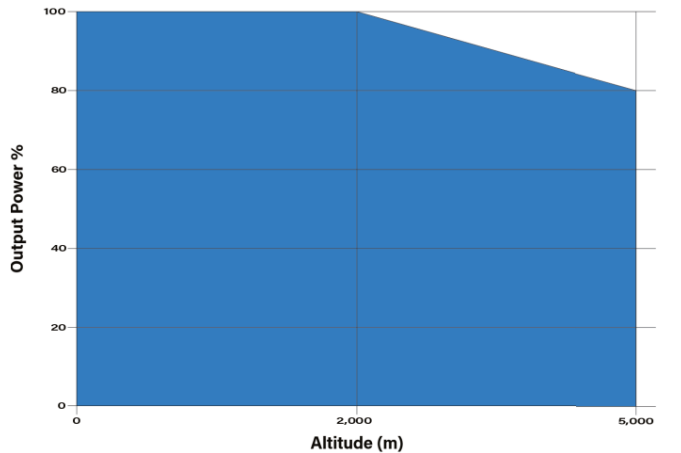
Temperature Derating: All Other Outputs



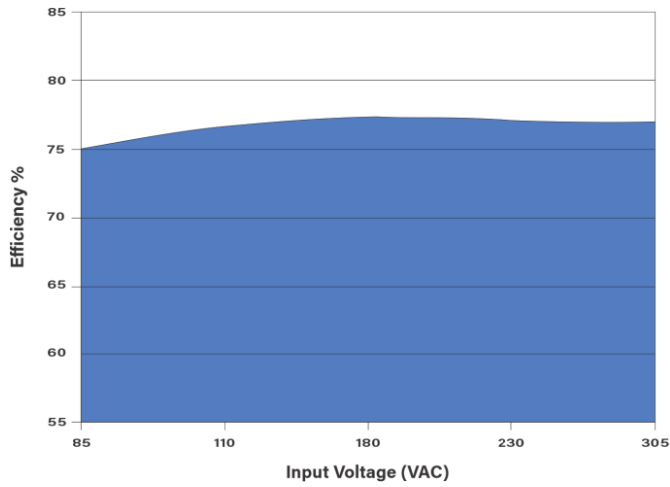
Input Voltage Derating



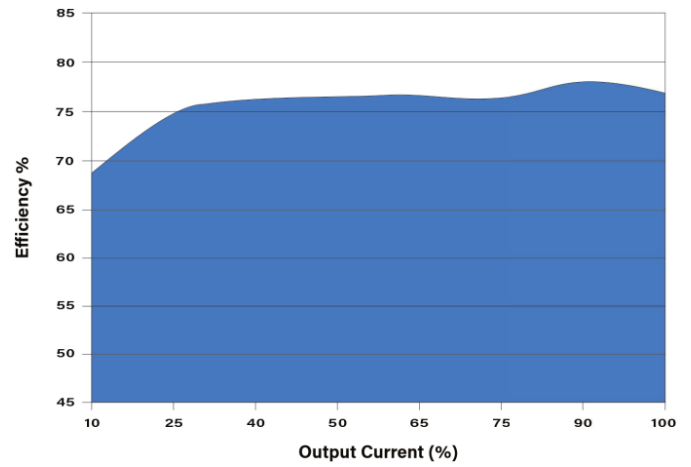
Altitude Derating



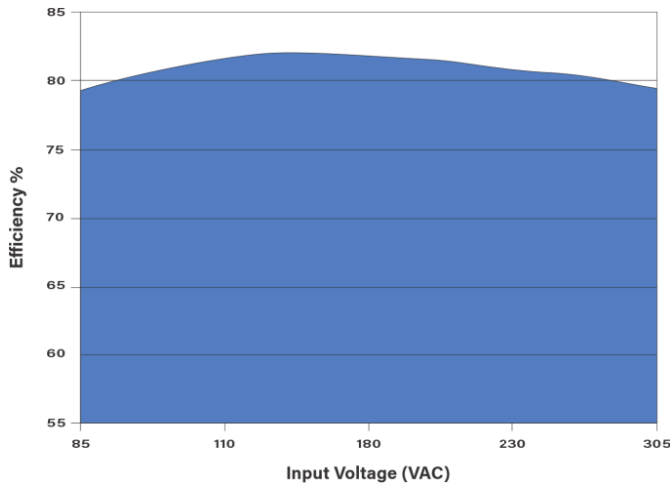
Efficiency vs Input Voltage: 5 VOUT Models



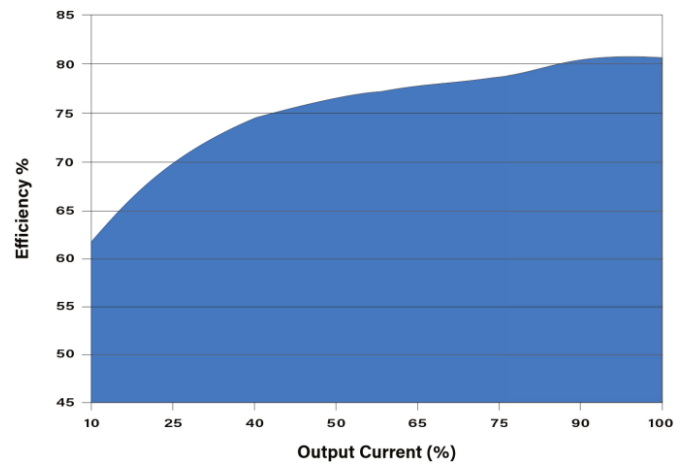
Efficiency vs Output Load: 5 VOUT Models



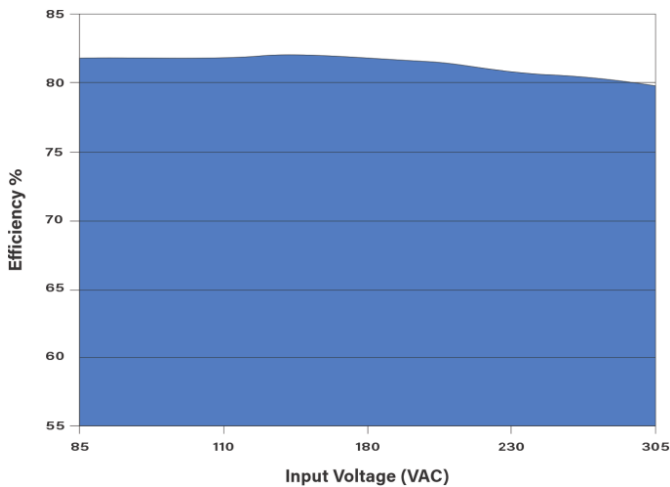
Efficiency vs Input Voltage: 12 VOUT Models



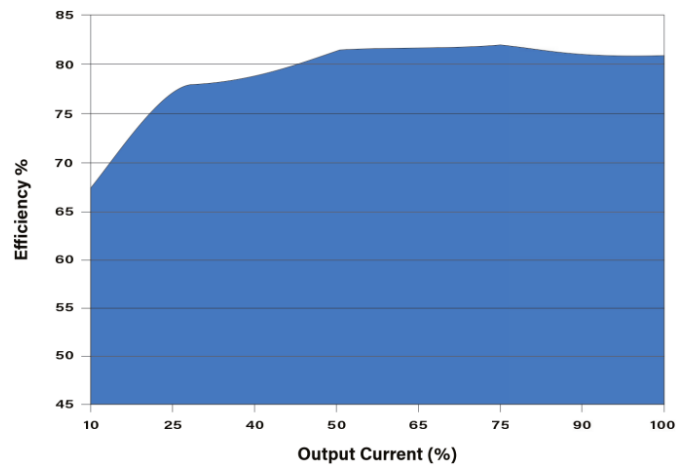
Efficiency vs Output Load: 12 VOUT Models



Efficiency vs Input Voltage: 24 VOUT Models



Efficiency vs Output Load: 24 VOUT Models



EMI Characteristics

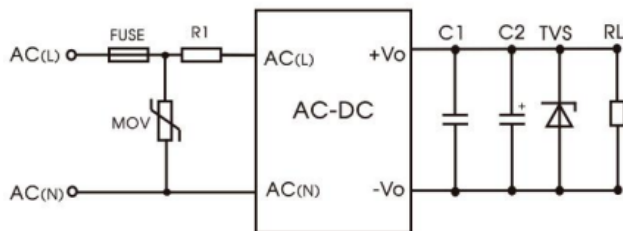
Parameter	Standard	Criteria	Level
Radiated Emissions (RE)	CISPR32/EN55032		B
	EN55014-1		
Conducted Emissions (CE)	CISPR32/EN55032		B
	EN55014-1		
ESD	IEC/EN61000-4-2	B	Contact $\pm 6KV$ /Air $\pm 8KV$
	EN55014-2	B	
RS	IEC/EN61000-4-3	A	10V/m
	EN55014-2	A	
EFT	IEC/EN61000-4-4	B	$\pm 2KV$
	IEC/EN61000-4-4	B	$\pm 4KV$
	IEC/EN61000-4-4	A	$\pm 4KV$
	IEC/55014-2	B	
Surge	IEC/EN61000-4-5	B	line to line $\pm 1KV$
	IEC/EN61000-4-5	B	line to line $\pm 2KV$
	IEC/EN61000-4-5	A	line to line $\pm 2KV$ /line to PE $\pm 4KV$
	EN55014-2	B	
CS	IEC/EN61000-4-6	A	10 Vr.m.s
	IEC/EN55014-2	A	
Voltage dips, Shorts, Interruptions	IEC/EN61000-4-11	B	0%, 70%
	EN55014-2	B	

Notes:

- To meet the requirements of CISPR32/EN55032 Class B, for Class II equipment, use the "Typical Connection" or the "EMI Connection for Class II Equipment" as shown below. Contact the factory for more information.
- To meet the requirements of IEC/EN61000-4-4 (± 2 kV, Criteria B), use the "Typical Connection" as shown below. To meet EN61000-4-4 (± 4 kV, Criteria B) use the "EMI Connection for Class II Equipment" as shown below.
- To meet the requirements of IEC/EN61000-4-4 (± 4 kV, Criteria A), use the "EMI Connection for Class I Equipment" as shown at the top of page 5. Contact the factory for more information.
- To meet the requirements of IEC/EN61000-4-5 (± 2 kV line to line, Criteria B), use the "Typical Connection" as shown below. Contact the factory for more information.
- To meet the requirements of IEC/EN61000-4-5 (± 2 kV line to line, Criteria B), use the "EMI Connection for Class II Equipment" as shown below. Contact the factory for more information.
- To meet the requirements of IEC/EN61000-4-5 (± 2 kV line to line / ± 4 kV line to ground, Criteria A), use the "EMI Connection for Class I Equipment" as shown at the top of page 5.
- To meet the requirements of CISPR32/EN55032 Class B, for Class I equipment, use the "EMI Connection for Class I Equipment" as shown at the top of page 5. Contact the factory for more information.

Application Circuits

Typical Connection Diagram

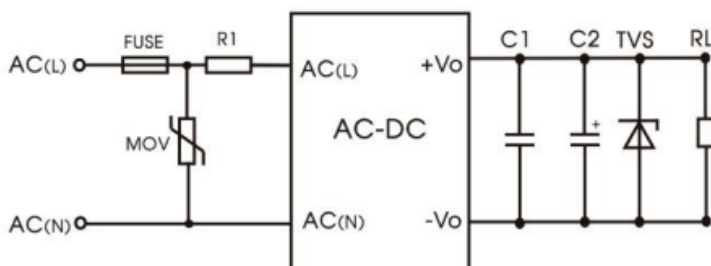


Part No.	C1 (uF)	C2 (uF)	Fuse	R1	TVS	MOV
MPM-05C-03	1	150	1A/ 300V, slow-blow, req.	12 Ω / 3W, wire-wound resistor, req.	SMBJ7.0A	S10K350
MPM-05C-05		150			SMBJ7.0A	
MPM-05C-09		120			SMBJ12A	
MPM-05C-12		120			SMBJ20A	
MPM-05C-15		120			SMBJ20A	
MPM-05C-24		68			SMBJ30A	

Output Filter Components:

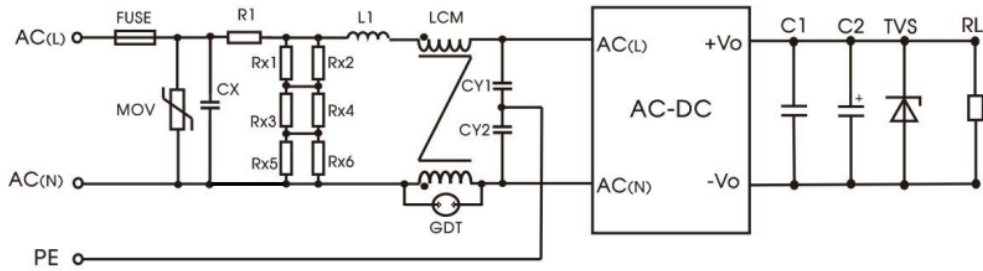
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2. Choose a capacitor voltage rating with at least 20% margin. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

EMI Connection for Class II Equipment



Component	Recommended Value
FUSE	2A/300V, slow-blow, required
MOV	S14K350
R1	33 Ω /3W (wire-round resistor)

EMI Connection for Class I Equipment

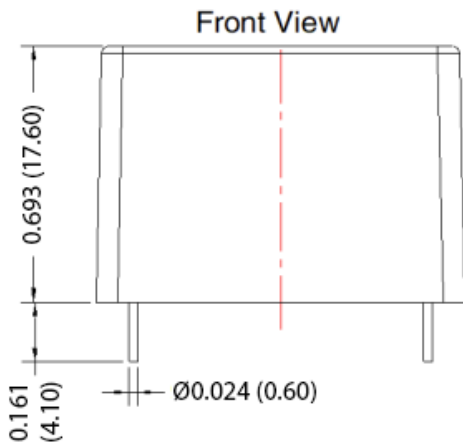


(Recommended when the output terminal of the product needs to be connected to PE or connected to PE through a Y capacitor)

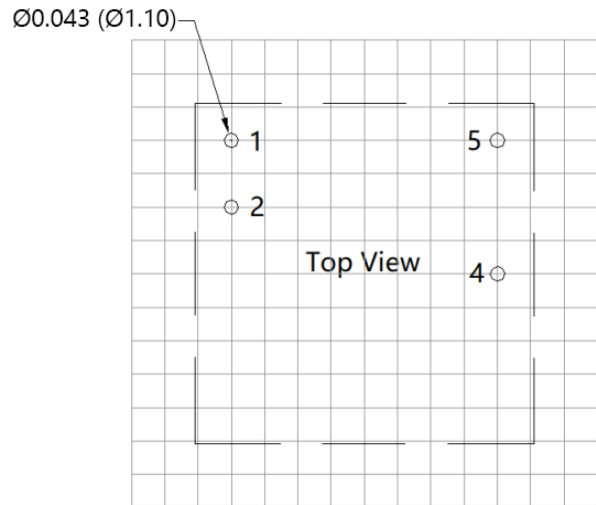
Component	Recommended Value
FUSE	2A/300V, slow-blow, required
CX	334K/305VAC
R1	3Ω/3W (wire-round resistor)
L1	1.2mH/0.3A
CY1/CY2	1nF/400VAC
GDT	300V/1KA
LCM	20 mH

Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ/150VDC.

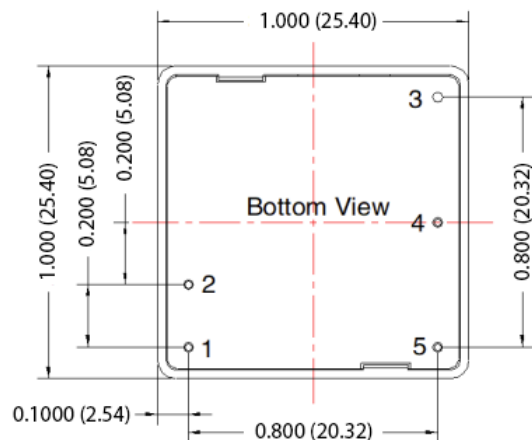
Mechanical Diagrams



THIRD ANGLE PROJECTION



Note: Grid 0.1 * 0.1 in



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

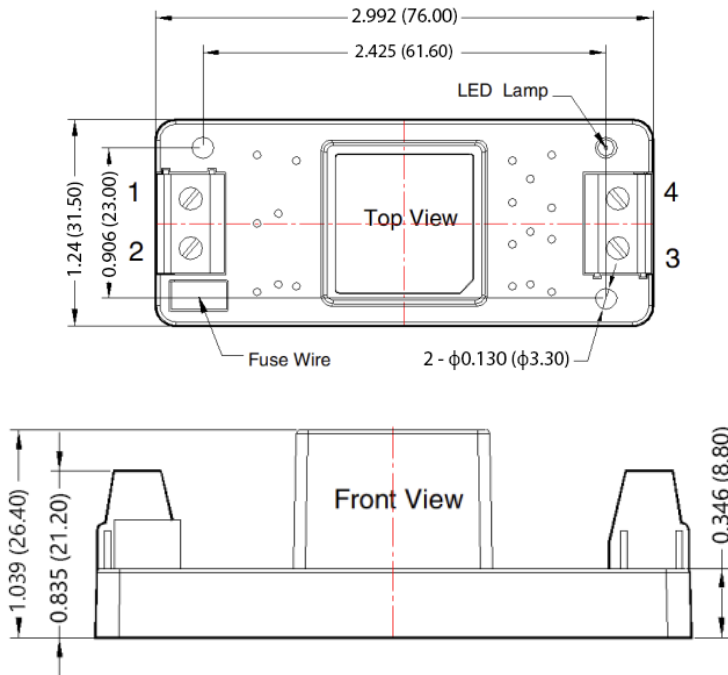
Notes:

- All dimensions are typical in inches (mm)
- Pin diameter tolerances: ±0.004 (±0.10)
- General tolerances: ±0.020 (±0.50)

Weight:

- Standard DIP Package: 0.62 oz (17.5g)

A2S Chassis Mechanical Diagram



THIRD ANGLE PROJECTION

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

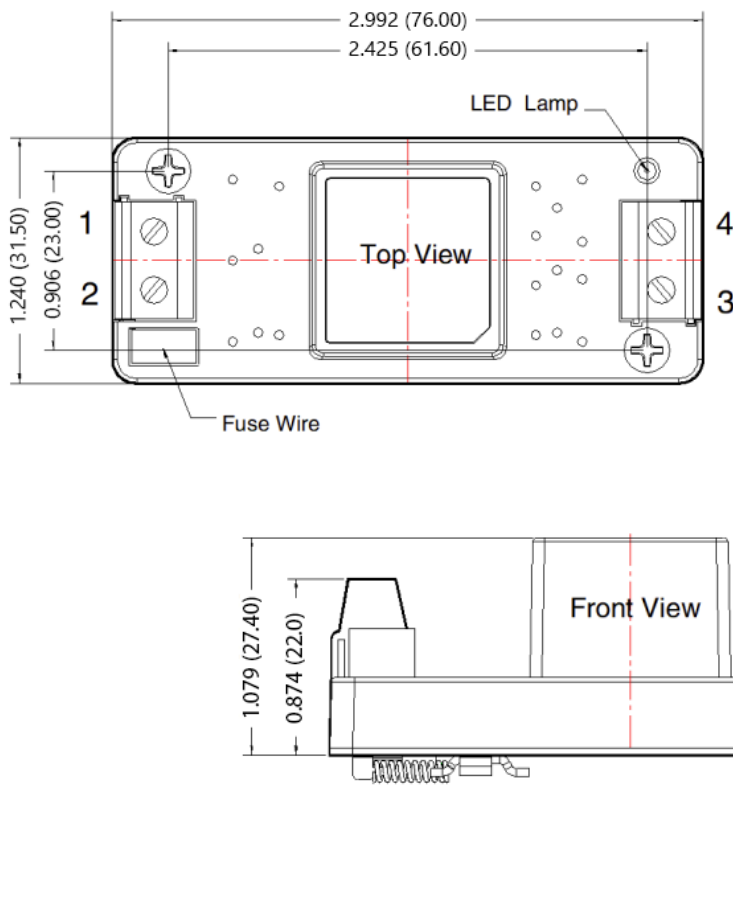
Notes:

- All dimensions are typical in inches (mm)
- Wire range: 24-12 AWG
- Tightening torque: Max 0.4 N·m
- General tolerances: ± 0.039 (± 1.00)

Weight:

- A2S Chassis: 1.34 oz (38.0g)

A4S Din-Rail Mechanical Diagram



THIRD ANGLE PROJECTION

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

Notes:

- All dimensions are typical in inches (mm)
- Wire range: 24-12 AWG
- Tightening torque: Max 0.4 N·m
- General tolerances: ± 0.039 (± 1.00)

Weight:

- A4S Din-Rail: 2.05 oz (58.0g)