

MPS-03 Series

Single Output, 3W Ultra-Miniature SIP AC/DC Power Supplies



Key Features:

- 3W Output Power
- Universal 85-264 VAC Input
- 100 - 400 VDC Input
- Meets IEC Safety Class II
- -40°C to +85°C Operation
- Single Regulated Output
- >200 kHour MTBF
- Ultra-Miniature SIP Case

RoHS



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	See Note 1	85		264	VAC
		100		400	VDC
Input Frequency		47		63	Hz
Input Current	See Model Selection Guide				
Inrush Current, See Note 1	115 VAC		10		A
	230 VAC		20		
Leakage Current				50	µA

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage	See Model Selection Guide				
Output Current	See Model Selection Guide				
Output Voltage Accuracy			±2.0		%
Line Regulation	V _{IN} = 10% to 100%		±0.5		%
Load Regulation	See Note 2		±1.0		%
Ripple & Noise (20 MHz)	3.3V And 5V Output Models		50		mV Pk - Pk
	All Other Models		100		
Hold Time, See Note 1	115 VAC	16			mS
	230 VAC	40			
Temperature Coefficient			±0.02		%/°C
Short Circuit Protection	Continuous (Autorecovery)				
Over Temperature Protection	See Note 3			150	°C

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input to Output	2,000			VAC
Switching Frequency			100		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Operating Temperature Range	Case			+90	°C
Storage Temperature Range		-40		+105	°C
Cooling	Free Air Convection (See Derating Curve)				
Humidity	RH, Non-condensing			85	%

Physical

Case Size	1.34 x 0.42 x 0.87 Inches (34.0 x 10.6 x 22.5 mm)				
Case Material	Non-Conductive Epoxy (UL94-V0)				
Weight	1.24 Oz (35g)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	200			kHours
Safety Class	IEC 61140 Class II				

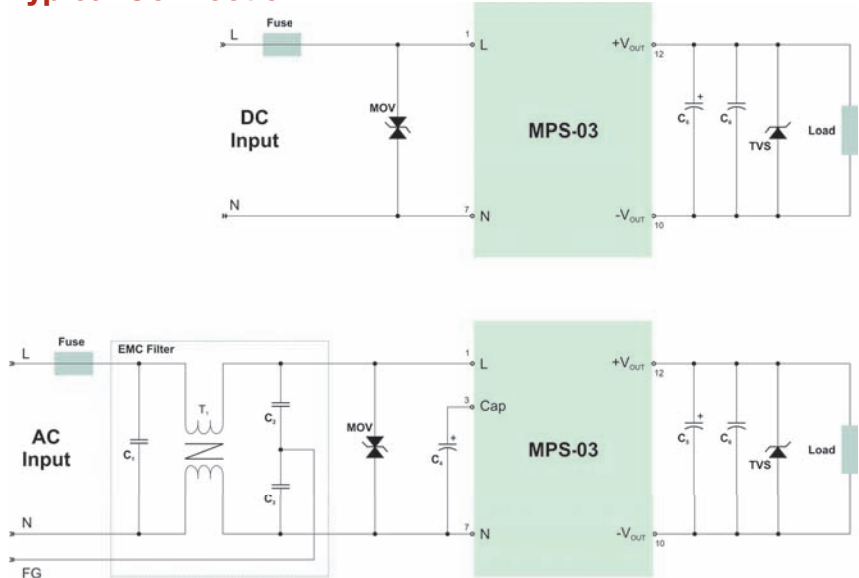
Model Selection Guide

Model Number	Input		Output		Efficiency (% Typ)
	Current (mA)	Voltage (VDC)	Current (mA)		
MPS-03S-03	40	3.3	500		63
MPS-03S-05	40	5.0	500		72
MPS-03S-09	40	9.0	330		74
MPS-03S-12	40	12.0	250		76
MPS-03S-15	40	15.0	200		76
MPS-03S-24	40	24.0	125		78

Notes:

- Specified with a C4 (see typical connection diagram at right) value of 22 $\mu\text{F}/400\text{V}$. A high frequency, low impedance electrolytic capacitor should be used.
- Load regulation is measured for an output change of 10% to 90% at nominal input line. For multiple output models, the loads are balanced.
- The unit will shut down when the over temperature protection is triggered. The unit will restart when the ambient operating temperature falls below 85°C.
- It is recommended that a fuse be used on the input of a power supply for protection. For the **MPS-03** series, a 0.5A/250V VAC slow blow should be used.

Typical Connection



The diagram above illustrates a typical application connection of the **MPS-03** series. The top diagram illustrates a DC/DC converter connection while the bottom diagram shows the unit connected as an AC/DC power supply. Notes on these circuits are:

- To maintain clearance and creepage distances (for Class I & Class II devices) the board layout should guarantee the following spacing between the L and N inputs (before the fuse):

Clearance - 2 mm
Creepage - 2.5 mm

- The recommended fuse is a 0.5A/250V slow blow.
- For EMI sensitive applications, the input filtering circuit (inside the dotted boxes of the AC circuit) may be added. The filter consists of:

Cx: Capacitor C₁ is 0.1 $\mu\text{F}/275\text{V}$

Cy: Capacitors C₂ and C₃ are 220 pF/2000V

T₁: Common mode choke, UU9.8 or ring core. Inductance is about 10 mH to 30 mH & wire diameter of 0.22 mm.

- The MOV is required for surge protection. Recommended is a 471KD07.

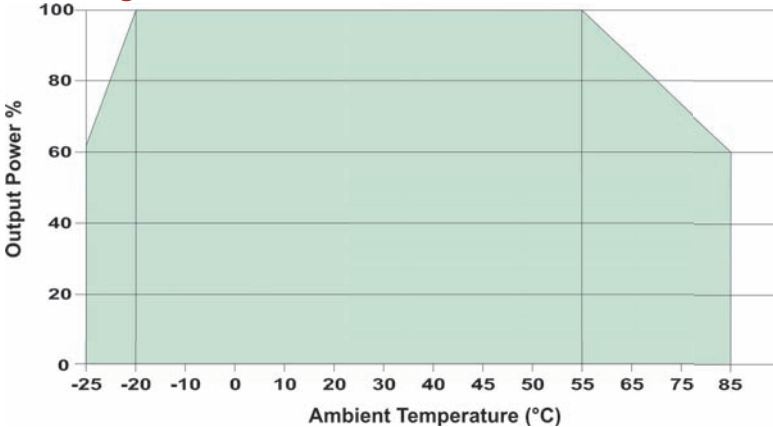
- The input storage capacitor (C₄) is a low ESR electrolytic with a rating of 22 $\mu\text{F}/400\text{V}$. This capacitor must be used for operation with an AC input.

- The output filtering capacitor (C₅) is a high frequency, low resistance electrolytic capacitor. A ceramic capacitor (C₆) is used to filter high frequency noise. Recommended values are given in the table at right.

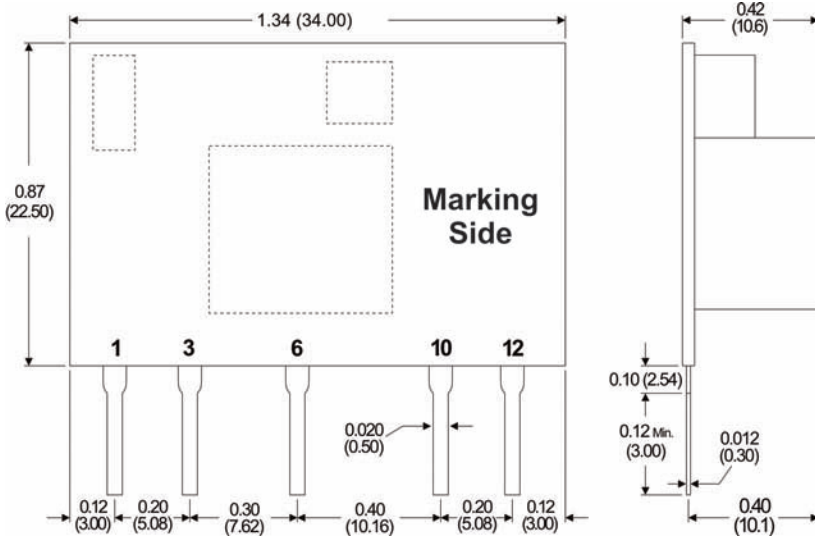
- The TVS is recommended to protect application circuitry in the event of a fault. Recommended values are given in the table above.

V _{OUT}	C ₅ ($\mu\text{F}/\text{N}$)	C ₆ ($\mu\text{F}/\text{N}$)	TVS
3.3	150/25	0.1/50	P4KE6.8A
5.0	150/25	0.1/50	P4KE6.8A
9.0	150/25	0.1/50	P4KE12A
12.0	150/25	0.1/50	P4KE20A
15.0	100/35	0.1/50	P4KE20A
24.0	100/35	0.1/50	P4KE33A

Derating Curve



Mechanical Dimensions



Pin Connections

Pin	Function
1	+Vin (AC-Line)
3	CAP
6	-Vin (AC-Neutral)
10	-Vout
12	+Vout

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ± 0.01 (± 0.25)



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