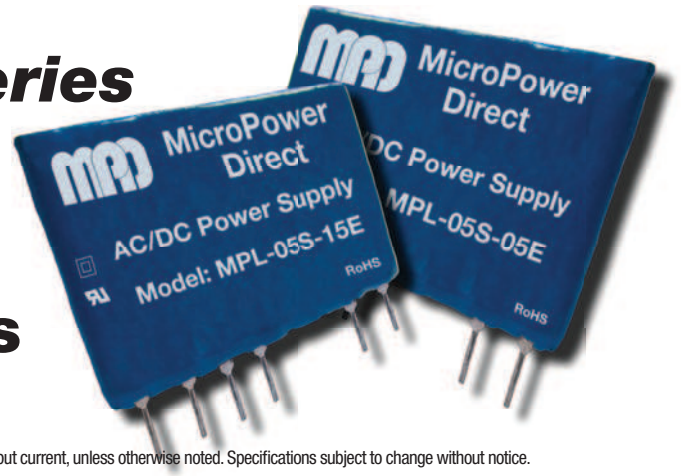


MPL-05SE Series

Single Output, 5W Ultra-Miniature SIP AC/DC Power Supplies



Key Features:

- 5W Output Power
- Universal 85-264 VAC Input
- EN 60950 Approved (UL)
- Meets IEC Safety Class II
- Single Regulated Output
- Meets EN 55022 Class A
- >300 kHour MTBF
- **Ultra-Miniature "SIP" Case**



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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		400	VDC
Input Frequency		47		63	Hz
Input Current	115 VAC		0.15		A
	230 VAC		0.20		A
Inrush Current	115 VAC		20.0		A Pk
	230 VAC		30.0		A Pk
Leakage Current				5.0	mA

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage	See Model Selection Guide				
Output Current	See Model Selection Guide				
Output Voltage Accuracy	See Model Selection Guide				
Line Regulation	V _{IN} = Min to Max		±0.5		%
Load Regulation	I _{OUT} = 10% to 100%		±1.5		%
Ripple & Noise (20 MHz)	3.3V, 24V Models		50	150	mV P-P
	All Other Models		50	120	mV P-P
Hold-Up Time	115 VAC		20		mSec
	230 VAC		80		mSec
Temperature Coefficient			±0.15		%/°C
Short Circuit Protection	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input to Output	3,000			VAC
Switching Frequency			100		kHz

EMI Characteristics

Parameter	Standard	Min.	Typ.	Max.	Units
Radiated Emissions	See Note 2 EN 55022				Class A
Conducted Emissions	See Note 2 EN 55022				Class A
ESD	EN 61000-4-2				Criteria B; ±4 kV Contact
RS	EN 61000-4-3				Criteria A; 10V/m
EFT	See Note 3 EN 61000-4-4				Criteria B; ±2 kV
Surge	See Note 4 EN 61000-4-5				Criteria B; ±2 kV / ±4 kV
CS	EN 61000-4-6				Criteria A; 3 Vrms
PFMF	EN 61000-4-8				Criteria A; 10A/m
Voltage Dips	EN 61000-4-11				Criteria B; 0% - 70%

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-25	+25	+85	°C
	Case			+100	°C
Storage Temperature Range		-40		+105	°C
Cooling	Free Air Convection (See Derating Curve)				
Humidity	RH, Non-condensing			85	%

Physical

Case Size	1.65 x 0.43 x 1.06 Inches (42.0 x 11.0 x 27.0 mm)
Case Material	Non-Conductive Epoxy (UL94-V0)
Weight	0.35 Oz (10g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	300			kHours
Safety Standards	EN 60950				
Safety Class	IEC 61140 Class II				

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Model Selection Guide

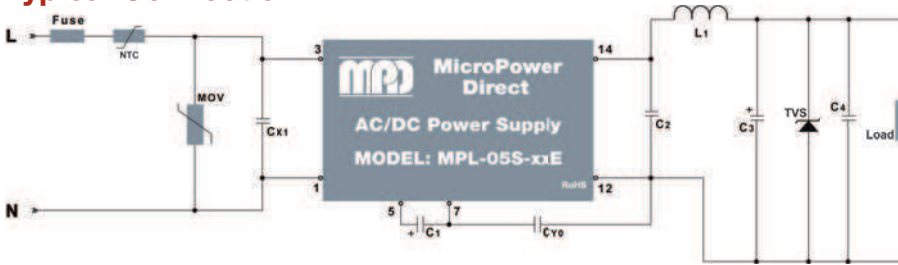
Model Number	Output		Output Voltage Accuracy (%)	Max Capacitive Load (μ F)	Efficiency (% , Typ)
	Voltage (VDC)	Current (mA Max.)			
MPL-05S-03E	3.3	1,000	\pm 2.0	1,000	65
MPL-05S-05E	5.0	1,000	\pm 1.0	1,500	70
MPL-05S-09E	9.0	560	\pm 1.0	630	72
MPL-05S-12E	12.0	420	\pm 1.0	470	74
MPL-05S-15E	15.0	340	\pm 1.0	330	75
MPL-05S-24E	24.0	210	\pm 1.0	100	75

Notes:

1. Operation at no load will not damage the units, however, they may not meet all specifications.
2. All units are rated for EN 55022 (CE/RE) class A with the addition of external components such as the typical circuit shown below. They will meet class B with the addition of the **ACFM-01** (or a similar discrete filter circuit). Contact the factory for more information.
3. To meet the requirements of EN 61000-4-4 (\pm 4 kV), external components are needed. This can be done discretely, or with the addition of the **ACFM-01**. Contact the factory for more information.
4. To meet the requirements of EN 61000-4-5 (\pm 4 kV/ \pm 4 kV), external components are needed. This can be done discretely, or with the addition of the **ACFM-01**. Contact the factory for more information.
5. It is recommended that a fuse be used on the input of a power supply for protection. For the **MPL-05SE** series, a 1.0A/250 VAC slow blow should be used.

Typical Connection

The diagram below illustrates a typical application connection of the **MPL-05SE** series. Notes on this circuit (starting with the input circuit) are:



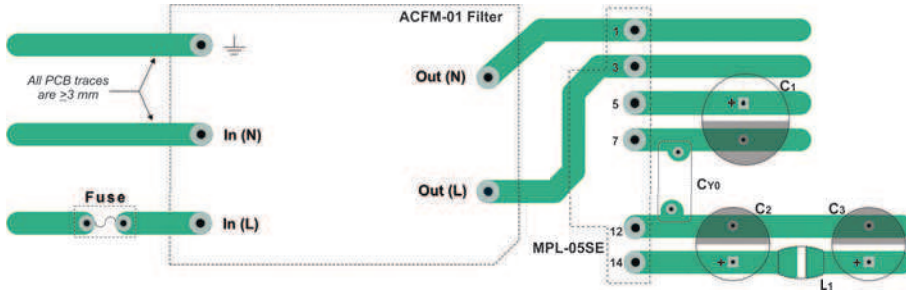
1. It is recommended that an external fuse and NTC be used. The recommended fuse is a 1.0A/250V slow blow and for the NTC, a 5D-9.
2. An external MOV is recommended on the input to protect the unit in the event of a surge. A 561KD14 or equivalent is recommended.
3. The filter capacitor C₁ is required for specified operation. The recommended value is 33 μ F/400V.
4. The safety capacitors (C_{x1} and C_{x0}) provide EMI/RFI suppression. Recommended values are 0.22 μ F/275 VAC (C_{x1}) and 1 nF/400 VAC (C_{x0}).
5. Recommended values for other components are:

Output	C ₂	L ₁	C ₃	C ₄	TVS
3.3V	470 μ F/16V	0.47 μ H	150 μ F/35V	100 nF/50V	SMBJ7.0A
5.0V	470 μ F/16V	0.47 μ H	150 μ F/35V	100 nF/50V	SMBJ7.0A
9.0V	330 μ F/35V	1.0 μ H	150 μ F/35V	100 nF/50V	SMBJ12A
12V	330 μ F/35V	1.0 μ H	150 μ F/35V	100 nF/50V	SMBJ20A
15V	330 μ F/35V	1.0 μ H	150 μ F/35V	100 nF/50V	SMBJ20A
24V	100 μ F/35V	4.7 μ H	47 μ F/35V	100 nF/50V	SMBJ30A

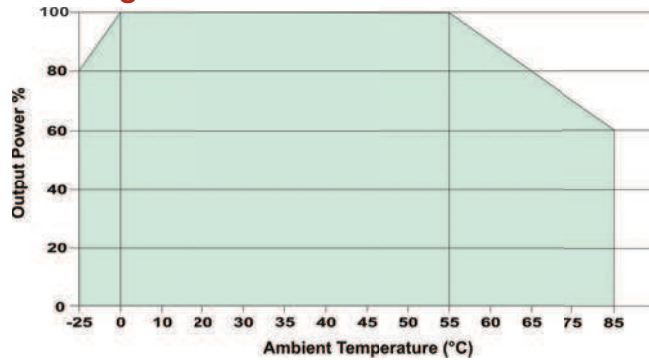
The output filtering capacitors (C₂, C₃) are high frequency, low resistance electrolytic capacitors. Capacitor (C₄) is ceramic. Voltage derating of capacitors should be 80% or above.

6. Input noise and surge suppression modules are available for a number of MPD AC/DC power supplies. An **MPL-05SE** connection with the **ACFM-01** is illustrated in the diagram at left. For pricing or full technical information on these modules (**ACFM-01** and **ACFM-02**) please contact the factory.

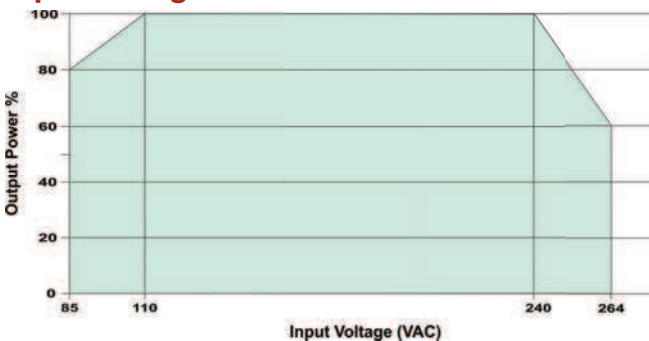
Typical Board Layout: With ACFM-01 Input Module (See note 6)



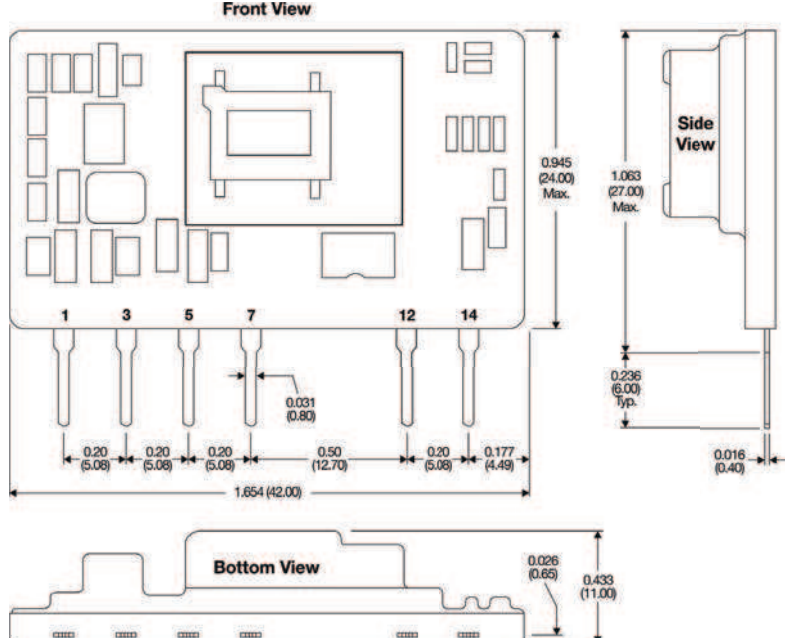
Derating Curve



Input Voltage Vs Load



Mechanical Dimensions



Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = \pm 0.02 (\pm 0.50)



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