

# MPL-01SE Series

## Single Output, 1W Ultra-Miniature SIP AC/DC Power Supplies



### Key Features:

- 1W 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	See Model Selection Guide				
Inrush Current	115 VAC		10.0		A Pk
	230 VAC		20.0		
Standby Power			0.3		W

#### Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage	See Model Selection Guide				
Output Current	See Model Selection Guide				
Output Voltage Accuracy, See Note 1	See Model Selection Guide				
Line Regulation	V <sub>IN</sub> = Min to Max		±1.5		%
Load Regulation	I <sub>OUT</sub> = 5% to 100%		±2.5		%
Ripple & Noise (20 MHz)	5V, 24V Models		100	150	mV P-P
	9V, 12V, 15V Models		80	120	
Hold-Up Time	230 VAC		50		mSec
Temperature Coefficient			±0.01		%/°C
Short Circuit Protection	Continuous (Autorecovery)				
Over Temperature Protection				150	°C

#### General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input to Output	3,000			VAC
Switching Frequency				50	kHz

#### EMI Characteristics

Parameter	Standard	Min.	Typ.	Max.	Units
Radiated Emissions	See Note 3 EN 55022				Class A
Conducted Emissions	See Note 3 EN 55022				Class A
ESD	EN 61000-4-2				Criteria B; ±4 kV Contact
RS	See Note 4 EN 61000-4-3				Criteria A; 10V/m
EFT	See Note 5 EN 61000-4-4				Criteria B; ±2 kV
Surge	See Note 6 EN 61000-4-5				Criteria B; ±1 kV /±2 kV
CS	See Note 7 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	-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	1.38 x 0.43 x 0.94 Inches (35.0 x 11.0 x 24.0 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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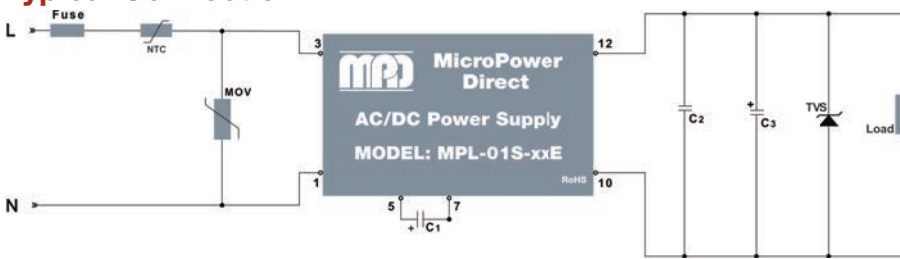
Model Number	Input		Output		Output Voltage Accuracy (%)	Efficiency (% Typ)
	Current (A)		Voltage (VDC)	Current (mA Max.)		
	115 VAC	230 VAC				
MPL-01S-05E	0.120	0.060	5.0	200	±5.0	66
MPL-01S-09E	0.120	0.060	9.0	111	±3.0	67
MPL-01S-12E	0.120	0.060	12.0	83.3	±3.0	70
MPL-01S-15E	0.120	0.060	15.0	66.6	±5.0	69
MPL-01S-24E	0.120	0.060	24.0	41.6	±5.0	68

Notes:

- For the 5V output model, accuracy is ±10% over the -40°C to +85°C temperature range.
- Operation at no load will not damage the units, however, they may not meet all specifications.
- All units are rated for EN 55022 (CE/RE) class A without external components. They will meet class B with the addition of the **ACFM-01** (or a similar discrete filter circuit). Contact the factory for more information.
- To meet the requirements of EN 61000-4-3, (10V/m) external components are needed. This can be done discretely, or with the addition of the **ACFM-01**. Contact the factory for more information.
- To meet the requirements of EN 61000-4-4 (±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.
- To meet the requirements of EN 61000-4-5 (±4 kV/±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.
- To meet the requirements of EN 61000-4-6 (3V rms), external components are needed. This can be done discretely, or with the addition of the **ACFM-01**. Contact the factory for more information.
- It is recommended that a fuse be used on the input of a power supply for protection. For the **MPL-01SE** series, a 1.0A/250 VAC slow blow should be used.

Typical Connection

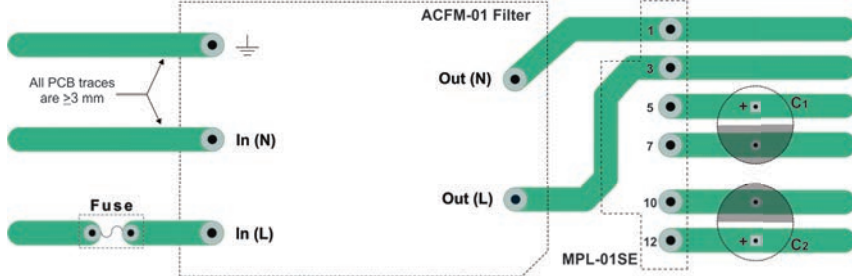
The diagram below illustrates a typical application connection of the **MPL-01SE** series. Notes on this circuit (starting with the input circuit) are:



- 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.
- An external MOV is recommended on the input to protect the unit in the event of a surge. A 561KD14 or equivalent is recommended.
- The filter capacitor C1 is required for EMC performance over the full input range. The recommended value is 10 to 22 µF/400V.
- Recommended output filtering capacitors are:

	C2	C3	TVS
MPL-01S-05E	1.0 µF/50V	470 µF/35V	SMBJ7.0A
MPL-01S-09E	1.0 µF/50V	150 µF/35V	SMBJ12A
MPL-01S-12E	1.0 µF/50V	150 µF/35V	SMBJ20A
MPL-01S-15E	1.0 µF/50V	150 µF/35V	SMBJ20A
MPL-01S-24E	1.0 µF/50V	100 µF/35V	SMBJ30A

Typical Board Layout: With ACFM-01 Input Module (See note 5)



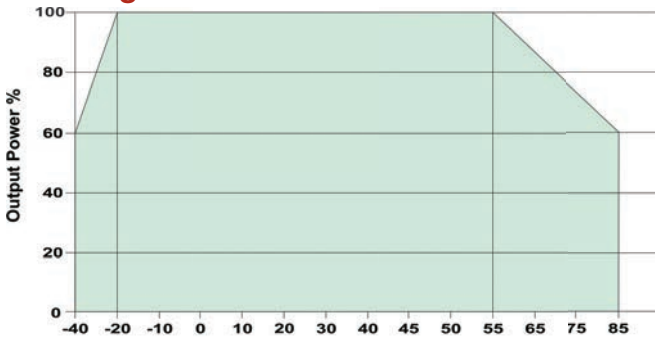
The output filtering capacitor (C3) is a high frequency, low resistance electrolytic capacitor. Capacitor (C2) is ceramic. Voltage derating of capacitors should be 80% or above.

- Input noise and surge suppression modules are available for a number of **MPD** AC/DC power supplies. An **MPL-01SE** 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.

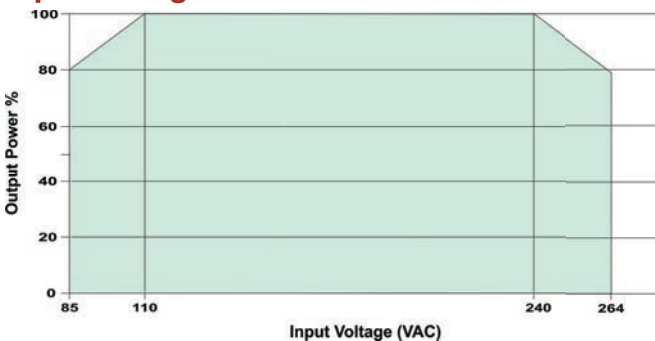
Pin Connections

Pin	Function	Pin	Function
1	AC-Neutral	7	-VCAP
3	AC-Line	10	-VOUT
5	+VCAP	12	+VOUT

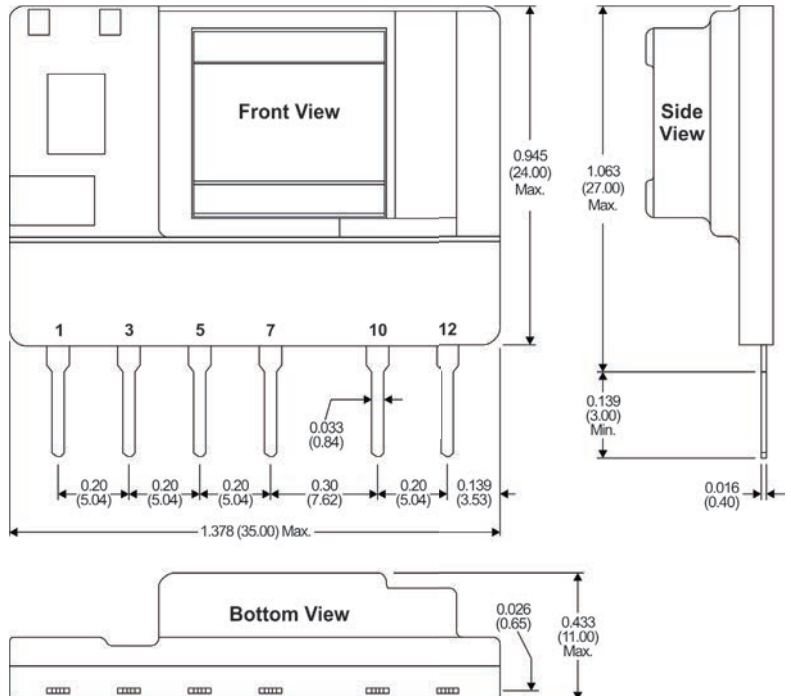
Derating Curve



Input Voltage Vs Load



Mechanical Dimensions



Notes:

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



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