

# MPV4080 Series

## PV Power, 40W 200 - 1500V Input DC/DC Converters



### Key Features:

- 40W Output Power
- 200 - 1500VDC Input Range
- 4,000 VAC Isolation
- Input Under Volt Protection
- Output Over Volt Protection
- Short Circuit Protection
- -40°C to +70°C Operation
- >300 kHours MTBF

RoHS



### 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		200		1,500	VDC
Input Start Voltage		180		195	VDC
Under Voltage Shutdown		170		185	VDC
Input Current	200 VDC Input			320	mA
	800 VDC Input			80	
	1500 VDC Input			42	
Inrush Current	200 VDC Input		30		A
	800 VDC Input		80		
	1500 VDC Input		150		
Start-Up Time				2.0	S

#### Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±2.0		%
Line Regulation	V <sub>IN</sub> = MIN to MAX		±1.0		%
Load Regulation	I <sub>OUT</sub> = 0% to 100%		±1.0		%
Ripple & Noise (20 MHz)	See Note 1		150	300	mV P - P
Temperature Coefficient			±0.02		%/°C
Over Power Protection	Autorecovery	120		320	%I <sub>OUT</sub>
Output Short Circuit	Continuous (Autorecovery)				

#### General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	4,000			VAC
Switching Frequency			65		kHz

#### EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Note 2	EN 55022		Class A
Conducted Emissions, See Note 2	EN 55022		Class A
ESD	EN 61000-4-2	B	±6 kV/±8
RS	EN 61000-4-3	A	10V/m
EFT, See Note 3	EN 61000-4-4	B	±2 kV
Surge, See Note 4	EN 61000-4-5	B	±1 kV
CS	EN 61000-4-6	A	10 Vrms
PFM	EN 61000-4-8	A	10 A/m

#### Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+70	°C
Storage Temperature Range		-40		+85	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

#### Physical

Case Size	See Mechanical Drawings (Page 3)				
Case Material	Black, Flame Retardant, Non-Conductive Plastic (UL94-V0)				
Weight	14.54 Oz (410g)				

#### Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	300			kHours

#### Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Lead Temperature, See Note 5	Wave Soldering (5-10S)	255	260	265	°C
	Manual Soldering (3-5S)	350	360	370	

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

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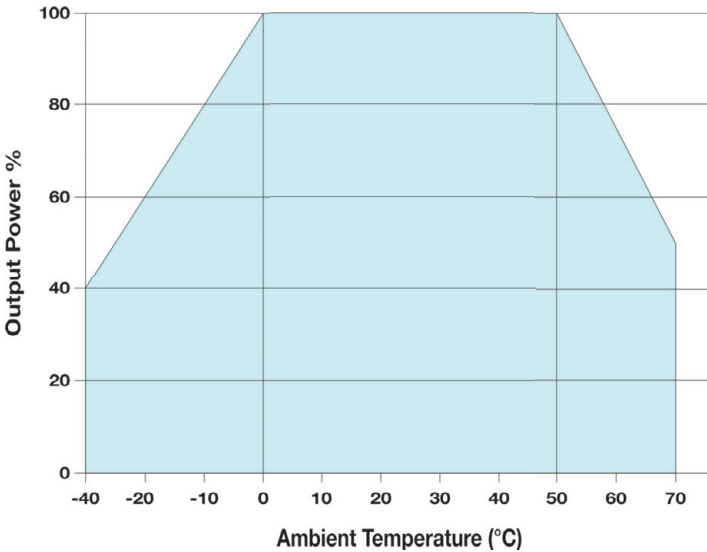
www.micropowerelectronics.com

Model Number	Input		Output			Efficiency (% Typ)	Over Voltage Protection (VDC Typ)	Capacitive Load ( $\mu$ F, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range							
MPV4080S-12RHI	800	200 - 1500	12.0	3,330	0.0	76	20.0	3,000	15A/1,500 VDC
MPV4080S-15RHI	800	200 - 1500	15.0	2,670	0.0	78	20.0	1,500	15A/1,500 VDC
MPV4080S-24RHI	800	200 - 1500	24.0	1,670	0.0	80	30.0	680	15A/1,500 VDC

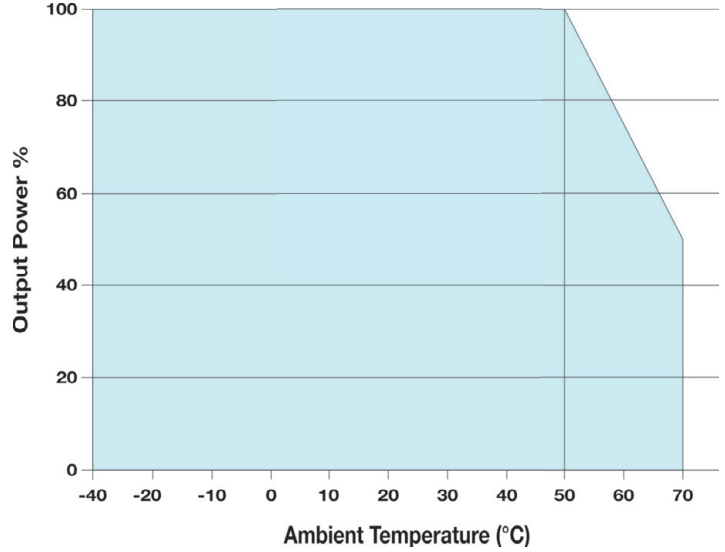
**Notes:**

1. To meet the specified ripple and noise levels, external capacitors are required. See the typical connection information on page three for recommended values. For more information, please contact the factory.
2. All units will meet EN 55022 (CE/RE) class A with the input circuit shown in the "Typical Connection 2" diagram on page 3. Contact the factory for more information.
3. All units will meet EN 61000-4-4 ( $\pm 2$  kV) with the input circuit shown in the "Typical Connection 2" diagram on page 3. Contact the factory for more information.
4. All units will meet the requirements of EN 61000-4-5 ( $\pm 1$  kV), with the input circuit shown in the "Typical Connection 2" diagram on page 3. Contact the factory for more information.
5. Lead temperature is measured 1.5 mm from the case.
6. Operation at no load will not damage the units, however, they may not meet all specifications.
7. It is recommended that a fuse be used on the input of a power supply for protection. For the **MPV4080-xxRHI** series, a 15A/1,500 VDC slow blow should be used.

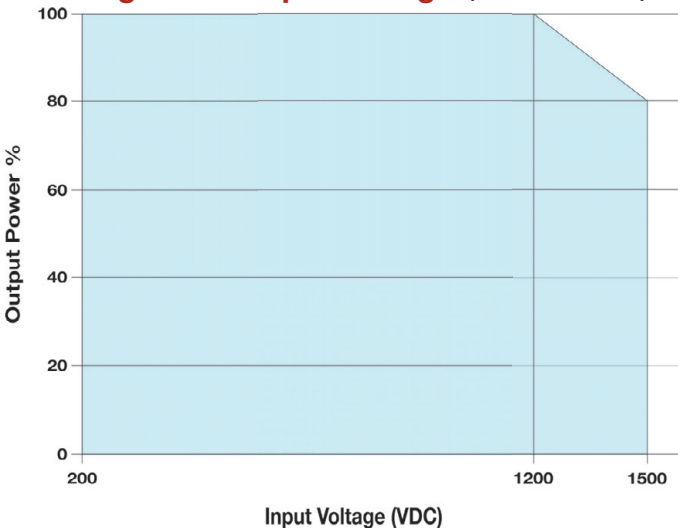
**Derating Curve: Temperature (Input = 200 - 300 VDC)**



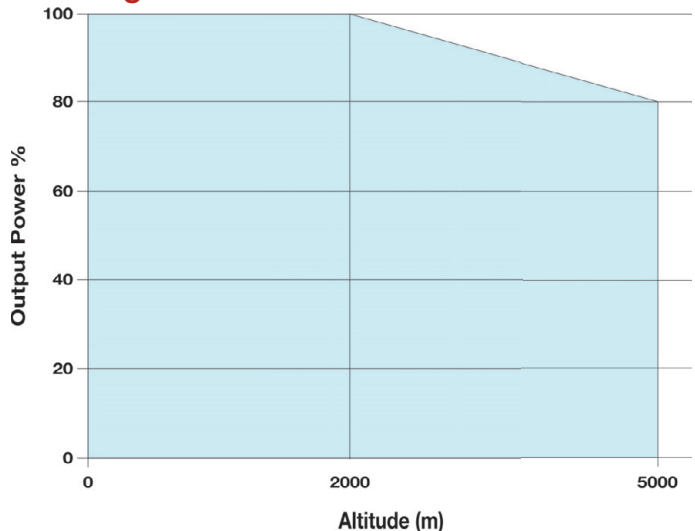
**Derating Curve: Temperature (Input = 300 - 1500 VDC)**



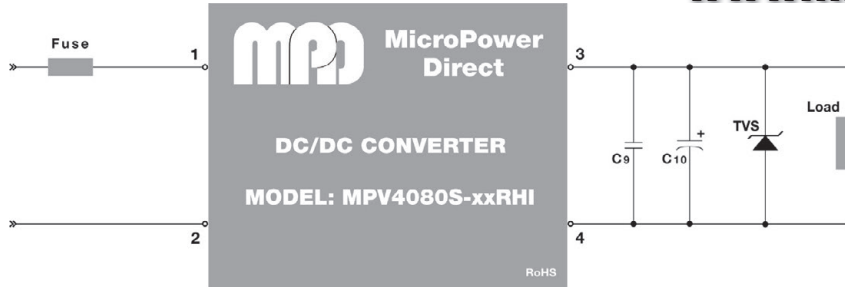
**Derating Curve: Input Voltage (At 25°C Ambient)**



**Derating Curve: Altitude**



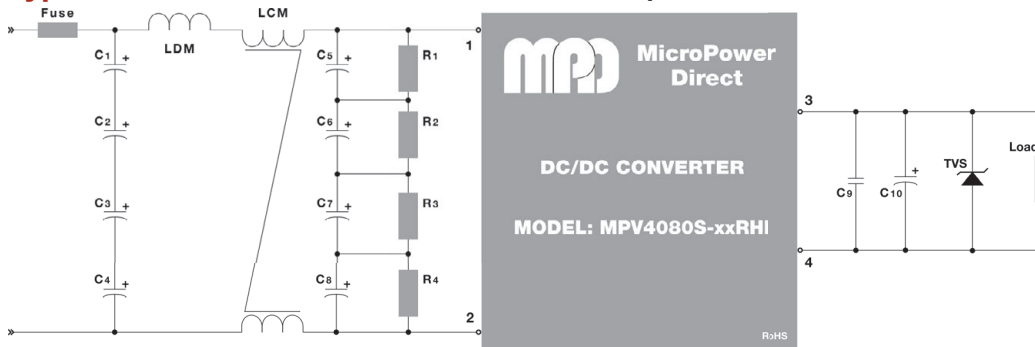
### Typical Connection 1



The diagram at left illustrates a typical connection of the **MPV4080S-xxRHI** series. Output capacitors  $C_9$  and  $C_{10}$  are filtering components. Capacitor  $C_9$  is a ceramic and  $C_{10}$  is a high frequency, low resistance electrolytic. The TVS is recommended to protect circuit components if there is a fault with the converter.

The recommended component values are given in the table below.

### Typical Connection 2: With External EMC Components



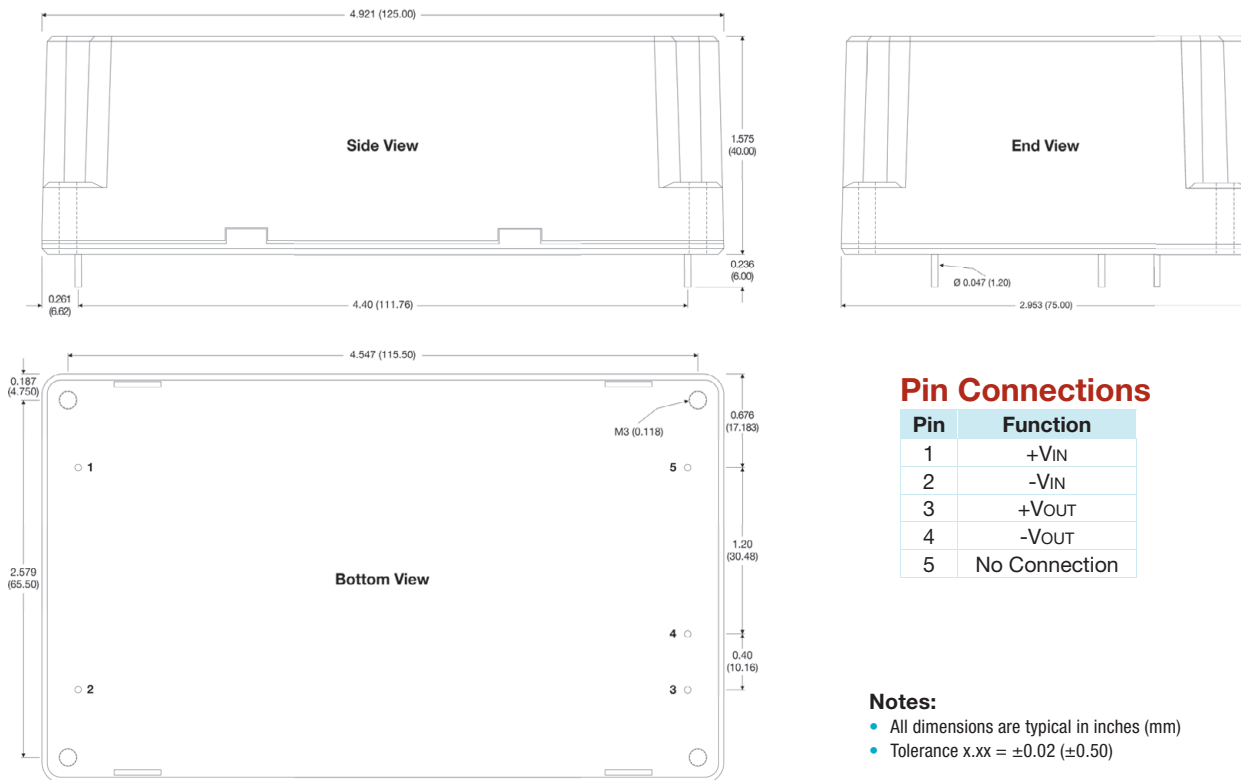
Recommended values for components are:

Model Number	LDM	LCM	C <sub>1</sub> , C <sub>2</sub> , C <sub>3</sub> , C <sub>4</sub>	C <sub>5</sub> , C <sub>6</sub> , C <sub>7</sub> , C <sub>8</sub>	R <sub>1</sub> , R <sub>2</sub> , R <sub>3</sub> , R <sub>4</sub>	C <sub>9</sub>	C <sub>10</sub>	TVS
MPV4080S-12RHI								
MPV4080S-15RHI	330 $\mu$ H/1A	7 mH/1A	104k/275 VAC	47 $\mu$ F/450V	1 M $\Omega$ /2W	1.0 $\mu$ F/50V	120 $\mu$ F/25V	SMBJ20A
MPV4080S-24RHI							68 $\mu$ F/35V	SMBJ30A

For applications that require meeting higher EMC standards, the circuit shown at left is recommended. Some notes on this diagram (starting with the input circuit) are:

1. It is recommended that an external fuse be used. The recommended fuse is 15A/1,500V.
2. Capacitors  $C_1$ ,  $C_2$ ,  $C_3$  and  $C_4$  are input filter components (connected in series to achieve the required capacitance level).
3. Capacitors  $C_5$ ,  $C_6$ ,  $C_7$  and  $C_8$  are also input filter components. Resistors  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  help to balance the current across the capacitors.
4. Capacitor  $C_9$  is ceramic. This capacitor is used to filter high frequency noise. A recommended value is given in the table below.
5. Capacitor  $C_{10}$  is an electrolytic. A low ESR, high frequency capacitor should be used. The recommended value is given in the table below.
6. The output TVS will help protect system circuitry if the converter fails. A recommended value is given in the table below.
7. Derating on all capacitors should be 80% or more.

### Mechanical Dimensions



### Pin Connections

Pin	Function
1	+VIN
2	-VIN
3	+VOUT
4	-VOUT
5	No Connection

#### Notes:

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