

# MPM-40E Series

## Low Cost, Encapsulated Single Output, 40W AC/DC Power Supplies



### Key Features:

- 40W Output Power
- Universal 85-264 VAC Input
- EN 60950 Approved (UL)
- Meets IEC Safety Class II
- Industry Standard Pin-Out
- Meets EN 55022 Class B
- >200 kHour MTBF
- **Low Cost**



### MicroPower Direct

292 Page Street  
Suite D  
Stoughton, MA 02072  
USA

T: (781) 344-8226  
F: (781) 344-8481  
E: sales@micropowerdirect.com  
W: www.micropowerdirect.com



### 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   |  |
|                     |                           | 120  |      | 370  | VDC   |  |
| Input Frequency     |                           | 47   |      | 440  | Hz    |  |
| Input Current       | See Model Selection Guide |      |      |      |       |  |
| Inrush Current      | 115 VAC                   |      | 30.0 |      | A Pk  |  |
|                     | 230 VAC                   |      | 50.0 |      |       |  |

| Output                   |                              |      |       |      |        |  |
|--------------------------|------------------------------|------|-------|------|--------|--|
| Parameter                | Conditions                   | Min. | Typ.  | Max. | Units  |  |
| Output Voltage           | See Model Selection Guide    |      |       |      |        |  |
| Output Current           | See Model Selection Guide    |      |       |      |        |  |
| Standby Power            |                              |      |       | 0.5  | W      |  |
| Output Voltage Accuracy  |                              |      | ±2.0  |      | %      |  |
| Line Regulation          | V <sub>IN</sub> = Min to Max |      | ±0.5  |      | %      |  |
| Load Regulation          | See Note 2                   |      | ±1.0  |      | %      |  |
| Ripple & Noise (20 MHz)  |                              |      | 50    | 100  | mV P-P |  |
| Hold-Up Time             | 115 VAC                      |      | 15    |      | mSec   |  |
|                          | 230 VAC                      |      | 80    |      |        |  |
| Temperature Coefficient  |                              |      | ±0.02 |      | %/°C   |  |
| Short Circuit Protection | Continuous (Autorecovery)    |      |       |      |        |  |
| Over Voltage Protection  | Zener Diode Clamp            |      |       |      |        |  |
| Overload Protection      | Autorecovery                 | 110  |       |      | %W     |  |

| General              |            |       |      |      |       |  |
|----------------------|------------|-------|------|------|-------|--|
| Parameter            | Conditions | Min.  | Typ. | Max. | Units |  |
| Isolation Voltage    | 60 Sec     | 3,000 |      |      | VAC   |  |
| Isolation Resistance | 500 VDC    | 100   |      |      | MΩ    |  |

| EMI Characteristics |               |                                     |      |         |       |  |
|---------------------|---------------|-------------------------------------|------|---------|-------|--|
| Parameter           | Standard      | Min.                                | Typ. | Max.    | Units |  |
| Radiated Emissions  | EN 55022      |                                     |      | Class B |       |  |
| Conducted Emissions | EN 55022      |                                     |      | Class B |       |  |
| ESD                 | EN 61000-4-2  | Criteria B; ±8 kV Air/±6 kV Contact |      |         |       |  |
| RS                  | EN 61000-4-3  | Criteria A; 10V/m                   |      |         |       |  |
| EFT                 | EN 61000-4-4  | Criteria B; ±2 kV                   |      |         |       |  |
| Surge               | See Note 4    | Criteria B; ±1 kV/ ±2 kV            |      |         |       |  |
| CS                  | EN 61000-4-6  | Criteria A; 10 Vrms                 |      |         |       |  |
| PFMF                | EN 61000-4-8  | Criteria A; 10A/m                   |      |         |       |  |
| Voltage Dips        | EN 61000-4-11 | Criteria B; 95% 5000 mS             |      |         |       |  |
| Switching Frequency |               |                                     | 65   |         | kHz   |  |

| Environmental               |  |      |      |      |       |  |
|-----------------------------|--|------|------|------|-------|--|
| Parameter                   | Conditions                               | Min. | Typ. | Max. | Units |  |
| Operating Temperature Range | Ambient                                  | -40  | +25  | +70  | °C    |  |
| Operating Temperature Range | Case                                     |      |      | +90  | °C    |  |
| Storage Temperature Range   |  | -40  |      | +85  | °C    |  |
| Cooling                     | Free Air Convection (See Derating Curve) |      |      |      |       |  |
| Humidity                    | RH, Non-condensing                       |      |      | 95   | %     |  |

| Physical      |            |  |      |      |       |  |
|---------------|------------|--|------|------|-------|--|
| Parameter     | Conditions | Min.   | Typ. | Max. | Units |  |
| Case Size     |            | 3.50 x 2.50 x 0.984 Inches (89.0 x 63.5 x 25.0 mm) |      |      |       |  |
| Case Material |            | Non-Conductive Black Plastic (UL94-V0)             |      |      |       |  |
| Weight        |            | 8.8 Oz (250g)                                      |      |      |       |  |

| Reliability Specifications |                                 |                    |      |      |        |  |
|----------------------------|---------------------------------|--------------------|------|------|--------|--|
| Parameter                  | Conditions                      | Min.               | Typ. | Max. | Units  |  |
| MTBF                       | MIL HDBK 217F, 25°C, Gnd Benign | 200                |      |      | kHours |  |
| Safety Standards           |                                 | EN 60950           |      |      |        |  |
| Safety Class               |                                 | IEC 61140 Class II |      |      |        |  |

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| Model Number | Input       |         | Output        |                  |                  | Capacitive Load ( $\mu$ F Max.) | Efficiency (% Typ) |
|--------------|-------------|---------|---------------|------------------|------------------|---------------------------------|--------------------|
|              | Current (A) |         | Voltage (VDC) | Current (A Max.) | Current (% Min.) |                                 |                    |
|              | 115 VAC     | 230 VAC |               |                  |                  |                                 |                    |
| MPM-40S-03E  | 0.860       | 0.460   | 3.3           | 8.000            | 10               | 60,000                          | 78                 |
| MPM-40S-05E  | 0.860       | 0.460   | 5.0           | 8.000            | 10               | 40,000                          | 82                 |
| MPM-40S-09E  | 0.860       | 0.460   | 9.0           | 4.444            | 10               | 7,200                           | 84                 |
| MPM-40S-12E  | 0.860       | 0.460   | 12.0          | 3.333            | 10               | 9,000                           | 84                 |
| MPM-40S-15E  | 0.860       | 0.460   | 15.0          | 2.666            | 10               | 6,600                           | 84                 |
| MPM-40S-24E  | 0.860       | 0.460   | 24.0          | 1.666            | 10               | 2,000                           | 84                 |

Notes:

1. Operation at no load will not damage the units, however, they may not meet all specifications.
2. Load regulation is measured for an output change of 10% to 100% at nominal input line.
3. All units are rated for EN 55022 (CE/RE) class B without external components.
4. All units are rated for EN 61000-4-4 ( $\pm 2$  kV) and EN 61000-4-5 ( $\pm 1$  kV/ $\pm 2$  kV) without external components. They will meet EN 61000-4-5 ( $\pm 2$  kV/ $\pm 4$  kV) with additional input filtering as shown below.
5. It is recommended that a fuse be used on the input of a power supply for protection. For the MPM-40S-xxE series, a 3.15A/250 VAC slow blow should be used.

Typical Connection

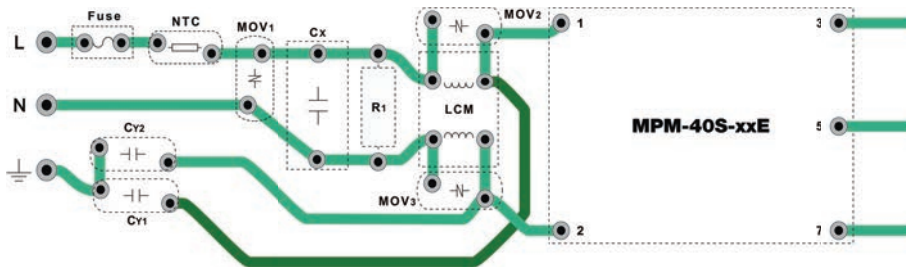
The diagram below illustrates a typical application connection of the MPM-40S-xxE series. Notes on this circuit (starting with the input circuit) are:



1. It is recommended that an external fuse and NTC be used. The recommended fuse is a 3.15A/250V slow blow and for the NTC, a 5D-9.
2. An external MOV is required on the input to protect the unit in the event of a surge. A 561KD20 or equivalent is recommended.
3. Recommended output filtering capacitors are:

|             | C1              | C2              | TVS      |
|-------------|-----------------|-----------------|----------|
| MPM-40S-03E | 1.0 $\mu$ F/50V | 680 $\mu$ F/10V | SMBJ7.0A |
| MPM-40S-05E | 1.0 $\mu$ F/50V | 680 $\mu$ F/10V | SMBJ7.0A |
| MPM-40S-09E | 1.0 $\mu$ F/50V | 220 $\mu$ F/25V | SMBJ12A  |
| MPM-40S-12E | 1.0 $\mu$ F/50V | 220 $\mu$ F/25V | SMBJ20A  |
| MPM-40S-15E | 1.0 $\mu$ F/50V | 220 $\mu$ F/25V | SMBJ20A  |
| MPM-40S-24E | 1.0 $\mu$ F/50V | 120 $\mu$ F/35V | SMBJ30A  |

Typical Board Layout: With EMI Components (See note 4)



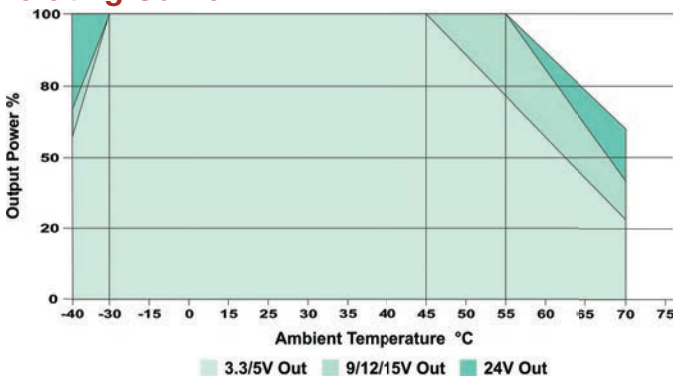
The output filtering capacitor (C2) is a high frequency, low resistance electrolytic capacitor. Capacitor (C1) is ceramic. Voltage derating of capacitors should be 80% or above.

4. Input noise and surge suppression components are illustrated in the typical board layout at left. Modules are available for a number of MPD AC/DC power supplies that contain these components. For pricing or full technical information on these modules (ACFM-01 and ACFM-02) or suggested EMI circuits, please contact the factory.

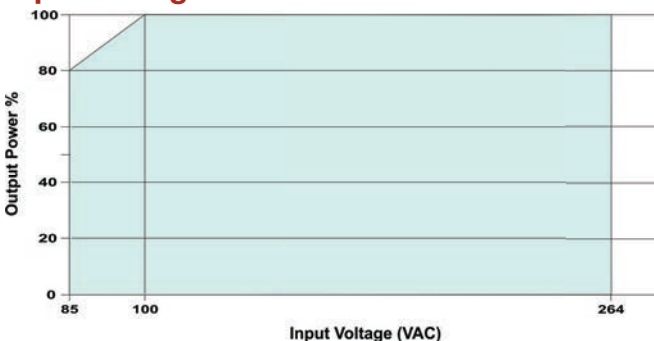
Pin Connections

| Pin | Function   | Pin | Function |
|-----|------------|-----|----------|
| 1   | AC-Line    | 5   | -VOUT    |
| 2   | AC-Neutral | 7   | Trim     |
| 3   | +VOUT      |     |          |

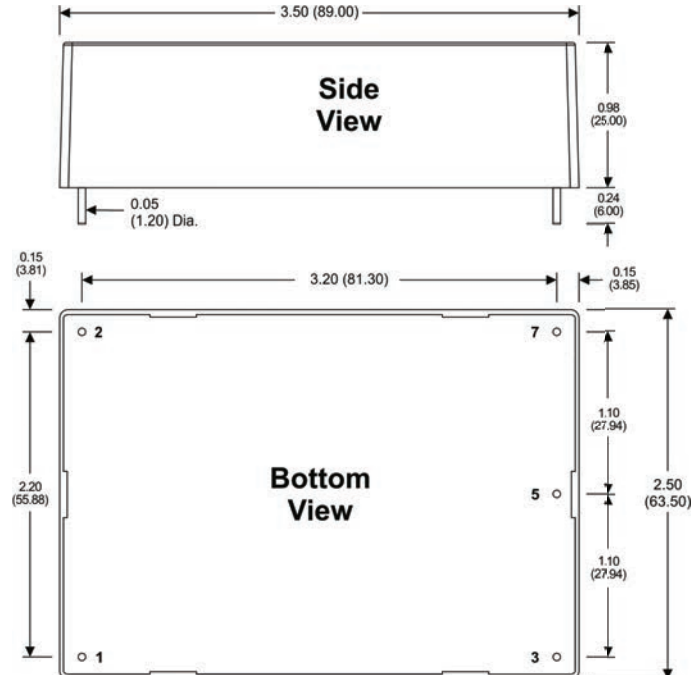
Derating Curve



Input Voltage Vs Load



Mechanical Dimensions



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Notes:

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