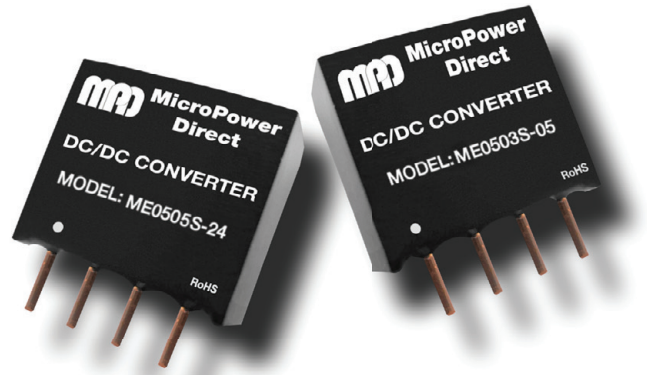


ME05S Series

Low Cost, 0.5W Ultra-Miniature SIP DC/DC Converters



Key Features:

- 0.5W Output Power
- Ultra-Miniature SIP Case
- 35 Standard Models
- 1,000 VDC Isolation
- >1.1 MHour MTBF
- -40°C to +85°C Operation

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 | 3.3 VDC Input | 2.97 | 3.3 | 3.63 | VDC |
| | 5 VDC Input | 4.50 | 5.0 | 5.50 | |
| | 12 VDC Input | 10.80 | 12.0 | 13.20 | |
| | 24 VDC Input | 21.60 | 24.0 | 26.40 | |
| 48 VDC Input | 43.20 | 48.0 | 52.80 | | |
| Input Reflected Ripple Current | | | 20 | | mA P - P |
| Input Filter | Internal Capacitor | | | | |

Output

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------------|---------------------------|------|-------|------|----------|
| Output Voltage Accuracy | | | ±3.0 | | % |
| Line Regulation | For V_{IN} Change of 1% | | ±1.2 | | % |
| Load Regulation, See Note 1 | See Model Selection Guide | | | | |
| Ripple & Noise (20 MHz) | | | 100 | | mV P - P |
| Temperature Coefficient | | | ±0.02 | | %/°C |
| Output Short Circuit | Momentary (0.5 Sec.) | | | | |

General

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------|------------|-------|------|------|-------|
| Isolation Voltage | 60 Seconds | 1,000 | | | VDC |
| Isolation Resistance | | 1,000 | | | MΩ |
| Isolation Capacitance | | | 60 | | pF |
| Switching Frequency | | | 80 | | kHz |

EMI Characteristics

| Parameter | Standard | Criteria | Level |
|---------------------|-------------------------|----------|-------------|
| Radiated Emissions | EN 55022 | | Class B |
| Conducted Emissions | See Note 3 EN 55022 | | Class B |
| ESD | EN 61000-4-2 | A | ±8 kV/±6 kV |
| RS | EN 61000-4-3 | A | 10V/m |
| EFT | See Note 3 EN 61000-4-4 | A | ±2 kV |
| Surge | See Note 3 EN 61000-4-5 | A | ±0.5 kV |
| CS | EN 61000-4-6 | A | 10 Vrms |
| PFMF | EN 61000-4-8 | A | 1A/m |

Environmental

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------------|---------------------|------|------|------|-------|
| Operating Temperature Range | Ambient | -40 | | +85 | °C |
| | Case | | | +100 | |
| Storage Temperature Range | | -40 | | +125 | °C |
| Cooling | Free Air Convection | | | | |
| Humidity | RH, Non-condensing | | | 95 | % |

Physical

| | | | | | |
|---------------|--|--|--|--|--|
| Case Size | See Mechanical Diagram (Page 2) | | | | |
| Case Material | Non-Conductive Black Plastic (UL-94V0) | | | | |
| Weight | 0.05 Oz (1.5g) | | | | |

Reliability Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------|---------------------------------|-------|------|------|--------|
| MTBF | MIL HDBK 217F, 25°C, Gnd Benign | 1.121 | | | MHours |

Absolute Maximum Ratings

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------------|-----------------------------|------|------|------|-------|
| Input Voltage Surge (1 Sec) | 3.3 VDC Input | | | 6.0 | VDC |
| | 5 VDC Input | | | 7.0 | |
| | 12 VDC Input | | | 15.0 | |
| | 24 VDC Input | | | 28.0 | |
| 48 VDC Input | | | 54.0 | | |
| Lead Temperature | 1.5 mm From Case For 10 Sec | | | 260 | °C |

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

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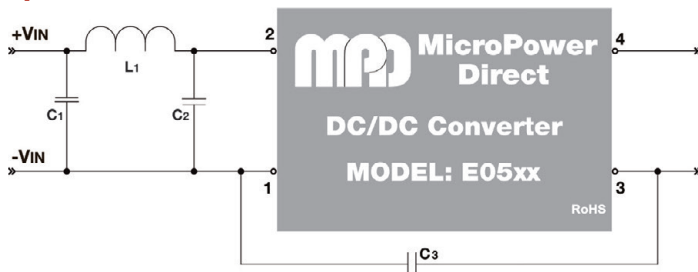
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| Model Number | Input | | | | Output | | Load Regulation (% Typ) | Efficiency (% Typ) | Capacitive Load (µF, Max) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------------|--------------------|---------------------------|----------------------------|
| | Voltage (VDC) | | Current (mA) | | Voltage (VDC) | Current (mA, Max) | | | | |
| | Nominal | Range | Full-Load | No-Load | | | | | | |
| ME0503S-03 | 3.3 | 2.97 - 3.63 | 205 | 20 | 3.3 | 152.0 | ±20 | 76 | 100 | 500 |
| ME0503S-05 | 3.3 | 2.97 - 3.63 | 216 | 25 | 5.0 | 100.0 | ±10 | 70 | 100 | 500 |
| ME0503S-09 | 3.3 | 2.97 - 3.63 | 216 | 25 | 9.0 | 56.0 | ±10 | 70 | 100 | 500 |
| ME0503S-12 | 3.3 | 2.97 - 3.63 | 201 | 25 | 12.0 | 42.0 | ±10 | 72 | 100 | 500 |
| ME0503S-15 | 3.3 | 2.97 - 3.63 | 208 | 25 | 15.0 | 33.0 | ±10 | 73 | 100 | 500 |
| ME0503S-18 | 3.3 | 2.97 - 3.63 | 208 | 25 | 18.0 | 28.0 | ±10 | 73 | 100 | 500 |
| ME0503S-24 | 3.3 | 2.97 - 3.63 | 208 | 25 | 24.0 | 21.0 | ±10 | 73 | 100 | 500 |
| ME0505S-03 | 5.0 | 4.5 - 5.5 | 132 | 20 | 3.3 | 152.0 | ±20 | 76 | 100 | 250 |
| ME0505S-05 | 5.0 | 4.5 - 5.5 | 121 | 13 | 5.0 | 100.0 | ±10 | 83 | 100 | 250 |
| ME0505S-09 | 5.0 | 4.5 - 5.5 | 128 | 15 | 9.0 | 56.0 | ±10 | 78 | 100 | 250 |
| ME0505S-12 | 5.0 | 4.5 - 5.5 | 127 | 18 | 12.0 | 42.0 | ±10 | 79 | 100 | 250 |
| ME0505S-15 | 5.0 | 4.5 - 5.5 | 130 | 22 | 15.0 | 33.0 | ±10 | 77 | 100 | 250 |
| ME0505S-18 | 5.0 | 4.5 - 5.5 | 127 | 20 | 18.0 | 28.0 | ±10 | 79 | 100 | 250 |
| ME0505S-24 | 5.0 | 4.5 - 5.5 | 134 | 25 | 24.0 | 21.0 | ±10 | 75 | 100 | 250 |
| ME0512S-03 | 12 | 10.8 - 13.2 | 58 | 15 | 3.3 | 152.0 | ±20 | 72 | 100 | 150 |
| ME0512S-05 | 12 | 10.8 - 13.2 | 54 | 10 | 5.0 | 100.0 | ±10 | 78 | 100 | 150 |
| ME0512S-09 | 12 | 10.8 - 13.2 | 57 | 15 | 9.0 | 56.0 | ±10 | 73 | 100 | 150 |
| ME0512S-12 | 12 | 10.8 - 13.2 | 58 | 20 | 12.0 | 42.0 | ±10 | 72 | 100 | 150 |
| ME0512S-15 | 12 | 10.8 - 13.2 | 61 | 20 | 15.0 | 33.0 | ±10 | 69 | 100 | 150 |
| ME0512S-18 | 12 | 10.8 - 13.2 | 61 | 15 | 18.0 | 28.0 | ±10 | 68 | 100 | 150 |
| ME0512S-24 | 12 | 10.8 - 13.2 | 59 | 15 | 24.0 | 21.0 | ±10 | 71 | 100 | 150 |
| ME0524S-03 | 24 | 21.6 - 26.4 | 31 | 8 | 3.3 | 152.0 | ±20 | 69 | 100 | 75 |
| ME0524S-05 | 24 | 21.6 - 26.4 | 29 | 8 | 5.0 | 100.0 | ±10 | 73 | 100 | 75 |
| ME0524S-09 | 24 | 21.6 - 26.4 | 30 | 10 | 9.0 | 56.0 | ±10 | 71 | 100 | 75 |
| ME0524S-12 | 24 | 21.6 - 26.4 | 30 | 8 | 12.0 | 42.0 | ±10 | 71 | 100 | 75 |
| ME0524S-15 | 24 | 21.6 - 26.4 | 29 | 10 | 15.0 | 33.0 | ±10 | 73 | 100 | 75 |
| ME0524S-18 | 24 | 21.6 - 26.4 | 29 | 10 | 18.0 | 28.0 | ±10 | 73 | 100 | 75 |
| ME0524S-24 | 24 | 21.6 - 26.4 | 29 | 10 | 24.0 | 21.0 | ±10 | 72 | 100 | 75 |
| ME0548S-03 | 48 | 43.2 - 52.8 | 17 | 6 | 3.3 | 152.0 | ±20 | 60 | 100 | 50 |
| ME0548S-05 | 48 | 43.2 - 52.8 | 16 | 6 | 5.0 | 100.0 | ±10 | 66 | 100 | 50 |
| ME0548S-09 | 48 | 43.2 - 52.8 | 17 | 6 | 9.0 | 56.0 | ±10 | 62 | 100 | 50 |
| ME0548S-12 | 48 | 43.2 - 52.8 | 17 | 6 | 12.0 | 42.0 | ±10 | 64 | 100 | 50 |
| ME0548S-15 | 48 | 43.2 - 52.8 | 17 | 6 | 15.0 | 33.0 | ±10 | 62 | 100 | 50 |
| ME0548S-18 | 48 | 43.2 - 52.8 | 17 | 6 | 18.0 | 28.0 | ±10 | 62 | 100 | 50 |
| ME0548S-24 | 48 | 43.2 - 52.8 | 18 | 10 | 24.0 | 21.0 | ±10 | 61 | 100 | 50 |

Notes:

1. Output load regulation is specified for a load change of 20% to 100%.
2. Operation at no-load will not damage these units. However, they may not meet all specifications.
3. These converters will operate without external components. However, to meet the specified EMI limits, a simple external input filter is required. See the input filter note below for more information.
4. All units are rated for operation at full output power to +85°C. Operation over +85°C without airflow is not recommended. Output power should be derated linearly from 100% at 85°C to 0% at 100°C.
5. It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

Input Filter

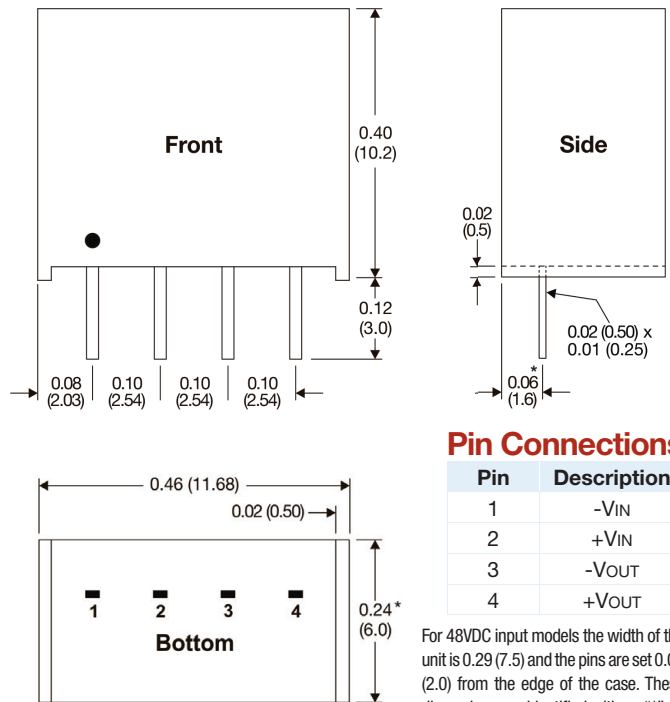


The filter (C1, C2, C3 & L1) shown in the figure above is required to meet EN 55022 level B. Recommended component values are shown in the table at right. Capacitor C1 is a 1210, 100V/ceramic, except for the 48V input which is a 100V/electrolytic. Capacitor C2 is a 1210 100V/ceramic. Capacitor C3 is a 1206 2 kV/ceramic. To meet the requirements of EN 61000-4-4 and EN 61000-4-5, the value of capacitor C1 should be changed to 470 µF/100V.

| V _{IN} (VDC) | C ₁ (µF) | L ₁ (µH) | C ₂ (µF) | C ₃ (µF) |
|-----------------------|---------------------|---------------------|---------------------|---------------------|
| 3.3 | 2.2 | 18.0 | | |
| 5.0 | 2.2 | 18.0 | | |
| 12 | 2.2 | 18.0 | | |
| 24 | 2.2 | 18.0 | 2.2 | 470 |
| 48 | 10.0 | 18.0 | 2.2 | 470 |

All components should be mounted as close to the unit as possible.

Mechanical Dimensions



Pin Connections

| Pin | Description |
|-----|-------------|
| 1 | -VIN |
| 2 | +VIN |
| 3 | -VOUT |
| 4 | +VOUT |

For 48VDC input models the width of the unit is 0.29 (7.5) and the pins are set 0.08 (2.0) from the edge of the case. These dimensions are identified with an "*" on the mechanical drawing

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)
- Pin 1 is marked by a "dot" or indentation on the front of the unit



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