

MG200MHI Series

Compact MiniDIP, 2W Medical Approved DC/DC Converters



Key Features:

- 2W Output Power
- 4 kVAC rms Isolation
- Reinforced Insulation
- Low Leakage Current
- Compact MiniDIP Case
- Single & Dual Outputs
- 2.0 MH MTBF
- Industry Standard Pin-Out
- **EN 60950 Approved**
- **EN 60601 Approved**



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, 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 | 5 VDC Input | 4.5 | 5.0 | 5.5 | VDC |
| | 12 VDC Input | 10.8 | 12.0 | 13.2 | |
| | 24 VDC Input | 21.6 | 24.0 | 26.4 | |
| Input Filter | Internal Capacitor | | | | |
| Reverse Polarity Input Current | | | | 0.3 | A |
| Leakage Current | | | | 2.0 | µA |

Output

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-------------------------------------|------------------------------|------|-------|-------|----------|
| Output Voltage Accuracy | | | ±2.0 | ±4.0 | % |
| Output Voltage Balance | Dual Outputs, Balanced Loads | | ±0.1 | ±1.0 | % |
| Line Regulation | Vin = Min to Max | | ±1.2 | ±1.5 | % |
| Load Regulation, See Note 1 | See Model Selection Guide | | | | |
| Ripple & Noise (20 MHz), See Note 2 | | | 100 | 150 | mV P - P |
| Ripple & Noise (20 MHz) | Over Line, Load & Temp. | | | 200 | mV P - P |
| Ripple & Noise (20 MHz) | | | | 15 | mV rms |
| Temperature Coefficient | | | ±0.01 | ±0.02 | %/°C |
| Output Short Circuit | Momentary (0.5 Sec.) | | | | |

General

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---------------------------------------|------------------------|-------|------|------|---------|
| Isolation Voltage, Rated | 60 Seconds | 4,000 | | | VAC rms |
| Isolation Test Voltage | Flash Tested For 1 Sec | 6,000 | | | Vpk |
| Reinforced Insulation Working Voltage | | 300 | | | VAC |
| Isolation Resistance | 500 VDC | 10 | | | GΩ |
| Isolation Capacitance | 100 kHz, 1V | | 15 | 20 | pF |
| Switching Frequency | | 50 | 80 | 100 | kHz |

Environmental

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------------|---------------------|------|------|------|-------|
| Operating Temperature Range | Ambient | -25 | | +80 | °C |
| Operating Temperature Range | Case | | | +90 | °C |
| Storage Temperature Range | | -50 | | +125 | °C |
| Cooling | Free Air Convection | | | | |
| Humidity | RH, Non-condensing | | | 95 | % |

Physical

| | |
|---------------|---|
| Case Size | 0.94 x 0.53 x 0.34 Inches (23.8 x 13.4 x 8.62 mm) |
| Case Material | Non-Conductive Black Plastic (UL94-V0) |
| Weight | 0.18 Oz (5.1g) |

Reliability Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|------------------|--|------|------|------|--------|
| MTBF | MIL HDBK 217F, 25°C, Gnd Benign | 2.0 | | | MHours |
| Safety Approvals | UL 60601, UL 60950, EN 60601, EN 60950 | | | | |

Absolute Maximum Ratings

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------------|-----------------------------|------|------|------|-------|
| Input Voltage Surge (1 Sec) | 5 VDC Input | -0.7 | | 9.0 | VDC |
| | 12 VDC Input | -0.7 | | 18.0 | |
| | 24 VDC Input | -0.7 | | 30.0 | |
| Lead Temperature | 1.5 mm From Case For 10 Sec | | | 260 | °C |
| Internal Power Dissipation | All Models | | | 650 | mW |

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

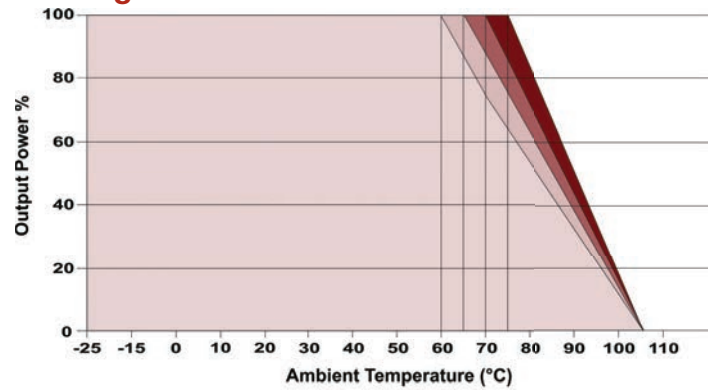
www.micropowerdirect.com

| Model Number | Input | | | | Output | | | Capacitive Load (μF, Max) | Load Regulation (% , Max) | Efficiency (% , Typ) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------|---------------------------|---------------------------|----------------------|----------------------------|
| | Voltage (VDC) | | Current (mA) | | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) | | | | |
| | Nominal | Range | Full-Load | No-Load | | | | | | | |
| MG205MS-05HI | 5 | 4.5 - 5.5 | 606 | 60 | 5.0 | 400.0 | 8.0 | 330 | 12 | 66 | 1,000 |
| MG205MS-12HI | 5 | 4.5 - 5.5 | 600 | 60 | 12.0 | 165.0 | 3.0 | 330 | 10 | 66 | 1,000 |
| MG205MS-15HI | 5 | 4.5 - 5.5 | 605 | 60 | 15.0 | 133.0 | 2.5 | 330 | 10 | 66 | 1,000 |
| MG205MD-12HI | 5 | 4.5 - 5.5 | 553 | 60 | ±12.0 | ±83.0 | ±1.5 | ±100 | 10 | 72 | 1,000 |
| MG205MD-15HI | 5 | 4.5 - 5.5 | 542 | 60 | ±15.0 | ±66.0 | ±1.0 | ±100 | 10 | 73 | 1,000 |
| MG212MS-05HI | 12 | 10.8 - 13.2 | 253 | 30 | 5.0 | 400.0 | 8.0 | 330 | 12 | 66 | 500 |
| MG212MS-12HI | 12 | 10.8 - 13.2 | 250 | 30 | 12.0 | 165.0 | 3.0 | 330 | 10 | 66 | 500 |
| MG212MS-15HI | 12 | 10.8 - 13.2 | 252 | 30 | 15.0 | 133.0 | 2.5 | 330 | 10 | 66 | 500 |
| MG212MD-12HI | 12 | 10.8 - 13.2 | 224 | 30 | ±12.0 | ±83.0 | ±1.5 | ±100 | 10 | 74 | 500 |
| MG212MD-15HI | 12 | 10.8 - 13.2 | 220 | 30 | ±15.0 | ±66.0 | ±1.0 | ±100 | 10 | 75 | 500 |
| MG224MS-05HI | 24 | 21.6 - 26.4 | 126 | 15 | 5.0 | 400.0 | 8.0 | 330 | 12 | 66 | 200 |
| MG224MS-12HI | 24 | 21.6 - 26.4 | 125 | 15 | 12.0 | 165.0 | 3.0 | 330 | 10 | 66 | 200 |
| MG224MS-15HI | 24 | 21.6 - 26.4 | 126 | 15 | 15.0 | 133.0 | 2.5 | 330 | 10 | 66 | 200 |
| MG224MD-12HI | 24 | 21.6 - 26.4 | 112 | 15 | ±12.0 | ±83.0 | ±1.5 | ±100 | 10 | 74 | 200 |
| MG224MD-15HI | 24 | 21.6 - 26.4 | 110 | 15 | ±15.0 | ±66.0 | ±1.0 | ±100 | 10 | 75 | 200 |

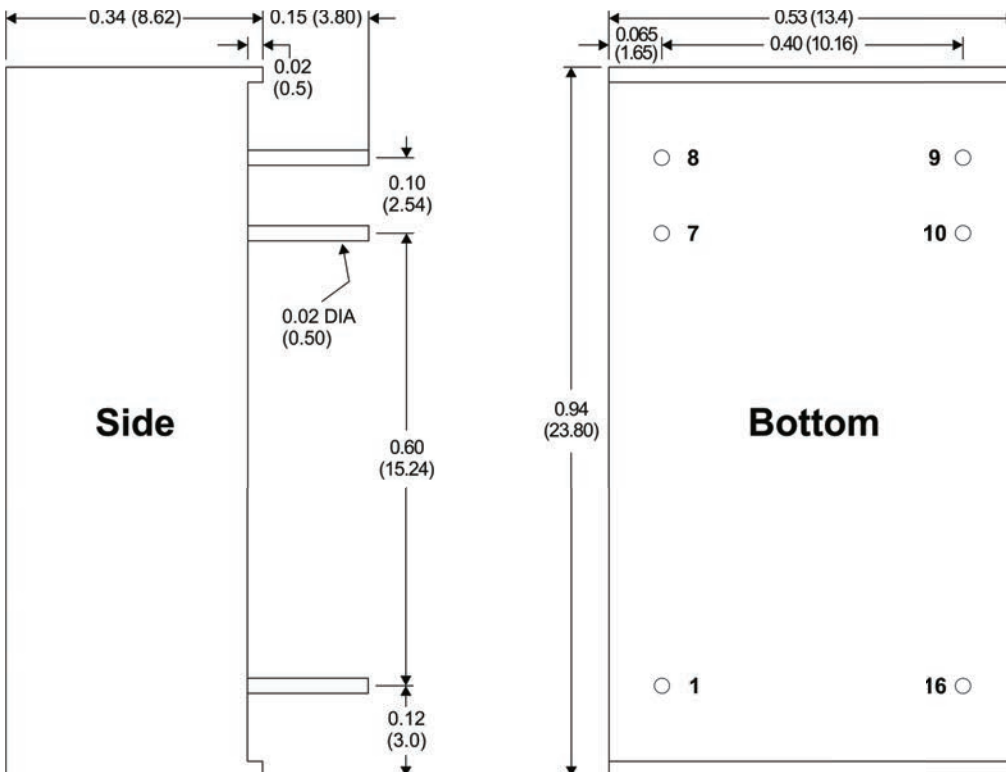
Notes:

1. Load regulation is measured for a load change of 20% to 100%.
2. When measuring output ripple, it is recommended that an external 0.47 μF ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3 μF capacitors will reduce the output ripple.
3. Operation at no-load will not damage these units. However, they may not meet all specifications.
4. For dual output units, the maximum capacitive load is given for each output.
5. Dual output units may be connected to provide a 24 VDC or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.
6. The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter. In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up. In this case, it is recommended that a low ESR (ESR <1.0Ω at 100 kHz) capacitor be mounted close to the converter. For 5V input units a 2.2 μF is recommended, for 12V input units, a 1.0 μF; and for 24V units a 0.47 μF.
7. It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

Derating Curve



Mechanical Dimensions



Pin Connections

| Pin | Single | Dual |
|-----|--------|--------|
| 1 | -Vin | -Vin |
| 7 | NC | NC |
| 8 | NC | Common |
| 9 | +Vout | +Vout |
| 10 | -Vout | -Vout |
| 16 | +Vin | +Vin |

NC = No Connection

Mechanical Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.01 (±0.25)



MicroPower Direct

We Power Your Success - For Less!