**MG800RU Series**

**Compact, 8W 4:1 Input, MiniDIP DC/DC Converters**

**Key Features:**
- 8W Output Power
- Very Small MiniDIP Case
- EN 60950 Approved
- Wide 4:1 Input Range
- High Efficiency
- 1,500 VDC Isolation
- Single and Dual Outputs
- >1.0 MHour MTBF
- -40°C to +80°C Operation
- LOW COST

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**Electrical Specifications**

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Range</td>
<td>9.0 VDC Input</td>
<td>24.0</td>
<td>36.0</td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.0 VDC Input</td>
<td>48.0</td>
<td>75.0</td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td>Input Start-up Threshold</td>
<td>9.0 VDC Input</td>
<td></td>
<td></td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td>Under Voltage Shutdown</td>
<td>8.0 VDC Input</td>
<td></td>
<td></td>
<td>VDC</td>
<td></td>
</tr>
</tbody>
</table>

**Output Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Voltage Accuracy</td>
<td>±2.0 %</td>
<td></td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Output Voltage Balance</td>
<td>±2.0 %</td>
<td></td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>±0.2 %</td>
<td></td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>±1.0 %</td>
<td></td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Ripple &amp; Noise (20 MHz)</td>
<td>±3.0 ±5.0 µSec</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transient Recovery Time</td>
<td>See Note 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transient Response Deviation</td>
<td>±0.1 ±0.02 %/°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload Protection</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>±0.01 ±0.02 %/°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Short Circuit</td>
<td>See Note 5 Continuous (Autorecovery)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**General Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation Voltage</td>
<td>1,500 VDC</td>
<td></td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Isolation Resistance</td>
<td>1,000 MΩ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation Capacitance</td>
<td>500 pF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching Frequency</td>
<td>370 kHz</td>
<td></td>
<td></td>
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</tbody>
</table>

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**EMI Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
<th>Criteria</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiated Emissions</td>
<td>EN 55022</td>
<td>±6 kV Contact/±8kV Air</td>
<td>Class A</td>
</tr>
<tr>
<td>Conducted Emissions</td>
<td>EN 55022</td>
<td>20 V/m</td>
<td>Class A</td>
</tr>
<tr>
<td>ESD</td>
<td>EN 61000-4-2</td>
<td>±2 kV</td>
<td>A</td>
</tr>
<tr>
<td>EFT, See Note 6</td>
<td>EN 61000-4-4</td>
<td>±1 kV</td>
<td>A</td>
</tr>
<tr>
<td>Surge, See Note 6</td>
<td>EN 61000-4-5</td>
<td>10 Vrms</td>
<td>A</td>
</tr>
<tr>
<td>CS</td>
<td>EN 61000-4-6</td>
<td>3A/m</td>
<td>A</td>
</tr>
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**Environmental Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature Range</td>
<td>Ambient -40 +25 +80</td>
<td>°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Case Temperature</td>
<td>+105 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-50 +125 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Free Air Convection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>RH, Non-condensing</td>
<td>95</td>
<td>%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Reliability Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTBF</td>
<td>MIL HDBK 217F, 25°C, Gnd Benign</td>
<td>1,06</td>
<td></td>
<td></td>
<td>MNhours</td>
</tr>
<tr>
<td>Safety Standards</td>
<td>UL 60950, EN 60950</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

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**Absolute Maximum Ratings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Surge (1 Sec)</td>
<td>24 VDC Input</td>
<td>50.0</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td></td>
<td>48 VDC Input</td>
<td>100.0</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Lead Temperature</td>
<td>1.5 mm From Case For 10 Sec</td>
<td>260</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Voltage (VDC) Nominal</th>
<th>Voltage (VDC) Full-Load</th>
<th>Voltage (VDC) No-Load</th>
<th>Current (mA, Max)</th>
<th>Current (mA, Min)</th>
<th>Output Capacitive Load (µF Max)</th>
<th>Efficiency (% Typ)</th>
<th>Fuse Rating Slow-Blow (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MG824S-03RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>282</td>
<td>10</td>
<td>3.3</td>
<td>1,600</td>
<td>680</td>
<td>78</td>
</tr>
<tr>
<td>MG824S-05RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>407</td>
<td>10</td>
<td>5.0</td>
<td>1,600</td>
<td>680</td>
<td>82</td>
</tr>
<tr>
<td>MG824S-12RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>391</td>
<td>10</td>
<td>12.0</td>
<td>665</td>
<td>330</td>
<td>85</td>
</tr>
<tr>
<td>MG824S-15RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>393</td>
<td>10</td>
<td>15.0</td>
<td>535</td>
<td>330</td>
<td>85</td>
</tr>
<tr>
<td>MG824S-24RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>390</td>
<td>10</td>
<td>24.0</td>
<td>335</td>
<td>150</td>
<td>86</td>
</tr>
<tr>
<td>MG824D-12RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>394</td>
<td>10</td>
<td>±12.0</td>
<td>±335</td>
<td>±0.0</td>
<td>150</td>
</tr>
<tr>
<td>MG824D-15RU</td>
<td>24</td>
<td>9.0 - 36.0</td>
<td>385</td>
<td>10</td>
<td>±15.0</td>
<td>±265</td>
<td>±0.0</td>
<td>150</td>
</tr>
<tr>
<td>MG848S-03RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>141</td>
<td>8</td>
<td>3.3</td>
<td>1,600</td>
<td>680</td>
<td>78</td>
</tr>
<tr>
<td>MG848S-05RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>206</td>
<td>8</td>
<td>5.0</td>
<td>1,600</td>
<td>680</td>
<td>81</td>
</tr>
<tr>
<td>MG848S-12RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>196</td>
<td>8</td>
<td>12.0</td>
<td>665</td>
<td>330</td>
<td>85</td>
</tr>
<tr>
<td>MG848S-15RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>197</td>
<td>8</td>
<td>15.0</td>
<td>535</td>
<td>330</td>
<td>85</td>
</tr>
<tr>
<td>MG848S-24RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>195</td>
<td>8</td>
<td>24.0</td>
<td>335</td>
<td>150</td>
<td>86</td>
</tr>
<tr>
<td>MG848D-12RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>195</td>
<td>8</td>
<td>±12.0</td>
<td>±335</td>
<td>±0.0</td>
<td>150</td>
</tr>
<tr>
<td>MG848D-15RU</td>
<td>48</td>
<td>18.0 - 75.0</td>
<td>193</td>
<td>8</td>
<td>±15.0</td>
<td>±265</td>
<td>±0.0</td>
<td>150</td>
</tr>
</tbody>
</table>

### Notes:
1. The specified maximum capacitive load is for each output.
2. When measuring output ripple, it is recommended that an external 0.47 µF ceramic capacitor be placed in parallel from the +VOUT pin to the -VOUT pin for single output models, or from each output to common for dual output models.
3. Transient recovery is measured to within a 1% error band for a load step change of 25%.
4. Output overload protection is provided by a Hiccup circuit with auto-recovery.
5. Output short circuit protection is provided by a Hiccup circuit with auto-recovery.
6. These converters are specified for operation without external components. However, in some applications the addition of input/output capacitors, as shown in the typical connection diagram at right, will enhance stability and reduce output ripple. This simple connection includes a low ESR (<1Ω at 100 kHz) capacitor connected across the input. It is recommended that a 2.2 µF be used. To improve the output ripple performance, a 3.3 µF capacitor should be connected across the output. For dual output units, a 3.3 µF capacitor should be connected from each output to common. For applications where the circuit must meet or exceed EN 61000-4-4 (5), refer to the note under the typical connection diagram.
7. Operation at no load will not damage these units, however, they may not meet all specifications.
8. It is recommended that a fuse be used on the input of a power supply for protection.

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### Typical Connection

To meet the specified EN 61000-4-4 and EN 61000-4-5 limits, an external capacitor must be connected across the input pins of the module (C1). A 220 µF/100V capacitor is recommended. This capacitor should be mounted as close to the module as possible.

### Derating Curve

- 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 unit

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### Mechanica Dimensions

#### Bottom View

![Bottom View](image)

#### Side View

![Side View](image)

#### End View

![End View](image)

### Pin Connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-V IN</td>
<td>-V IN</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
<td>Common</td>
</tr>
<tr>
<td>9</td>
<td>+V OUT</td>
<td>+V OUT</td>
</tr>
<tr>
<td>10</td>
<td>-V OUT</td>
<td>-V OUT</td>
</tr>
<tr>
<td>16</td>
<td>+V IN</td>
<td>+V IN</td>
</tr>
</tbody>
</table>

### 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 unit