**INTRODUCTION**

The MMP Series Melf Metal Film High Power Resistors are manufactured using a vacuum sputtering system to deposit multiple layers of mixed metal alloys and passivative materials onto a carefully treated high grade ceramic substrate. SMD enabled structure and high power in small packages. The resistors are coated with layers of lacquer.

**FEATURES**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Rating</td>
<td>1W, 2W</td>
</tr>
<tr>
<td>Resistance Tolerance</td>
<td>±1%, ±2%, ±5%</td>
</tr>
<tr>
<td>T.C.R.</td>
<td>±50ppm/°C, ±100ppm/°C</td>
</tr>
</tbody>
</table>

**DERATING CURVE**

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below.

**DIMENSIONS**

<table>
<thead>
<tr>
<th>STYLE</th>
<th>DIMENSION</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra Miniature</td>
<td>L</td>
<td>D</td>
</tr>
<tr>
<td>MMP100</td>
<td>5.9±0.2</td>
<td>2.2±0.1</td>
</tr>
<tr>
<td>MMP200</td>
<td>8.5±0.2</td>
<td>3.2±0.2</td>
</tr>
</tbody>
</table>
## ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>STYLE</th>
<th>MMP100</th>
<th>MMP200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Rating at 70°C</td>
<td>1W</td>
<td>2W</td>
</tr>
<tr>
<td>Maximum Working Voltage</td>
<td>350V</td>
<td></td>
</tr>
<tr>
<td>Maximum Overload Voltage</td>
<td>700V</td>
<td></td>
</tr>
<tr>
<td>Voltage Proof on Insulation</td>
<td>500V</td>
<td></td>
</tr>
<tr>
<td>Resistance Range</td>
<td>1Ω - 1MΩ &amp; 0Ω for E24 &amp; E96 series value</td>
<td></td>
</tr>
<tr>
<td>Operating Temp. Range</td>
<td>-55°C to +155°C</td>
<td></td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>±50ppm/°C, ±100ppm/°C</td>
<td></td>
</tr>
</tbody>
</table>

Note: Special value is available on request.

## ENVIRONMENTAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PERFORMANCE TEST</th>
<th>TEST METHOD</th>
<th>APPRAISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Time Overload</td>
<td>IEC 60115-1 4.13 2.5 times RCWW for 5 Sec.</td>
<td>±0.5%+0.05Ω</td>
</tr>
<tr>
<td>Voltage Proof on Insulation</td>
<td>IEC 60115-1 4.7 in V-block for 60 Sec., test voltage by type</td>
<td>By type</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>IEC 60115-1 4.8 -55°C to +155°C</td>
<td>By type</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>IEC 60115-1 4.6 in V-block for 60 Sec.</td>
<td>&gt;10,000MΩ</td>
</tr>
<tr>
<td>Solderability</td>
<td>IEC 60115-1 4.17 235±5°C for 3±0.5 Sec.</td>
<td>95% Min. coverage</td>
</tr>
<tr>
<td>Solvent Resistance of Marking</td>
<td>IEC 60115-1 4.30 IPA for 5±0.5 Min. with ultrasonic</td>
<td>No deterioration of coatings and markings</td>
</tr>
<tr>
<td>Periodic-pulse Overload</td>
<td>IEC 60115-1 4.39 4 times RCWW 10,000 cycles (1 Sec. on, 25 Sec. off)</td>
<td>±1.0%+0.05Ω</td>
</tr>
<tr>
<td>Damp Heat Steady State</td>
<td>IEC 60115-1 4.24 40±2°C, 90-95% RH for 56 days, loaded with 0.1 times RCWW</td>
<td>±2.0%+0.1Ω</td>
</tr>
<tr>
<td>Endurance at 70°C</td>
<td>IEC 60115-1 4.25 70±2°C at RCWW for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. off)</td>
<td>±2.0%+0.1Ω</td>
</tr>
<tr>
<td>Temperature Cycling</td>
<td>IEC 60115-1 4.19 -55°C ↔ Room Temp. ↔ +155°C ↔ Room Temp. (5 cycles)</td>
<td>±0.75%+0.05Ω</td>
</tr>
<tr>
<td>Resistance to Soldering Heat</td>
<td>IEC 60115-1 4.18 260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body</td>
<td>±0.5%+0.05Ω</td>
</tr>
</tbody>
</table>

Note: RCWW(Rated Continuous Working Voltage) = √(Power Rating x Resistance Value or Max. working voltage listed above, whichever less.)

Revision: 201304
EXPLANATIONS OF ORDERING CODE

- **MFR** - Series Name
- **-12** - Code 4 - 6: Power Rating
  - 05 = ød0.5mm
  - 06 = ød0.6mm
  - 07 = ød0.7mm
  - 08 = ød0.8mm
  - 10 = ød1.0mm
  - 14 = ød1.4mm
  - 12 = 1/6W
  - 25 = 1/4W
  - 50 = 1/2W
  - 100 = 1W
  - 1WS = 1WS
  - 200 = 2W
  - 2WS = 2WS
  - 204 = 0.4W
  - 207 = 0.6W
  - 300 = 3W
  - 3WS = 3WS
  - 3WM = 3WM
  - 400 = 4W
  - 500 = 5W
  - 5WS = 5WS
  - 55S = 5WS
  - 700 = 7W
  - 7WS = 7WS
  - 10A = 10W
  - 20A = 20W
  - 30A = 30W
  - 40A = 40W
  - 50A = 50W
  - 105 = 10WS
  - 15A = 15W
  - 25A = 25W
  - 10B = 100W
  - 25B = 250W

- **F** - Code 7: Tolerance
  - P = ±0.02% 
  - A = ±0.05% 
  - B = ±0.1% 
  - C = ±0.25% 
  - D = ±0.5% 
  - F = ±1% 
  - G = ±2% 
  - J = ±5% 
  - K = ±10% 
  - - = Base on Spec.

- **T** - Code 8: Packing Style
  - T = Tape/Box 
  - R = Tape/Reel 
  - B = Bulk

- **F** - Code 9: Temperature Coefficient of Resistance
  - 26- = ±5 ppm/°C 
  - 52- = ±10 ppm/°C 
  - 73- = ±15 ppm/°C 
  - 81- = ±20 ppm/°C 
  - 91- = ±25 ppm/°C 
  - F = ±50 ppm/°C 
  - G = ±100 ppm/°C 
  - J = ±200 ppm/°C 
  - K = ±300 ppm/°C 
  - M = ±350 ppm/°C

- **52-** - Code 10 - 12: Forming Type
  - 26- = 26mm 
  - 52- = 52.4mm 
  - 73- = 73mm 
  - 81- = 81mm 
  - 91- = 91mm 
  - F = F Type 
  - FK = FK Type 
  - FKK = FKK Type 
  - FFK = F-form Kink 
  - M = M-Type Forming 
  - MB = M-form W/flat 
  - MT = MT Type Forming 
  - MR = MR Type 
  - AV = AVIsert 
  - PN = PANAsert

- **100R** - Code 13 - 17: Resistance Value
  - OR1 = 0.1
  - 100R = 100
  - 10K = 10,000
  - 10M = 10,000,000

**EXCEPTION:**

- **Cement series:**
  - <Code B>: Special packing style code
    - B: Bulk with wirewound or metal oxide sub-assembly for resistance value
    - W: Bulk with ceramic based wirewound sub-assembly for resistance value
    - M: Bulk with metal oxide sub-assembly for resistance value
    - F: Bulk with Fiberglass based wirewound sub-assembly for resistance value
  - <Code 10-12>: Without forming code
    - Example: SQP500B-10R

- **JPW series:**
  - <Code 13-17>: without resistance value code
    - Example: JPW-06-T-52-