**Milli-Cap®**

**Ideal SMT Capacitor**

**Features**
- 0201, 0402 and 0602 footprints
- Low Loss High Q part
- Very Low Series Inductance
- Ultra High Series Resonance
- Matches typical 50Ω line widths
- Behaves like an Ideal Capacitor
- Single piece construction
- Orientation insensitive

**Functional applications**
- Test Equipment, Photonics, SONET, TOSA/ROSA, High Speed Data
- Broadband Microwave/Millimeter Wave
- Transimpedance Amplifiers

**Specification**

**Electrical**

Temperature Coefficient of Capacitance
- Values as per electrical characteristics table

Milli-Cap® Metallization
- 7.5µ” Au over 50µ” Ni

Capacitance Range
- 0.5pF to 82pF

Maximum Assembly Process Temperature
- 250°C

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**Insertion Loss**

**P21**

Frequency (GHz) vs. Magnitude (dB)

- **P21BN300M5S (S21)**

**P42**

Frequency (GHz) vs. Magnitude (dB)

- **P42CG1R5C5S**
- **P42NR2R0K5S**
- **P62NV100M5S**
- **P62BN820M5S**

**P62**

Frequency (GHz) vs. Magnitude (dB)

- **P62CF0R3B5S**
- **P62CF0R5B5S**
- **P62CD0R7B5S**
- **P62CG0R9B5S**
- **P62CG1R0C5**
- **P62NV100M5S**
- **P62BN820M5S**

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**Insertion Loss**

**P42**

Frequency (GHz) vs. Magnitude (dB)

- **P42CG1R5C5S**
- **P42NR2R0K5S**
- **P62NV100M5S**
- **P62BN820M5S**

**P62**

Frequency (GHz) vs. Magnitude (dB)

- **P62CF0R3B5S**
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- **P62CG0R9B5S**
- **P62CG1R0C5**
- **P62NV100M5S**
- **P62BN820M5S**

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**Electrical characteristics - Milli-Cap®**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Value (pF)</th>
<th>Voltage Rating</th>
<th>TCC</th>
<th>Dissipation Factor (Max)</th>
<th>Insulation Resistance (Min)</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>P21BN300M5S</td>
<td>30</td>
<td>50</td>
<td>± 15%</td>
<td>3.5%</td>
<td>10^6 Ω</td>
<td>20MHz – 40GHz</td>
</tr>
<tr>
<td>P42BN820M5S</td>
<td>82</td>
<td>50</td>
<td>± 15%</td>
<td>3.5%</td>
<td>10^6 Ω</td>
<td>20MHz – 40GHz</td>
</tr>
<tr>
<td>P42NR2R0K5S</td>
<td>2</td>
<td>50</td>
<td>N1500 ± 500ppm/°C</td>
<td>0.25%</td>
<td>10^6 Ω</td>
<td>4GHz – 20GHz</td>
</tr>
<tr>
<td>P42CG1R5C5S</td>
<td>1.5</td>
<td>50</td>
<td>0 ± 30ppm/°C</td>
<td>0.7%</td>
<td>10^6 Ω</td>
<td>8GHz – 32GHz</td>
</tr>
<tr>
<td>P62BN820M5S</td>
<td>82</td>
<td>50</td>
<td>± 15%</td>
<td>3.5%</td>
<td>10^6 Ω</td>
<td>20MHz – 40GHz</td>
</tr>
<tr>
<td>P62NV100M5S</td>
<td>10</td>
<td>50</td>
<td>N4700 ± 1000ppm/°C</td>
<td>1.2%</td>
<td>10^6 Ω</td>
<td>4GHz – 20GHz</td>
</tr>
<tr>
<td>P62CG1R0C5S</td>
<td>1</td>
<td>50</td>
<td>0 ± 30ppm/°C</td>
<td>0.7%</td>
<td>10^6 Ω</td>
<td>18GHz – 40GHz</td>
</tr>
<tr>
<td>P62CD0R7B5S</td>
<td>0.7</td>
<td>50</td>
<td>N20 ± 15ppm/°C</td>
<td>0.15%</td>
<td>10^6 Ω</td>
<td>20GHz – 40GHz</td>
</tr>
<tr>
<td>P62CF0R5B5S</td>
<td>0.5</td>
<td>50</td>
<td>0 ± 15 ppm/°C</td>
<td>0.6%</td>
<td>10^6 Ω</td>
<td>28GHz – 40GHz</td>
</tr>
</tbody>
</table>

**Dimensional specifications - Milli-Cap®**

<table>
<thead>
<tr>
<th>Case size</th>
<th>Milli-Cap®</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length</td>
</tr>
<tr>
<td>P21 (0201)</td>
<td>0.020” ± 0.004”</td>
</tr>
<tr>
<td>P42 (0402)</td>
<td>0.038” ± 0.004”</td>
</tr>
<tr>
<td>P62 (0602)</td>
<td>0.058” ± 0.004”</td>
</tr>
</tbody>
</table>

**Attachment Methods - Milli-Cap®**

**Recommended attachment to soft or hard substrate using Conductive Epoxy**

1. Place a single drop of conductive epoxy onto each micro strip as illustrated; the edge of the epoxy shall be at least .003” - .004” back from the edge of the trace to prevent filling the gap with epoxy.
2. Centering the termination gap of the capacitor within the gap in the micro strip, press with careful, even pressure onto the micro strip ensuring the terminations make good contact with the epoxy drops.
3. Cure according to the epoxy manufacturer’s preferred schedule, typically 125°C to 150°C max.
4. After curing, inspect joint for epoxy shorts across the termination and micro strip gaps that would cause a short across the cap.

Isopropanol and Methanol are both safe to use to pre clean Milli-Caps®. Isopropanol, and Methanol are not to be used after mounting with conductive epoxy as they act as a solvent!

**Recommended attachment to soft or hard substrate using Solder**

1. Place a single drop of solder paste onto each micro strip as illustrated; the edge of the solder shall be at least .001” - .002” back from the edge of the trace to prevent filling the gap with solder.
2. Centering the termination gap of the capacitor within the gap in the micro strip, press with careful, even pressure onto the micro strip ensuring the terminations make good contact with the drops of solder paste.
3. Reflow according to the solder manufacturer’s preferred profile, ensuring the reflow temperature does not exceed 250°C.

4. After the reflow step is completed, inspect joint for voids or excess flux and non-reflowed solder balls that can degrade performance or cause shorts across the gaps. Proper cleaning after the reflow process is crucial to avoiding performance degradation and discovering poor solder joints.

Isopropanol and Methanol are both safe to use with soldered Milli-Caps®.