# Teflon woven glass fabric with ceramic filler copper-clad laminates

# BTM-1/2

BTM-1/2 is laminated by laying up of the imported varnished glass cloth with Teflon resin and filled with Nano-ceramic，with scientific formulation and strict manufacturing process. This product has improved heat dissipation and smaller thermal expansion coefficient compared to BM series products.

Technical Specifications：

<table>
<tr><td>Appearance</td><td colspan="6">Meet the specification requirements for the laminate of microwave PCB<br>by National and Military Standards.</td></tr>
<tr><td rowspan="2">Types</td><td>BTM-1/2<br>（255）</td><td>BTM-1/2<br>（265）</td><td>BTM-1/2<br>（285）</td><td>BTM-1/2<br>（294）</td><td>BTM-1/2<br>（300）</td><td>BTM-1/2<br>（320）</td></tr>
<tr><td>BTM-1/2<br>（338）</td><td>BTM-1/2<br>（350）</td><td>BTM-1/2<br>（400）</td><td>BTM-1/2<br>（440）</td><td>BTM-1/2<br>（615）</td><td>BTM-1/2<br>（1020）</td></tr>
<tr><td rowspan="2">Dimension<br>（mm）</td><td>610×460</td><td>600×500</td><td>1220×914</td><td>1220×1000</td><td>1500×1000</td><td></td></tr>
<tr><td colspan="6">For special dimension，customized laminates is available.</td></tr>
<tr><td rowspan="6">Thickness and Tolerance（mm）</td><td>Laminate thickness</td><td>0.254</td><td>0.508</td><td>0.762</td><td>0.787</td><td>1.016</td></tr>
<tr><td>Tolerance</td><td>±0.025</td><td>±0.05</td><td>±0.05</td><td>±0.05</td><td>±0.05</td></tr>
<tr><td>Laminate thickness</td><td>1.27</td><td>1.524</td><td>2.0</td><td>3.0</td><td>4.0</td></tr>
<tr><td>Tolerance</td><td>±0.05</td><td>±0.05</td><td>±0.075</td><td>±0.09</td><td>±0.1</td></tr>
<tr><td>Laminate thickness</td><td>5.0</td><td>6.0</td><td>9.0</td><td>10.0</td><td>12.0</td></tr>
<tr><td>Tolerance</td><td>±0.1</td><td>±0.12</td><td>±0.18</td><td>±0.18</td><td>±0.2</td></tr>
<tr><td rowspan="3">Mechanical Strength</td><td rowspan="2">Cutting/punching Strength</td><td colspan="5">Thickness<1mm，no burrs after cutting，minimum space between two punching holes is 0.55mm，no delamination.</td></tr>
<tr><td colspan="5">Thickness≥1mm，no burrs after cutting，minimum space between two punching holes is 1.10mm，no delamination.</td></tr>
<tr><td>Peel strength（1oz copper）</td><td colspan="5">Normal state：≥18N/cm；No bubble、delamination、peel strength≥15N/cm（in the constant humidity and temperature、and keep in the melting solder of 265℃±2℃ for 20 seconds）.</td></tr>
<tr><td>Thermal stress</td><td colspan="6">After solder float，260°C，10s，≥3 times ，no delamination and blister.</td></tr>
<tr><td>Chemical Property</td><td colspan="6">According to the properties of laminate，the chemical etching method for PCB can be used. The dielectric properties of laminate are not changed. The plating through hole can be done，but the sodium treatment or the plasma treatment must be used.</td></tr>
<tr><td rowspan="3">Electrical Property</td><td>Name</td><td colspan="2">Test condition</td><td>Unit</td><td colspan="2">Value</td></tr>
<tr><td>Density</td><td colspan="2">Normal state</td><td>g/ cm³</td><td colspan="2">2.1～3.0</td></tr>
<tr><td>Moisture</td><td colspan="2">Dip in the distilled water of</td><td>%</td><td colspan="2">≤0.05</td></tr>
</table>

| Property | Test condition | | Unit | Value |
|---|---|---|---|---|
| Absorption | 20±2℃ for24 hours | | | |
| Operating Temperature | High-low temperature chamber | | ℃ | -50℃～+260℃ |
| Thermal Conductivity | | | W/m/k | 0.6~0.9 |
| CTE（typical） | -55～288℃（εr：2.55~3.0） | | ppm/℃ | 15（x） |
| | | | | 15（y） |
| | | | | 65（z） |
| CTE（typical） | -55～288℃（εr：3.2~3.5） | | ppm/℃ | 15（x） |
| | | | | 15（y） |
| | | | | 55（z） |
| CTE（typical） | -55～288℃（εr：4.0~10.2） | | ppm/℃ | 12（x） |
| | | | | 14（y） |
| | | | | 50（z） |
| Shrinkage Factor | 2 hours in boiling water | | % | < 0.0002 |
| Surface Resistivity | 500V DC | Normal state | M·Ω | ⩾1×$10^{6}$ |
| | | Constant humidity and temperature | | ⩾1×$10^{5}$ |
| Volume Resistivity | Normal state | | MΩ.cm | ⩾1×$10^{7}$ |
| | Constant humidity and temperature | | | ⩾1×$10^{6}$ |
| Surface dielectric strength | Normal state | | δ=1mm（Kv/mm） | ⩾1.2 |
| | Constant humidity and temperature | | | ⩾1.1 |
| Dielectric Constant | 10GHz | | εr | 2.85±0.05、2.94±0.05<br>3.00±0.05、3.20±0.05<br>3.38±0.05、3.50±0.05<br>4.00±0.08、4.40±0.1<br>6.15±0.15、10.2±0.25 |
| Thermal Coefficient of εr（PPM/℃）-50~150℃ | εr | | Value | |
| | 2.85，2.94 | | -85 | |
| | 3.0，3.2 | | -75 | |
| | 3.38 | | -65 | |
| | 3.5 | | -60 | |
| | 4.0 | | -60 | |
| | 4.4 | | -60 | |
| | 6.15 | | -55 | |
| | 10.2 | | -50 | |
| Dissipation Factor | 10GHz | | tgδ | 2.55~3.0: ⩽1.5×$10^{-3}$ |
| | | | tgδ | 3.0~3.5: ⩽2.0×$10^{-3}$ |
| | | | tgδ | 4.0~10.20: ⩽2.5×$10^{-3}$ |
| UL Flammability | 94 V-0 | | | |