Recommended assemble method for MITSUBISHI's leadless packaged device

<Contents>

1. Recommended foot pattern and metal mask pattern 2
2. Recommended reflow soldering 4
3. Visual Inspection 5
4. Rework process 7
5. Evaluation of Solder Printing 8
6. Notice 8

(1/8)
1-a Recommended Foot pattern for MGF495** and MGF485**

Substrate : Rogers RO4003C
(ε r=3.38, t=0.508mm)

Unit : mm
Tolerance : ±0.05
1-b  Recommended Metal Mask pattern for MGF495** and MGF485**

Unit : mm
Tolerance : ±0.05

Metal Mask Thickness = 0.15mm

Point : Each quantity of solder have to be same quantity for all terminals.
(→ Prevent inclination of package.)
2 Recommended reflow soldering
(Lead free Solder)

2-1. Solder type
- Alloy: Sn-3Ag-0.5Cu
- Particle Size: 25～35 μm
- Content of Halide: under 0.1wt%

2-2. Reflow Profile

Point:
- Number of reflow: 3 times max
- Indicated temperature means the temperature on the surface of package.
- Keep under 260degC
## 3-a Visual inspection criteria for MGF495** and MGF485**

<table>
<thead>
<tr>
<th></th>
<th>accept</th>
<th>failure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shape of solder fillet</strong></td>
<td>Solder fillet contact angle is less than 90°. Solder is wetting to more than ½ height of a side terminals.</td>
<td>Solder fillet contact angle is more than 90°. Contact angle(θ)θ &gt;90°</td>
</tr>
<tr>
<td></td>
<td>[Diagram: Solder fillet, contact angle θ &lt; 90°, wetting to over ½ height]</td>
<td>[Diagram: Solder fillet, contact angle θ &gt; 90°, no wetting]</td>
</tr>
<tr>
<td><strong>Shape of solder fillet</strong></td>
<td>Solder fillet contact angle is less than 90°. Solder is wetting to more than ½ height of a side terminals.</td>
<td>There is no fillet. (Solder flow into Via hole.)</td>
</tr>
<tr>
<td></td>
<td>[Diagram: Solder fillet, contact angle θ &lt; 90°, wetting to over ½ height]</td>
<td>[Diagram: Solder fillet, no wetting to Via hole]</td>
</tr>
<tr>
<td><strong>Tile of device</strong></td>
<td>The device does not tile.</td>
<td>Tile of device is more than 100 μm.</td>
</tr>
<tr>
<td></td>
<td>[Diagram: Device, non-tiled]</td>
<td>[Diagram: Device, tiled, H &gt; 100 μm]</td>
</tr>
<tr>
<td><strong>Solder bridge</strong></td>
<td>There is no solder bride.</td>
<td>Solder bridge between devices on the same pattern.</td>
</tr>
<tr>
<td></td>
<td>[Diagram: No solder bridge]</td>
<td>[Diagram: Solder bridge]</td>
</tr>
</tbody>
</table>
3-b Visual inspection

(a) Ideal mounting

(b) Failure mounting

Excess solder
(Fillet angle > 90°)

Poor solder
(There is no fillet)

Floating

If quantity of solder increases (excess solder), Package may float and the RF characteristic may degrade.
To rework MGF495*A on application board, we recommend the following soldering rework method.

**Soldering rework method**
1. Please adjust the temperature and position of hot gun so that the surface temperature of Package which needs rework becomes about 240 ~ 260 deg.C.
2. After the solder melts, please take rework Package using tweezers.

**Attention**
1. Please be careful so that the solder of the other adjacent components does not melt by thermal influence.
2. Mitsubishi does not recommend, and also not guarantee to use the removed Package.
3. Please put on a wrist wrap in order to protect the other devices from ESD.
5 Evaluation of Solder Printing

(1) Solder shape for MGF495** and MGF485**

Metal Mask Size & Solder shape after printing

<table>
<thead>
<tr>
<th></th>
<th>Xs1</th>
<th>Ys1</th>
<th>Xg1</th>
<th>Yg1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mask Size</strong></td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Solder Size</strong></td>
<td>0.539</td>
<td>0.599</td>
<td>0.589</td>
<td>0.549</td>
</tr>
</tbody>
</table>

Printability is no problem.

6 Notice

These conditions which is shown on this technical note is not only guaranteed condition but also MITSUBISHI’s recommended conditions.
Please confirm the assembly conditions at customer side before using our device.