DESIGN GUIDE

FLEX SOLUTIONS VOLUME

Technology variants

<table>
<thead>
<tr>
<th>Technology variants</th>
<th>RIGID / flex outside</th>
<th>RIGID / flex inside</th>
<th>SEMI / flex / BEND / flex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1F-3R</td>
<td>3(1)-2F-2R</td>
<td>1R-3R</td>
<td></td>
</tr>
<tr>
<td>2F-2R</td>
<td>3R-8F-3R</td>
<td>2R-4R</td>
<td></td>
</tr>
</tbody>
</table>

Flexibility and costs – An estimation

<table>
<thead>
<tr>
<th>Case</th>
<th>Distance A</th>
<th>Distance B</th>
<th>Distance C</th>
<th>Thickness</th>
<th>Flex length L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A ≥ 2R</td>
<td>A + 2T ≥ 2R</td>
<td>B + C + T ≥ 2R</td>
<td>T</td>
<td>L ≥ A + R (π – 2)</td>
</tr>
<tr>
<td>2</td>
<td>L ≥ A + R (n – 2)</td>
<td>L = A + T + R (n – 2)</td>
<td></td>
<td>T</td>
<td>L ≥ A + R (π – 2)</td>
</tr>
<tr>
<td>3</td>
<td>L = A + R (n – 2)</td>
<td>L = A + T + R (n – 2)</td>
<td></td>
<td>T</td>
<td>L ≥ A + R (π – 2)</td>
</tr>
<tr>
<td>4</td>
<td>L = B + C + T + R (½ · π – 2)</td>
<td></td>
<td></td>
<td>T</td>
<td>L ≥ A + R (π – 2)</td>
</tr>
</tbody>
</table>

Calculation of flex length

- L ≥ A + R (π – 2)
- L ≥ A + T + R (π – 2)
- L ≥ B + C + T + R (½ · π – 2)

Lift-off option

- No PTH in the lift-off area
- No copper design allowed on the layer adjacent to the lifted flex area
- Specification in drawing, i.e. “lift-off area, not laminated”
- Preserve NFP (Non Functional Pads) on flexible layers to avoid reliability risk

Advantages of RIGID / flex

- Reliability
- System benefits
- Miniaturization
- Signal integrity
- Dynamic bending

Layout / routing in the bending area

- No vias in flexible area with flex-rigid
- Use teardrops
- Round routing in flexible area

Here you will find more information about the stack-ups:
www.we-online.com/flex-stackups

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![QR Code](https://example.com)