Design Rules for Package Substrates

Using virtually any substrate type, QP Technologies can create board solutions to meet your unique requirements, with industry-leading delivery times (**ABF build in ≤ 16 weeks**) and quality. Through our substrate design and development service, we provide board solutions to meet customers’ demand for a broad range of substrate materials.

The illustration above shows some of the package types and applications that we can address using various substrate options.

Types of Organic Packages

**Type 1:**
**WB/FC-BGA/CSP Package**
- BT core <0.2mm
- BT prepreg build up
- Subtractive process
- Off-set via
- Filled via plating
- WB or FC assembly package

**Type 2A & 2B:**
**FC-HDI BGA Package**
- Low CTE FR4 core 0.4/0.8mm
- Prepreg or ABF build up
- mSAP or SAP process
- TH filling via stack
- Filled via plating
- FC assembly package

**Type 3 (MIS):**
**Ultra HDI Module/FC Package**
- Ultra HDI L/S capability
- Cu filled via plating technology
- Thin core handling/alignment
- Multi-chip module
- Coreless <0.2mm
- ABF build-up SAP process
- Filled TH Cu
- Cu stud vias
- Via plating, via stack
- Multi or FC assembly package
Build-up Materials Available

Current Package Structure

BGA

CSP

Coreless Package

Demand for build-up material

- Fine line & space
  (high adhesion with low roughness)
- Fine via pitch
- Low warpage during cure and reflow
  - Low CTE
- High insulation reliability
  (Layer to layer, and circuit to circuit)
- Lower dielectric constant and loss tangent

Range covers standard BT, LDI, SAP and mSAP technologies

Layers Structure:
From Up to 4-2-4 to Up to 7-2-7

<table>
<thead>
<tr>
<th>Item</th>
<th>Description (min.)</th>
<th>Standard Cu (20μm≤CuT&lt;25μm or 15μm≤CuT&lt;20μm)</th>
<th>LDI Advance (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 Via Diameter</td>
<td></td>
<td>100–200/150</td>
<td>50–100/50</td>
</tr>
<tr>
<td>Cu Stud Diameter [SAP]</td>
<td></td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>D2 Via Pad Diameter</td>
<td></td>
<td>230–350/300</td>
<td>110–200/150</td>
</tr>
<tr>
<td>Cu Stud Pad Diameter [SAP]</td>
<td></td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>S1 Via Pad to Trace Space</td>
<td></td>
<td>20–45</td>
<td>15–35</td>
</tr>
<tr>
<td>S2 Via Pad to Via Pad Space</td>
<td></td>
<td>20–45</td>
<td>15–35</td>
</tr>
<tr>
<td>S3 Bump Pad to Trace Space</td>
<td></td>
<td>20–50</td>
<td>15–40</td>
</tr>
<tr>
<td>S4 Trace to Trace Space</td>
<td></td>
<td>20–50</td>
<td>15–40</td>
</tr>
<tr>
<td>S5 Bump Pad to Shape Space</td>
<td></td>
<td>25–50</td>
<td>20–40</td>
</tr>
<tr>
<td>S6 Trace to Shape Space</td>
<td></td>
<td>25–50</td>
<td>20–40</td>
</tr>
<tr>
<td>S7 Via Pad to Shape Space</td>
<td></td>
<td>25–45</td>
<td>20–35</td>
</tr>
<tr>
<td>S8 Shape to Shape Space</td>
<td></td>
<td>30–50</td>
<td>25–40</td>
</tr>
<tr>
<td>W1 Trace Width</td>
<td></td>
<td>20–45</td>
<td>15–35</td>
</tr>
<tr>
<td>W2 Bump Pad Width</td>
<td></td>
<td>25–45</td>
<td>20–35</td>
</tr>
<tr>
<td>W3 Shape Width</td>
<td></td>
<td>20–45</td>
<td>15–35</td>
</tr>
</tbody>
</table>

Contact us today to get started on your project!

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