ChipArray® CABGA/FBGA

Amkor’s ChipArray Ball Grid Array (CABGA) laminate based packages are compatible with SMT mounting processes worldwide. The near chip size CABGA fine-pitch BGA (FBGA) offers a broad selection of ball array pitches (≥0.3 mm pitch), ball counts and body sizes (1.5 mm to 27 mm body), single and multi-die layouts, stacked die (1-16) and passive component integration.

Thin core laminate (2 to 6 metal layer) from the strongest supply chain in the industry, ultra-thin mold cap thickness and Si thinning to 50 µm enable next generation tablets, smartphones, game controllers, digital and video cameras and remote devices.

Advances in substrate surface finishes and routing techniques reduce gold costs while improving electrical and board level reliability performance. Innovative thermal package structures offer cost competitive solutions for the most challenging thermal management needs.

Applications

The ChipArray package family is applicable for a wide range of semiconductors from high end FPGAs, ASICS to memory, analog, RF devices, MCUs and simple PLDs requiring a package size smaller than conventional PBGAs or leadframe packages. ChipArray packages fill the need for the low cost, minimum space, high performance and reliability requirements of mobile and gaming devices, notebooks, personal computers, networking, automotive and industrial applications.

Thermal Performance (Standard BOM)

<table>
<thead>
<tr>
<th>Body Size (mm)</th>
<th>LFBGA (°C/W)</th>
<th>TFBGA (°C/W)</th>
<th>VFBGA (°C/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 x 8</td>
<td>37.28</td>
<td>36.45</td>
<td>37.52</td>
</tr>
<tr>
<td>10 x 10</td>
<td>29.86</td>
<td>29.04</td>
<td>26.7</td>
</tr>
<tr>
<td>15 x 15</td>
<td>20.1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>19 x 19</td>
<td>17.04</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Reliability Qualification

Amkor assures reliable performance by continuously monitoring key indices:

- Moisture Sensitivity Characterization: JEDEC Level 3 @ 260°C L2 & L1 achievable in some structures/BOMs*
  85°C/85% RH, 168 hours
- HAST: 130°C/85% RH, 96 hours
- Temp/Humidity: 85°C/85% RH, 1000 hours
- Temperature Cycle: -55°C/+125°C, 1000 cycles
- High Temperature Storage: 150°C, 1000 hours
- Automotive AEC-Q100 Grade 0 reliability available**

*Contact Amkor for additional information
**Board level reliability available
ChipArray® CABGA/FBGA

Package View

Process Highlights
- Die thickness: 0.040-0.27 mm
- Marking: Laser
- Ball inspection: Optical
- Wafer backgrinding available
- Encapsulated SMT components available
- Micro Pb-free covered LGA pads/LGAs available

Test Services
- Program generation/conversion
- Product engineering
- Wafer sort
- 256 pin x 20 MHz test system available
- -55°C to +165°C test available
- Burn-in capabilities

Shipping
- Standard JEDEC trays
- Tape and reel
- Dry pack

Standard Materials
- Package substrate:
  - Conductor: Copper
  - Dielectric: Epoxy resin glass reinforced
- Die attach adhesive: Low stress elastomer
- Encapsulant: Epoxy mold compound
- Low alpha material: Available
- Solder balls: Pb-free
- Wire type: Copper (PCC, Au Pcc), Silver and Gold (2N, 4N)

CABGA Package Thickness Capability

<table>
<thead>
<tr>
<th></th>
<th>LFBGA &gt; 1.2 mm</th>
<th>TFBGA 1.2 mm (max)</th>
<th>VFBGA 1.0 mm (max)</th>
<th>WFBGA 0.8 mm (max)</th>
<th>UFBGA 0.65 mm (max)</th>
<th>XFBGA 0.45 mm (max)</th>
<th>XFBGA 0.40 mm (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold Cap Thickness</td>
<td>0.70 mm</td>
<td>0.60 mm</td>
<td>0.45 mm (BGGA)</td>
<td>0.40 mm (BGGA)</td>
<td>0.32/0.35 mm (BGGA)*</td>
<td>0.25 mm (BGGA)*</td>
<td>0.18 mm (BGGA)*</td>
</tr>
<tr>
<td>Substrate Layer</td>
<td>0.32 mm, 0.56 mm</td>
<td>0.21 mm, 0.26 mm</td>
<td>0.21 mm, 0.13 mm</td>
<td>0.13 mm</td>
<td>0.10 mm</td>
<td>0.075 mm</td>
<td>0.040 mm</td>
</tr>
<tr>
<td>Die Thickness**</td>
<td>0.27 mm</td>
<td>0.23 mm</td>
<td>0.18 mm</td>
<td>0.13 mm</td>
<td>0.10 mm</td>
<td>0.075 mm</td>
<td>0.050 mm</td>
</tr>
<tr>
<td>Availability</td>
<td>0.7 mm All Sites</td>
<td>0.45 mm All Sites</td>
<td>0.32 mm, K4, P3 0.35 mm, All Sites</td>
<td>0.25 mm All Sites</td>
<td>0.2 mm K4</td>
<td>0.18 mm K4</td>
<td></td>
</tr>
</tbody>
</table>

*Options are available with microballs
**Die thickness is also dependent on the wirebond loop height requirement

Visit amkor.com or email sales@amkor.com for more information.