

# PBGA/TEPBGA



Amkor's PBGA/TEPGA (Plastic Ball Grid Array/Thermally Enhanced Plastic Ball Grid Array) packages incorporate the most advanced assembly processes and designs for cost/performance applications. This advanced IC package technology allows application and design engineers to optimize innovations while maximizing the performance characteristics of semiconductors.

These PBGA packages are designed for low inductance, improved thermal operation and enhanced SMT ability. Custom performance enhancements, like ground and power planes, are available for significant improvements in electrical response demanded by advanced electronics.

Additionally, these packages utilize industry proven, semiconductor grade materials for reliable, long-term operations while providing user flexible design parameters.

## Features

Innovative designs and expanding package offerings provide a platform from prototype-to-production.

- ▶ Custom ball counts up to 1521
- ▶ 1.00, 1.27 & 1.50 mm standard ball pitch available (other ball pitches available upon request, e.g. 0.8 mm)
- ▶ 17 to 40 mm body sizes
- ▶ Thin Au wire or Cu wire compatible
- ▶ Chip-on-Chip (CoC)
- ▶ Large mold cap for quality enhancement
- ▶ Low profile and lightweight
- ▶ Thermal and electrical enhancement capable
- ▶ Highly flexible internal routing of signal, power and ground for device performance and system compatibility
- ▶ HDI designs possible
- ▶ Suitable substrate for multi-die (MCM) and integrated SMT structures
- ▶ Mature strip based manufacturing process with high yields
- ▶ Full in-house design capability
- ▶ Quickest design-to-prototype delivery
- ▶ Perimeter, stagger and full ball arrays
- ▶ Special packaging for memory available
- ▶ Multi-layer, ground/power
- ▶ JEDEC MS-034 standard outlines
- ▶ Excellent reliability
- ▶ 63 Sn/37 Pb eutectic or Pb-free solder balls

## Applications

The integrated design features of Amkor's PBGAs offer enhanced performance in many devices, making this the ideal package for: microprocessors, microcontrollers, ASICs, gate arrays, memory, DSPs, PLDs, graphics and PC chip sets.

Applications requiring improved portability, form-factor/size and high-performance such as cellular, wireless telecommunications, PCMCIA cards, Global Positioning Systems (GPS), laptop PCs, netbooks, video cameras, disc drives and similar products benefit from Amkor's PBGA attributes.

## Reliability Qualification

Amkor assures reliable performance by continuously monitoring key indices.

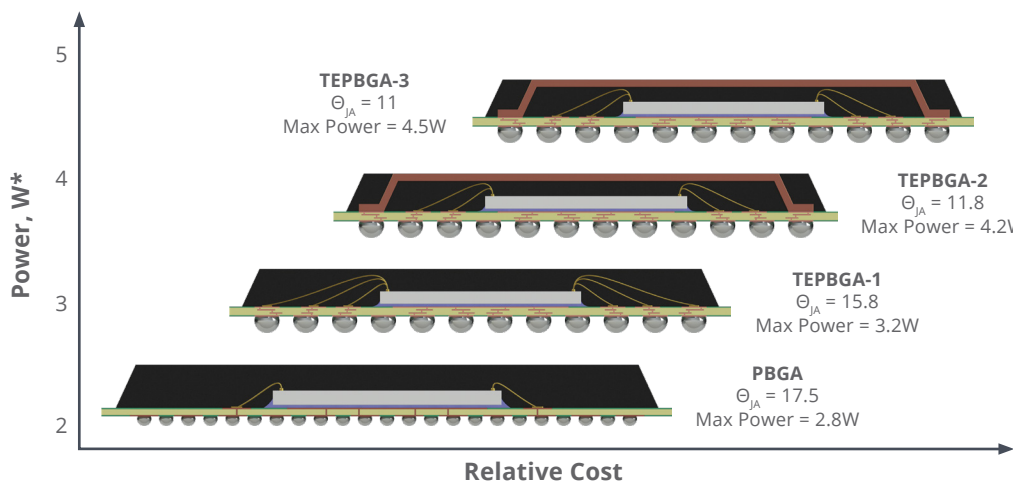
- ▶ Moisture sensitivity characterization: JEDEC level 3, 30°C/60% RH, 192 hours
- ▶ uHAST: 130°C/85% RH, 96 hours
- ▶ Temp cycle: -55°C/+125°C, 1000 cycles
- ▶ High temp storage: 150°C, 1000 hours
- ▶ Automotive AEC-Q100 reliability available

## Process Highlights

- ▶ Die thickness: 13 mils
- ▶ Bond pad pitch (min): 2.4 mils
- ▶ Au wire diameter: 1.2-0.5 mils
- ▶ Cu wire diameter: 1.2-0.7 mils
- ▶ Marking: Laser
- ▶ Ball inspection: Optical
- ▶ Pack/Ship options: JEDEC trays, dry pack
- ▶ Wafer backgrinding available

## Thermal Performance

### Thermal Performance vs. Cost



\*Max powers shown are estimates based on 35 x 35 mm body, 10.2 x 10.2 mm die, 64 thermal balls/vias,  $\Delta T = 50^\circ\text{C}$ , no air flow, JEDEC multilayer PCB

## Standard Materials

- ▶ Package substrate: CCL-HL832HX-A
- ▶ Die attach adhesive: Ablestik 2300
- ▶ Wire: Au HTS/Cu PCC
- ▶ Mold compound: Nitto GE100L, Sumitomo G770FE
- ▶ Solder balls: Leaded or lead-free options

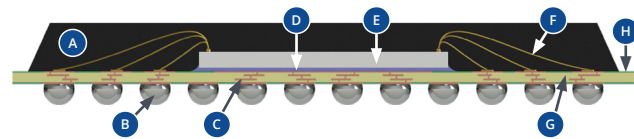
## Test Services

- ▶ Program generation/conversion
- ▶ Product engineering
- ▶ Wafer sort
- ▶ 256 pin x 20 MHz test system available
- ▶ -55°C to +125°C test available
- ▶ Burn-in capabilities
- ▶ Tape and reel services

## Shipping

- ▶ JEDEC outline CO-029 low-profile tray

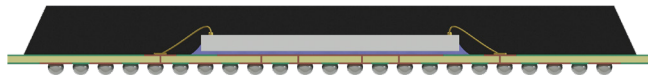
## Cross Section PBGA



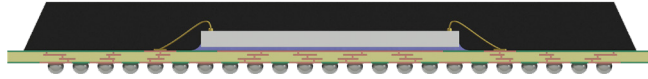
- |          |                      |          |                |
|----------|----------------------|----------|----------------|
| <b>A</b> | Mold compound        | <b>E</b> | Die            |
| <b>B</b> | Eutectic solder ball | <b>F</b> | Wirebond       |
| <b>C</b> | Via                  | <b>G</b> | Rigid laminate |
| <b>D</b> | Die attach adhesive  | <b>H</b> | Solder mask    |

# PBGA/TEPBGA

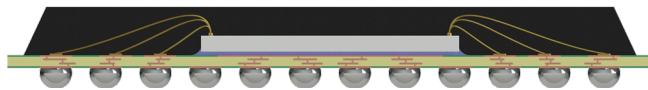
## PBGA Standard Package Offering



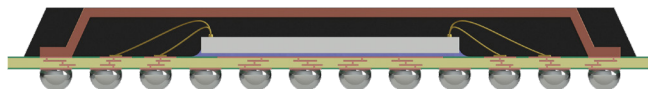
PBGA - 2 layer



PBGA - 4 layer



TEPBGA-1



TEPBGA-2  
TEPBGA-3

- ▶ PBGA (qualified L2AA/260°C)
- ▶ 2/4/6 Layer
- ▶ 4 Layer with 1 oz (35  $\mu\text{m}$ ) internal Cu planes
- ▶ Single or multi-die

- ▶ TEPBGA-1 (qualified L2AA/260°C)
- ▶ 4 Layer with 2 oz (70  $\mu\text{m}$ ) internal Cu planes
- ▶ Single or multi-die

- ▶ TEPBGA-2 (qualified L3/260°C)
- ▶ 4 Layer with 2 oz (70  $\mu\text{m}$ ) internal Cu planes
- ▶ Embedded Cu heat spreader (grounded option)
- ▶ TEPBGA-3 (qualified L3/260°C)
- ▶ 4 Layer with 2 oz (70  $\mu\text{m}$ ) internal Cu planes
- ▶ Embedded Cu heat spreader (grounded option)
- ▶ Thermally enhanced mold compound



Visit [amkor.com](http://amkor.com) or email [sales@amkor.com](mailto:sales@amkor.com) for more information.

With respect to the information in this document, Amkor makes no guarantee or warranty of its accuracy or that the use of such information will not infringe upon the intellectual rights of third parties. Amkor shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon it and no patent or other license is implied hereby. This document does not in any way extend or modify Amkor's warranty on any product beyond that set forth in its standard terms and conditions of sale. Amkor reserves the right to make changes in its product and specifications at any time and without notice. The Amkor name and logo are registered trademarks of Amkor Technology, Inc. All other trademarks mentioned are property of their respective companies. © 2020 Amkor Technology, Incorporated. All Rights Reserved. DS520T-EN Rev Date: 12/20

