



APPLICATIONS

The fcCSP package is an attractive option for applications in which both performance and form factor are critical. Examples include high-performance mobile devices (including 5G), infotainment and ADAS for automotive and AI. Further, the benefits from low inductance and increased routing density enable optimized electrical paths for high-frequency signals, making fcCSP suitable for Baseband, RF and in-substrate antenna applications.

PROCESS HIGHLIGHTS

- ▶ Die size: 0.5 x 0.5 mm² to 16 x 16 mm²
- ▶ Package size: 1 x 1 mm² to 25 x 25 mm²
- ▶ Bump pitch (LF or eutectic)
 - ▷ As low as: 80 µm
- ▶ Bump pitch (Cu pillar)
 - ▷ As low as: 30/60 µm

Flip Chip CSP (fcCSP)

Amkor Technology offers the Flip Chip CSP (fcCSP) package – a flip chip solution in a CSP package format. This package construction can be used with all of Amkor’s available bumping options (copper pillar, Pb-free solder, eutectic), while enabling flip chip interconnect technology in area array and, when replacing standard wirebond interconnect, in a peripheral bump layout. There are multiple advantages to flip chip interconnect; it provides enhanced electrical performance over standard wirebond technology, it allows for a smaller form factor due to increased routing density and it eliminates the z-height impact of wirebond loops.

The fcCSP package is assembled on a laminate or mold-based substrate with or without a core. The package is processed in strip format for manufacturing efficiency and to minimize cost and enables bare die, overmolded and exposed die structures. The thermal challenges of high-power devices can be managed by applying an integrated heat spreader. Antenna in Package (AiP) can be enabled with the use of bottom side chip attach (POSSUM™). Finally, when coupled with copper pillar bumped die, fcCSP technology takes advantage of fine line/space substrate routing and bump pitch to reduce layer count and cost while increasing electrical performance.

Features

- ▶ Suitable for low and high-frequency applications
- ▶ Low inductance of flip chip bumps – short, direct signal path
- ▶ No technological limitation to BGA ball count
- ▶ Target markets – mobile (AP, BB, RF, PMIC), automotive, consumer, connectivity, multi-die (side-by-side or stacked) applications requiring high-routing density
- ▶ Custom package sizes and shapes with strip-based processing
- ▶ Coreless, thin core, laminate and molded substrate construction
- ▶ Bare die, overmolded, exposed die molded constructions
- ▶ Accommodates package sizes from 1 x 1 mm² to 25 x 25 mm²
- ▶ Bump pitches down to 50 µm in-line and 30/60 µm staggered
- ▶ BGA ball pitches down to 0.3 mm
- ▶ Package thicknesses down to 0.35 mm
- ▶ Turnkey solutions – design, bumping, wafer probe, assembly, final test
- ▶ Exposed die molding available for low-profile and thermal applications
- ▶ Heat spreader attach available for high-power devices
- ▶ Bottom side chip attach available for AiP applications (POSSUM™)
- ▶ Mass reflow and thermal compression chip attach available

Flip Chip CSP (fcCSP)

Standard Materials

- ▶ Substrate
 - ▷ Laminate: Prepreg, ABF
 - ▷ Molded
 - ▷ Supplier base: Extensive experience with all major suppliers of substrates & substrate materials
- ▶ Bump: Cu pillar, Pb-free solder, eutectic solder
- ▶ Underfill: Epoxy mold compound (MUF), capillary materials (CUF)
- ▶ Encapsulant: Epoxy mold compound
- ▶ Solder balls: Pb-Free

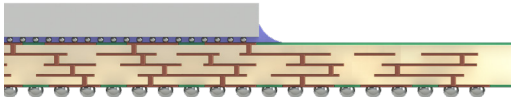
Test Services

- ▶ Program generation/conversion
- ▶ Product engineering
- ▶ Wafer sort
- ▶ -55°C to +165°C test available
- ▶ Burn-in capabilities
- ▶ Tape and reel services

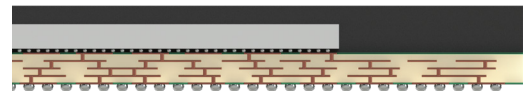
Shipping

- ▶ JEDEC trays

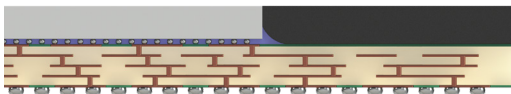
Cross Sections



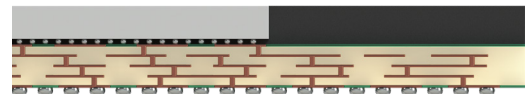
Bare die, capillary underfill



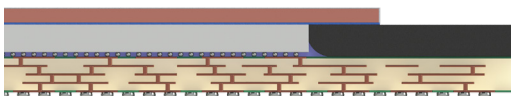
Overmolded, molded underfill



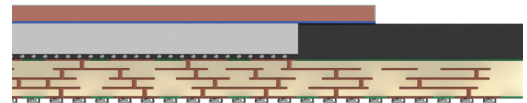
Exposed die molded, capillary underfill



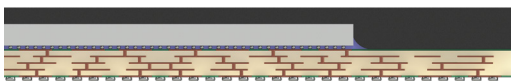
Exposed die, molded underfill



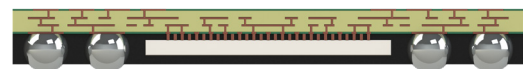
Exposed die molded, capillary underfill
plate heatsink



Exposed die molded, molded underfill
plate heatsink



Overmolded, capillary underfill



POSSUM™ antenna in package,
molded underfill



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