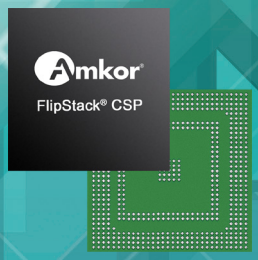
FlipStack® CSP



The FlipStack® CSP family utilizes Amkor's industry leading ChipArray® Ball Grid Array (CABGA) manufacturing capabilities, in combination with Amkor's fcCSP technology. This broad high-volume infrastructure enables the rapid deployment of advances in die stacking technology across multiple products and factories to achieve lowest total cost.

FlipStack® CSP technology enables the stacking of a wide range of different semiconductor devices to deliver the high level of silicon integration and area efficiency required in portable multi-media products. This type of packaging uses high density thin core substrates, advanced wafer thinning, die attach, flip chip and wire bonding capabilities to stack multiple devices in a conventional fine pitch BGA (FBGA) surface mount package.

Many customers have relied on Amkor to solve their highest density and most complex device stack combinations. As a result, Amkor has established industry leadership in stacking complex mixed signal, logic + memory devices, including digital base band or application/processors + high density flash or mobile DRAM devices. Designers are looking to FlipStack® CSP technologies to achieve integration, size and cost reductions in chip set combinations.

FEATURES

- Package height down to 0.6 mm
- Design, assembly and test capabilities that enable stacking combinations of memory, logic and mixed signal type devices
- Established package infrastructure with standard CABGA and fcCSP footprints
- Consistent product performance with high yields and reliability
- Die overhang wirebonding
- Low loop wirebonding to 40 µm or less
- Pb-free, RoHS compliant and green materials
- Passive component integration options
- JEDEC standard outlines including MO-192, MO-195, MO-216, MO-219 and MO-298

Applications

FlipStack® CSP technology enables smaller, lighter and more innovative new product form factors at a lower cost. This solution addresses a range of design requirements, and enables a wide variety of applications, including portable multimedia devices such as tablets, cell phones and digital cameras.

Reliability Qualification

Amkor assures reliable performance by continuously monitoring key indices.

- Moisture resistance testing: JEDEC level 3 @ 260°C
- Biased/Unbiased HAST: 121°C/100% RH, 2 atm, 192 hours
- Temp/Humidity: 85°C/85% RH, 1000 hours
- Temp cycle: -55°C/+125°C, 1000 cycles
- High temp storage: 150°C, 1000 hours

Board Level

- Thermal cycle: -40°C/+125°C, 1000 cycles

Test Services

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

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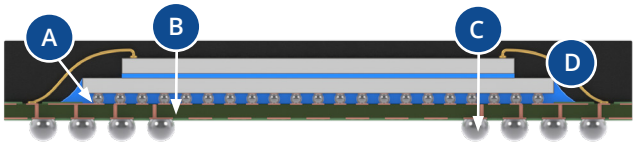
FlipStack® CSP

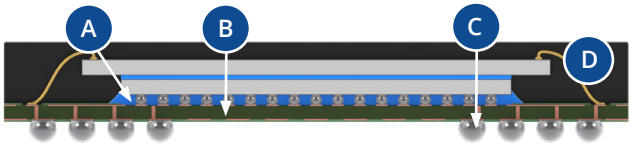
Standard Materials

- Package substrate
  - Laminate dielectric
    - HL832: NXA, NS, NS-LC, NSF-LCA
    - E679: FG, FGB, FGBS, GT, E700G, E705G, DS7409HG, DS7409HGB(S), DS7409HGB(LE), ELC4785GSB, ELC4785THB, ELC4785THG
  - Layer count (laminate): 2-6
- Die attach
  - Bottom die: Flip chip attached by mass reflow or thermal compression
  - Top die: Non-conductive epoxy, film
- Wire type: Au, Cu or Ag
- Encapsulant: Transfer molded epoxy
- Underfill: Capillary or molded
- Bumps (F/C die): Pb-free, eutectic, Cu pillar
- Solder balls: Pb-free, eutectic
- Device type: Silicon, SiGe, GaAs, glass (IPD film on glass)
- Marking: Laser

Cross Sections



- **A** Capillary or molded underfill options
- **B** 2-6 Layer substrates
- **C** Eutectic or lead-free solder ball options
- **D** Gold, silver or copper wire options



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Process Highlights

Ball pad pitch:	0.35, 0.4, 0.5, 0.65, 0.75, 0.8, 1.0 mm
Die thickness (flip chip):	As thin as 70 µm
Die thickness (wirebond):	As thin as 50 µm
Ball diameter:	As required
Wirebond pitch (min):	40 µm in-line with roadmap to 25 µm
Bump pitch mass reflow:	60 µm in-line
Thermal compression:	50 µm in-line
Wirebond length (max):	5 mm (200 mils)
Wirebond diameter (min):	0.7, 0.8, 0.9, 1.0 mil+ in gold, silver or copper wirebond diameters
Wafer diameter:	150, 200 & 300 mm wafers

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