Data Sheet

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.

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 multi-media devices (cell phones, digital cameras, PDAs and audio players).

Visit Amkor Technology online for locations and to view the most current product information.

FlipStack® CSP

Features

- 4-15 mm body size
- Package height down to 0.6 mm
- Design, assembly and test capabilities that enable stacking combinations of memory, logic and mixed signal type devices in I/O counts from 50 to 1100
- Established package infrastructure with standard CABGA and fcCSP footprints
- Consistent product performance with high yields and reliability
- Die overhang wire bonding
- Low loop wire bonding to 40 µm or less.
- Wafer thinning: wire bond to 40 µm, bumped wafer to 75 µm, cu pillar bumped wafer to 50 µm
- 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

Reliability Qualification

Amkor assures reliable performance by continuously monitoring key indices:

• Moisture Resistance Testing	JEDEC Level 3 @ 260°C
• Unbiased Autoclave/PCT	121°C/100% RH, 2 atm, 168 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

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Process Highlights

- Ball pad pitch: 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
- Laminate core thickness: 60, 100 or 150 µm
- Ball diameter: 0.18, 0.20, 0.22, 0.25, 0.3, 0.4, 0.46 mm
- Wirebond pitch (min): 40 µm in-line with road map to 25 µm
- Bump pitch mass reflow: 80 µm In-line, 130 µm array
- Thermal compression: 30 µm/60 µm staggered peripheral 150 µm array
- Wirebond length (max): 5 mm (200 mils)
- Wirebond dia (min): 0.7, 0.8, 0.9, 1.0 mil+ in gold, silver or copper wire bond diameters
- Wafer thinning: 150, 200 & 300 mm wafers

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: Dispensed
- Bumps (F/C die): Pb-free, Eutectic, Cu Pillar
- Solder balls: Eutectic, Pb-free
- Device type: Silicon, SiGe, GaAs, Glass (IPD film on glass)
- Marking: Laser

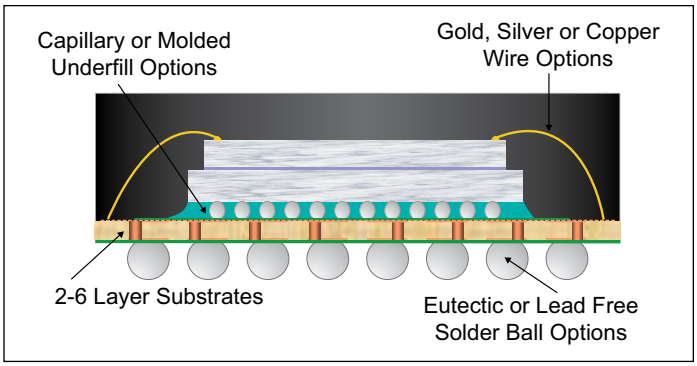
Test Services

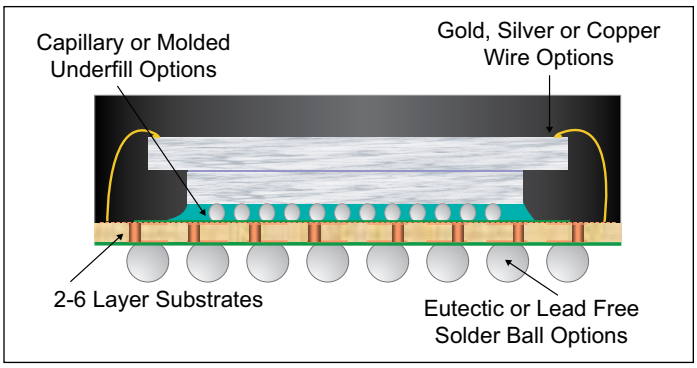
- Program generation/conversion
- Product engineering
- Wafer sort
- -55°C to +165°C test available
- Burn-in capabilities
- Tape and reel services

Shipping

- JEDEC trays

Cross-section FlipStack® CSP





Wide range of die size combinations supported.

Contact Amkor for the latest FlipStack® packaging capabilities.

Visit Amkor Technology online for locations and to view the most current product information.

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