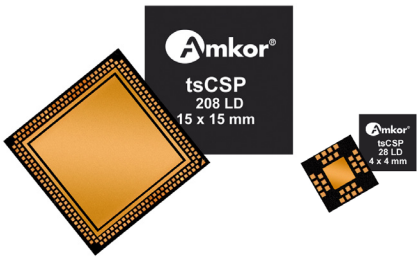
data sheet

tsCSP



Thin Substrate CSP (tsCSP):
Very Thin, Superior Performance, Cost Effective

Amkor's tsCSP is a land grid array multi-row package (up to 3 rows of lands) compatible with established CSP mounting processes. The near-chip-size standard outlines of the tsCSP package offer a broad selection of land pitch, count, and body sizes. By utilizing a thin substrate, this package achieves a standard height of 0.4 mm to 0.8 mm.

The package uses Amkor's ExposedPad™ technology as a thermal enhancement by having the die attach paddle exposed on the bottom of the package surface to provide an efficient heat path when soldered directly to the PWB. These enhancements also enable stable ground by use of down bonds or by electrical connection through a conductive die attach material.

Regardless of body size and thickness, Amkor tsCSP packages utilize streamlined, flexible manufacturing process to provide economical packaging solutions.

Applications:

Amkor's tsCSP package is an ideal choice for handheld portable devices such as cell phones and PDAs or other applications requiring small size, light weight, excellent thermal and electrical performance, and low cost.

Typical device applications for Amkor's tsCSP package include hard disk drives, USB controllers, wireless LAN, memory, analog, ASICs, RF devices and simple PLDs.

Features:

- Low NRE cost
- Square or rectangle packages available
- Body sizes less than 2mm SQ and up to 15mm SQ*
- Ultra thin: 0.35 to 0.75mm nominal package profile
- High I/O density: 0.5mm, 0.4mm land pitch
- Isolated Power/Ground ring option
- Strip testing capabilities
- No antenna effect for high speed devices
- High MSL performance (L1/260 MSL)**
- Exposed die attach pad for superior thermal performance
- No die attach pad for additional routing under die
- JEDEC MO-247 compliant: Plastic Quad No-lead Staggered Multi-row Packages
- JEDEC Publication 95 Design Guide 4.19 complaint: Quad No-lead Staggered and Inline Multi-row Packages
- Standard PB free and Green package

* Qualification required for larger body sizes
** Depending on body sizes

Thermal Resistance:

JEDEC Multi-layer PCB

Package Size (mm)	I/O Count	Exposed Pad (mm)	Die (mm)	Theta JA (°C/W)
15 x 15	208	11.6 x 11.6	9.3 x 9.3	19.4
10 x 10	200	5.8 x 5.8	5.29 x 5.29	24.9
7 x 7	92	3.8 x 3.8	3.29 x 3.29	33.6
4 x 4	28	1.7 x 1.7	1.29 x 1.29	57.5

Modeled data @ 0 air flow and 1W power

Electrical Simulation:

Package Size (mm)	I/O Count	(nH)	(pF)	(mOhm)
12 x 12	172 (corner)	4.22	0.286	217.2
12 x 12	172 (center)	3.04	0.264	173.5

Values dependent on specific die and wire configurations_

Reliability:

Amkor's tsCSP packages are reliability assured through optimized design, material and process.

• Moisture sensitivity characterization	JEDEC Level 1* 85 °C/85%, 168 hours
• HAST	130 °C/85% RH, 96 hours
• Temp cycle	-65 °C/+150 °C, 1000 cycles
• High temperature storage	150 °C, 1000 hours

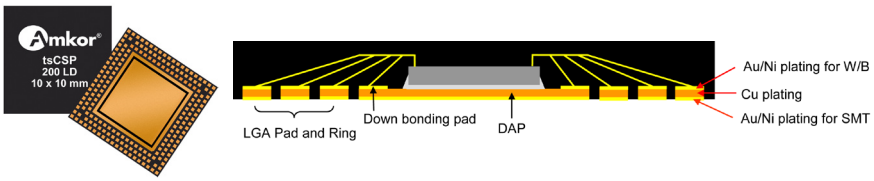
*Depending on body size

data sheet

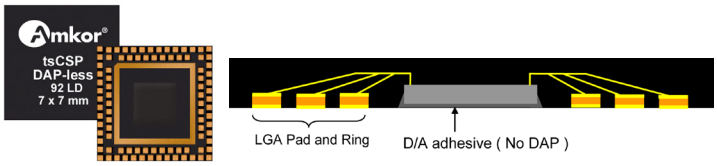
tsCSP

tsCSP Cross Sections

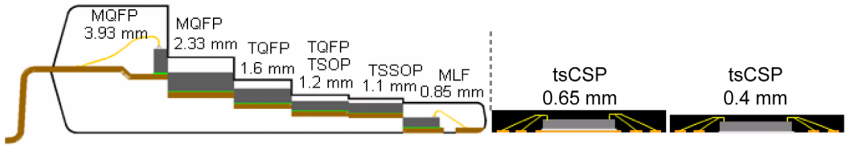
Exposed Die Pad



Non-Exposed Die Pad
(For thin package and/or escape routing on board)



Package Height Comparison



Process Highlights

Die thickness	0.25 ± 0.5 mm nominal
Plating	Au/Ni
Marking	Laser

Standard Materials

Substrate	Plate-up coreless technology, Au/Ni/Cu
Die attach	Conductive Epoxy
Wire	1.0 mil low loop
Mold compound	Pb free / Green capable

Test Services

- Program generation / conversion
- Product engineering support
- Available test / handling technology
- Burn-in capabilities
- Tape & Reel services

Shipping

This product is shipped in clear antistatic tubes, bakeable trays or metal canisters.

tsCSP PACKAGE OFFERING

Body Size	0.4 mm Pitch I/O 1- row	0.4 mm Pitch I/O 2-rows	0.4 mm Pitch I/O 3-rows	0.5 mm Pitch I/O 1-row	0.5 mm Pitch I/O 2-rows	0.5 mm Pitch I/O 3-rows	0.65 mm Pitch I/O 1-row	0.65 mm Pitch I/O 2-rows
3	24	36		20	28			
4	36	60		28	44			
5	44	76	96	36	60	80		
6	56	100	132	44	76	104		
7	64	116	156	52	92	128	36	68
8	76	132	180	60	108	152	44	76
9	84	156	216	68	124	176	48	92
10	96	172	240	76	140	200	56	100
11	104	196	276	84	156	224	64	116
12	116	212	300	92	172	248	68	124
13	124	236	336	100	188	272	76	140
14	136	252	360	108	204	296	80	148
15	144	276	396	116	220	320	88	164

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