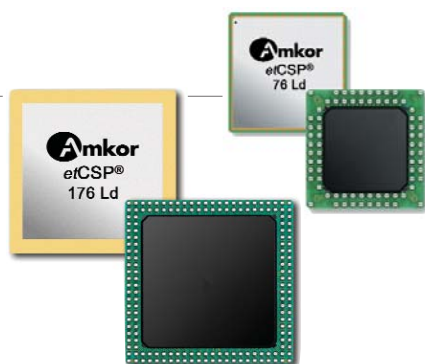




etCSP® Package:

Amkor's etCSP® package is the first ball grid array capable of an extremely thin 0.5 mm maximum mounted height. This package can squeeze into applications requiring a thin form factor. The etCSP® package is constructed using conventional IC processing including standard wire bonding, molding and substrate infrastructure. The resulting package consists of one or two peripheral rows of 0.3 mm diameter solder balls to allow common SMT processing.

There are many advantages as a direct result of the unique etCSP® design. One key advantage is the 0.5 mm mounted height of the package, the result of solder ball diameter and thin core laminate substrate. Every other aspect of the package, die, wires and moldcap are within the dimensions of the substrate and solderballs. Another direct result of the etCSP® design is the superior moisture resistance. Since die attach materials are not used to mount the die, there is reduced capability to trap moisture. Therefore, popcorn induced delamination is reduced.

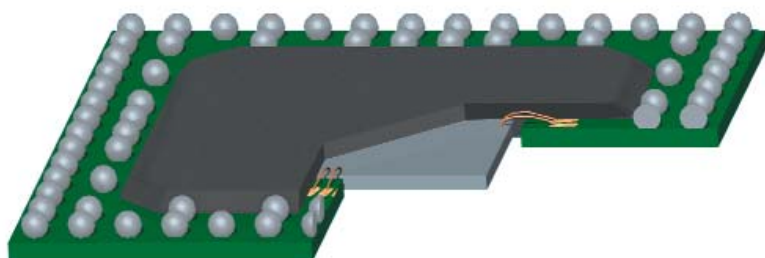
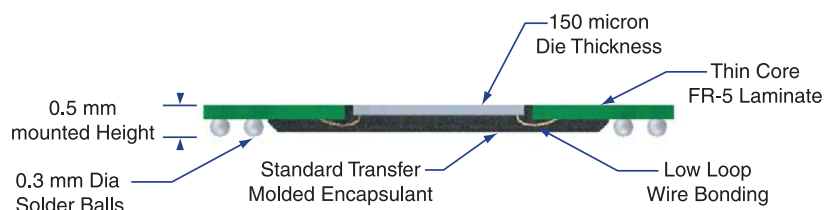
The etCSP® package can also be designed with the capability of stacking completely tested packages, i.e., packaged memory, into a single footprint on the motherboard. In this manner, two stacked etCSP™ packages can be tested before mounting and the combined height is less than 1.0 mm.

etCSP®

Features:	<ul style="list-style-type: none"> Up to 176 ball count 7-12 mm body size Thinnest CSP available at 0.5 mm max mounted height JEDEC Level 1 Reliability to 260 °C reflow temperature Conventional process flow with proven wirebond technology Standardized footprints at 0.5 mm pitch Package stacking potential of tested packages Two stacked die potential 		
Thermal Performance:	12 x 12 mm body; 176 I/O; Typical 39 °C/W Amkor's initial etCSP® packages are offered for low power applications. Higher thermal performance can be achieved by adding a heat spreader or heat sink to the die's exposed backside. In addition, future die-up configurations will provide a direct heat dissipation path into the product motherboard through the die backside.		
Electrical:		Min	Max
	Inductance (nH)	0.735	1.546
	Capacitance (pF)	0.176	0.319
	Resistance (mOhms)	47.9	89.83
	Package Dimensions: 7 x 7 mm body; 89 I/O; 0.3 mm ball diameter; 100 MHz		
Reliability:	Package Level*: <ul style="list-style-type: none"> Moisture sensitivity JEDEC Level 1 @ 260 °C Temp Cycle -55 °C / +125 °C, 1000 cycles Temp/Humidity 85 °C / 85% RH, 1000 hrs High Temp Storage 150 °C, 1000 hrs PCT/HAST 130 °C, 85% RH, 96 hrs *Data for 12 x 12 mm body; 176 I/O; 7.62 mm DC die, 0.15 mm thick Board Level: <ul style="list-style-type: none"> Thermal cycle -55 °C / 125 °C 2 cycles / hour, 1000 cycles First failure 1100 cycles Lead free solder 		

Applications:

Amkor's etCSP® design makes this package type ideal for PCMCIA card applications, mini disk drives, thin wireless handsets, Flash or EEPROM memory and other portable products where vertical height is limited. Because of the unique design of the etCSP® package, stacking is easily achieved with proper substrate designs. This creates an opportunity to multiply memory capacity without increasing board area.

Cross-section etCSP®**etCSP®****Process Highlights**

Die thickness (max)	150 μ m
Wire bonding	Standard; low loop
Die attach adhesive	Not required
Package marking	Laser

Standard Materials

Package substrate	Thin core FR5 or equivalent
Au wire	20 μ m diameter
Encapsulant	Standard EMC
Solder balls	0.3 mm dia. 63 Sn/37Pb & SnAgCu
Top coating	Conductive epoxy (option)

Shipping

etCSP® packages are shipped in JEDEC trays or tape and reel if final electrical testing is performed.

Daisy Chain Availability

etCSP® 80, 7 x 7, 0.5 mm ball pitch
etCSP® 176, 12 x 12, 0.5 mm ball pitch

Configuration Options:**etCSP® Standard Package Offering
(units in mm)**

Package Size	Max Die Size	Max I/O (2 rows)
7 x 7	3.6	96
8 x 8	4.6	112
9 x 9	5.6	128
10 x 10	6.6	144
11 x 11	7.6	160

*Maximum die size may increase +1 mm.