

Ball Grid Array (BGA) is a package style of integrated circuits at which the connections compactly lie on the underside of the chip for SMD equipping.

The connections are little plumb line pearls which are in a grid besides each other from columns and lines. These pearls will solder in a furnace on melted and combine with the copper of the circuit board at the Reflow.

This form represents a solution of the problem of the accommodation of a very large number of connections on a component. Conventional dual in line or pin-Grid Array forms must dually have higher minimum distances between the connections to avoid the short circuit formation during the process of soldering conventional.

The chips can be removed from the circuit board with hot air without taking damage. The tin solder pearls can be removed from the chip (deballing). They can be soldered again with new tin balls (reballing) and it is possible to assemble it on a new circuit board. This technique also can be used to exchange faulty chips at the repair of circuit boards.

Key benefits:

- low space requirements
- Self centering when soldering due to the surface tension of the tin
- good thermal deduction to the circuit.
- low impedance by short connections
- Made more difficult for manipulations at safety relevant wirings as well as imitation.
- A well adjustet Reflow-soldering is necessary for a good quality, better solutions with the steam
- Phase
- Inspection and repair of the soldering points is more difficult. Besides radiograph and ultrasound methods the direct visual inspection is only restrictedly possible.
- mechanical tensions on the printed board are transferred more strongly to the components
- as "gull Wing" components
- only with special equipment like regulated soldering furnace are safe results possible.
- Initiation, measuring and repairs are more heavily accessible.

Different types

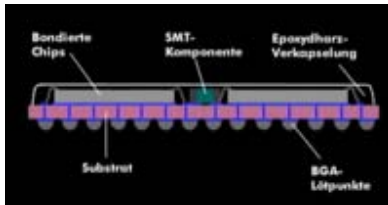
- ❖ BGA, grid 0,7-1,5 mm
- ❖ FBGA, Fine Pitch BGA, BGA package with a reduced soldering dot pitch (0,5-0,7 mm)
- ❖ VFBGA, Very Fine BGA, grid < 0.5 mm
- ❖ FCBGA, Flip chip BGA
- ❖ CBGA, Ceramic ball Grid Array, like BGA in the ceramic package
- ❖ CSP, chip Scale package, no BGA heard to the LLPs (Lead Less chip carrier)

Testing of BGAs

Testing of BGA circuit needs a resolvable adapter, sockets or for example rigid needle adapters. Contact from pad structures to down to a Pitch of 150 µm.

BGA (BGA package)

The architecture of the BGA package (Ball Grid Array) is assimilable with a small printed circuit with a plastic case that includes the electronic. The connections on the underside of the printed circuit consist of spherically formed soldering points; is ordered in a square Array in which connection points are from saved in the middle of the Arrays.

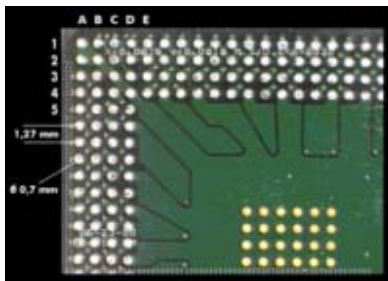



Construction of a BGA-Chip 

BGA socket are CPU socket for 32 and 64 bit processors with more than 200 connection pins.

BGA packages

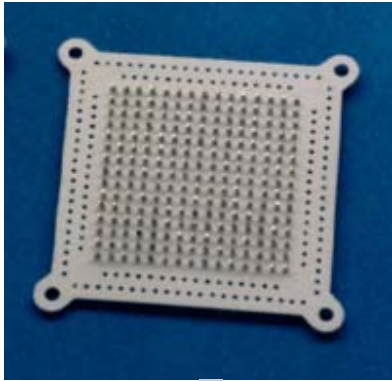
Are available with 256, 352, 420 and 560 connection points which are placed in a distance of 1 mm or 1.27 mm (1/20 inches). The connections are in an axis with numbers, marked with letters in the other axis. The connection "A1" is in the place of the marking, this is the corner of the BGA which doesn't show any notching.




 BGA constituent with spherical connection contacts

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At the assembly the BGA package is put together on a BGA adapter. These will melt soldering points as long as heated up and combine with the lines on the adapter. Since the distances of the individual connection soldering points are only 1 mm or 1.27 mm from each other, a precise positioning of the chip is imperative.



BGA-adapter 

BGA adapter