

COB Technology

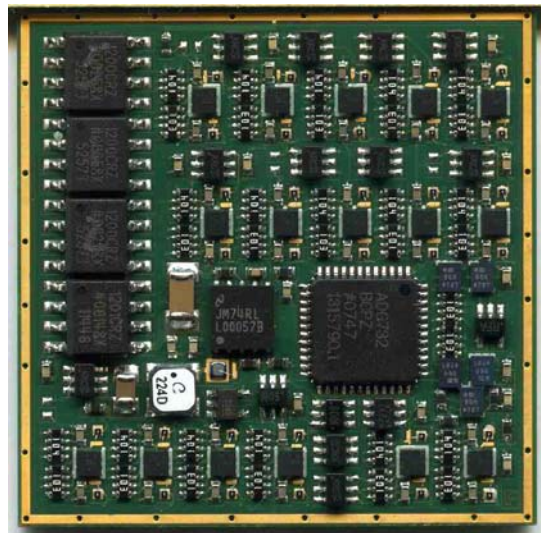
Manufacturing processes for Chip-on-Board modules may be applied to PCB or IMS substrate, the main differences is the basic materials substrate used.

A bare chip that is mounted directly onto the printed circuit board (PCB). After the wires are attached, a glob of epoxy or plastic is used to cover the chip and its connections.

Printed circuit boards or PCB's are made from a number of different materials such as phenolic resins, polyurethane, polyamide resin, silicon, epoxy, Teflon and more.

A PCB consists of two basic parts: a substrate (the board) and printed wires (the copper traces). The substrate provides a structure that physically holds the circuit components and printed wires in place and provides electrical insulation between conductive parts.

The conductive tracks used in COB can be normal copper but the bond pads on the board require special preparation. Usually they are built up from a copper base covered with a 2 to 4 micron layer of nickel in which a 0.1 to 0.2 micron layer of gold is deposited. Today bond pads of less than 100 microns with a pitch of less than 100 microns are state of the art.



Al-Wire

Copper foil

Nickel (2 μm)

Gold (0.1 μm)

The bond surface must be completely free of contaminants.

Gold Wire

Copper foil

Nickel (2 μm)

Gold (1 to 2 μm)

The chips are attached to the board using silver or isolating epoxy pastes cured and degassed at around 150°C.

The problem of conducting away the heat generated by power devices is solved by bonding the chips onto a metallic plate integrated into the board. During final assembly the cooling plate will be fixed to cooling fins or the main casing.

The chips electrical connections are usually made with gold or aluminum wire.

After wire bonding the chips may be encapsulated using various processes.

Silicone or epoxy compounds cured at 100°C temperature are used.

Additionally the chip can be covered with a plastic or metal case. Finally the COB element will be mounted in a package and electrically connected using soldering, bonding or crimping techniques.

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