FCOS™ Flip Chip on Substrate

The evolution of chip card modules

FCOS™ (Flip Chip on Substrate) stands for the latest evolution of chip card technology: It combines newest flip chip assembly with a revolutionary concept of materials. FCOS™ is a joint development of Infineon Technologies and Giesecke & Devrient.

FCOS™ CHIP MODULES offer leading-edge chip card technology for both memory and microprocessor cards (6- and 8-contact modules). Higher mechanical stability as well as an increased optical quality of the FCOS™ cards provide a clear advancement for chip cards. The FCOS™ modules are designed to be used in standard card production equipment.

Possible application areas for the FCOS card:
- Electronic payment
- Mobile telecommunications
- ID cards

Benefits
- Improvement for high dynamic bending stress
- Increased mechanical reliability for statical tests
- Increased flatness of the module
- Increased temperature cycling (MIL-STD 883)
- High corrosion resistance (ISO 10373-1)
- Housing for large IC area
- Increased bonding area module-cardbody
- FIPS compatibility
- Green package (RoHS compliant)
- Standard card production equipment usable
- Proven technology – successful in field
- Fulfils future technology requirements

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Secure Mobile Solutions

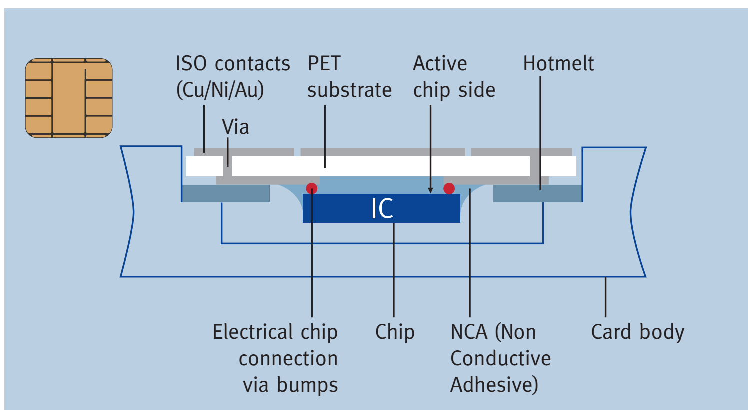
Never stop thinking.

What is Flip Chip?

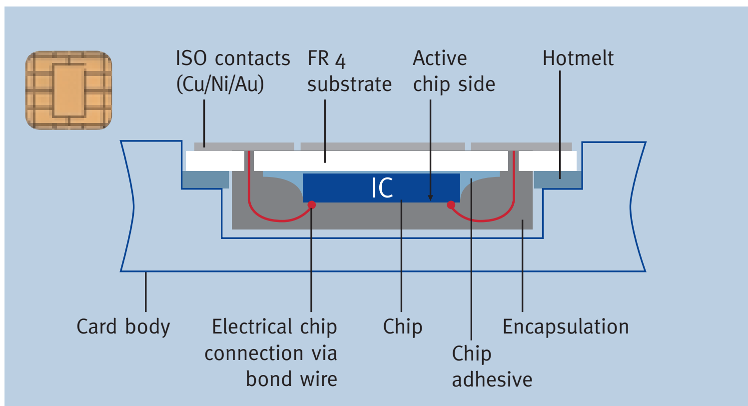
THE TERM FLIP chip technology refers to a process of interconnecting semiconductor chips with carriers. The technology makes it possible to increase the packing density of elements on a carrier and allows for a more direct and more stable electrical interconnection compared to wire bond technology.

UNLIKE WIRE BOND technology, which has been almost exclusively used in smart card modules up to now, the flip chip process involves flipping the chip, i.e. its electrical interconnections (pads) are turned toward the carrier side. In addition, there is no need for encapsulation (glob top). The electrical interconnection is made using conductive materials, so-called bumps, located between the chip contacts and carrier. The system is held together mechanically by means of an adhesive between the chip and carrier.

AS A RESULT of the development of new materials for flip chip technology and optimisation of the production process, it is now possible to use flip chip technology in the area of smart cards.



FCOS card cross section



Standard module card cross section

Technical Details

- **Thickness**
  Approx. 300 – 500 µm
- **Dimensions**
  Comparable to existing module types
- **Card materials**
  Can be embedded in standard card material
- **Throughput**
  Comparable to existing products
- **Variations**
  6- and 8-contact modules

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