



**DIGITCONCEPT**

Microelectronics & HighTech Equipment

# ***Analog IC sample prep***

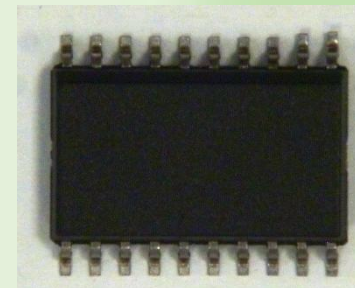
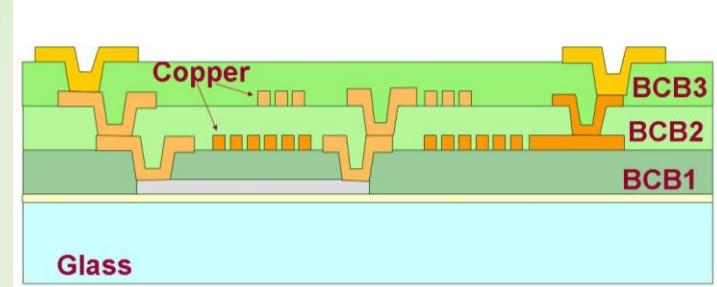
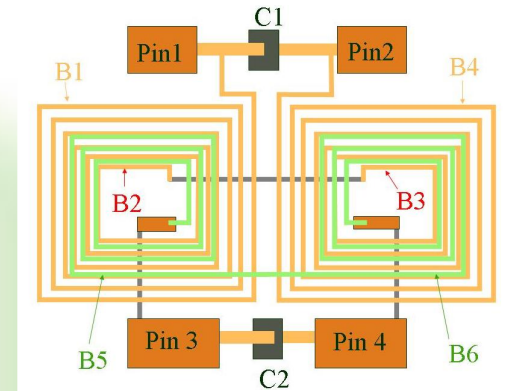
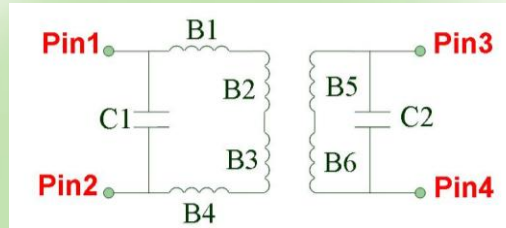


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## Case study of failing device using BCB/Cu technology

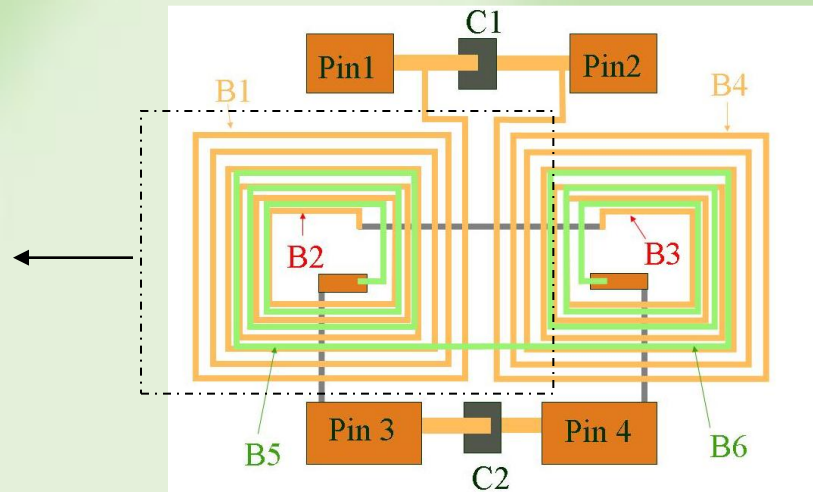
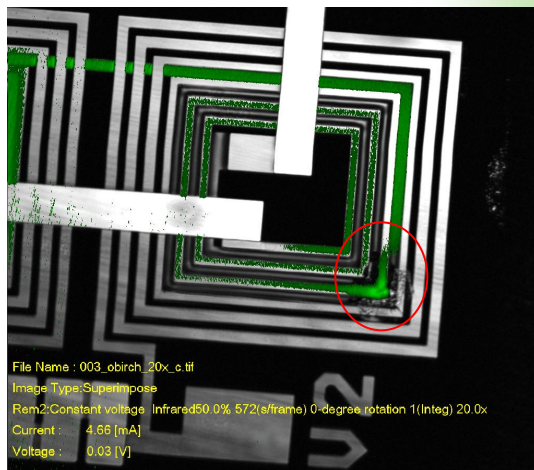
- The component is an RF product used in the transceiver module of cellular phones, and is made up of inductors and capacitors.
- The component contains:
  - A glass substrate
  - 2 copper metallization layers
  - Several dielectric layers composed of BCB, an organic isolator
- The component is encapsulated in an SO20 type package made of plastic molding compound





## Localization of defect

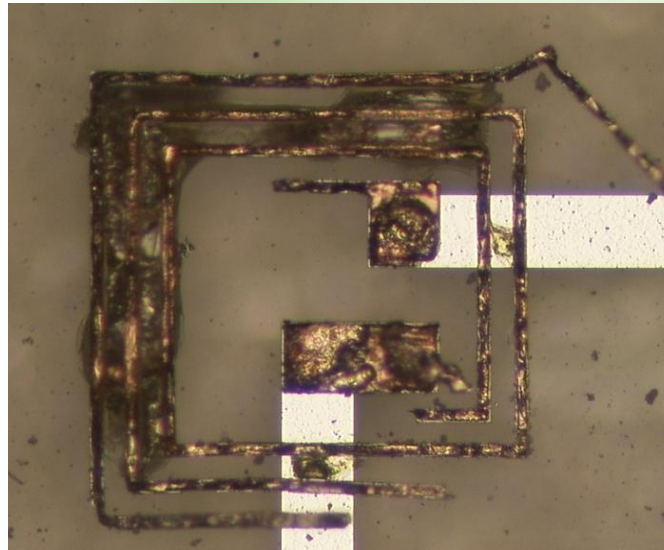
- Backside polishing, followed by OBIRCh, which detected low ohmic short
- To determine cause of failure would be necessary to access the frontside of the die without damaging the BCB dielectric layers or the Cu lines





## Physical access to the defect:

- Standard Method:
  - Access front side of the die by wet chemical etch of the plastic molding compound
- Result:
  - Molding compound removed, but the BCB layers have been etched as well and the copper lines have been detached and/or etched away





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## Physical access to defect using a new approach: Laser + Plasma

Laser pre-decapsulation



SESAME 1000, DigitConcept



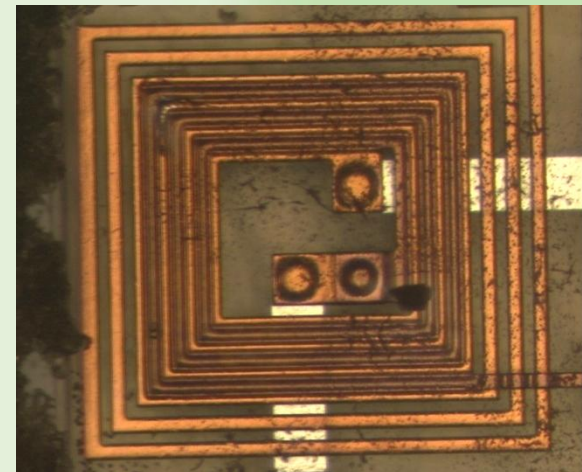
Plasma RIE assisted by (CO2) filler blast



FA2000P, BSET EQ

	Gaz	Puissance	Pression
Prog 1 <sup>a</sup>	190cm <sup>3</sup> CF <sub>4</sub> ; 495 cm <sup>3</sup> O <sub>2</sub>	200W	4350mT
Prog 2 <sup>a</sup>	47 cm <sup>3</sup> CF <sub>4</sub> ; 495 cm <sup>3</sup> O <sub>2</sub>	200W	4350mT

- Results:
  - The plastic molding compound has been removed
  - BCB layers and Cu lines still intact





## Conclusions

- Conclusion after decapsulation:
  - The defect was found not to be at the surface of the die, but between two metal layers
  - Defect found after further RIE plasma etch of BCB layers (2 Cu lines fused by heating).
- Conclusions on methodology:
  - Standard method not applicable due to introduction of new materials
  - Laser + plasma etch has made it possible to access this type of device from front side without damage

