Research Consortium in Speckled Computing

Optical Device Integration

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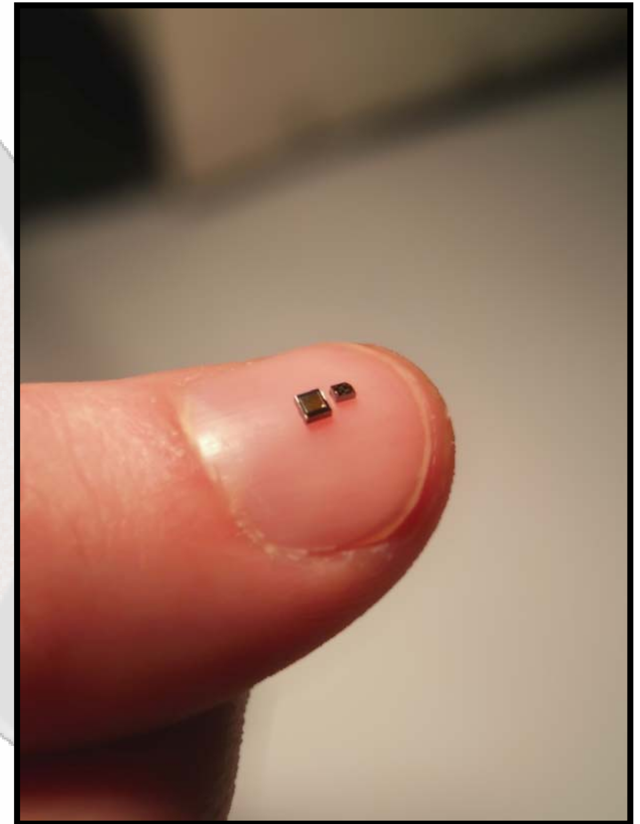
Importance of Packaging

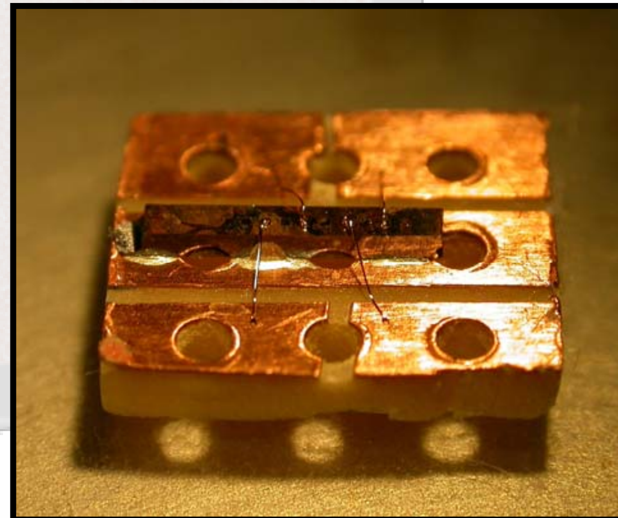
- Handling and testing of very small devices
  - VCSEL: 300um x 300um
  - Detector: 1mm x 1mm

- Handing over to Edinburgh
  - Communication test
  - Location discovery



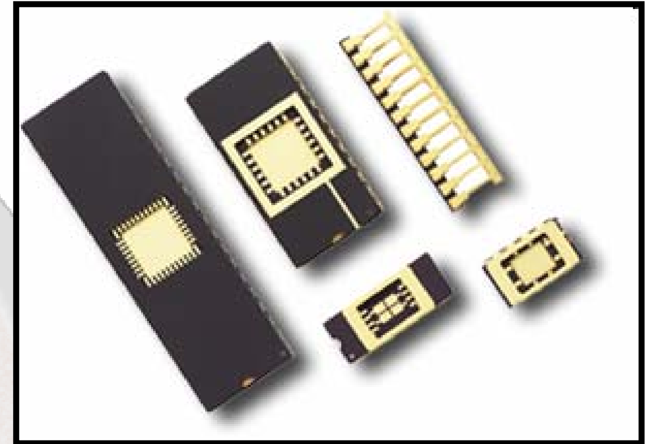
Early Packaging stage

- Printed Circuit Board (PCB)
  - Quick solution
  - Wire-bonded
  - **Difficult to handle**
  - **Not standardised**



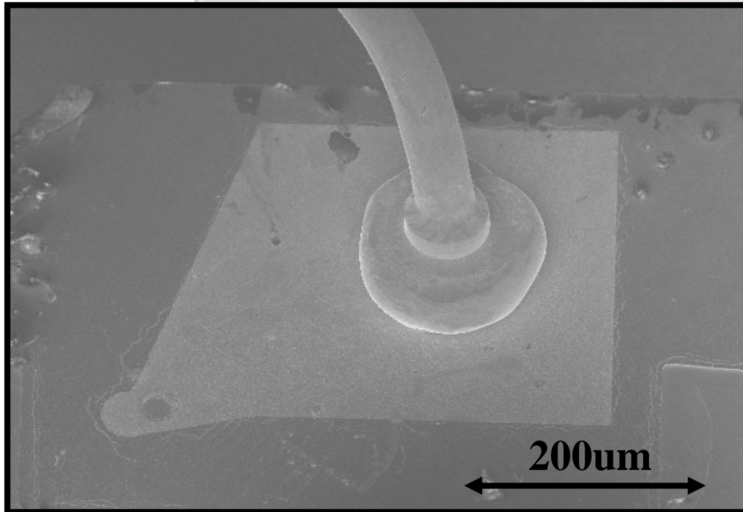
Dual-Inline-Package (DIP)

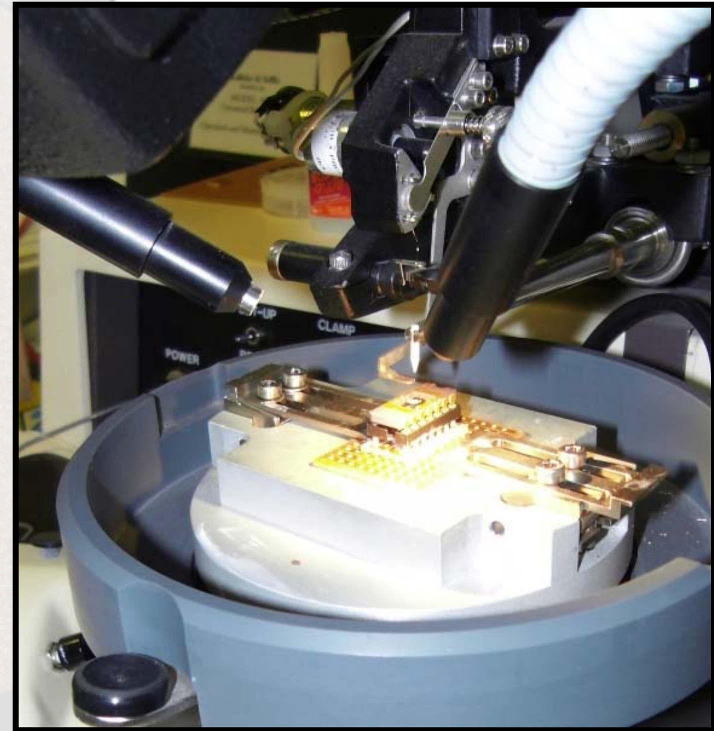
- Standardised package
- High performance and reliability
- Ease of soldering and reliable removal techniques
- Future-proof



Au Wire-Bonding

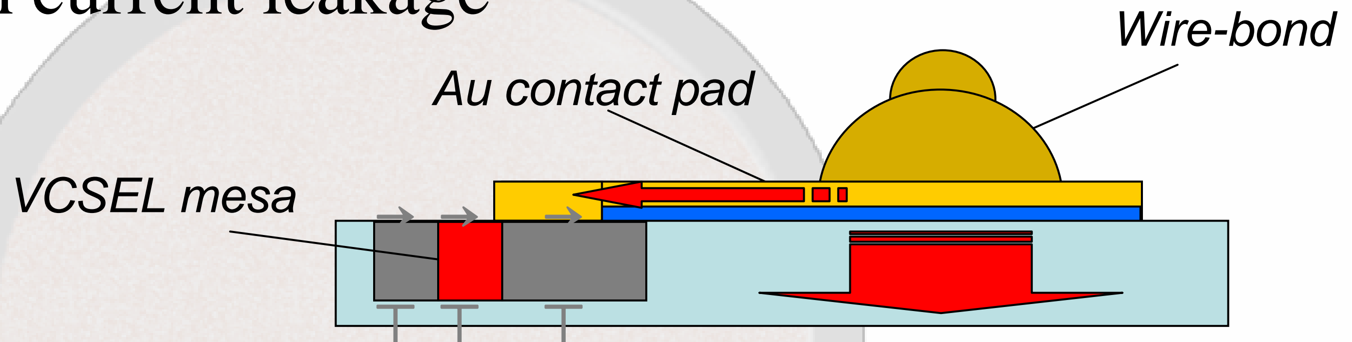
- Reliable thermosonic bonding
- Ball-Wedge-bond
- 50um Au wire





Insulation of contact-pads

- Problem: no contact-pad insulation
  - ➢ High current leakage

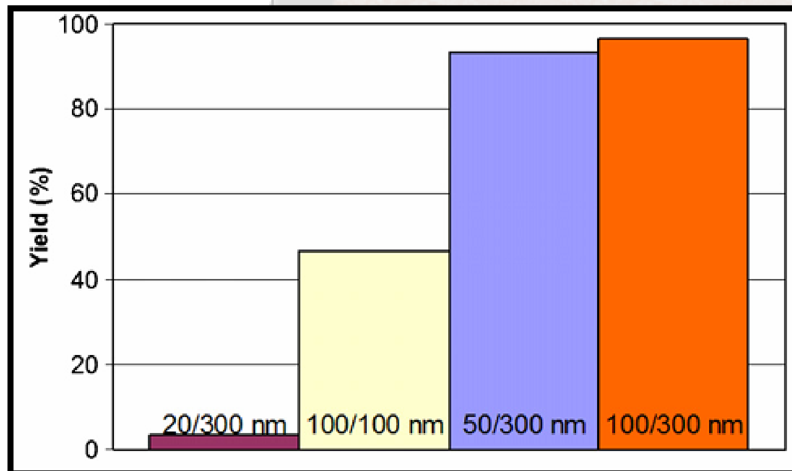


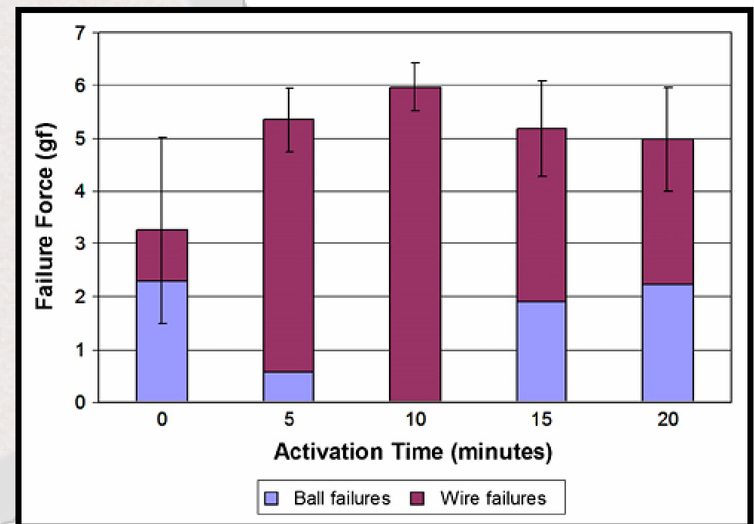
- Insulating layer: Si_xN_x, Polyimide etc…
  - ➢ Epoxy (SU-8), lithographic

Wire-bonding on polymer

Wire-Bonding on SU-8

- Three step process for SU-8 bonding*
  - ✔ Hard-backing of SU-8
  - ✔ Surface activation with O_2 plasma
  - ✔ Cr-adhesion layer between SU-8 and Au

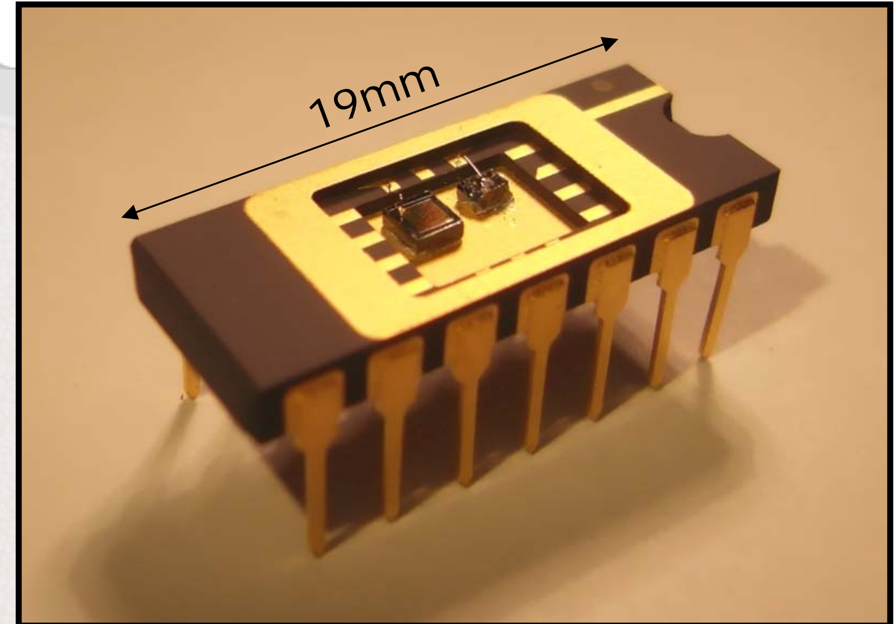




*Sameto, D; Lee, S-W: "Electrical interconnection through optimized wire bonding onto SU-8 structure and actuators"; J. Mircomech. Mircoeng, Vol 18; (2008)

VCSEL in DIP

- Handling
- Testing
- Standardised socket



Handing over to Edinburgh