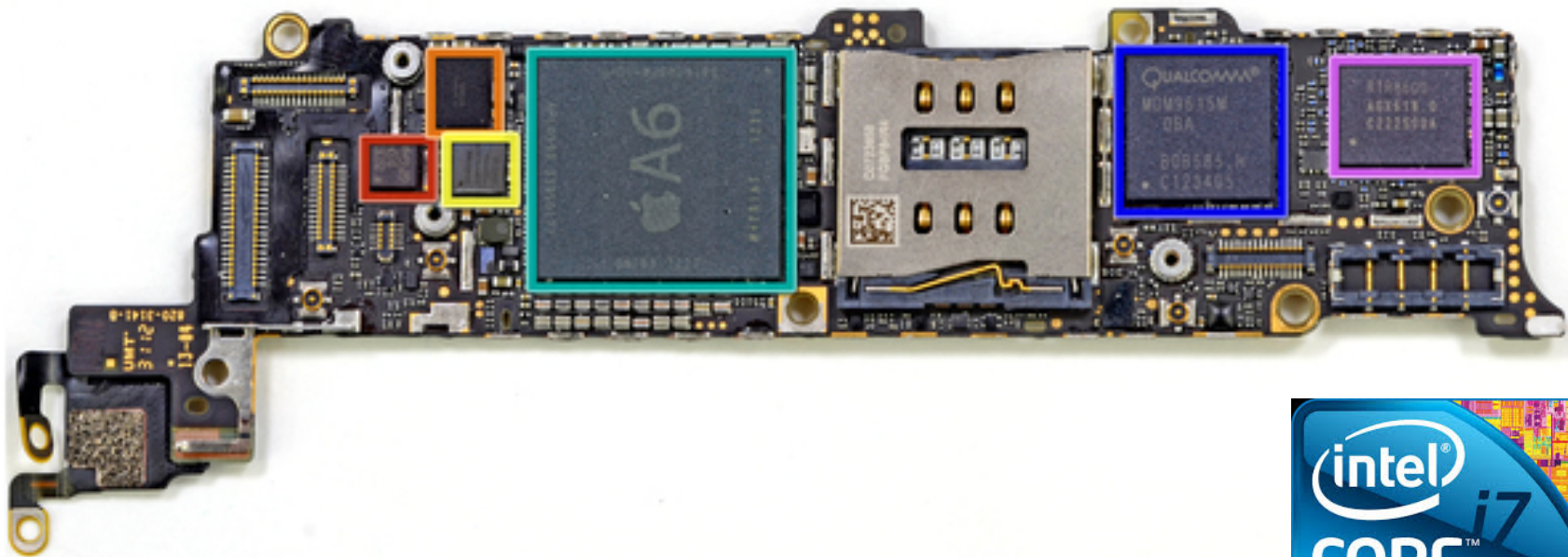
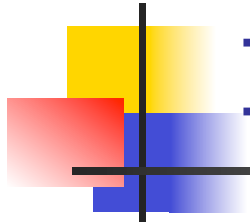


Integrated Circuit Assembly



iPhone 5 Teardown Courtesy ifixit.com



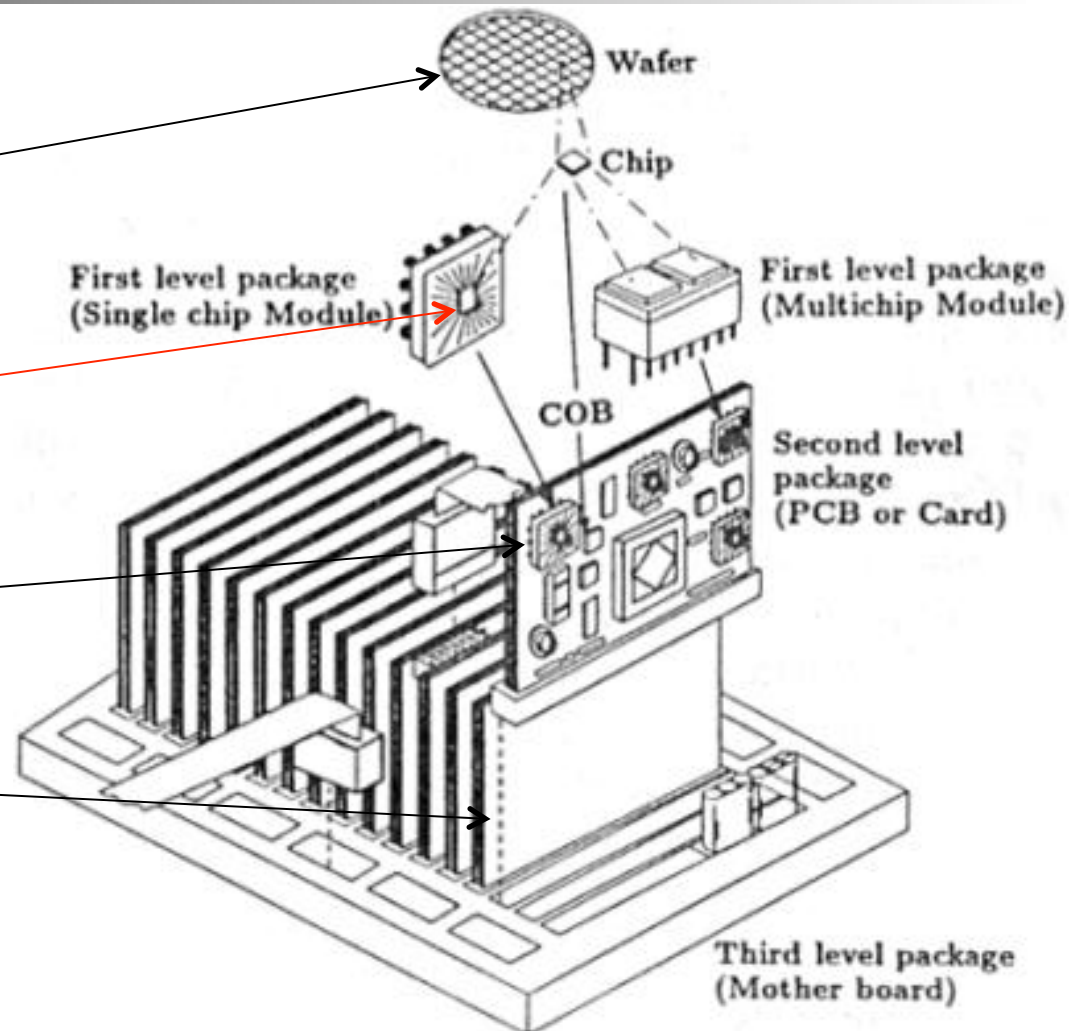
Integrated Circuit Assembly

Objectives

1. Identify the key sub components in an IC assembly package.
2. Describe the basic functions of the sub components of an IC assembly.
3. Identify the materials of construction of an IC package.
4. Select appropriate material types for the IC components.

Packaging Hierarchy Review

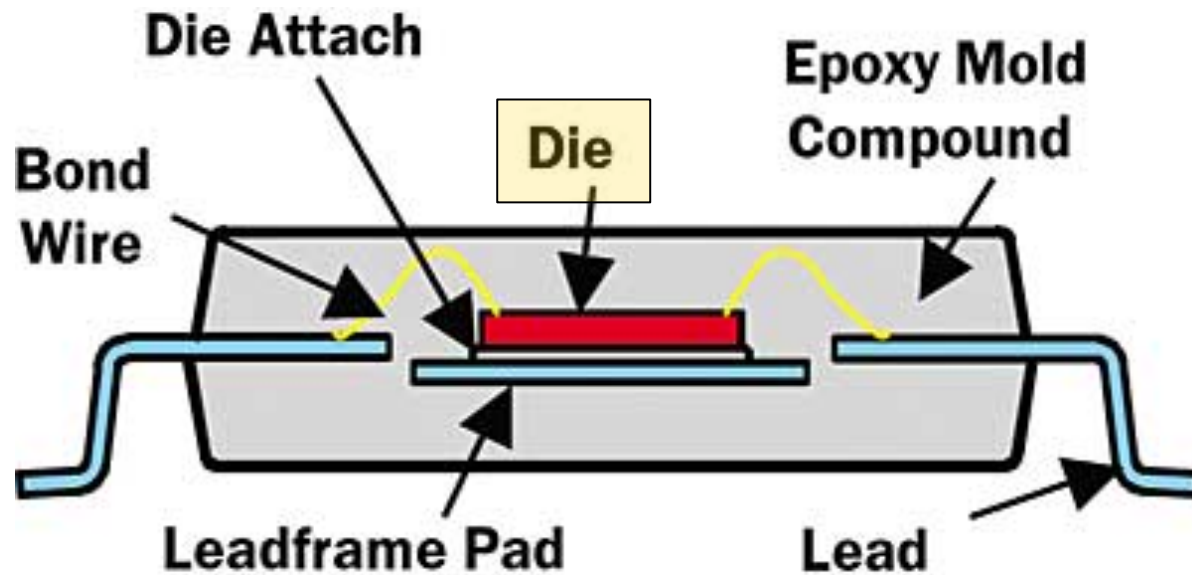
- Level 0: Wafer level
(gate-to-gate)
- Level 1: Chip level
(chip-to-package)
'IC Assembly' Process
- Level 2: Board level
(packaged chip to PCB)
- Level 3: System level
(board-to-board)



IC Assembly “Connect & Protect”

Functions:

- Electrically Connect Die (Silicon Chip)
- Physically & Thermally Protect the Die

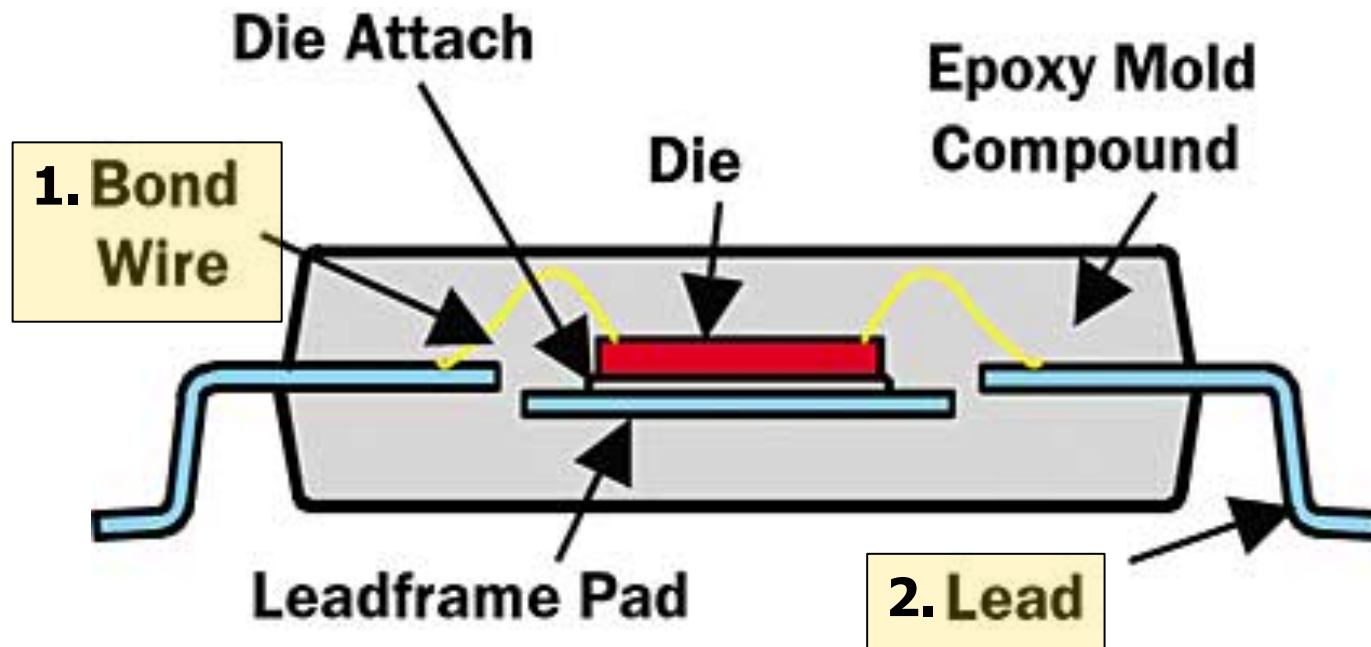


Assembled IC Package

IC Assembly Functions

Electrically Connect:

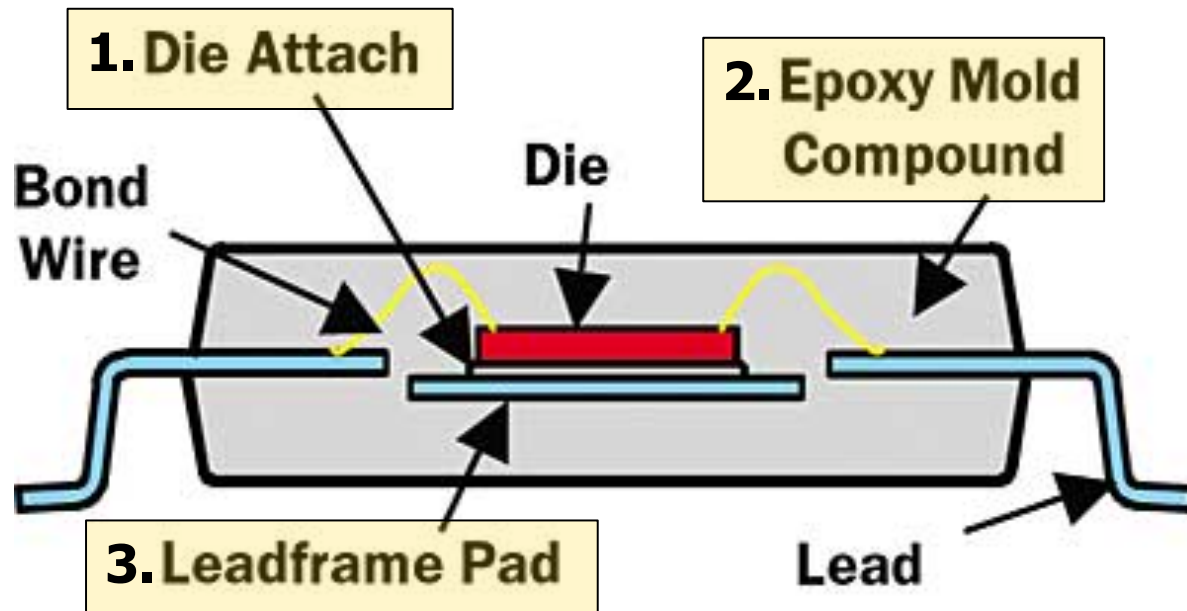
1. Between the die and package leads using Wire Bonds.
2. Between package and the PCB via the package Leads.



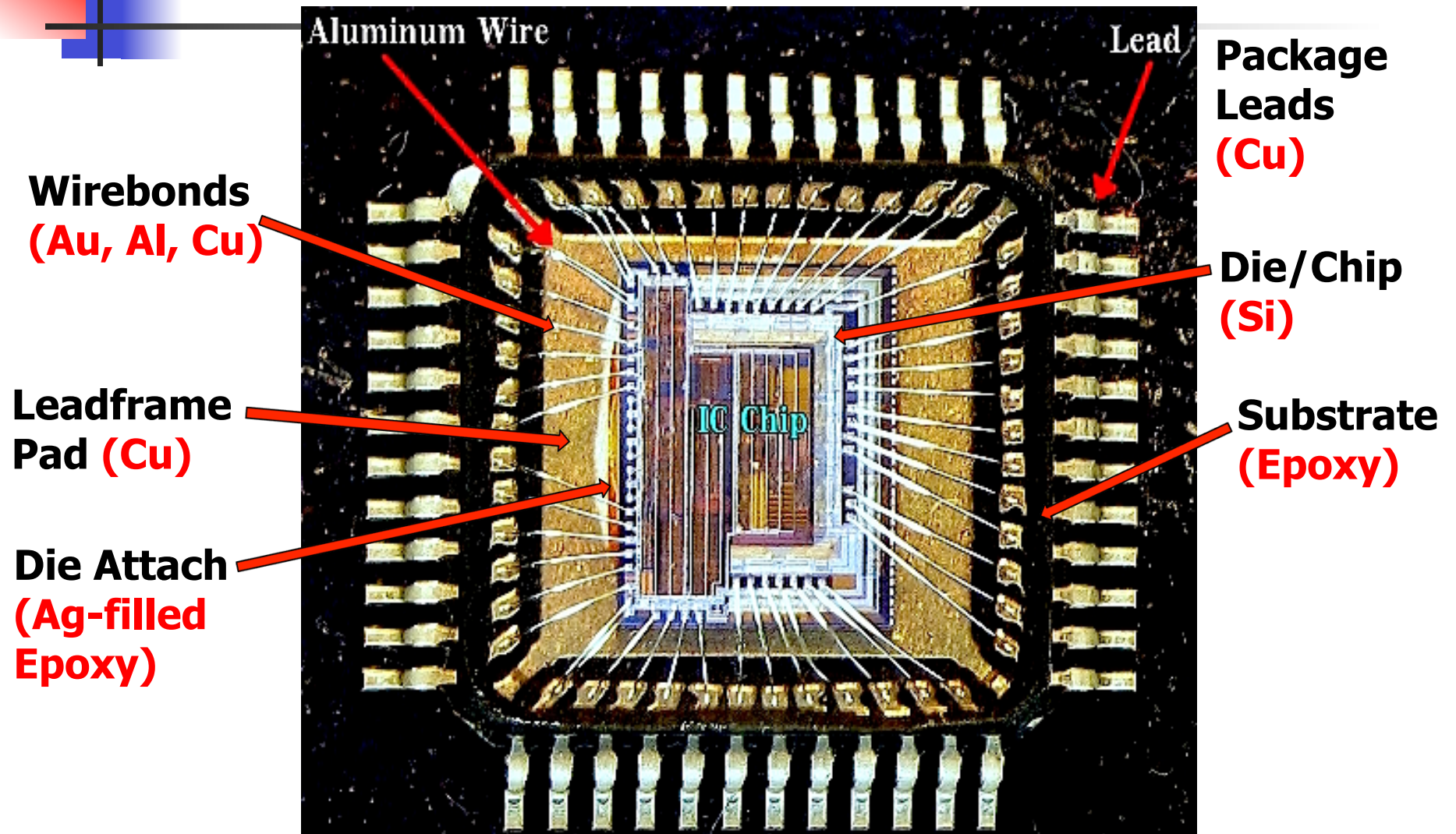
IC Assembly Functions (cont.)

Attach & Thermally Protect:

1. Die attachment bonds die to leadframe and also conducts heat away.
2. Mold Compound protects die from environment (moisture, dust)
3. Leadframe Pad provides a heat sink for cooling the die.

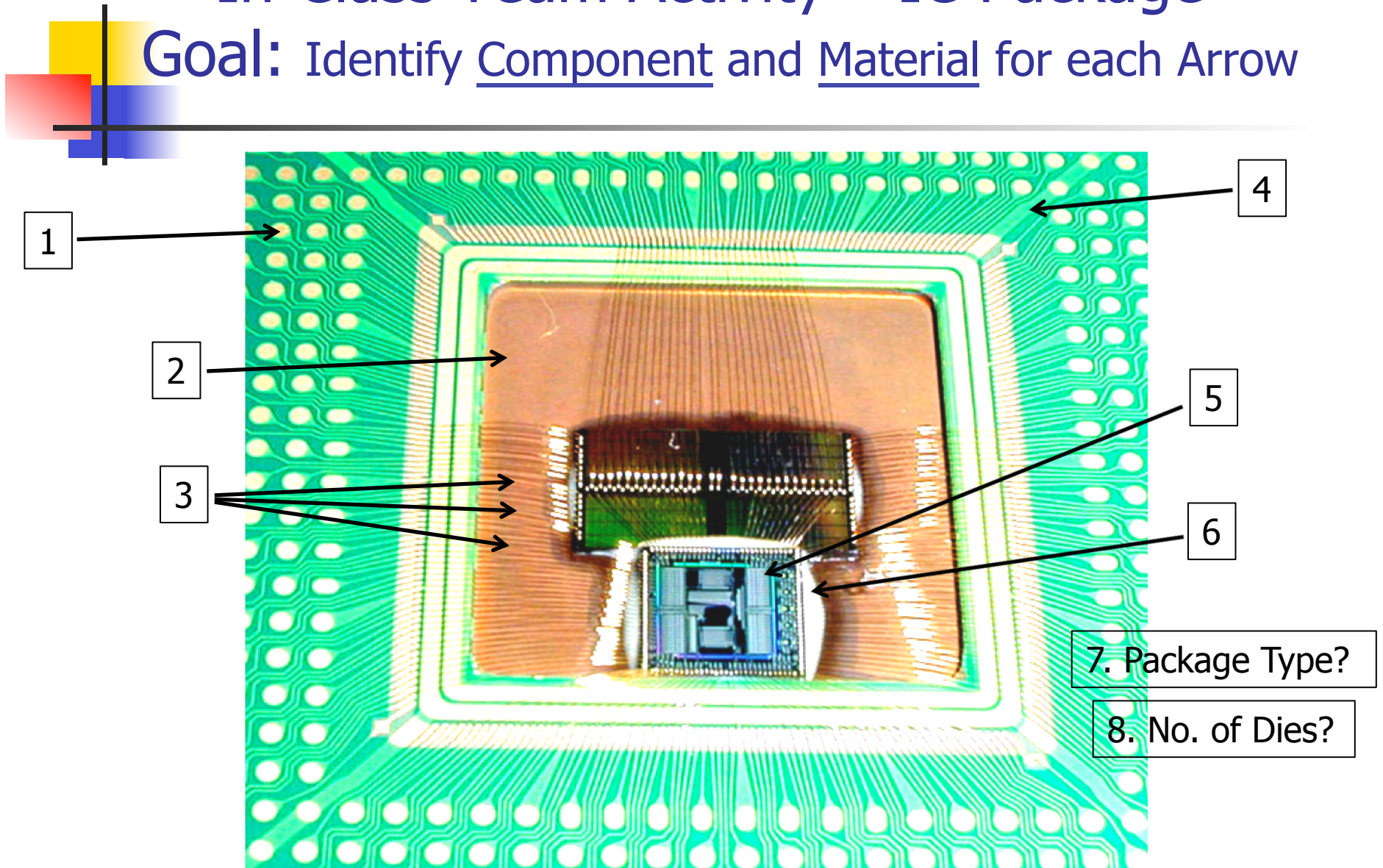


IC Assembly Materials

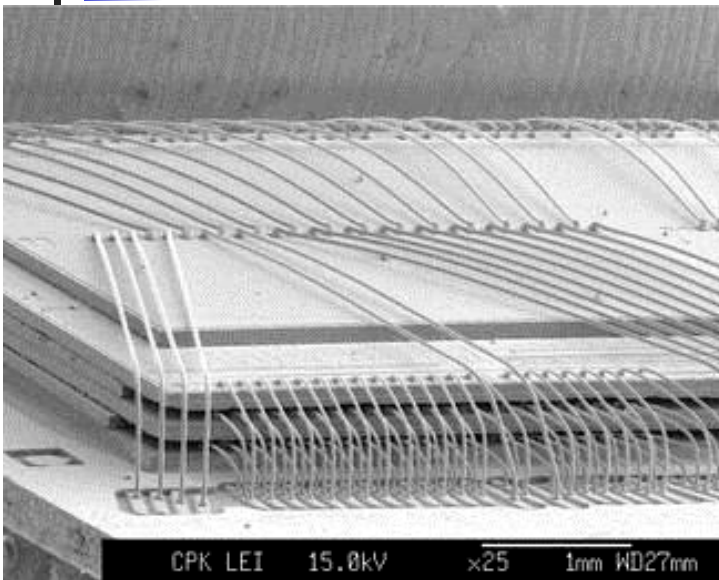


In-Class Team Activity – IC Package

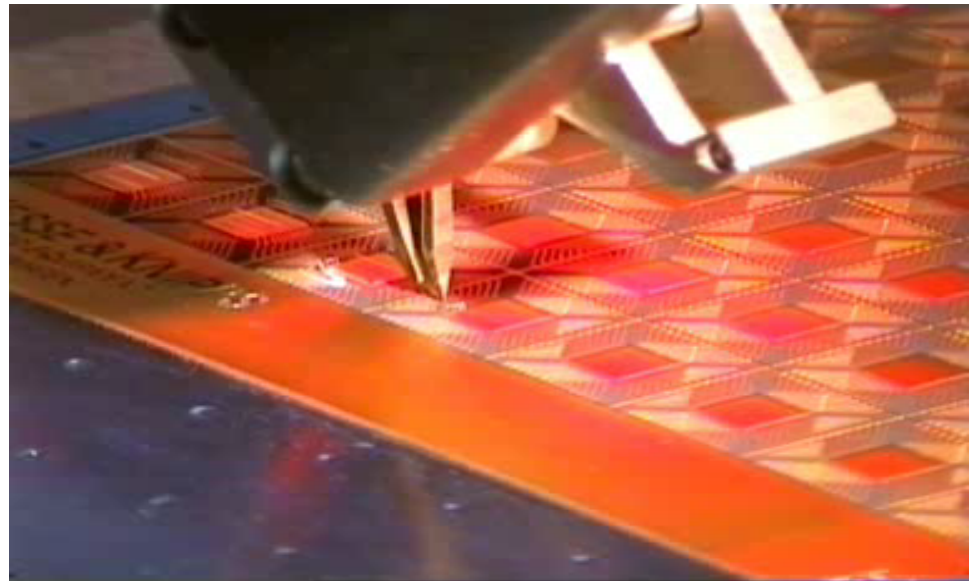
Goal: Identify Component and Material for each Arrow



Wire Bonding Examples



Multiple stacked IC wirebonds



Mass production wirebonding

Wirebonding Videos:

Real Time: <https://www.youtube.com/watch?v=X8YRbOkesko>

<https://www.youtube.com/watch?v=2FUnmwZ9al8>

Slow Motion: <http://www.youtube.com/watch?v=DO104aoscxw>