



First Bond Ball and Stud Bump Pull for Copper Interconnects

Application Note

Copper is increasingly replacing gold as the interconnect material for wire bonds, stud bumps and pillars which provides several advantages including cost reduction, superior electrical and thermal conductivity and less intermetallic growths.

Testing the mechanical integrity of these bonds is an important aspect of the manufacturing quality assurance process however testing copper interconnects presents several challenges for traditional shear testing. To overcome these Nordson DAGE has introduced the first bond ball pull (FBBP) test method; the ball bond is gripped using a specialised tweezer jaw in such a way that a vertical load is applied to the bond thus enabling a pull test to be applied.

The stiffness of copper allows for tensile testing to be conducted therefore the FBBP test method can be applied to a number of different interconnects such as stud bumps and pillars and ball bonds. Micro jaws are designed to grip the bumps and vertical loads are applied with the appropriate load cartridge. Consistent failure forces are measured and reproducible failure modes observed.

Features and Benefits

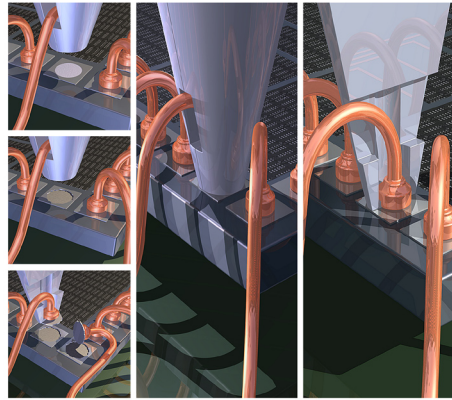
- **Low force load cell and jaws enables testing of emerging interconnect technology such as copper ball bonds and stud bumps**
- **Pull tests avoids pad cratering artifacts produced by shear tests**
- **Copper bonds as small as 50 microns in diameter can be evaluated**
- **Test is quick to set-up and perform**

Conducting the Test

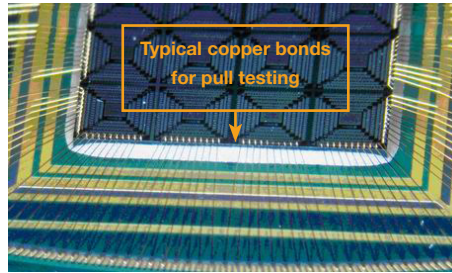
Conducting copper interconnect tensile tests with Nordson DAGE equipment is simple. The experienced Nordson DAGE design engineers will consult with you to understand the specific geometry of the interconnects to be tested. An assessment will be made based on the essential parameters are the shape (if not circular), diameter, height, and pitch to determine the feasibility of testing.

The opening and closing of the jaws is achieved through a software controlled air-driven collet mechanism. This ensures high precision adjustment of the jaw clamping pressure via incremental increases in the air pressure until the interconnect fails when the test is activated. Unlike cold bump pull on conventional solder balls, closing the jaws on the copper interconnect will not reform it; the load is applied through a friction fit of the jaws.

Compliance in the pull system means a forgiving alignment process, ensuring consistent results independent of the operator.



First bond ball pull test



Further Information

- Accurate dimensions of the interconnect are required for the specialized jaw design
- Full technical support is available worldwide

**For more information,
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