



SERVICES

Material Qualification

- New wire bonding materials (metal alloys, polymers, hybrid materials)
- Surface finishes and metallization for wire bonding
- Combinations of wire material and bond pad material (optimized for specific applications)

Manufacturing and Processing

- Wire Bonding from ultra fine pitch thin wires (15 μm) to heavy wires (500 μm), e. g. made from Al, Au, Cu, Pt
- Ribbon bonding (fine ribbon to heavy ribbon)
- Bonding solutions for individual customer needs (e. g. high frequency connections, power electronics, high temperature applications)
- Loop shape optimization
- Hardness testing

Test

- Shear and pull tests
- Mechanical fatigue tests (realization of special mechanical cyclic loading tests)
- Surface analysis (material, roughness, contamination)
- Interface analysis down to the nm-scale
- Failure analysis and reliability studies
- Active power cycling tests

CONTACT

Fraunhofer Institute for Reliability and Microintegration IZM

Gustav-Meyer-Allee 25
13355 Berlin, Germany
www.izm.fraunhofer.de

info@izm.fraunhofer.de

Dr. Martin Hempel

Phone: +49 30 46403-159
martin.hempel@izm.fraunhofer.de



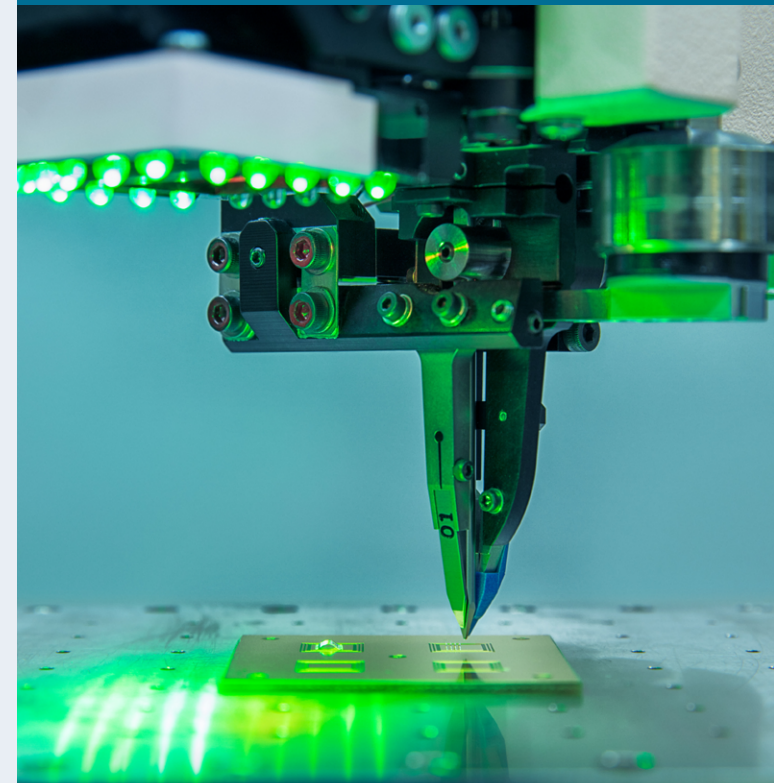
Further information:

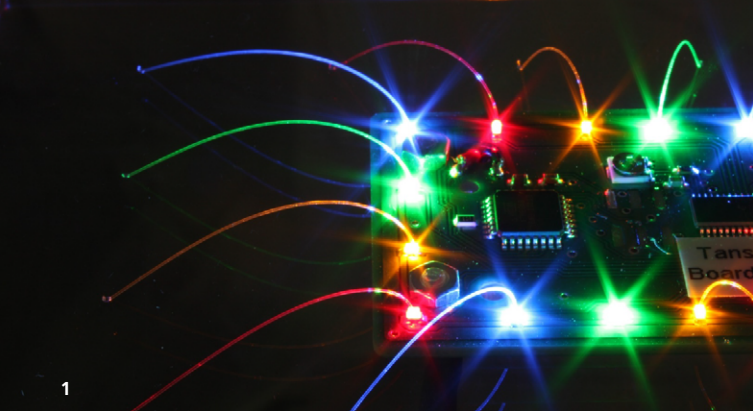
<https://www.izm.fraunhofer.de/wb>

Cover Heavy Wire Bonding on DBC Substrate

- 1 Polymer Optical Fiber Wire Bonded as Optical interconnect
- 2 Measured Surface Roughness of different Bonding Interfaces
- 3 Materials for Power Electronics
- 4 Wire Bonding Lab

ADVANCED CHIP AND WIRE BONDING



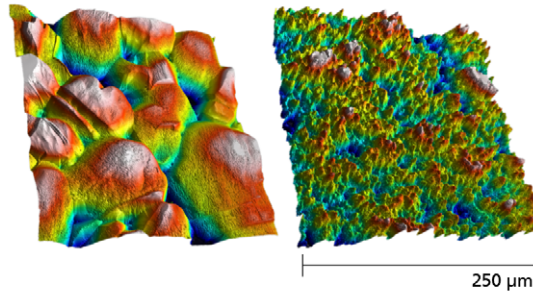


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APPLICATIONS

Wire Bonding is one of the most common interface formation technologies in microelectronics. It is a reliable, flexible and cost effective interconnection technology. Moreover, connections made by wire bonds have versatile unique features which are advantageous over other interconnection technologies:

- Flexible, e.g. changing of bonding layout in seconds
- Fast (up to more than 10 wire connections per second)
- Tolerant with respect to chip alignment by automated optical bondpad detection and re-adjustment of loop-position and shape
- Cost-effective
- Thermal decoupling of sub-systems
- Reparability
- Reduced stress on semiconductors compared to double-sided die attach
- Working with different wire material on existing machines
- Not only metal-based wire material, but also polymer optical fibers for optical interconnects



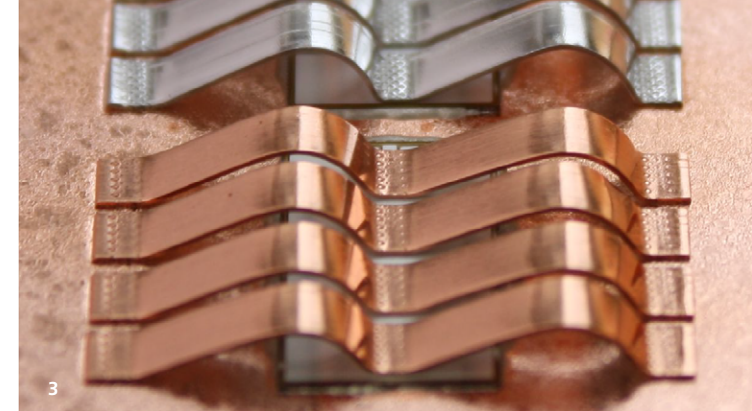
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IZM WIRE BONDING ACTIVITIES

Our activities cover the entire field of wire bonding, starting with material and interface formation research, the assessment of processing capability of wire and bond pad material, optimization of the wire bonding to the customer needs, through to failure analyses and reliability studies.

In particular, Fraunhofer IZM has a great experience in feasibility studies of new materials and equipment, qualification of wire bonding in processing chains, investigation of the interaction of different assembly and interconnection technologies, and failure analysis. Especially systems with high frequency interconnects (like RADAR) and power electronics are in our field of expertise.

Moreover, our mission is to bring wire bonding technology one step forward, e. g., the functionalization of wire bonds beyond their classical purpose of simply establishing an electrical interconnect. The latter is done by using wire bonds directly as antennas, as electromagnetic shielding or guidance. Another example of new ways in classical wire bonding is the direct application of polymer optical fibers with standard wire bond equipment to establish optical interconnects.



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EQUIPMENT

Bonder

- F&K Delvotec
 - G5 64000 + G5 64000 DA
 - G5 Heavy Ribbon
 - Laserbonder M17LSB
- Hesse
 - BJ 820
 - BJ 935
- Kulicke & Soffa
 - Maxµm Ultra
 - ProCu Iconn
 - Orthodyne 3600R Plus
- F&S Bondtec 56xx

US welding

- Schunk DS20-S-plus

Testing

- Dage 4000 / 4000 Plus
- XYZtec Condor Sigma
- Olympus LEXT OLS 4000
- Zeiss AXIO
- Leica stereo microscopes, Keyence digital microscopes
- Scanning Electron Microscope (SEM) (e. g. ZEISS Supra 55vp)
- Focussed Ion Beam (FIB) (e. g. FEI Helios NanoLab 600i)