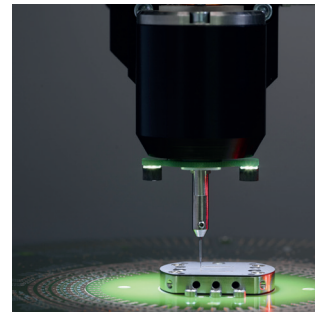


WAFER PROBE CARD SOLUTIONS



WAFER PROBE CARD SOLUTIONS



Wafer Probe Card Excellence

As numerous as the applications for semiconductor components and modules are the requirements to set up a suitable test strategy. Key is always to ensure the desired function during and after wafer processing before the bare die is further packaged and assembled.

A maximized yield and a low-wear contacting solution resulting in a low total cost of ownership are therefore central. FEINMETALL convinces with years of experience in comprehensive advice and project-specific contacting solutions as well as further service support worldwide.

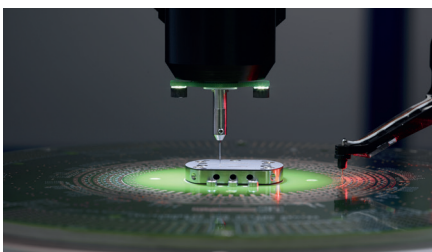
Our Products Address and Overcome the Biggest Challenges in Wafer Test

- Fine-pitch applications down to 40 μm
- High current applications up to 5 A
- Radio frequency applications up to 80 GHz
- Excellent pad (aluminum, copper and other alloys), solder bump and copper pillar probing
- Reliable probe card from -55°C to +180°C
- Multiple million TDs
- Customized solutions for light and gyro sensors, nitrogen flush and non-magnetic
- Turnkey services and support in all fields of wafer testing and surrounding systems
- Service experts support you worldwide and minimize downtime



We Make the Impossible Possible

Innovative technologies meet the extremely high demands of precision and quality for manufacturing our products. Clean rooms and manufacturing facilities, test equipment and specially developed machines combined with consequent and continual process optimization lead to zero-defect quality, short lead times and a high process stability.



Outstanding Test Equipment

State of the art probe card analyzers guarantee a final inspection of each probe card. A wide variety of testers allow a maximum of test flexibility and reliability. Flying probe testers enable inspections of SMD components on PCBs. Special test equipment has been implemented as inspection gates for high product quality and early failure detection along manufacturing.

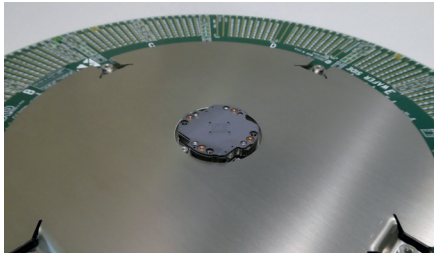
PRODUCT PORTFOLIO



ViProbe® - The Established Solution

Customizable to an enormous range of applications and probing materials it is the vertical solution in the market for many years and especially appreciated for its unique simple reparability.

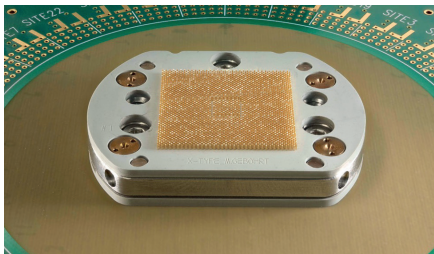
Page 4



ViProbe® II - The Next Generation

With multiple lifetime extension options and various security features for the DUT, the ViProbe®II brings all the advantages of the ViProbe® to the next level.

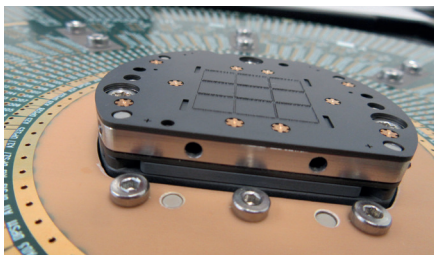
Page 4



FeinProbe® - The Spring Probe Solution

Probing WLCSP, SiP or flipchip wafers requires probes withstanding high current while simultaneously assuring high signal integrity. The FEINMETALL FeinProbe® addresses those applications with excellence.

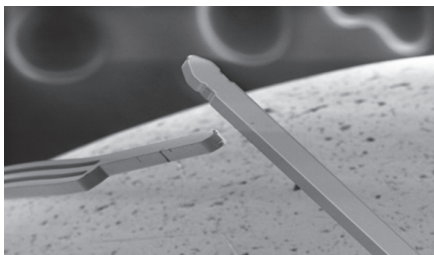
Page 5



MμProbe® - The MEMS Solution

Rectangular MEMS probes offered for high-current and fine-pitch applications on pads and copper pillars.

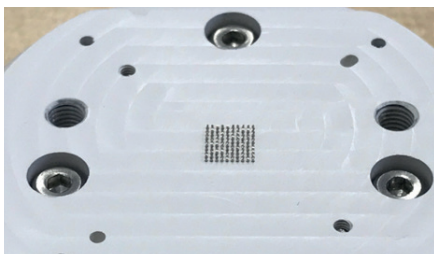
Page 6



LiProbe® - The Lamella Solution

Lamella probes offer various advantages in terms of RF and force requirements. The short length of the probe as well as the flexible amount of lamellae makes it the perfect solution for sophisticated applications.

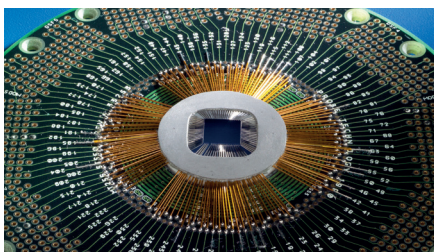
Page 7



BasicProbe - The Easy Solution

Vertical probing solutions offer many advantages compared to epoxy solutions: With the BasicProbe FEINMETALL offers all these advantages in an easy, fast, and economic vertical probe card.

Page 7

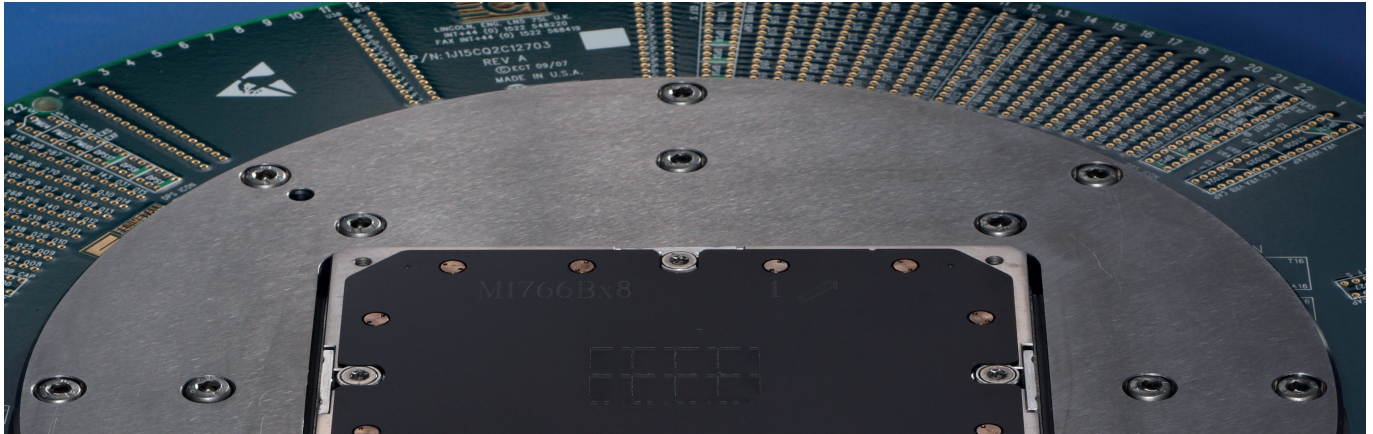


Cantilever – The Epoxy Solution

For a wide range of simple applications, fast and easy probing solutions are required.

Page 7

WAFER PROBE CARD SOLUTIONS



Vertical Probe Card ViProbe® and ViProbe®II - From the Established Solution to the Next Generation

For years, the FEINMETALL ViProbe® has dominated the vertical probe card industry. Several advantages such as the stable contact performance as well as the simple exchange of the contact elements and outstanding temperature behavior make this probing solution the favorite to the automotive industry.

With the introduction of the next generation of vertical wafer probing, the ViProbe®II, all these advantages are extended by multiple lifetime extension options and further security additions to ensure security of the DUT.

Advantages

- Accurate wafer probing on fine-pitch pads over the whole temperature range
- Simple exchange of single contact elements, complete replacement of the probes and even probe heads by the customer leads to lowest cost-of-ownership
- Adjustable to most applications: from high pin count, to copper probing up to fine-pitch
- Multiple lifetime extension
- Extended security features of the probe head

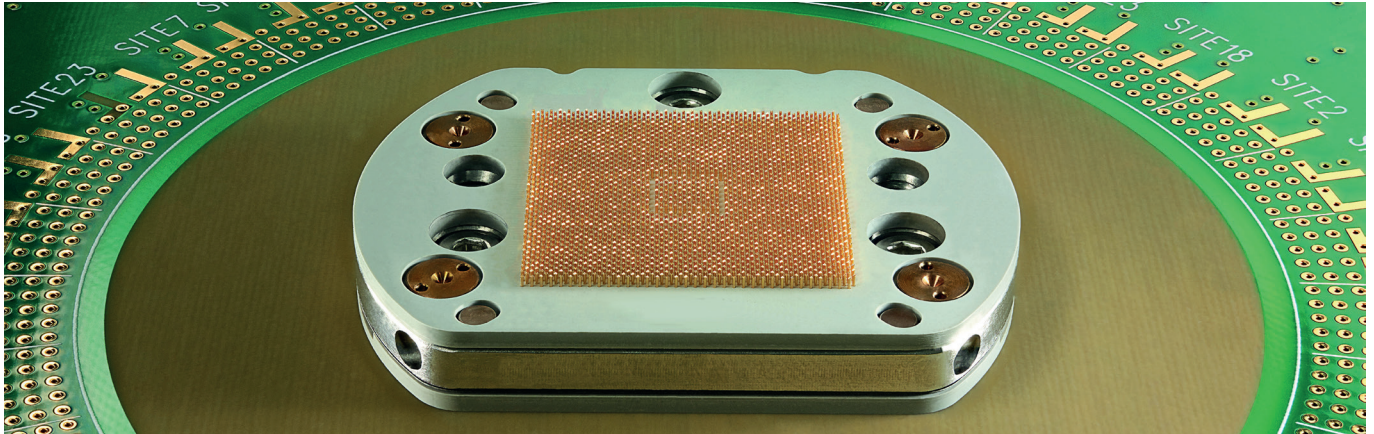
FM Patented Solutions Applicable for all Buckling Beam Technologies

- *Radial Thermal Movement*, #DE 102004023987 (EP, JP, US, TW, CN)
The probe card is aligned on the center of the DUT and has the same radial thermal movement as the wafer.
- *Shimming*, #DE 202007016398 (EP, US, JP, TW, CN)
Extensive lifetime extension due to removable shims adjustable on the test floor.
- *Spacer Strut*, #DE102012016449 (US, JP, TW, CN, EP Pending)
Additional stiffening function for large array tight pitched probe heads.
- *Wired Connector*, #DE 202005020724 (EP, JP, US, TW)
Contact is done by singular wiring of the contact points to the edge connector on the PCB using noble metal.

Specifications at a Glance

| | ViProbe® | ViProbe®II |
|-----------------------------------|------------------------|------------------------|
| Min pitch of the DUT | Down to 56 µm | Down to 40 µm |
| Diameter of the contact element | Down to 1.6 mil | Down to 1.1 mil |
| Max active area | Up to 80 mm x 80 mm | Up to 105 mm x 105 mm |
| Capable temperature range | From -55°C to 180°C | From -55°C to 180°C |
| Current carrying capability at RT | Up to 800 mA | Up to 800 mA |
| Contact force at rec. OD | From 2.6 cN to 10.8 cN | From 2.2 cN to 10.8 cN |

WAFER PROBE CARD SOLUTIONS



FeinProbe® - The Spring Probe Solution

The FEINMETALL FeinProbe® uses spring contact probes as contact elements for contacting bumped wafers for WLCSP, SiP and Flip Chip Applications.

By using FEINMETALL spring contact probes, the probe solution has several advantages because of the independent spring loaded pins and the crown tip of the contact element. This ensures a stable contact without a stressful impact on the bumps. Even more, signal transmission can be guaranteed when applying specific design rules.

Advantages

- Stable contact performance in terms of low contact resistance and force
- Self-aligning plunger and crown tip reduces stress to the bump
- Spring probes are able to withstand higher currents
- Signal transmission of up to 80 GHz (when following specific layout rules)
- Combined know-how from FM-spring probe department, special adaptations and wafer probe cards

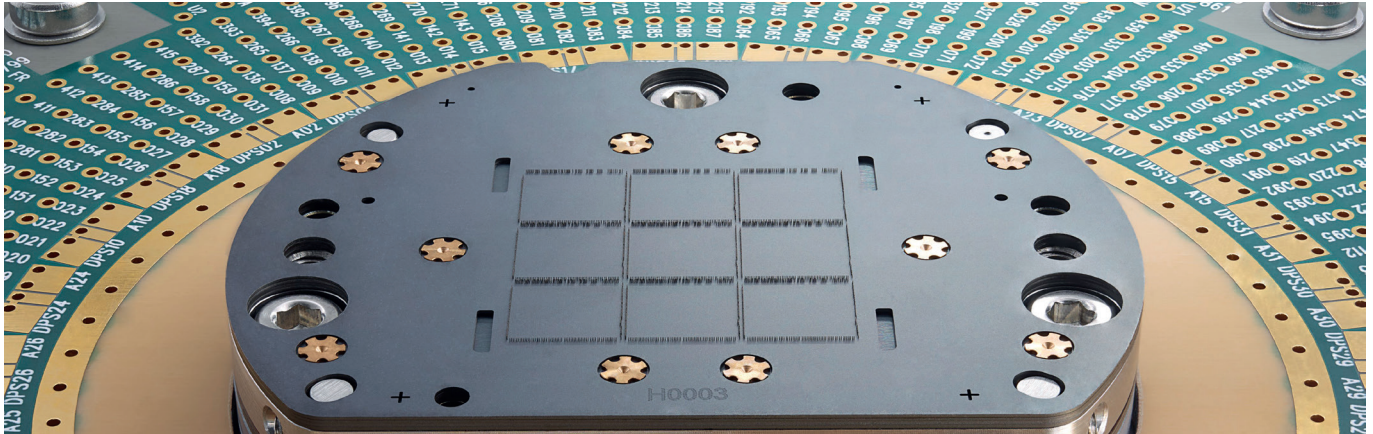
FM Patented Solutions Applicable for all Spring Probe Technologies

- *Radial Thermal Movement*, #DE 102004023987 (EP, JP, US, TW, CN)
The probe card is aligned on the center of the DUT and has the same radial thermal movement as the wafer.
- *Spacer Strut*, #DE102012016449 (US, JP, TW, CN, EP Pending)
Additional stiffening function for large array tight pitched probe heads.
- *Wired Connector*, #DE 202005020724 (EP, JP, US, TW)
Contact is done by singular wiring of the contact points to the edge connector on the PCB using noble metal.

Specifications at a Glance

| | |
|-----------------------------------|----------------------------|
| Min pitch of the DUT | Down to 150 µm |
| Diameter of the plunger | Down to 120 µm |
| Max active area | Up to 50 mm x 61 mm |
| Capable temperature range | From -40°C to 150°C |
| Current carrying capability at RT | Up to 2800 mA |
| Contact force at rec. OD | From 10 cN to 18 cN |
| Bandwidth analog @ -1dB limit | 30 GHz (80 GHz on request) |

WAFER PROBE CARD SOLUTIONS



MμProbe® The MEMS Solution

The FEINMETALL MμProbe® is used for contacting wafers in a wide range of applications from very narrow pitches to high current and high temperature testing requirements. As a further development of the classic buckling beam principle for defined contact force on the wafer surface, it offers numerous electrical advantages. The design of the MμProbe® contact element enables the temperature and current carrying capability of the contact element to be selected for the respective application.

Advantages

- Adjustable to most applications: from high pin count, to copper probing up to fine-pitch
- Multiple lifetime extension for bump applications
- Accurate wafer probing on fine-pitch pads over the whole temperature range
- Stable contact performance in terms of contact resistance and force
- Extended security features of the probe head

FM Patented Solutions Applicable for all Buckling Beam Technologies

- *Radial Thermal Movement*, #DE 102004023987 (EP, JP, US, TW, CN)
The probe card is aligned on the center of the DUT and has the same radial thermal movement as the wafer.
- *Shimming*, #DE 202007016398 (EP, US, JP, TW, CN)
Extensive lifetime extension due to removable shims adjustable on the test floor.
- *Spacer Strut*, #DE102012016449 (US, JP, TW, CN, EP Pending)
Additional stiffening function for large array tight pitched probe heads.
- *Wired Connector*, #DE 202005020724 (EP, JP, US, TW)
Contact is done by singular wiring of the contact points to the edge connector on the PCB using noble metal.

Specifications at a Glance

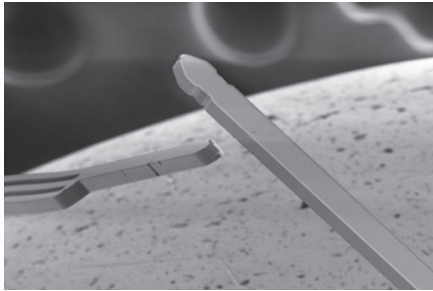
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| Min pitch of the DUT | Down to 50 µm |
| Diameter of the contact element | Down to 1.2 mil (equivalent) |
| Max active area | Up to 105 mm x 105 mm |
| Capable temperature range | From -55°C to 200°C |
| Current carrying capability at RT | Up to 1170 mA |
| Contact force at rec. OD | From 1.4 cN to 4.2 cN |

LATEST DEVELOPMENTS

Probe Card LiProbe® - The Lamella Solution

The FEINMETALL LiProbe® is the solution for advanced probing requirements. It has been designed to ensure a specific contact force as well as maintaining it over the whole lifetime. The lamella technology allows the probe to be much shorter than a conventional buckling beam and therefore is used in applications which require advanced frequency requirements.

Due to the flexibility of the probe design it is possible to equip a probe head with probes in different geometries depending on their specific function.



Advantages

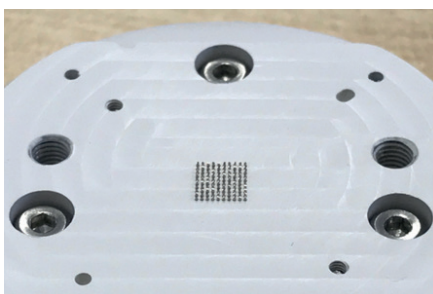
- Shortness of the probe excellent for frequency-dependent applications
 - Product families with different geometries in the same probe head
 - High design flexibility in terms of defining exact contact force
 - Stable contact force over the lifetime as well as a low contact resistance
- Patented Lamella Probe, #DE 102008023761 (EP, JP, US, TW, SG, CN, KR)*
Rectangular cross sectioned contact element with lamella structures

Specifications at a Glance

| | |
|-----------------------------------|-----------------------|
| Min pitch of the DUT | Down to 80 µm |
| Max active area | Up to 105 mm x 105 mm |
| Capable temperature range | From -55°C to 180°C |
| Current carrying capability at RT | Up to 900 mA |
| Contact force at rec. OD | From 2.8 cN to 5.4 cN |
| Bandwidth analog @ -1dB limit | Up to 30 GHz |

BasicProbe - Epoxy Meets Vertical

For a wide range of applications, fast and easy probing solutions are required. However, performance wise, vertical probing solutions offer many advantages compared to epoxy solutions: With the BasicProbe, FEINMETALL offers all these advantages in an easy, fast, and economic vertical probe card. The advantages of a vertical solution are clear: The stable force on the DUT compared to the linear when using an epoxy card as well as the maintenance options.



Advantages

- Stable contact force for BasicProbe
- Maintenance simplified for BasicProbe due to single exchangeable contact elements, Cantilever is limited, especially for multisite
- Flexible head-sizes (shelf etc) and designs for specific applications
- Longer lifetime compared to Cantilever
- Lead-time comparable to Cantilever

Specifications at a Glance

| | Cantilever | BasicProbe |
|-----------------------------------|--------------------|----------------------|
| Min pitch of the DUT | Down to 50 µm | Down to 80 µm |
| Diameter of the contact element | Down to 4 mil | Down to 2 mil |
| Max active area | Flexible | Flexible |
| Capable temperature range | From RT to 180°C | From RT to 85°C |
| Current carrying capability at RT | Up to 750 mA | Up to 800 mA |
| Contact force at rec. OD | From 4 cN to 12 cN | From 3.4 cN to 10 cN |

INTERNATIONAL WAFER PROBE CARD CONTACTS



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Version 5

MARKETINGGo66

Customer Oriented Probe Card Service - All Over the Globe

For your tailored support we offer various levels of service agreements, combining some important advantages:

- On-the-spot support - we are where our probe cards are
- Guaranteed turnaround times
- Custom-tailored solution from small repairs to complete repair shop management
- High competence and deep understanding of customer needs

Please contact us directly by email: service@feinmetall.de



FEINMETALL
Contact Technologies

www.feinmetall.com

