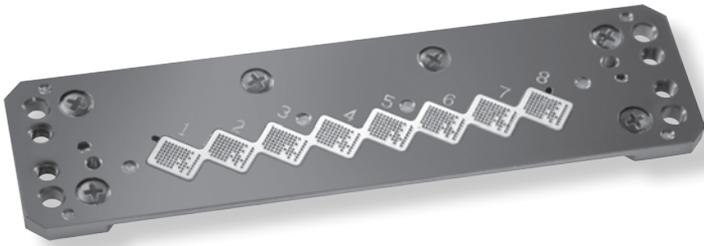


Volta 180 Series Probe Head

Wafer Level Testing



The Volta Series Probe Head ensures improved efficiency in high reliability WLP, WLCSP and KGD testing.

Smiths Interconnect's Volta 180 Series Probe Head addresses the need for reduced test time and increased throughput in high reliability testing of Wafer Level Packages (WLP), Wafer Level Chip Scale Packages (WLCSP) and Known Good Die (KGD).

The Volta 180 Series is capable of testing sorted die for engineering development or failure analysis. Volta 180 Series offers a high performance, cost-effective, easily maintainable alternative to cantilever and vertical probe card technologies.

Smiths Interconnect's high performance spring probe contacts are used in the Volta Series. Spring probes are individually replaceable in the field with minimal tooling and technical expertise.

The state-of-the-art Volta Manual Actuator (Lid) design allows sorted die tests, at all sites, simultaneously. The unique lid design eliminates the possibility of die cracking even after repetitive testing. This feature enables probe card bring-ups prior to even wafer availability.

Smiths Interconnect's capabilities cover design validation, RF measurements and custom simulations, including Probe Card Analyzer (PCA) test capability in Outgoing Quality Assurance.

Features

- Proprietary engineered plastic and machined ceramic for improved planarity allowing increased site to site test parallelism
- Customized footprint with component clearance close to Device Under Test (DUT)
- Probe Head to PCB alignment by guide pins with optional fiducials
- Lid design options including individual spring loaded device plunger and floating device guide
- Easy maintenance and quick installation
- Field repairable
- Compatible to industry standard interval cleaning

Benefits

- Long product life
- Increased test throughput
- Higher signal integrity performance
- Reduced test set-up time
- Lower cost of ownership

Value Proposition

World-class Technology

- Non-plated noble material spring probe contact
- Optimized contact force for low and stable contact resistance
- Higher compliance compared to traditional vertical, cobra or pyramid contact technologies
- Sorted die test capability for test development
- Probe Card Analyzer (PCA) validation capability
- Suited for tri-temp test
- Replacement for cantilever and vertical probe card technologies
- Available for 180, 200, 250, 300, 350, 400 (or above) μm pitch applications

Superior Durability

- Metal frame with removable cartridge
- Proprietary engineered plastic material for high rigidity
- Easy maintenance and field repairable
- 100% in-house manufacturing

Optimized Design

- Improved structure based on finite element and Monte Carlo analyses
- Machinable ceramic material option for increased planarity
- Excellent site to site coplanarity
- High test parallelism (over 32 sites)
- 4-point crown (less bump damage)

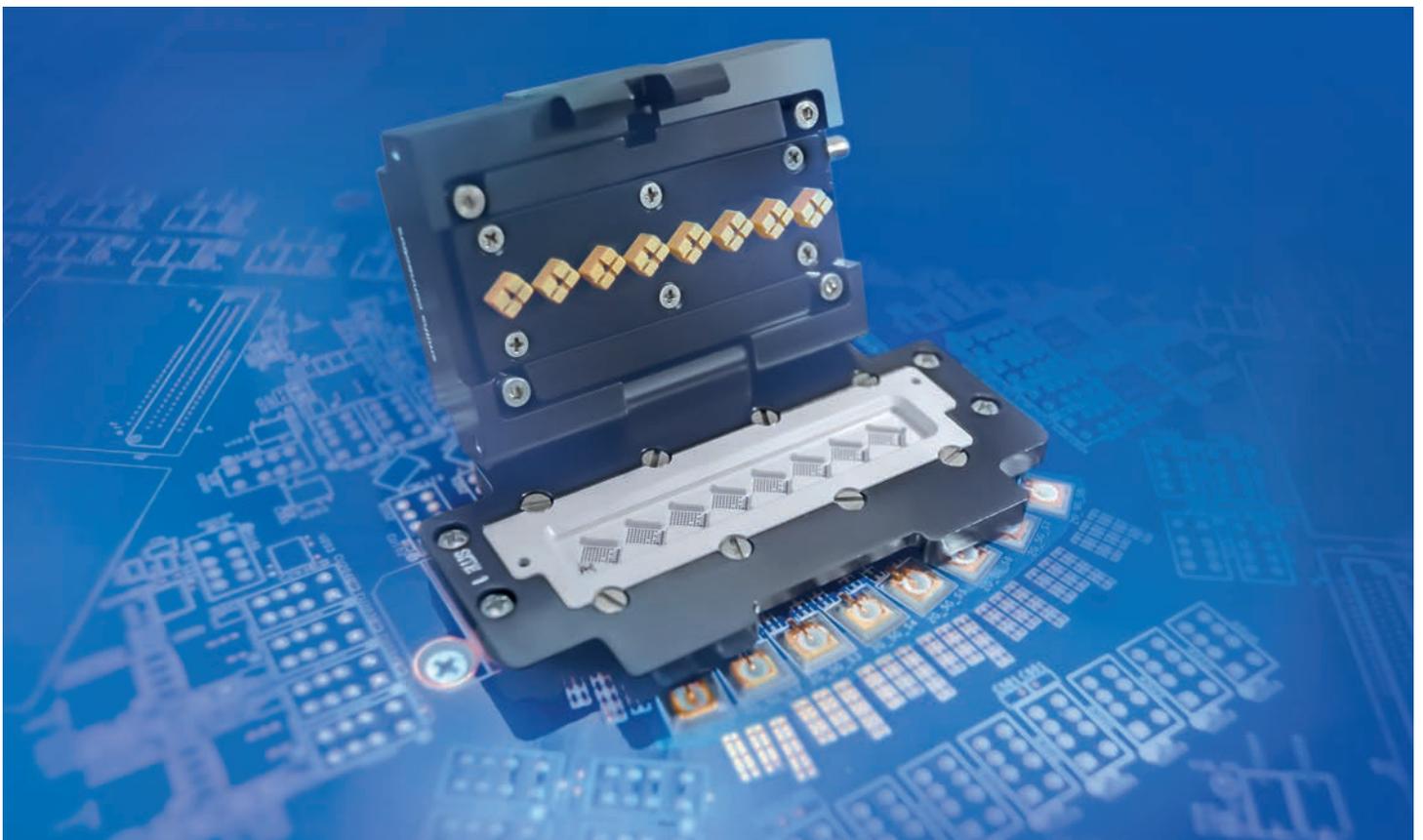
Exceptional Performance*

- High Current Carrying Capacity (CCC)
- Excellent DC and RF performance
- Low and stable contact resistance
- Reduced signal path
- Long product life

* Refer to the Volta Series Probe Specifications

Volta 180/200 Fan-out PCB

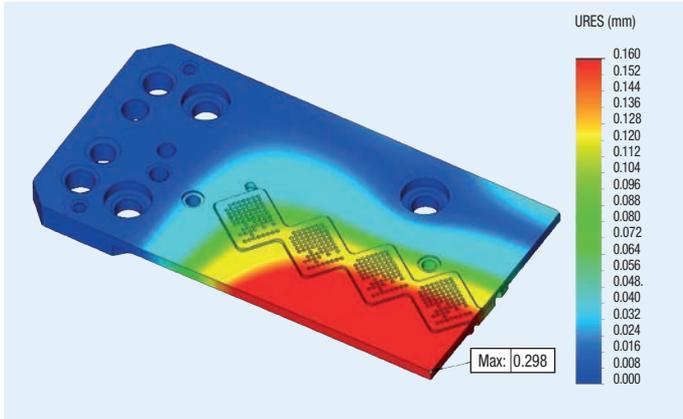
- 1 Fan-out routing approximately 600 pins from 180/200 μ m to \geq 0.8mm per site; up to 10 sites
- 2 Identical routing for each site in parallel configuration
- 3 Up to 6 layers of Signal I/Os using laser stacked micro via
- 4 Up to 10 layers of Ground and Power I/Os; 18 layers maximum
- 5 Typical board size is 127x51 mm (1.5 mm thickness)
- 6 Fiducial Pads for accurate Probe Head true position
- 7 Optimized low loss material for high speed performance



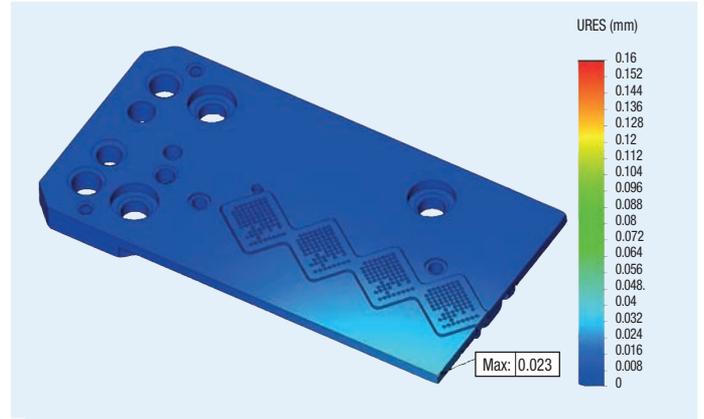
Manual Actuator for Sorted Die Test

Structural Simulation

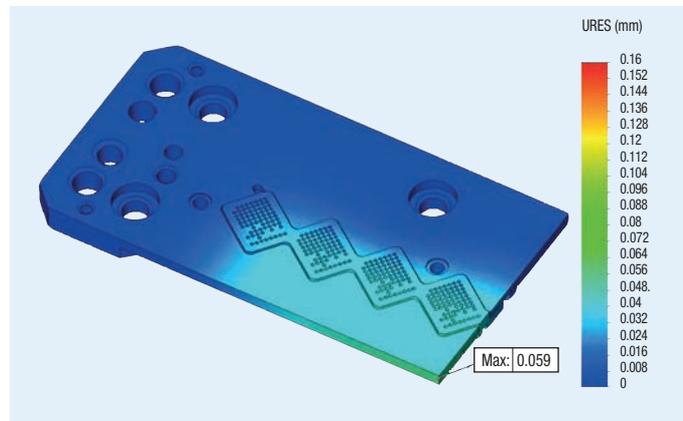
Probe Head Preload Deflection FEA Analysis



Ceramic PEEK Frame & Body



SST Frame & Proprietary Material
"PEEK Rigid" Body



SST Frame & Material "PI-1" Body

Max Deflection Due to Preload

| | Ceramic PEEK Frame & Body | Stainless Steel Frame & Proprietary Material "PEEK Rigid" Body | Stainless Steel Frame & Material "PI-1" Body |
|-----------------------|------------------------------|---|--|
| Max Deflection | 0.298 mm | 0.023 mm | 0.059 mm |

Volta Series Probe Specifications

| Volta Series Specifications | | Volta 180 | Volta 200 | Volta 250 | Volta 300 | Volta 350 | Volta 400 |
|---|------------|---|-------------------|-------------------|-----------------|-----------------|-----------------|
| | | **851-0023049-H00 | **851-0012074-H01 | **851-0023038-H00 | *102121-H00 | *102119-H00 | **102120-H00 |
| Wafer I/O Pitch | | 180 µm | 200 µm | 250 µm | 300 µm | 350 µm | 400 µm |
| Minimum Probe Depth (At Test) | | 2.85 mm | 2.85 mm | 2.90 mm | 3.80 mm | 3.50 mm | 2.90 mm |
| Probe Travel | Wafer Side | 230 µm | 230 µm | 250 µm | 250 µm | 300 µm | 300 µm |
| | PCB Side | 170 µm | 170 µm | 150 µm | 150 µm | 150 µm | 150 µm |
| Spring Material | | music wire | music wire | music wire | stainless steel | stainless steel | stainless steel |
| Device Side Contact Material | | Homogenous | | | | | |
| Probe Tip Shape | | 4-Point Crown | | | | | |
| Spring Force | | 6.5 gf | 10 gf | 15 gf | 17.5 gf | 16 gf | 17 gf |
| Contact Resistance | | < 200 mΩ | < 250 mΩ | < 100 mΩ | < 100 mΩ | < 70 mΩ | < 50 mΩ |
| Continuous Current Carrying Capacity (Room Temp.) | | 0.84 A | 1.2 A | 1.5 A | 2 A | 2.50 A | 3 A |
| Insertion Loss (Pattern: R-S-R @ -1 dB) | | 20 GHz | 22 GHz | 30 GHz | 20 GHz | 20 GHz | 20 GHz |
| Loop Inductance | | 0.65 nH | 0.56 nH | 0.76 nH | 0.95 nH | 0.92 nH | 0.82 nH |
| Capacitance | | 0.40 pF | 0.22 pF | 0.31 pF | 0.39 pF | 0.41 pF | 0.30 pF |
| Working Temperature | | -55° to 120°C | -55° to 120°C | -55° to 120°C | -55° to 150°C | -55° to 150°C | -55° to 150°C |
| Max. Number of Test Sites | | Defined by the FEA [Total pin count at a defined area is the limit] | | | | | |
| Sorted Die Test Feature (Alignment Plate and Manual Actuator) | | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual Contact Replacement | | Yes | Yes | Yes | Yes | Yes | Yes |

Notes:

* Suitable for engineering plastic and machined ceramic

** Suitable for engineering plastic only

Global Support

Americas

- Kansas City, KS
+1 913 342 5544
info.us@smithsinterconnect.com
- Tampa, FL
+1 813 901 7200
info.tampa@smithsinterconnectinc.com
- Milpitas, CA
+1 408 957 9607 x 1125
info.us@smithsinterconnect.com
- Kirkland, QC, Canada
+1 514 842 5179
info.us@smithsinterconnect.com
- Salisbury, MD
+1 800 780 2169
info.us@smithsinterconnect.com

Europe

- Deggendorf, Germany
+49 991 250 120
info.de@smithsinterconnect.com
- Rouen, France
+33 2 32 96 91 76
info.fr@smithsinterconnect.com
- Dundee, UK
+44 1382 427 200
info.dundee@smithsinterconnect.com
- Genova, Italy
+39 0 10 60361
info.it@smithsinterconnect.com

Asia

- Bangalore, India
+91 080 4241 0529
info.in@smithsinterconnect.com
- Singapore
+65 6846 1655
info.asia@smithsinterconnect.com
- Mianyang, China
+86 816 231 5566
HSICSR@hf-smiths.com
- Suzhou, China
+86 512 6273 1188
info.asia@smithsinterconnect.com
- Shanghai, China
+86 21 2283 8008
info.asia@smithsinterconnect.com