Volta Series Probe Specifications

<table>
<thead>
<tr>
<th>Volta Series Specifications</th>
<th>Volta 200</th>
<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/250 inch contact spacing</td>
<td>0.635 mm</td>
<td>0.635 mm</td>
<td>0.635 mm</td>
<td>0.635 mm</td>
</tr>
<tr>
<td>Contact Resistance</td>
<td>250 mΩ</td>
<td>100 mΩ</td>
<td>50 mΩ</td>
<td>50 mΩ</td>
</tr>
<tr>
<td>Continuous Contact Capacity (Room Temp.)</td>
<td>1.2 A</td>
<td>2 A</td>
<td>2.5 A</td>
<td>3 A</td>
</tr>
<tr>
<td>Insertion Loss (Pattern: R-S-R @ -1 dB)</td>
<td>22 GHz</td>
<td>20 GHz</td>
<td>20 GHz</td>
<td>20 GHz</td>
</tr>
<tr>
<td>Loop Inductance</td>
<td>0.56 μH</td>
<td>0.95 μH</td>
<td>0.92 μH</td>
<td>0.92 μH</td>
</tr>
<tr>
<td>Capacitance</td>
<td>0.22 pF</td>
<td>0.39 pF</td>
<td>0.41 pF</td>
<td>0.30 pF</td>
</tr>
<tr>
<td>Max. Number of Test Sites</td>
<td>-55° to 120°C</td>
<td>-55° to 150°C</td>
<td>-55° to 150°C</td>
<td>-55° to 150°C</td>
</tr>
</tbody>
</table>

**Notes:**
* Suitable for engineering plastic and machined ceramic
** Suitable for engineering plastic only

Global Support

UK Headquarters
- London, UK
  - +44 20 3004 3010
  - info.uk@smithsinterconnect.com

US Headquarters
- Stuart, FL
  - +1 772 286 9300
  - info.us@smithsinterconnect.com

Americas
- Costa Mesa, CA
  - +1 714 271 7000
  - info.us@smithsinterconnect.com
- Houston, TX
  - +1 713 560 0450
  - info.hp@smithsinterconnect.com
- Atlanta, GA
  - +1 404 752 3650
  - info.atlanta@smithsinterconnect.com
- Tempe, AZ
  - +1 480 792 7200
  - info.tempre@smithsinterconnect.com
- Springfield, OH
  - +1 937 342 5544
  - info.us@smithsinterconnect.com
- Thousand Oaks, CA
  - +1 805 267 1700
  - info.tlak@smithsinterconnect.com

Asia
- Singapore
  - +65 6846 1655
  - info.asia@smithsinterconnect.com
- Shanghai, China
  - +86 21 2263 8006
  - info.asia@smithsinterconnect.com
- Suzhou, China
  - +86 512 6273 1188
  - info.asia@smithsinterconnect.com

Europe
- Dusseldorf, UK
  - +44 1892 427 210
  - info.dusseldorf@smithsinterconnect.com
- Rome, Italy
  - +39 02 46 11 76
  - info.it@smithsinterconnect.com
- Elstree, UK
  - +44 20 3236 2400
  - info.uk@smithsinterconnect.com

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 include individual spring loaded device plunger and floating device guide
- Easy maintenance and quick installation
- Field repairable
- Comparable to industry standard incorrecting

Benefits
- Low product life
- Increased test throughput
- Enables higher signal integrity performance
- Reduced test set-up time
- Lower cost of ownership
Value Proposition

Volta 200 Fan-out PCB

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 200, 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-pg pin 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

Structural Simulation

Probe Head Preload Deflection FEA Analysis

Max Deflection Due to Preload

<table>
<thead>
<tr>
<th></th>
<th>Ceramic PEEK Frame &amp; Body</th>
<th>Stainless Steel Frame &amp; Proprietary Material “PEEK Rigid” Body</th>
<th>Stainless Steel Frame &amp; Material “PI-1” Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Deflection</td>
<td>0.298 mm</td>
<td>0.023 mm</td>
<td>0.059 mm</td>
</tr>
</tbody>
</table>

Manual Actuator for Sorted Die Test
**World-class Technology**
- Fan-out routing approximately 600 pins from 200μm to ≥0.8mm per site; up to 10 sites
- Identical routing for each site in parallel configuration
- Up to 6 layers of Signal I/Os using laser stacked micro via
- Up to 10 layers of Ground and Power I/Os; 18 layers maximum
- Typical board size is 127x51 mm (1.5 mm thickness)
- Fiducial Pads for accurate Probe Head true position
- Optimized low loss material for high speed performance

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---

**Probe Head Preload Deflection FEA Analysis**

- Ceramic PEEK Frame & Body
- SST Frame & Proprietary Material “PEEK Rigid” Body

**Max Deflection Due to Preload**

<table>
<thead>
<tr>
<th>Material Configuration</th>
<th>Max Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic PEEK Frame &amp; Body</td>
<td>0.298 mm</td>
</tr>
<tr>
<td>Stainless Steel Frame &amp; Proprietary Material “PEEK Rigid” Body</td>
<td>0.023 mm</td>
</tr>
<tr>
<td>Stainless Steel Frame &amp; Material “PI-1” Body</td>
<td>0.059 mm</td>
</tr>
</tbody>
</table>

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**Value Proposition**
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Volta 200 Fan-out PCB

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- Probe Head Preload Deflection FEA Analysis
- Max Deflection Due to Preload

<table>
<thead>
<tr>
<th>Probe Head Preload Deflection FEA Analysis</th>
<th>Max Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceramic PEEK Frame &amp; Body</td>
<td>0.298 mm</td>
</tr>
<tr>
<td>SST Frame &amp; Proprietary Material “PEEK Rigid” Body</td>
<td>0.023 mm</td>
</tr>
<tr>
<td>SST Frame &amp; Material “PI-1” Body</td>
<td>0.059 mm</td>
</tr>
</tbody>
</table>

Manual Actuator for Sorted Die Test
# Volta Series Probe Specifications

## Volta Series Specifications

<table>
<thead>
<tr>
<th></th>
<th>Volta 200</th>
<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wafer I/O (Pitch)</td>
<td>300 μm</td>
<td>300 μm</td>
<td>350 μm</td>
<td>400 μm</td>
</tr>
<tr>
<td>Minimum Probe Depth</td>
<td>2.85 mm</td>
<td>3.80 mm</td>
<td>3.50 mm</td>
<td>2.50 mm</td>
</tr>
<tr>
<td>Probe Travel</td>
<td>250 μm</td>
<td>250 μm</td>
<td>300 μm</td>
<td>300 μm</td>
</tr>
<tr>
<td>Contact Resistance</td>
<td>&lt; 250 mΩ</td>
<td>&lt; 100 mΩ</td>
<td>&lt; 70 mΩ</td>
<td>&lt; 50 mΩ</td>
</tr>
<tr>
<td>Continuous Current Carrying Capacity</td>
<td>1.2 A</td>
<td>2 A</td>
<td>2.50 A</td>
<td>3 A</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>0.56 mΩ</td>
<td>0.95 mΩ</td>
<td>0.62 mΩ</td>
<td>0.62 mΩ</td>
</tr>
<tr>
<td>Loop Inductance</td>
<td>0.22 μH</td>
<td>0.39 μH</td>
<td>0.41 μH</td>
<td>0.30 μF</td>
</tr>
<tr>
<td>Capacitance</td>
<td>1.2 A</td>
<td>10 μF</td>
<td>16 μF</td>
<td>20 μF</td>
</tr>
<tr>
<td>Working Temperature</td>
<td>-55°C to 120°C</td>
<td>-55°C to 150°C</td>
<td>-55°C to 150°C</td>
<td>-55°C to 150°C</td>
</tr>
</tbody>
</table>

## Spring Material

<table>
<thead>
<tr>
<th></th>
<th>Volta 200</th>
<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB Side</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Wafer Side</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>

## Device Side Contact Material

<table>
<thead>
<tr>
<th></th>
<th>Volta 200</th>
<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Music Wire</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>

## Contact Resistance

<table>
<thead>
<tr>
<th></th>
<th>Volta 200</th>
<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 250 mΩ</td>
<td>250 μm</td>
<td>300 μm</td>
<td>350 μm</td>
<td>400 μm</td>
</tr>
</tbody>
</table>

## Workmanship

<table>
<thead>
<tr>
<th></th>
<th>Volta 200</th>
<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Number of Test Sites</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

## Notes

- * Suitable for engineering plastic and machined ceramic
- ** Suitable for engineering plastic only

---

[Volta Series Probe Head]

**UK Headquarters**
- London, UK
  - +44 20 7204 3620
  - info.uk@smithsinterconnect.com

**Americas**
- Costa Mesa, CA
  - +1 949 238 0100
  - info.us@smithsinterconnect.com
- Houston, TX
  - +1 713 569 0445
  - info.us@smithsinterconnect.com
- Kansas City, KS
  - +1 913 342 1144
  - info.us@smithsinterconnect.com
- Michigan, MI
  - +1 616 582 3620
  - info.us@smithsinterconnect.com
- Thousand Oaks, CA
  - +1 805 226 7100
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**Europe**
- Deggendorf, Germany
  - +49 991 250 120
  - info.uk@smithsinterconnect.com
- Oxford, UK
  - +44 1865 730 300
  - info.uk@smithsinterconnect.com
- Rouen, France
  - +33 2 32 96 16 16
  - info.fr@smithsinterconnect.com
- London, UK
  - +44 20 8236 2400
  - info.uk@smithsinterconnect.com

**Asia**
- Shanghai, China
  - +86 21 2293 8008
  - info.asia@smithsinterconnect.com
- Singapore
  - +65 6846 1665
  - info.asia@smithsinterconnect.com

**Global Support**
- Suzhou, China
  - +86 512 6273 1188
  - info.asia@smithsinterconnect.com
- Shenzhen, China
  - +86 795 8828 7961
  - info.asia@smithsinterconnect.com

**Features**
- Proprietary engineered plastic and machined ceramic for improved plating allowing increased site to site test parallelism.
- Customized footprint with component clearance close to Device Under Test (DUT).
- Probes with dedicated alignment tools for improved productivity.
- Lid design options include individual spring loaded device plunger and floating device guide.
- Easy maintenance and quick installation.
- Field repairable.
- Compatible to industry standard cleaning processes.

**Volta Series Probe Head**

- Enables higher signal integrity performance.
- Reduced test set-up time.
- Lower cost of ownership.

---

The information contained within this document is subject at all times to applicable Export Control regulations and legal requirements.
## Volta Series Probe Specifications

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</tr>
</thead>
<tbody>
<tr>
<td><em>850-0020204-400</em></td>
<td><em>102321-400</em></td>
<td><em>102319-400</em></td>
<td><em>1023120-400</em></td>
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</table>

### Wafer I/O Pitch

<table>
<thead>
<tr>
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<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 μm</td>
<td>300 μm</td>
<td>350 μm</td>
<td>400 μm</td>
</tr>
<tr>
<td>500 μm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Minimum Probe Depth (At Test)

<table>
<thead>
<tr>
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<th>Volta 300</th>
<th>Volta 350</th>
<th>Volta 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.85 mm</td>
<td>3.80 mm</td>
<td>3.50 mm</td>
<td>2.50 mm</td>
</tr>
<tr>
<td>3.20 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Probe Travel

<table>
<thead>
<tr>
<th>Wafer Side</th>
<th>PCB Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 μm</td>
<td>150 μm</td>
</tr>
<tr>
<td>300 μm</td>
<td>150 μm</td>
</tr>
</tbody>
</table>

### Spring Material

- music wire
- stainless steel
- stainless steel
- stainless steel
- stainless steel

### Device Side Contact Material

- Homogenous

### Probe Tip Shape

- 4-Point Crown

### Spring Force

<table>
<thead>
<tr>
<th>Room Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 gf</td>
</tr>
<tr>
<td>17.5 gf</td>
</tr>
<tr>
<td>16 gf</td>
</tr>
<tr>
<td>17 gf</td>
</tr>
</tbody>
</table>

### Contact Resistance

<table>
<thead>
<tr>
<th>Room Temp.</th>
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</thead>
<tbody>
<tr>
<td>&lt; 250 mΩ</td>
</tr>
<tr>
<td>&lt; 100 mΩ</td>
</tr>
<tr>
<td>&lt; 70 mΩ</td>
</tr>
<tr>
<td>&lt; 51 mΩ</td>
</tr>
<tr>
<td>&lt; 50 mΩ</td>
</tr>
</tbody>
</table>

### Continuous Current Carrying Capacity

<table>
<thead>
<tr>
<th>Room Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2A</td>
</tr>
<tr>
<td>2A</td>
</tr>
<tr>
<td>2.50 A</td>
</tr>
<tr>
<td>4A</td>
</tr>
</tbody>
</table>

### Insertion Loss (Pattern: R-S-R @ -1 dB)

- 32 GHz
- 20 GHz
- 10 GHz

### Loop Inductance

<table>
<thead>
<tr>
<th>Room Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.56 nH</td>
</tr>
<tr>
<td>0.95 nH</td>
</tr>
<tr>
<td>1.08 nH</td>
</tr>
<tr>
<td>1.62 nH</td>
</tr>
</tbody>
</table>

### Capacitance

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<tbody>
<tr>
<td>0.22 pF</td>
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<td>0.39 pF</td>
</tr>
<tr>
<td>0.41 pF</td>
</tr>
<tr>
<td>0.30 pF</td>
</tr>
<tr>
<td>0.35 pF</td>
</tr>
</tbody>
</table>

### Working Temperature

- -55° to 120°C
- -55° to 150°C
- -55° to 150°C
- 15°C to 55°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

### Individual Contact Replacement

- Yes
- Yes
- Yes
- Yes

### Notes:

1. Suitable for engineering plastic and machined ceramic
2. Suitable for engineering plastic only