A Ground-Signal (GS) configuration is the most cost-effective RF design, as less wafer space is taken up with contact pads. Cascade Microtech’s |Z| Probe® in a GS/SG configuration enables wafer-level testing with the highest accuracy and throughput available, while maintaining excellent electrical behavior regardless of footprint size.

It is ideal for reliable high-volume production testing, providing proven unsurpassed contact repeatability. The |Z| Probe GS/SG 20 GHz has been further enhanced with the revolutionary 1MX™ technology, ensuring superior electrical performance, especially insertion and return loss. In addition, isolation (crosstalk) has been significantly improved resulting in a probe that delivers the highest accuracy for your wafer-level RF and microwave measurements.

Independent, long contact springs touch down precisely yet gently even on metal layer thicknesses down to an ultra-thin 50 nm. The unique |Z| Probe design with its independent spring contacts minimizes the impact between tips and pads. Therefore, by design the |Z| Probe overcomes the limitations of the traditional micro-coax and thin-film style HF probes which typically cause damage after multiple contacts and over travel. The |Z| Probe has an extremely low contact resistance on gold and aluminum pads.

### FEATURES AND BENEFITS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
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</thead>
<tbody>
<tr>
<td><strong>Durability</strong></td>
<td>Incredibly long lifetime</td>
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<tr>
<td></td>
<td>Unparalleled repeatable and reliable contact quality</td>
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<td></td>
<td>Suitable for automated testing</td>
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<tr>
<td><strong>Flexibility</strong></td>
<td>Probe on most pad material with minimal damage</td>
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<td></td>
<td>Independent, long contact springs easily overcome pad height differences up to 50 µm</td>
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<td></td>
<td>Small structures such as 40 µm x 40 µm pads can be tested</td>
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<tr>
<td></td>
<td>Excellent performance in vacuum environments and temperatures from 10 K to 300°C</td>
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<tr>
<td><strong>RF performance</strong></td>
<td>Lowest insertion loss</td>
</tr>
<tr>
<td></td>
<td>New 1MX technology ensures low insertion loss, high isolation and accurate measurements</td>
</tr>
</tbody>
</table>
### Electrical Characteristics

- **Characteristic impedance**: 50 Ω
- **Frequency range**: DC to 20 GHz
- **Return loss**: > 20 dB DC to 20 GHz**
- **Insertion loss**: < 0.6 dB DC to 20 GHz**
- **Maximum RF power**: 5 W at 20 GHz
- **Maximum DC current**: 1 A
- **Maximum DC voltage**: 75 V
- **Contact resistance on Au**: < 6 mΩ**

### Mechanical Characteristics

- **Contacts**: Solid nickel springs
- **Insulator**: RF dielectric
- **Contact cycles on Al**: > 1,000,000
- **Contact spring pressure**: 4 N/mm
- **Available standard pitches**: 50 µm to 200 µm with 25 µm increments, 200 µm to 500 µm with 50 µm increments

### RF Connector

- **Type**: PC 2.92 mm
- **Coupling torque**: 0.8 Nm to 1.1 Nm (Recommended)
- **Outer contact**: Stainless steel
- **Center contact**: CuBe with Au plating
- **Insulator**: PS

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*Data, design and specification depend on individual process conditions and can vary according to equipment configurations. Not all specifications may be valid simultaneously.*

**Typical for probes with pitches from 50 µm to 200 µm

***1MX technology is available for pitches up to 500 µm.***

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### PHYSICAL DIMENSIONS

![Probe standard case](image1)

![Probe slim case](image2)

|Z| Probe standard case (all dimensions in mm).

|Z| Probe slim case (all dimensions in mm).
Uncalibrated performance of a [Z] Probe 20 K3N GS 150.

Signal isolation (crosstalk) of two [Z] Probes separated by a distance of 150 µm.

Long lifetime of [Z] Probe (Contact material: Al, Overtravel: 75 µm)

New [Z] Probe (upside-down).

The same probe after 1.5 million touchdowns.

The same probe after three million touchdowns.