VSCC

*Vertical Spring Contact Card for Bump Probing*

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Outline

- VSCC Concept
- Electrical and Mechanical Data
- Maintenance
- Specifications
- Roadmap
- Summary
Vertical Spring Contact Card

Features:

- For probing area arrays (solder or Cu bumps).
- Mechanically-isolated probes.
- Stable alignment and planarity.
- Replaceable probes and head.
- No floating probes.
- Low, linear probe force.
- Two different tip shapes.
Vertical Spring Contact Card

- Contact to Interposer (Conical Tip)
- Contact to Bump (Flat or pointed Tip)

MLO \ MLC side

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VSC Configuration (Wire Transformer Type)

- Stiffener
- Wire Transformer
- Board
- Guide Plate
- Spring Pin
VSC Configuration (Space Transformer with MLO/MLC)

- Stiffener
- Board
- Spacer
- MLO / MLC
- Guide Plate
- Spring Pin
- Solder Reflow
Current Rating under room temp

For 150um pitch pin

**Rated current** under room temperature

*SCP10-2510BP*

**SCP10-2510**

- Change rate 80%
- Rated current result: 0.6A

**Current [A]** @ 60sec loading
### Dielectric Breakdown Voltage

**Voltage Source**

<table>
<thead>
<tr>
<th>Model</th>
<th>Pitch</th>
<th>Voltage Type</th>
<th>Voltage (for 1 minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCP14-3010</strong></td>
<td>0.2mm Pitch</td>
<td>AC</td>
<td>400V</td>
</tr>
<tr>
<td><strong>SCP12-2510</strong></td>
<td>0.175mm Pitch</td>
<td>AC</td>
<td>400V</td>
</tr>
<tr>
<td><strong>SCP10-2510</strong></td>
<td>0.15mm Pitch</td>
<td>AC</td>
<td>300V</td>
</tr>
</tbody>
</table>
Impedance - $S_{11}$ Short Measurement

**Smith Chart**

- 50M~10.05GHz
- Measured at 0.150mm pitch

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Inductance
SPICE Equivalent Circuit Model Simulation
by S-NAP Circuit Simulator

DUT = SCP10-2510BP

Pin Inductance

Frequency [GHz]

Inductance $L$ [nH]

0.71nH
Operating Frequency (Insertion Loss)

*Insertion Loss*  
(*S_{21} Through Measurement*)

**DUT=SCP10-2510BP**

![Graph showing insertion loss vs frequency with specific details on the graph such as frequency in GHz and insertion loss in dB.](image)
Signal Integrity
(TDT Measurement)

*Signal Delay (TDT Measured Data)*

<table>
<thead>
<tr>
<th>Rise Time [ps]</th>
<th>Source</th>
<th>Response</th>
<th>Delay [ps]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>50</td>
<td>58.6</td>
<td>20.8</td>
</tr>
<tr>
<td>100</td>
<td>108.3</td>
<td>22.6</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>208.4</td>
<td>24.7</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>309.0</td>
<td>26.4</td>
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<tr>
<td>400</td>
<td>406.9</td>
<td>28.6</td>
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<tr>
<td>500</td>
<td>506.9</td>
<td>30.0</td>
<td></td>
</tr>
</tbody>
</table>
Force / Resistance - Travel Curve

Average = 3.81gf @170um OD

DC Resistance / Spring Force

SCP10-2510

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CRES vs Touchdowns

Resistance Measurements

Durable Test Travel: 100?m
Resistance is Measured at 100?m Travel

- MAX
- AVE
- MIN

Number of Touchdowns

Resistance [mΩ]

0 200 400 600 800 1000

100 1,000 10,000 100,000 1,000,000
Solder Bump Deformation After Probing

- Temp.: 85 degree
- O.D.: 170 µm

* Contact Deformation Diameter is measured on Xaxis

Top View of Non-Contact Solder Bump

First contact

3 times contact

6 times contact

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Ball Deformation Measurement

Temp.: 85 degree  TD: 1 time  OD: 170um

Before Contact

After Contact

1.77um

35um

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Probe Alignment at 85°C

Condition
Number of probes: 40pins
Number of DUT: Single

±15μm

† 1000 TD
※ 300K TD
Planarity

Condition
Number of probes: 40pins
Number of DUT: Single

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Cleaning Procedure

≥ Cleaning Sheet
   Lapping film with 1-µm grain size

≥ Conditions
   ? OD : 100 µm
   ? Wiping action : 150 µm
   ? Number Touchdowns : 5~10
# Tip Cleaning

<table>
<thead>
<tr>
<th>Number of Wipes</th>
<th>Initial</th>
<th>3K TDs</th>
<th>5 Times</th>
<th>10 Times</th>
<th>20 Times</th>
<th>30 Times</th>
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</thead>
<tbody>
<tr>
<td>No.1</td>
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<td>No.3</td>
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<td><img src="image18.jpg" alt="Image" /></td>
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<td>No.10</td>
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<td><img src="image23.jpg" alt="Image" /></td>
<td><img src="image24.jpg" alt="Image" /></td>
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</table>
Specifications

- **Alignment**: ±15 um
- **Planarity**: ±15 um
- **Minimum Pitch**: 150 um
- **Material**: P7, Steel
- **Tip Diameter**: 75 - 100 um
- **Tip Length**: 250 - 300 ± 20 um
- **Contact Resistance**: less than 1 ohm
- **Contact Force**: 4.1 - 6 g
- **Recommended OD**: 170 - 200 um
- **Maximum Current**: 500 mA
- **Temperature Range**: 25 - 85 °C
Summary

- New solution for area arrays.
- Stable mechanical and electrical performance.
- Very easy to repair.
- Proven in production at multiple sites.