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Vertical Contact Probe Card (VCPC™)

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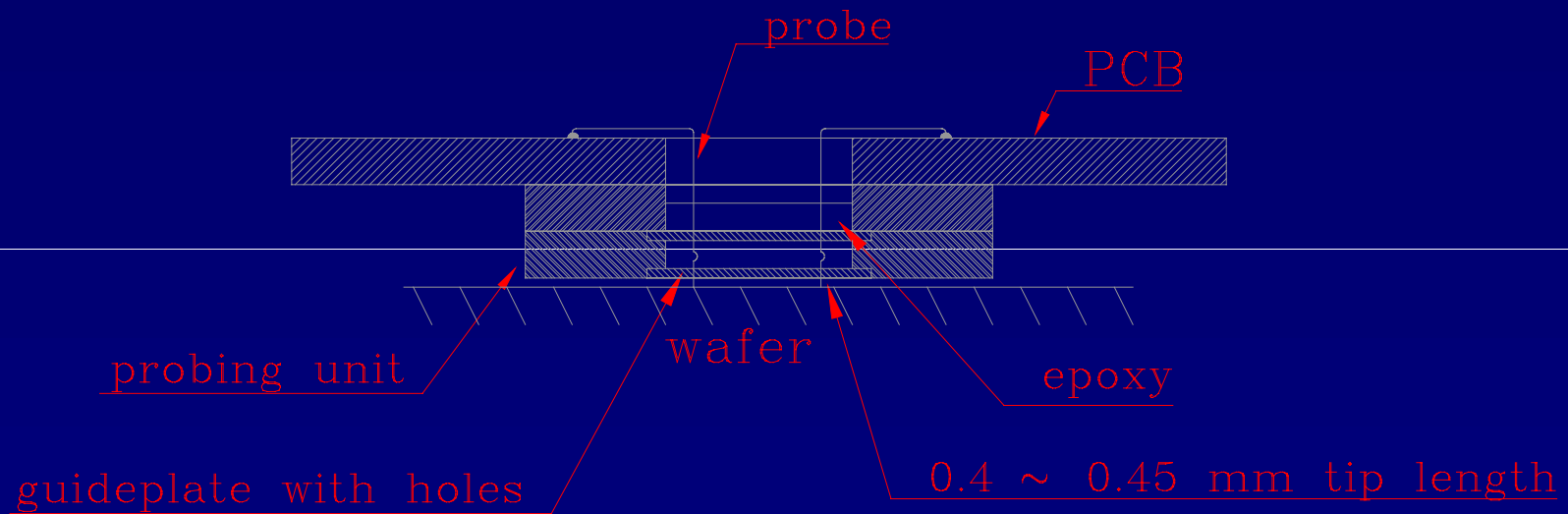
Introduction

- Two Types (VCPC and Ribbon VCPC)
- Matrix - C4, BGA
- Multi-die memory, Logic

Topics of Discussion

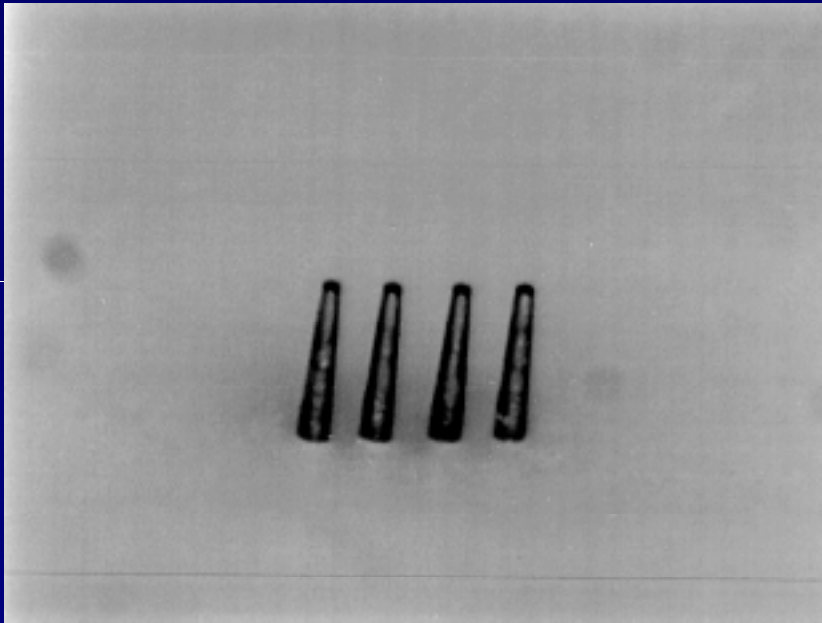
- Concept and Structure
- Mechanical Characteristics
- Electrical Characteristics
- Concept and Structure of Ribbon VCPC

Concept and Structure

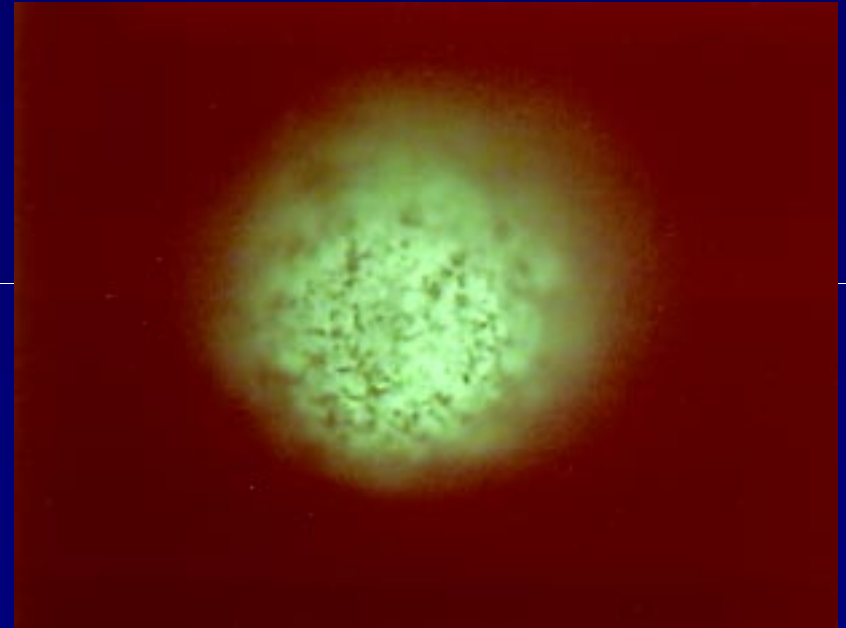


■ Cross-sectional view of VCPC

Concept and Structure



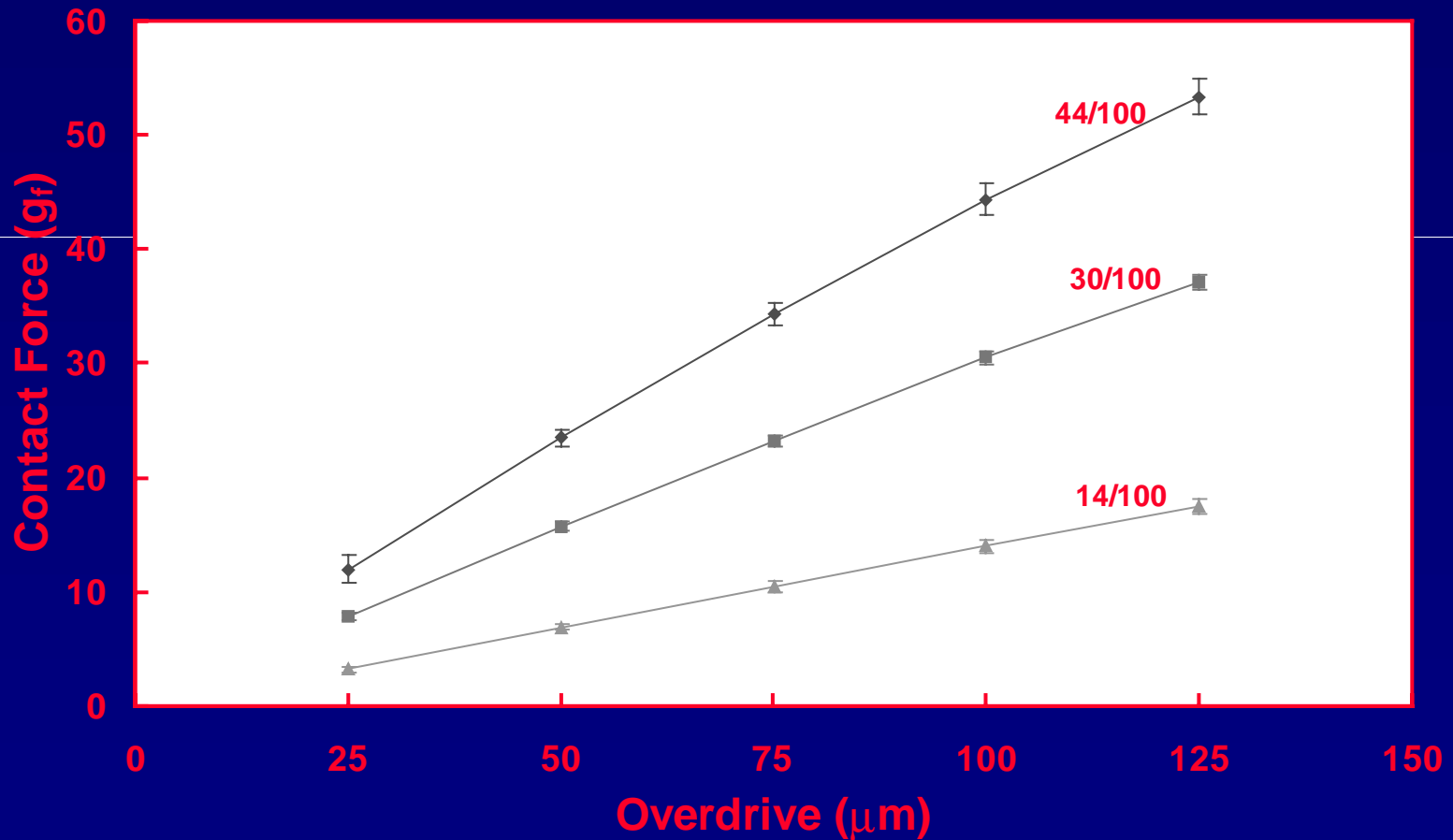
■ Four probe tips



■ Rounded tip

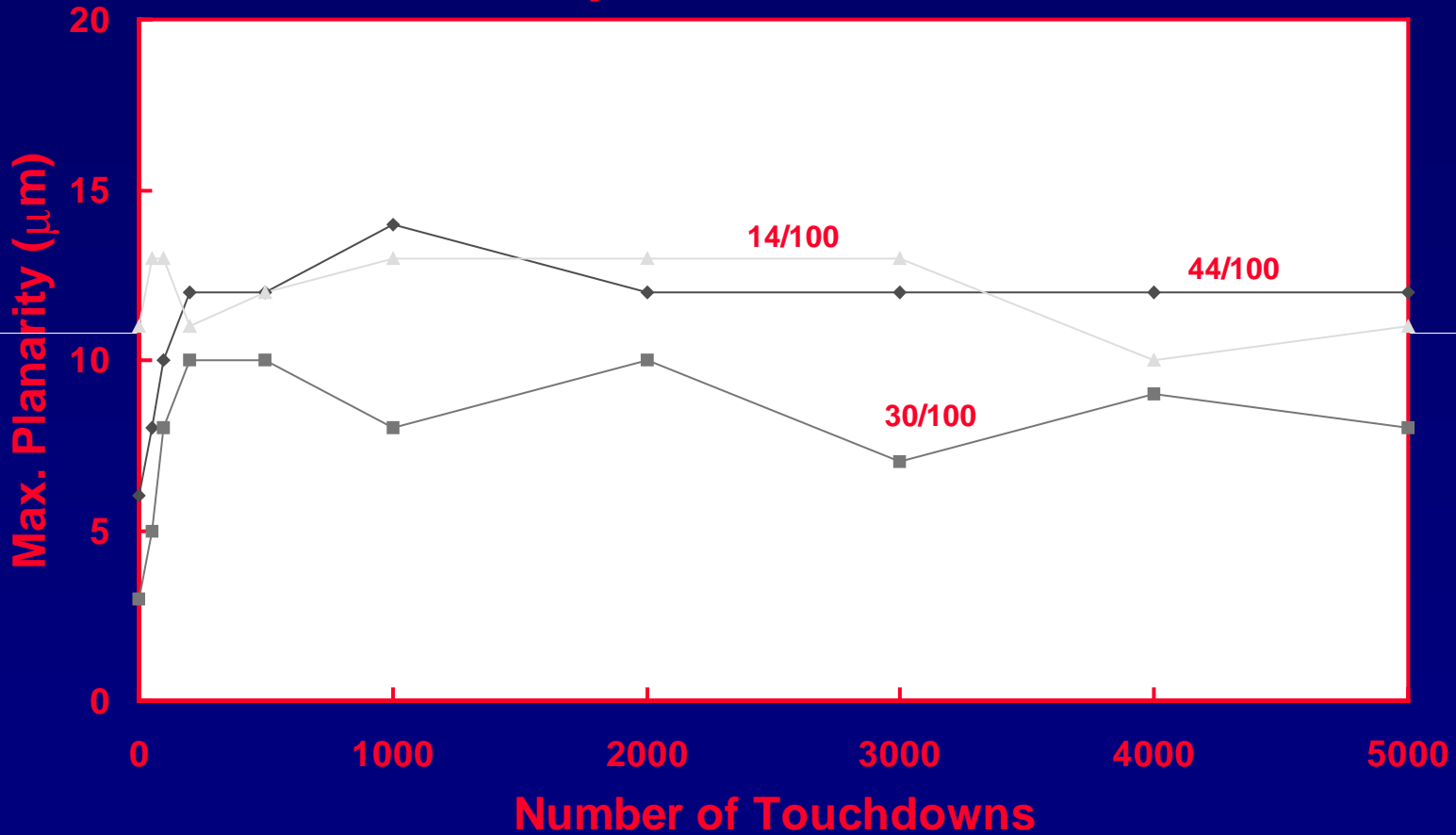
Mechanical Characteristics

Contact Force vs. Overdrive



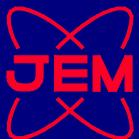
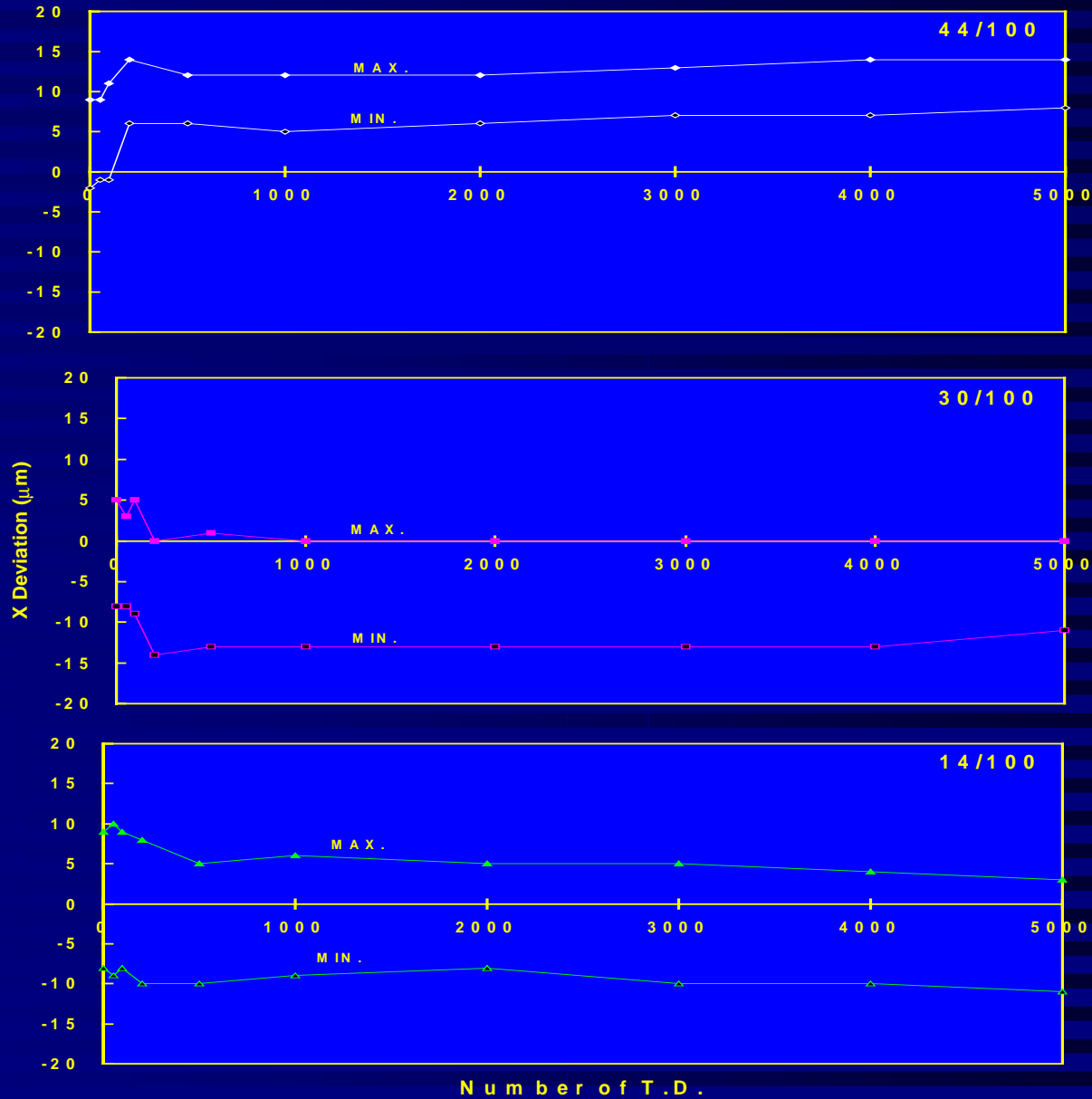
Mechanical Characteristics

Planarity vs. Touchdowns



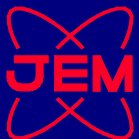
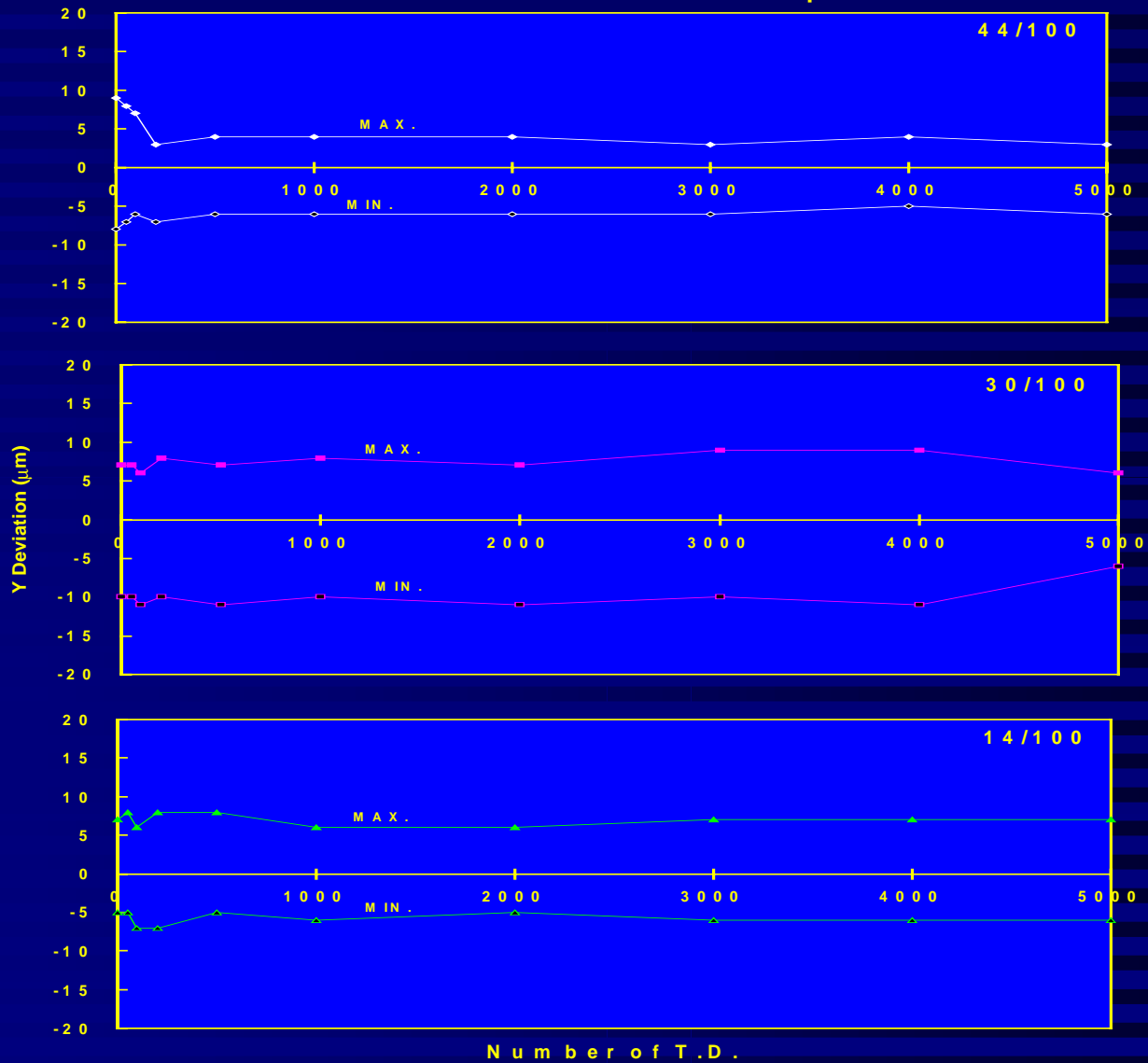
Mechanical Characteristics

X Deviation of Probe Tips



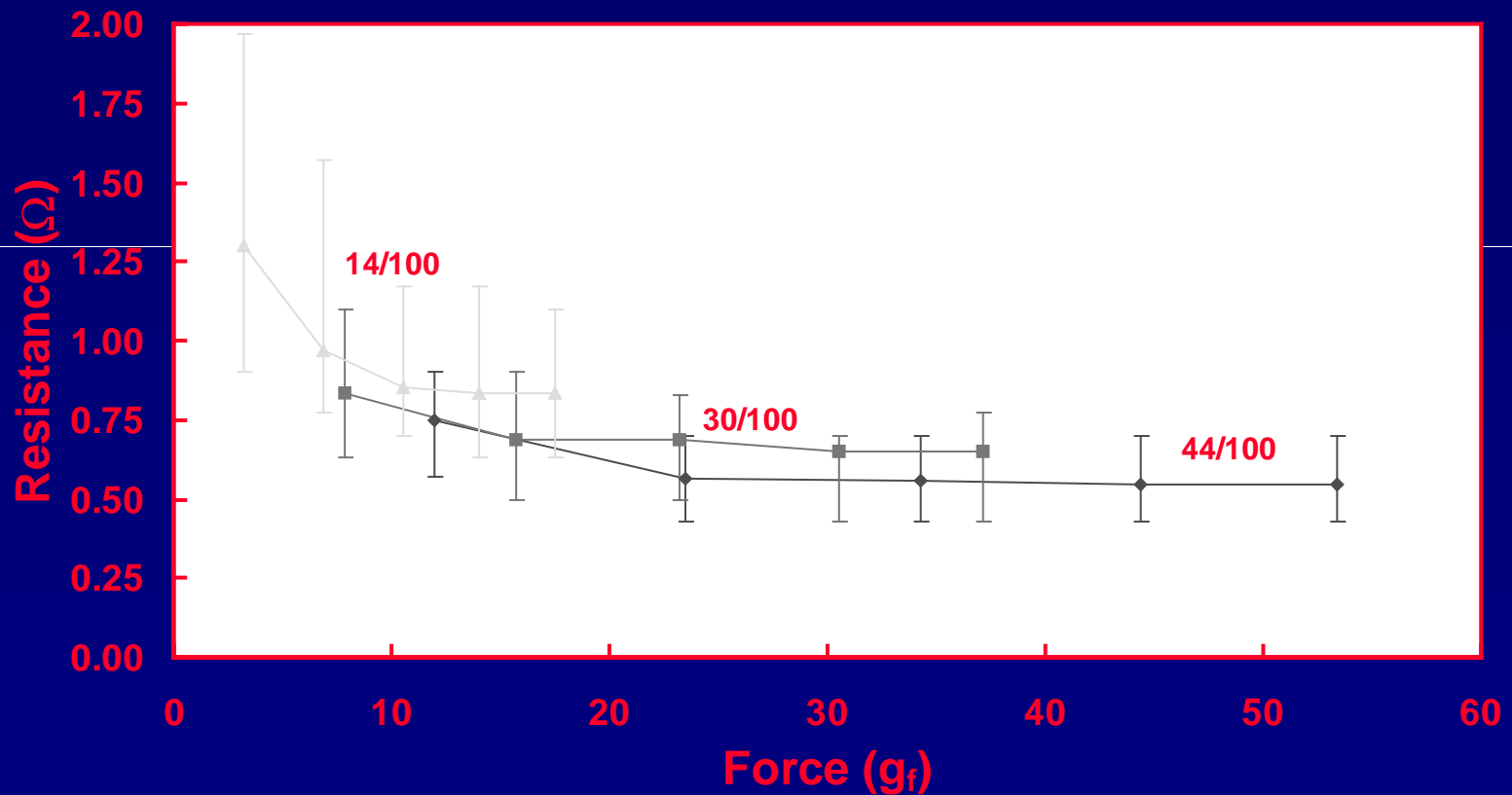
Mechanical Characteristics

Y Deviation of Probe Tips



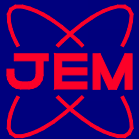
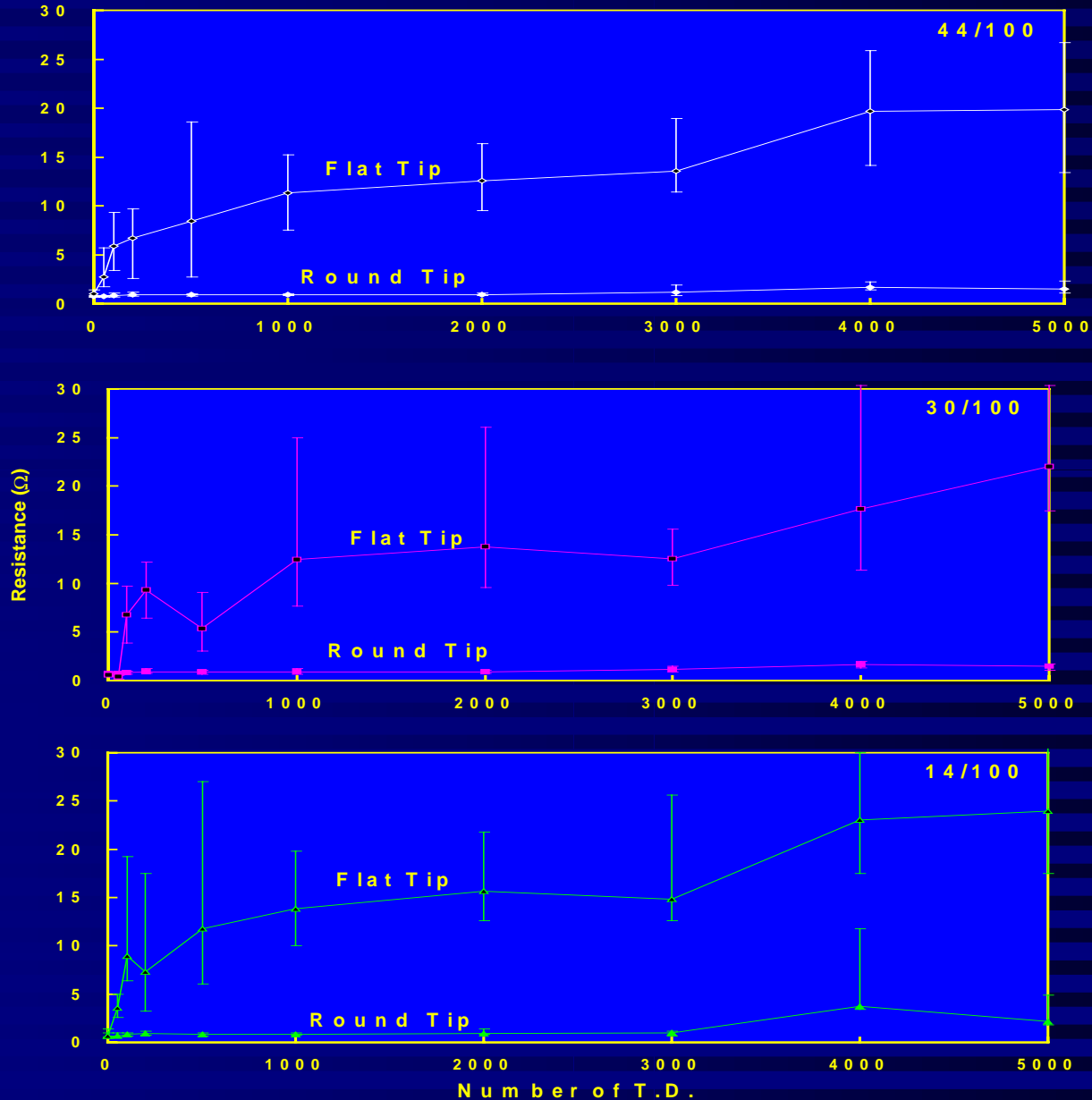
Electrical Characteristics

Contact Resistance vs. Contact Force



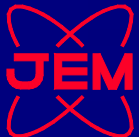
Electrical Characteristics

Contact Resistance vs. Touch Downs

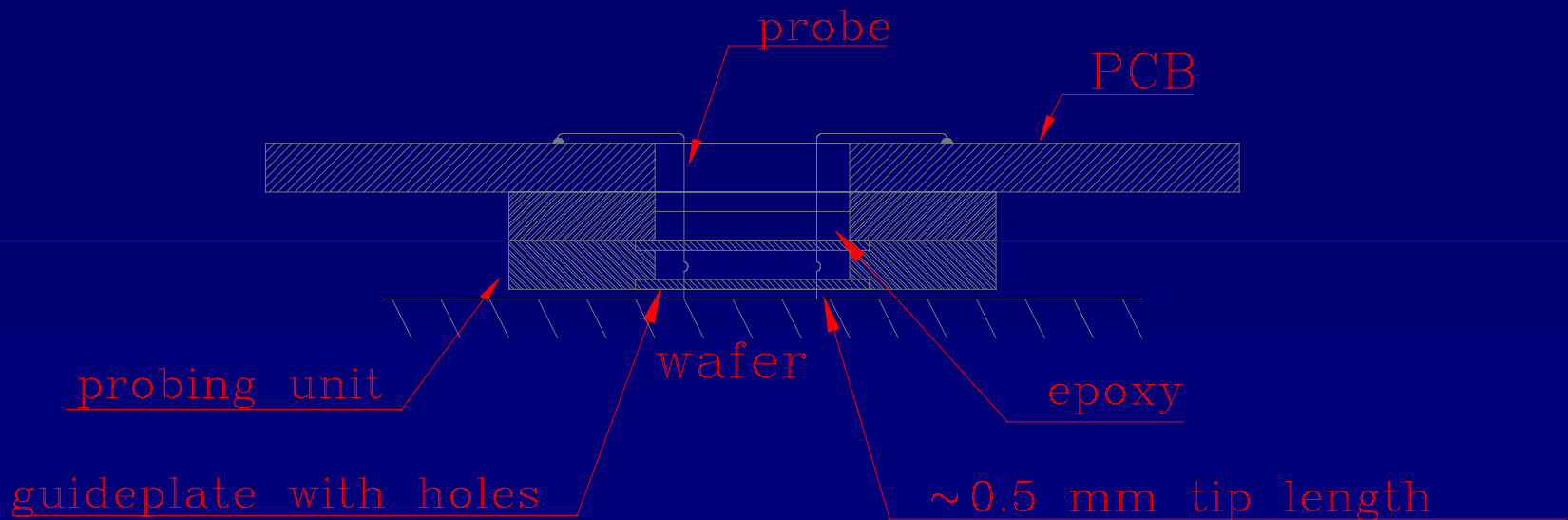


VCPC Specifications

- Alignment $\pm 10 \mu\text{m}$
- Planarity $\pm 10 \mu\text{m}$
- Minimum Pitch $135 \mu\text{m}$
- Probe Material W, Re-W
- Probe Diameter $80 \mu\text{m}$
- Probe Tip Length $400\text{-}450 \mu\text{m}$
- Probe Tip Diameter $30 \mu\text{m}$
- Contact Resistance $1\Omega \text{ max}$
- Contact Force $30 \text{ g} \pm 10\% @ 100 \mu\text{m O.D.}$
- Maximum Current 250 ma
- Temperature Range $0\text{-}125 \text{ }^\circ\text{C}$
- Maximum Device Size $100 \times 100 \mu\text{m}$, or $50 \times 150 \mu\text{m}$
- Minimum Board Size $4.5'' \times 7''$, or $5.25''$ diameter
- Life 1 million touchdowns max.

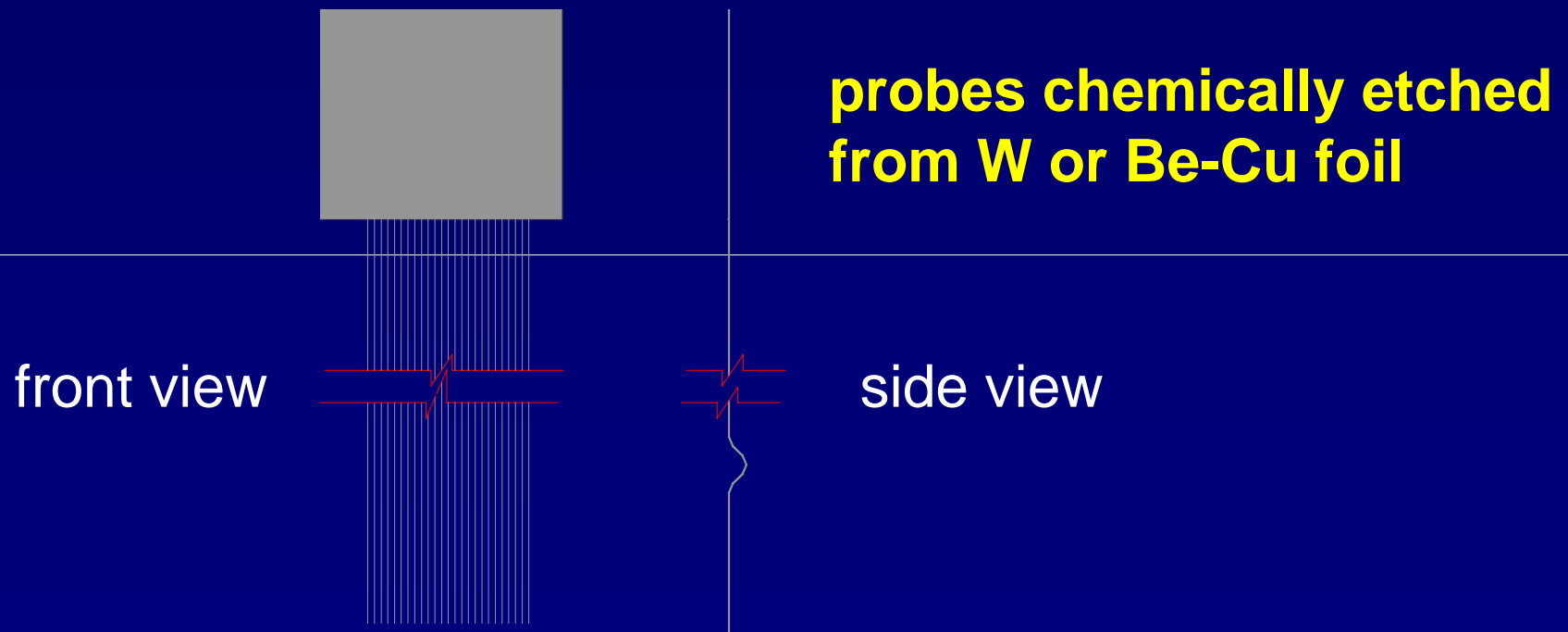


Concept and Structure of Ribbon VCPC



■ Schematic of Ribbon VCPC

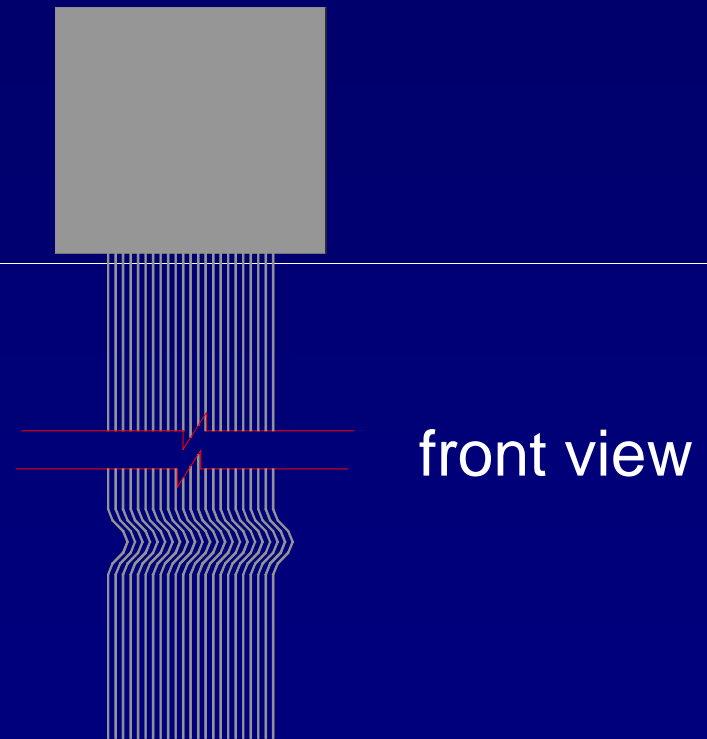
Concept and Structure of Ribbon VCPC



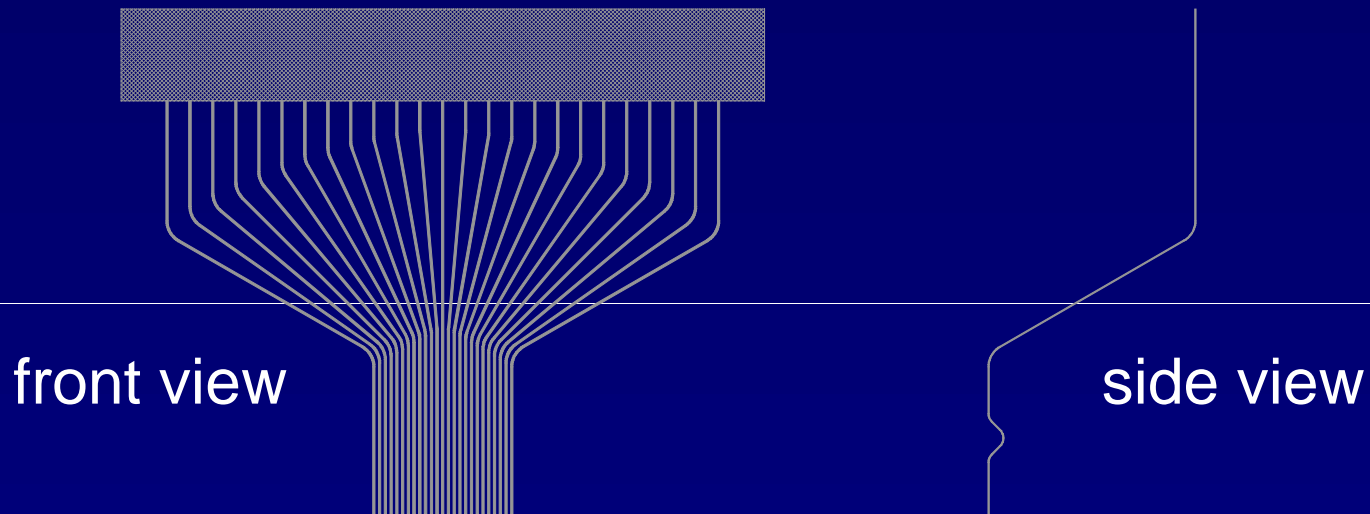
- Schematic of ribbon probe grouping

Concept and Structure of Ribbon VCPC

- chemical etching of the bead directly into the probe
- Lateral instability is manageable



Concept and Structure of Ribbon VCPC



- Small-to-large pitch, etched grouping
- Attached to underside of PCB via an interposer

Future Work

- Mechanical and Electrical Testing of Ribbon VCPC
- Materials Evaluation
- Design for more scrub action