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October 26 – 29, 2021 Virtual Event

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Session 1 Presentation 1

New Technology

TestConX China 2021

A New Type Scrubbing Contact (J shape)

Eric Zhang Gary Wang Cleveland Chen Smiths Interconnect



China Virtual = October 26-29, 2021

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A New Type Scrubbing Contact (J shape)

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Background





- 5G,AI and automated driving technology development
- The chip development trend towards high-speed and miniaturization.



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China





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Peripheral ICs Existing Test Method

Peripheral IC common test contact:

- Spring Probe
- Scrubbing contact



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Challenges for Peripheral IC Package Test

Peripheral IC package test challenges

- RF

- Hard pad material : NiPdAu
- Adhered tin in Spring Probe tips
- Smaller pitch
- PCB pad wear out

Common issues for current scrubbing contact

- Long contact path to impact RF
- PCB pad wear







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Scrubbing Contact Mechanism

Methodology:

- Scrubbing pin is fixed by elastic material part, It rotate centered around elastic material part, this elastic material part provide necessary contact force;
- Device is in IC pocket, it can't move at X,Y axis or rotary;
- When Device move △Z at Z axis , Scrubbing pin tip also move △Z at Z axis and generate △X displacement at X axis; under contact force, Scrubbing pin tip will scrape off the oxide layer on the device pad





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Scrubbing Contact Mechanism

Scrubbing action remove Oxidation layer



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J Scrubbing Contact Specification



Mechanical Specifications:

- Pitch: ≥0.3mm
- Compressed Height: 0.75mm
- Compliance: 0.26mm
- Contact Force: 40~45 Grams
- Wiping length: <0.13mm
- Operating Temp: -40 °C ~ 125 °C



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Force vs Deflection



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J Scrubbing Contact Life: Cres vs 500K Cycles



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J Scrubbing Contact Signal Integrity: IL



J Scrubbing Contact Signal Integrity: RL



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J Scrubbing Contact CCC Performance

Current Capacity Test - Single Pin in Free Air Max T-Rise (C) Vs Current (A)



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J Scrubbing Contact Marks on QFN Matt Tin Pad



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J Scrubbing Contact Marks on PCB Pads (500K cycles)



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Summary

- Joule 20 QFN sockets with J contact have been qualified in customers site with good performance .
- Test height is 0.75mm, short signal path
- Resistance < 20 m Ω per contact (reliable contact)
- Current carrying capacity: < 60 °C temp rise at 8 Amps
- Bandwidth of 20GHz at >-1 dB insertion loss
- Operating temperature range: 40 °C to 125 °C
- Cycle life: > 500,000 cycles
- Maintain PCB pad long life (almost no wear)



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