
EIGHTEENTH ANNUAL
BiTS
Burn-in & Test Strategies Workshop
March 5 - 8, 2017
Hilton Phoenix / Mesa Hotel
Mesa, Arizona
Archive – Session 8
© 2017 BiTS Workshop – Image: tonda / iStock

Copyright Notice

Session 8

Hongjun Yao

Session Chair

BiTS Workshop 2017 Schedule

Solutions Day

Wednesday March 8 - 10:30 am

Contact Frequency

" Small Form Factor Cantilever Concepts for High Performance Analog / RF Applications"

Gerhard Gschwendtberger – Cohu

"MRC (MEMS Rubber Contact) Socket Bump Particle Structure & Performance Analysis"

BoHyun Kim, Dave Oh, Justin Yun - TSE Co., Ltd

"Flat Probe Technology For High Frequency Test"

Jason Mroczkowski, Nadia Steckler - Xcerra

Small Form Factor Cantilever Concepts for High Performance Analog/ RF Applications

Gerhard Gschwendtberger
Cohu

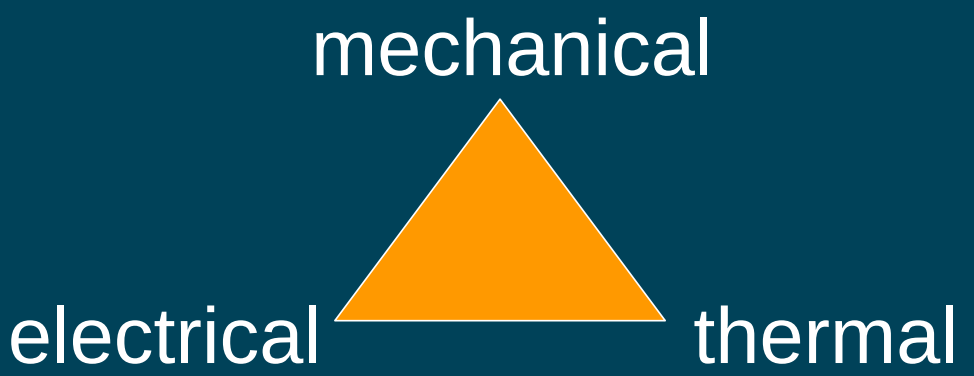
BiTS Workshop
March 5 - 8, 2017

Content

- Contactor requirements
- New multi-beam cantilever concepts
- RF/Analog & power Kelvin example
- RF/Analog contactor features
- Prototype qualification & specification
- High volume production results
- Summary & outlook

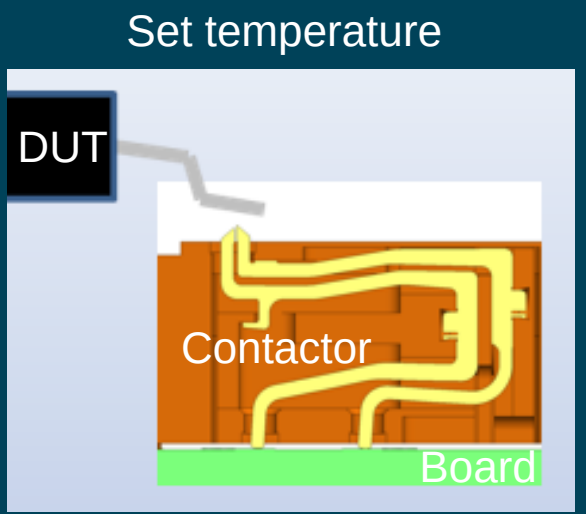
Contactor Requirements

Today's contactors have to fulfill more complex requirements in various disciplines.

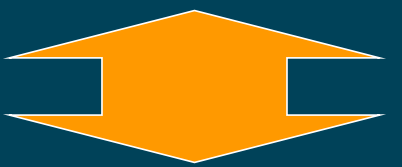


The handling system has significant influence on some of the performance parameters

Thermal Challenges



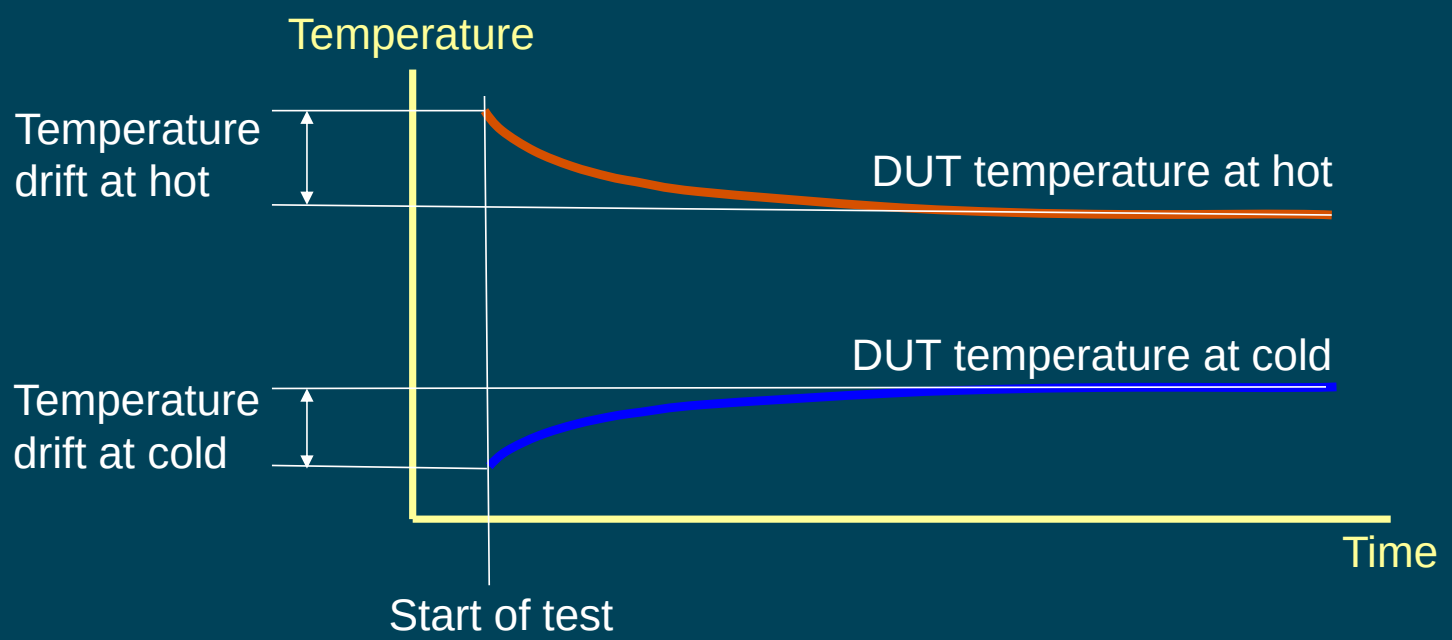
Plunge to board / high performance contactors provide best signal integrity by small contact elements.



Thermal accuracy during test requires large contact surface for thermal conditioning

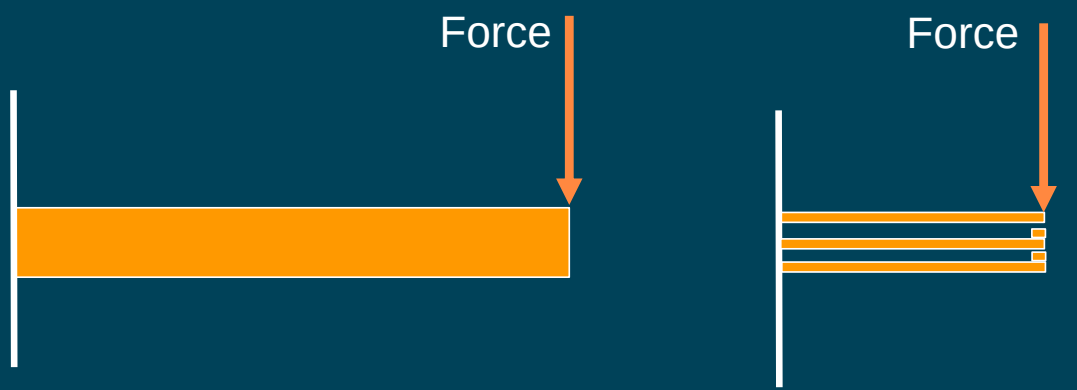
Temperature Accuracy During Test

Contactors influence the thermal accuracy of the DUT



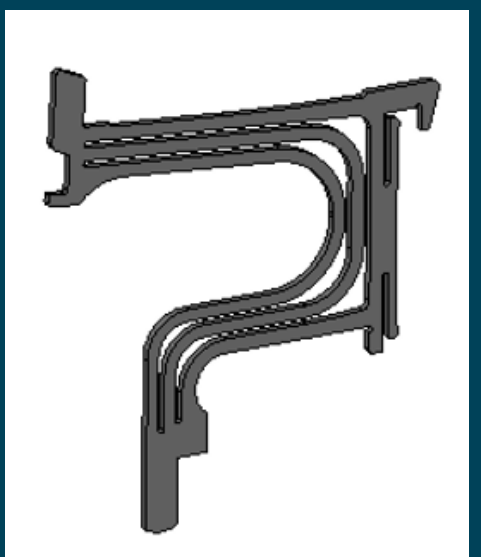
Cantilever Concept Considerations

Multi-beam compared to single-beam concepts

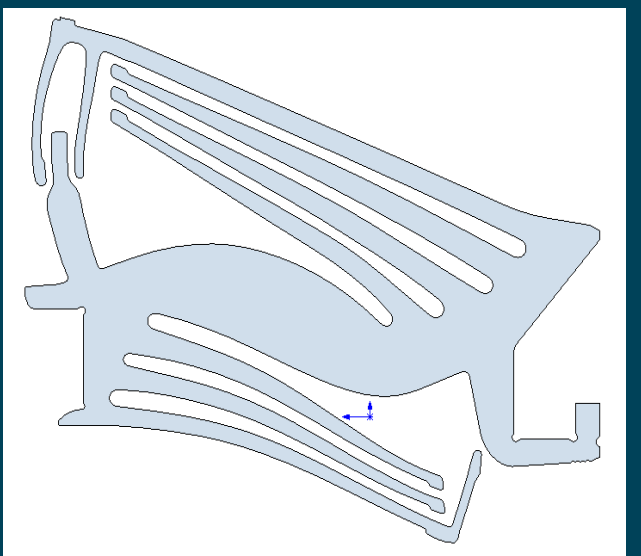


Multi-beam structures allow a smaller formfactor and provide large surface for thermal conditioning

Multi-Beam Contact Spring Architecture

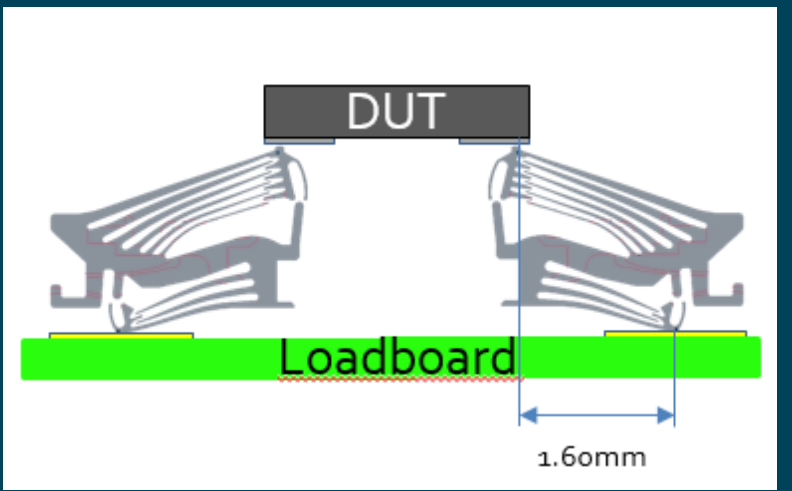


High Power Cantilever



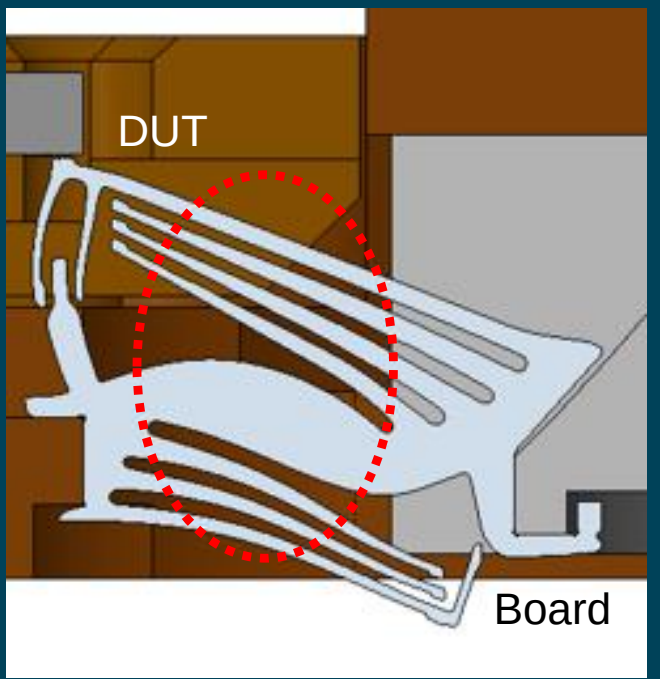
High Performance RF/Analog Cantilever

RF/Analog Cantilever Concept



- Elastomer free multi-beam cantilever
- Scrub against package pad/lead
- Static connection to load board

Contactor Housing Concept



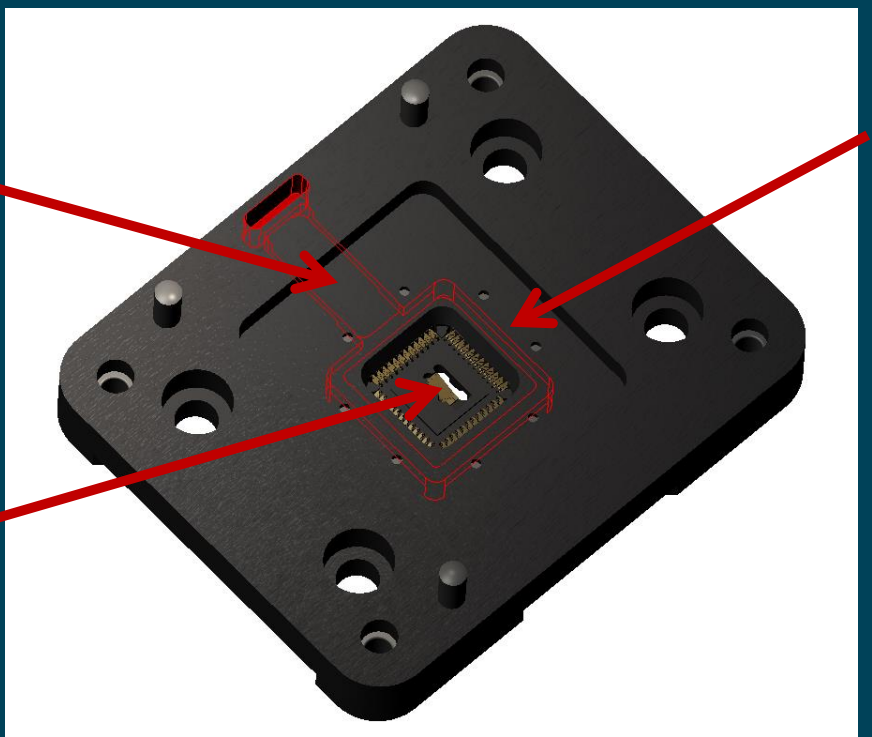
Contact Socket Section

The contact socket design contains air channel features which enable an airstream through the multi-beam structure of the contact spring

Contactor Housing Thermal Features

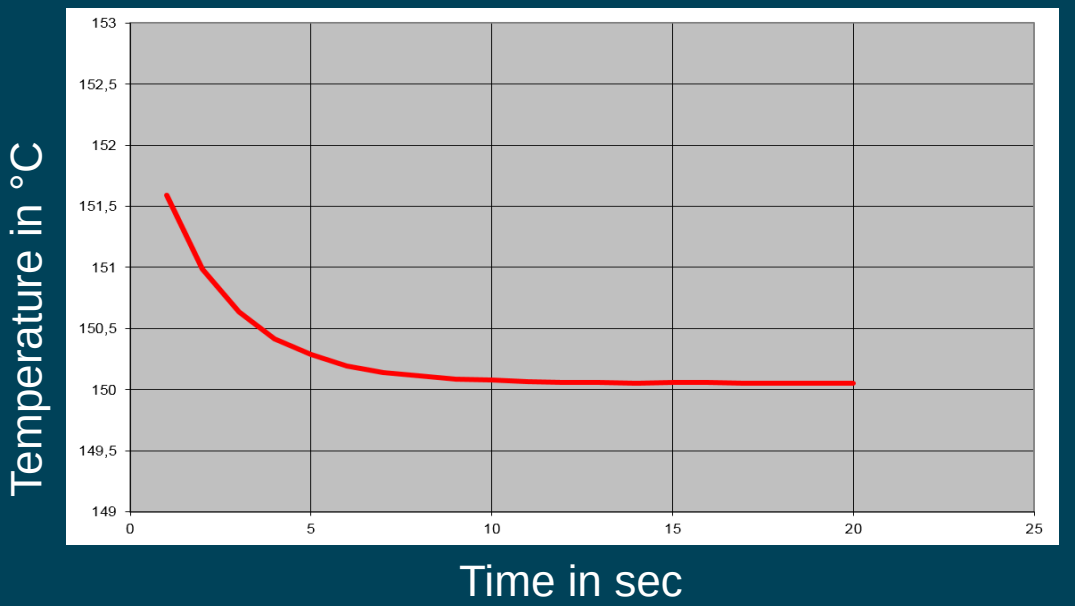
Air flow from handling system

Air outlet on the pins



annular air flow channel

Thermal Drift Measurements



Temperature drift on Cohu handling system with 150°C set temperature: 1.65°C over 20 sec test-time

Contactor Specification

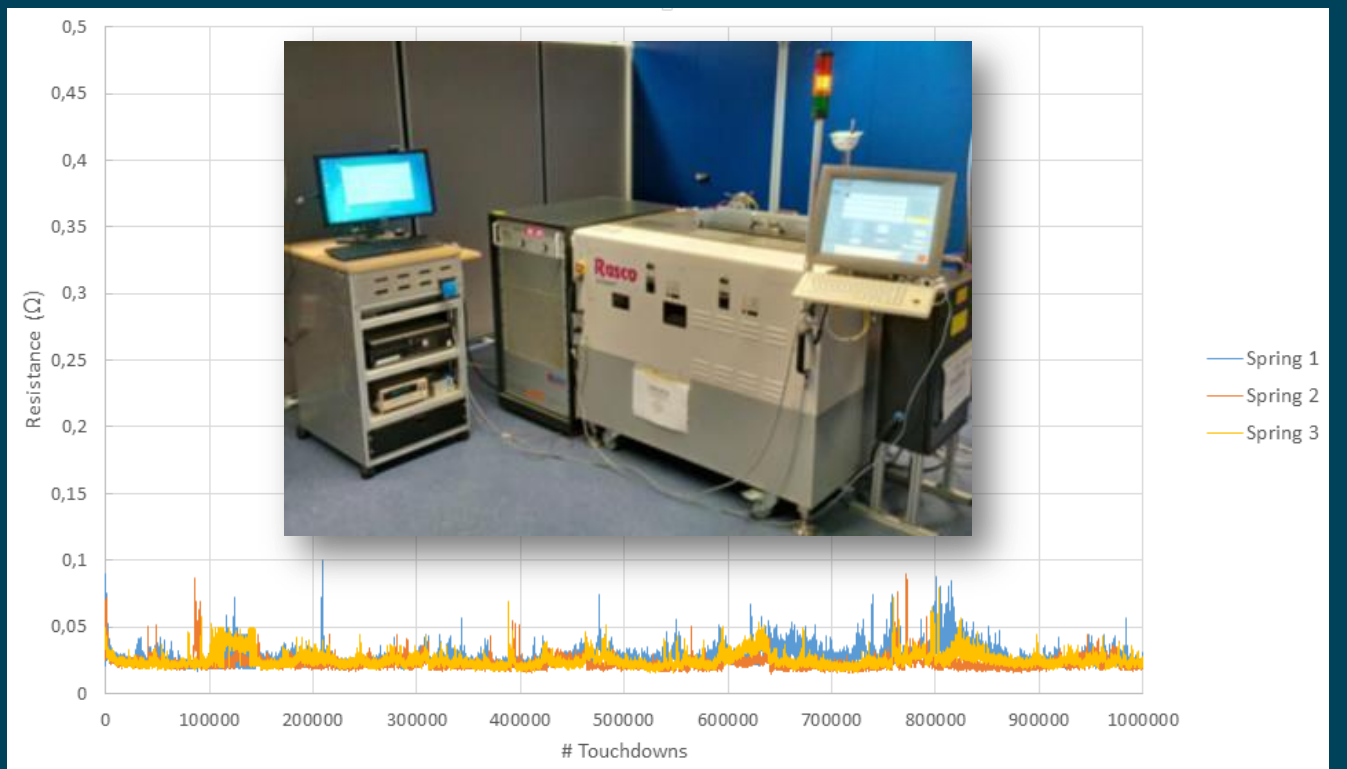
Electrical:			
Insertion Loss S21	-1 dB @ 22 GHz	Cres typ.	30mOhm
Return Loss S11	-20 dB @ 12 GHz	CCC	1.2A DC
Crosstalk S41	-20 dB @ 22 GHz		
Self Inductance	0.43nH		

Mechanical:			
Compressed Contact Height:	1.7 mm	Min. Pitch	0.3 mm
Lifetime:	1 M+	Scrub	0.06 mm
Contact Force:	0.4 N		
Deflection:	0.3 mm		

Thermal:	
Temperature Range:	-55 °C to 155 °C

Contact Resistance Qualification

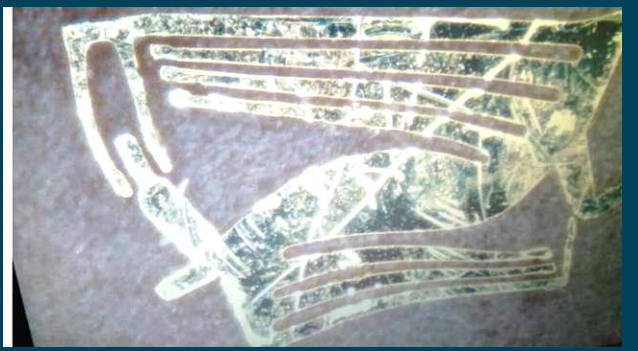
CRes test results on Cohu's strip test handler



High Volume Production Results

Setup:	Ismeca Turret System NY20, SOT1232
Lifespan:	1M to 1.5M
Cleaning cycles:	500k to 1M insertions
Yield:	99.5% - 99.8%
End of life reason:	Wear on contact spring tips

New contact spring



Contact spring after 1M

Summary

Multi-beam cantilever concepts are suitable to enable small form factor plunge-to-board (PTB) contactor solutions in combination with best temperature accuracy behavior.

No elastomers are needed to generate contact force.

Lifespan, yield and cleaning performance have been proven in high volume production environment.

Multi-beam concepts can be applied to various applications from high power Kelvin to RF/Analog solutions.