

innovate . collaborate . deliver

About Us

Vision

To be a leading semiconductor test tooling solutions provider in Asia.

Mission

Creating values for our stakeholders by reducing the total cost of test and shortening the time to market for our customers.

Quality Policy

Our Customers, Our Focus

Innovative, On-Time and Value-Added Services

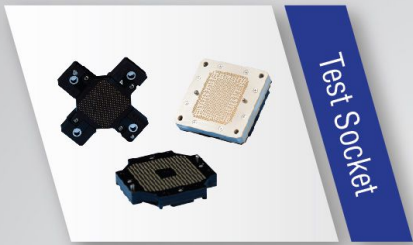
Our Processes, Our Challenges

Continuous Improvement towards Excellence

Our People, Our Pride

Learning, Collaborative and Fulfilling Environment

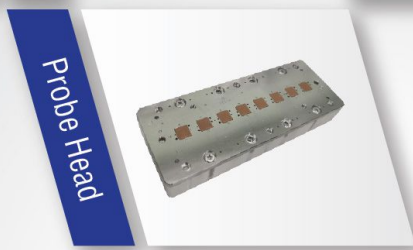
Products



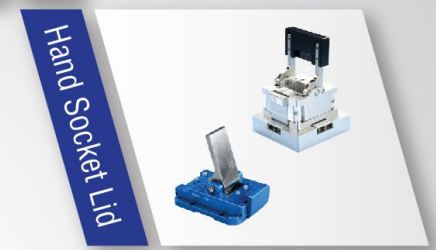
Test Socket



Probe Pin



Probe Head

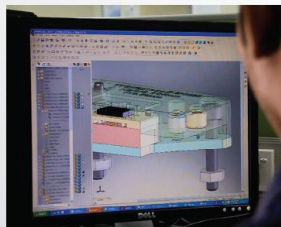


Hand Socket Lid

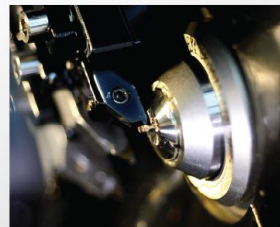
Engineering Capabilities



R&D



Design & Simulation



Auto Lathe

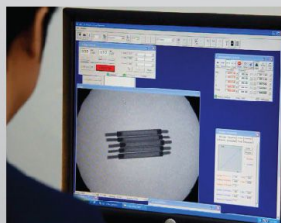


CNC

Quality Assurance



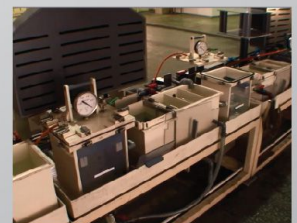
Test & Validation



Assembly



Plating

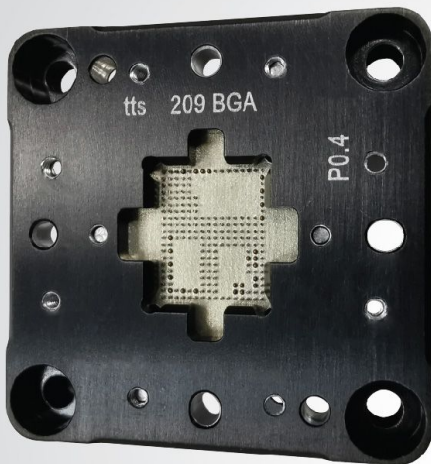


Coaxial Socket

Min. Pitch
0.40mm

Pin Count
< 500

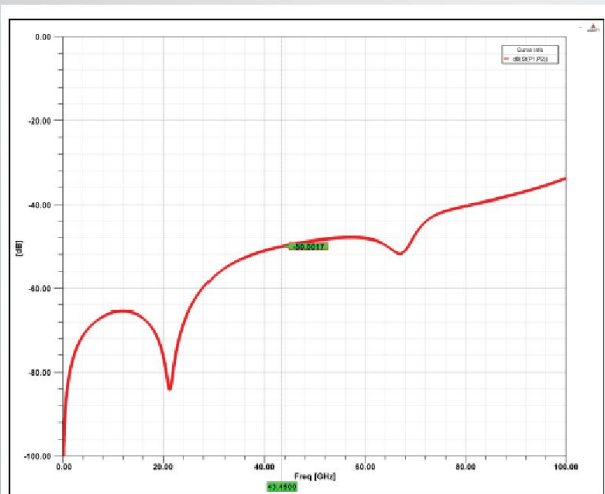
Package Type
BGA



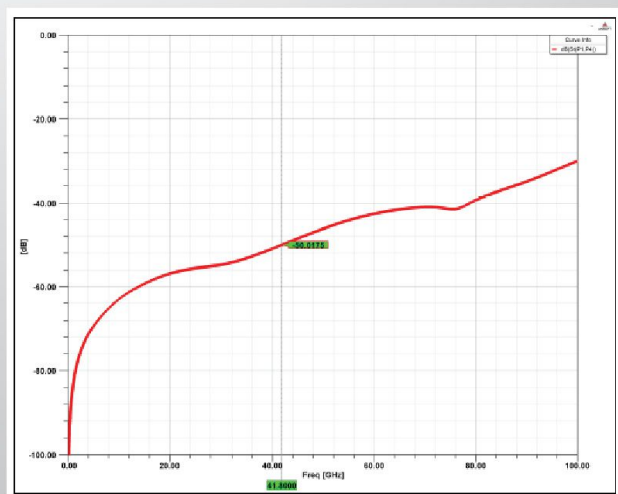
Specifications

Package Size	6.5mm x 8.1mm
Test Temperature	-40°C to 125°C
Single-ended NEXT @ -50 dB	40 GHz
Single-ended FEXT @ -50 dB	40 GHz

Coming out with the high speed test generation, TTS provide a reliable solution based on accurate simulation, considerate design and precise machining. Focus on customer experience, TTS provides the most suitable solution which with customized socket to fulfil the testing condition, environment and so on. With high insistence on quality, coaxial socket can achieve high reliability and longer life.



Single-ended Near-End Crosstalk



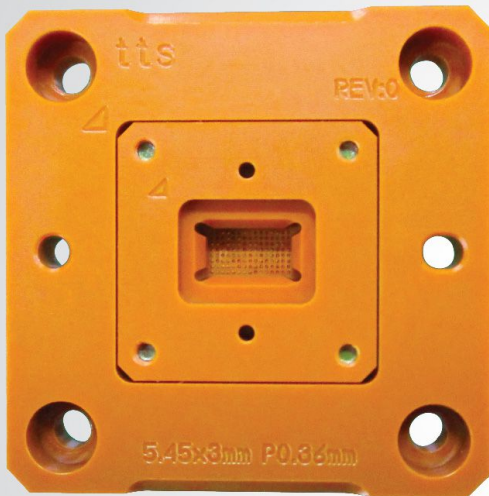
Single-ended Far-End Crosstalk

High Frequency & mmWave Socket

Min. Pitch
0.35mm

Insertion Loss
>100GHz
@-1dB

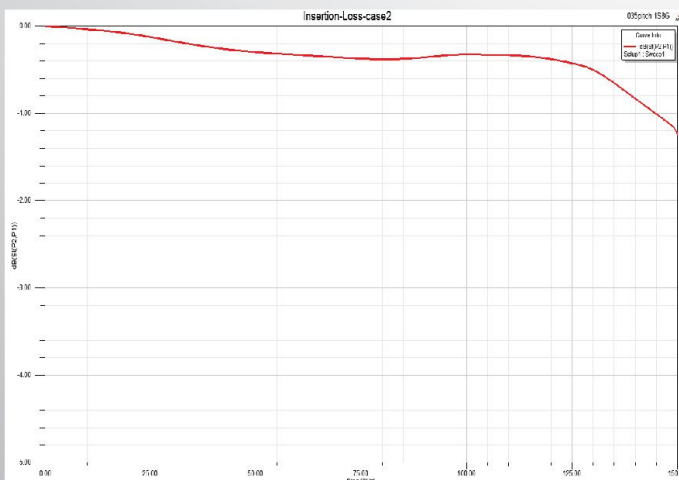
Return Loss
>100GHz
@-10dB



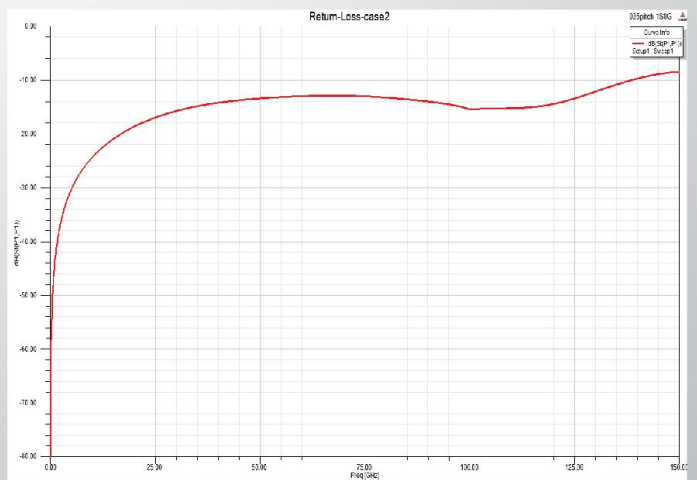
Specifications

Working Travel	0.18mm
Current Rating	2.5A
Pin Contact Resistance	< 75mΩ
Force @ Working Travel	8gf
Pin Inductance	0.35nH

Conventional RF socket design which doesn't require shielding technique. Easy socket and pin maintenance. Provide longer lifespan compare to elastomer contact.



Insertion Loss



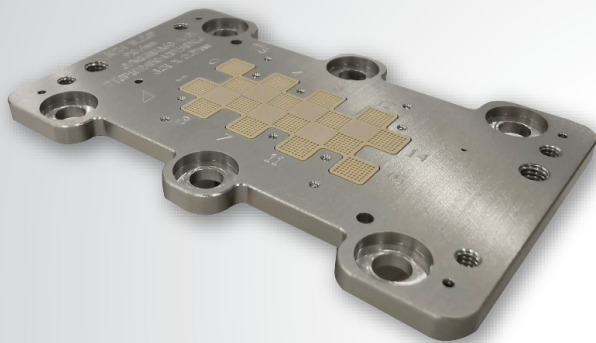
Return Loss

16 Sites WLCSP Probe Head

Min. Pitch
0.35mm

Pin Count
> 1000

Package Type
WLCSP

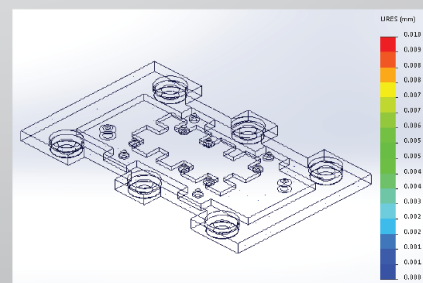
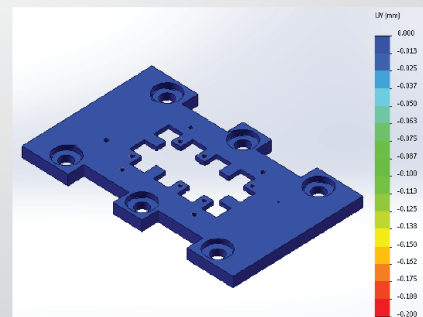
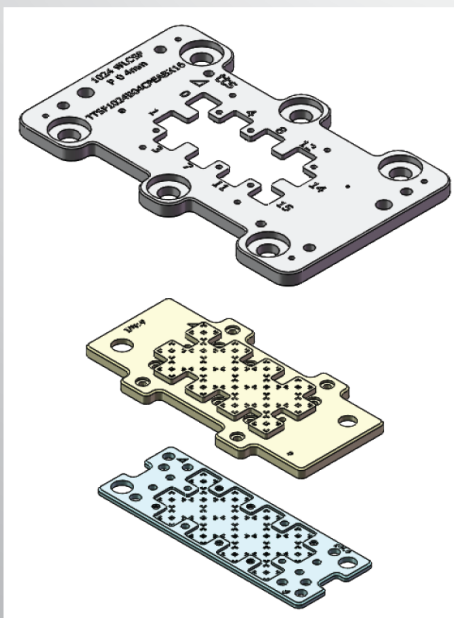


Specifications

Package Size	3.29mm X 3.31mm
Test Temperature	-40°C to 125°C
Coplanarity	100µm
Pin Contact Resistance	<60mΩ
Working OD / Max OD	250/280µm
Return loss @ -10dB	>50 GHz
Bandwidth @ -1dB (GSG)	49.37GHz

Ideal for wafer level testing and cost-effective testing solution. As a precision-level testing product, you will be able to use this product for all small and specific tests.

TTS Group is able to design and manufacture a range of WLCSP sockets suited for a variety of smaller devices. With assured high performance for a number of applications, our probe heads are quality investment for achieving high bandwidth, low contact resistance, longer life and high reliability.

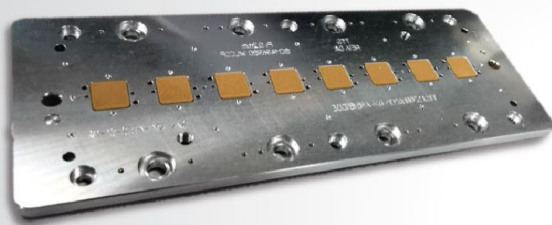


WLCSP Probe Head

Min. Pitch
0.15mm

Pin Count
> 5000

Package Type
WLCSP

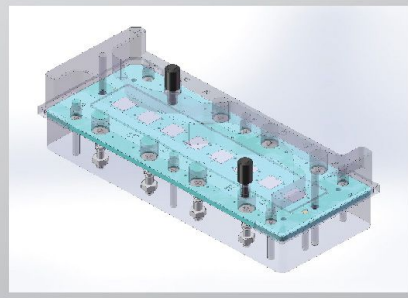
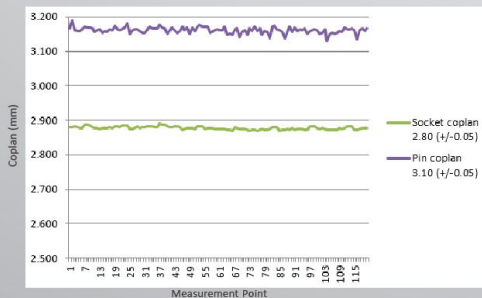
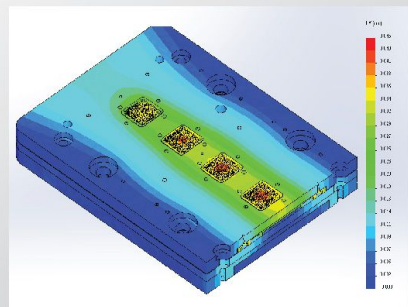
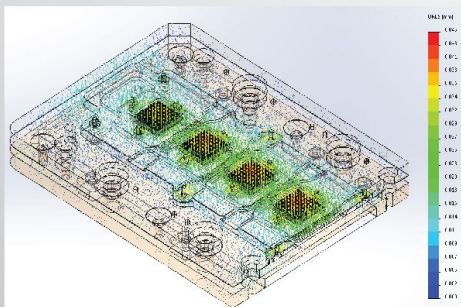


Specifications

Package Size	6.3mm x 6.6mm
Test Temperature	-40°C to 125°C
Coplanarity	100µm
Pin Contact Resistance	< 250mΩ
Working OD / Max OD	200 / 250µm
Return loss @ -10dB	> 20GHz
Bandwidth @ -1dB (GSG)	> 50GHz

Ideal for wafer level testing and cost-effective testing solution. As a precision-level testing product, you will be able to use this product for all small and specific tests.

TTS Group is able to design and manufacture a range of WLCSP sockets suited for a variety of smaller devices. With assured high performance for a number of applications, our probe heads are quality investment for achieving high bandwidth, low contact resistance, longer life and high reliability.

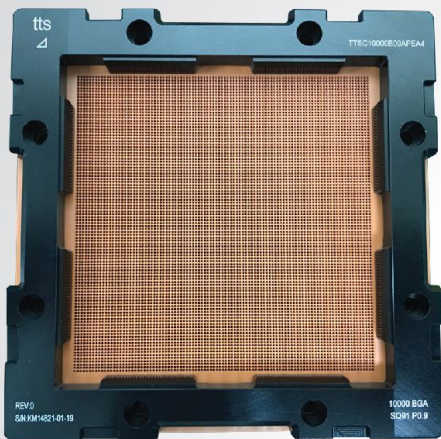


10,000 High Pin Count Socket

Min. Pitch
0.90mm

Pin Count
UP TO 10000

Package Type
BGA

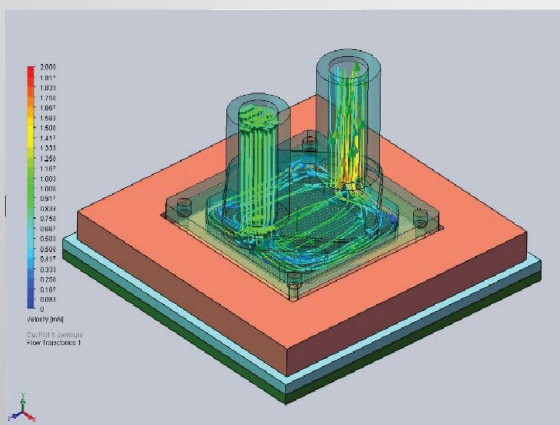


Specifications

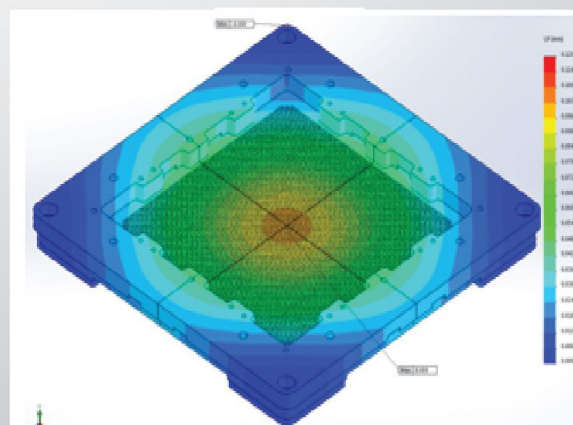
Package Size	91mm x 91mm
Test Temperature	-40°C to 150°C
Coplanarity	< 0.35mm
Power Dissipation (Available with Air or Liquid Cooling)	> 700W

The major challenge of big package with high pin counts is warpage issue. TTS able to custom made Pin & Socket by simulation for optimum design solution to overcome co-planarity variation for stable contact to prevent intermittent contact failure.

Air & liquid cooling solution are available for high power heat dissipation on high pin count requirement.



Temperature Flow Diagram



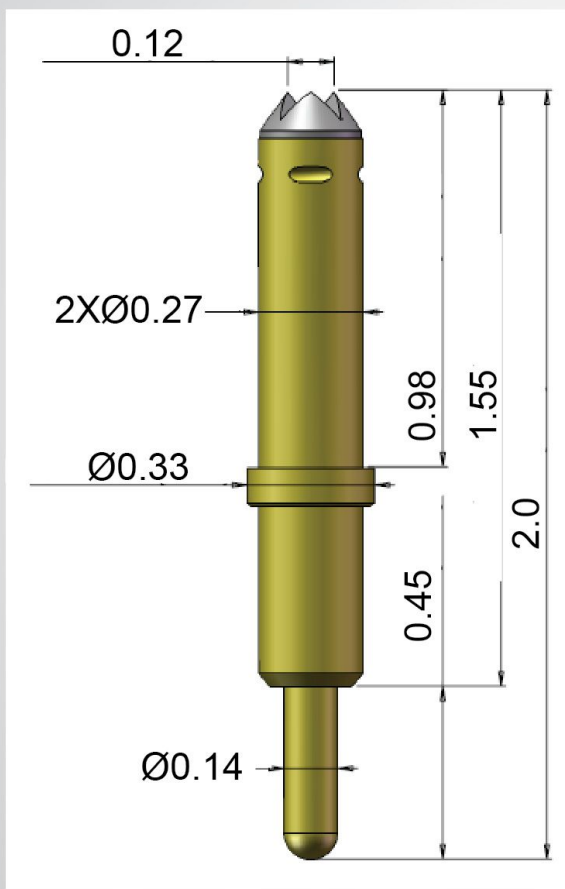
Warpage Diagram

2mm Short Pin

Min. Pitch
0.40mm

Length
2.00mm

LGA,
QFN, etc.



Mechanical

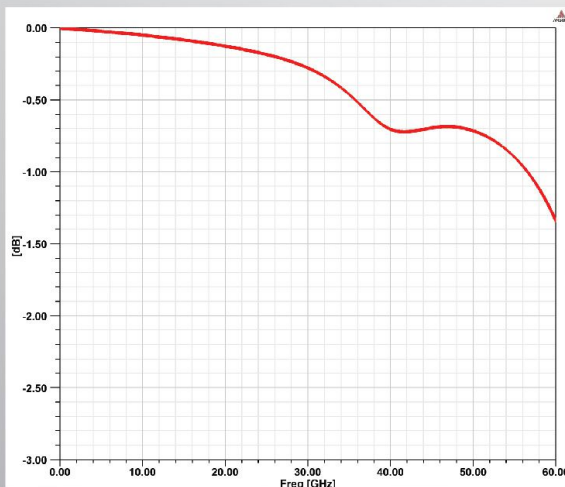
Recommended Travel	0.3mm
Spring Force	32gf @ 0.3mm
Test Temperature	-40 to 125°C

Electrical

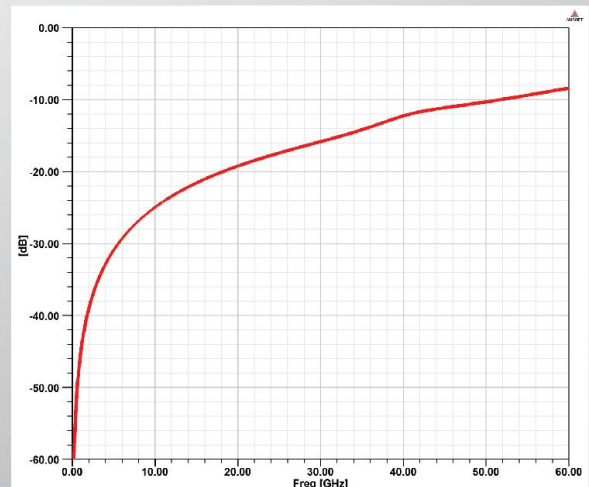
Current Rating (Continuous)	2.5A
Contact Resistance	<50mΩ
Bandwidth @ -1dB (GSG)	>50GHz
Self Inductance	0.38nH

Material

Plunger A	Pd Alloy (Non Plated)
Barrel	Phosphor Bronze (Au Plated)
Plunger B	BeCu (Au Plated)
Spring	Music Wire (Au Plated)



Single-ended Insertion Loss



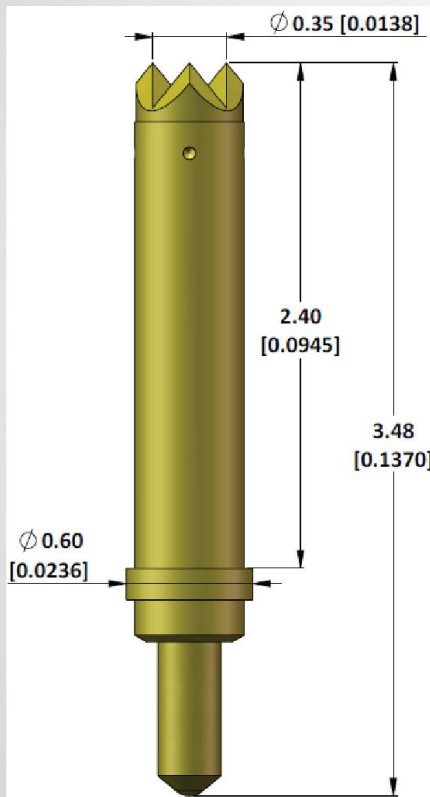
Single-ended Return Loss

P0.8mm High Performance Pin

Min. Pitch
0.80mm

Current Rating
6.5A

LGA,
QFN, etc.



Mechanical

Recommended Travel 0.48mm

Test Temperature -40 to 150°C

Electrical

Current Rating (Continuous) 6.5A

Contact Resistance <20mΩ

Bandwidth @ -1dB (GSG) 39.89GHz

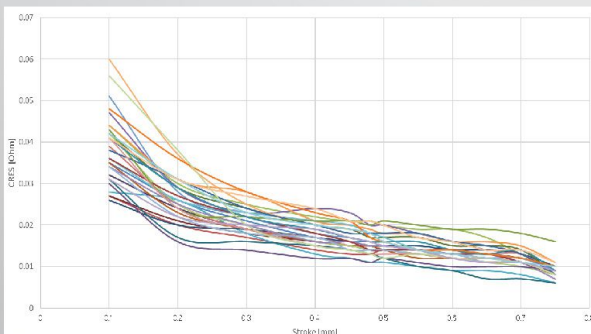
Self Inductance 0.67nH

Material

Barrel BeCu (Multilayer Plated)

Plunger B BeCu (Au Plated)

Spring Stainless Steel Wire (Au Plated)

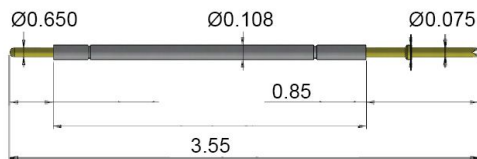


Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err		
				Mean	Lower 95%	Upper 95%
0k	60	0.018483	0.002425	0.00031	0.01786	0.01911
20k	30	0.020833	0.003842	0.00070	0.01940	0.02227
50k	30	0.026933	0.007263	0.00133	0.02422	0.02965
100k	30	0.024900	0.008053	0.00147	0.02189	0.02791
200k	30	0.025267	0.006432	0.00117	0.02286	0.02767
300k	30	0.021700	0.006717	0.00123	0.01919	0.02421
500k	30	0.025733	0.007679	0.00140	0.02287	0.02860

Probe Pins

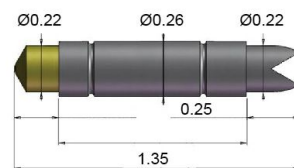
P0.13mm WLCSP Pin



Specification

Min. Pitch	0.13mm
Test Height	3.20mm
Spring Force	5.3gf @ 0.35mm
Current Rating (Continuous)	0.6A
Contact Resistance	<250mΩ
Bandwidth @ -1dB (GSG)	50.05GHz
Self Inductance	0.66nH

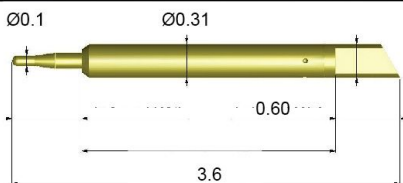
High Frequency Short Pin



Specification

Min. Pitch	0.35mm
Test Height	1.20mm
Spring Force	6gf @ 0.15mm
Current Rating (Continuous)	1.6A
Contact Resistance	<140mΩ
Bandwidth @ -1dB (GSG)	98.90GHz
Self Inductance	0.29nH

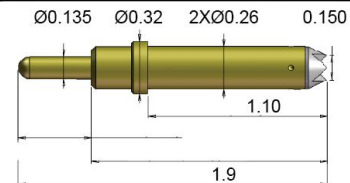
Kelvin Pin



Specification

Min. Pitch	0.40mm
Test Height	3.20mm
Spring Force	27gf @ 0.40mm
Current Rating (Continuous)	2.7A
Contact Resistance	<50mΩ
Bandwidth @ -1dB (GSG)	20.71GHz
Self Inductance	0.65nH

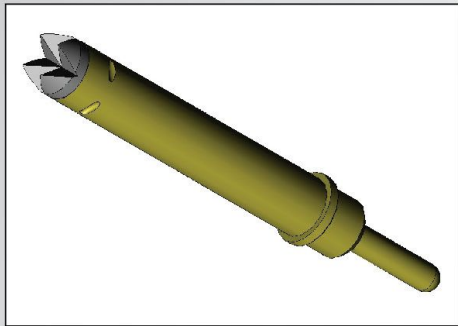
High Force Short Pin



Specification

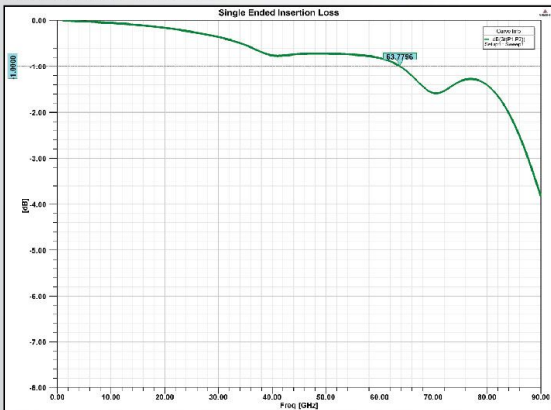
Min. Pitch	0.40mm
Test Height	1.60mm
Spring Force	20gf @ 0.30mm
Current Rating (Continuous)	2.0A
Contact Resistance	<65mΩ
Bandwidth @ -1dB (GSG)	62.75GHz
Self Inductance	0.37nH

Electrical Simulation

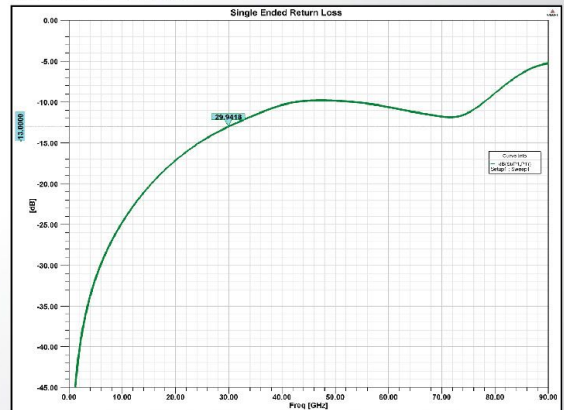


T-031-0023WPN-D0	
PITCH: 0.4mm	
SOCKET MATERIAL	Vespel
INDUCTANCE ONE PORT @500MHz	0.44nH
BANDWIDTH	THRESHOLD FREQUENCY
CONFIGURATION	G S G
SINGLE ENDED INSERTION LOSS @-1.00dB	63.78GHz
SINGLE ENDED RETURN LOSS @-13.00dB	29.94GHz

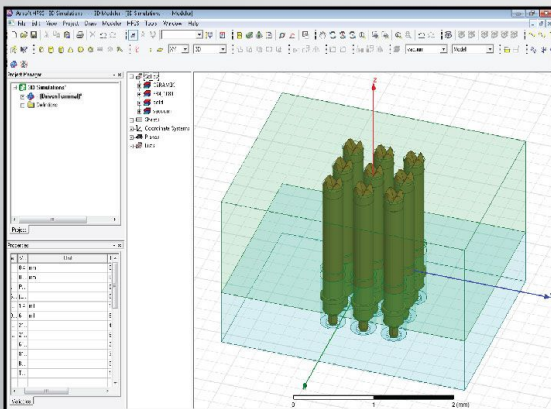
Insertion Loss



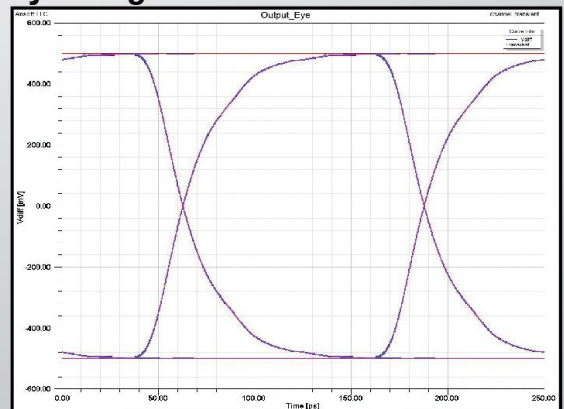
Return Loss



3D Simulation

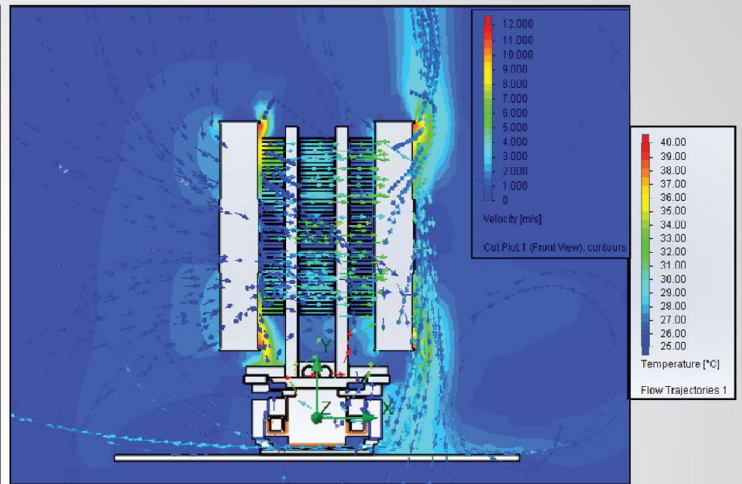
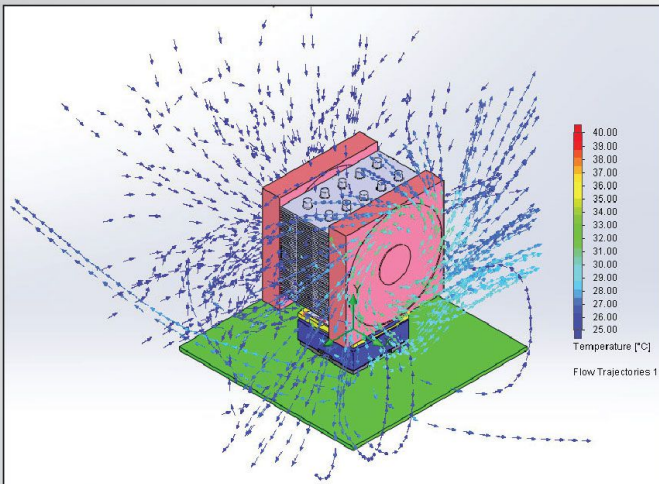


Eye Diagram



Thermal Simulation

Hand Socket Lid with Heat Pipe Simulation

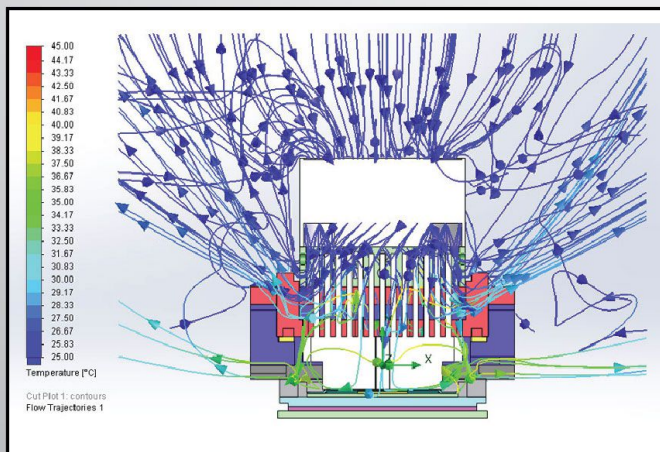


SolidWorks Flow Simulation

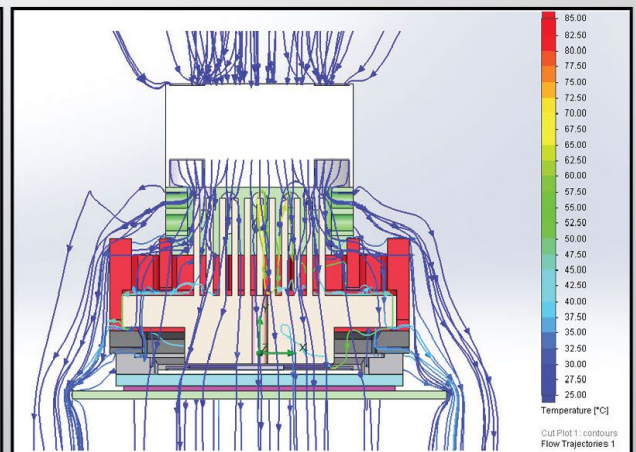
Package Size 45mm x 45mm
Power Dissipation: 215W
Simulation Study: Steady State

Hand Socket Lid with Fan Heat Sink Simulation

Fan Air Flow: Swirl Effect



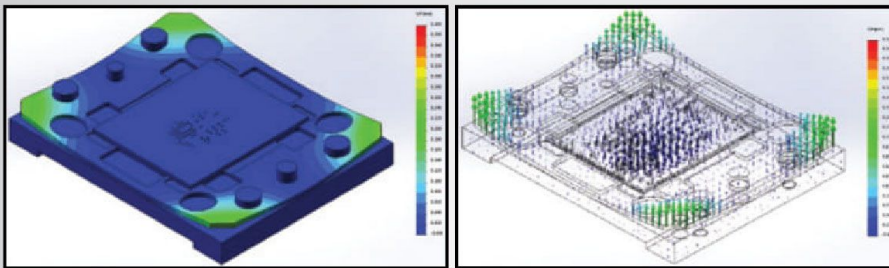
Fan Air Flow: Linear Effect



SolidWorks Flow Simulation

FEA Simulation & SigmundWorks Analysis

FEA-Floating Plate Warpage Simulation



SolidWorks Simulation Professional

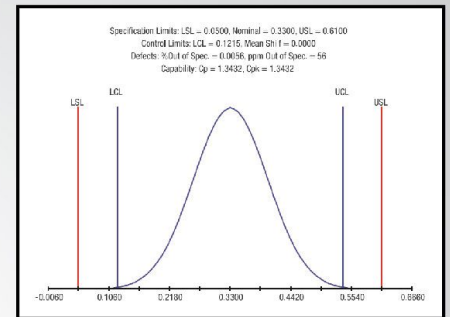
Pin Count: 1515

Total Compression Force from Top: 13.0kgf

Total Probe Pin Force from Bottom: 9.4kgf

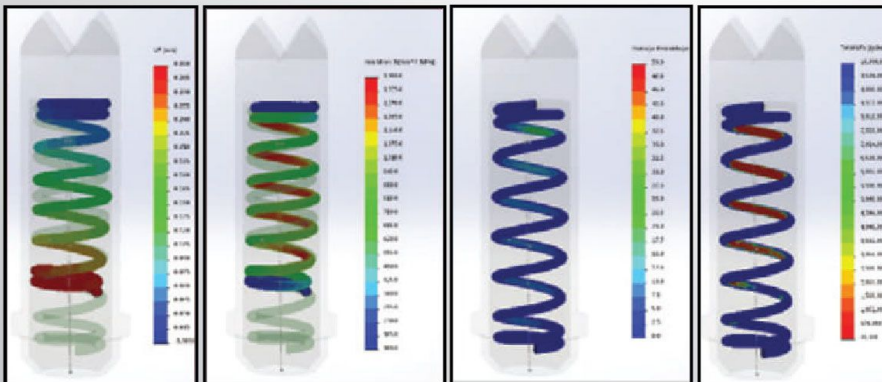
Package Size: 20.0mm x 16.5mm

SigmundWorks Analysis



Roll Up / Roll Down Statistic Report

FEA (Non Linear & Fatigue) - Pin Life Span Simulation



SolidWorks Simulation Premium

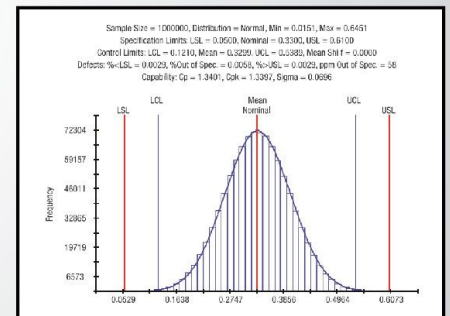
Pin Travel: 0.3mm

Initial Pin Tip Attack Angle: 5Deg

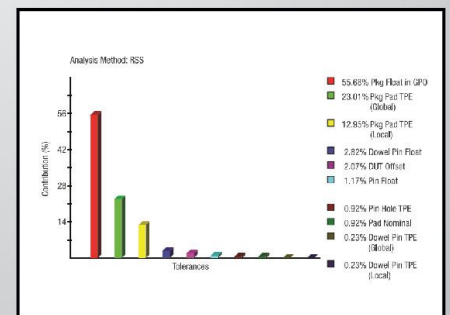
Test Cycle: 100K

Loading Type: Constant Amplitude

Fully Reversed (FR=-1)



Monte Carlo Statistic Report

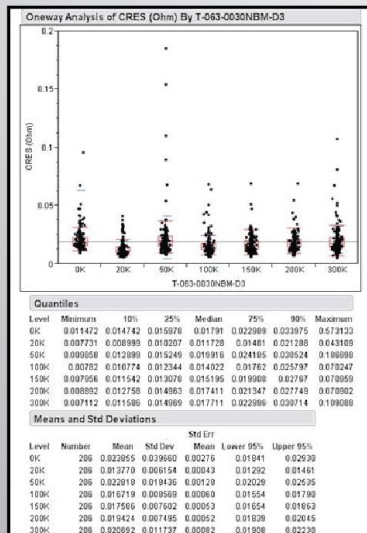


Sensitivity Report

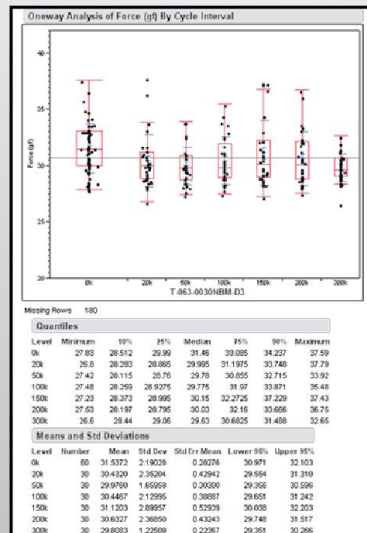
Technology & QA



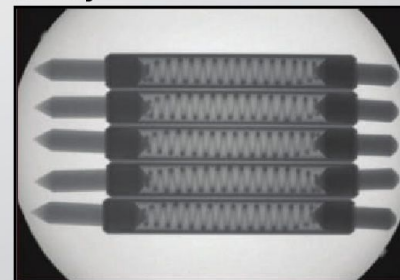
CRES



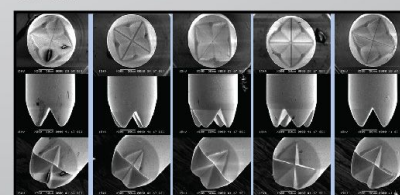
Force



X-Ray



SEM



Global Locations

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