Ironwood Electronics, Inc.

B.C.E. ELECTRONICS

Socket Technologies

High Performance IC Sockets And Test Adapters

Overview

Ironwood Electronics, Inc.
www.ironwoodelectronics.com

- Company Overview
  - Over 5,000 products
  - High Performance Adapters and Sockets
  - Many Custom Designs
  - Engineering – Electrical and Mechanical
  - ISO9001:2008 Registration
- Socket Technology Overview
  - Embedded gold plated wire elastomer (SG)
  - Spring pins (SS)
  - Diamond particle interconnect (DG)
  - Embedded silver particle elastomer w/ gold cap (XG)
  - Stamped & Etched spring pins (SBT)
  - Embedded silver ball elastomer matrix (SM/SMP)
  - Surface mount adapters for sockets (SF)

Embedded gold plated wire elastomer socket (SG)

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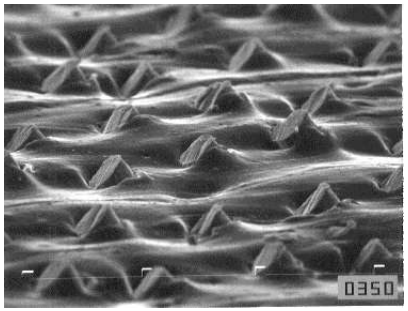
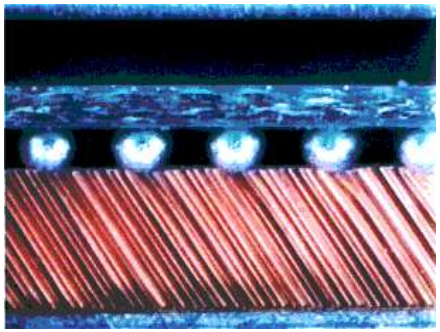
Continuous improvement
12 Years
Proven Capability
Development



Protruded wire from elastomer


BGA compressed on Elastomer


Wire marks on BGA


Heat sink lid


Torque indicator

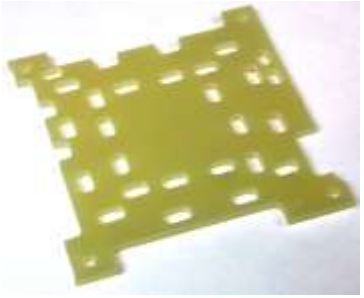
Features	Benefits
Short contact	High bandwidth applications
Gold plated Brass wire	Low contact resistance
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
High resilient elastomer	Compression cycles in thousands
Optimized contact force	Reliable connection without damage to device or board


Back-to-back socket

Capabilities
- 0.3mm to 1.27mm pitch
- 2x3mm to 50x50mm device
- BGA, QFN, QFP, SOIC
- 3000 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options


Open top lid


No mounting hole socket


Custom insulation plate

Spring pin socket (SS)

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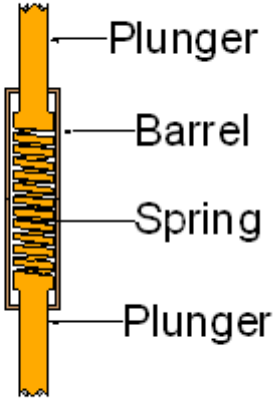
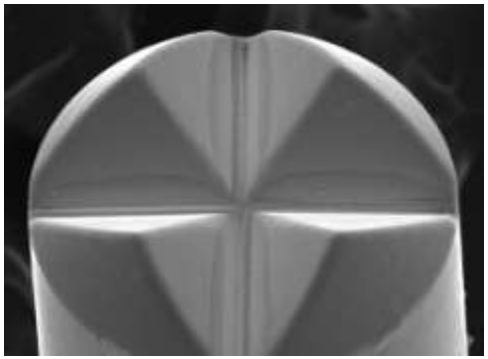


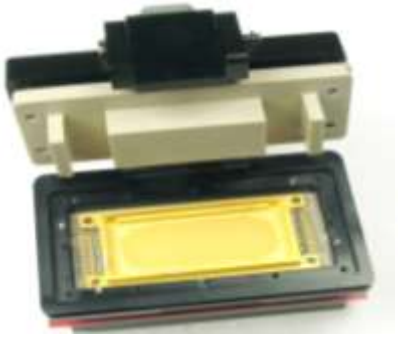

SEM Picture of pin crown tip

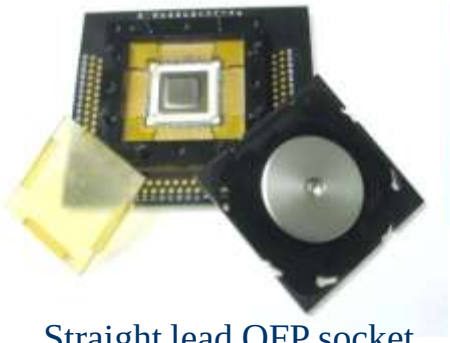

Clamshell BGA socket

Continuous improvement
8 Years
Proven Capability
Development

Features	Benefits
Long contact travel	Compliancy for large package warpage
Gold plated BeCu material	High temperature applications
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
High resilient spring	Compression cycles in millions
Optimized pin diameter to length ratio	Impedance matched high speed applications

Capabilities
- 0.3mm to 1.27mm pitch
- 2x3mm to 50x50mm device
- BGA, LGA, QFN, QFP, SOIC
- 5000 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options


Hybrid SOIC socket


Straight lead QFP socket


Clamshell heat sink BGA socket

Diamond particle interconnect socket (DG)

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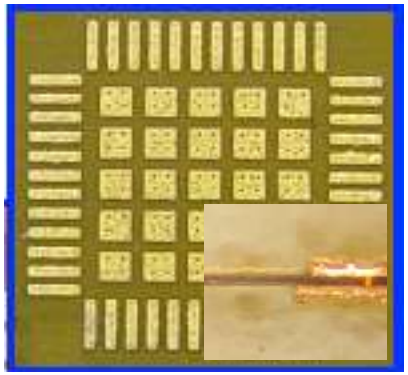
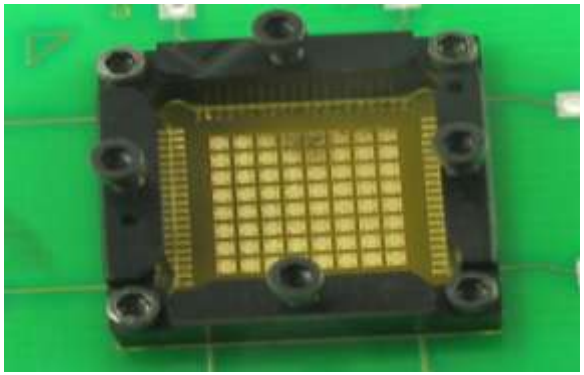


QFN contact module

DPI cross section

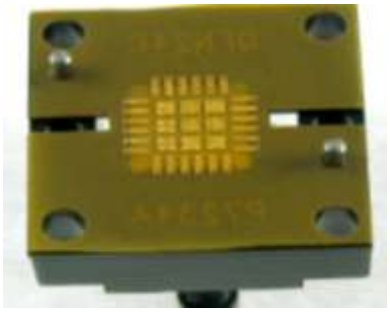


DPI small footprint socket

Continuous improvement
Proven Capability
5 Years
Development

Features	Benefits
Shortest contact	Highest bandwidth applications
Diamond particle	Reliable piercing connection to break oxide layers
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
Rocking polyimide design	Compression cycles in hundreds of thousands
Conventional PCB material	CTE match and high temperature applications

Capabilities
- 0.4mm to 0.8mm pitch
- 2x3mm to 20x20mm device
- LGA, QFN
- 250 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options



Cutout for close caps

Two mounting hole socket

Self centering socket for lead less device

Embedded silver particle elastomer with gold cap socket (XG)

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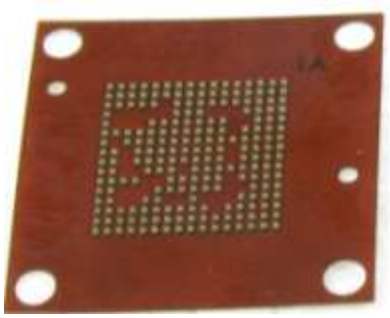
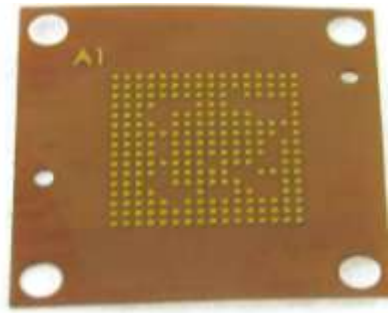
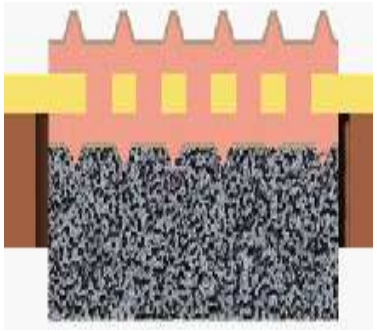
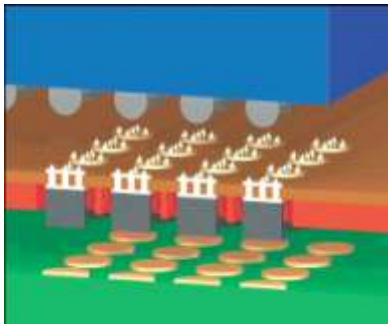

BGA contact back side

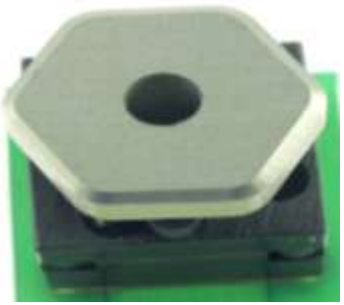

BGA contact top side


Cross section

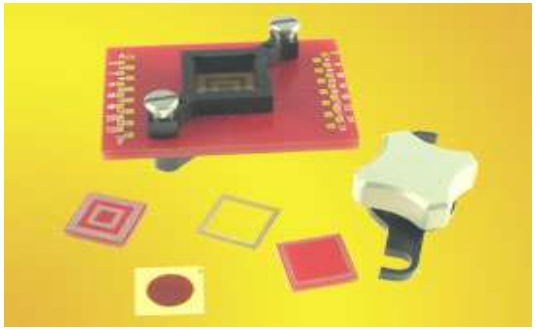

Cross section stack up model

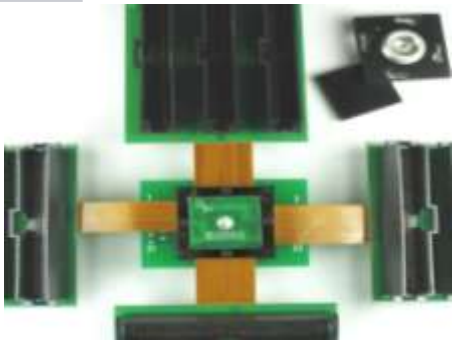
Continuous improvement
Proven Capability
4 Years
Development

Features	Benefits
Shortest contact	Highest bandwidth applications
Silver particle	Low contact resistance
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
High resilient elastomer	Compression cycles in tens of thousands
Flexible top side traces	Probing solution without additional interconnect


Low profile thumb screw socket

Capabilities
- 0.4mm to 1.27mm pitch
- 2x3mm to 50x50mm device
- BGA, LGA, QFN
- 2000 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options


Package on package socket


Flex probe socket

Stamped & Etched spring pin socket (SBT)

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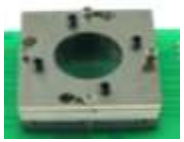
LGA high force pin


BGA low force pin


BGA socket w/ Snap Lid


Open top socket


Super short Etched spring pin

Features	Benefits
Long contact travel	Compliancy for large package warpage
Gold plated BeCu material	High temperature applications
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
High resilient spring	Compression cycles in hundreds of thousands
Optimized pin diameter to length ratio	Impedance matched high speed applications
Stamped contact	High current applications
Automated assembly	Low cost, short lead time

Continuous improvement
Proven Capability
3 Years
Development


Crown Plunger
External Spring
Cone /ball Plunger

Capabilities
- 0.4mm to 1.27mm pitch
- 2x3mm to 50x50mm device
- BGA, LGA, QFN, QFP, SOIC
- 5000 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options


Floating plate for precise alignment and swivel lid


Clamshell BGA socket

Embedded silver ball elastomer matrix socket (SM/SMP)

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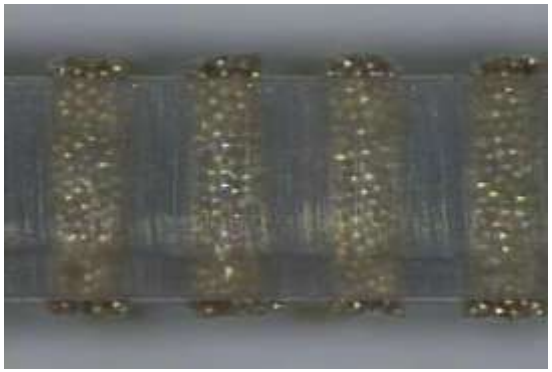
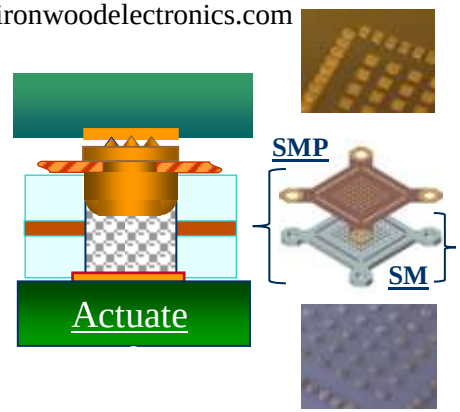
Array of Columns - Elastomer Matrix

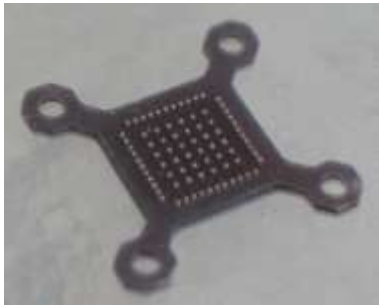


Cross section - Silver balls



SMP = Elastomer layer + Protective layer

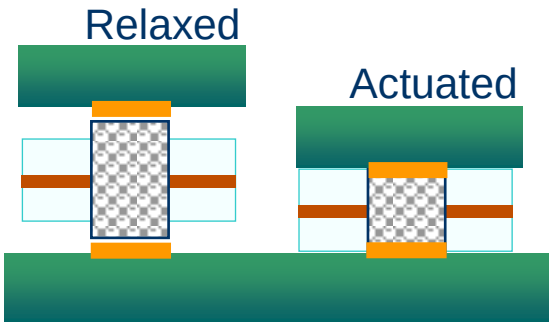
Features	Benefits
Shortest contact	Highest bandwidth applications
Silver balls	Low contact resistance
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
High resilient elastomer	Compression cycles in hundreds of thousands
Matrix with core	Optimized force and built-in compression stop mechanism



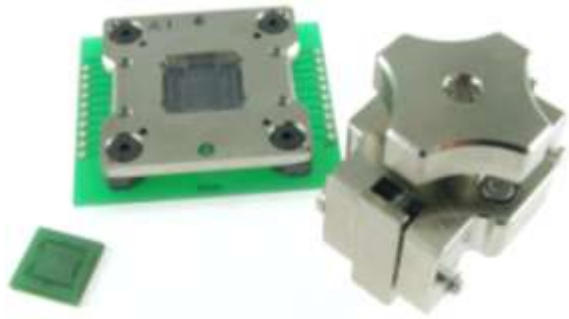
Replaceable elastomer module

Continuous improvement
Proven Capability
Development
1 Year

Capabilities
- 0.25mm to 1.27mm pitch
- 2x3mm to 50x50mm device
- BGA, LGA, QFN
- 2000 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options



Rest & Test condition



ATE socket with double latch clam shell lid

Contact Technology Summary

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Characteristics	Embedded Wire Elastomer (SG)	Spring Pins (SS)	Embedded Silver Particle Elastomer (XG)	Diamond Particle Interconnect (DG)	Stamped spring pins (SBT)	Embedded Silver Ball Elastomer Matrix (SM/SMP)
Bandwidth, GHz	8 to 10	6 to 12	40	40	23	40
Endurance, Cycles	2K	500K	10K	100K	500K	500K
Resistance, mΩ	20	50	50	3	15	15
Self Inductance, nH	0.15	1.1	0.11	0.11	0.88	0.21
Max Current, Amp	2	5	5	5	8	4
Temp Range, ^{0}C	-35 to +100	-40 to +150	-40 to +120	-70 to +200	-55 to +180	-55 to +155
Pitch, mm	0.3 to 1.27	0.3 to 1.27	0.4 to 1.27	0.4 to 0.8	0.4 to 1.27	0.25 to 1.27
Package Types	BGA, QFN, QFP, SOIC	BGA, LGA, QFN, QFP, SOIC	BGA, QFN, LGA	LGA, QFN	BGA, LGA, QFN, QFP, SOIC	BGA, LGA, QFN
Relative Cost	Lowest	Highest	Middle	Middle	Middle	Highest
Lab test	√	√	√	√	√	√
Production test		√			√	√
Field upgrade	√				√	
Temperature test	√	√	√	√	√	√
Kelvin test	√	√	√	√	√	√
Burn-in test		√		√	√	

Pin Datasheet

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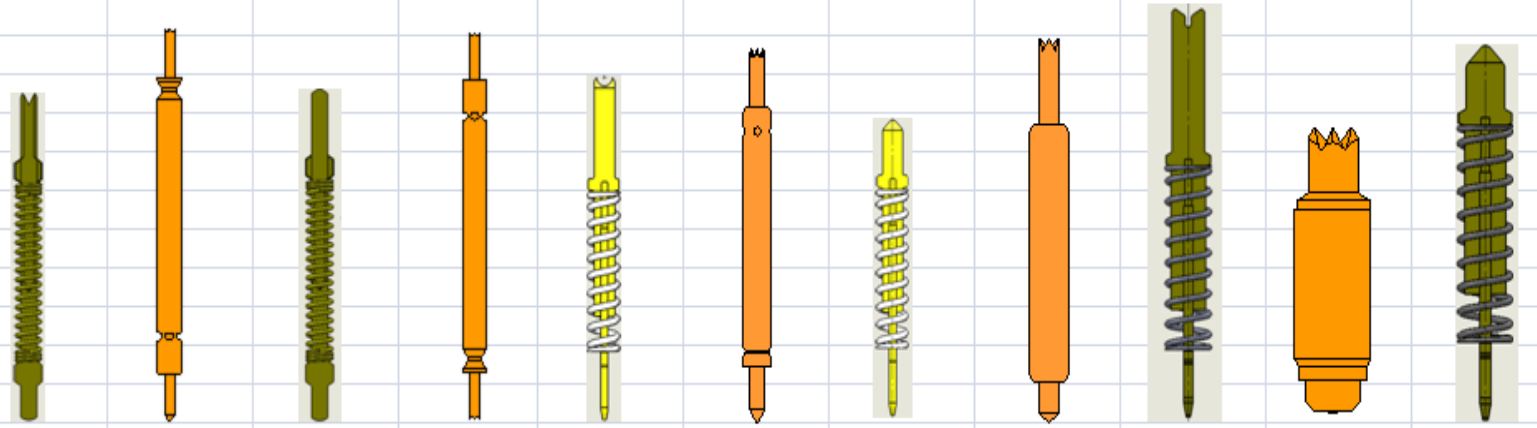

Pin Family	SBT	SS	SBT	SS	SBT	SS	SBT	SS	SBT	SS	SBT
Part Number	P-P168A	P-P134A	P-P163A	P-P136A	P-P149A	P-P115A	P-P150A	P-P114A	P-P151A	P-P112A	P-P152A
Minimum Pitch (mm)	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.8	1.0	1.0	1.0
Pin Type	BGA	BGA	LGA	LGA	BGA	BGA/LGA	LGA	BGA	BGA	BGA/LGA	LGA
Length (mm)	3.3	5.18	3.3	5.18	3.85	4.11	2.95	4.78	5.69	2.79	4.45
DUT Side Tip Shape	V Shape	Crown	Radius Cone	Crown	U Shape	Crown	Radius Cone	Crown	Notched V	Crown	Radius Cone
DUT Side Tip Dimension (mm)	0.13	0.13	0.04	0.13	0.18	0.1	0.06	0.25	0.54	0.52	0.1
PCB Side Tip Shape	Radius Cone	Radius Cone	Radius Cone	Crown	Radius Cone	Radius Cone	Radius Cone	Radius Cone	Radius Cone	Radius Cone	Radius Cone
PCB Side Tip Dimension (mm)	0.18	0.05	0.18	0.11	0.06	0.05	0.06	0.05	0.1	0.1	0.1
DUT Side Travel (mm)	0.4	0.28	0.4	0.28	0.33	0.2	0.33	0.57	0.6	0.2	0.6
PCB Side Travel (mm)	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Force (g)	34	20	34	20	30	16	30	22	19	30	19
Cres (mOhms)	< 70	< 70	< 70	< 70	< 30	< 100	< 30	< 25	< 15	< 35	< 15
CCC @ ambient (Amps)	2.2	1.7	2.2	1.7	6.0	2.5	6.0	3.0	8.0	4.0	8.0
Bandwidth (GHz @ -1dB)	7	11.5	7	11.5	15.7	6	15.7	6.7	23.2	10	23.2
Self inductance (nH)	0.95	1.1	0.95	1.1	0.88	1.3	0.88	0.84	0.93	0.62	0.93
Temperature (deg C)	-55 to +155C	-40 to +120C	-55 to +155C	-40 to +120C	-55 to +180C	-40 to +150C	-55 to +180C	-40 to +120C	-55 to +180C	-40 to +150C	-55 to +180C
Insertion Cycles	500K	500K	500K	500K	500K	500K	500K	500K	500K	500K	500K

* 0.5mm pitch SBT pins are used in 0.65mm and 0.8mm pitch applications

Surface Mount Adapters for sockets (SF)

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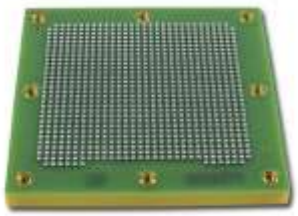
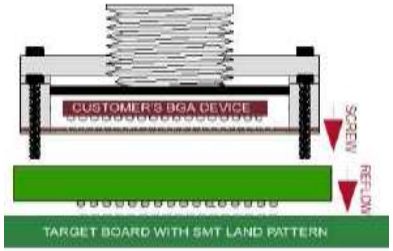
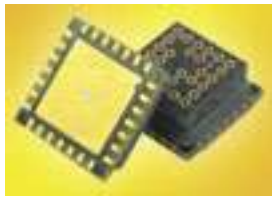


Surface mount adapter



Socket + SM adapter



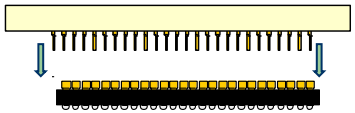
QFN SM adapter

QFP SM adapter

Spring pin socket +
Thru hole adapter +
Surface mount adapter

Continuous improvement
9 Years
Proven Capability
Development

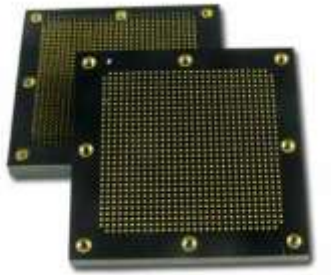
Features	Benefits
Pluggable interface	Easy insertion and extraction for device swap
FR4 & Gold plated contacts	High temperature applications
Small adapter footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
Conductive filled via	Excellent thermal dissipation and high current applications
Optimized plated thru hole with filled via	Low inductance and high speed applications
Edge castellation (QFN)	Easy manual assembly
Standard Solder (BGA)	Easy assembly (industry standard reflow profile)



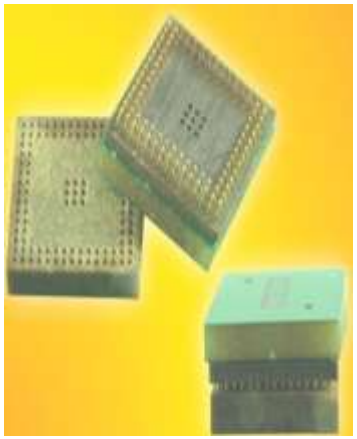
Thru hole adapter +
Surface mount adapter

Capabilities
- 0.5mm to 1.27mm pitch
- 2x3mm to 50x50mm device
- BGA, LGA, QFN, QFP, SOIC
- 2000 pin count
- Lead free options
- Easy pluggable module
- Custom height extension

Pluggable adapter pair
with soldered device



Thru hole adapter



0.5mm pitch
Pluggable adapter pair

Custom Capability

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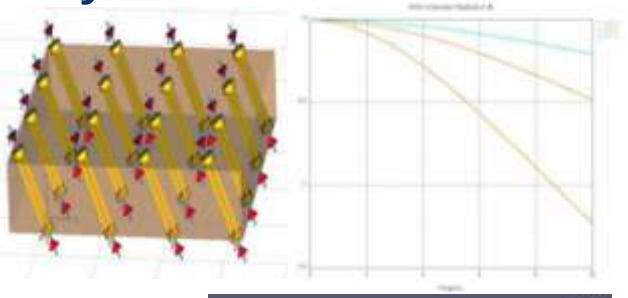
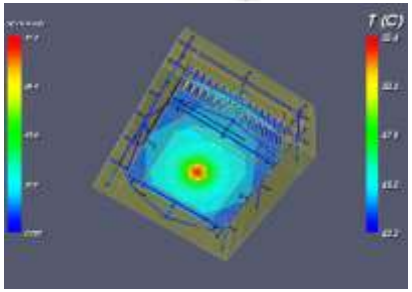
- Custom socket designs in 2 days
- Match customer's PCB footprint
- Custom socket manufacturing in 10 days
- Multiple contactor technologies
- Heat sink simulation and design
- Contactor signal integrity simulation
- In-house automated optical inspection
- In-house machining
- Quick-turn production





Comments and Notes

- NB:
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Valued Quality. Delivered.

Tack
Vielen Dank
Obrigado
Merci
ありがとうございます
Bedankt
Takk
感謝您
谢谢
Grazie
Спасибо
Thank You
Kiitos
Tak
감사합니다
Gracias
Σας ευχαριστούμε
Dziękujemy

Email: bce@bce.it

Website: www.bce.it