



**Ironwood**  
**ELECTRONICS**  
[www.ironwoodelectronics.com](http://www.ironwoodelectronics.com)

## **Socket Technologies**



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# Introduction

## ● Company Overview

- Over 8,000 products
- High Performance Adapters and Sockets
- Many Custom Designs
- Engineering – Electrical and Mechanical
- ISO9001:2015 Registration

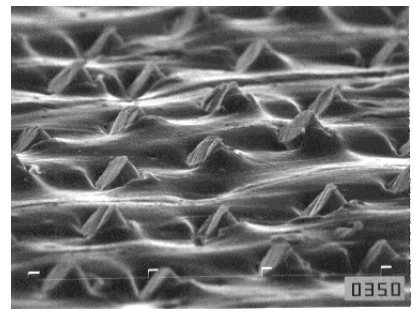
## ● Socket Technology Overview

- Embedded gold plated wire elastomer (SG)
- Stamped & Etched spring pins (SBT)
- Embedded silver ball elastomer matrix (SM/SMP)
- Compressible silver button in polyimide (GT/GTP)
- Surface mount adapters for sockets (SF)

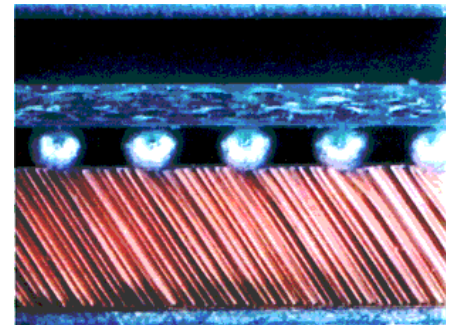
# Embedded gold plated wire 40GHz GHz elastomer socket (SG)

Development  
Proven Capability  
Continuous improvement

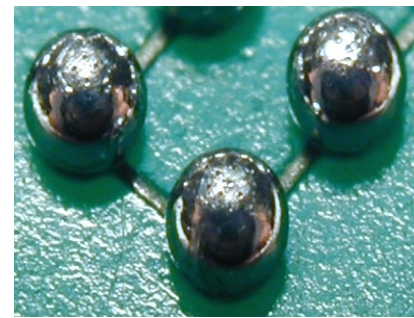
20 Years



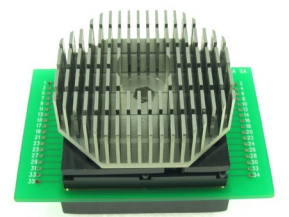
Protruded wire from elastomer



BGA compressed on Elastomer



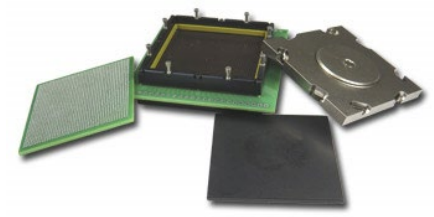
Wire marks on BGA



Heat sink lid

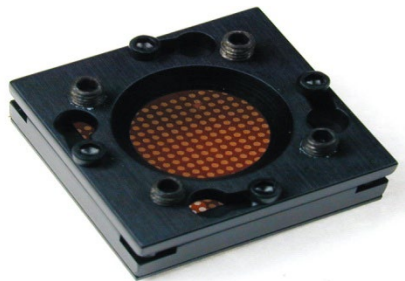


Features	Benefits
Short contact	High bandwidth applications
Gold plated Brass wire	Low contact resistance
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable system designs
High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

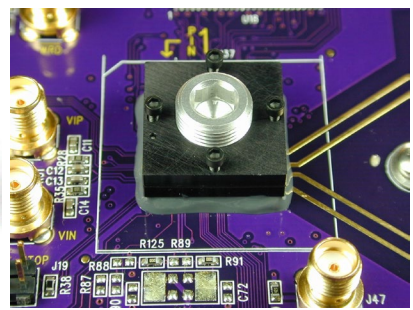


Xilinx FPGA socket

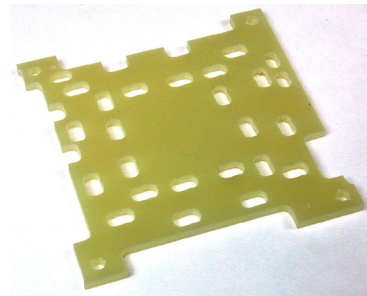
- Capabilities**
- 0.3mm to 1.27mm pitch
  - 1x1mm to 55x55mm device
  - BGA, QFN, QFP, SOIC
  - 4000 pin count
  - Heat sink options
  - Easy chip replacement
  - Custom support plate options



Open top lid



No mounting hole socket



Custom insulation plate

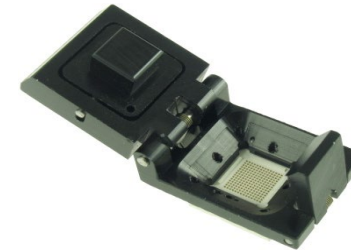
# Stamped & Etched spring pin 31.7 GHz socket (SBT)



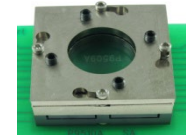
LGA high force pin



BGA low force pin



BGA socket w/ Snap Lid



Open top socket



Super short  
Etched spring pin



Crown Plunger

External Spring

Cone /ball  
Plunger

Continuous improvement

Proven Capability

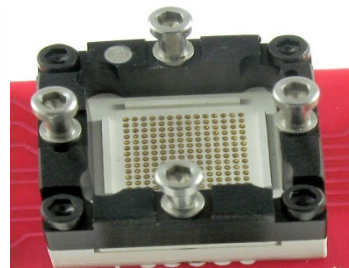
Development

10 Years

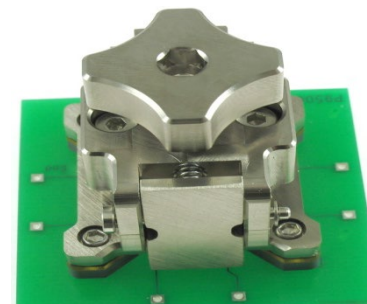
Features	Benefits
Long contact travel	Compliance for large package warpage
Gold plated BeCu material	High temperature applications
Small socket footprint	Easy to place inductors, capacitors, resistors, etc for tuning and increasing bandwidth. Ideal for IC prototype and system testing and field upgradeable 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

### Capabilities

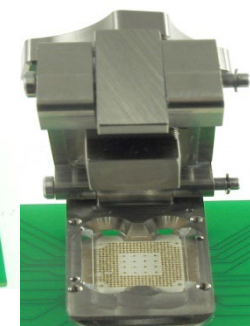
- 0.3mm to 1.27mm pitch
- 1x1mm to 60x60mm device
- BGA, LGA, QFN, QFP, SOIC
- 5000 pin count
- Heat sink options
- Easy chip replacement
- Custom support plate options



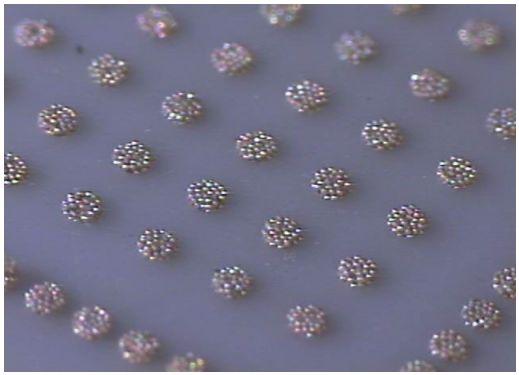
Floating plate for precise alignment and swivel lid



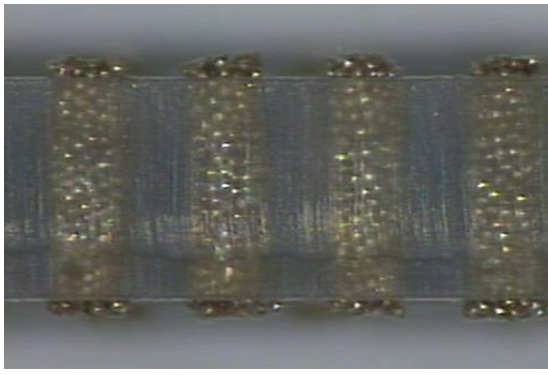
Clamshell BGA socket



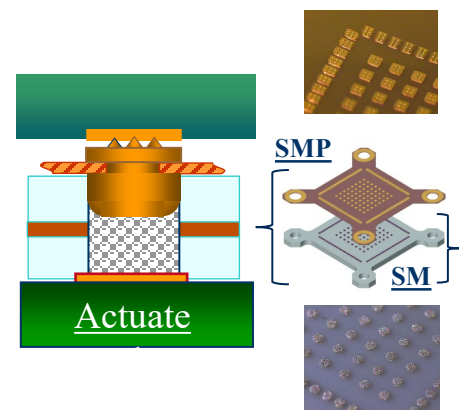
# Embedded silver ball 45 GHz elastomer socket (SM/SMP)



Array of Columns - Elastomer Matrix



Cross section - Silver balls



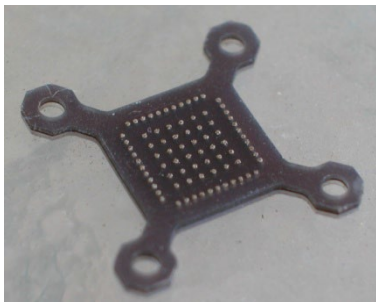
Continuous improvement

Proven Capability

Development

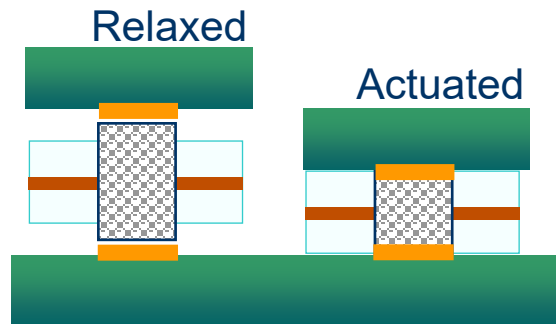
8 Years

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

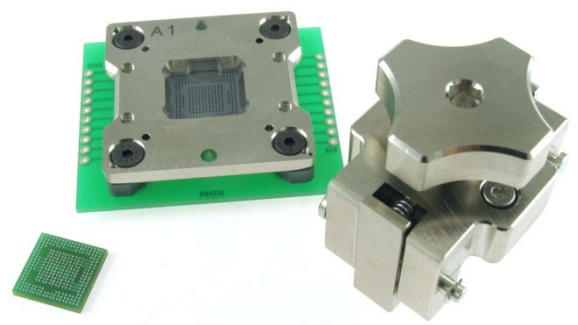


Replaceable elastomer module

- Capabilities**
- 0.25mm to 1.27mm pitch
  - 1x1mm to 60x60mm device
  - BGA, LGA, QFN
  - 3000 pin count
  - Heat sink options
  - Easy chip replacement
  - Custom support plate options

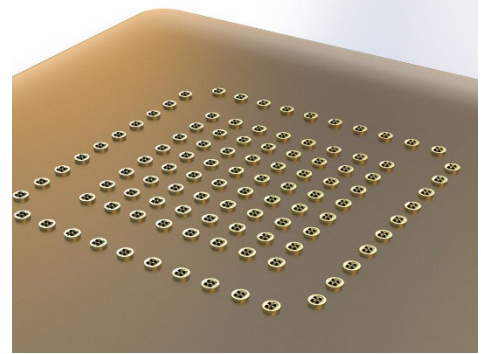
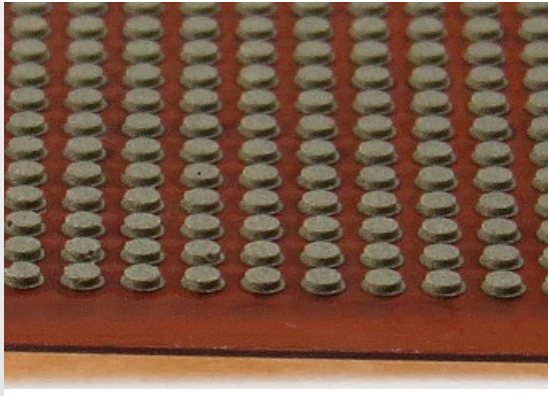
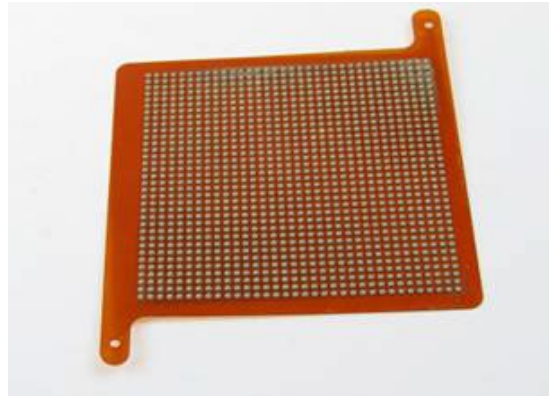


Rest & Test condition



ATE socket with double latch clam shell lid

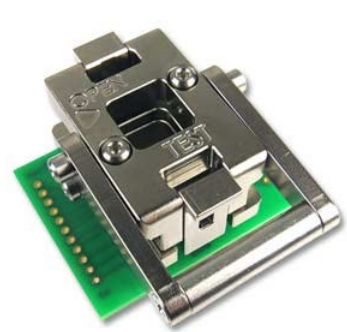
# Compressible silver button 94 GHz elastomer socket (GT/GTP)



Array of Silver Buttons - Elastomer Matrix

Protective layer over Elastomer Matrix

Features	Benefits
Shortest contact	Highest bandwidth applications
Silver particles	Low contact resistance
Small socket footprint	2.5 mm per side larger than actual IC packages
Individual buttons	No mechanical coupling
Laser cut substrate	Precise contact location

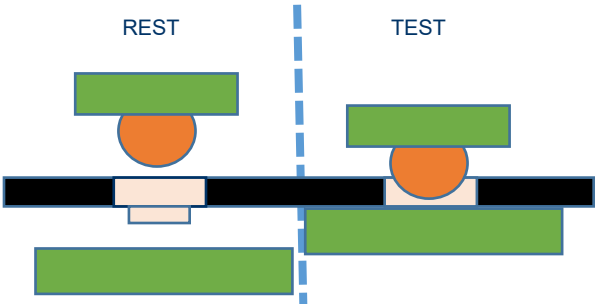


Lever actuated socket

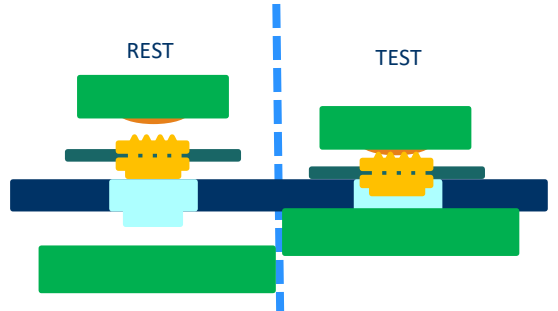


Socket with heat sink

- Capabilities**
- 0.2mm to 1.27mm pitch
  - 1x1mm to 50x50mm device
  - BGA, LGA, QFN
  - 5000 pin count
  - Heat sink options
  - Easy chip replacement
  - Custom support plate options



BGA Rest & Test condition



QFN, LGA Rest & Test condition

Continuous improvement

Proven Capability

Development

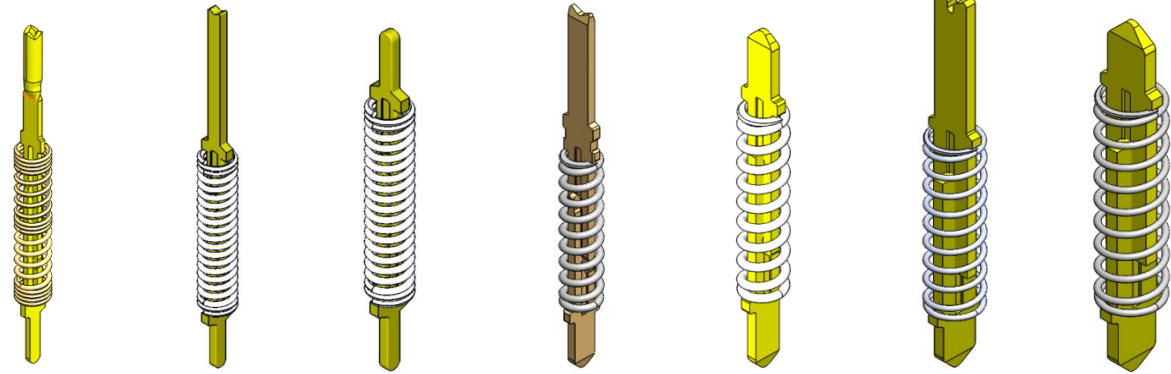
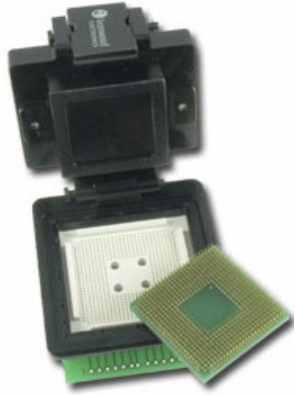
7 Years

# Contact Technology Summary

<u>Characteristics</u>	<u>Embedded Wire Elastomer (SG)</u>	<u>Stamped spring pins (SBT)</u>	<u>Embedded Silver Ball Elastomer Matrix (SM/SMP)</u>	<u>Silver Button Elastomer (GT/GTP)</u>
Bandwidth, GHz	27 to 56.8	4.15 to 31.7	44.8	94
Endurance, Cycles*	2K	500K	5K/500K	1K/200K
Resistance, mΩ	20	15	15	20
Self Inductance, nH	0.11 to 0.28	0.88 to 0.98	0.1	0.04
Max Current, Amp	2	8	7.8	7.8
Temp Range, °C	-35 to +125	-55 to +180	-55 to +155	-55 to +160
Pitch, mm	0.3 to 1.27	0.3 to 1.27	0.25 to 1.27	0.2 to 1.27
Package Types	BGA, QFN, QFP, SOIC	BGA, LGA, QFN, QFP, SOIC	BGA, LGA, QFN	BGA, LGA, QFN
Lab test	√	√	√	√
Production test		√	√	√
Field upgrade	√	√	√	√
Temperature test	√	√	√	√
Kelvin test	√	√	√	√
Burn-in test		√		

\*Cycle life shown at room temperature. Reduced cycle life is expected when used at extreme temperatures, thermal cycling, improper force, cleaning and handling.

# Pin Datasheet



Pin Family	SBT	SBT	SBT	SBT	SBT	SBT	SBT
Part Number	P-P204A	P-P185A	P-P184A	P-P196A	P-P150A	P-P151A	P-P152A
Minimum Pitch (mm)	0.35	0.4	0.4	0.5	0.5	1.0	1.0
Pin Type	BGA	BGA	LGA	BGA	LGA	BGA	LGA
Length (mm)	3.46	3.81	2.9	3.86	2.95	5.69	4.45
DUT Side Tip Shape	Crown	V Shape	Radius Cone	V Shape	Radius Cone	Notched V	Radius Cone
DUT Side Tip Dimension (mm)	0.17	0.14	0.12	0.2	0.06	0.54	0.1
PCB Side Tip Shape	Radius Cone	Radius Cone	Radius Cone	Radius Cone	Radius Cone	Radius Cone	Radius Cone
PCB Side Tip Dimension (mm)	0.12	0.12	0.12	0.04	0.06	0.1	0.1
DUT Side Travel (mm)	0.3	0.5	0.3	0.33	0.33	0.6	0.6
PCB Side Travel (mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Force (g)	8.7	17	14.5	30	30	19	19
Cres (mOhms)	< 70	< 50	< 50	< 30	< 30	< 15	< 15
CCC @ ambient (Amps)	1	1.8	1.8	4.0	6.0	8.0	8.0
Bandwidth (GHz @ -1dB)**	23.5 - 26.1	20.5 - 31.7	20.5 - 31.7	5.2 - 15.7	5.2 - 15.7	14.1 - 21.9	14.1 - 21.9
Self inductance (nH)	0.92	0.98	0.98	0.88	0.88	0.93	0.93
Temperature (deg C)	-55 to +180C	-55 to +180C	-55 to +180C	-55 to +180C	-55 to +180C	-55 to +180C	-55 to +180C
Insertion Cycles	50K	75K	75K	500K	500K	500K	500K

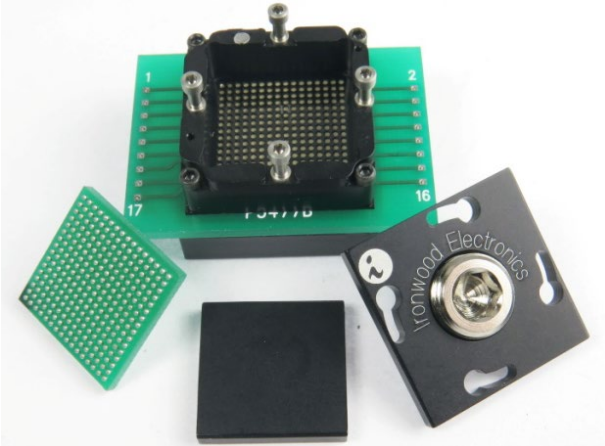
\* 0.4mm/0.5mm pitch SBT pins are used in 0.65mm and 0.8mm pitch applications

\*\* Bandwidth range is based on pin location (corner, edge, field). See report for test conditions and setup.

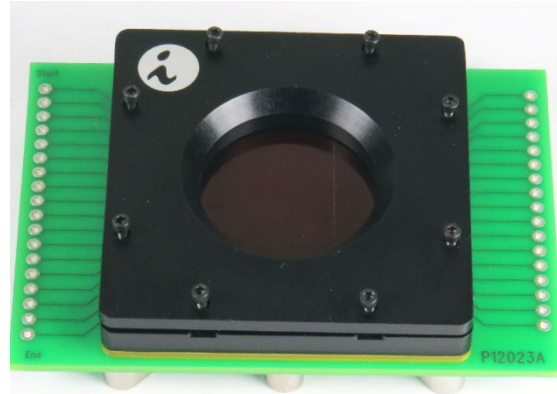


# Socket Lid Options

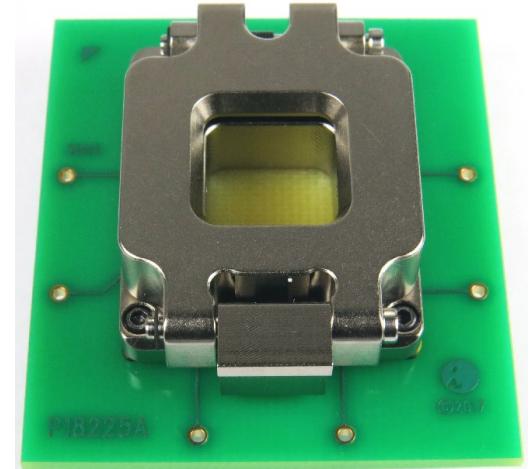
Swivel Lid Socket



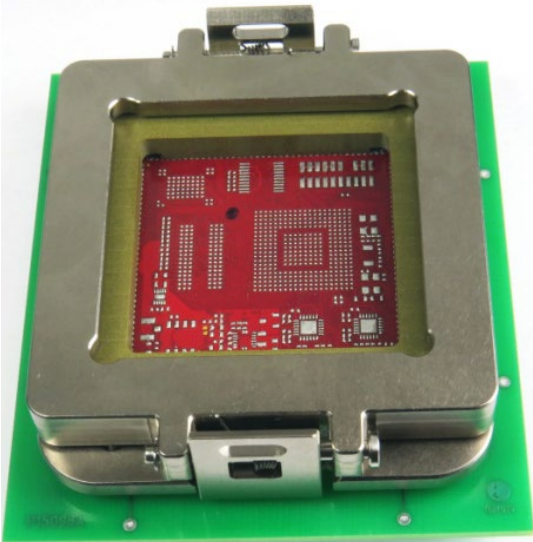
Screw Top Socket w/Center Open



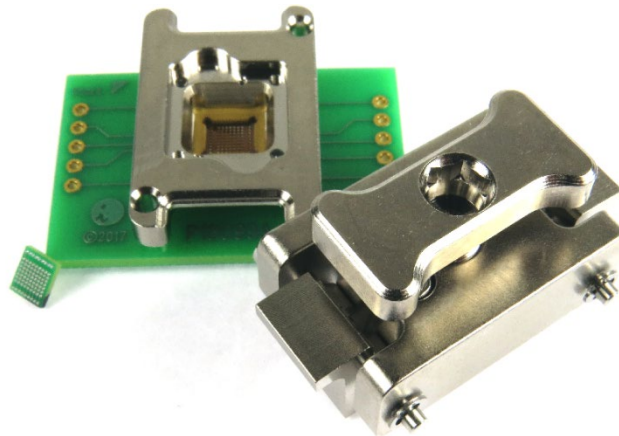
Snap Lid Socket w/Center Open



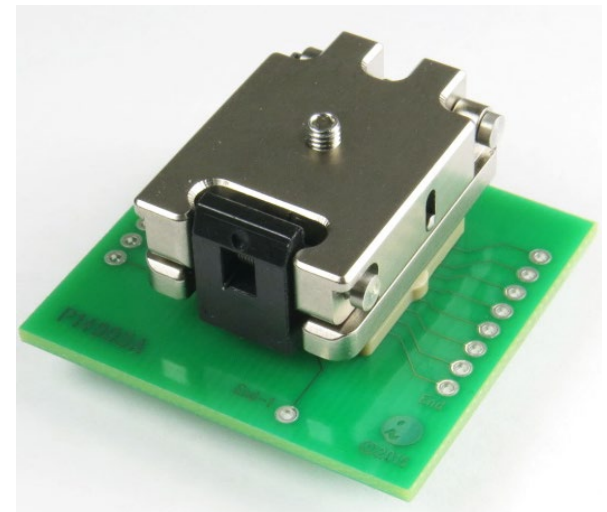
Double Latch Socket w/Center Open



Double Latch Socket w/Handle

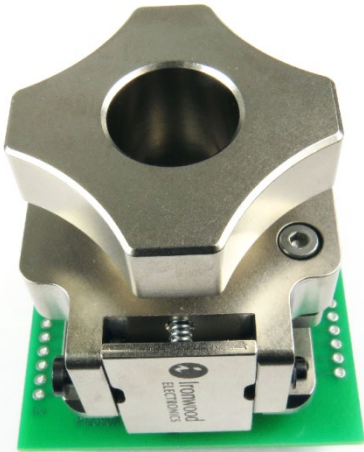


Snap Lid with adjustable pressure screw Socket

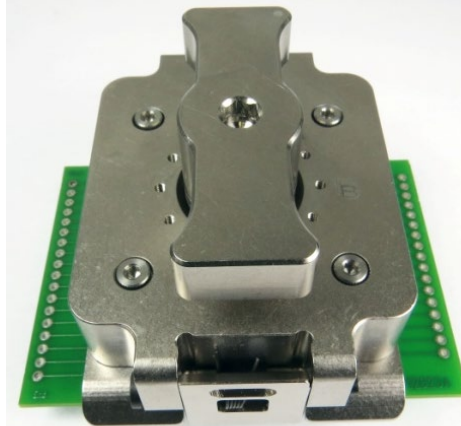


# Socket Lid Options

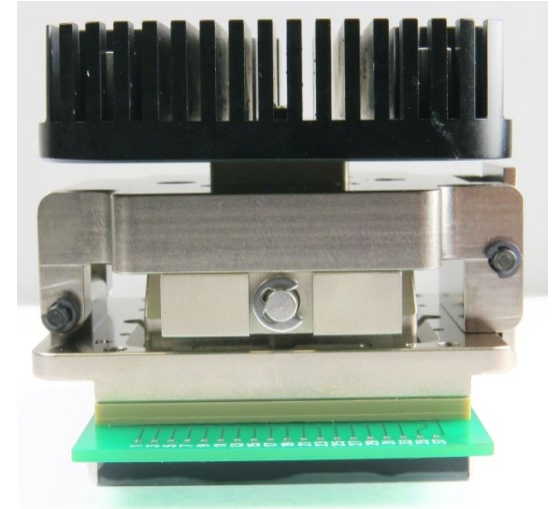
Clamshell Socket w/Center Open



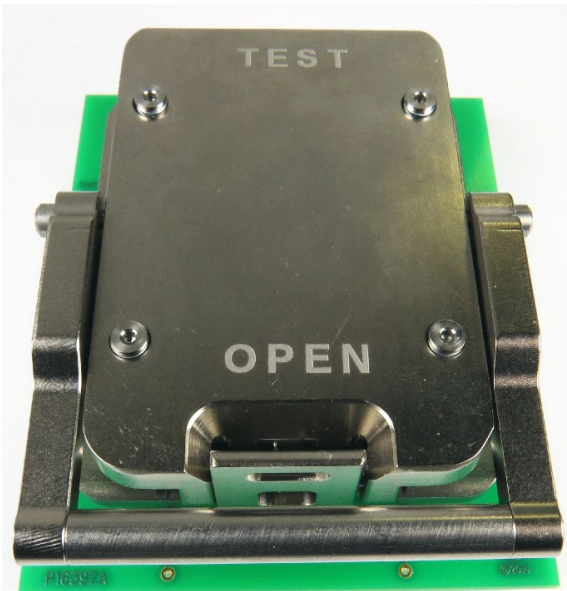
Clamshell Adjustable Hard Stop Socket



Clamshell Socket w/Heat Sink



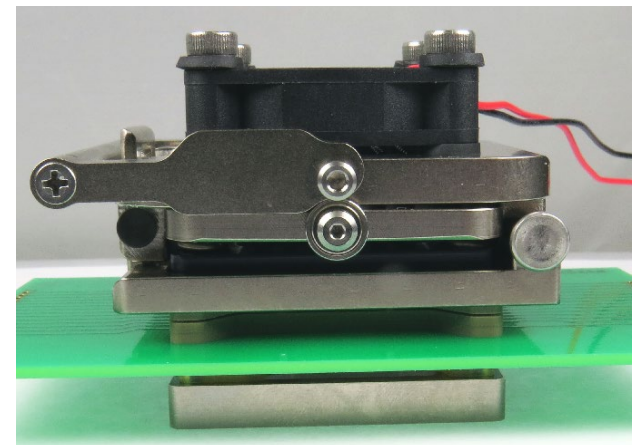
Lever Lid Socket



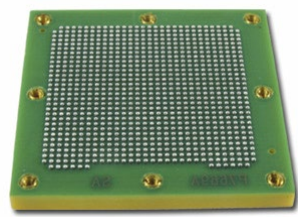
Lever Lid Socket w/Center Open



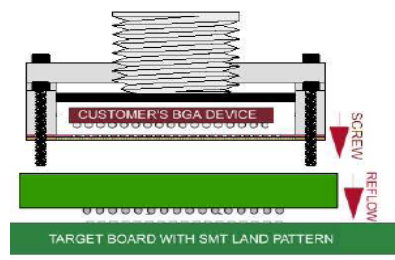
Lever Lid Socket w/Fan and Heat Sink



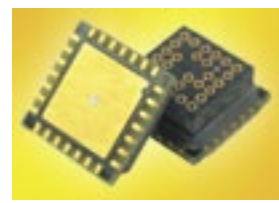
# Surface Mount Adapters for sockets (SF)



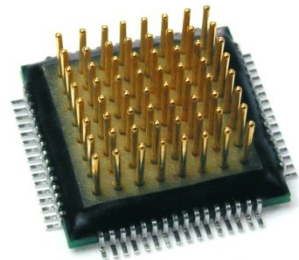
Surface mount adapter



Socket + SM adapter



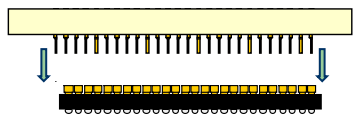
QFN SM adapter



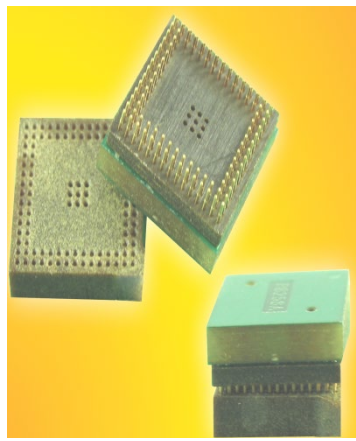
QFP SM adapter



Spring pin socket +  
Thru hole adapter +  
Surface mount adapter



Thru hole adapter +  
Surface mount adapter



0.5mm pitch  
Pluggable adapter pair

Continuous improvement

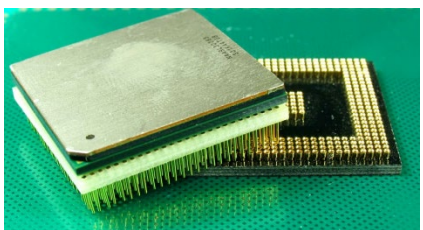
Proven Capability

Development

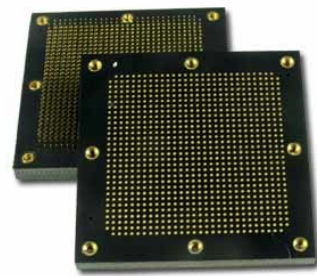
20 Years

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)

- 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

# Custom Capability

- 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

