Products, Services & Capabilities

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Overview

● Company Overview
  - Founded 1986
  - Over 10,000 catalog products
  - High Performance Adapters and Sockets
  - Many Custom Designs & Turn-Key Solutions
  - Engineering – Electrical and Mechanical
  - ISO9001:2015 Registration
  - Worldwide distribution
  - Customers – Engineering and OEM
  - 57 Employees

● Capabilities Overview
  - Simulation
    ● QFIN for heat sink design
    ● Microwave Studio for electrical
  - 3D Solid Modeling CAD & CAM
    ● ProEngineer, Solid Works
    ● Gibbs cam
  - PCB Technology
    ● PADS Layout, PADS Router
    ● Controlled Impedance, Embedded Resistors, Laser Micro Vias, Filled Via in Pad, 3/3 traces, Rigid-flex PCBs
  - State of the art CNC machines - Tight Tolerance 3D Machining (e.g. ±0.0127mm), Swiss screw machine, Print, Pick, Place & Reflow assembly line, High speed PCB drilling, Laser cutting/drilling, Automated Optical Inspection, Impedance test, FDR test.

Product Overview

● Elastomer Sockets
● Spring Pin Sockets
● Manual Socket Lids
● Clamshell/Lever Actuation
● Zero footprint Sockets
● Near Zero footprint Sockets
● SMT Adapter Sockets
● SMT Package Emulation
● Package Convertors
● Prototype, Probing & Analysis Adapters
● Electronic Modules
Engineering Sockets

Capabilities
- 0.3mm to 1.27mm pitch
- 1x1mm to 60x60mm device
- BGA, LGA, QFN, QFP, SOIC, WLP
- 4000 pin count
- 75GHz
- Heat sink options
- Easy chip replacement
- Custom support plate options
- Custom mounting options
- Industry’s smallest footprint

BGA compressed on Elastomer
Silver particle Elastomer
Double latch lid
Surface mount adapter
Clamshell lid
Gold RF socket
Open top lid
No mounting hole socket
Custom insulation plate
Heat sink lid
Torque indicator
Back-to-back socket
Swivel lid socket with decaps accommodated back plate
PoP socket with two elastomers
Production & Burn-in Sockets

Capabilities
- 0.2mm to 1.27mm pitch
- 1x1mm to 60x60mm device
- BGA, LGA, QFN, QFP, SOIC, WLP
- 4000 pin count
- 45 GHz, 500K cycles
- Consistent contact resistance throughout life
- Low cleaning frequency
- High current & extreme temperature

Types of sockets:
- Stamped LGA pogo pin
- Stamped BGA pogo pin
- Self cleaning Pogo pin crown
- Short 3piece Pogo pin
- Offset plunger Kelvin pogo pin
- Ceramic QFP socket with center E-pad
- SOIC production socket
- BGA production socket with heat sink lid
- Multi Level SBT socket
- Flat lead Ceramic QFP production socket
Socket Lid Options

- Swivel Lid Socket
- Screw Top Socket w/Center Open
- Snap Lid Socket w/Center Open
- Snap Lid with adjustable pressure screw Socket
- Double Latch Socket w/Center Open
- Double Latch Socket w/Handle

IP, 1/23/2020
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
## Contact Technology Summary

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

*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

<table>
<thead>
<tr>
<th>Pin Family</th>
<th>SBT</th>
<th>SBT</th>
<th>SBT</th>
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<th>SBT</th>
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<tbody>
<tr>
<td>Part Number</td>
<td>P-P204A</td>
<td>P-P185A</td>
<td>P-P184A</td>
<td>P-P196A</td>
<td>P-P150A</td>
<td>P-P151A</td>
<td>P-P152A</td>
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<tr>
<td>Minimum Pitch (mm)</td>
<td>0.35</td>
<td>0.4</td>
<td>0.4</td>
<td>0.5</td>
<td>0.5</td>
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<td>Pin Type</td>
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<td>LGA</td>
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<td>LGA</td>
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<tr>
<td>Length (mm)</td>
<td>3.46</td>
<td>3.81</td>
<td>2.9</td>
<td>3.86</td>
<td>2.95</td>
<td>5.69</td>
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<tr>
<td>DUT Side Tip Shape</td>
<td>Crown</td>
<td>V Shape</td>
<td>Radius Cone</td>
<td>V Shape</td>
<td>Radius Cone</td>
<td>Notched V</td>
<td>Radius Cone</td>
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<tr>
<td>DUT Side Tip Dimension (mm)</td>
<td>0.17</td>
<td>0.14</td>
<td>0.12</td>
<td>0.2</td>
<td>0.06</td>
<td>0.54</td>
<td>0.1</td>
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<tr>
<td>PCB Side Tip Shape</td>
<td>Radius Cone</td>
<td>Radius Cone</td>
<td>Radius Cone</td>
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<tr>
<td>PCB Side Tip Dimension (mm)</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.04</td>
<td>0.06</td>
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<tr>
<td>DUT Side Travel (mm)</td>
<td>0.3</td>
<td>0.35</td>
<td>0.3</td>
<td>0.33</td>
<td>0.33</td>
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<tr>
<td>PCB Side Travel (mm)</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
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<td>0.1</td>
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<tr>
<td>Force (g)</td>
<td>8.7</td>
<td>17</td>
<td>14.5</td>
<td>30</td>
<td>30</td>
<td>19</td>
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<td>Cres (mOhms)</td>
<td>&lt; 70</td>
<td>&lt; 50</td>
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<td>&lt; 30</td>
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<td>CCC @ ambient (Amps)</td>
<td>1</td>
<td>1.8</td>
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<td>4</td>
<td>6</td>
<td>8</td>
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<tr>
<td>Bandwidth (GHz @ -1dB)**</td>
<td>23.5 - 26.1</td>
<td>20.5 - 31.7</td>
<td>20.5 - 31.7</td>
<td>5.2 - 15.7</td>
<td>5.2 - 15.7</td>
<td>14.1 - 21.9</td>
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</tr>
<tr>
<td>Self inductance (nH)</td>
<td>0.92</td>
<td>0.98</td>
<td>0.98</td>
<td>0.88</td>
<td>0.88</td>
<td>0.93</td>
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<tr>
<td>Temperature (deg C)</td>
<td>-55 to +180C</td>
<td>-55 to +180C</td>
<td>-55 to +180C</td>
<td>-55 to +180C</td>
<td>-55 to +180C</td>
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<tr>
<td>Insertion Cycles</td>
<td>50K</td>
<td>50K</td>
<td>50K</td>
<td>500K</td>
<td>500K</td>
<td>500K</td>
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<td></td>
</tr>
</tbody>
</table>

* 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.

IP, 1/23/2020
Zero Footprint Sockets

• No lid required
• Socket same size as device
• Device simply snaps in for test
• Allows test on platform boards

Grypper

G80

G35/40
Near Zero Footprint Sockets

- **“Y” contact technology:**
  - Does have a cover
  - Great for vibration testing
  - Still near zero footprint
  - Test same device up to 200+ times with little mark on the ball

- **“Spring Pin” contact technology:**
  - Same attributes of “Y” solution.
  - Longer life out of the socket
  - Low volume ATE applications
  - LGA, BGA, small ball.

**Methodology**

- Device
- Spring Pins
- PCB Interposer with solder balls for attachment
- Customer PCB
- LID Bolt Down shown
- Housing
- Cantilever area is ~1.6 mm above any discrete components
Engineering Adapters

27 Years
Development
Proven Capability
Continuous improvement

Power PC BGA device interfaced to Logic analyzer and motherboard for functional analysis

0.5mm pitch 21x21 array 289 position BGA solder balls to AMP 104068 connectors using rigid flex PCB with socket fixture

60 pin, 0.8mm pitch BGA rigid-flex probing adapter with AMP mictor and BGA surface mount foot

J-leded PLCC Emulator foot

Capabilities
• 0.4mm to 1.27mm pitch
• 2x2mm to 50x50mm device
• BGA, LGA, QFN, SOIC, PLCC, QFP, DIP, PGA, etc
• 2000 pin count
• RoHS compatible
• Agilent, Tektronix compatible
• Rigid & flex options

Gull-wing QFP Emulator foot

BGA proto adapter with Clamshell pogo pin socket

Leadless QFN emulator

IP, 1/23/2020

SOIC, PLCC adapter

Allows QFN device to be socketed to motherboard with signals brought out to test pins

Flex emulator – 125 position AMP Z pack connector to 80 position female interface
Production Adapters

- 0.4mm to 2.54mm pitch
- 2x2mm to 50x50mm device
- BGA, LGA, QFN, SOIC, PLCC, QFP, DIP, PGA, etc
- 3 mil trace/space
- Laser micro vias
- Embedded caps & resistors
- Lead free options
- Tray, Tape & Reel options
- Turnkey solutions

Capabilities

- BGA to BGA conversion with complex signal swap due to device enhancement without additional real estate
- SOIC device mounted to PLCC footprint using solder column technology for high volume production
- 0.5mm pitch BGA Pluggable adapter system
- QFP device mounted to PLCC Footprint on target board with shortest trace length
- Daughter card module Interfaced to QFP footprint
- SOIC to DIP convertor using blind hole technology
- PLCC plug connects Daughter card to socket
- 2000 pin count BGA adapter system plugged together
- Daughte…r card module with high density connector

Development

Proven Capability

Continuous improvement

27 Years

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Facility Overview

24000 Sq. Ft Building

Production area

Machining area

ESD Automated Assembly area
Custom Capabilities

- Custom designs in 2 days
- Match customer’s PCB footprint
- Custom 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
Global Presence