SG15 & SG25 Series

High Performance IC Sockets And Test Adaptors
Application Need & Solution

- Low cost for small quantity
- High bandwidth
- Low inductance
- Low contact resistance
- Low cycle count

GHz BGA socket technology provides >40GHz bandwidth in a small, cost-effective ZIF socket for prototype and test applications. The GHz BGA socket is a simple mechanical socket based on elastomer contact technology.

The elastomer consists of a fine pitch wire matrix which are embedded at a 63-degree angle in a soft insulating sheet of silicone rubber. The insulation resistance between connections with 500V DC is 1000 MΩ. The elastomer is ideal for high-current (30mA to 50mA per filament) applications where a thin, high-density anisotropic connector is required. The gold-plated brass filaments protrude several microns from the top and bottom surfaces of the silicone sheet to penetrate heavily oxidized solder ball. The operating temperature range for the elastomer is -35° to 125° C.
Elastomer Classification

SG-6000 series
Ps, Pi = 0.1mm
L, W = 1mm to 50mm
t = 0.75mm
BGA, QFN, etc, >=0.75mm pitch

SG-7000 series
Ps, Pi = 0.05mm
L, W = 1mm to 50mm
t = 0.5mm
BGA, QFN, etc, >=0.5mm pitch

SG-8000 series
Ps, Pi = 0.1mm
L, W = 1mm to 50mm
t = 0.5mm
BGA, QFN, etc, >=0.75mm pitch

SG-9000 series
Ps, Pi = 0.075mm
L, W = 1mm to 50mm
t = 0.5mm
BGA, QFN, etc, >=0.4mm pitch

Gold-plated brass wire (φ40μm)
Inclined in the direction parallel to the dimension L

Insulation Silicone Rubber

Inclined Gold plated brass wire

Offset
Elastomer Classification

SG25 - series
Ps, Pi = 0.05mm
L, W = 1mm to 25mm
\( t = 0.25\text{mm} \)
BGA, QFN, etc, >=0.3mm pitch

SG15 - series
Ps, Pi = 0.05mm
L, W = 1mm to 25mm
\( t = 0.15\text{mm} \)
BGA, QFN, etc, >=0.3mm pitch

Insulation Silicone Rubber

Inclined Gold plated brass wire

IP, May 2017
Socket Lid Options

**IMPROVED SWIVEL LID**
- Easier-to-use swivel lid
- Maintains low-profile design
- Quick IC installation

**SNAP LID WITH ADJUSTABLE PRESSURE SCREW SOCKET**
- No tools required
- Reliable installation
- Available for all IC's

**LEVER LID SOCKET**
- Fully removable lid
- Optional heat sink
- Easy access to IC

**HEAT SINK LID SOCKET**
- Easy 2-in-1 installation
- Up to 100 watts
- Optional fan available

**CLAM-SHELL ADJUSTABLE HARD STOP SOCKET**
- Easy to use snap lid
- Quick IC installation
- Low profile designs available

**OPEN TOP LID SOCKET**
- Optical applications
- Easy access to chip
- Thermal applications
BGA1156, 14x14mm, 0.4mm pitch
34x34 ball array

1. Socket assembled to daisy chain test PCB.
2. Daisy chain device simulator placed inside the socket.
3. Recommended torque applied.
4. Contact resistance measured using multi-meter.
5. Un-tighten the compression screw.
6. Step 3-5 repeated.

SG25 Cycle life @ 40 gms/ per ball
## SG25 Test Data

### 0.4mm pitch

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductance</td>
<td>0.060 nH</td>
</tr>
<tr>
<td>Mutual Inductance</td>
<td>0.019 nH</td>
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<tr>
<td>Capacitance to Ground*</td>
<td>0.129 pF</td>
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<tr>
<td>Mutual Capacitance</td>
<td>0.017 pF</td>
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<tr>
<td>S21 (insertion loss) @ -1dB, GSG</td>
<td>25.1 GHz</td>
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<tr>
<td>S21 (insertion loss) @ -1dB, GSSG</td>
<td>40.0 GHz</td>
</tr>
<tr>
<td>S11 (return loss) @ -20 dB, GSG</td>
<td>6.0 GHz</td>
</tr>
<tr>
<td>S11 (return loss) @ -20 dB, GSSG</td>
<td>27.5 GHz</td>
</tr>
<tr>
<td>Crosstalk at -20dB</td>
<td>24.5 GHz</td>
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<tr>
<td>Impedance, GSG</td>
<td>40.6 Ω</td>
</tr>
<tr>
<td>Impedance, GSSG</td>
<td>48.5 Ω</td>
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</tbody>
</table>
SG15 Test Data

BGA1156, 14x14mm, 0.4mm pitch
34x34 ball array

1. Socket assembled to daisy chain test PCB.
2. Daisy chain device simulator placed inside the socket.
3. Recommended torque applied.
4. Contact resistance measured using multi-meter.
5. Un-tighten the compression screw.
6. Step 3-5 repeated.

SG15 Cycle life @ 40 gms/ per ball

IP, May 2017
## SG15 Test Data

### 0.4mm pitch

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<tr>
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<tbody>
<tr>
<td>Inductance</td>
<td>0.060 nH</td>
</tr>
<tr>
<td>Mutual Inductance</td>
<td>0.023 nH</td>
</tr>
<tr>
<td>Capacitance to Ground*</td>
<td>0.089 pF</td>
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<tr>
<td>Mutual Capacitance</td>
<td>0.012 pF</td>
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<tr>
<td>S21 (insertion loss) @ -1dB, GSG</td>
<td>40.0 GHz</td>
</tr>
<tr>
<td>S21 (insertion loss) @ -1dB, GSSG</td>
<td>40.0 GHz</td>
</tr>
<tr>
<td>S11 (return loss) @ -20 dB, GSG</td>
<td>9.8 GHz</td>
</tr>
<tr>
<td>S11 (return loss) @ -20 dB, GSSG</td>
<td>32.9 GHz</td>
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<tr>
<td>Crosstalk at -20dB</td>
<td>24.1 GHz</td>
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<tr>
<td>Impedance, GSG</td>
<td>43.6 Ω</td>
</tr>
<tr>
<td>Impedance, GSSG</td>
<td>51.3 Ω</td>
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</table>
Insertion loss S2,1
• 40 Micron Diameter Cu wire fusing limit is 750mA/wire. Recommended safe amount = 50mA/wire
• 23 Micron Diameter BeCu wire fusing limit is 350mA/wire. Recommended safe amount = 30mA/wire
• Maximum amount should not be reached, but higher limits can be achieved as long as the test can handle higher temperature ranges.
• For example: a couple of hundred mA per wire would be fine for a short term test (< 5 sec), but if the test is being held for hours, a heat sink may be necessary to pull off excess heat that may be produced from pushing large amounts of current through each wire.