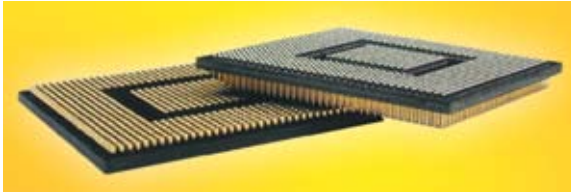




**Ironwood**  
ELECTRONICS



# Giga-snaP BGA SMT Adapters

*The new Giga-snaP line of BGA SMT adapters provide the most reliable interconnect to BGA SMT pads. These patent pending adapters remain attached through many solder cycles and will not warp as plastic molded parts. They also offer half the insertion force of other SMT adapters.*

## **GIGA-SNAP BGA SMT ADAPTERS- RELIABLE, EASY TO PLUG, HIGH SPEED**

The Giga-snaP 1 mm pitch BGA Surface Mount Feet Adapter line of products provide an inexpensive and reliable method for socketing 1mm BGA chips. The product line consists of patent pending female sockets with machined pins epoxy over-molded into an assembly that matches a particular BGA pattern. The epoxy over-molded female BGA socket is soldered to a PCB using standard soldering methods. A corresponding male pin BGA adapter, to which the user attaches their BGA chip, is plugged into the female socket on the board. The chip is interconnected, and the system is ready to go. The SMT adapters have the same solder ball types as the chip's they are emulating. A complete description and drawings of Giga-snaP 1 mm pitch BGA Surface Mount Feet Adapter can be found on the Ironwood Electronics website: [www.ironwoodelectronics.com](http://www.ironwoodelectronics.com).

These adapters have less than 1/3 the insertion force of competitive adapters, shorter electrical path for highest speed, and can be solder reflowed numerous times.

## **BENEFITS**

The patent pending over molding method for the adapter results in a much more reliable device. The coefficient of thermal expansion (CTE) of the BGA SMT foot adapter exactly matches that of the PCB to which it is attached, thus eliminating failures caused by CTE mismatch. Thermal changes from either component heat dissipation or environmental effects will not result in fractured solder ball connections. Secondly, the Giga-snaP SMT adapters can be reflowed up to at least 3 times while maintaining full integrity of all solder ball connections. Adapters with pressed pins tend to fracture the substrate, which allows the solder ball to flow up the pin and wick away - sometimes on the initial solder attachment.

With ball counts in the 1000-2000 range large forces are normally required when inserting the male device. The force to mate conventional adapters may exceed 80 pounds (356 Newtons) for a 1000 pin device. The Giga-snaP BGA Surface Mount Feet Adapters require less than 1/3 the force, only resulting in about 26 pounds (115 Newtons) for the same device.

The electrical path of the Giga-snaP BGA SMT foot adapters is a high priority performance issue. The physical length from the point where the top connection point on the male adapter to the solder ball on the female is only 4.5 mm. This is the shortest connection length available in a pin and socket combination, thus providing providing better

transmission of high frequency signals.

Ironwood Electronics has the tooling, software, and equipment in place to deliver quickly any array, custom or standard 1 mm Giga-snaP. Our speed of delivery for BGA SMT adapters sets the pace for the industry.

#### DESCRIPTION OF THE GIGA-SNAP EPOXY OVERMOLD ADAPTER

Our patent pending epoxy over-mold method for Giga-snaP uses FR4 substrate with pins held by a thin ring of epoxy. The cured epoxy ring effectively seals the pin for optimum solderability. This solves the PCB fracturing problem and warping caused by press fitting into a substrate. This also allows us to use FR4 rather than plastic, thus avoiding CTE mismatch.



Giga-snaP testing setup: Insertion / Extraction forces **Fig. A**

### Data Specs\*

#### Contents:

1. Design-Description
2. Electrical-Spec
3. Assembly-and Handling Conditions
4. Delivery-Form
5. Endurance-Test

#### Details:

### 1. Design-Description

#### Materials

Terminals:

Material: Brass Alloy

Plating : 10 $\mu$ " Gold over 100 $\mu$ " Nickel (min.)

Receptacles:

Shell Material: Brass Alloy 360 1/2 Hard

Plating: 10 $\mu$ " Gold over 100 $\mu$ " Nickel (min.)

Contacts Material: Beryllium Copper Alloy 172, HT

Plating : Gold 0.1  $\mu$ m (min.) over Nickel 1.27  $\mu$ m (min.)

Solder Ball: Eutectic 63Sn/37Pb, 183°C

Coplanarity:  $\leq$  150 $\mu$ m

Insulator: FR4/G10 Tg 130C

#### Mechanical Data (Fig. A)

Drawing: See Ironwood Electronics for specific array.

Insertion Force:

$\leq$  0.12N Initial insertion force (0.2mm diameter pin)

$\leq$  0.2N Initial insertion force (0.254mm diameter pin)

Extraction Force:

$\leq$  0.12N Extraction force (0.2mm diameter pin)

$\leq$  0.2N Extraction force (0.254mm diameter pin)

Contact-durability:  $>$  100 cycles

Operating Temperature: -55°C - 125°C

Socket: Mass

388 position Female Receptacle: 4.25g

388 position Male Land Socket: 3.5g

### 2. Electrical-Detail-Spec

mating-condition for reliability-tests:

388 position Land Socket and Receptacle (terminal with 0.254mm diameter pin)

Min Max Remarks

Current per contact 1A@85°C

Contact-Resistance  $\leq$  15m $\Omega$

After reliability- tests

Test method LLCR (Low Level Circuit Resistance):

- Test current 10mA

- Test Voltage 20mV

Isolation-Resistance between contacts

10x109 $\Omega$

U max= 500V

Frequency-Characteristics

Specification for BGA male and female pins,  
1mm pitch

Frequency of Simulation: 1 GHz

These results include the socket pin and  
terminal pin inserted together as they would  
be used in many applications

Avg Contact Resistance: 8.65 mΩ

Self Inductance (nH)

Avg	Min	Max
2.456	2.453	2.459

Mutual Inductance (nH)

Avg	Min	Max
0.463	0.234	0.639

Capacitance (ff) (10<sup>-15</sup>F)

Avg	Min	Max
67.1	54.5	112

### 3. Assembly / Handling

Soldering conditions:

Reflow Soldering: reflow-cycles 2x, max. 3x

Solder paste: 63Sn/37Pb

Rework: with Hot-Air or Infrared

Preconditioning before soldering according  
to Jedec-Level 3

### 4. Delivery Form

Tape and Reel in Dry Pack available.

Marking: Per Customer specifications

### 5. Endurance-Tests

Test-No (Test)

Conditions:

BGA Receptacle soldered on circuit board  
with Land

Socket and test PCB inserted. Mass of Land  
socket and test PCB 8.0g.

1 (High-Temp.-Storage)

Conditions: 48h ; 125°C

Norm: IEC 68-2-2 Ba

2 (Temp.-Cycling)

Conditions: 100 cycles ; -55°C ... +125°C

Norm: IEC 68-2-14 Na

Transfertime £ 10s; Soak-Time 30 min

3 (Vibration)

Conditions: Random RMS acceleration value  
43 m/s

Spectrum random

Low: 5 Hz 2.0 (m/s)/Hz

High: 2000 Hz 0.14 (m/s)/Hz

Temperature -55°C ... +125°C

Testduration 3\*48h

48h for each device under test plane

Norm: IEC 68-2-64

4 (Vibration-Shock)

Conditions: Form: half-sinusoidal

Acceleration: 500m/s

Puls-Duration : 6ms

No of Shocks: 10 shocks for each room axis

Norm: IEC 68-2-27

**\*Upon Request, Ironwood Electronics will  
supply full test report.**

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*Ironwood Electronics offers a comprehensive line of sockets and adapters used to incorporate integrated circuits and printed circuit boards into higher-level products for prototyping, testing, and production applications. The company's line of standard products has grown out of extensive custom design work for major electronics manufacturers around the world. Ironwood is proud of its ISO 9001:2000 certification that includes design and development.*