ADVANCED INTERCONNECTIONS

Where Research Becomes Reality . . . Worldwide

DATA BOOK

BGA-TECH04 (REV. 3/04)

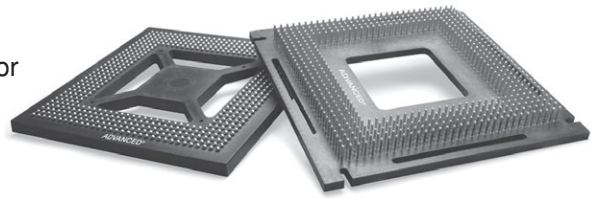
BGA Socketing Systems

Search for a footprint or build a part number online at www.bgasockets.com

Solutions for Virtually Any BGA Application

BGA Socket Adapter System

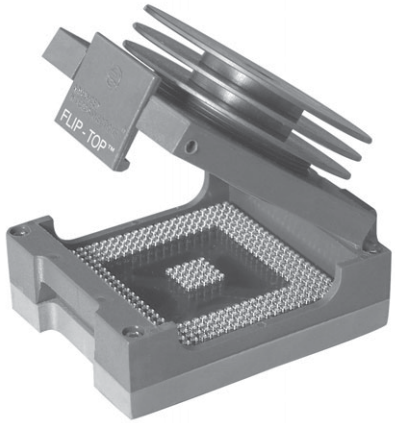
Designed for volume production and development applications.



- Two piece design offers affordable solution for mass production to handle future upgrades, device stability and allocation issues
- Designs for SMT and Thru-hole applications
- Available from .0295" (0.75mm) to .059" (1.50mm) pitch
- Lead-free sockets now available

Flip-Top™ BGA Socket

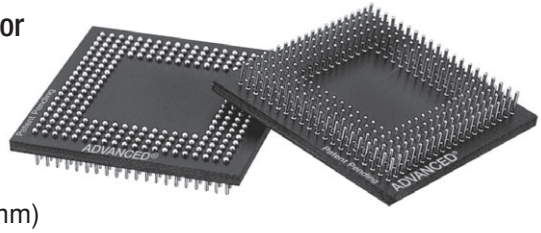
Designed for test, development and production applications with no device soldering required.



- Compact, low-profile design maximizes PCB space
- Integral heat sink
- Designs for SMT and Thru-hole applications
- Now available in .050" (1.27mm) pitch

SMT Adapter

Designed for mounting or socketing LGA, CGA, or reworked BGA devices.



- Compact, low-profile design maximizes PCB space
- Same footprint as device
- Now available in .0315" (0.80mm), .039" (1.00mm) and .050" (1.27mm) pitch

Contents

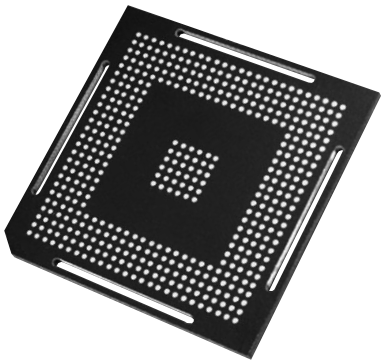
5 Energy Way ■ W. Warwick, RI 02893 USA ■ info@advintcorp.com

Tel: 800-424-9850 / 401-823-5200 ■ Fax: 401-823-8723 ■ www.bgasockets.com

ISO 9001

Ball Grid Array (BGA) Adapters

ADVANCED INTERCONNECTIONS®
5 Energy Way, West Warwick, RI 02893 USA Tel: 800-424-9850 / 401-823-5200 Fax: 401-823-8723 E-mail: info@advintcorp.com Website: www.bgasockets.com



Adapter Features

- Soldering BGA to Adapter subjects BGA to less thermal stress than soldering BGA directly to a PCB due to Adapter's lower mass.
- Uses same footprint as BGA device.
- Custom Adapters available for heat sink attachments.

Specifications

Terminals:
Brass; Copper Alloy (C36000)

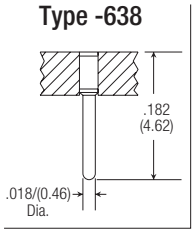
Plating:
G – Gold over Nickel

Body Material:
F – FR-4 Glass Epoxy, U.L. Rated 94V-0

Terminals

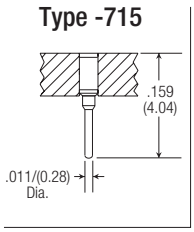
1.27mm and 1.50mm Pitch

Type -638



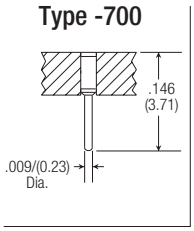
1.00mm Pitch

Type -715



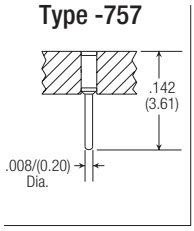
0.80mm Pitch

Type -700



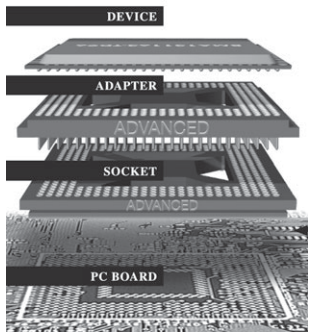
0.75mm Pitch

Type -757



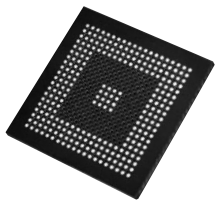
How It Works

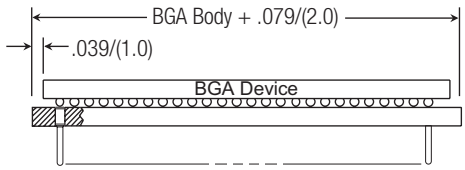
- Device is reflow soldered to BGA Adapter, converting it to a pinned device.
- BGA Socket is reflow soldered to PC board (SMT and Thru-hole models available).
- Device/Adapter assembly easily plugs into Socket.
- Economical solution for future device upgrade, replacement, repair, etc.



Standard Adapter (A)

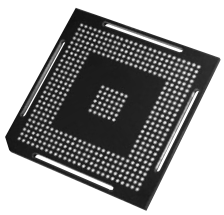
- Mates with Standard Socket (S)
- Adapter size equals BGA device body + .079 in. (2.0mm)

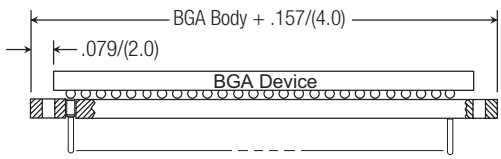




Extraction Slot Adapter (AX)

- Slots allow easy device/Adapter assembly removal from socket with Advanced® Extraction Tool without damaging valuable PCB
- Mates with Extraction Socket (SB)
- Adapter size equals BGA device body + .157 in. (4.0mm)





Advanced® BGA Adapter Extraction Tool

New design works with any size BGA device package.
P/N 8125

How To Order – BGA Adapters

1 F G A XXXX - 638 G

Footprint Dash# If Applicable*

Body Type
F - FR-4

Pitch
B = .059/(1.50mm)
G = .050/(1.27mm)
H = .039/(1.00mm)
J = .0315/(0.80mm)
K = .0295/(0.75mm)

Model Type
A = Standard Adapter
AX = Extraction Slot Adapter [1.50, 1.27, & 1.00mm pitch only]

Number of Positions

Terminal Type
See options at left

Terminal Plating
G - Gold

*See BGA Footprint Booklet or web site

BGA-TECH04 REV. 3/04

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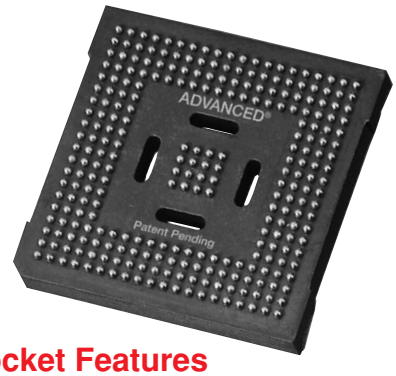
Ball Grid Array (BGA) Sockets



Socket Features

- Advanced® exclusive eutectic solder ball terminals offer superior SMT processing.
- Uses same footprint as BGA device.
- Proven long-term performance in vigorous temperature cycling applications – solder ball terminal absorbs CTE mismatch.
- Closed bottom socket terminal for 100% anti-wicking of solder.
- Gold contacts allow gold/gold interconnections to male Adapter pins.
- Low insertion force socket with multi-fingered high reliability Beryllium Copper contacts.
- Coplanarity consistently under .006 in. (0.15mm) industry standard.
- In-house Tape and Reel packaging available.

Specifications

Terminals:
Brass; Copper Alloy (C36000)

Contacts:
Beryllium Copper (C17200)

Plating:
G – Gold over Nickel

Body Material:
M (1.27mm pitch) – Molded PPS (High Temp. Glass Filled Thermoplastic) U.L. Rated 94V-0, -60°C to 260°C (-76°F to 500°F)
M (1.00mm pitch) – Molded LCP (High Temp. Glass Filled Thermoplastic) U.L. Rated 94V-0, -40°C to 276°C (-40°F to 528°F)
F – FR-4 Glass Epoxy, U.L. Rated 94V-0

Solder Ball:
Standard: Eutectic, 63Sn/37Pb, 183°C (361°F)
Lead-free: Tin/Silver/Copper Alloy, 218°C (424°F)

Standard Socket (S)

- Mates with Standard Adapter (A)
- **Socket size**: same size as BGA device body
- Use with SMT Adapter for LGA and reworked BGA device socketing (see pg. 7)


(Bottom view shown)

Extraction Socket (SB)

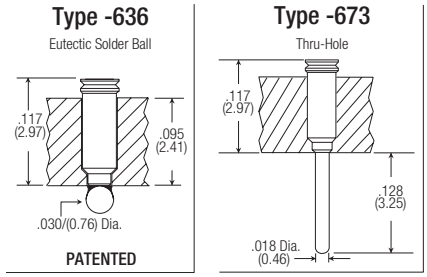
- Mates with Extraction Slot Adapter (AX)
- **Socket size**: 1.00mm pitch: Device + .138/(3.5mm)
  1.27 and 1.50mm pitch: Device + .079/(2.0mm)
- Protects valuable PCB during device/Adapter extraction – tool never touches PCB
- Available in 1.00, 1.27 and 1.50mm pitch


(Bottom view shown)

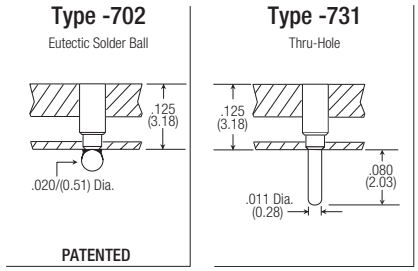
New Lead-Free Sockets

Now available in 1.00mm pitch featuring new high temperature, molded LCP insulators – visit our web site for latest releases in other pitch sizes.

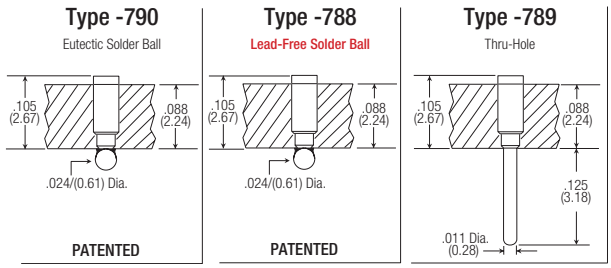
1.27 & 1.50mm Pitch Terminals



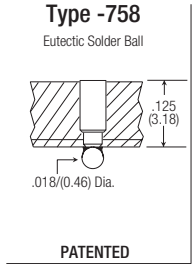
0.80mm Pitch Terminals



1.00mm Pitch Terminals



0.75mm Pitch



How To Order – BGA Sockets

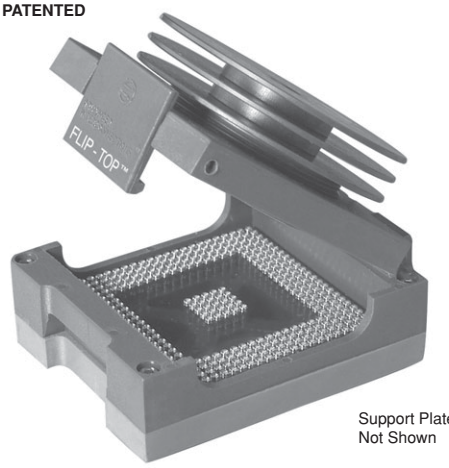
1 M G S XXXX - 636 G G

- **Footprint Dash#** – If Applicable*
- **Body Type** – M - Molded (1.27 & 1.00mm pitch); F - FR-4 (0.75 & 0.80mm pitch)
- **Pitch** – B = .059/(1.50mm); G = .050/(1.27mm); H = .039/(1.00mm); J = .0315/(0.80mm); K = .0295/(0.75mm)
- **Model Type** – S = Standard Socket; SB = Extraction Socket [1.50, 1.27, and 1.00mm Pitch only]
- **Number of Positions** – *See BGA Footprint Booklet or web site
- **Terminal Type** – See options
- **Terminal Plating** – G - Gold
- **Contact Plating** – G - Gold

Flip-Top™
Ball Grid Array Sockets

5 Energy Way, West Warwick, RI 02893 USA Tel: 800-424-9850 / 401-823-5200 Fax: 401-823-8723 E-mail: info@advintcorp.com Website: www.bgasockets.com

PATENTED



Support Plate Not Shown

Flip-Top™ Socket Features

- Designed to save space on new and existing PC boards in test, development, programming and production applications.
- No external hold-downs or soldering of BGA device required.
- AIC exclusive eutectic solder ball terminals offer superior processing.
- Uses same footprint as BGA device.
- Compact design maximizes PCB real estate – only 3mm wider and 10mm longer than BGA device package.
- Available with integral, finned heat sink or coin screw clamp assembly.
- Currently available in 1.27mm pitch.
- Consult factory for additional terminal styles and heat sink options, as well as custom designs.

Specifications

Terminals: Brass; Copper Alloy (C36000)

Terminal Support: Polyimide Film

Contacts: Beryllium Copper (C17200)

Plating: G – Gold over Nickel

Spring Material: Stainless Steel

Heat Sink/Coin Screw and Support Plate Material: Aluminum

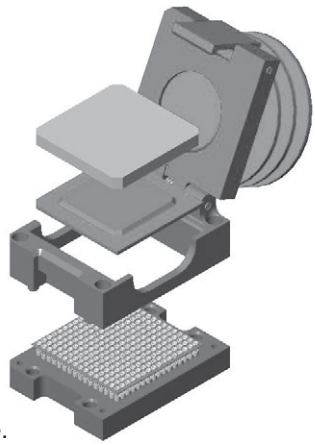
Insulator, Lid and Latch Material:
Molded PPS (High Temp. Glass Filled Thermoplastic), U.L. Rated 94V-0,
-60°C to 260°C (-76°F to 500°F)

Solder Ball:
Eutectic, 63Sn/37Pb,183°C (361°F)

How It Works

SMT models are shipped un-assembled to ease solderability. Thru-hole models are shipped fully assembled.

1. Lower assembly is soldered to PC board with no external hold-down mechanism. Thru-hole models may be soldered to PC board or plugged into a mating socket.
2. Upper assembly inserts easily to lower assembly by aligning guide posts and installing four (supplied) screws.
3. Finned heat sink or coin screw is screwed down to flush position.
4. Lid opens easily by pressing latch.
5. BGA device is inserted by aligning A1 position with chamfered corner of Flip-Top™ socket. Place support plate on top of device, close lid, engage heat sink or coin screw, and socket is ready for use.

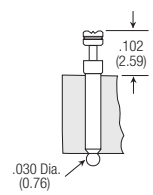


Detailed Installation and General Usage Instructions are provided with product.

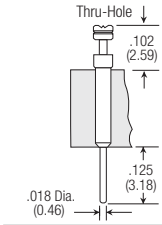
1.27mm Pitch Terminal Options

Standard Terminals
for Test, Development and Production Applications

Type -690
Surface Mount

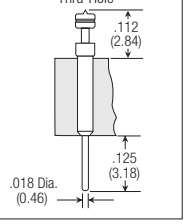


Type -708
Thru-Hole

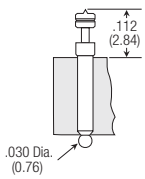


Terminals for LGA or De-balled BGA Device Applications

Type -712
Thru-Hole

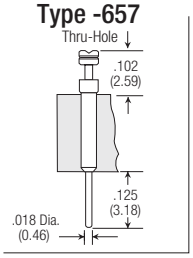


Type -713
Surface Mount

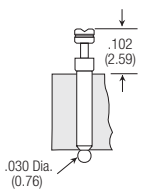


Terminals for BGA Device Test Applications
(Consult Factory for Availability)

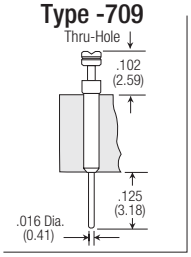
Type -657
Thru-Hole



Type -659
Surface Mount



Type -709
Thru-Hole



How To Order

X FT G XXXX - 690 G G XX

Footprint Dash #
If Applicable*

Flip-Top™ BGA Socket

Pitch
G = .050/(1.27mm) pitch

Number of Positions

*See BGA Footprint Booklet or web site

Terminal Type
See options above

Terminal Plating
G - Gold

Contact Plating
G - Gold

Clamp Options
HS - Heat Sink (3 Fins Std.)
CS - Coin Screw

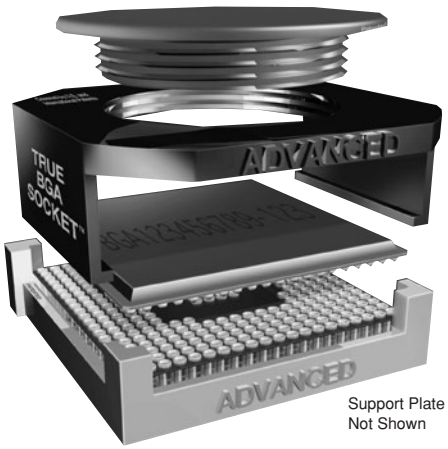
Mechanical specifications for BGA device package required for quoting/ordering.

BGA-TECH04 REV. 3/04

ADVANCED INTERCONNECTIONS®
5 Energy Way, West Warwick, RI 02893 USA Tel: 800-424-9850 / 401-823-5200 Fax: 401-823-8723 E-mail: info@advintcorp.com Website: www.bgasockets.com

True BGA Socket™
Ball Grid Array Sockets

PATENTED



True BGA Socket™ Features

- No soldering of BGA device required.
- AIC exclusive eutectic solder ball terminals offer superior processing.
- Uses same footprint as BGA device.
- Designed for production, development, programming and test applications.
- Compact design maximizes PCB real estate:
  TSG = Device Pkg. Size + 0.216/(5.5mm)
  TSH = Device Pkg. Size + 0.374/(9.5mm)
- Available with integral, finned heat sink or coin screw clamp assembly.
- Currently available in 1.00 and 1.27mm pitch.
- New Short Slide Clamp reduces required installation space on PCB.

Specifications

Terminals: Brass; Copper Alloy (C36000)

Terminal Support: Polyimide Film

Contacts: Beryllium Copper (C17200)

Plating: G – Gold over Nickel

Spring Material: Beryllium Copper

Clamp Assembly: Aluminum
(Heat Sink/Coin Screw, Clamp, Support Plate)

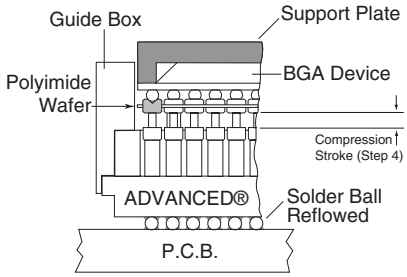
Insulator Material:
Molded PPS (High Temp. Glass Filled Thermoplastic), U.L. Rated 94V-O, -60°C to 260°C (-76°F to 500°F)

Solder Ball:
Eutectic, 63Sn/37Pb,183°C (361°F)

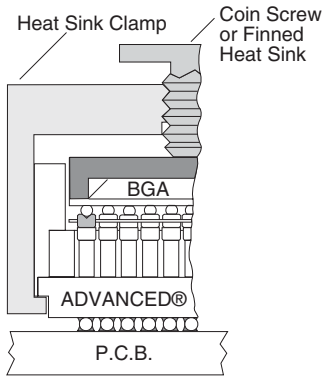
How It Works

Step 1
- Solder True BGA Socket™ to PCB

Step 2
- Align and place BGA device on top of True BGA Socket mating contacts. Place Chip Support Plate over BGA device.



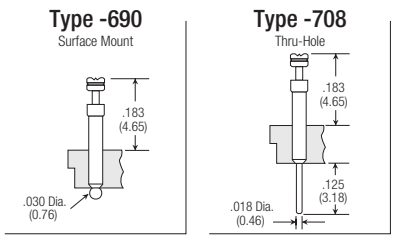
Step 3
- Slide Clamp over assembly. Allow space on PCB for sliding clamp [approximately 33% of device package size on one side only with new Short Slide Clamp]. Refer to Clamp Sliding Directions for pin 1 location (see page 4).



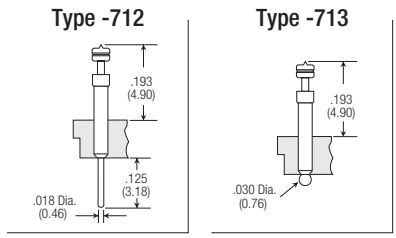
Step 4
- Tighten Coin Screw or Finned Heat Sink to engage compression stroke.

1.27mm Pitch Terminal Options

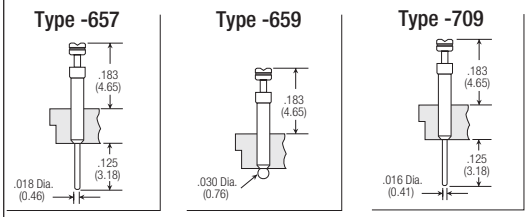
Standard Terminals
for Test, Development and Production Applications



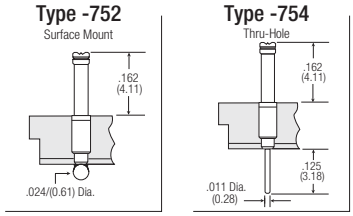
Terminals for LGA or De-balled BGA Device Applications



Terminals for BGA Device Test Applications
(Consult Factory for Availability)



1.0mm Pitch Terminals
for Test, Development and Production Applications



How To Order

X TS G XXXX - 690 G G XX

- **Footprint Dash #** If Applicable*
- **True BGA Socket™**
- **Pitch**
  G = .050/(1.27mm) pitch
  H = .039/(1.0mm) pitch
- **Number of Positions**
  *See BGA Footprint Booklet or web site
- **Terminal Type** See options above
- **Terminal Plating** G - Gold
- **Contact Plating** G - Gold
- **Clamp Options**
  YH - Heat Sink (3 Fins Std.)
  YC - Coin Screw

Mechanical specifications for BGA device package required for quoting/ordering.

BGA Socketing Systems Technical Specifications

5 Energy Way, West Warwick, RI 02893 USA Tel: 800-424-9850 / 401-823-5200 Fax: 401-823-8723 E-mail: info@advintcorp.com Website: www.bgasockets.com

Socket Adapter Systems

Test Results for 1.27mm Pitch, Low Force Contacts (P/N 1427-1G) – Test Report No. 92351A

Durability

50 Cycles at 1 inch per minute, followed by Low Level Resistance Test.

3.1 m Ohm Average, +0.1 m Ohm average change

Vibration

MIL-STD 1344, Method 2005 Test, Condition III, 15 G's followed by Low Level Resistance Test.

2.8 m Ohm Average, -0.0 m Ohm average change

Gas Tight

Exposed in a sealed container to concentrated Nitric Acid (NHO3) followed by Low Level Resistance Test.

3.4 m Ohm Average, +0.5 m Ohm average change

Thermal Cycle

MIL-STD 1344, Method 1003, Test Condition A.

3.4 m Ohm Average, +0.7 m Ohm average change

Shock

MIL-STD 1344, Method 2004, Test Condition A.

No mechanical damage or loss of continuity

Self Inductance

2.52 nH average at 1 GHz*

Loop Inductance

2.26 nH average at 1 GHz*

*From Test Report No. 96313, consult factory for other frequencies.

Flip-Top™ BGA Socket and True BGA Socket™ 1.27mm Pitch Test Data

Loop Inductance (nH)

Frequency	Avg.	Max.	Min.
10 MHz	1.85	2.08	1.64
100 MHz	1.69	1.89	1.44
250 MHz	3.10	3.2	2.9
500 MHz	2.82	2.9	2.7
1 GHz	2.86	3.0	2.7

Self Inductance (nH)

Frequency	Avg.	Max.	Min.
10 MHz	1.48	1.70	1.05
100 MHz	1.46	1.69	1.09
250 MHz	2.32	2.6	2.0
500 MHz	2.38	2.6	2.1
1 GHz	2.68	3.0	2.3

Capacitance (pF)

Frequency	Avg.	Max.	Min.
10 MHz	1.30	1.36	1.29
100 MHz	1.22	1.23	1.19
250 MHz	1.03	1.04	1.02
500 MHz	1.05	1.06	1.03
1 GHz	0.78	0.78	0.76

Flip-Top™ BGA Socket 1.27mm Pitch Test Data

Durability

500 Cycles, followed by LLCR measurement.

0.1 milliohm average change

Attenuation

-0.8964 dB average at 6,000 MHz

Crossover Frequency

3 dB at greater than 6,000 MHz

For further test results, consult factory.

Typical Solder Process Example*

1. Solder paste deposition

- The recommended solder paste is 63Sn/37Pb.
- The recommended solder volume is 0.0016 – 0.0032 cubic inches (0.040 – 0.080 cubic mm) with a pad diameter of 0.020 – 0.028 inches (0.51 – 0.71mm).

2. Solder Reflow - see profile

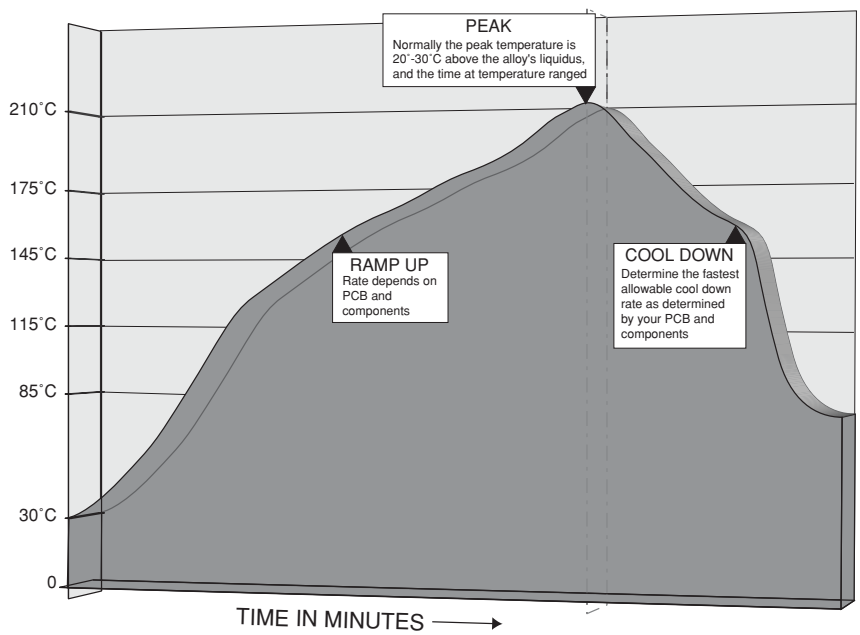
3. Inspection and Testing

- Initial visual inspection for positioning of solder ball to pad along perimeter is recommended to verify reflow of balls.
- Secondary X-Ray tests for overall continuity verification are recommended.
- For production applications, electrical MDA (Mfg. Defects Analysis) tests are recommended.

Consult factory for generic lead-free reflow profile.

Generic Reflow Profile

[63Sn/37Pb Solder Liquidus @ 183°C (361°F)]



** Solder process recommendations are presented for guidance only. Factors such as different board sizes, densities, and equipment will vary actual solder process requirements. Recommendations presented above should be used as starting point only – actual solder process specifications should be developed based on individual requirements and capabilities.*

BGA-TECH04 REV. 3/04

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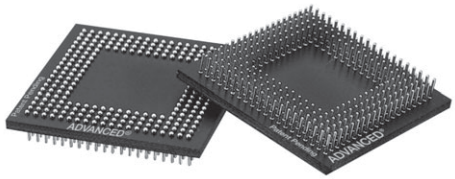
SMT Adapter



Using our exclusive, field-proven eutectic solder ball terminal design, the SMT Adapter from Advanced provides a reliable solution for mounting or socketing LGA or re-worked BGA Devices. Use in conjunction with our standard BGA Sockets for LGA to BGA conversion.

Features & Benefits

- Maximizes PCB real estate – only 2mm larger than LGA or BGA device.
- Custom designs available.
- Available in hundreds of footprints.
- Same footprint as BGA device.
- Short lead times.
- Patented eutectic solder ball terminals provide superior solderability.
- Available with optional extraction slot for easy extraction with Advanced Interconnections BGA Extraction Tool.

Terminals:
Brass, Copper Alloy (C36000)

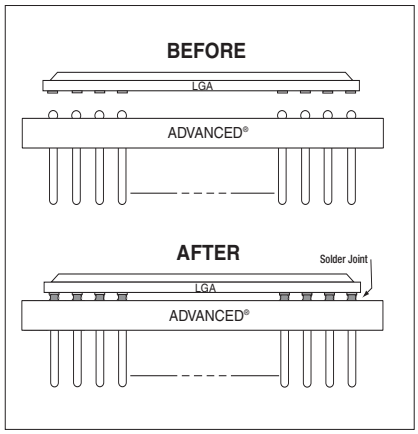
Solder Ball:
Eutectic, 63Sn/37Pb, 183°C (361°F)

Plating:
G – Gold over Nickel

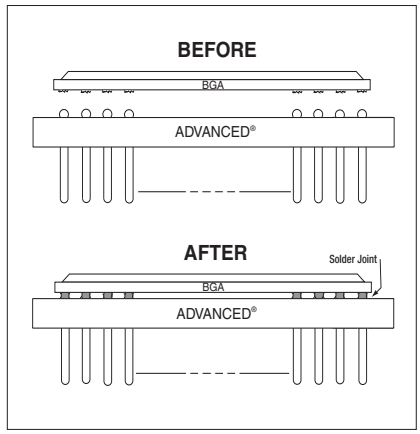
Body Material:
FR-4 Glass Epoxy, UL Rated 94V-0

Typical Applications

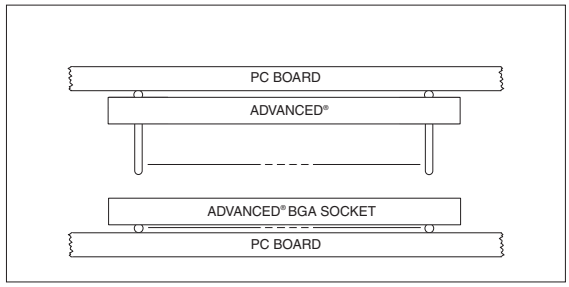
LGA Adapter



De-balled BGA Adapter



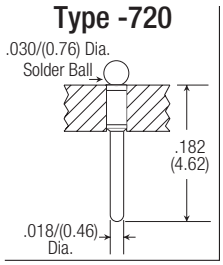
Board to Board



Terminals

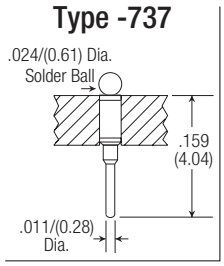
1.27mm Pitch

Type -720



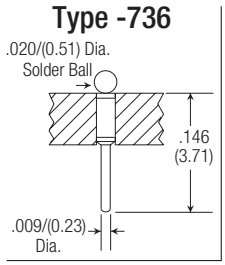
1.00mm Pitch

Type -737



0.80mm Pitch

Type -736



How To Order

1 F G A XXXX - 720 G

Footprint Dash #
If Applicable*

Body Type
F = FR-4

Pitch
G = .050/(1.27mm) Pitch
H = .039/(1.00mm) Pitch
J = .0315/(0.80mm) Pitch

Model
A = Standard Adapter (Device +.079/(2.00))
AX = Extraction Slot Adapter (Device +.157/(4.00))
(AX not available in 0.80mm pitch)

Number of Pins
*See BGA Footprint Booklet or web site

Terminal Type
See options above

Terminal Plating
G = Gold

BGA Device Dimension and I/O Requirements

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Advanced Interconnections has complete design and manufacturing capabilities for your BGA Socket needs.
By answering the following questions we can design a socket to meet your requirements.
Copy this page and fill in the information needed.
Fax to Customer Service at 401-823-8723.

Contact Name: _____ Date: _____

Company Name: _____

Address: _____

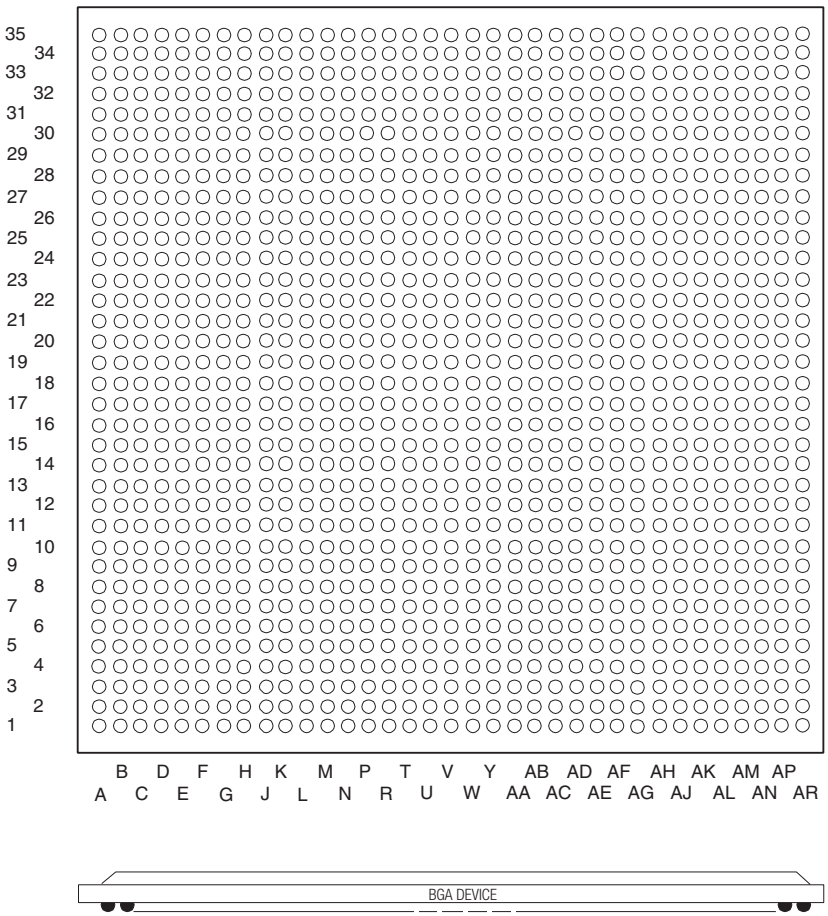
City: _____ State: _____

Postal/Zip Code: _____ Country: _____

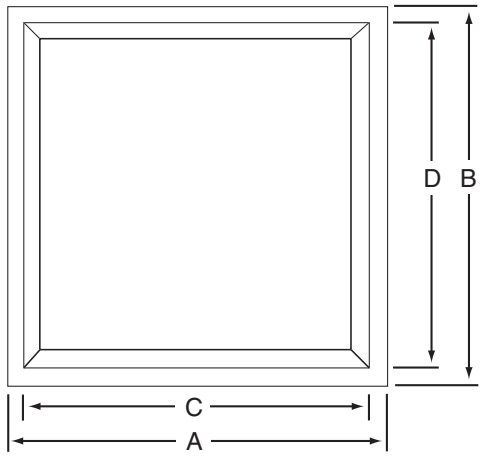
Phone _____ Fax: _____

E-mail: _____

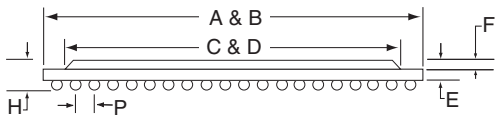
Fill in ball location* or attach complete device mech. specifications:
*All sockets (footprints) viewed top down – looking toward seating plane of PCB and into female side of socket.



BGA Device – Top View



BGA Device – Side View



BGA DEVICE DIMENSIONS			
Dim.	inches	mm	Tol.
A			
B			
C			
D			
E			
F			
H			
P			

Specification Requirements:

Device Manufacturer: _____

BGA Device Model No.: _____

Application: _____

Number of Balls: _____

Grid Pattern (rows across X down): _____

Pitch (specify inches or mm): _____

Complete the required dimension table and attach BGA mechanical specifications including footprint.