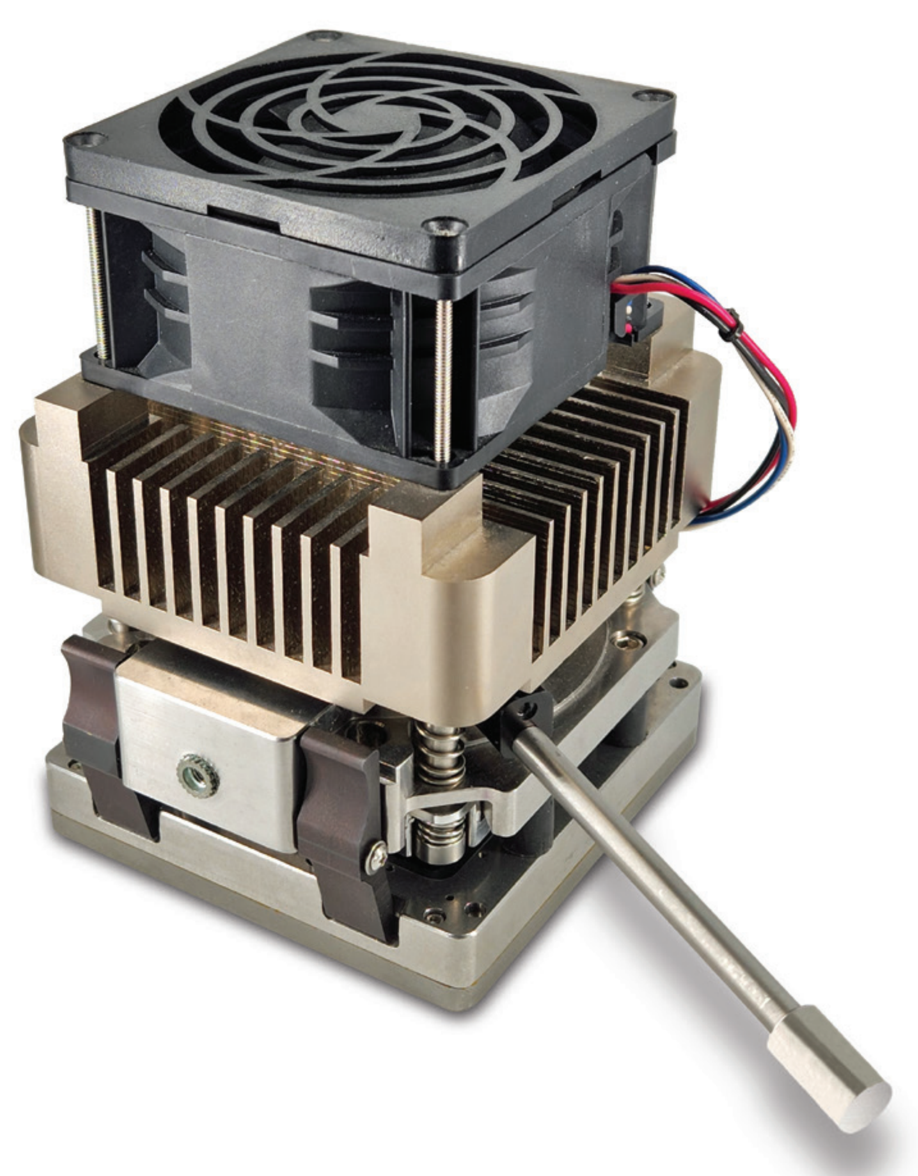
smiths interconnect

Burn-In Test Solutions

Accelerated life testing solution



H-Pin

Stamped contact

Robust contact solution for burn-in, programming, and system-level applications.

The H-Pin is a stamped spring probe with the mechanical, electrical, and thermal performance of a spring probe, and the ease of use and high volume manufacturability of a stamped contact. The H-Pin serves applications without the typical compromises that are generally required when considering cost versus performance.

Excellent mechanical and electrical performance.

Utilizing high volume BeCu stamping technology, combined with a stainless steel spring for mechanical travel, the H-Pin has a working range up to 0.70 mm with a flat spring rate and can be utilized up to 15 GHz with −1.0 dB loss, carry up to 4 A of current and withstand temperatures up to 200+ °C.

High volume stamping and quality control.

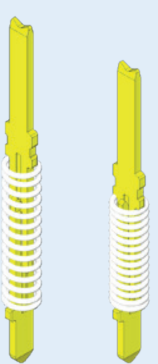
From pin one to one million, you'll get the same pin every time. Because of our automated H-Pin manufacturing process, you'll be the first person to make contact with your pins.

Benefits

- Compliancy for large package warpage
- Stable contact resistance and force
- Solid beam electrical performance
- Compliancy at high temperatures (200+ °C)
- Correlated bi, system evaluation and test
- Reliable power and ground contact
- Stocked inventory and better lead time
- High volume capacity, quality control, and ease of use

Feature Options

- 0.40 mm to 0.70 mm travel
- Flat-spring rate
- BeCu H-Pin
- Stainless steel core spring
- Bandwidth −1dB @ 15 GHz
- Current carrying capacity
- High-volume stamping
- Reel-to-reel pin insertion



H-Pin detail, showing full deflection (right).

Standard off-the-shelf H-Pins

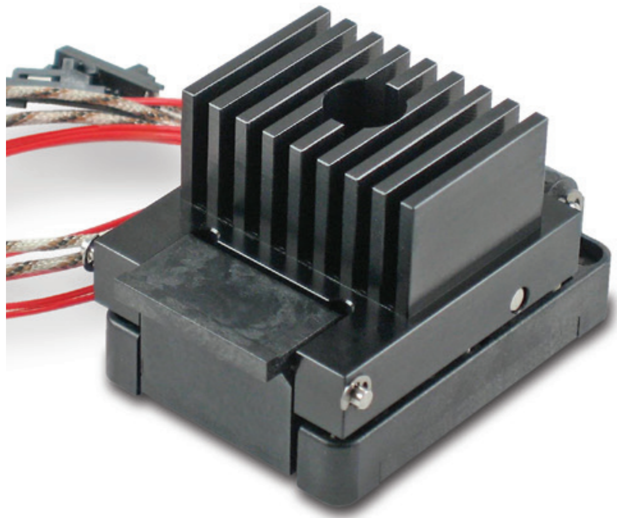
Technical specifications

	H027	T033	H033	H038	H057	H077
Min Pitch (mm)	0.35	0.40	0.40	0.50	0.70	1.00
Pin Diameter (mm)	0.27	0.33	0.33	0.38	0.57	0.77
Force Options (gF)	8.2	8.6	14.5	30.9	30	34.9
Contact Resistance (mΩ)	<65	<35	<50	<35	<30	<16
Current Rating (A, free air)	0.5	1.8	1.8	2.9	3.0	4.0
Bandwidth at -1dB (GHz)	24.7	50.0	31.7	15.7	18.1	21.9
Self-Inductance (nH)	0.92	0.28	0.75	0.88	0.95	1.04

Dimensions are in mm.

C-Series H-Pin Socket

Accelerated life testing solution



Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

C Series Socket is a modular burn-in socket with clamshell-style lid. The small footprint outline allows for a best-in-class range of package accommodations, from 0.5 mm body size up to 12 mm and optimal socket density per burn-in board.

Utilizing the H-Pin in the C-Series socket provides market leading electrical performance for all reliability testing requirements.

The modularity provides unmatched design flexibility and ensures no sacrifices are made in delivering a complete solution without compromising performance or reliability.

Benefits

- Design flexibility, in-house tooling and moulds allow for lowest cost of test.
- Extensive catalogue of standard components reduces cost and lead-time.
- ≥0.35 pitch accommodates a wide variety of application needs.
- Optimized thermal profile to end-use specification.

Feature options

- LCC, QFP, QFN, LGA, BGA, and WLCSP
- Spring-loaded plunger
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Package inserts for a variety of sizes
- High temperature materials for above 200 °C applications

C-Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 0.5 mm to 12 mm
  BGA: 0.5 mm to 9 mm
- **Pin count**:
  LGA: 625
  BGA/QNF: 750
- **Temperature**: −55 °C to 200+ °C

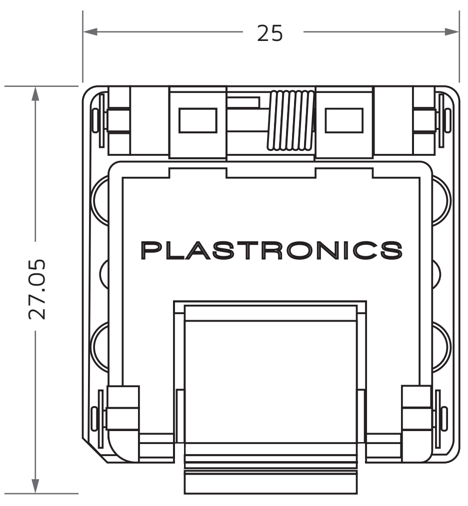
Electrical properties

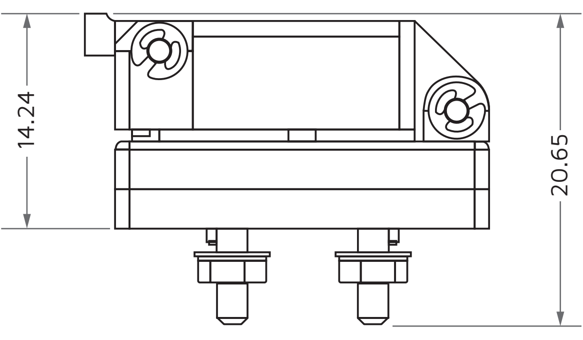
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

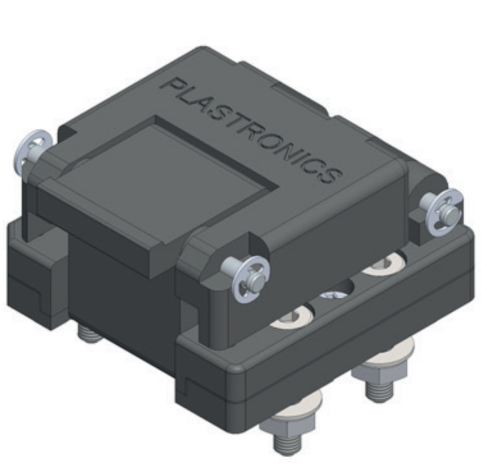
Materials

- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

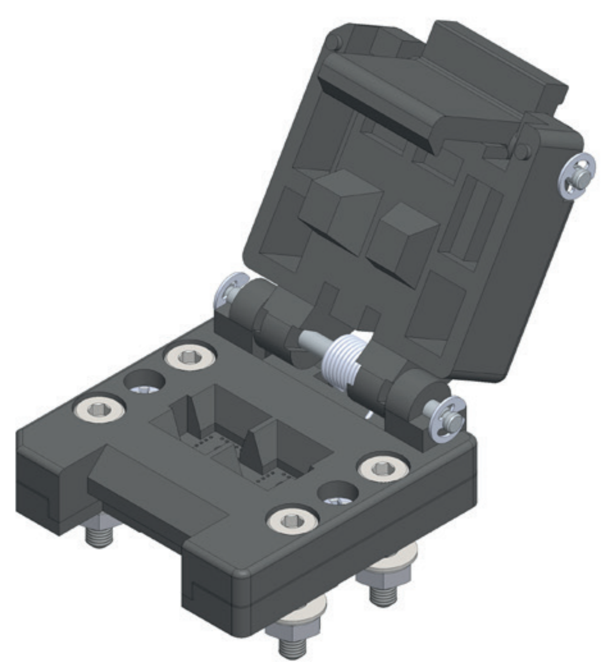
C-Series socket dimensions







Heat sink, heater, and RTD

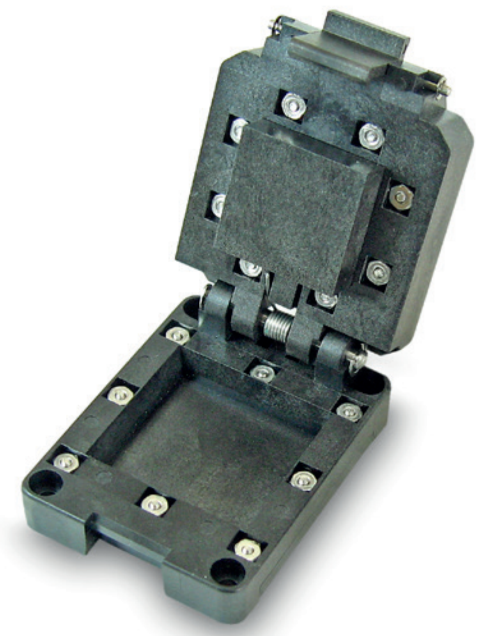


Spring-loaded plunger

Dimensions are in mm.

D-Series H-Pin Socket

Accelerated life testing solution



D-Series Socket is a performance burn-in socket, with a clamshell-style lid that can be equipped with a heater and thermal sensor.

The D-Series line shares the same configurable features as other socket series in the Smiths Interconnect burn-in test portfolio.

Leveraging H-Pin™ technology the D-Series line provides market-leading electrical performance, for high-speed burn-in applications.

Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

Benefits

- Design flexibility, in-house tooling and moulds allow for the lowest cost of test.
- Extensive catalogue of components and configurable options
- Proven track record of reducing the cost of test leveraging modular components, automated assembly, and short lead times.
- Exceptional electrical performance providing wide RF bandwidth.

Feature options

- For QFN,QFP,LCC, SOIC, BGA, and LGA
- Spring loaded plunger
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor.
- Reverse seating plane
- High temperature materials for above 200 °C applications

D-Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 2 mm to 25 mm
  BGA: 2 mm to 20 mm
- **Pin count**: 1570
- **Temperature**: –55 °C to 200+ °C

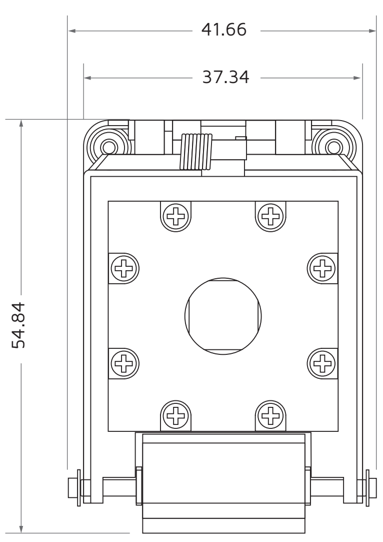
Electrical properties

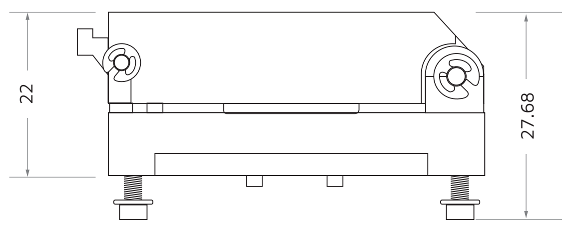
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

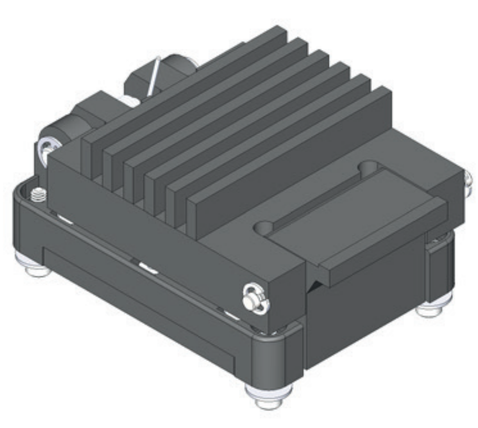
Materials

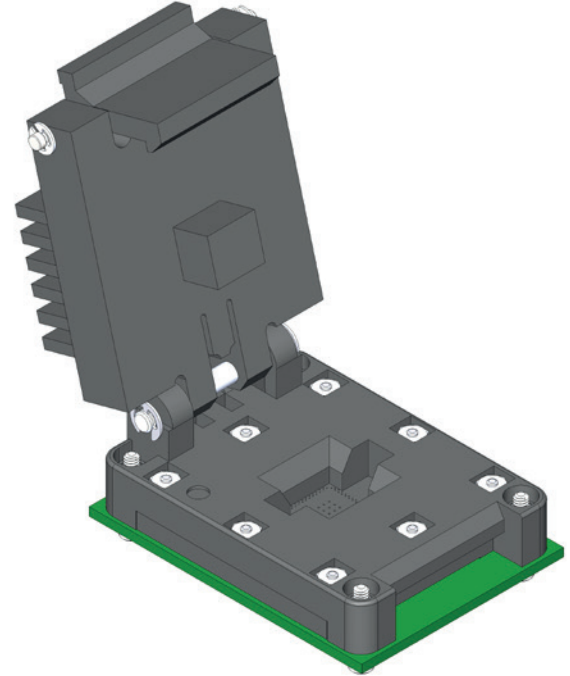
- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

D-Series socket dimensions





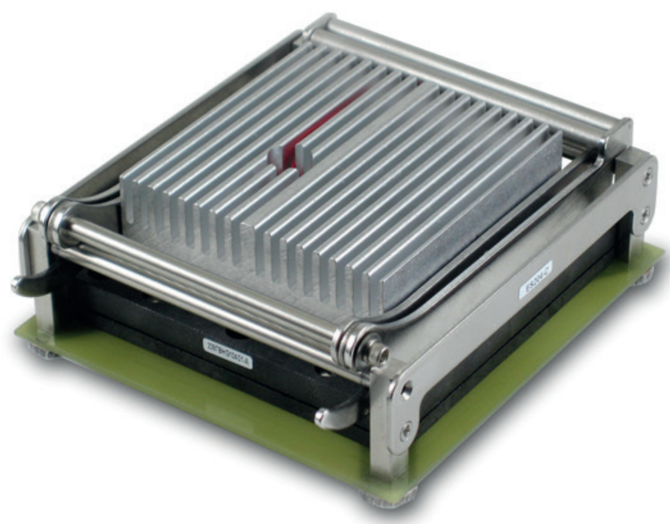




Dimensions are in mm.

ES-Series H-Pin Socket

Accelerated life testing solution



Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

ES family Series of sockets extended the scope of a burn-in socket. The modular lid construction can handle up to 1 kW of power and is optimized with thermal simulation to ensure out-of-the-box performance whether liquid or air cooled.

Leveraging a variety of advanced manufacturing techniques and industry-leading automation enables the lowest cost of test. Our patented H-Pin technology provides versatility in the socket application which can be used for ATE and SLT functional testing, in addition to covering the full gambit of burn-in test applications. The ES family Series of sockets is designed for use with all advanced burn-in systems. With adaptation comes unmatched value in delivering cutting-edge technology.

ES-Series product meets the demanding requirements of next-generation AI, datacenter, and network accelerator applications as these cutting-edge devices get larger and more powerful. The ES socket modularity allows for the platform to evolve with each new generation of device.

Benefits

- Configurable design, large tooling catalogue, moulding, machining, 3D printing, and assembly automation deliver best-in-class quality, price, and lead times.
- An extensive catalogue of standard components provides field-tested designs.
- Double-latching clamshell provides ease of use during operation for high pin count applications.
- Thermal and electrical simulation, Monte Carlo and FEA all ensure the delivery of out-of-the-box solution.

Feature Options

- Spring loaded plunger
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Maximum component clearance under the DUT
- High temperature materials for above 200 °C applications

ES Series socket specifications

Mechanical properties

- **Pitch**: 0.35 mm minimum
- **Package size**:
  LGA: 27 mm to 100 mm
  BGA: 27 mm to 100 mm
- **Pin count**: 7000+
- **Temperature**: –55 °C to 200+ °C

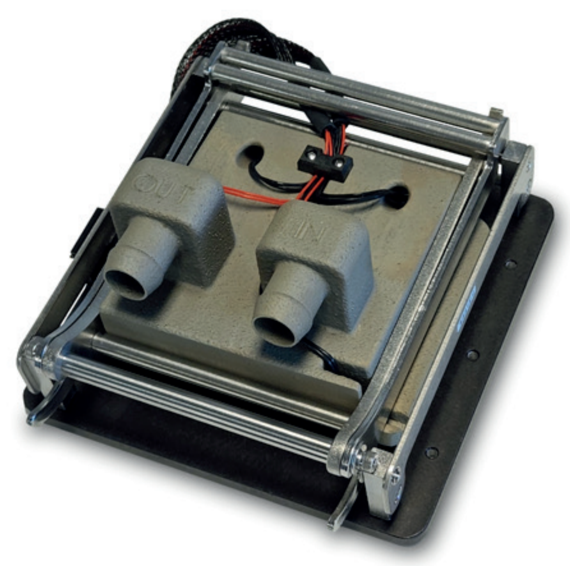
Electrical properties

- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

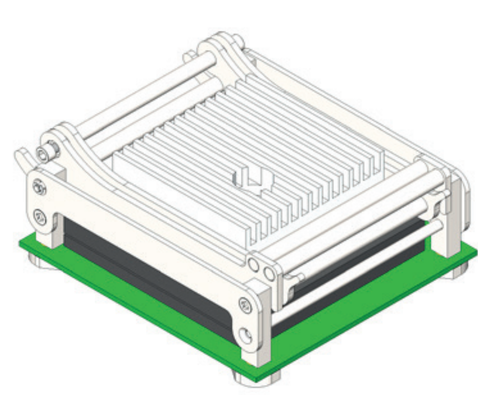
Materials

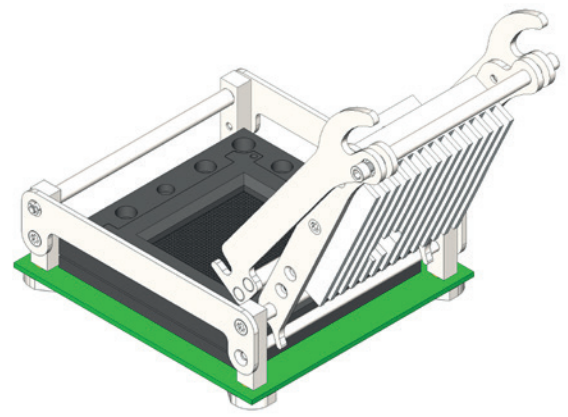
- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

ES Series socket dimensions



Liquid cooled heatsink option





Heat sink, heater and RTD, spring loaded pusher

Dimensions are in mm.

ES Micro Series H-Pin Socket

Accelerated life testing solution

Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

Benefits

- Configurable design, In-house tooling and moulds allow for the lowest cost of test.
- An extensive catalogue of standard parts reduces cost and lead time.
- Double-latching clamshell provides ease of use during operation and clearance for lid operation.
- Exceptional electrical performance provides wide RF bandwidth.

Feature Options

- LGA, BGA, and package on package
- Spring loaded plunger
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Max component clearance under the DUT
- High temperature materials for above 200 °C applications

ES Micro Series Socket is a technological advancement in the burn-in socket segment, with a dual latch clamshell lid to provide co-planar pressure on the DUT when the lid is actuated.

The inclusion of the patented H-Pin contact technology in the ES Micro-Series socket provides market-leading electrical performance in the smallest footprint for the highest possible parallelism on a burn-in board. This series is compatible with standard heaters and temperature sensors.

ES Micro Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size for BGA**: 4 mm to 22 mm
- **Pin count**: 1190
- **Temperature**: −55 °C to 200+ °C

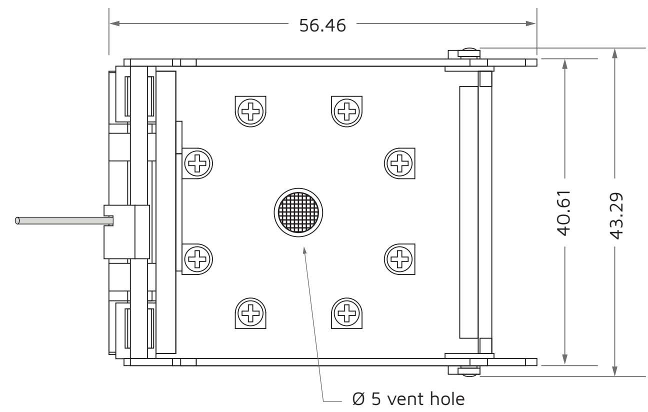
Electrical properties

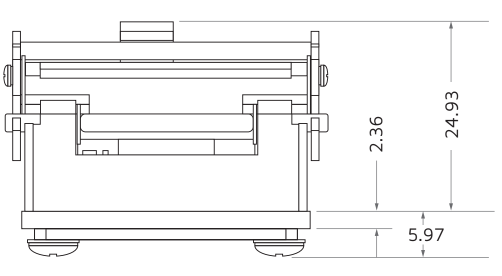
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 2.5 A

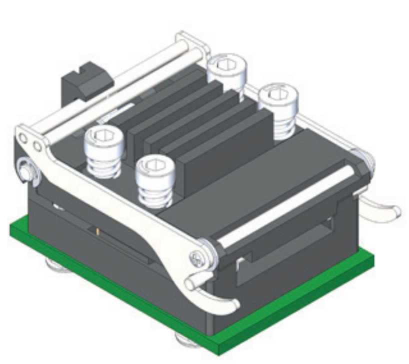
Materials

- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

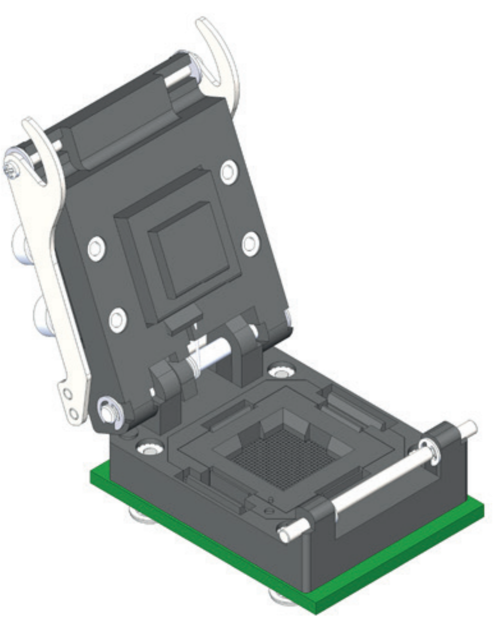
ES Micro Series socket dimensions







Heat sink, heater, and RTD



Spring-loaded plunger

Dimensions are in mm.

ESJ-Series H-Pin Socket

Accelerated life testing solution

Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

ESJ-Series socket is a high-performance burn-in socket, with dual latch clamshell lid to provide co-planar pressure on the DUT when the lid is actuated.

The patented H-Pin contact technology in the ESJ-Series socket provides versatility and the ability to use the same socket for multiple application needs and test functions.

Option for heatsink addresses the wide variety of product requirements targeted specifically for advanced mobile SoC, CPU, GPU, or other IoT application devices. When consistent reliability is required, ESJ Series is the product trusted in the industry. a

Benefits

- Configurable design, in-house tooling, moulding and machining provide short lead times.
- Extensive catalogue of components, drive reduction in cost of test.
- Modular lid design allows for easy configuration of different end-use requirements.
- Exceptional electrical performance provides wide RF bandwidth.

Feature Options

- Spring loaded plunger
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Max component clearance under the DUT
- High temperature materials for above 200 °C applications

ESJ Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 10 mm to 31 mm
  BGA: 10 mm to 31 mm
- **Pin count**: 3000
- **Temperature**: –55 °C to 200+ °C

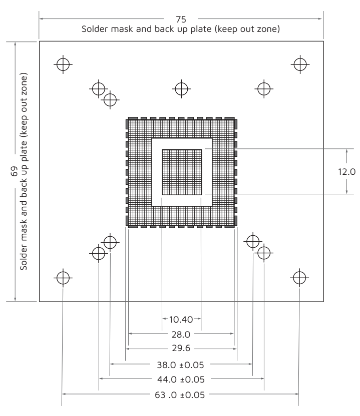
Electrical properties

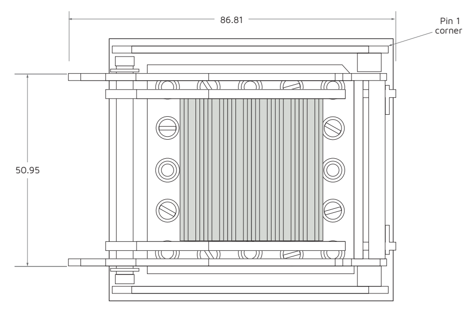
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

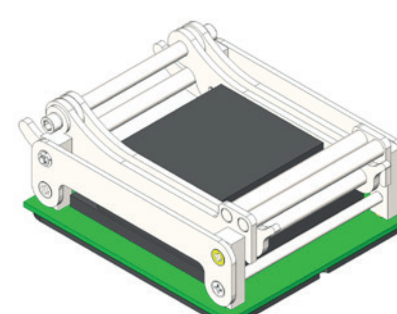
Materials

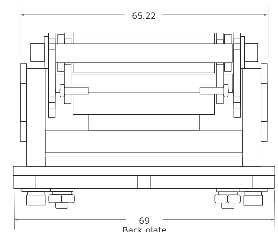
- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

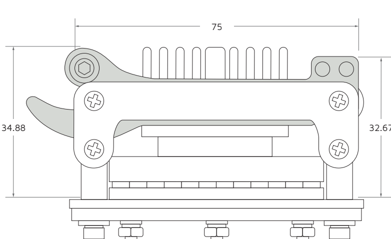
ESJ Series socket dimensions

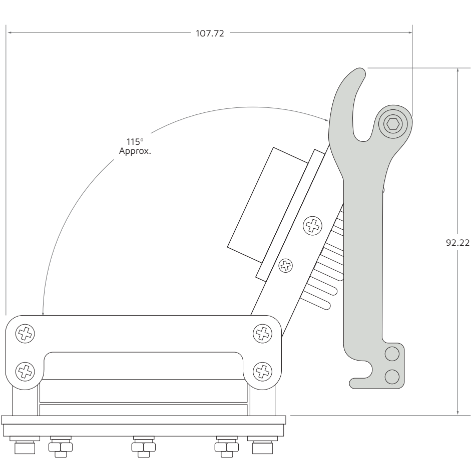


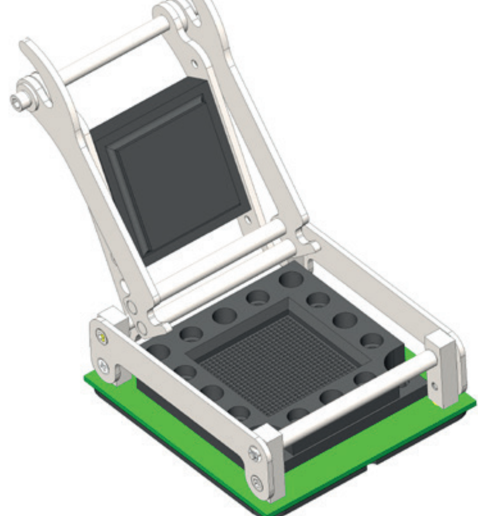








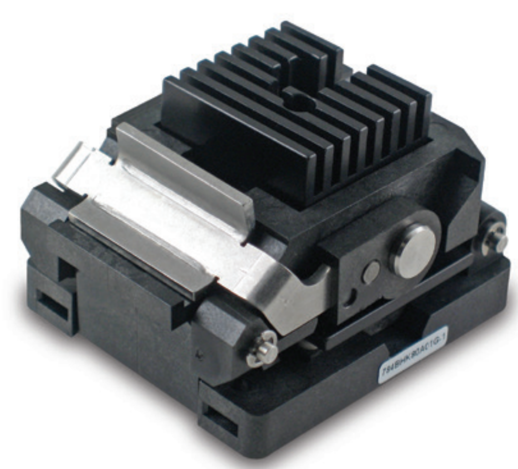




Dimensions are in mm.

K-Series H-Pin Socket

Accelerated life testing solution



Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

Benefits

- Industry-proven design, in-house tooling, moulding, and machining, with 100% automated assembly.
- Extensive catalogue of components, configurable options
- Zero-marking lid actuation contributes to higher yields.
- Market-leading electrical performance

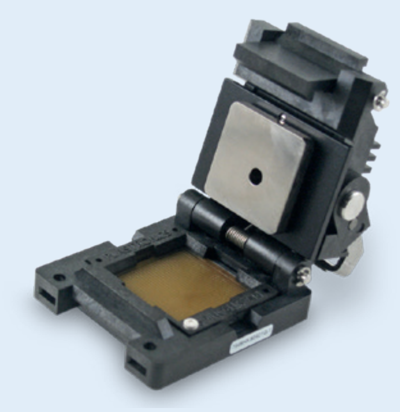
Feature options

- Vertical pressure platen
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Max component clearance under the DUT
- 2 or 3 plate systems
- High temperature materials for above 200 °C applications

The K-Series socket is designed to apply flat even pressure on the DUT with a secondary lever once the lid has been closed. This is to ensure that the platen does not skid across the top of the device when closing the lid potentially marking the device. This is especially important for exposed die products, or automotive applications where appearance is part of the pass/fail acceptance criteria post test.

The vertical lever actuation does not increase the overall socket footprint, allowing for the highest density of populated sites on the burn-in board and in some cases reduces the overall footprint compared to other clamshell lid sockets. Another added benefit of the K-Series lid is airflow through the socket due to the taller profile, allowing for larger air channels to help maintain accurate temperatures.

This socket also uses the H-Pin contact technology providing wide RF performance capabilities and exceptional DC characteristics. The K-Series socket checks all the boxes: high frequency, high current, high temperature, low inductance, and Low loss. These features contribute to lower the cost of tests.



K-Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 10 mm to 23 mm
  BGA: 12 mm to 23 mm
- **Pin count**: 1500
- **Temperature**: –55 °C to 200+ °C

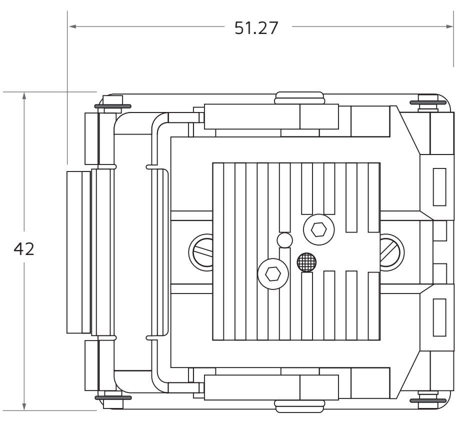
Electrical properties

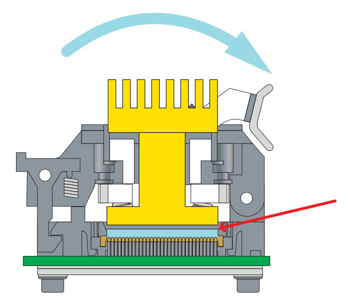
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 3 A

Materials

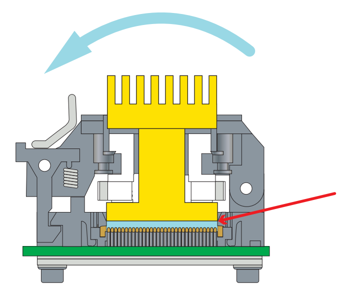
- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

K-Series socket dimensions

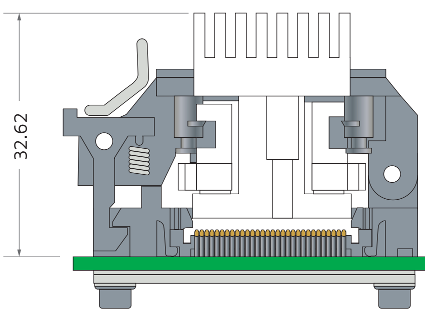


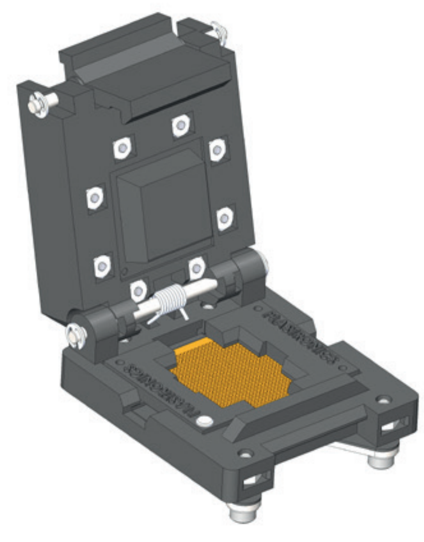


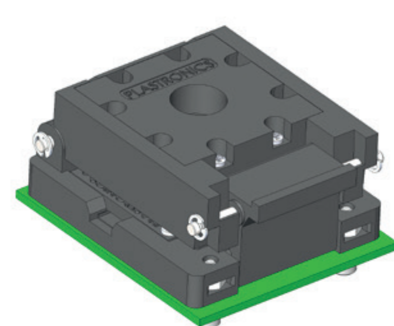
Handle opened and not engaged. Plunger is in the up condition, not touching the package.



Handle closed and engaged. Plunger is down, touching the package and the actuation handle locks the latch while the package is under load.



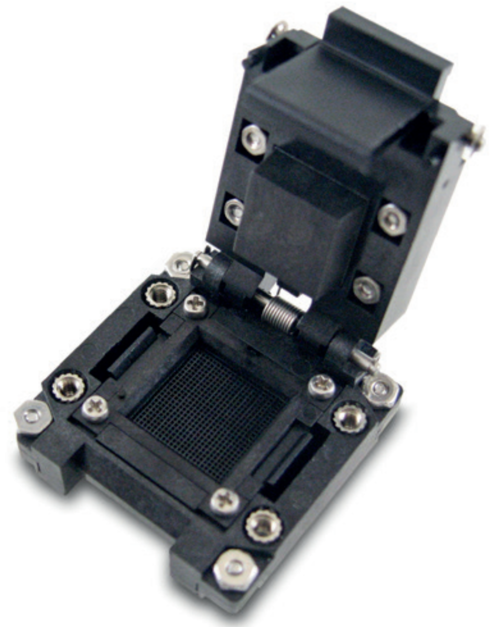




Dimensions are in mm.

M-Series H-Pin Socket

Accelerated life testing solution



Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

M-Series socket has long been the gold standard for reliability and out-of-the-box performance burn-in sockets.
The high-quality components have been refined and enhanced over their lifetime for optimum performance and the highest quality.

M-Series being one of the most mature products in the portfolio does not mean it lacks technology. In fact, quite the opposite, the M-Series offers all the same configurable features and high-performance H-Pin™ contact technology to exceed performance expectations of the most demanding applications. The M-Series has been trusted to deliver uncompromised performance generation after generation.

The small outline footprint provides design flexibility and allows for high socket density on the burn-in board.

Benefits

- Industry-proven design, in-house tooling, moulding, and machining, with 100% automated assembly.
- Extensive catalogue of components and configurable options
- Proven track record of reducing the cost of test leveraging modular components, automated assembly, and short lead times.
- Exceptional electrical performance provides wide RF bandwidth.

Feature Options

- Spring loaded plunger
- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Max component clearance under the DUT
- 2 or 3 plate systems
- High temperature materials for above 200 °C applications

M-Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 0.6 mm to 16 mm
  BGA: 0.6 mm to 16 mm
- **Pin count**: 1200+
- **Temperature**: –55 °C to 200+ °C

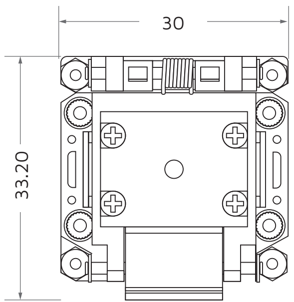
Electrical properties

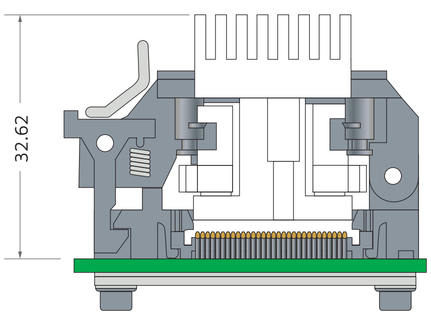
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

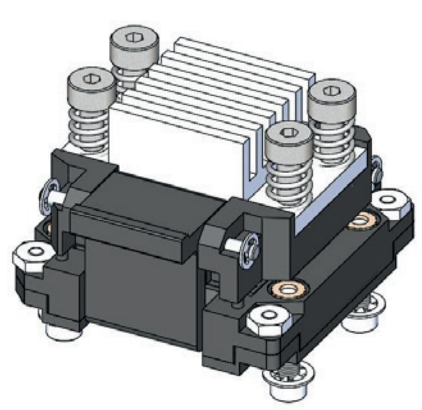
Materials

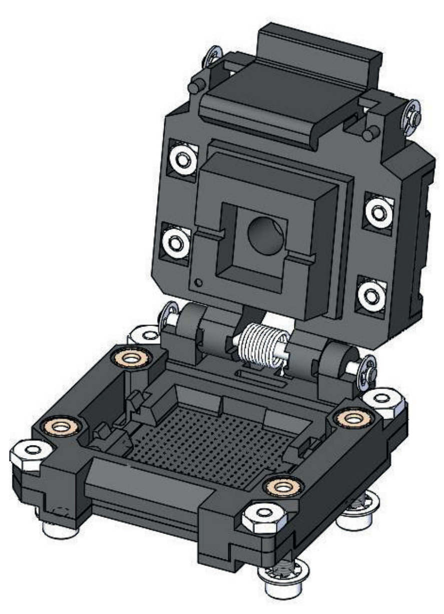
- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

M-Series socket dimensions






Heat sink, heater, and RTD


Spring-loaded plunger

Dimensions are in mm.

Q-Series H-Pin Socket

Accelerated life testing solution

Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

The Q-Series socket is available for mid to large package sizes. The Q-Series is a fully moulded socket body and lid designed to meet the rigours of a wide variety of accelerated life testing applications.

The lid can be configured with or without a heatsink for precise thermal response and with the aid of design simulation air channels are optimized to maintain accurate temperature throughout testing.

This socket also uses the H-Pin™ contact technology providing wide RF performance capabilities and exceptional DC characteristics. The Q-Series socket checks all the boxes: high frequency, high current, high temperature, low inductance, and low loss. These features contribute to lower the cost of tests.

Benefits

- Industry-proven design, in-house tooling, moulding, and machining, with 100% automated assembly.
- Extensive catalogue of components, configurable options
- H-Pin offers unmatched DC performance.

Feature options

- Heat sink
- HAST venting features
- Integrated thermal control with heater and sensor
- Reverse seating plane
- Max component clearance under the DUT
- 2 or 3 plate systems
- High temperature materials for above 200 °C applications

Q-Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 12 mm to 32 mm
  BGA: 12 mm to 32 mm
- **Pin count**: 2000+
- **Temperature**: –55 °C to 200+ °C

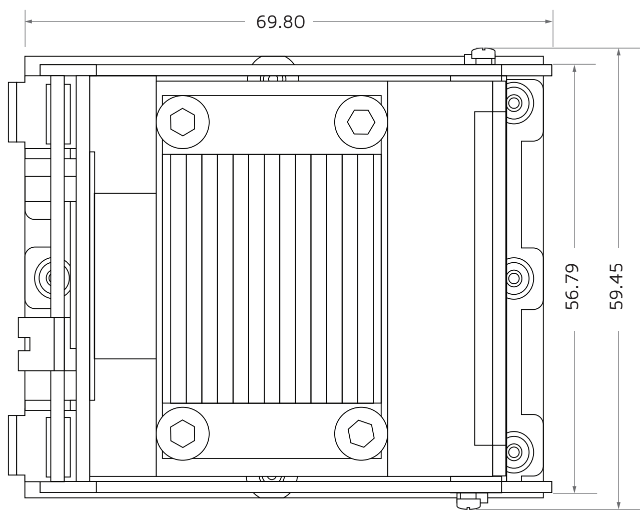
Electrical properties

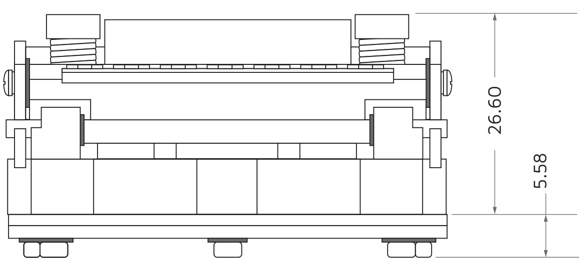
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

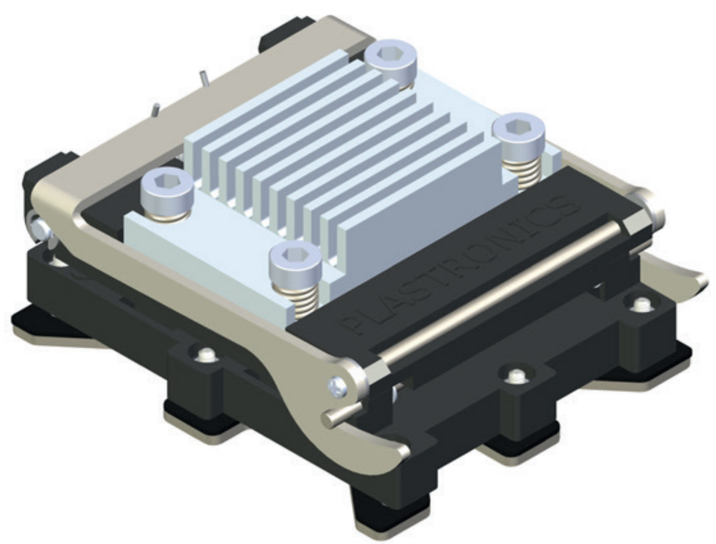
Materials

- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

Q-Series socket dimensions





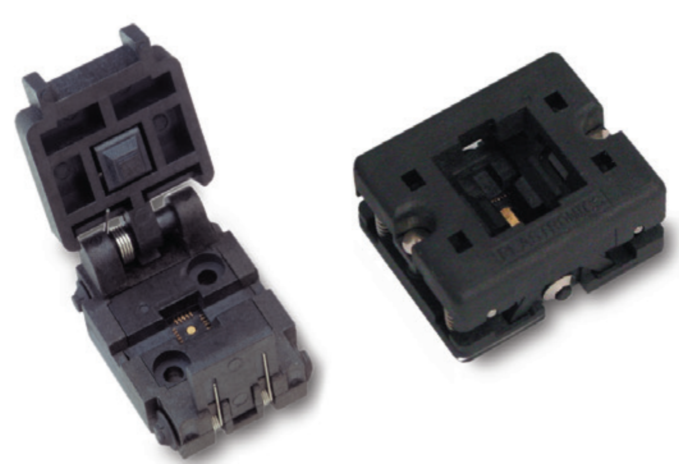


Heat sink, heater and RTD, spring-loaded pusher

Dimensions are in mm.

QN-Series

Accelerated life testing solution



Smiths Interconnect has taken a leadership role in designing and developing socket solutions for the newest QFN packages such as MLF, BCC, and LPCC. These sockets offer a modular design in a small outline with very low inductance.

The new Open Top QFN socket allows for more convenient package loading and unloading in most of the same lead count options as the lidded version.

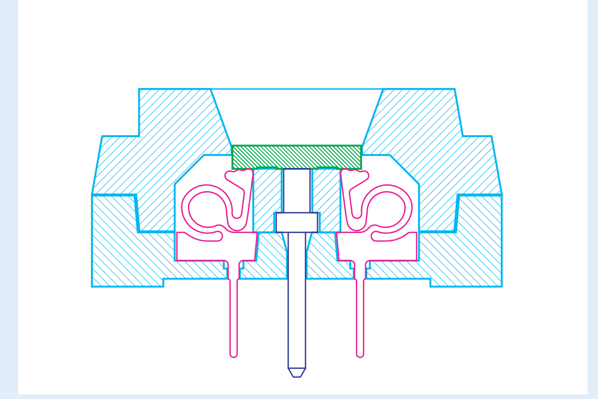
Burn-in sockets for high-reliability testing of next-generation IC packages

Benefits

- Industry proven design, in-house tooling, moulding and machining, with 100% automated assembly.
- Extensive catalogue of components and configurable options

Feature Options

- Available in 0.40 mm, 0.50 mm, 0.65 mm, 0.80 mm, and 1.00 mm pitches
- Custom pitches down to 0.40 mm
- Lidded and Open Top Sockets for ≤10 mm packages
- Lidded Sockets for 10 mm to 16 mm packages
- Centre ground pin standard for all sockets
- Optional copper heat slug available for high wattage devices
- Sockets for over 80 different JEDEC standard footprints



QN-Series socket specifications

Mechanical Properties:

- **Mounting**: Thru hole
- **Socket operation**: Clamshell lid; ZIF open
- **Operating temperature**: -55 °C to 150 °C
- **Contact Force**: 32 g
- **Life Cycles**: 5,000 mechanical cycles

Electrical Properties

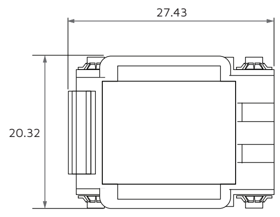
- **Contact resistance**: <50 mΩ
- **Inductance**: 3 nH
- **Current rating**: 0.5A with 30 °C rise, 1.0 A with 75 °C rise
- **Volume resistivity**: 1×10^{15} Ω-cm
- **Insulation resistance**: 220.5 kV/cm

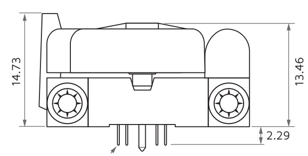
Materials

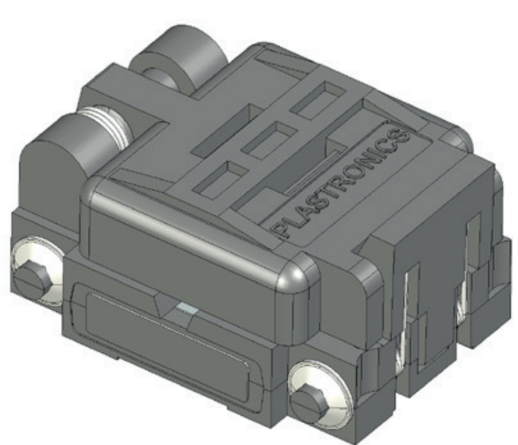
- **Plastic body**: PPS
- **Contact base metal**: BeCu
- **Contact plating**: Au over Ni; NiB optional
- **Centre pin base metal**: Brass; Cu optional
- **Centre pin plating**: Au
- **Springs, torsion/coil**: Passivated S.S.

QN-Series socket dimensions

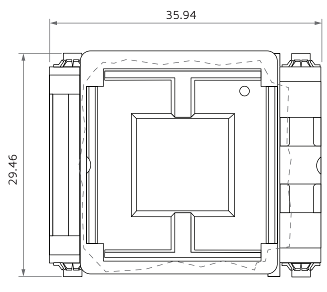
Lidded Body Size ≤10 mm

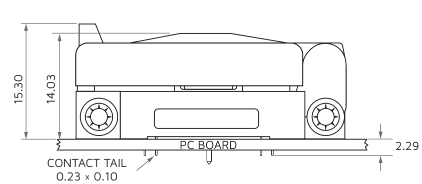




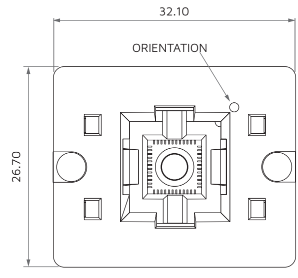


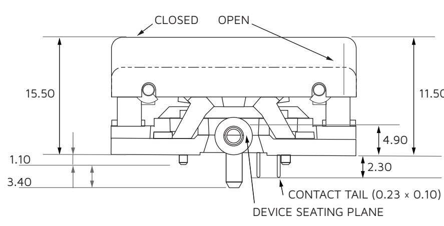
Lidded Body Size 10 mm to 16 mm





Open Top Body Size ≤10 mm



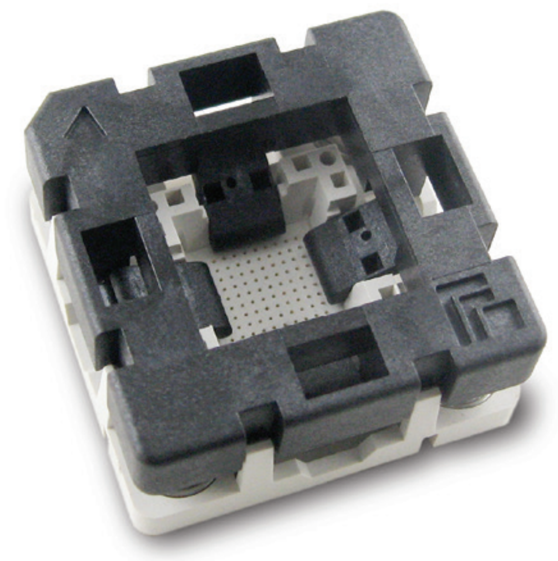


Dimensions are in mm.

smiths interconnect

R-Series H-Pin Socket

Accelerated life testing solution



Burn-in sockets using H-Pin technology for high-reliability testing of next-generation IC packages

Benefits

- Industry-proven design, In-house tooling, moulding and machining with 100% automated assembly.
- Extensive catalogue of components, configurable options
- H-Pin offers unmatched DC performance.

Feature Options

- Auto IC loading / un-loading compatible
- High temperature materials for above 200 °C applications
- Drop-in replacement for legacy products

Series Type

RE

5 mm to 9 mm package size range for QFN, LGA, and BGA

R

10 mm to 14 mm package size range for QFN and LGA

- 10 mm to 13 mm package size range for BGA
- Drop in replacement for legacy designs

RL

16 mm to 19 mm package size range for QFN, LGA, and BGA

The R-Series product line is an open-top reliability socket used for accelerated life testing. With versions of the compression mount open-top design available as a drop-in replacement for other legacy products on the market, there is no need to purchase new burn-in boards.

The open-top design allows for autoloading, and un-loading of the integrated circuit. The small socket footprint outline allows you to utilize the full resources available in the burn-In system for each burn-in board.

Each socket uses the H-Pin™ contact technology providing wide RF performance capabilities and exceptional DC characteristics. The Q-Series socket checks all the boxes: high frequency, high current, high temperature, low inductance, and low loss. These features contribute to lower the cost of tests.

R-Series socket specifications

Mechanical properties

- **Pitch**: ≥0.35 mm
- **Package size**:
  LGA: 2 mm to 19 mm
  BGA: 2 mm to 19 mm
- **Pin count**: 200+
- **Temperature**: −55 °C to 200+ °C

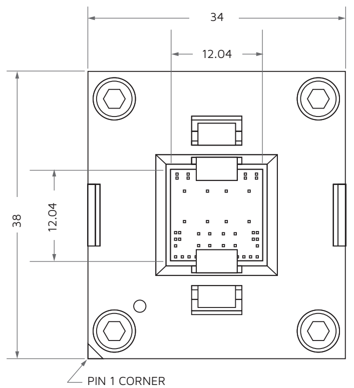
Electrical properties

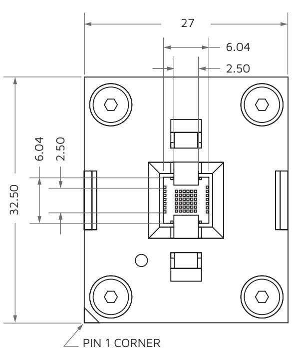
- **Contact resistance**: 35 mΩ
- **Current carrying capacity**: up to 4 A

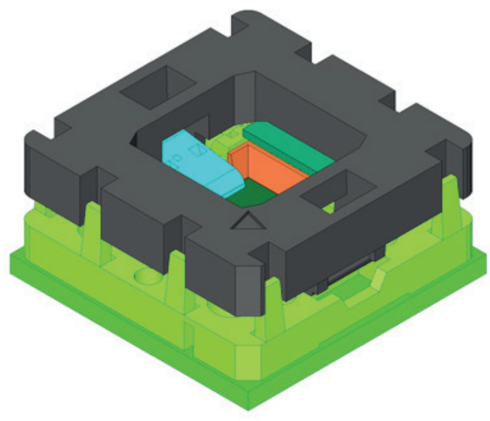
Materials

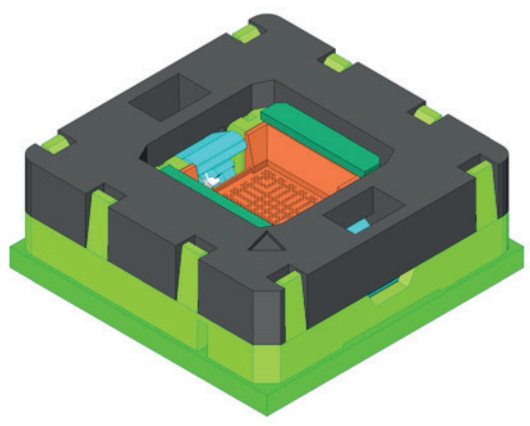
- **Contact**: BeCu/Au plated
- **Spring**: SS/Au plated
- **Socket**: Engineering plastics

R-Series socket dimensions









Dimensions are in mm.

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