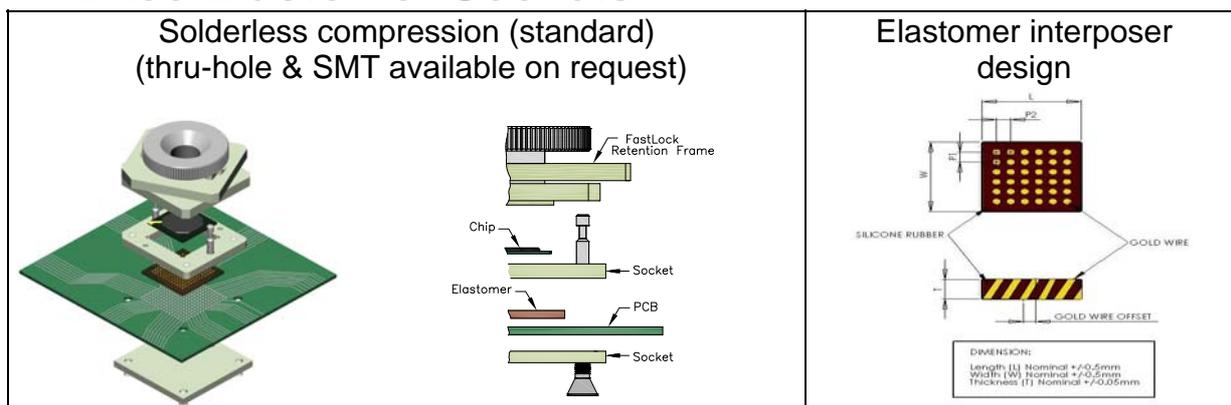


## E-tec Socketing solutions for BGA, LGA, CGA, CSP, MLF & Gullwing chips

### Available contact styles:

- ◆ Elastomer interposers (10 Ghz & more)
- ◆ Probe pin sockets (generally below 5 Ghz)
- ◆ Other interposer styles on request

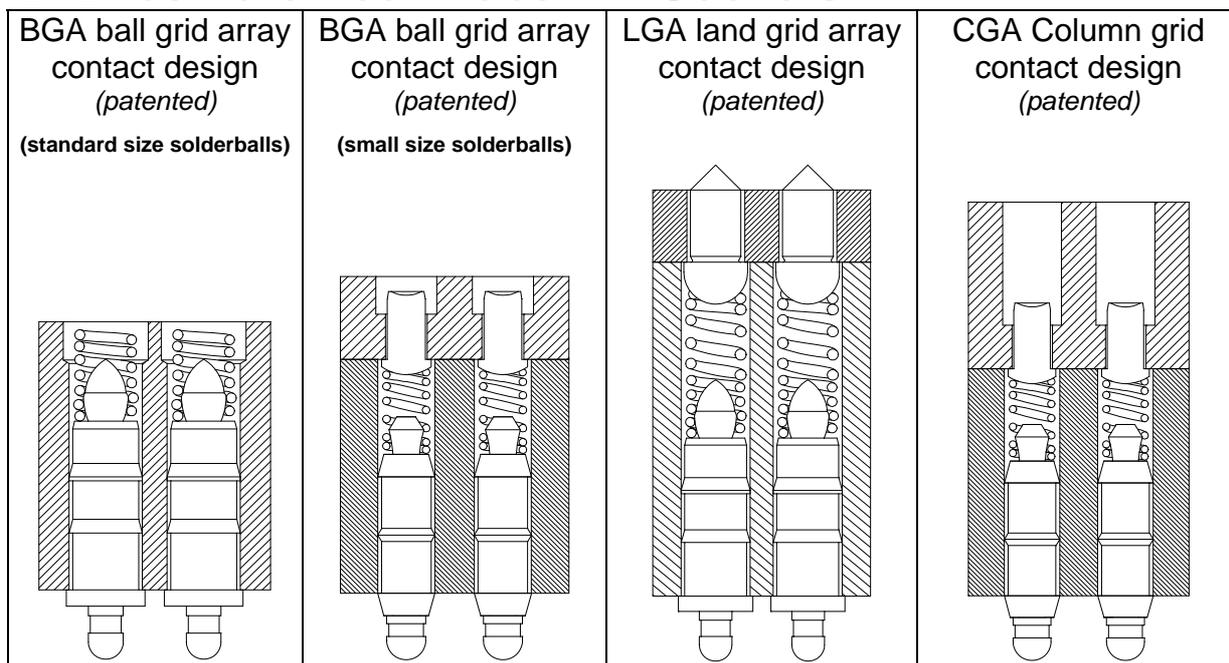
### 1. E-tec Elastomer Sockets



### Elastomer Socket Features:

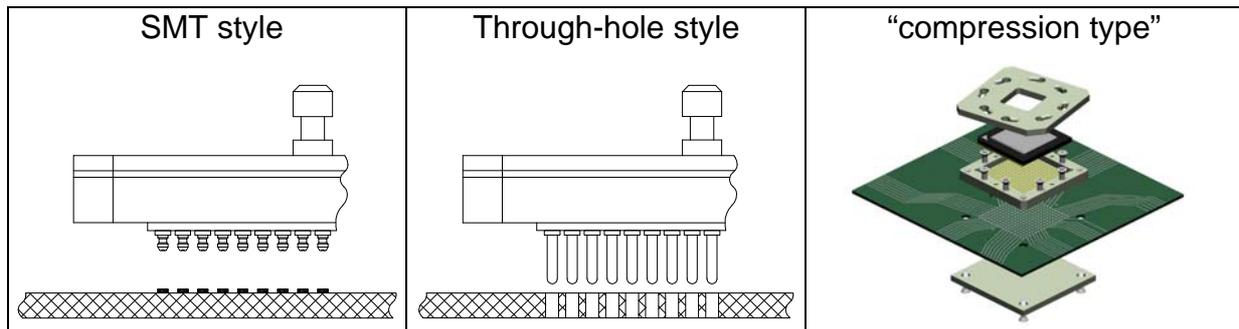
- ◆ elastomer = gold plated round 0.03mm metal wires embedded densely into soft silicon
- ◆ elastomer thickness 0.50mm & 1.00mm (standard) – others on request
- ◆ very low inductance (below 1nH) & frequency in excess of 10 GHz
- ◆ recommended working travel 0.12mm
- ◆ normal contact force: 40 to 50 grams
- ◆ any pincount & any chip size up to 39x39mm,
- ◆ sockets adapt to all chip styles & any pitch down to 0.30mm
- ◆ many different locking systems (FastLock, TwistLock, ClamShell, etc)

### 2. E-tec Patented Probe Pin Sockets

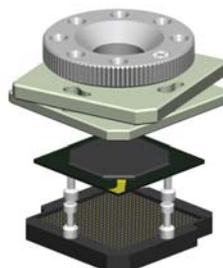
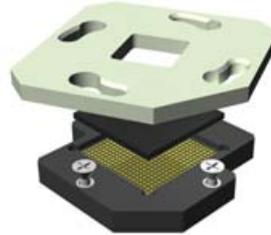
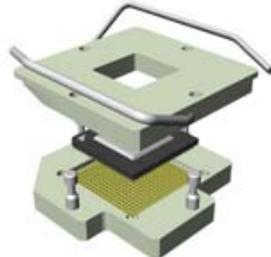
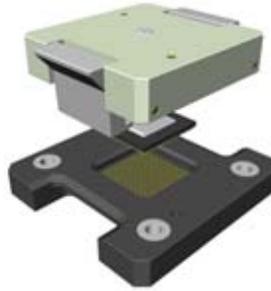
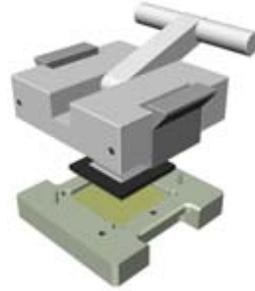
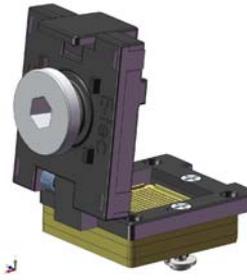


### Probe Pin Socket Features:

- ◆ only 40 grams per contact after closing the socket
- ◆ sockets adapt to all package styles (at present down to 0.40mm pitch):
- ◆ same PCB layout as the chip (no holes required for SMD socket)
- ◆ raised SMD for lifting socket over components
- ◆ thermal expansion, shock & vibration absorbed by E-tec contact design
- ◆ low profile socket (TwistLock is less than 10mm including chip)
- ◆ heat dissipation with open frame or heatsinks
- ◆ low inductance of less than 2 nH
- ◆ Frequency range up to 3 Ghz (others on request)
- ◆ LGA contact design can also be used for board-to-board connections
- ◆ available in SMT, raised SMT, thru-hole and “compression type” probe pin sockets



### 3. Available retention designs from E-tec:

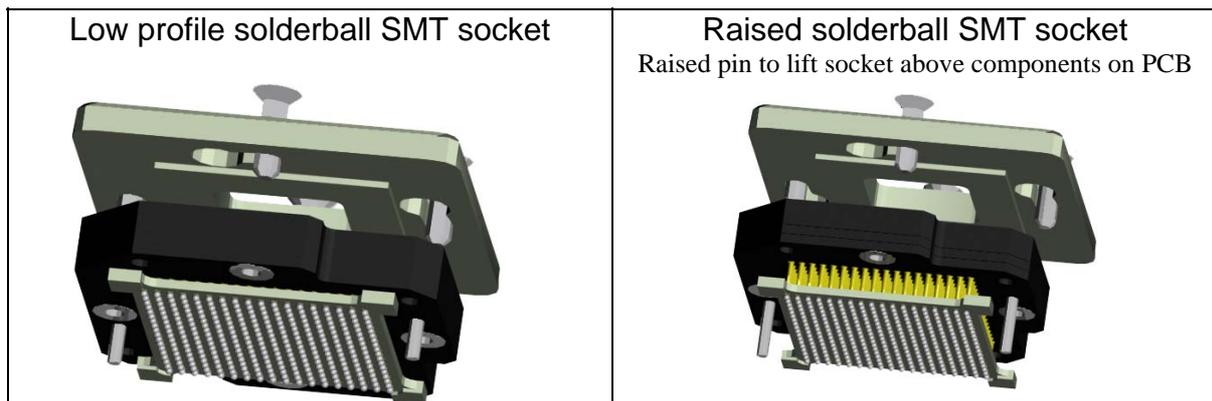
|   |   |   |
|---|---|---|
| <p>“FastLock”<br/>for multiple insertions and extractions of chips, for example in test and burn-in</p>  | <p>“TwistLock”<br/>for prototypes and pre-production</p>         | <p>“LeverLock”<br/>for pre-production and volume productions</p>               |
| <p>“QuickLock”<br/>for test purposes (socket up to 80 pins)</p>    | <p>“QuickLock”<br/>for test purposes (socket as of 81 pins)</p>  | <p>“ClamShell”<br/>“economy” &amp; “professional” style for test purposes</p>  |
| <p>Other retention styles: Please contact E-tec for other retention styles</p>  |   |   |

## 4. E-tec Solderball Solution

For customers who prefer to solder regular solderballs instead of tin plated brass pins to the PCB, E-tec offers two solutions:

### A. Solderball sockets

True sockets with solderballs attached to the pin terminals, allows easy reflow of solderballs to the PCB.



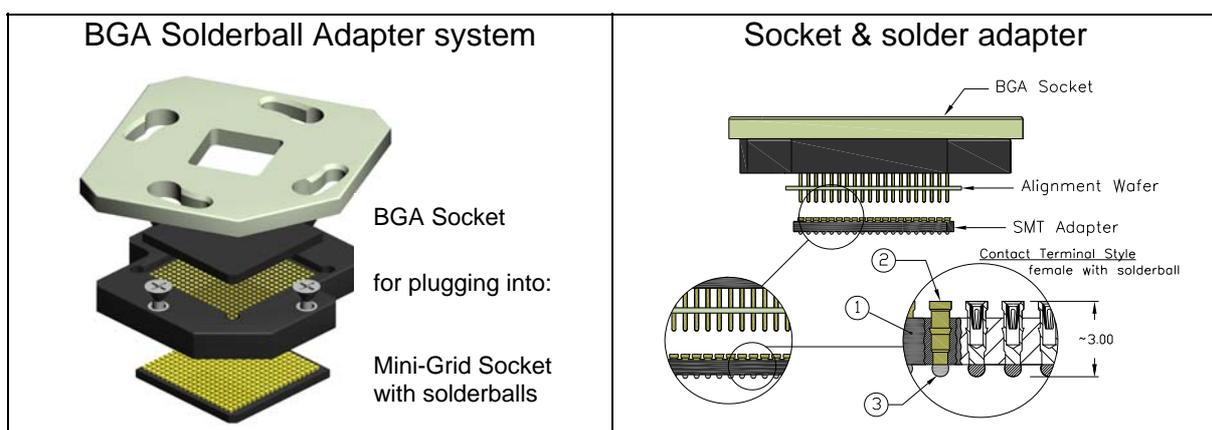
### B. Solderball adapter solution

A mini-grid socket with solderballs attached (available as of 0.80mm pitch upwards) is reflowed to the PCB first and thereafter a thru-hole socket can be plugged into the solderball adapter.

Advantages: easy soldering of adapter to PCB (standard process, same as chip)  
the adapter has a smaller outline than the BGA socket

Disadvantages: smallest pitch: 0.80mm  
higher cost than direct soldering of socket

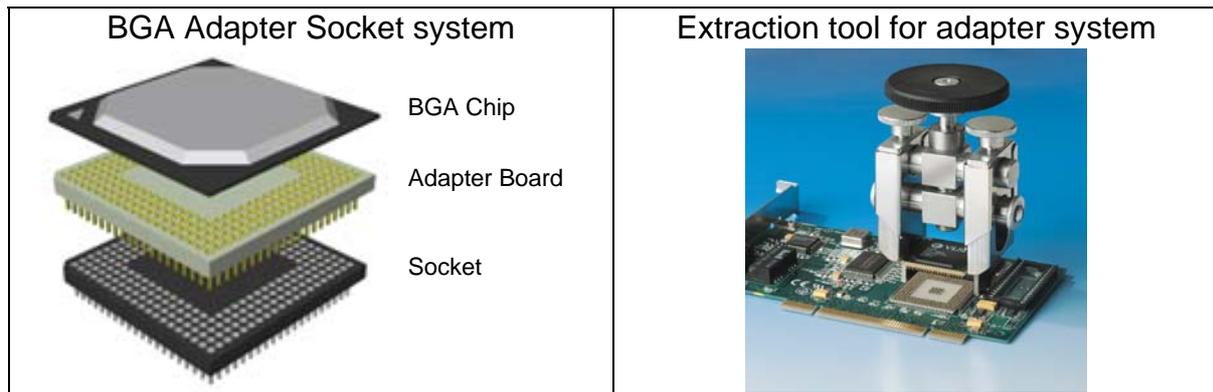
Options: the mini-grid sockets are also available with solid tin plated brass pins for soldering to the PCB (without solderballs) = lower cost solution and offers possibility to desolder & resolder the adapters.



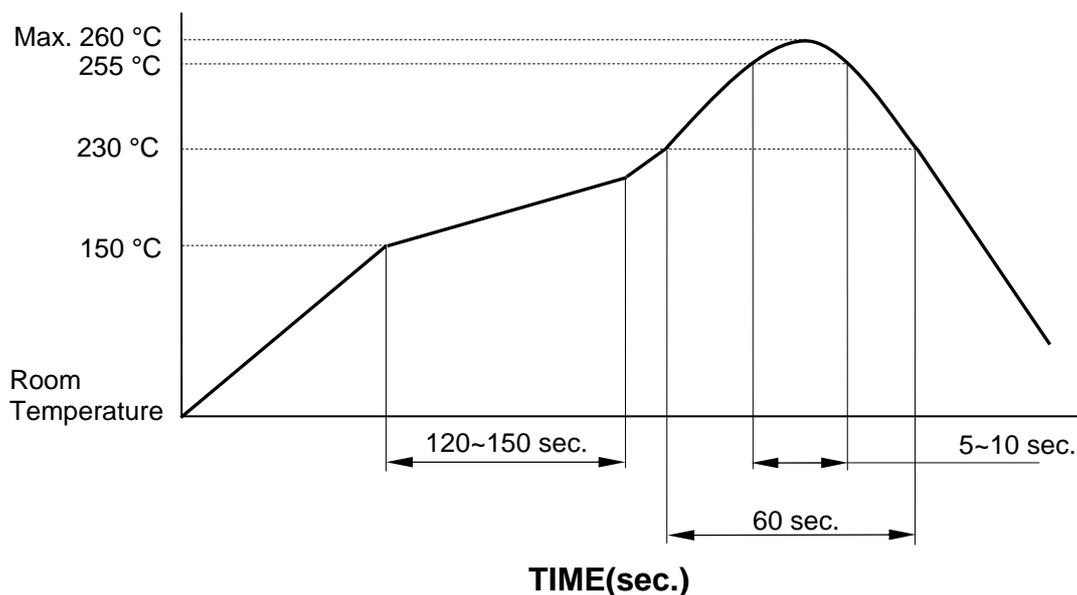
## 5. E-tec Adapter system (alternative to true socket system):

Advantages: smaller outer dimensions than true socket

Disadvantages: Chip needs to be soldered to adapter board  
Can only be used with BGA chips  
Smallest pitch is 1.00mm  
Relatively high insertion & extraction forces (difficult without tool)



## RECOMMENDED LEAD-FREE REFLOW PROFILES



### Notes

- 1) Temperature indicated refers to the PCB surface temperature at solder tail area.
- 2) Actual reflow profile also depends on equipment, solder paste, PCB thickness, and Other components on the board. Please consult your solder paste & reflow equipment manufacturer for their recommendations to adopt a suitable process.

## Chip package styles used with E-tec sockets:

### BGA “Ball Grid Array”

Comprises plastic packages with “cavity up” (= processor is located on top of the substrate) and “cavity down” (= processor is located below the substrate), as well as ceramic packages. The plastic packages with 1.27mm ball pitch have solderballs of 0.60mm (.024 inch) height with a diameter of 0.76mm (.030 inch), while the ceramic packages have solderballs of 0.90mm (.035 inch) height with a diameter of 0.86 (.034 inch). The most common pitch is 1.27mm (.050 inch), but other pitches such as 1.00mm (.039 inch), 1.50mm (.059 inch) or 2.00mm (.079 inch) or interstitial pitches are also available.

### CSP “Chip Scale Packaging”

The outer dimensions of these packages, which are also supplied in “ball grid array technology”, are designed so as not to exceed the size of the processor by more than 20%. The pitch starts with 0.80mm (.032 inch) and reduces to 0.50mm (.020 inch). The solderball diameter in this pitch size is as little as 0.30mm (.012 inch).

### LGA “Land Grid Array”

These chips are supplied with a gold pad (= land) instead of the solderballs. The advantage of this package is that it is cheaper to manufacture (no solder balls required). The disadvantage is that it is more difficult to assemble onto a PCB (connector required).

### CGA “Column Grid Array”

Soldercolumns of more than 2.00mm (.079 inch) height replace the standard 0.90mm (.035 inch) solderballs. These soldercolumns overcome the problem of “thermal expansion” of the chip and the inherent mechanical stress this exercises on the solderjoints of standard solderballs. These relatively soft columns have the ability of absorbing the “micro movements” of the chip thus eliminating the problem.

### QFN/MLF “micro leadframe”

These chips are a near CSP plastic encapsulated packages which present lands instead of solderballs around the four sides of the package.