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Elastomer Interposer Structure for BGA Device Testing

Tony Smith and Frank Bumb – Phoenix Test Arrays

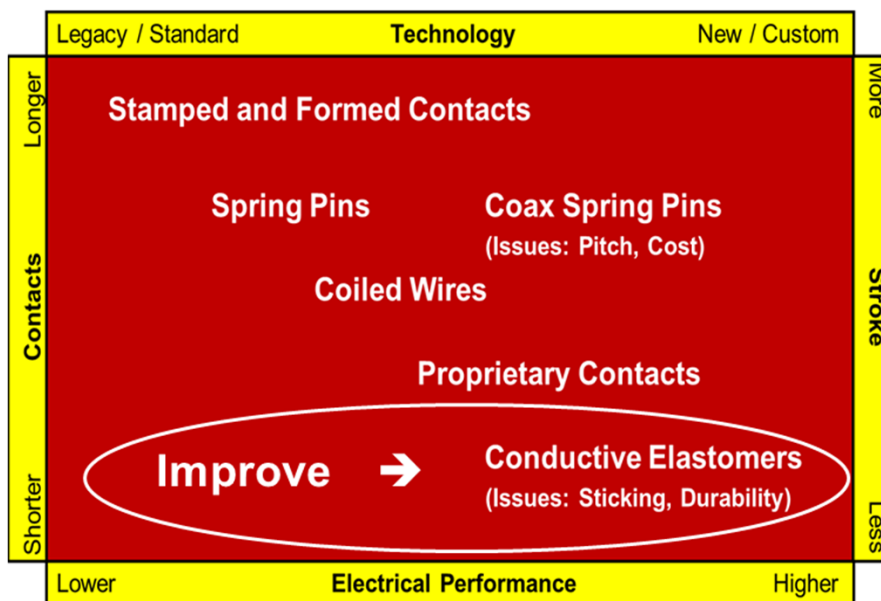
Market Trends Driving High Performance BGA Sockets

Market growth for reliable high performance BGA sockets in ATE production testing is being driven by three key factors:

- Electrical performance for emerging high frequency, high speed and high-power IC applications (e.g. serdes, 5G and other RF/mmwave)
- BGA devices for increasing IC functionality and density requirements
- Volumes from accelerating demand for high performance BGA's

High Performance BGA Socket Options and Challenges

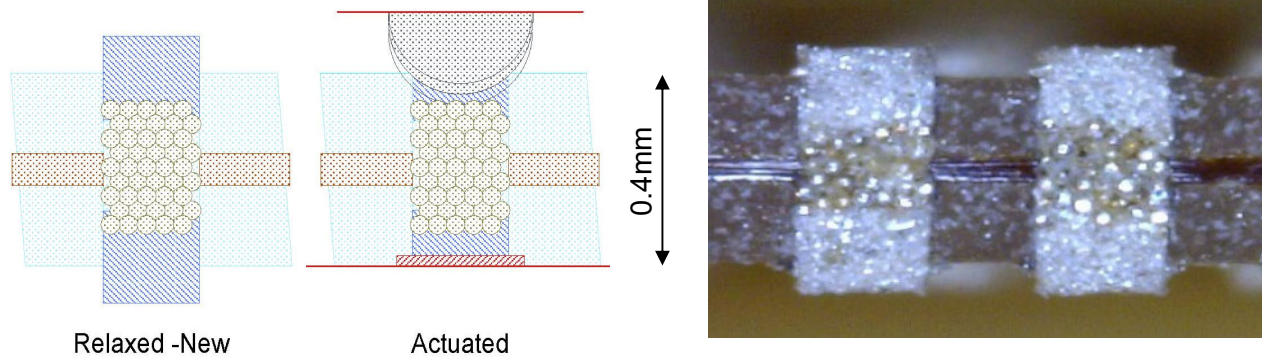
- Coax spring pin solutions – Coax structure for controlled impedance and electrical isolation. Good stroke but challenges with pitch and cost.
- Low profile proprietary contact solutions (e.g. elastomer interposers) – Short contacts for excellent signal integrity. Some are low cost but can have challenges with stroke, sticking/deformation and durability for cycling.



Need improved high performance BGA socket with

- Excellent RF and DC performance
- Durability for cycling
- No sticking/deform. over temp range
- Low cost with easy contact replacements

Silmat® Elastomer Interposer Structure for BGA Testing

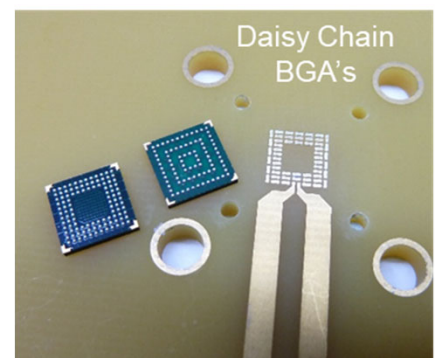
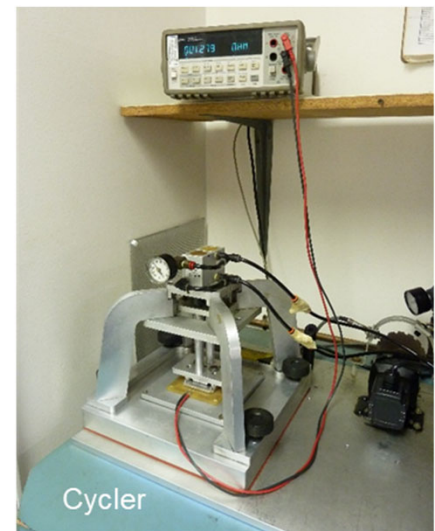
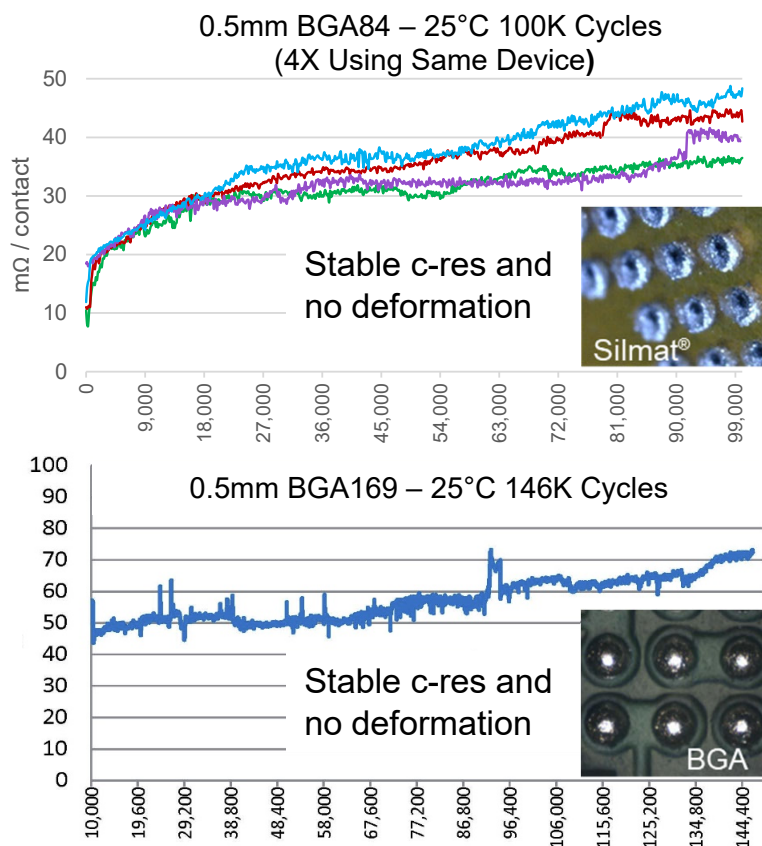


- Short vertical height and large diameter conductive columns for excellent signal integrity (40-80GHz) and high current capacity (8A/lead)*

*Based on measured data in GWN electrical characterization reports for a Silmat® interposer

- Patented core layer for electrical and mechanical stability (i.e. stable c-res over time/temp/cycles with limited x-y shift and z-compression set)
- Reliable and durable with no premature degradation in ATE cycling
- Conductive caps for no ball deformation or sticking across temp range
- Single component for low cost socket assembly and quick replacements

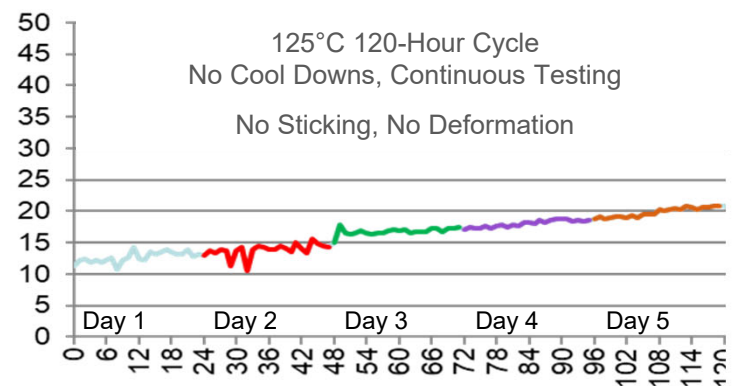
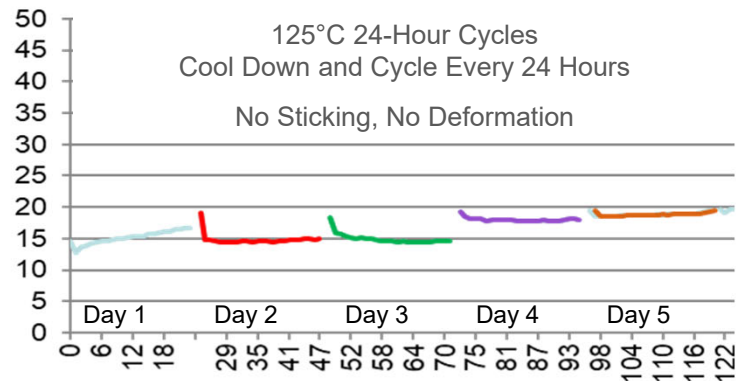
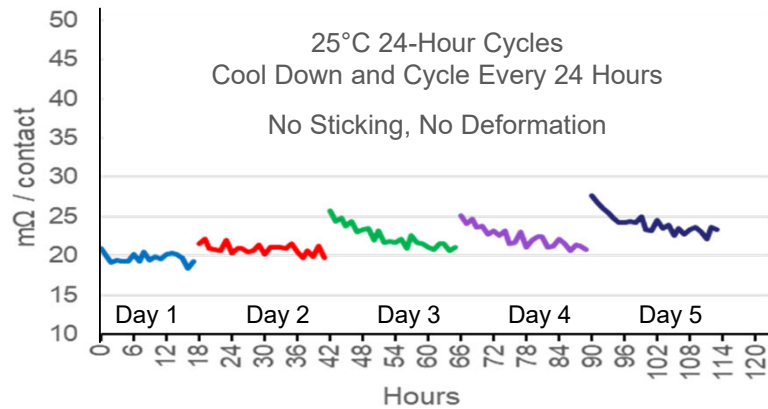
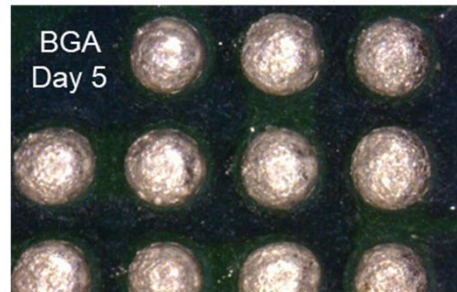
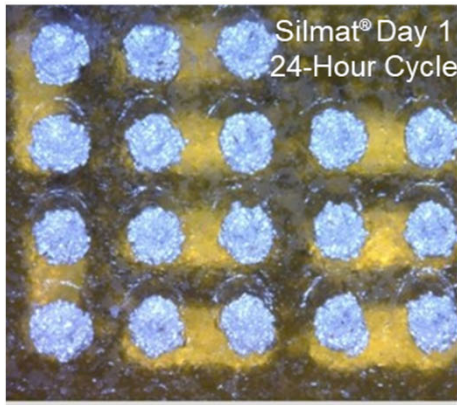
Cycling Results



Long-Term Compression Results

0.5mm BGA108

30-40 grams
per contact



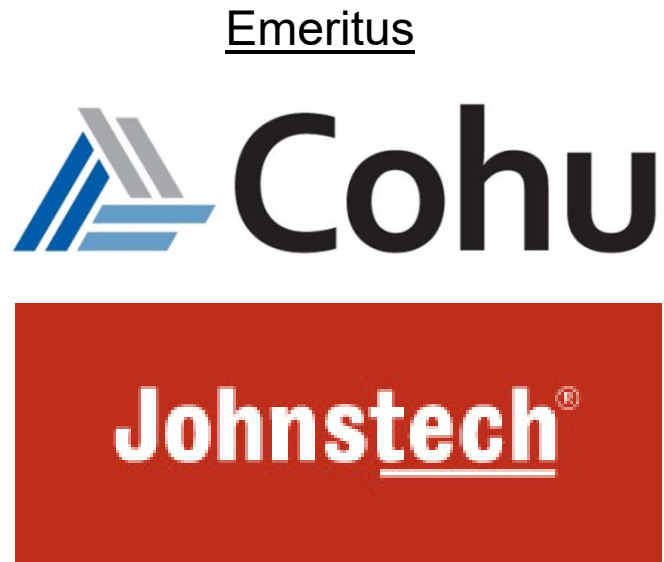
- Stable c-res and no sticking in thermal cycles
- BGA witness marks show no deformation

Summary

- Silmat® elastomer interposer structure optimized for high performance BGA device testing over time, temp and cycles
- Test results indicate stable contact resistance for 100K+ cycles and 120-hours compression over entire temp range with no sticking
- Photos show no deformation of the BGA device or elastomer interposer
- Excellent low cost BGA socket solution for hand test and ATE production

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