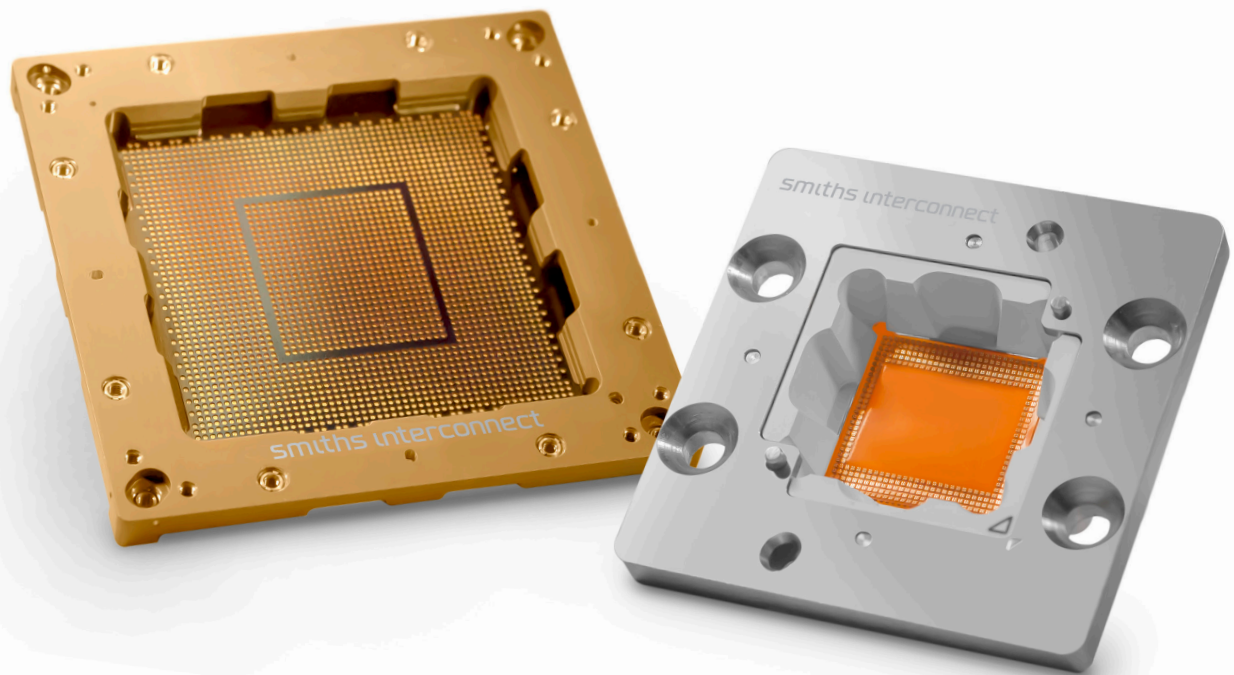


# Silmat<sup>®</sup> Test Socket

Elastomeric Solutions for Digital High Speed & PoP Top Test



# Silmat® Test Socket

Uniting the unparalleled attributes of Silmat® Elastomeric Contacts with the best-in-class engineering and test development practices of Smiths Interconnect.

## The Next Generation of Test Solutions

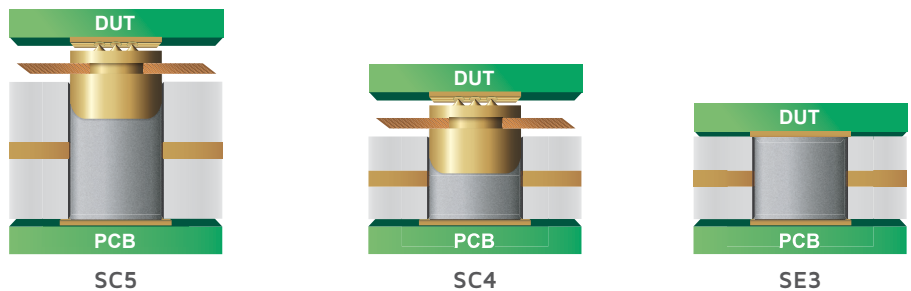
Smiths Interconnect, a leading supplier of high reliability test solutions, is introducing the Silmat® elastomeric contact to our technology portfolio. The patented, low profile contact is engineered specifically to provide electrical and mechanical advantages in the Digital High Speed and PoP Top segments of the Semiconductor Test industry.

Smiths Interconnect's best-in-class engineering, test development expertise and commitment to excellence allows us to continuously invest in innovative technologies and solutions for the testing requirements of next generation devices.

## Features & Benefits

- **Patented, low profile contact**
  - Solderless memory replacement
  - Short signal path
  - Conformal to recessed LGAs
- **High speed signal integrity**
  - Electrically transparent contact
  - High frequency bandwidth > 40 GHz
  - Low inductance
- **Durability**
  - Long cycle life > 500,000 cycles
  - No PCB or solder ball damage
  - Minimal labor and tester downtime
- **Engineering expertise**
  - Monte Carlo Analysis
  - Thermal Analysis
  - RF Simulation

## Technical Characteristics



<b>High Performance Contacts</b>	2 piece system: contact set and elastomer	2 piece system: contact set and elastomer	1 piece system: elastomer
<b>Package Types</b>	All package types and sizes, full and partial array capabilities		
<b>Package Size</b>	50 mm x 50 mm	30 mm x 30 mm	30 mm x 30 mm
<b>Recommended Applications</b>	RF / Microwave, Power, System Level Test, ATE HVM, High Compliance	RF / Microwave, Power, System Level Test, ATE HVM	RF / Microwave, Power, Device Characterization, Low Cycle

## Mechanical & Environmental

<b>Minimum Pitch</b>	0.5 mm	0.4 mm	0.3 mm
<b>Compliance / Travel</b>	0.40 mm	0.28 mm	0.23 mm
<b>Operating Temperature</b>	-55°C to 155°C	-55°C to 155°C	-55°C to 200°C
<b>Gold Contact Set Expected Life</b>	> 2,000,000	> 2,000,000	—
<b>Elastomeric Interposer Expected Life</b>	> 500,000	> 500,000	> 1,000-100,000

## Electrical

<b>Inductance</b> (Self / Mutual)	0.33 nH / 0.15 nH	< 0.15 nH / 0.05 nH	0.10 nH / 0.02 nH
<b>Capacitance</b> (Self / Mutual)	0.20 pF / 0.05 pF	0.15 pF / 0.02 pF	0.14 pF / 0.01 pF
<b>Contact Resistance</b>	< 25 mΩ	< 25 mΩ	< 25 mΩ
<b>Current Capacity</b>	4 A @ 14°C rise	4 A @ 14°C rise	4 A @ 14°C rise
<b>Bandwidth</b>	Up to 40 GHz	> 40 GHz	> 40 GHz

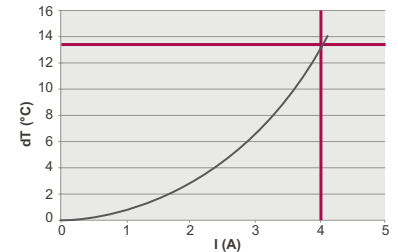
Note: All data is subject to change without notice.

# Performance

## Current Carrying Capacity

- Provides higher current at lower temperature rise as compared to spring probe (3 Amps) and competitive elastomeric solutions (< 2 Amps)
- Characterization data for 0.5 mm contact structure

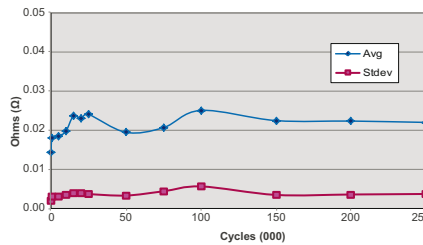
**4 Amps @ 14°C Temperature Rise<sup>(1)</sup>**  
Temperature Rise as a Function of Drive Current I



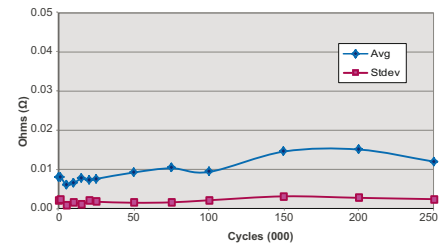
## Contact Resistance

- 0.5 mm pitch

**Ambient Testing**  
250K Cycles



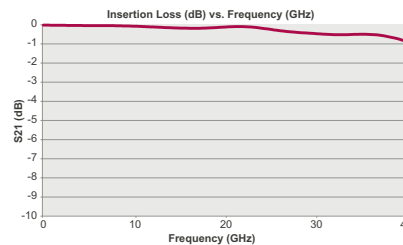
**Hot Testing**  
250K Cycles @ 150°C



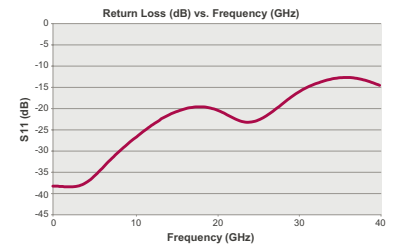
## Bandwidth & Frequency Response

- 0.5 mm pitch

**Insertion Loss (S21)**  
Better than -1 dB @ 40 GHz<sup>(1)</sup>



**Return Loss (S11)**  
Better than -12 dB @ 40 GHz<sup>(1)</sup>

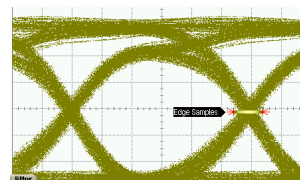


## EYE Diagram

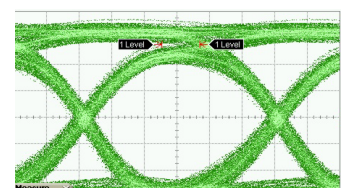
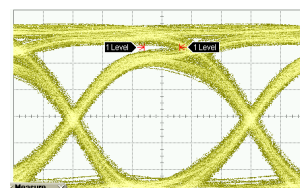
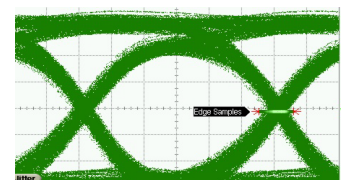
- 28 Gbps application
- EYE Pattern is similar between device tested in Silmat® Socket and soldered down environments
- Pattern: PRBS 2<sup>9</sup>

Measured Data	Socketed	Soldered Down
Deterministic Jitter	3.58 ps	4.04 ps
Random Jitter	0.238 ps	0.234 ps
Inter Symbol Interference	4.02 ps	4.13 ps
Rise Time (20%-80%)	18.40 ps	17.50 ps
Fall Time (20%-80%)	15.10 ps	14.80 ps
EYE Amperage	550 mV	571 mV
Input Voltage	800 mVpp	800 mVpp

**Socketed**  
EYE Diagram

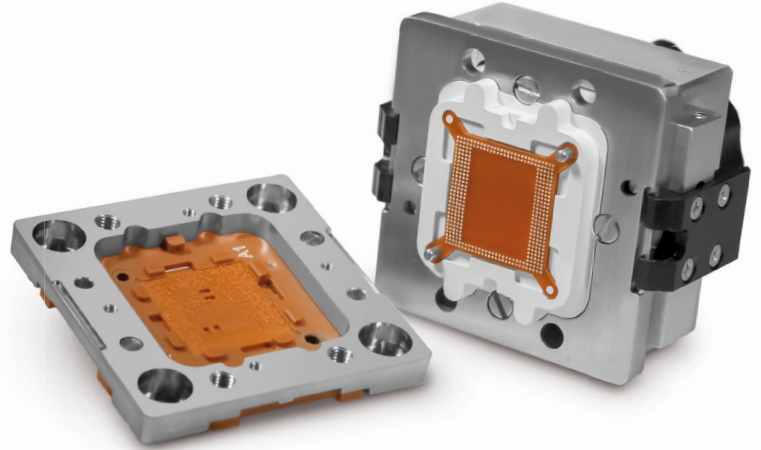
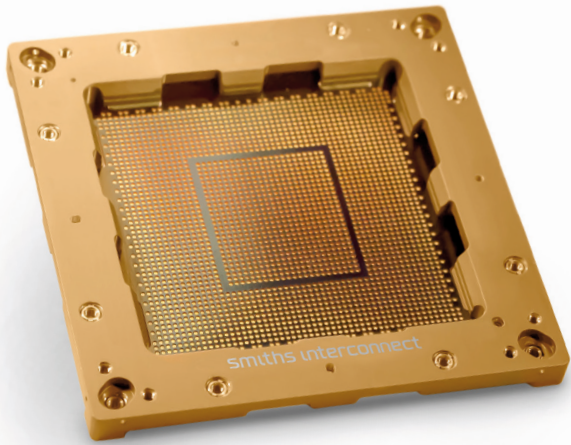


**Soldered Down**  
EYE Diagram

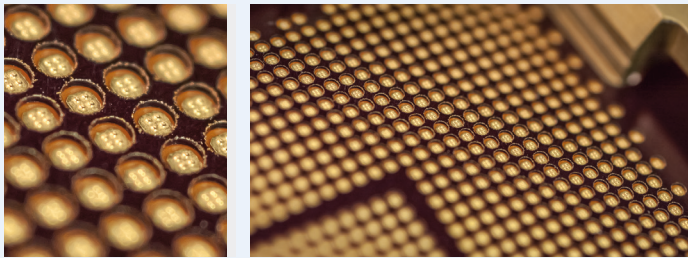


Note: 1) Lab measured data. All data is subject to change without notice.

# Applications

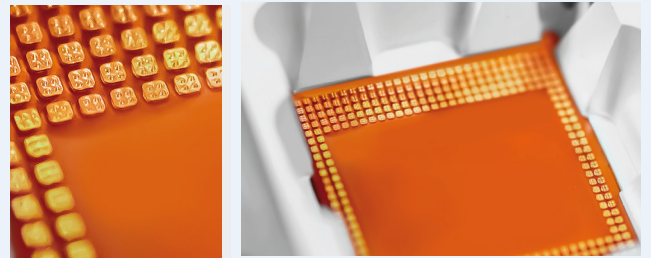


## Digital High Speed



- **Electrically transparent interconnect**
  - Enables system level and ATE testing to full speed
- **More bandwidth available for other test hardware**
- **Minimal signal distortion**
  - Ensuring reliable measurement
- **Enables clean power delivery**

## Package-on-Package Top



- **Conformal contacts for recessed pads**
  - Accommodates device tolerance misalignment
- **Provides soldered memory performance level while eliminating the memory soldering/desoldering operation**
- **Reduced cost of ownership**
  - Offers maximized equipment utilization
  - Minimized labor requirement

# Global Support

## Americas

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