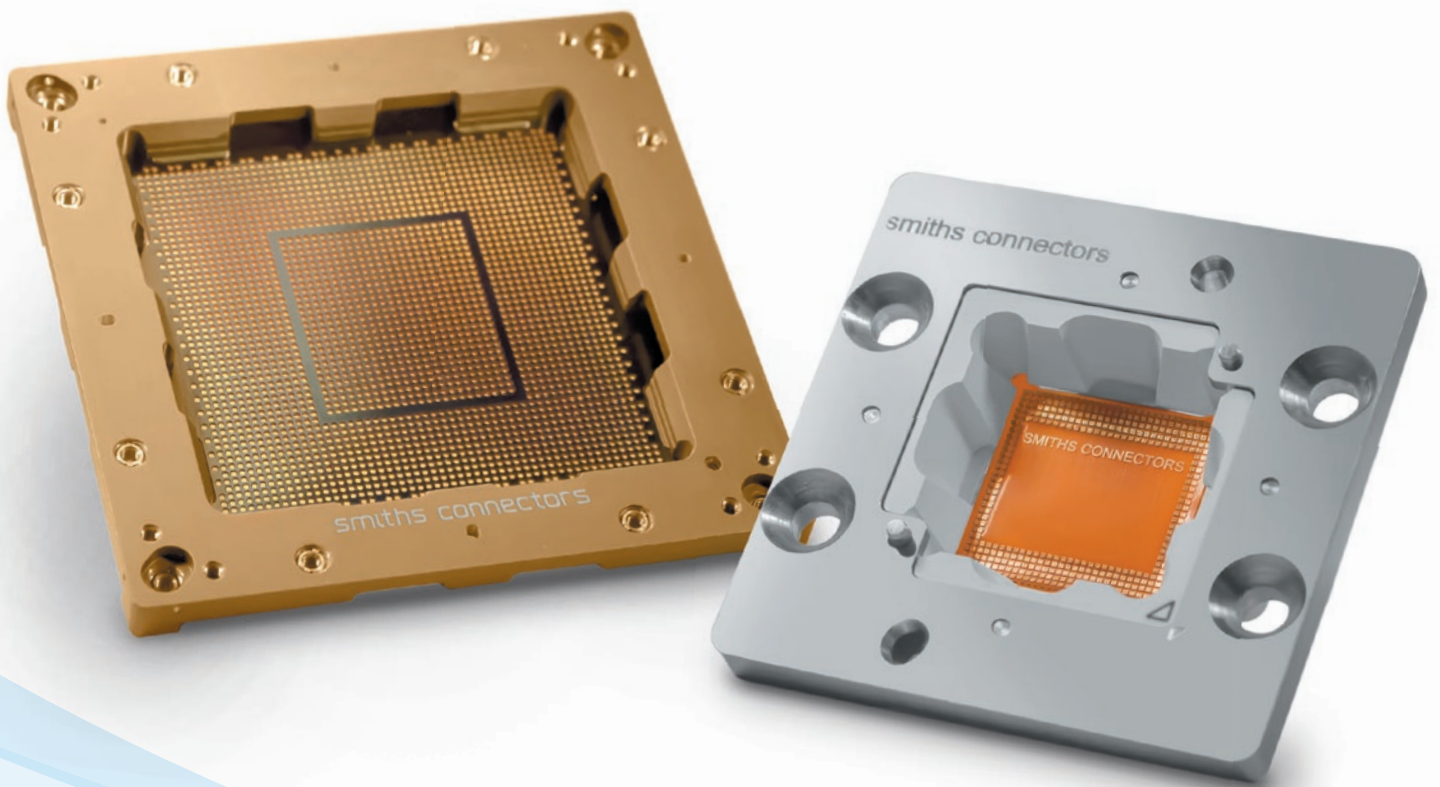


SILMAT® TEST SOCKET

Elastomeric Solutions for Digital High Speed & PoP Top Test



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

FEATURES & BENEFITS

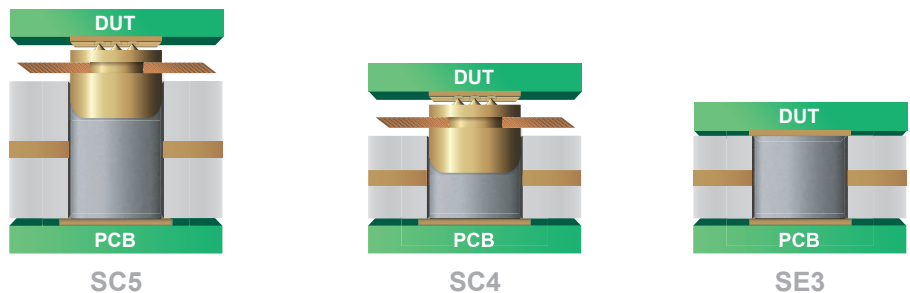
- ▶ **Patented, low profile contact**
 - ▶ Solderless memory replacement
 - ▶ Short signal path
 - ▶ Conformal to recessed LGAs
- ▶ **High speed signal integrity**
 - ▶ Electrically transparent contact
 - ▶ High frequency bandwidth > 40 GHz
 - ▶ Low inductance
- ▶ **Durability**
 - ▶ Long cycle life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

The Next Generation of Test Solutions

Smiths Connectors, 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 Connectors' 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.

TECHNICAL CHARACTERISTICS



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

MECHANICAL & ENVIRONMENTAL

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

ELECTRICAL

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

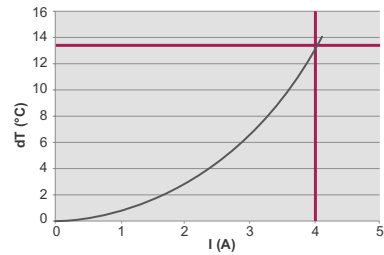
PERFORMANCE

▶ 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⁽¹⁾

Temperature Rise as a Function of Drive Current I

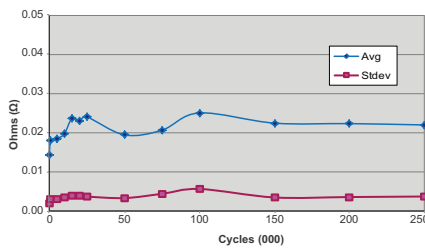


▶ CONTACT RESISTANCE

- ▶ 0.5 mm pitch

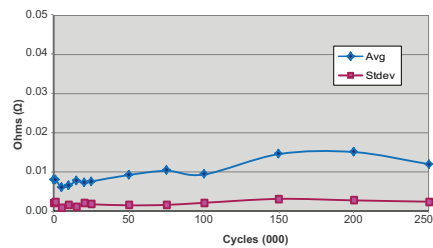
AMBIENT TESTING

250K Cycles



HOT TESTING

250K Cycles @ 150°C

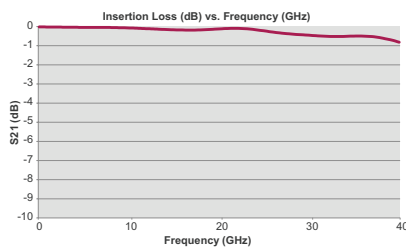


▶ BANDWIDTH & FREQUENCY RESPONSE

- ▶ 0.5 mm pitch

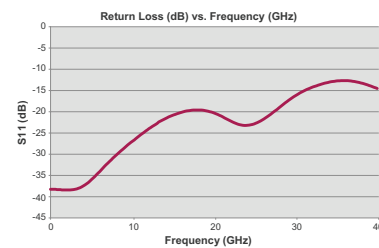
INSERTION LOSS (S21)

Better than -1 dB @ 40 GHz⁽¹⁾



RETURN LOSS (S11)

Better than -12 dB @ 40 GHz⁽¹⁾



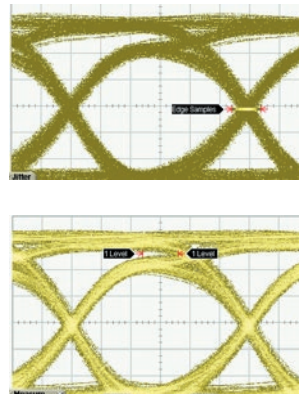
▶ EYE DIAGRAM

- ▶ 28 Gbps application
- ▶ EYE Pattern is similar between device tested in Silmat® Socket and soldered down environments
- ▶ Pattern: PRBS 2⁹

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

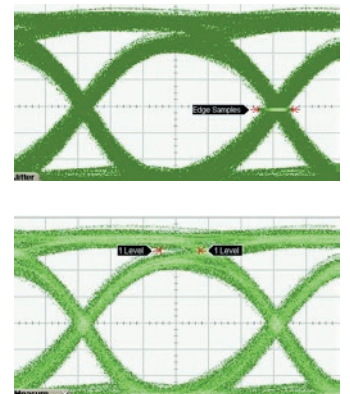
SOCKETED

EYE Diagram



SOLDERED DOWN

EYE Diagram

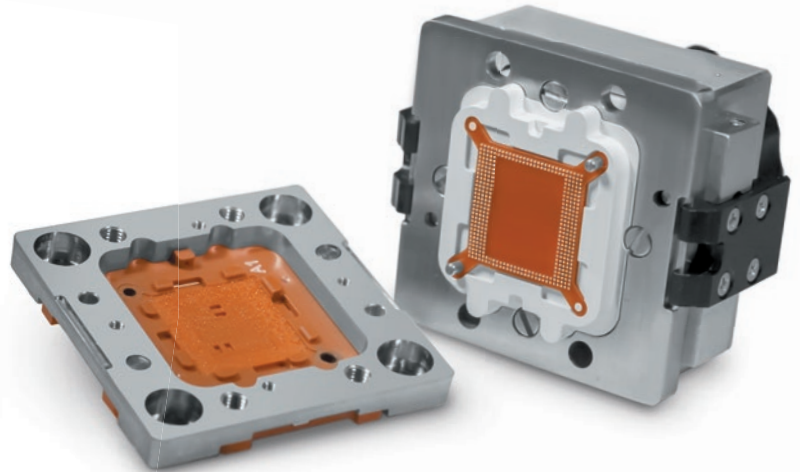
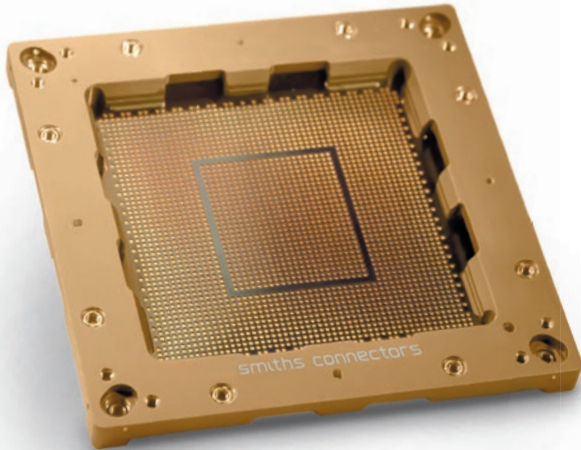


Notes:

1) Lab measured data

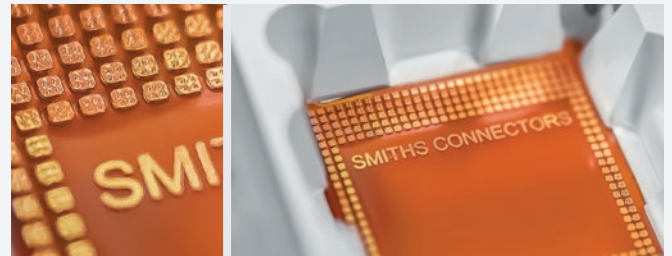
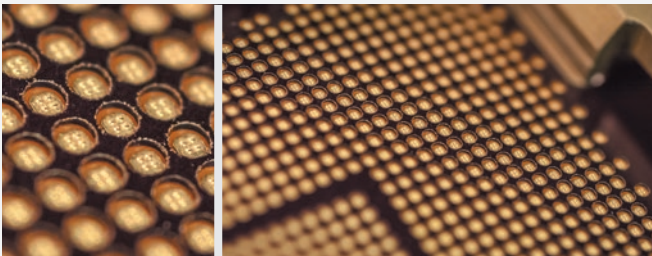
All data is subject to change without notice

APPLICATIONS



DIGITAL HIGH SPEED

PACKAGE-ON-PACKAGE TOP



- ▶ **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**

- ▶ **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 maximised equipment utilisation
 - ▶ Minimised labour requirement