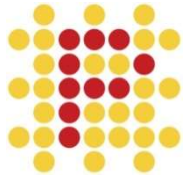


Drawings not to scale

<b>Silmat® Contact Systems</b> High Performance Contacts for Hand Test & Automation (Patented / Proprietary Contact Structures)	<b>C200</b> 2 Piece System Gold Contact Set & Silmat® with Core	<b>C300</b> 2 Piece System Gold Contact Set & Silmat® with Core	<b>C400</b> 1 Piece System Silmat® with Core (No Gold Contact Set)	<b>G100</b> 1 Piece System Gold Contact Set (No Silmat®)	<b>SMU-150</b> 1 Piece System Universal Silmat® 0.15mm Pitch Sheet
Packages (BGA, LGA, QFN, CSP, PoP) Minimum Package Pitch (Mixed Pitch Ok)	All Package Types & Sizes, Full & Partial Array Capabilities 0.5 mm			QFN / LGA Only 0.35 mm	All Non-Recessed 0.35 mm
Compressed Contact Length	1.0 mm	0.6 mm	0.4 mm	0.2 mm	0.25 mm
Bandwidth (S21 @ -1db Loss)	40 Ghz	> 40 Ghz	> 40 Ghz	> 90 Ghz	> 40 Ghz (coax)
Inductance (Self / Mutual)	0.22 / 0.05 nH	0.13 / 0.03 nH	0.10 / 0.03 nH	0.06 / 0.01 nH	0.08 (coax) / 0.03 nH
Capacitance (Self / Mutual)	0.25 / 0.04 pF	0.18 / 0.03 pF	0.14 / 0.02 pF	0.06 / 0.01 pF	0.08 (coax) / 0.05 pF
Contact Resistance	< 25 mOhms	< 25 mOhms	< 25 mOhms	< 25 mOhms	< 25 mOhms
Current (Continuous / Pulse per Lead)	3.4A / 5.8A @ 20°C	4.2A / 6.0A @ 20°C	8.5A / 8.7A @ 20°C	> 10A / 20A @ 4°C	5.3A / 5.3A @ 20°C
Closest Component Proximity	Within 0.5 mm	Within 0.5 mm	Within 0.5 mm	Within 0.5 mm	Within 0.1 mm
Compliance (Travel / Operating Stroke)	0.38 / 0.23 mm	0.28 / 0.18 mm	0.23 / 0.13 mm	0.05 mm (Gold Tips)	0.18 / 0.10 mm
Contact Force (Initial per Lead)	25-45 Grams	25-45 Grams	20-40 Grams	> 45 Grams	20-60 Grams
Operating Temperature	-55°C to +155°C	-55°C to +155°C	-55°C to +125°C	-55°C to +155°C	-55°C to +125°C
Contact Set Expected Life (Actuations)*	> 2,000,000	> 2,000,000	n/a	> 1,000-100,000	n/a
Silmat® Expected Life (Actuations)*	> 500,000	> 500,000	> 1,000-100,000	n/a	> 500-5,000
Value Summary: High Performance, Reliable, Durable, Compliant & Easily Replaceable = Low Cost of Ownership	Most Robust Longest Life in Prod ATE Optimized	Best Electricals w/ Long Life in Prod ATE Optimized	Best Electricals Low Cost Custom Hand Test/ Eval/ B2B	Ultra Low Inductance Best RF Isolation Hand Test/ Eval	Excellent Electricals Low Cost, Quick LT Hand Test/ Eval/ B2B
Target Applications (IC Test, Industrial, Military, Medical)	Lrg BGA/Hi Freq/Hi Pwr Char/ SLT/ ATE HVM	RF/ Mmwave/ Hi Speed Char/ SLT/ ATE HVM	Hi Freq-Speed-Pwr Char/ SLT/ ReI-BI/ B2B	Hi Freq-Speed-Pwr Diamond Part. Replace	Hi Freq-Speed-Pwr Char/ SLT/ B2B

\*Contact life may vary and can be influenced by many factors including the package, board, amount of compression, debris, test application, environment, handling and maintenance, etc.



# C200 Silmat<sup>®</sup> Contact System

## 2 Piece System – Gold Contact Set & Silmat<sup>®</sup> Interposer with Core Technology

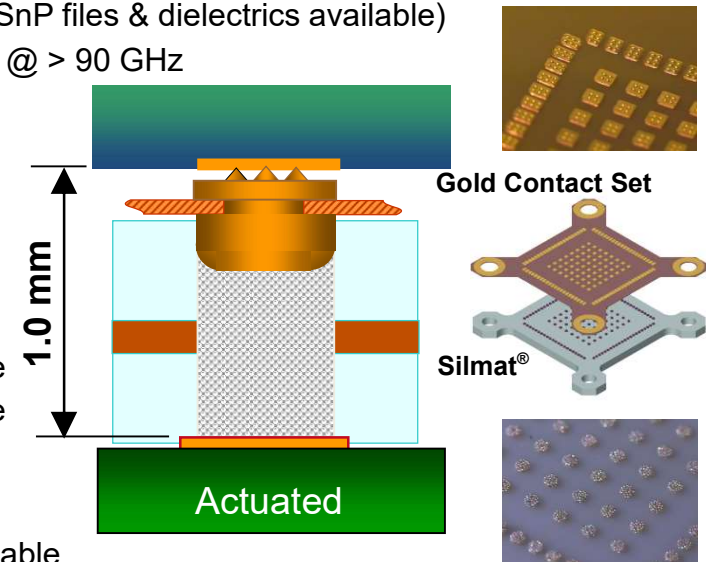
**Electrical** (0.5 mm pitch, measured data with full reports, SPICE models, SnP files & dielectrics available)

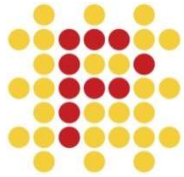
- Insertion loss / bandwidth (corner) -1.0 db @ 40 GHz, -1.5 db @ > 90 GHz
- Inductance (field) 0.22 nH
- Mutual inductance (field) 0.05 nH
- Capacitance to ground (field) 0.25 pF
- Mutual capacitance (field) 0.04 pF
- Contact resistance (initial) < 25 mΩ
- Thermal resistance (per contact) 130.5 K/W
- Continuous current rating (per contact) 3.4 amps @ 20°C heat rise
- Pulse rating 1% duty cycle (per contact) 5.8 amps @ 20°C heat rise

**Mechanical** (qualified & validated, measured data available)

- Contact length (compressed) 1.0 mm
- Minimum pitch 0.5 mm – mixed pitch available
- Packages BGA, LGA, QFN, DFN, CSP, POP – full and partial arrays available
- Structure Gold Contact Set & Silmat<sup>®</sup> Interposer with core technology (patented)
- Gold Contact Set materials Gold & nickel plating over copper (no vias)
- Silmat<sup>®</sup> Interposer materials Silver particles in silicone elastomer with polyimide core (patented)
- Compliance range 0.38 mm maximum travel with 0.23 mm operating stroke
- Contact force (per contact) 25-45 grams – depends on amount of compression
- Operating temperature -55°C to +155°C
- Estimated life\* Gold Contact Set > 2,000,000 actuations, Silmat<sup>®</sup> > 500,000 actuations

\* Contact life may vary and can be influenced by many factors including the package, board, amount of compression, debris, test application, environment, handling and maintenance, etc.





# C300 Silmat<sup>®</sup> Contact System

## 2 Piece System – Gold Contact Set & Silmat<sup>®</sup> Interposer with Core Technology

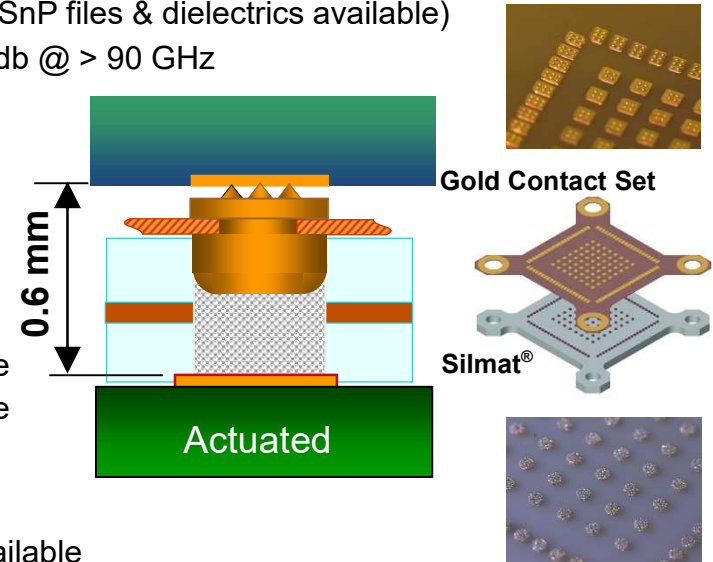
**Electrical** (0.5 mm pitch, measured data with full reports, SPICE models, SnP files & dielectrics available)

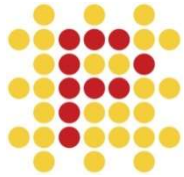
- Insertion loss / bandwidth (corner) -1.0 db @ > 40 GHz, -1.5 db @ > 90 GHz
- Inductance (field) 0.13 nH
- Mutual inductance (field) 0.03 nH
- Capacitance to ground (field) 0.18 pF
- Mutual capacitance (field) 0.03 pF
- Contact resistance (initial) < 25 mΩ
- Thermal resistance (per contact) 109.8 K/W
- Continuous current rating (per contact) 4.2 amps @ 20°C heat rise
- Pulse rating 1% duty cycle (per contact) 6.0 amps @ 20°C heat rise

**Mechanical** (qualified & validated, measured data available)

- Contact length (compressed) 0.6 mm
- Minimum pitch 0.35 mm – mixed pitch available
- Packages BGA, LGA, QFN, DFN, CSP, POP – full and partial arrays available
- Structure Gold Contact Set & Silmat<sup>®</sup> Interposer with core technology (patented)
- Gold Contact Set materials Gold & nickel plating over copper (no vias)
- Silmat<sup>®</sup> Interposer materials Silver particles in silicone elastomer with polyimide core (patented)
- Compliance range 0.28 mm maximum travel with 0.18 mm operating stroke
- Contact force (per contact) 25-45 grams – depends on amount of compression
- Operating temperature -55°C to +155°C
- Estimated life\* Gold Contact Set > 2,000,000 actuations, Silmat<sup>®</sup> > 500,000 actuations

\* Contact life may vary and can be influenced by many factors including the package, board, amount of compression, debris, test application, environment, handling and maintenance, etc.





# C400 Silmat<sup>®</sup> Interposer

## 1 Piece System – Silmat<sup>®</sup> Interposer with Core Technology

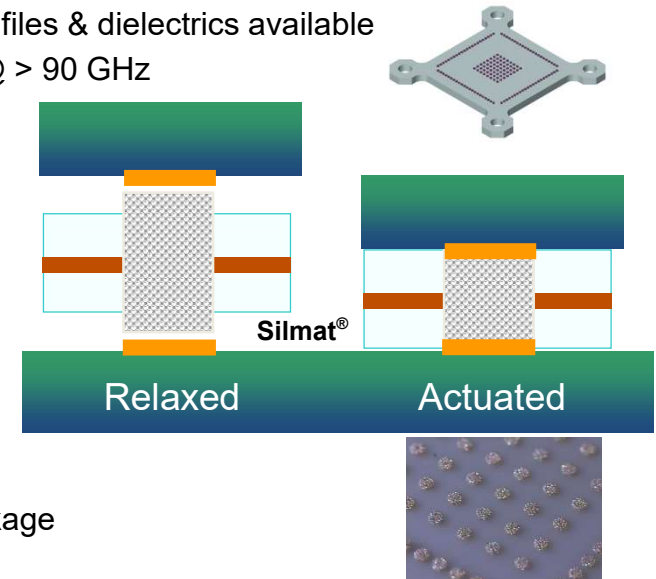
**Electrical** (0.5 mm pitch, measured data with full reports, SPICE models, SnP files & dielectrics available)

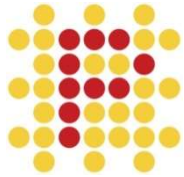
- Insertion loss / bandwidth (corner) -1.0 db @ > 40 GHz, -1.2 db @ > 90 GHz
- Inductance (field) 0.10 nH
- Mutual inductance (field) 0.03 nH
- Capacitance to ground (field) 0.14 pF
- Mutual capacitance (field) 0.02 pF
- Contact resistance (initial) < 25 mΩ
- Thermal resistance (per contact) 59.8 K/W
- Continuous current rating (per contact) 8.5 amps @ 20°C heat rise
- Pulse rating 1% duty cycle (per contact) 8.7 amps @ 20°C heat rise

**Mechanical** (qualified & validated, measured data available)

- Contact length (compressed) 0.4-0.6 mm – depends on package
- Minimum pitch 0.3 mm – mixed pitch available
- Packages BGA, LGA, QFN, DFN, CSP, POP – full and partial arrays available
- Structure Silmat<sup>®</sup> Interposer with core technology (patented)
- Silmat<sup>®</sup> Interposer materials Silver particles in silicone elastomer with polyimide core (patented)
- Compliance range 0.23 mm maximum travel with 0.13 mm operating stroke
- Contact force (per contact) 20-40 grams – depends on amount of compression
- Operating temperature -55°C to +125°C
- Estimated life\* > 1,000-100,000 actuations

\* Contact life may vary and can be influenced by many factors including the package, board, amount of compression, debris, test application, environment, handling and maintenance, etc.





# G100 Gold Contact Set Interposer

## 1 Piece System – Gold Contact Set Interposer

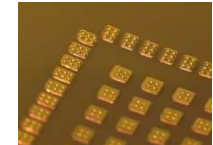
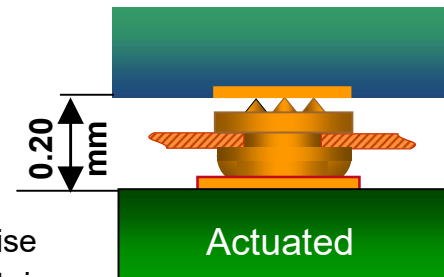
**Electrical** (0.5 mm pitch, measured data with full reports, SPICE models, SnP files & dielectrics available)

- Insertion loss / bandwidth (corner) -1.0 db @ > 90 GHz
- Inductance (field) 0.06 nH
- Mutual inductance (field) 0.01 nH
- Capacitance to ground (field) 0.06 pF
- Mutual capacitance (field) 0.01 pF
- Contact resistance (initial) < 25 mΩ
- Thermal resistance (per contact) 54.1 K/W
- Continuous current rating (per contact) 10 amps @ 3.8°C heat rise
- Pulse rating 1% duty cycle (per contact) > 20 amps @ 3.8°C heat rise

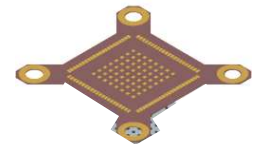
**Mechanical** (qualified & validated, measured data available)

- Contact length (compressed) 0.2 mm
- Minimum pitch 0.35 mm – mixed pitch available
- Packages LGA, QFN, DFN – full and partial arrays available
- Structure Gold Contact Set Interposer
- Gold Contact Set materials Gold & nickel plating over copper (no vias)
- Compliance range Up to 0.05mm from uniform rigid contact tips
- Contact force (per contact) > 45 grams
- Operating temperature -55°C to +155°C
- Estimated life\* > 1,000-100,000 actuations

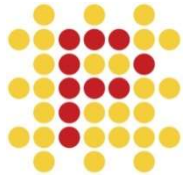
\* Contact life may vary and can be influenced by many factors including the package, board, amount of compression, debris, test application, environment, handling and maintenance, etc.



Gold Contact Set







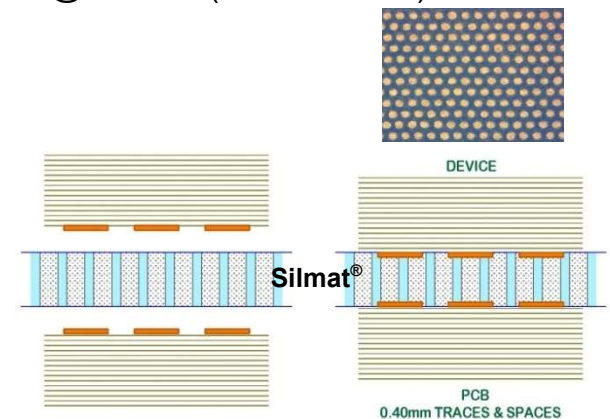
# SMU-150 Universal Silmat<sup>®</sup> Material

## 1 Piece System – Universal Silmat<sup>®</sup> Material

**Electrical** (Coax & 0.5mm on 0.15mm pitch, measured data with full reports, SPICE models, SnP files & dielectrics available)

- Insertion loss / bandwidth -1.0 db @ > 40 GHz (coax), -1.0 db @ 19 GHz (0.5mm corner)
- Inductance 0.08 nH (coax), 0.11 nH (field)
- Mutual inductance 0.03 nH (field)
- Capacitance to ground 0.08 pF (coax), 0.36 pF (field)
- Mutual capacitance 0.05 pF (field)
- Contact resistance (initial) < 25 mΩ
- Thermal resistance (per each column) 188.1 K/W
- Continuous current (per lead\*) 5.3 amps @ 20°C heat rise
- Pulse current 1% duty cycle (per lead\*) 5.3 amps @ 20°C heat rise

\* Based on a measured contact pad diameter of 0.28mm



**Mechanical** (qualified & validated, measured data available)

- Contact length (compressed) 0.25 mm
- Minimum pitch 0.35 mm package pitch – enables minimum of two columns on 0.15 mm pitch
- Packages BGA, LGA, QFN, DFN, CSP, POP – no alignment required, full and partial ok
- Structure Universal Silmat<sup>®</sup> material with 90 micron columns on 0.15 mm pitch
- SMU-150 Universal Silmat<sup>®</sup> materials Silver particles in silicone elastomer
- Compliance range 0.18 mm maximum travel with 0.10 mm operating stroke
- Contact force (per contact) 20-60 grams – depends on type of package and amount of compression
- Operating temperature -55°C to +125°C
- Estimated life\* > 500-5,000 actuations

\* Contact life may vary and can be influenced by many factors including the package, board, amount of compression, debris, test application, environment, handling and maintenance, etc.