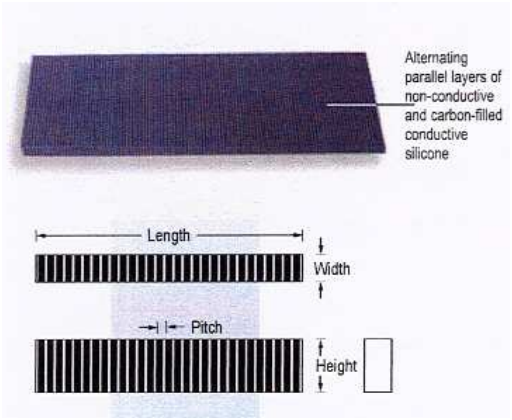
RUBBER ELASTOMERIC CONNECTOR

Elastomeric Electronic Connectors are a comprehensive group of high performance interconnect devices with applications throughout the entire field of electronics.
With the expansion of micro-electronics and miniaturization of all products, the same high reliability must be maintained. Elastomeric Connectors are an obvious choice. And one which offers a variety of alternatives based on the primary design objectives. Some of the more important considerations are:

- High Density; increased number of I/O's
- Low resistance, high current capacity
- Low insertion force, low compression force
- Redundant contact engagement
- High electrical and mechanical reliability
- Chemical stability, degradation resistance
- Cost-effectiveness, ease of assembly



Applications

- LCD and EL displays
- Board-to-board
- Chip-to-board
- Memory cards
- Flex circuit-to-board
- Burn-in sockets
- Miniature and low profile interconnect - general electronics

CARBON AND LOW TEMPERATURE CARBON CONNECTORS

Series	LCD contact spacing center-to-center	Pitch: sum of the thickness of an adjacent conductive and non-conductive layer		Conductive layer per inch	Individual conductive and insulating layer thickness		Available lengths
	Minimum	Nominal	Maximum	Minimum	Minimum	Maximum	Maximum
Carbon-a	0.015 in. 0.38 mm	0.004 in. 0.10 mm	0.006 in. 0.15 mm	240	0.001 in. 0.025 mm	0.004 in. 0.10 mm	9.0 in. 230 mm
Carbon-b	0.020 in. 0.50 mm	0.007 in. 0.18 mm	0.010 in. 0.25 mm	140	0.002 in. 0.05 mm	0.006 in. 0.15 mm	9.0 in. 230 mm
Carbon-c	0.010 in. 0.25 mm	0.002 in. 0.05 mm	0.004 in. 0.10 mm	500	0.0004 in. 0.010 mm	0.0024 in. 0.060 mm	9.0 in. 230 mm
Low temperature Carbon	0.015 in. 0.38 mm	0.004 in. 0.10 mm	0.006 in. 0.15 mm	240	0.001 in. 0.025 mm	0.004 in. 0.10 mm	5.0 in. 127 mm

Measurement	Tolerance (inches/mm)
Length L	0.157 in. to 2.40 in. — ± 0.008 in. 4.00 mm to 61.00 mm — ± 0.20 mm 2.410 in. to 6.00 in. — ± 0.015 in. 61.2 mm to 152.4 mm — ± 0.38 mm 6.010 in. to 7.87 in. — ± 0.020 in. 152.6 mm to 200.0 mm — ± 0.50 mm 7.880 in. to 9.00 in. — ± 0.039 in. 200.1 mm to 230.0 mm — ± 1.00 mm
Height H	0.020 in. to 0.750 in. ± 0.005 in. 0.50 mm to 19mm ± 0.127 mm above 0.750 in/19.0 mm consult factory
Width W	0.015 in. to 0.039 in. — ± 0.002 in 0.38 mm to 1.0 mm — ± 0.050 mm 0.040 in. to 0.079 in. — ± 0.003 in 1.01 mm to 2.0 mm — ± 0.076 mm 0.080 in. to 0.118 in. — ± 0.005 in 2.01 mm to 3.0 mm — ± 0.127 mm above 0.118 in./3.00 mm consult factory.

Connectors	Temperature range		Current carrying capacity 0.035x0.035 in pad	Resistance between layers
	Minimum	Maximum		
Carbon	-55℉ -50℃	260℉ 125℃	0.050 amps	10^{12} ohms
Low temperature	-85℉ -65℃	260℉ 125℃	0.050 amps	10^{12} ohms

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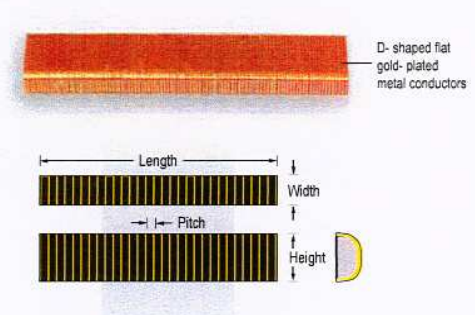
GOLD CONNECTORS

	Minimum	Maximum
Length L	0.200 in. ± 0.005 in. 5.08 mm ± 0.127 mm	6.000 in. ± 0.030 in. 152.4 mm ± 0.762 mm
Height H	0.100 in. ± 0.005 in. 2.54 mm ± 0.127 mm	0.500 in. ± 0.015 in. 12.70 mm ± 0.381 mm
Width W	0.060 in. ± 0.005 in. 1.52 mm ± 0.127 mm	0.125 in. ± 0.010 in. 3.18 mm ± 0.254 mm

For good design practice and low deflection force requirements, the height H should be twice the width W. For other sizes please consult us.



Conductive Elements	Gold-plated copper wire. gold 0.00025mm (0.00001”), nickel 0.0013mm (0.00005”).
Wire Size and Spacing	**A.** 0.05x0.127mm (0.002” x 0.005”) flat wire on 0.25mm (0.010”) center-to-center spacing. (Min. 100 wires/ in.) **B.** 0.05x0.10mm (0.002” x 0.004”) flat wire on 0.19mm (0.0075”) center-to-center spacing. (Min. 133 wires/in.) **C.** 0.025x0.076mm (0.001” x 0.003”) flat wire on 0.15mm (0.006”) center-to-center spacing. (Min. 166 wires/in.)
Connector body	Non-conductive tan color silicone rubber. UL-94-HB rating, 500 volts/mil dielectric strength.
Film	0.025mm (0.001”) thick polyamide dielectric strength of film ASTM-D-149, 2000 volts/mil.

Performance characteristics

Contact Resistance	<25 mΩ on 0.025” wide contact pads; 0.100 amperes DC, Kelvin- type four probe test method
Insulation Resistance	Minimum 1012 Ω between adjacent conductive elements.
Current Carrying Capacity	Series A and B, 500 mA per wire max.; Series C, 250 mA per wire max.
Capacitance	Maximum 0.100 picofarads per adjacent pad at 1 MHz and 0.100” high (“H”).
Inductance	Maximum 7 nanohenries per adjacent pad at 1 MHz and 0.100” high (“H”).
Repeated Actuations	500 actuations without appreciable change in contact resistance (deflection of 15%).
Deflection	8% to 20%. Recommended deflection 10 to 15% of original height.
Deflection Force/Inch	4lbs. per linear inch for 15% deflection for a 0.062” (“W”) x 0.285 (“H”) connector.
Operating Temp. Range	-20°C min., 125°C max.
Salt Spray Test	MIL-STD-202E, method 101D, condition B. 5% salt solution 95°F, 48 hours.: no evidence of blistering or peeling of the contact material.
Temperature Cycling	MIL-STD-202E, method 102A, condition D, -55°C, 25°C , 125°C.: no change in the physical properties of the specimens.
Humidity (Steady State)	MIL-STD-202E, method 103B, condition C modified. 95% RH room temperature: no appreciable change in contact resistance after 500 hours exposure.
Corrosive Environment	1000 hours exposure at 1 ppm H2S and 1 ppm SO2, 60°C AND 75% RH. Slight change in contact resistance; no evidence of contact peeling or blistering.

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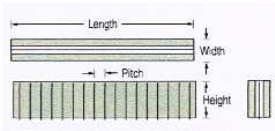
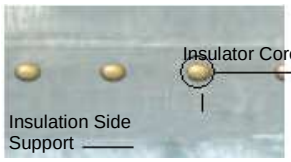
FG-S CONNECTORS





Single row of Gold-plated tips of Phosphor Bronze wire (30µØ)

The FG-S connectors have anisotropic conduction properties. Thin metal wires are embedded with a vertical orientation within the silicone rubber on 0.10 mm centers. Low resistance and high current carrying capacity make this series very versatile for most typical interconnect applications.

The basic FG-S design is one row of gold-plated tips of Phosphor Bronze wires embedded in silicone rubber which will connect two parallel sets of contact, both having one row of contact pads.

Property	Units	Measure		Method
Insulation material	-	Silicone rubber	Silicone sponge	-
Color	-	Clear or white	Blue	Visual
Specific Gravity	g/cc	1.02	0.74	ASTM D792
Hardness	Durometer A	47	-	ASTM D2240
Tensile Strength	MPa	3	-	ASTM D412
Elongation	%	240	-	ASTM D412
Volume resistivity	MΩ.m	7.0×10^6	-	ASTM D257
Conductive material	Type	Tips of Phosphor Bronze wire; Gold-Plated		-
Wire diameter	µm	30		-
Gold-plated thickness	µm	0.15		-
Dimensions, Tolerances Width (W)	mm…/... in.	1.40 to 3.00 ± 0.20 .../... 0.055” to 0.120” ± 0.008”		-
Length (L)	mm…/... in.	10.00 to 25.00 ± 0.25 .../... 0.393” to 0.984” ± 0.010” 25.01 to 50.00 ± 0.30 .../... 0.985” to 1.96” ± 0.012” 50.01 to 80.00 ± 0.40 .../... 1.97” to 3.14” ± 0.016” 80.01 to 120.00 ± 0.50 .../... 3.15” to 4.72” ± 0.020”		-
Height (H) Note: H> W	mm…/... in.	1.40 to 4.00 ± 0.10 .../... 0.055” to 0.157” ± 0.004” 4.01 to 10.00 ± 0.15 .../... 0.158” to 0.393” ± 0.006”		-
Core: Width (W) Pitch (P) Skewness	mm…/... in. mm…/... in. degrees	0.40 ± 0.08 ...../..... 0.016” ± 0.003” 0.10 ± 0.05 ...../..... 0.004” ± 0.002” 2 °maximum		-
Recommended dimensions: Connector height versus electrode Width and Gap	mm…/... in.	Connector Height / Electrode Width / Electrode Gap min. 1.4 .../... 0.055” / 0.21 .../... 0.008” or more / 0.21 .../... 0.008” or more 2.0 .../... 0.079” / 0.22 .../... 0.009” or more / 0.22 .../... 0.009” or more 3.0 .../... 0.118” / 0.24 .../... 0.009” or more / 0.24 .../... 0.009” or more 4.0 .../... 0.157” / 0.25 .../... 0.010” or more / 0.25 .../... 0.010” or more 5.0 .../... 0.197” / 0.27 .../... 0.011” or more / 0.27 .../... 0.011” or more 6.0 .../... 0.236” / 0.29 .../... 0.011” or more / 0.29 .../... 0.011” or more 7.0 .../... 0.276” / 0.31 .../... 0.012” or more / 0.31 .../... 0.012” or more 8.0 .../... 0.315” / 0.32 .../... 0.013” or more / 0.32 .../... 0.013” or more 9.0 .../... 0.354” / 0.34 .../... 0.014” or more / 0.34 .../... 0.014” or more max. 10.0 .../... 0.393” / 0.36 .../... 0.014” or more / 0.36 .../... 0.014” or more		-

Continuity Resistance	0.50Ω/pad (0.25mm Width Pad)
Current Carrying Capacity	30 mA/wire
Insulation Resistance	> 20 MΩ (Gap=0.25mm)
Temperature Range	-40°C to +85°C (-40°F to +185 °F)
Compression Range	5% to 20% H < 3mm, 0.15 ~ 0.60mm H≥3mm consult factory for application specifics

Test Method for FG-S Connectors in the charts on this page used the following physical and electrical parameters:
– Electrodes: (Upper) Gold-plated PCB (common type electrode) (Lower) 0.5mm P, 0.25mm Pad’s W, Gold-plated PCB
– Space of electrodes @ 0.25, 50VDC
– Measurement: Digital ohm meter & Compression load meter
– Using Amps: 100mA D.C.
– Condition: Measured at room temperature 30 minutes later

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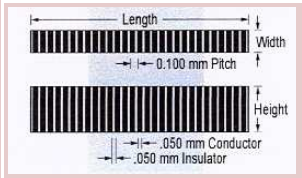
HIGH PERFORMANCE SILVER CONNECTORS



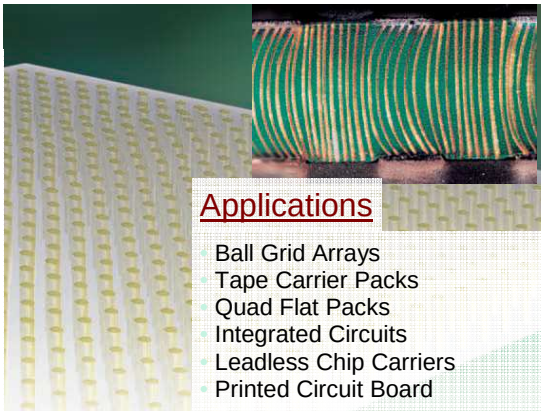
	Contact spacing center-to-center	Pitch: sum of the thickness of an adjacent conductive and non-conductive layer		Conductive layer per inch	Individual conductive and insulating layer thickness		Available lengths
	Minimum	Nominal	Maximum	Minimum	Minimum	Maximum	Maximum
Silver	0.015 in. 0.38 mm	0.004 in. 0.10 mm	0.006 in. 0.15 mm	240	0.001 in. 0.025 mm	0.003 in. 0.075 mm	5.00 in. 127 mm

Measurement	Tolerance (inches/mm)	
Length L	0.250 ± 0.005 in. to 5.000 ± 0.025 in	6.35 ± 0.12 mm to 127.00 ± 0.64 mm
Height H	0.040 ± 0.003 in. to 0.500 ± 0.007 in	1.00 ± 0.08 mm to 12.70 ± 0.18 mm
Width W	0.020 ± 0.003 in. to 0.100 ± 0.005 in	0.50 ± 0.08 mm to 2.54 ± 0.13 mm

Connectors	Temperature range		Current carrying capacity 0.035x0.035 in pad	Resistance between layers
	Minimum	Maximum		
Silver	-40℉ -40℃	185℉ 85℃	0.700 amps	10^{12} ohms

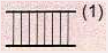
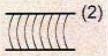
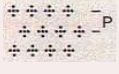
ELASTOMERIC MATRIX CONNECTORS

Excellent for **Land Grid Arrays** and similar type interconnects. Extremely accurate silicone rubber electronic connectors with anisotropic conductive properties. A range of 300 to 2,000 fine metal wires per 1 cm2 are embedded in the thickness direction of the transparent silicone rubber sheet. The fine metal conductors are gold-plated to ensure low resistance and the ability to withstand a relatively high current flow.
High density and greatly increased number of I/O's are possible; especially beyond 200 connections. Eliminates the costs of soldering and related rework. Facilitates denser and less expensive packaging. After inserting the correctly sized connector pad between the opposing groups of electrodes, all that is necessary is to apply the appropriate pressure to allow the electrodes to be properly connected.



Applications

- Ball Grid Arrays
- Tape Carrier Packs
- Quad Flat Packs
- Integrated Circuits
- Leadless Chip Carriers
- Printed Circuit Board

Series		Pitch (P)	Pattern side view	Pattern plan view	Thick-nesses	Applied electrode gaps	Suitable electrodes		Max.dimensions		Applications
							Width	Length	Length	Width	
W - a		1.0	 (1)	 P	0.50	over 0.4	over 0.3	over 1.5	76.0	5.0	Combination type
					1.00	over 0.5	over 0.5	over 1.5			
W - b		0.35	 (1)	 P	0.50	over 0.6* over 0.6**	over 0.7* over 0.9**	over 0.9* over 0.9**	50.0	50.0	Matrix type electrode
					1.00	over 0.7* over 0.7**	over 0.7* over 0.9**	over 0.9* over 0.9**			
W - c		0.35	 (2)	 P	0.50	over 0.6* over 0.6**	over 0.7* over 0.9**	over 0.9* over 0.9**	50.0	50.0	Matrix type electrode
					1.00	over 0.7* over 0.7**	over 0.7* over 0.9**	over 0.9* over 0.9**			

(1) The W-a and W-b types have straight metal conductors protruding slightly from both top and bottom of the silicone rubber sheet to ensure perfect connections with slight pressure. Designed for mounting applications.
(2) The W-c type has curved fine metal conductors embedded in a silicone rubber sheet which are flush with the top and bottom planes. The curved configuration facilitates repeated compressions. Ideal for inspection applications.
*12.5mm x 12.5mm product - **25mm x25mm, 37.5mm x 37.5mm or 50mm x 50mm product

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