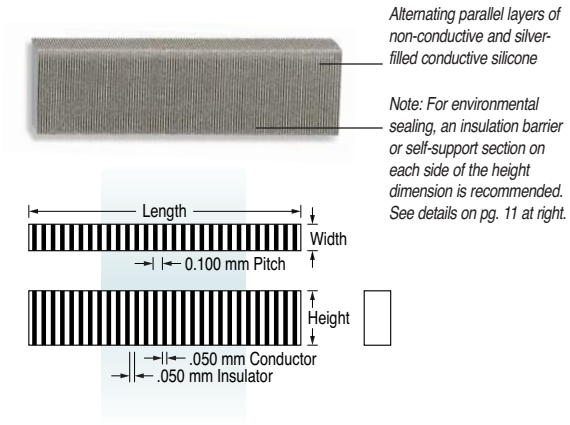
ZEBRA® Elastomeric Connectors

ZEBRA® HIGH PERFORMANCE SILVER CONNECTORS

FUJIPOLY low resistance ZEBRA® elastomeric connectors are constructed of alternating parallel layers of electrically conductive and non-conductive silicone elastomer. The electrically conductive layer is filled with silver-metal particles.

The composite alternating layers provide reliable electrical connection when placed between two aligned conducting surfaces.

The low resistance ZEBRA® provides a redundant connection with a minimum of two conductive layers recommended per PC contact pad. The connector is available with insulating barrier or silicone supports (See page 6). The connectors are used for connecting electroluminescent (EL) and plasma type displays to PC boards or for connecting hybrid circuits to PC boards, among other applications.



Low resistance ZEBRA® connectors are positioned between two aligned surfaces and are mechanically clamped together with a lid or another PC board. The connectors may be free standing or positioned in a retainer depending on packaging profiles and design.

Series	Contact Spacing Center-to-Center Minimum	Pitch: Sum of the Thickness of an Adjacent Conductive and Non-conductive Layer Nominal	Pitch: Sum of the Thickness of an Adjacent Conductive and Non-conductive Layer Maximum	Conductive Layers per inch Minimum	Individual Conductive and Insulating Layer Thickness Minimum	Individual Conductive and Insulating Layer Thickness Maximum	Available Lengths
5002 (SZ100)	0.015 in. 0.38 mm	0.004 in. 0.100 mm	0.006 in. 0.152 mm	240	0.001 in. 0.025 mm	0.003 in. 0.075 mm	5.00 in. 127 mm

TABLE A (For requirements over 4" consult factory)

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

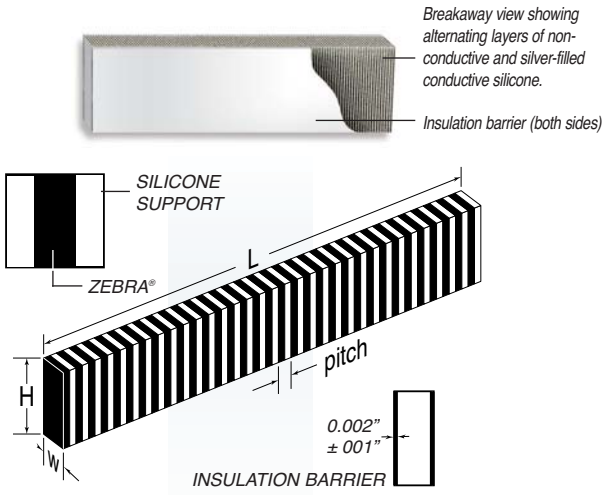
TABLE B

ZEBRA® Connectors	Temperature Range Minimum	Temperature Range Maximum	Current Carrying Capacity 0.040" x 0.040" pad	Resistance Between Layers
Silver ZEBRA®	-40°F -40°C	185°F 85°C	0.3 amps	10^{12} ohms

TABLE C

All dimensions in inches and millimeters

SELF-SUPPORT AND INSULATION BARRIER



Details show silicone support (left) and insulation barrier (right). Each is available on one or both sides. Configurations may also include support on one side and insulation on the other.

***Note:** Recommended Height (H) should be twice Width (W) dimension for minimum force deflection. Maximum Skewness 2% of Height.*

DESIGN RECOMMENDATIONS

Recommended deflection range is 5-25% of free height. Minimum deflection will vary with packaging applications and should consider overall height, PC board warpage, finish, etc. (Contact FUJIPOLY Product Application Engineering for assistance.) Design recommendations for solid ZEBRA® over 0.400" deflect 0.050" maximum. Silicone supported over 0.400" deflect 0.060" typical.

TEST CONDITIONS:

The use of an insulating barrier or silicone self-support material on one or both sides of the connector is recommended. The silicone support is utilized to reduce clamp force and provide an element of environmental protection for a cost-effective connection.

Item	Standard	Test Method
High Temperature	MIL-202D-108A	85° C 1500 hr
Low Temperature	—	-40° C 500 hr
Moisture	MIL-202D-103B	40° C 95% RH x 500 hr (250mA/pad)
Thermal cycle	MIL-202E-107G	65°C/25°C/150°C/ 25°C, 5 cycles

NOMINAL RESISTANCE CALCULATION

For the purpose of calculating the resistance of silver ZEBRA® connectors and testing them for compliance please use the following formula:

Where: R = Resistance in Ohms
W_1. = Width of ZEBRA® portion (inches or mm)
E_W = Electrode pad width (inches or mm)
H = ZEBRA® height (inches or mm)

Metric (mm)

$$R = \frac{H \times 0.01}{E_W \times W_1} + 0.10$$

English (inches)

$$R = \frac{H \times 0.0004}{E_W \times W_1} + 0.10$$

Example: if ZEBRA® is 0.100"/2.54 mm H and 0.030"/0.762mm W, then the maximum resistance on a 0.050"/1.27 mm wide pad will be:

Metric

$$R = \frac{2.54 \times 0.01}{0.762 \times 1.27} + 0.10 = 0.127 \text{ ohms}$$

English:

$$R = \frac{0.100 \times 0.0004}{0.030 \times 0.050} + 0.10 = 0.127 \text{ ohms}$$

NOMINAL FORCE DEFLECTION - PLAIN ZEBRA® OR INSULATION BARRIER TYPE

ZEBRA® connectors should be deflected 5% to 25% of H. To calculate F-Force for deflection, use the following formula:

Where:

F = Force (N)

$$D = \frac{H - H_1}{H} \times 100\ (\%)$$

H = Height of connector (mm or inches)
H_1 = Deflected height of connector (mm or inches)
W = Width of connector (mm or inches)
W_1 = Width of ZEBRA portion (mm or inches)
L = Length of connector (mm or inches)

Metric:

$$F(N) = 10.0 \times D \times W \times L \times 9.8 \times 10^{-3}$$

Inches:

$$F(N) = 6452 \times D \times W \times L \times 9.8 \times 10^{-3}$$

NOMINAL FORCE DEFLECTION - SILICONE SUPPORT TYPE

Metric:

$$F(N) = [(10.0 \times D \times W_1 \times L) + \{2.2 \times D \times (W-W_1) \times L\}] \times 9.8 \times 10^{-3}$$

Inches:

$$F(N) = [(6452 \times D \times W_1 \times L) + \{1149 \times D \times (W-W_1) \times L\}] \times 9.8 \times 10^{-3}$$

All dimensions in inches and millimeters