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FUJIPOLY

Carbon ZEBRA Connector

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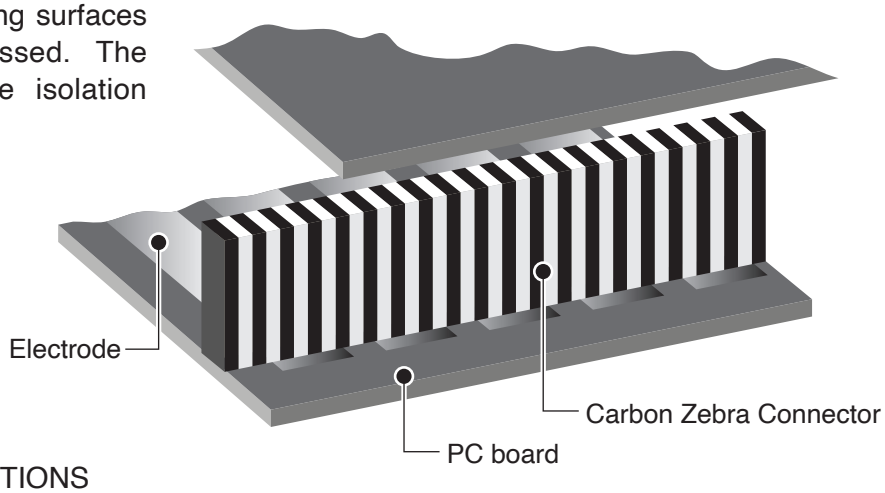
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1] Product Name :

Carbon ZEBRA Connector.
Low Temperature Carbon ZEBRA Connector

2] Features :

FUJIPOLY Carbon Zebra Connectors and Low Temperature Carbon Zebra Connectors consist of alternating layers of conductive carbon filled and non-conductive silicone rubber. Contact density of the carbon Zebra Connector is greater than the contact pad density of either LCD (Liquid Crystal Display) or PCB (Printed Circuit Board). At least one conductive layer will connect when the two mating surfaces are aligned and compressed. The insulation layer will insure isolation from adjacent circuits.



-1)SOLDERLESS CONNECTIONS

Pressure type contact eliminates lead straightening, hole drilling and soldering.

-2)NONABRASIVE CONTACTS (ZERO INSERTION FORCE)

Contact to the LCD is made by deflecting the Carbon Zebra connector between the LCD and PC board. Carbon Zebra connectors are nonabrasive and will not damage indium oxide contact pads on the LCD. Repeated assembly and disassembly of package components will not affect performance.

-3)ENVIRONMENTAL RELIABILITY

The LCD, when mounted with a Carbon Zebra rubber connector, creates a gas tight seal at the contact interface. Assures contact in chemically corrosive atmospheres while at the same time protecting the glass display from shock and vibration.

-4)SMALL GLASS OVERHANG

With a Carbon Zebra connector, LCD terminal overhangs can be as narrow as 0.030"/0.80mm permitting more efficient use of glass size related to character height. (Metal pins normally require a 0.150"/3.8mm glass overhang, reducing character height by as much as 0.240"/6.1mm for a dual in-line LCD.)

-5)HIGH DENSITY CONTACT

Carbon Zebra connectors are available in a variety of contact densities. The most dense allows contact pad spacing as close as 0.010"/0.25mm center-to-center. This spacing can be compared to 0.050"/1.3mm minimum for pins, allowing for increased capacity of LCD formats.

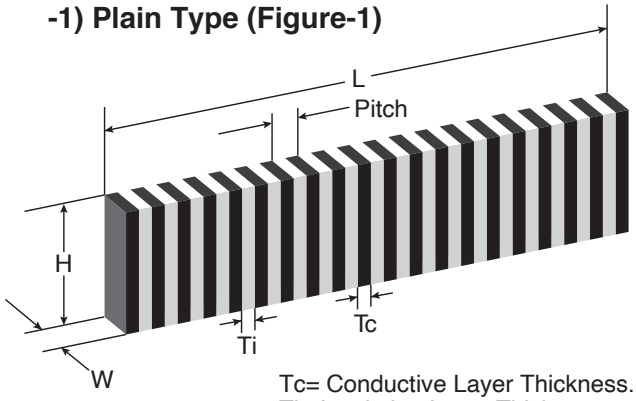
-6)LABOR SAVING EASE OF ASSEMBLY

3] Variety of Carbon Zebra Connector.

Table - 1

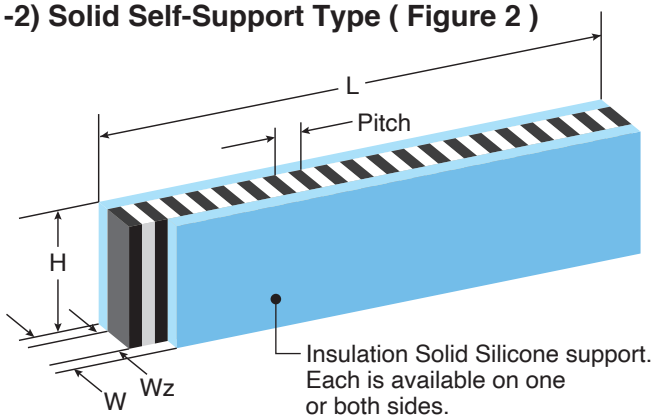
Type of Zebra	Series	LCD Contact Spacing Center-to-Center Minimum	Figure-1 Plain - Type	Figure-2 Insulation Barrier - Type	Figure-3 Solid Self-Support - Type	Figure-4 Sponge Self-Support - Type
Carbon Connector (Standard)	1002 (CZ410 / CZ710)	0.010"(0.25mm)	Available	Available	Available	Available
	2004 (CZ418)	0.020"(0.50mm)	Available	Available	Available	Available
	2005 (CZ405 / CZ705)	0.006"(0.15mm)	Available	Available	Available	Available
Low Temperature Cobon Connector	LT200 (CZ610)	0.010"(0.25mm)	Available	Available	Available	Not Available

-1) Plain Type (Figure-1)



Tc= Conductive Layer Thickness.
Ti= Insulating Layer Thickness.

-2) Solid Self-Support Type (Figure 2)



Insulation Solid Silicone support.
Each is available on one
or both sides.

-3) Insulation Barrier Type (Figure-3)

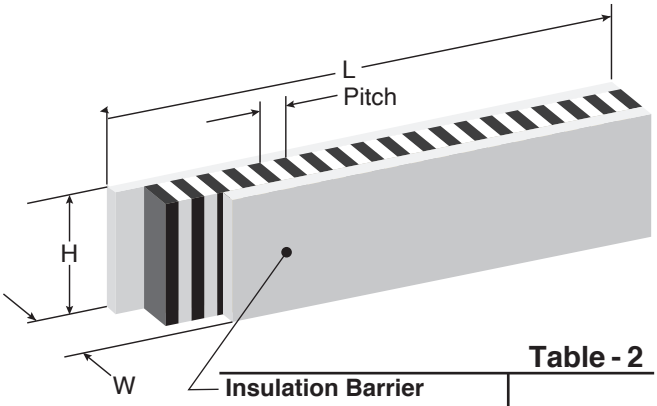
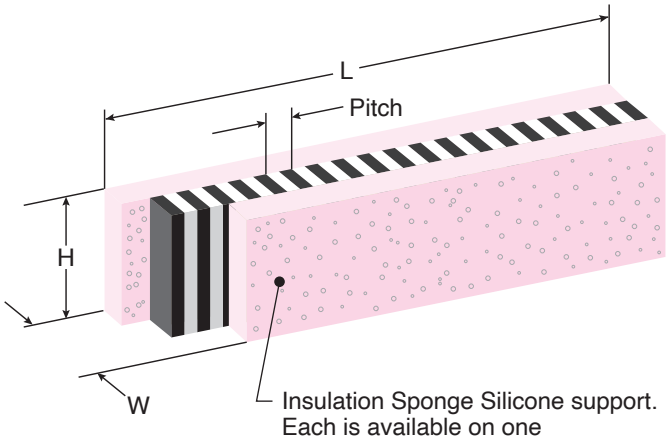


Table - 2

Insulation Barrier	
Color (one only)	White
Thickness	0.002" (0.05mm)
Dielectric Strength	500 volts/mil
Resistance (ohms)	10^{12}

-4) Sponge Self-Support Type (Figure 4)



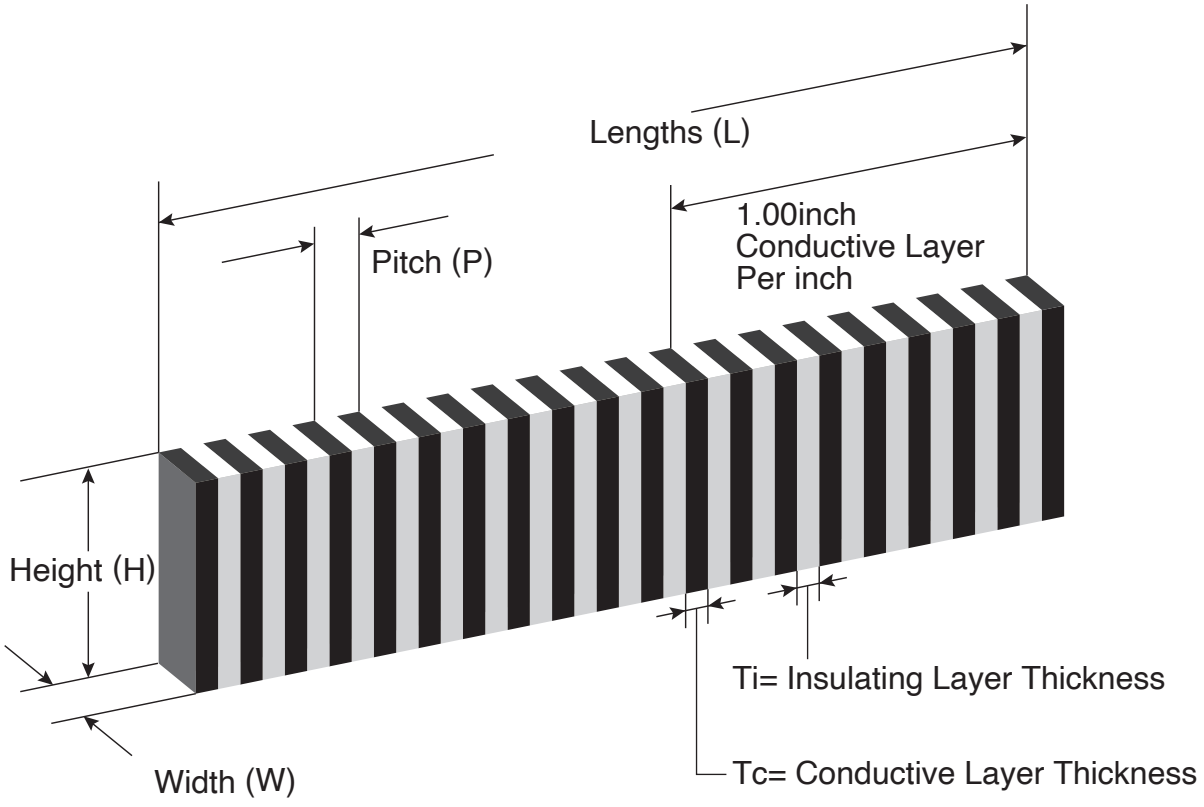
Insulation Sponge Silicone support.
Each is available on one
or both sides.

4] Series of Carbon Connector (Standard) and Low Temperature Carbon Connector

Table - 3

	LCD Contact Spacing Center-to-Center	LCD Sum of the Thickness of an Adjacent Conductive and non-Conductive Layer		Conductive Layer per inch	Individual Conductive and Insulating Layer Thickness		Available Lengths
Series	**Minimum**	**Nominal**	**Maximum**	**Minimum**	**Minimum**	**Maximum**	**Maximum**
1002 (CZ410 / CZ710)	0.015" (0.38 mm)	0.004" (0.10 mm)	0.006" (0.15 mm)	240	0.001" (0.025 mm)	0.004" (0.10 mm)	9.0" (230 mm)
2004 (CZ418)	0.020" (0.50 mm)	0.007" (0.18 mm)	0.010" (0.25 mm)	140	0.002" (0.050 mm)	0.006" (0.15 mm)	9.0" (230 mm)
2005 (CZ405 / CZ705)	0.010" (0.25 mm)	0.002" (0.050 mm)	0.004" (0.10 mm)	500	0.0004" (0.010 mm)	0.0024" (0.060 mm)	9.0" (230 mm)
LT200 (CZ610)	0.015" (0.38 mm)	0.004" (0.10 mm)	0.006" (0.15 mm)	240	0.001" (0.025 mm)	0.004" (0.10 mm)	5.0" (127 mm)

Figure - 5



5] Maximum Available Size and Standard Widths.

Table - 4

	Series	Available Lengths	Standard Widths
Plain Type	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.015"~0.118" (0.38mm~3.00mm) above 0.118" Consult factory
	LT200 (CZ610)	5.00" (127mm)	
Insulation Barrier Type	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.015"~0.118" (0.38mm~3.00mm) above 0.118" Consult factory
	LT200 (CZ610)	5.00" (127mm)	
Solid **Self - Support Type**	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.050" (1.27mm) 0.090" (2.30mm) 0.060" (1.50mm) 0.100" (2.50mm) 0.070" (1.80mm) 0.120" (3.00mm) 0.080" (2.00mm) 0.140" (3.50mm)
	LT200 (CZ610)	5.00" (127mm)	
Sponge **Self - Support Type**	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.060" (1.50mm) 0.087" (2.00mm) 0.118" (3.00mm) 0.063" (1.60mm) 0.091" (2.30mm) 0.126" (3.20mm) 0.067" (1.70mm) 0.100" (2.50mm) 0.138" (3.50mm) 0.070" (1.80mm) 0.102" (2.60mm) 0.150" (3.80mm) 0.075" (1.90mm) 0.106" (2.70mm) 0.157" (4.00mm) 0.079" (2.00mm) 0.110" (2.80mm)

6] Tolerance Table.

-1) Plain type Connector / Insulation Barrier Connector.

Table - 5

Measurement	Mark	MM : Size and Tolerance	inch : Size and Tolerance
Length	**L**	4.00 ~ 61.00 ±0.20 61.20 ~ 152.40 ±0.38 152.60 ~ 200.00 ±0.50 200.10 ~ 230.00 ±1.00	0.157" ~ 2.400" ±0.008" 2.410" ~ 6.000" ±0.015" 6.010" ~ 7.870" ±0.020" 7.880" ~ 9.000" ±0.039"
Height	**H**	0.50 ~ 19.00 ±0.127 above 19.00 Consult factory	0.020" ~ 0.750" ±0.005" above 0.750" Consult factory
Width	**W**	0.38 ~ 1.00 ±0.050 1.01 ~ 2.00 ±0.076 2.01 ~ 3.00 ±0.127 above 3.00 Consult factory	0.015" ~ 0.039" ±0.002" 0.040" ~ 0.079" ±0.003" 0.080" ~ 0.118" ±0.005" above 0.118" Consult factory

-2) Solid Self-Support Connector.

Table - 6

Measurement	Mark	MM : Size and Tolerance	inch : Size and Tolerance
Length	**L**	4.00 ~ 61.00 ±0.20 61.20 ~ 152.40 ±0.38 152.60 ~ 200.00 ±0.50 200.10 ~ 230.00 ±1.00	0.157" ~ 2.400" ±0.008" 2.410" ~ 6.000" ±0.015" 6.010" ~ 7.870" ±0.020" 7.880" ~ 9.000" ±0.039"
Height	**H**	1.00 ~ 19.00 ±0.127 above 19.00 Consult factory	0.039" ~ 0.750" ±0.005" above 0.750" Consult factory
Width	**W**	1.27 ~ 2.00 ±0.15 2.03 ~ 2.54 ±0.18 2.55 ~ 3.50 ±0.20 above 3.50 Consult factory	0.050" ~ 0.079" ±0.006" 0.080" ~ 0.100" ±0.007" 0.101" ~ 0.140" ±0.008" above 0.140" Consult factory

-3) Sponge Self-Sopport Connector.

Table - 7

Measurement	Mark	MM : Size and Tolerance	inch : Size and Tolerance
Length	**L**	4.00 ~ 61.00 ±0.20 61.20 ~ 152.40 ±0.38 152.60 ~ 200.00 ±0.50	0.157" ~ 2.400" ±0.008" 2.410" ~ 6.000" ±0.015" 6.010" ~ 7.870" ±0.020"
Height	**H**	1.00 ~ 19.00 ±0.127 above 19.00 Consult factory	0.039" ~ 0.750" ±0.005" above 0.750" Consult factory
Width	W	1.52 ~ 4.00 ±0.10 above 4.00 Consult factory	0.060" ~ 0.157" ±0.004" above 0.157" Consult factory

7] Typical Product Properties.

Table - 8

Operating Temperature Range	(Standard) Carbon Connector Series : 1002 (CZ410 / CZ710) / 2004 (CZ418) / 2005 (CZ405 / CZ705)	-55°F ~ +260°F (-50°C ~ +125°C)	
	Low Temperature Carbon Connector Series : LT200 (CZ610)	-85°F ~ +260°F (-65°C ~ +125°C)	
Current Carrying Capacity	(Standard) Carbon Connector Series : 1002 (CZ410 / CZ710) / 2004 (CZ418) / 2005 (CZ405 / CZ705)	50mA	0.035" x 0.035" Pad (0.90mm x 0.90mm)
	Low Temperature Carbon Connector Series : LT200 (CZ610)	50mA	
Resistance Between Layers	(Standard) Carbon Connector Series : 1002 (CZ410 / CZ710) / 2004 (CZ418) / 2005 (CZ405 / CZ705)	10^{12} ohms	
	Low Temperature Carbon Connector Series : LT200 (CZ610)	10^{12} ohms	

8] Typical Material Properties.

Table - 9

Item	**Conductive Layer**	**Insulating Layer**	**Support Rubber**	**Support Sponge**
material	Carbon Filled Silicone Rubber	Non-conductive Silicone Rubber	Non-conductive Silicone Rubber	Non-conductive Silicone Sponge
Color	Black	Off-white	Light blue	Pink
Hardness Shore A	73	70	25	10
Tensile Strength MPa	5.8	6.9	4.9	2.9
Elongation %	100	250	250	100
Tear Strength KN/m	7	10	10	5
Volume Resistivity MΩ·m	$5x10^{-8}$	$1x10^{6}$	$1x10^{6}$	$1x10^{6}$

9] Calculation of Resistance and Force Deflection.

-1) Resistance.

For the purpose of calculating the resistance of a Carbon Connector and testing them for compliance, please use the following formula.

Table - 10

Inches	Metric
$R = \frac{2.37 \times h}{(Ew \times w)}$ =ohms	$R = \frac{60 \times h}{(Ew \times w)}$ Where, cw, and w arein "cm"
Ew = Electrode Pad width in inches W = Width of ZEBRA portion in inches H = Connector Height (H) in inches	Ew = Electrode Pad width in mm w = Width of ZEBRA portion in mm h = Connector Height (H) in mm

-2) Force Deflection.

Connector should be deflected 5% to 25% of Height (H) To calculate Force for deflection, use following formula.

Plain ZEBRA or Insulation Barrier Type

Table - 11

Inches	Metric
$F(N) = 5806D \times W \times L \times 9.8 \times 10^{-3}$	$F(N) = 9D \times W \times L \times 9.8 \times 10^{-3}$

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

H = Height of Connector (inches or mm)

H_1 = Deflected height of Connector (inches or mm)

L = Length of Connector (inches or mm)

W = Width of Connector (inches or mm)

Insulation Silicone Support Type

Table - 12

Inches	Metric
$F(N) = [(5806D \times W \times L) + \{1161D \times (W - W_1) \times L\}] \times 9.8 \times 10^{-3}$	$F(N) = [(9D \times W \times L) + \{1.8D \times (W - W_1) \times L\}] \times 9.8 \times 10^{-3}$

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

H = Height of Connector (inches or mm)

H_1 = Deflected height of Connector (inches or mm)

L = Length of Connector (inches or mm)

W = Width of Connector (inches or mm)

W_1= Width of ZEBRA Connector (inches or mm)

10] Others

FUJIPOLY website http://www.fujipoly.com/

11] Trade Marks



in USA and UK

ZEBRA

Notes :

- All FUJIPOLY test data in this document is based on FUJIPOLY test method and is believe to be accurate and reliable. Nevertheless, any FUJIPOLY test data shows typical product properties, and does not show the guaranteed product properties.
- Some Silicone oil could exude from the product according to operating conditions.
- Some low molecular Siloxane could vaporize from the product according to operating conditions.
- It is advisable to use the product under recommended operating condition. Some more Silicone oil could exude from the product if it was used over the recommended condition.
- It is advisable to use the product under parallel and even compression. Some more Silicone oil could exude from the product if it was used under excessive or partial stress.
- Products testing by the purchaser is recommended in order to meet expected results such as performance and application.

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