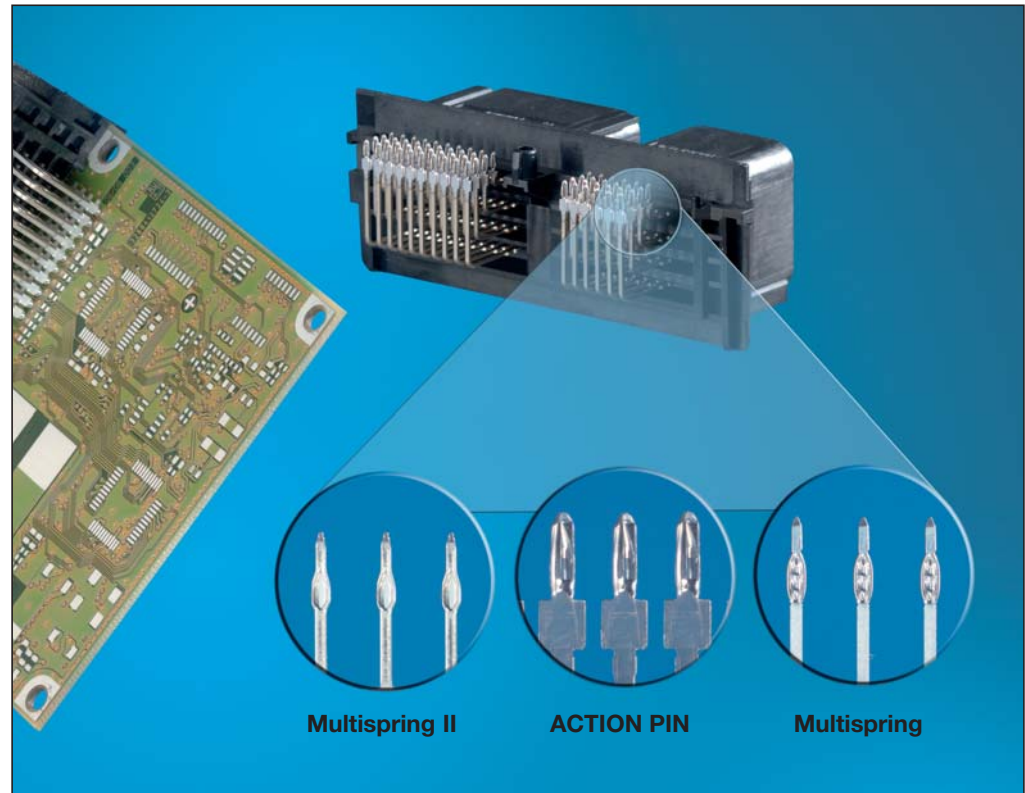


## Introduction



**For many years  
Compliant ACTION PIN  
Contacts have proven  
their Reliability in the  
Automotive Industry**



Solderless interconnections have been popular in electrical and electronic applications with worldwide success for decades. They provide reliable electrical and mechanical stability and offer cost savings across the board.

Solderless electrical interconnections have become increasingly important for printed circuit board applications. The Tyco Electronics compliant ACTION PIN and Multispring contacts provide reliable electro-mechanical connection to plated-through pc board holes.

Since Tyco Electronics compliant contacts do not have to be soldered, the following problems associated with solder are eliminated:

- Faulty soldered joint
- Solder fumes (contacts become contaminated)
- Solder spots (short circuits between printed circuits)
- Flux residues
- Thermal strain on PCBs and components
- Degassing of plated-through holes.

Since its introduction in the early 1970's, the compliant ACTION PIN contact has achieved wide success. Billions of contacts have successfully proven their reliability in electronic and electrical applications.

For many years compliant pin contacts have been extensively used in the automotive industry.

Solderless press-in interconnections are used in racks, especially where connectors

must be fixed on the solder side of the PCB and/or component side. In those cases, the holes for the compliant connectors are covered during the solder process and press-in is done after soldering.

Other applications for press-in interconnections include PCBs that incorporate components using surface mounting technology (SMT). Here, too, press-in interconnections can be applied after soldering, eliminating complications caused by connectors suitable for surface mounting.

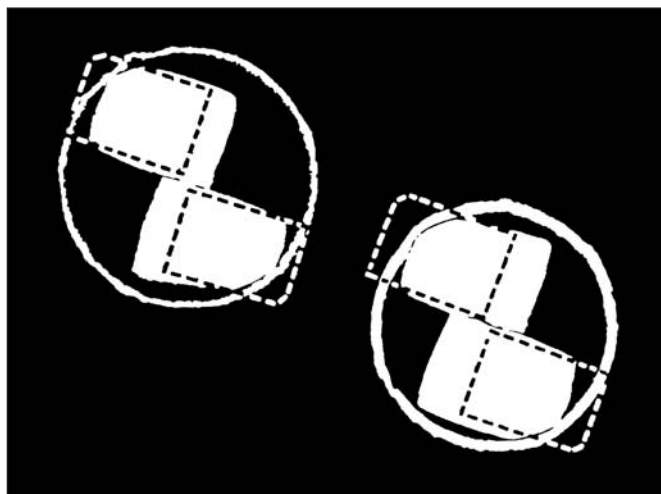
Implementing lead-free technology according environmental directives, all Tyco Electronics compliant press-in connectors feature lead-free plating finishes.

### Features of the Compliant ACTION PIN and Multispring Contacts

- Large gas-tight contact zone
- High reliability due to stored energy
- Minimum damage to plated-through holes during application
- Especially suited for multi-layer PCBs
- More economic board manufacturing due to larger hole tolerances compared to the use of a solid pin
- Application can be made by the end-user
- High-end Tyco Electronics application tooling available

ACTION PIN and Multispring are trademarks.

## Introduction (continued)



**Figure 1:**  
 Cross section of ACTION PIN  
 contact press-in area in pc board  
 holes with minimum and maximum  
 hole diameter.

### Principle of the Compliant ACTION PIN Contact

When a compliant ACTION PIN contact is inserted into a plated-through hole, two spring members are compressed, exerting force against the hole for a gas-tight connection. The diameter of the hole is smaller than the diagonal size of the pin (fig. 1).

The beam characteristics of the pin are designed so that a plastic as well as an elastic deformation will take place during insertion. The two spring members are compressed at different degrees to accommodate hole tolerances.

The compliant pin also reduces strain on the board. With a rigid pin, the elastic strain energy is stored entirely in the board. This will lead to damage of plated-through holes.

The compliant ACTION PIN contact produces a tight contact zone between the pin and the plated-through hole and guarantees long-term reliable electrical interconnection and mechanical reliability. The residual force of the elastic deformation maintains stored energy, insuring long-term reliability of compliant ACTION PIN contact press-in connections.

### PC Board Thickness

Each compliant pin contact connector type is designed for a certain minimum pc board thickness. Generally, types suitable for pc board thickness of 1.5/1.6 mm can also be used for thicker pc boards. A tolerance of 10 % applies to the normal thickness.

For information concerning other printed circuit board thicknesses contact your local Tyco Electronics representative.

Introduction (continued)

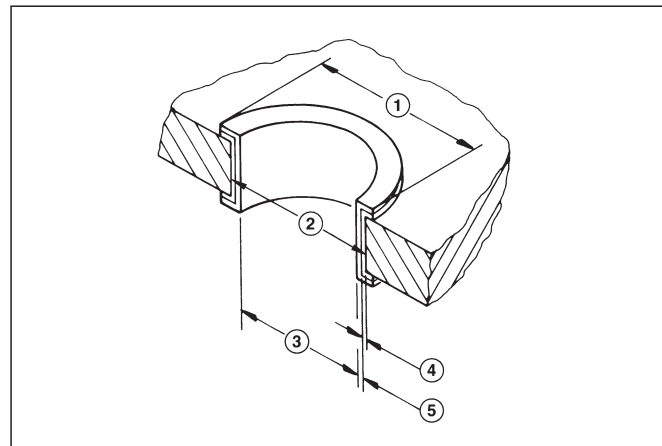
**Specifications of  
Plated-Through Holes**

Besides the final diameter, the entire hole design – hole diameter, copper and tin thickness – is important.

**PC Board Requirements for  
Solderless ACTION PIN Contact  
Press-In Connections**

**Type:** Glass-epoxy (NEMA grade G 10, G 11, FR 4, FR 5 corresponding to DIN 7735 Hgw-Types or DIN 40802 EP-Types).

**Hole Position Tolerance:**  
±0.05 mm not cumulative



- ① Pad
- ② Drilled Hole
- ③ Plated-Through Hole
- ④ Copper Thickness
- ⑤ Tin Thickness

**Structure of Plated-Through Hole**

Nominal PCB Hole Diameter, Plated	0.6 mm	0.9 mm	1.0 mm	1.35 mm	1.45 mm	1.6 mm
Drilled Hole Diameter (mm)	0.7 ±0.025	1.0 ±0.025	1.15 ±0.025	1.5 ±0.025	1.6 ±0.025	1.75 ±0.025
Copper Layer (µm)	25–50	25–75				
Tin Layer (µm)	4–10	4–15				
Diameter, Galvanized (mm)	0.55–0.65	0.85–0.95	0.94–1.09	1.29–1.44	1.39–1.54	1.54–1.69

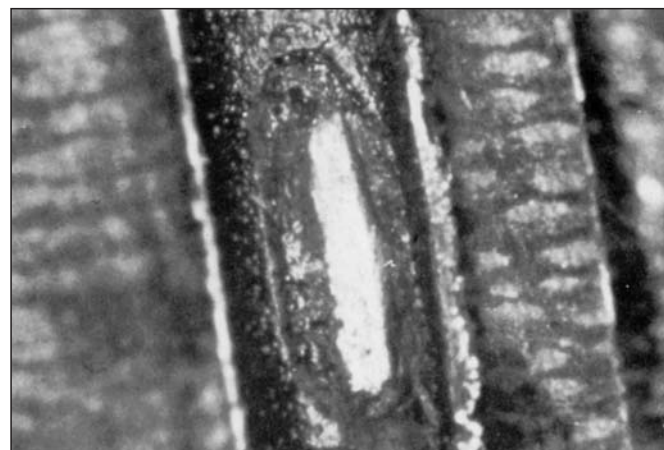
For information concerning other printed circuit board plating types contact your local Tyco Electronics representative.

**Gas-Tight Connection**

An electrical connection should have a long-term low electrical resistance which is not effected by environmental conditions.

This feature is described as gas-tight. Press-in methods using compliant ACTION PIN and Multispring contacts with corresponding pc board holes are gas-tight.

In figure 2, the area can be seen, where the compliant ACTION PIN contact the plated-through hole, protecting against industry atmosphere.



**Figure 2:** The polished section of a plated-through hole shows a clean contact area. The remaining plated-through area has visibly changed due to industry atmosphere.

**Replaceable Contacts**

In general, press-in connections cannot be re-used.

Using a new compliant ACTION PIN contact as a replacement, a pc board hole can be used again. Compliant ACTION PIN contacts are individually replaceable by use of a simple tool. Damaged pins can be removed and replaced several times without sacrificing mechanical or electrical performance.

**Retention Force**

Press-in pins are designed to take on additional functions besides contacting the pc board. They can also be used for wire wrapping and/or with connectors. Therefore, press-in pins must take additional stresses without damaging the press-in connection.

ACTION PIN and Multispring are generally designed in accordance with the IEC 60352-5 specification. Tyco Electronics press-fit solutions have been designed for the use with HAL Sn finishes.

Alternative lead-free PCB plating finishes can have significant effect on the mechanical performance of a press-fit system.

Consequently, different finishes need to be evaluated separately.

ACTION PIN and Multispring compliant pin contacts feature typical retention force values of 30 N minimum.

### AMPMODU II Pins

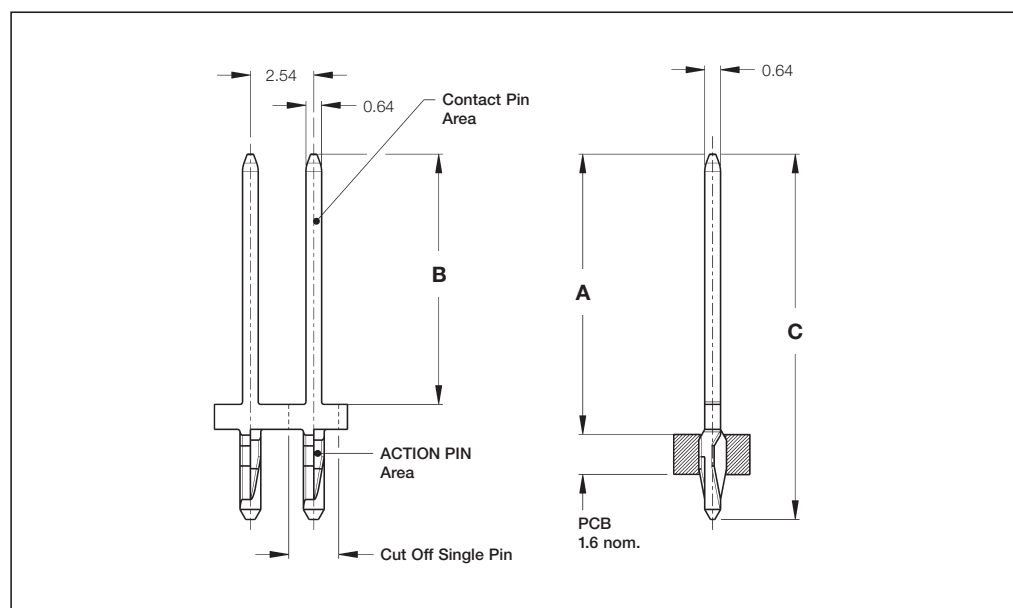
#### Technical Features

##### Product Specification:

IEC 60352-5

##### Application Specification:

114-25011



Dimensions (mm)			Nominal PCB Hole Diameter, Plated*	Material	Finish	Part Numbers			
A	B	C				Strip Form	Package Quantity	Loose-Piece	Package Quantity
5.20	4.00	8.40	0.9	CuSn 4	1)	1-928776-9	50,000	1-928836-9	1,000
6.80	5.60	10.00			1)	2-928776-5		2-928836-5	
7.45	6.25	10.65			3)	1-928776-5		1-928836-5	
8.25	7.05	11.45			3)	2-928776-0		2-928836-0	
9.50	8.30	12.70			1)	2-928776-2		2-928836-2	
10.00	8.80	13.20			3)	1-928776-2		1-928836-2	
12.00	10.80	15.20			1)	1-928776-8		1-928836-8	
13.60	12.40	16.80			1)	3-928776-4		3-928836-4	
18.00	16.80	21.20			3)	1-928776-4		1-928836-4	
21.30	20.10	24.50			1)	2-928776-3		2-928836-3	
3.60	2.40	6.80			3)	1-928776-3		1-928836-3	
8.25	8.05	11.45			1)	1-928776-6		1-928836-6	
9.70	6.70	13.60			3)	2-928776-6		2-928836-6	
13.10	10.10	17.00			1)	2-928776-7		2-928836-7	
					3)	1-928776-7		1-928836-7	
					1)	2-928776-1		2-928836-1	
					3)	1-928776-1		1-928836-1	
3.60	2.40	6.80	0.9	CuSn 4	1)	964056-2	50,000	–	–
8.25	8.05	11.45	0.9	CuSn 4	2)	737604-2	50,000	–	–
9.70	6.70	13.60	1.0	CuSn 4	1)	1-215345-4	50,000	–	–
13.10	10.10	17.00			3)	215345-2			
					4)	215345-3			
					1)	1-215345-3			
					4)	215345-5			

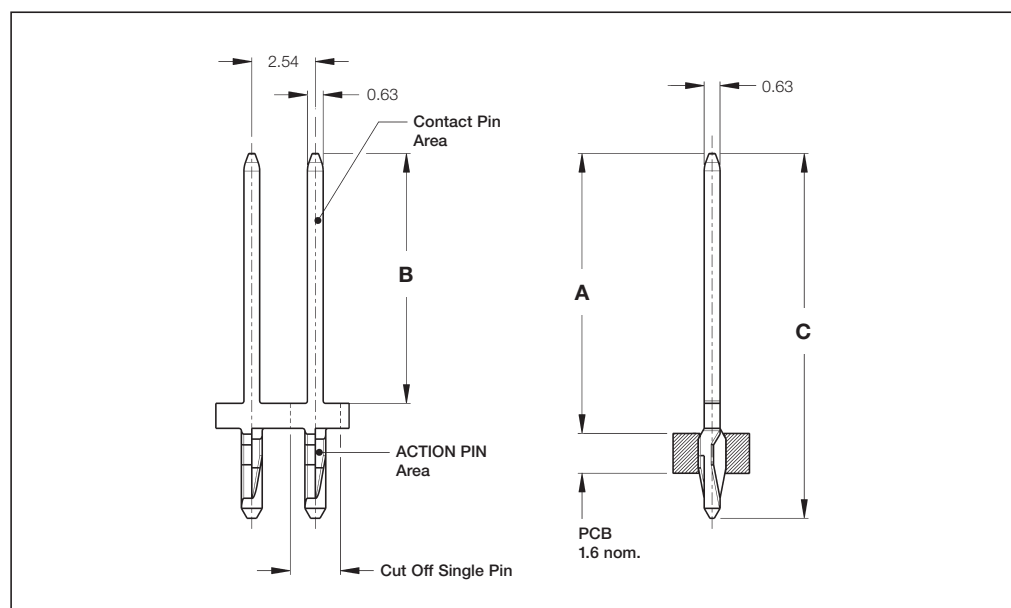
#### Finish:

- 1) Tin over nickel plated
- 2) Contact pin area selective 0.2 µm gold over nickel plated, ACTION PIN area selective tin over nickel plated
- 3) Contact pin area selective 0.8 µm gold over nickel plated, ACTION PIN area selective tin over nickel plated
- 4) Contact pin area selective 1.3 µm gold over nickel plated, ACTION PIN area selective tin over nickel plated

\*) Structure of finished plated-through hole see table page 31-3.

Other post lengths, materials and finishes on request.

### MQS Pins ( $0.63_{-0.03} \times 0.63_{-0.03}$ )



Dimensions (mm)			Nominal PCB Hole Diameter, Plated *	Material	Finish	Part Number		Product Specification	Application Specification
A	B	C				Strip Form	Package Quantity		
8.25	7.05	11.45	0.9	CuSn 4	1)	2-929958-1	50,000	-	-
					2)	1-929958-1			
10.00	8.80	13.20			1)	2-929958-2			
					2)	1-929958-2			
8.25	7.05	11.65	1.0	CuNiSi	1)	2-963964-3	50,000	108-18643	114-18279
					2)	1-963964-3			
9.40	8.20	12.80			1)	2-963964-8			
10.00	8.80	13.40			1)	2-963964-4			
			1.0	CuNiSi	2)	1-963964-4	50,000	108-18643	114-18279
11.30	10.10	14.70			1)	2-963964-7			
					2)	3-963964-7			
21.50	20.30	24.90			1)	7-963964-9			
10.60	9.30	13.90	1.0	CuNiSi	1)	1-929278-2 **	-	108-18643	114-18279

### TH .025 Pins ( $0.64_{\pm 0.05} \times 0.64_{\pm 0.05}$ )

Dimensions (mm)			Nominal PCB Hole Diameter, Plated *	Material	Finish	Part Number		Product Specification	Application Specification
A	B	C				Strip Form	Package Quantity		
9.4	8.2	12.8	1.0	CuNiSi	1)	1801209-1 **	-	-	-

#### Finish:

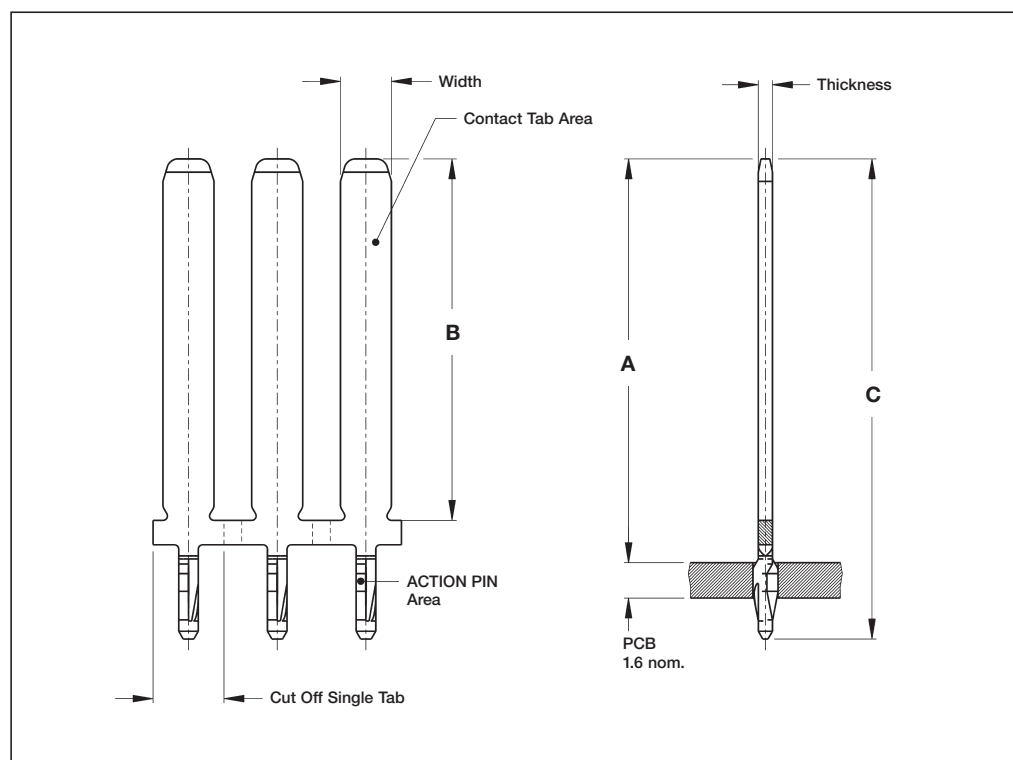
- 1) Tin over nickel plated
- 2) Contact pin area selective 0.8 µm gold over nickel plated, ACTION PIN area selective tin over nickel plated.

\*) Structure of finished plated-through hole see table page 31-3.

\*\*) Customer restricted

Other post lengths, materials and finishes on request.

### Tab with 1 ACTION PIN Area



Tab Width x Thickness	Dimensions (mm)			Nominal PCB Hole Diameter, Plated *	Material	Finish	Part Numbers		Product Specification	Application Specification
	A	B	C				Strip Form	Package Quantity		
1.20 x 0.60	13.60	12.20	17.00	1.00	CuSn	1)	1743447-2	–	108-61069	114-61008
1.50 x 0.60	13.55	10.30	16.90	1.00	CuNiSi	1)	1394353-2 **	50,000	–	–
1.00 x 0.64	13.80	12.60	17.20	1.00	CuSn	1)	368405-2 **	–	108-61087	114-61013
2.30 x 0.64	18.20	16.30	21.65	1.00	CuSn	1)	1-1452691-2	20,000	–	–
	10.20	8.50	14.10			1)	1-1452692-2	25,000		
1.50 x 0.80	11.30	9.60	15.20	1.35	CuSn	1)	1-1563229-2	25,000	108-18867	114-18570
	12.40	10.70	16.30			1)	1-1670386-2 **	25,000		
						2)	1-1670386-4 **	25,000		
1.00 x 1.00	22.00	20.00	29.00	1.60 pcb thickness 2.4	CuSn	1)	100349-2	50,000	–	–

#### Finish:

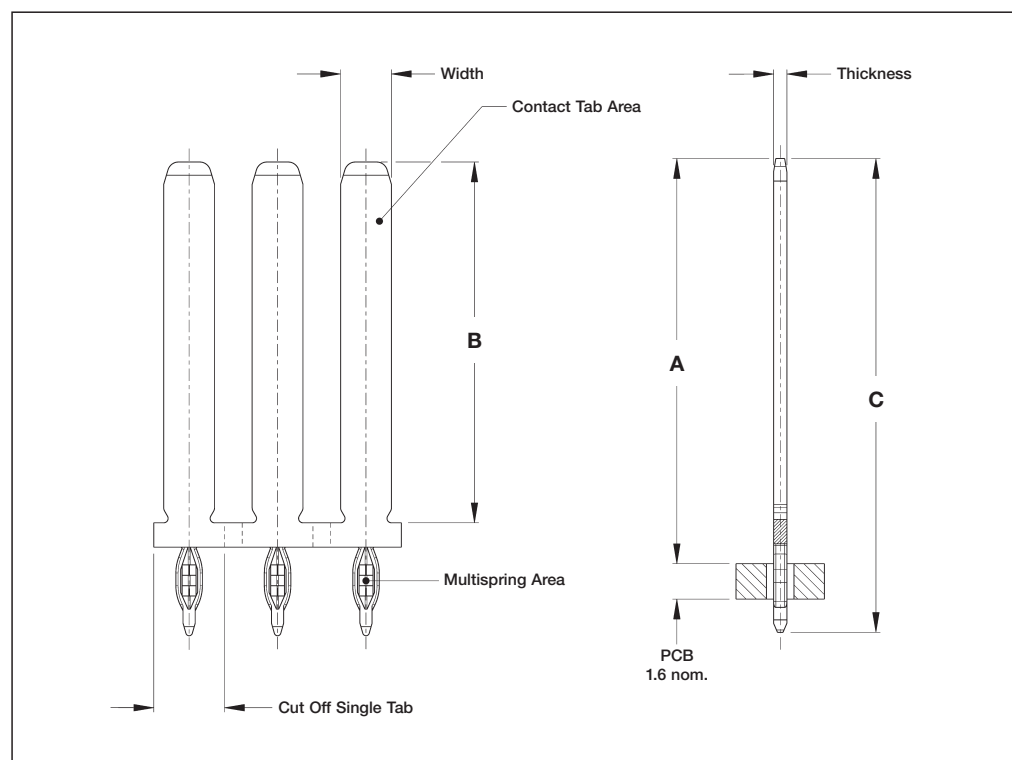
- 1) Tin over nickel plated
- 2) Contact tab area selective silver over nickel plated, ACTION PIN area selective tin over nickel plated.

\*) Structure of finished plated-through hole see table page 31-3.

\*\*) Customer restricted

Other post lengths, materials and finishes on request.

Tab with 1 Multispring Area



Tab Width x Thickness	Dimensions (mm)			Nominal PCB Hole Diameter, Plated *	Material	Finish	Part Numbers		Product Specification	Application Specification
	A	B	C				Strip Form	Package Quantity		
1.70 x 0.64	12.40	10.80	16.40	1.00	CuSn	1)	1801059-1 **	–	–	–

**Finish:**

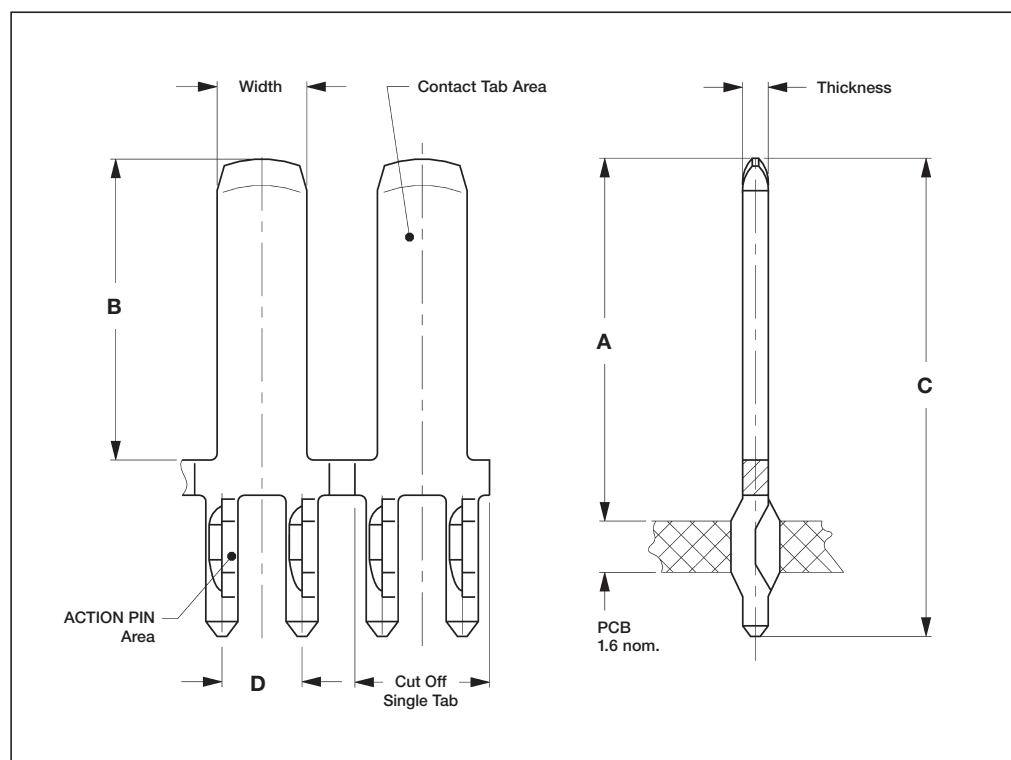
1) Tin over nickel plated

\*) Structure of finished plated-through hole see table page 31-3.

\*\*) Customer restricted

Other post lengths, materials and finishes on request.

### Tab with 2 ACTION PIN Areas



Tab Width x Thickness	Dimensions (mm)				Nominal PCB Hole Diameter, Plated *	Material	Finish	Part Numbers		Product Specification	Application Specification
	A	B	C	D				Strip Form	Package Quantity		
1.5 x 0.6	10.50	9.00	13.80	2.00	1.00	CuSn	1)	1-1823233-2	–	108-18706	114-18379
2.8 x 0.6	10.00	7.90	13.40	2.54	1.00	CuNiSi	1)	1-1452568-1	–	–	–
2.4 x 0.8	12.40	10.40	15.90	3.10	1.35	CuSn	1)	969174-2 **	20,000	–	–
	8.00	6.00	11.50	3.10	1.35		1)	969053-2	20,000	–	–
	8.50	6.00	12.00	2.54	1.35		1)	352604-2	–	–	–
							1)	1-1452688-2			
	11.30	9.40	14.90	2.50	1.35		2)	3-1452688-1	20,000	108-18644	114-18280
							3)	2-1452688-1			
	11.30	9.40	14.90	2.50	1.35		1)	1-0929277-2 **	20,000	108-18644	114-18280
2.8 x 0.8						CuSn	1)	338429-2	12,500		
	13.50	10.75	18.50	2.54	1.45		2)	338429-3	12,500	–	–
							1)	1483313-2	12,500		
							2)	1483313-3	12,500		
	13.50	11.60	17.70	2.54	1.45		1)	1-1670123-2 **			
	13.80	11.80	17.80	3.10	1.35		1)	969054-2	20,000		
	16.40	13.65	21.40	2.54	1.45		1)	1377181-2	–		
4.8 x 0.8	13.70	10.95	18.70	2.54	1.45	CuSn	1)	1345034-2	11,000	–	–

#### Finish:

- 1) Tin over nickel plated
- 2) Contact tab area selective silver over nickel plated, ACTION PIN area selective tin over nickel plated.
- 3) Contact tab area selective 0.8 µm gold over nickel plated, ACTION PIN area selective tin over nickel plated.

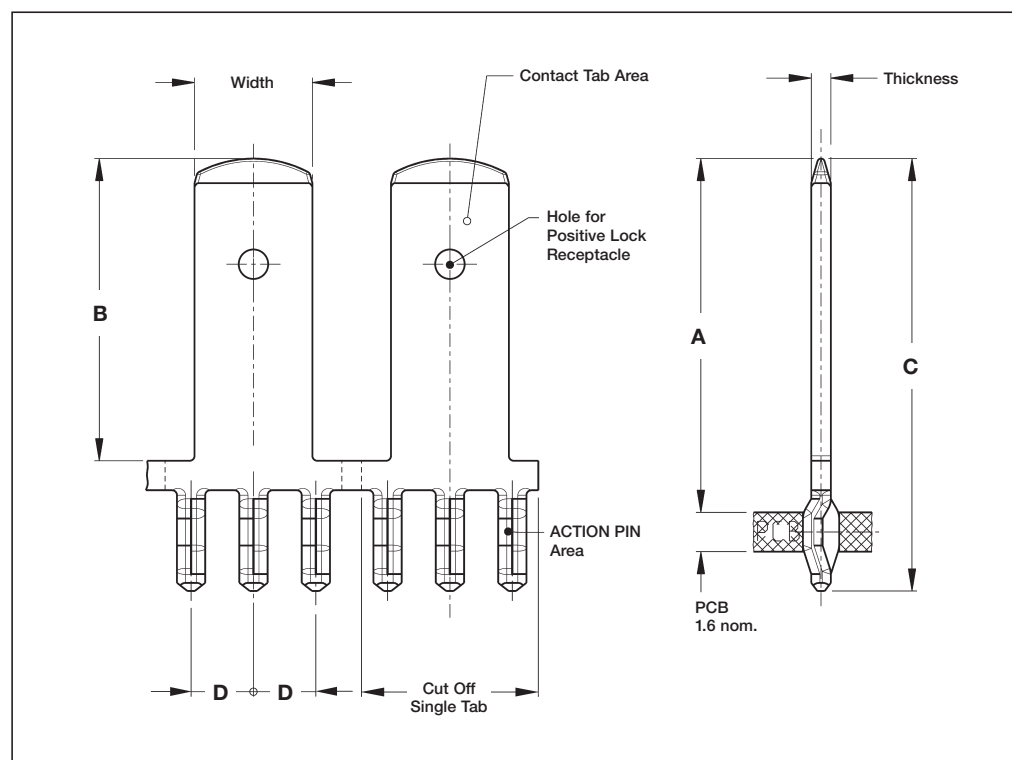
\*) Structure of finished plated-through hole see table page 31-3.

\*\*) Customer restricted

Other post lengths, materials and finishes on request.



### Tab with 3 ACTION PIN Areas



Tab Width x Thickness	Dimensions (mm)				Nominal PCB Hole Diameter, Plated*	Hole	Material	Finish	Part Numbers			Product Specifi- cation	Application Specifi- cation
	A	B	C	D					Strip Form	Package Quantity	Loose- Piece		
4.8 x 0.8	12.20	10.10	15.40	2.54	1.35	–	CuSn	1)	1-0929451-2**	20,000	1564228-2	108-18707	114-18380
	14.40	12.30	17.60	2.54	1.35	–	CuSn	1)	1-1452719-2	20,000	–	108-18707	114-18380
	13.50	10.75	18.50	2.54	1.45	X	CuSn	1)	216842-2	12,500	–	–	–
6.3 x 0.8	13.50	10.75	18.50	2.54	1.45	X	CuSn	2)	216842-4	12,500	–	–	–
	19.85	16.05	23.85	2.54	1.45	X	CuSn	1)	1740723-2**	12,500	–	–	–

#### Finish:

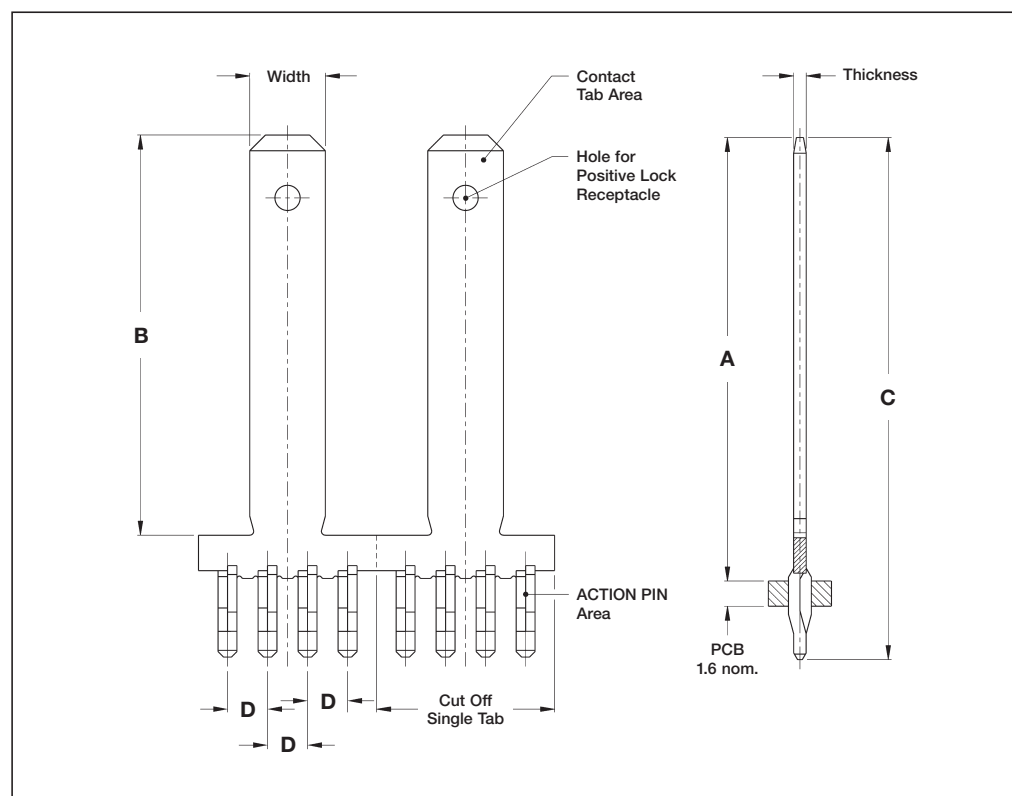
- 1) Tin over nickel plated
- 2) Contact tab area selective silver over nickel plated,  
ACTION PIN area selective tin over nickel plated.

\*) Structure of finished plated-through hole see table page 31-3.

\*\*) Customer restricted

Other post lengths, materials and finishes on request.

### Tab with 4 ACTION PIN Areas



Tab Width x Thickness	Dimensions (mm)				Nominal PCB Hole Diameter, Plated *	Hole	Material	Finish	Part Numbers		Product Specifi- cation	Application Specifi- cation
	A	B	C	D					Strip Form	Package Quantity		
4.8 x 0.8	28.2	25.45	33.2	2.54	1.45	X	CuSn	1)	338099-2	–	–	–

#### Finish:

1) Tin over nickel plated

\*) Structure of finished plated-through hole see table page 31-3.

Other post lengths, materials and finishes on request.

## ACTION PIN – PCB EDGE Contact

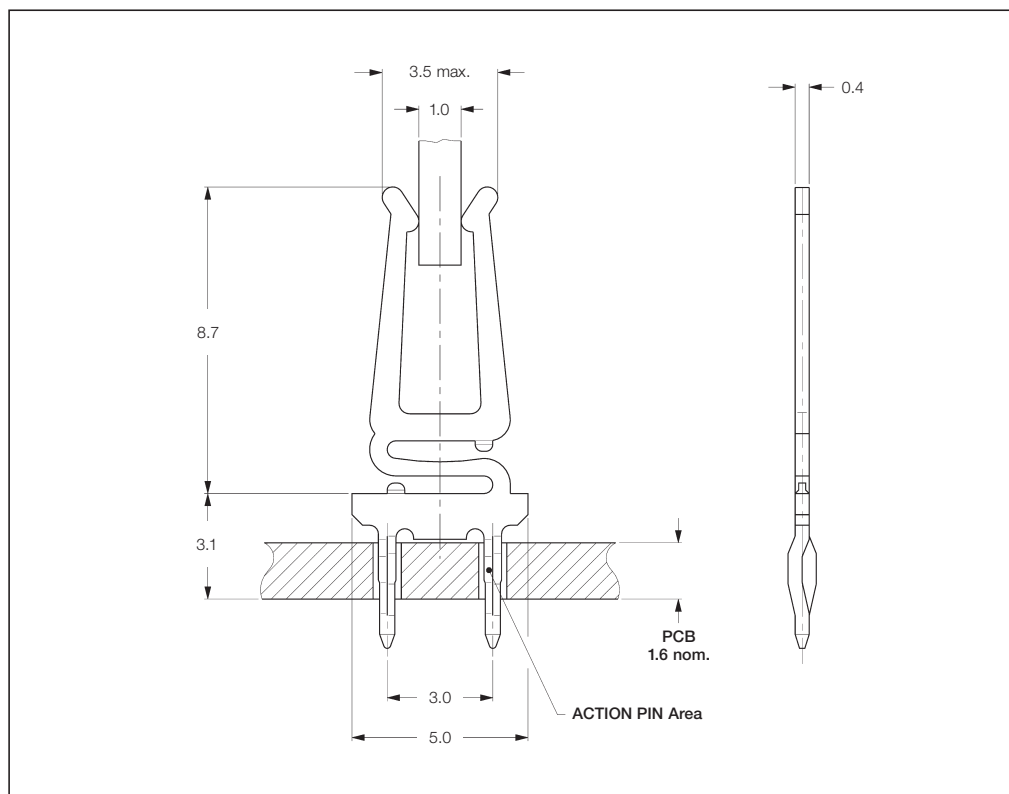
### Technical Features

**Contact Material:**

CuSn

**Contact Finish:**

tin over nickel plated



### PCB EDGE Contact

Nominal PCB Hole Diameter, Plated	Part Numbers					
	Strip Form	Package Quantity	Loose- Piece	Package Quantity	Applicator	Hand Tool
0.6	969015-2	50,000	–	–	–	–

### ACTION PIN Contact – Wire Connection

#### Technical Features

**Contact Material:**

CuNiSi

**Contact Finish:**

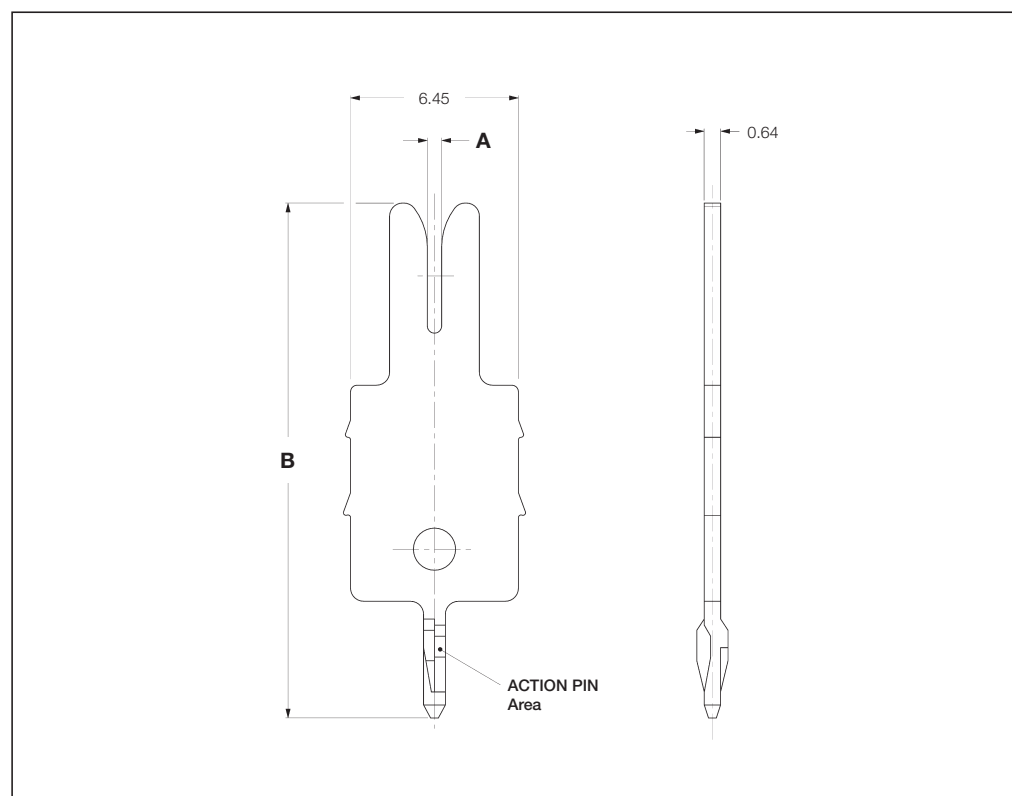
tin over nickel plated

**Product Specification:**

108-18298

**Application:**

for Capacitor



#### Wire Connection

For Wire Diameter A (mm)	Dimension B (mm)	Nominal PCB Hole Diameter, Plated	Part Numbers					
			Strip Form	Package Quantity	Loose-Piece	Package Quantity	Applicator	Hand Tool
0.8	19.8	1.0	1-968964-2	20,000	–	–	–	–
1.0			2-968964-2	20,000	–	–	–	–
0.8	22.2	1.0	2-1670195-2	20,000	–	–	–	–
1.0			1-1670195-2	20,000	–	–	–	–

**Finish:**

Tin over nickel plated

**ACTION PIN Contact – Foil-PC Board – Multiple Crimp**

**Technical Features**

**Contact Material:**

CuNiSi

**Contact Finish:**

tin over nickel plated

**Contact Resistance (New State):**

CuNiSi:  $\leq 3 \text{ m}\Omega$

**Total Temperature max.:**

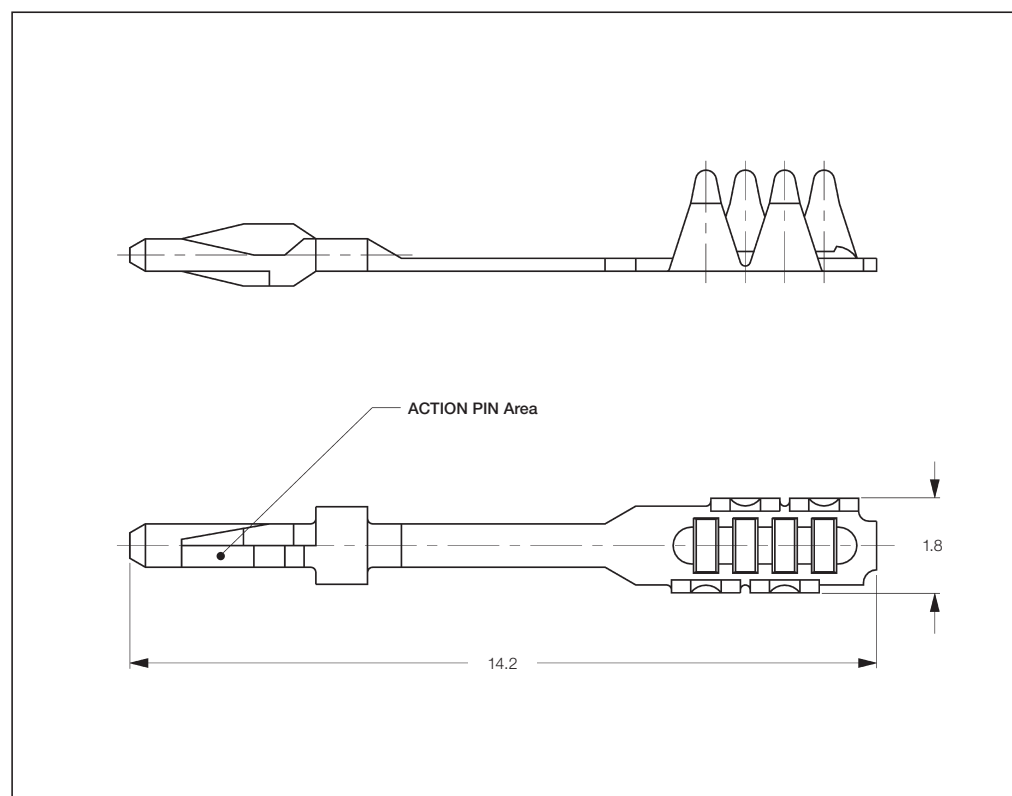
-40 °C to +120 °C (tin plated)

**Product Specification:**

108-18587-2

**Application Specification:**

114-18210-2



**Multiple Crimp**

Nominal PCB Hole Diameter, Plated	Part Numbers					Applicator	Hand Tool
	Strip Form	Package Quantity	Loose- Piece	Package Quantity			
1.0	1670255-2	–	–	–		224910 318619	90273-5

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Engineering Notes

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