

# 1mm Pitch, Board to Cable Lock Connector

## DF50 Series



### ■ Features

#### 1. It provides clear tactile click and secure mating

Locking function and contact mating occur simultaneously, for a clearer tactile click.

(Please refer to Figure 1 on the right)

#### 2. Robust structure resistant to wrenching forces

Thick and robust housing wall provides higher strength against cracking. Insertion depth for mating housings protects against wrenching.

(Please refer to Figure 2 on the right)

#### 3. Robust and reliable lance structure

High lance strength by mating with crimp contact on the surface

(Please refer to Figure 3 on the right)

#### 4. Ensured adsorption area eliminates the need for adsorption gap.

Adequate adsorption area is ensured despite the small size, allowing for automatic mounting without adsorption gap.

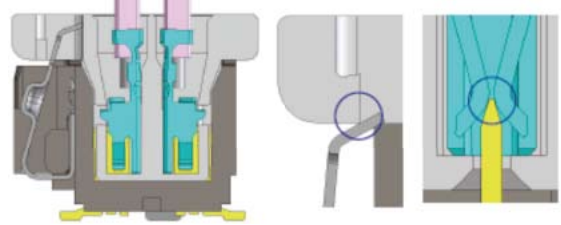
(\*Specifications for adsorption gap may be provided according to your requirements)

#### 5. Insulation outer diameter $\phi 0.9\text{mm}$ , compatible with AWG#28

Despite 1 mm Pitch, it is compatible with  $\phi 0.9\text{mm}$ , UL1061-AWG#28 Cable ( $\phi 0.127 \times 7$ )

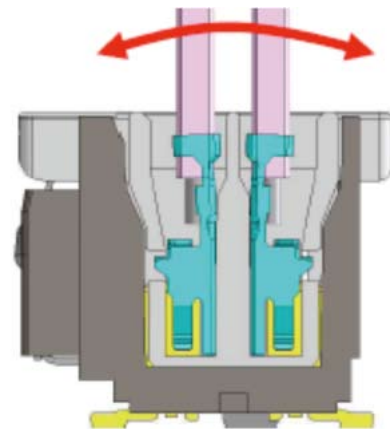
#### It provides clear tactile click and secure mating

Timing of locking function



Simultaneous timing of locking function and Figure 1. contact mating provides a clearer tactile click.

#### Robust structure resistant to wrenching forces

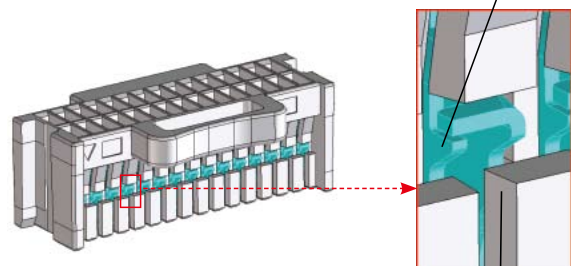


Insertion depth for mating protects against wrenching.

Thick and robust outer wall provides higher strength and prevents cracking.

#### Robust and reliable lance structure

The lance mates with the crimp contact on the surface.



It is possible to visually inspect the assembled lance.

Figure 3.

## ■Product Specifications

|         |                |            |                                                         |                                              |
|---------|----------------|------------|---------------------------------------------------------|----------------------------------------------|
| Ratings | Current Rating | 1A         | Operating Temperature Range<br>Operating Humidity Range | -35 to + 85°C (Note 1)<br>20 to 80%          |
|         | Voltage Rating | AC/DC 100V | Storage Temperature Range<br>Storage Humidity Range     | -10 to + 60°C (Note 2)<br>40 to 70% (Note 2) |

| Items                        | Specifications                                                                         | Conditions                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1. Insulation resistance     | No less than 500MΩ                                                                     | Measured at DC 100V                                                                                                                   |
| 2. Withstand voltage         | No flashover or breakdown                                                              | AC300V is applied for one minute                                                                                                      |
| 3. Contact resistance        | No more than 30mΩ                                                                      | Measured at 1mA and no higher than 20mV                                                                                               |
| 4. Vibration Resistance      | No electric outage of 1μs or greater                                                   | 10 cycles in each of three directions at frequency 10-55 Hz, half amplitude 0.75 mm                                                   |
| 5. Shock Resistance          | No electric outage of 1μs or greater                                                   | Accelerated velocity: 490m/s <sup>2</sup> for 11ms, half-sine in 3 directions, 3 times for each direction                             |
| 6. Moisture-resistance       | Contact resistance: no more than 50mΩ;<br>insulation resistance: no less than 100MΩ    | Temperature: 40±2°C; humidity: 90 to 95%, left as it is for 96 hours                                                                  |
| 7. Temperature cycles        | Contact resistance: no more than 50mΩ;<br>insulation resistance: no less than 500MΩ    | (-55°C for 30 minutes → 5 to 35°C for 2 to 3 minutes → 85°C for 30 minutes → 5 to 35°C for 2 to 3 minutes) in 5 cycles                |
| 8. Push-pull durability life | Contact resistance: no more than 50mΩ                                                  | 30 times of push-pull operation                                                                                                       |
| 9. Solder Heat Resistance    | There should be no dissolution of the resin part which will influence the performance. | Reflow: according to the Recommended Temperature Profile<br>Hand soldering: temperature of soldering iron at 350°C for 3 to 4 seconds |

(Note 1) Temperature rise at the time of electrification is included.

(Note 2) The term "storage" refers to the long-term storage condition of unused products before PCB mounting.

Operating Temperature Range is applied to the deenergized state after mounting of PCB and the temporary storage state during transportation.

(Note 3) The above specifications are representative of this series. Please refer to "delivery specifications" for official individual agreement.

## ■Materials

| Product                       | Part                          | Materials          | Color / Treatment              | UL Regulation |
|-------------------------------|-------------------------------|--------------------|--------------------------------|---------------|
| Header<br>(on the board side) | Insulator                     | LCP                | Black                          | UL94V-0       |
|                               | Contact                       | Brass              | Gold plating                   | ——            |
|                               | Metal fitting                 | Brass (Note 1)     | Tin Plating                    | ——            |
|                               | Locking metal fittings (DF50) | Stainless steel    | ——                             | ——            |
| Crimp socket                  | Insulator                     | PBT                | Black (DF50A)<br>White (DF50S) | UL94V-0       |
| Crimp contact                 | Contact                       | Phosphorous Bronze | Gold plating                   | ——            |

(Note 1) Phosphor bronze is applied a material for only to the single-row straight pin header.

## ■Product Number Structure

### ●Connector

**DF50** – **\*** **DP** – **1** **V** **\*\***

①                      ②                      ③                      ④                      ⑤                      ⑥

- ① Series Name: DF50 (Double-row pin header)  
DF50S (Double-row crimp socket)  
DF50A (Single-row)
- ② Number of contacts: 20, 30, 40, 50 (Double-row)  
: 2 to 16 (Single-row)
- ③ Connector type  
DP: Double-row pin header  
DS: Double-row socket  
P: Single-row pin header  
S: Single-row socket
- ④ Contact Pitch: 1mm

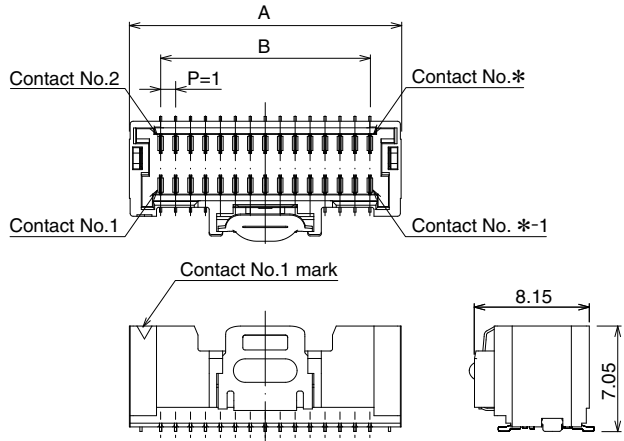
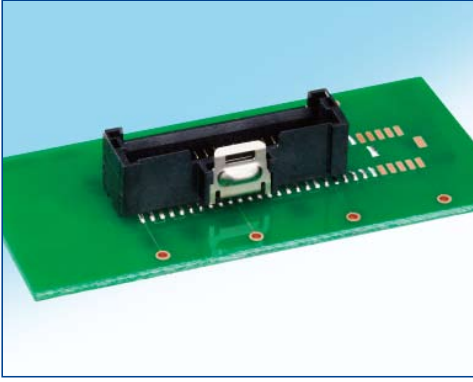
### ●Crimp contact

**DF50** – **2830** **SCF** **A**

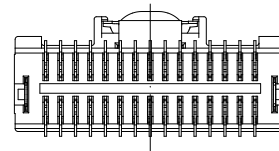
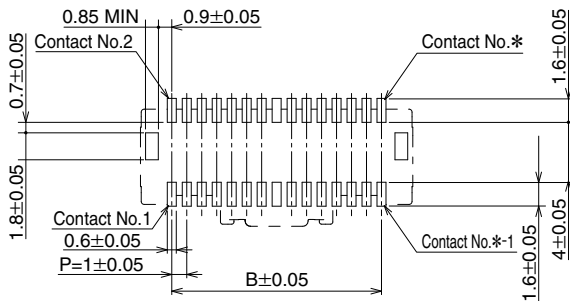
①                      ⑦                      ⑧                      ⑨

- ⑤ Wire connection method/Geometry of terminal  
C: Crimp socket  
V: SMT Straight Type  
H: SMT Right Angle Type
- ⑥ Specifications  
51: SMT Embossed packaging  
52: SMT Embossed packaging (with cap, DF50)
- ⑦ Applicable wire size  
2830: AWG28, 30  
3032: AWG30, 32 (Under development)
- ⑧ Method type/Packaging type  
SCF: Socket contact reel
- ⑨ Plating specifications  
A: Gold plating

## Double-row straight pin header



## Recommended pattern schematic



\*: No. of Contacts

[Specification Number : \*\*, (\*\*) ]

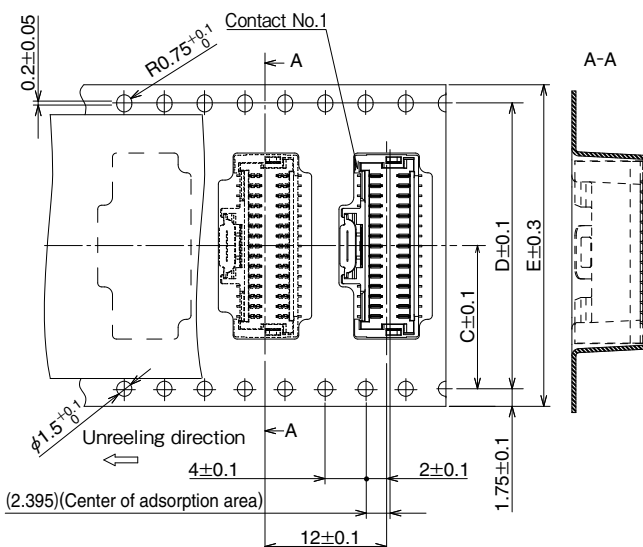
(51): Gold plating, embossed packaging  
(52): Gold plating, embossed packaging, with adsorption cap

Unit : mm

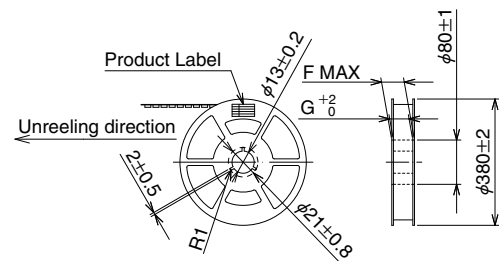
| Product No.       | HRS No.          | No. of Contacts | A     | B  | C    | D    | E  | F    | G    |
|-------------------|------------------|-----------------|-------|----|------|------|----|------|------|
| DF50-20DP-1V (**) | CL665-0019-3-**- | 20              | 13.18 | 9  | 14.2 | 28.4 | 32 | 38.4 | 32.4 |
| DF50-30DP-1V (**) | CL665-0001-8-**- | 30              | 18.18 | 14 | 14.2 | 28.4 | 32 | 38.4 | 32.4 |
| DF50-40DP-1V (**) | CL665-0005-9-**- | 40              | 23.18 | 19 | 20.2 | 40.4 | 44 | 50.4 | 44.4 |
| DF50-50DP-1V (**) | CL665-0011-1-**- | 50              | 28.18 | 24 | 20.2 | 40.4 | 44 | 50.4 | 44.4 |

(Note) Please place orders for embossed packaged products by the multiple of the number of reels. (1,000 connectors per reel)

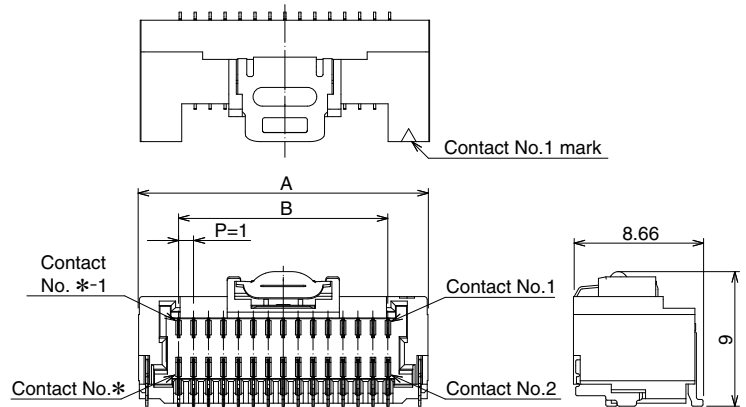
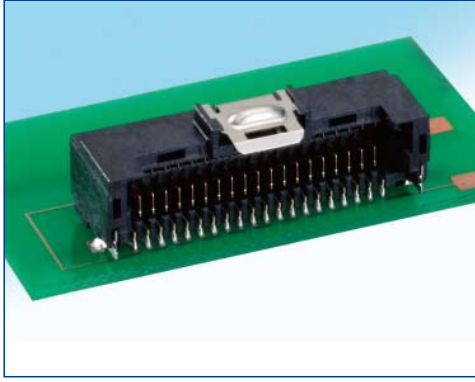
## Emboss tape dimensions (in conformity to JIS C 0806)



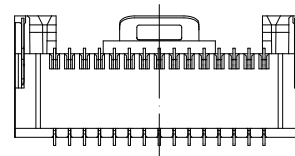
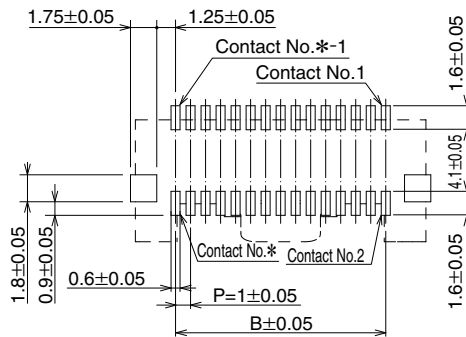
## Reel Condition Dimensions



## Double-row right angle pin header



## Recommended pattern schematic



\*: No. of Contacts

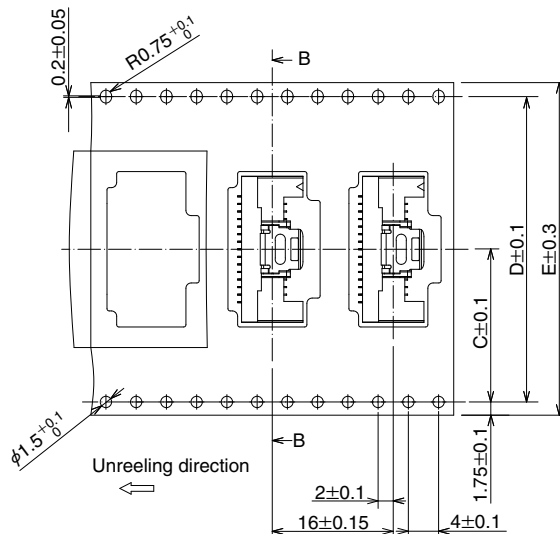
**[Specification Number: \*\*, (\*\*)]**  
(51): Gold plating, embossed packaging

Unit : mm

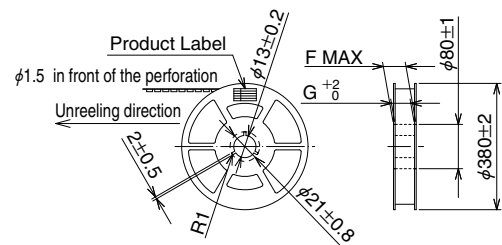
| Product No.      | HRS No.          | No. of Contacts | A     | B  | C    | D    | E  | F    | G    |
|------------------|------------------|-----------------|-------|----|------|------|----|------|------|
| DF50-20DP-1H(**) | CL665-0016-5-**- | 20              | 14.35 | 9  | 14.2 | 28.4 | 32 | 38.4 | 32.4 |
| DF50-30DP-1H(**) | CL665-0015-2-**- | 30              | 19.35 | 14 | 20.2 | 40.4 | 44 | 50.4 | 44.4 |
| DF50-40DP-1H(**) | CL665-0014-0-**- | 40              | 24.35 | 19 | 20.2 | 40.4 | 44 | 50.4 | 44.4 |
| DF50-50DP-1H(**) | CL665-0013-7-**- | 50              | 29.35 | 24 | 20.2 | 40.4 | 44 | 50.4 | 44.4 |

(Note) Please place orders for embossed packaged products by the multiple of the number of reels. (1,000 connectors per reel)

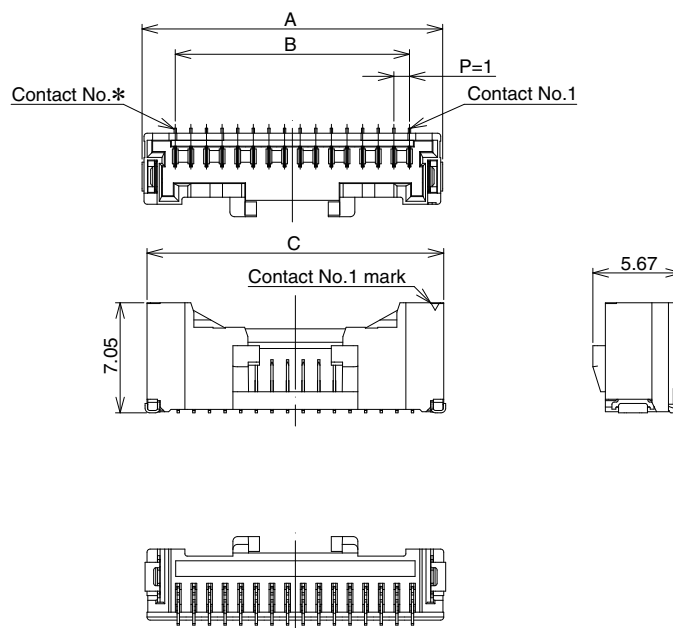
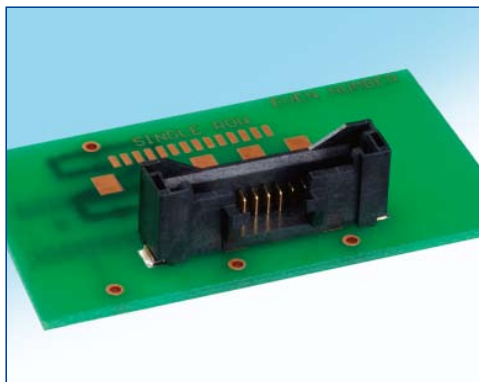
## Emboss tape dimensions (in conformity to JIS C 0806)



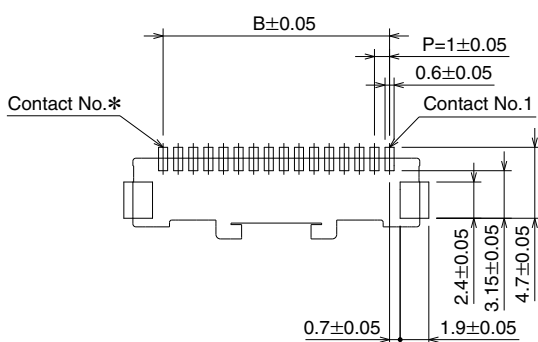
## Reel Condition Dimensions



## Single-row straight pin header



## Recommended pattern schematic



\*: No. of Contacts

[Specification Number: \*\*, (\*\*) ]  
(51): Gold plating, embossed packaging

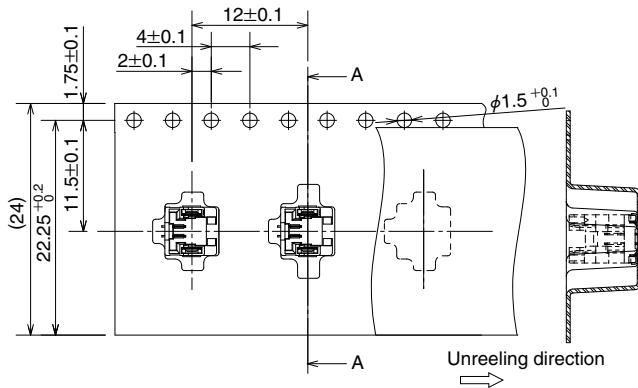
Unit : mm

| Product No.       | HRS No.         | No. of Contacts | A     | B  | C  |
|-------------------|-----------------|-----------------|-------|----|----|
| DF50A-2P-1V (**)  | CL665-1001-3-** | 2               | 5.25  | 1  | 5  |
| DF50A-3P-1V (**)  | CL665-1004-1-** | 3               | 6.25  | 2  | 6  |
| DF50A-4P-1V (**)  | CL665-1006-7-** | 4               | 7.25  | 3  | 7  |
| DF50A-5P-1V (**)  | CL665-1008-2-** | 5               | 8.25  | 4  | 8  |
| DF50A-6P-1V (**)  | CL665-1010-4-** | 6               | 9.25  | 5  | 9  |
| DF50A-7P-1V (**)  | CL665-1012-0-** | 7               | 10.25 | 6  | 10 |
| DF50A-8P-1V (**)  | CL665-1014-5-** | 8               | 11.25 | 7  | 11 |
| DF50A-9P-1V (**)  | CL665-1016-0-** | 9               | 12.25 | 8  | 12 |
| DF50A-10P-1V (**) | CL665-1017-3-** | 10              | 13.25 | 9  | 13 |
| DF50A-11P-1V (**) | CL665-1019-9-** | 11              | 14.25 | 10 | 14 |
| DF50A-12P-1V (**) | CL665-1021-0-** | 12              | 15.25 | 11 | 15 |
| DF50A-13P-1V (**) | CL665-1023-6-** | 13              | 16.25 | 12 | 16 |
| DF50A-14P-1V (**) | CL665-1025-1-** | 14              | 17.25 | 13 | 17 |
| DF50A-15P-1V (**) | CL665-1027-7-** | 15              | 18.25 | 14 | 18 |
| DF50A-16P-1V (**) | CL665-1029-2-** | 16              | 19.25 | 15 | 19 |

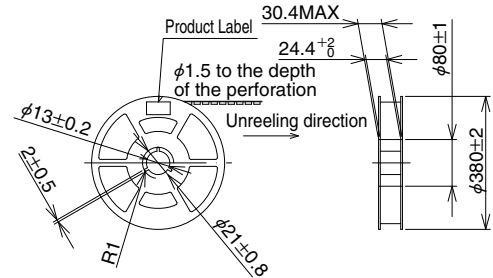
(Note) Please place orders for embossed packaged products by the multiple of the number of reels. (1,000 connectors per reel)

## ◆ Emboss tape dimensions (in conformity to JIS C 0806)

● DF50A-2P-1V to F50A-8P-1V (Number of contacts: 2 to 8)

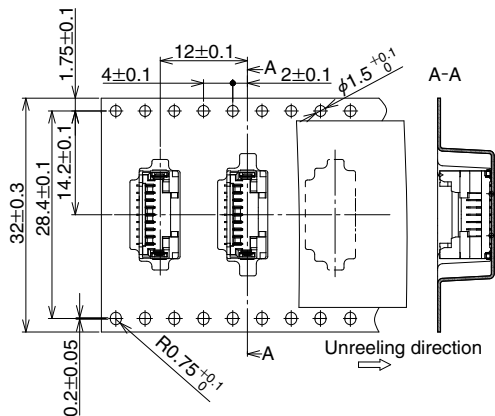


## ◆ Reel Condition Dimensions

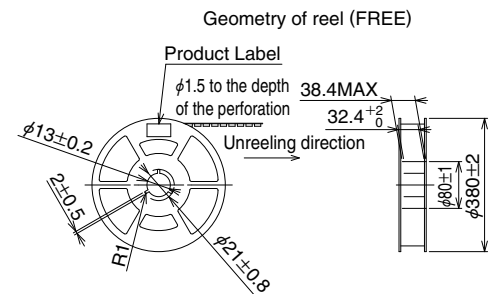


## ◆ Emboss tape dimensions (in conformity to JIS C 0806)

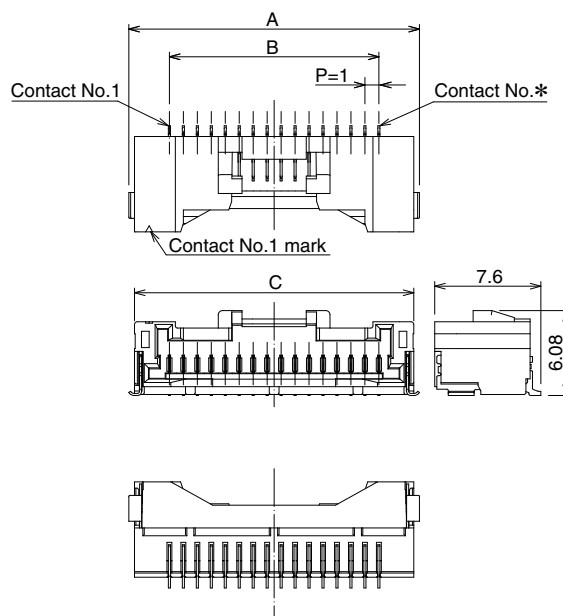
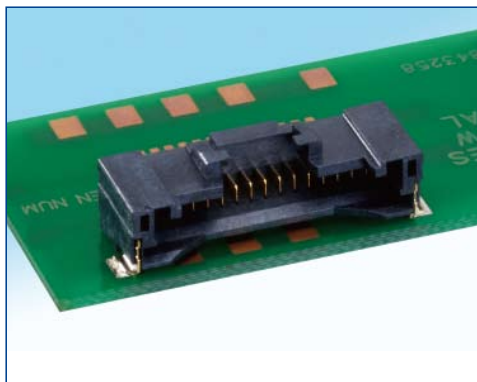
● DF50A-9P-1V to DF50A-16P-1V (Number of contacts: 9 to 16)



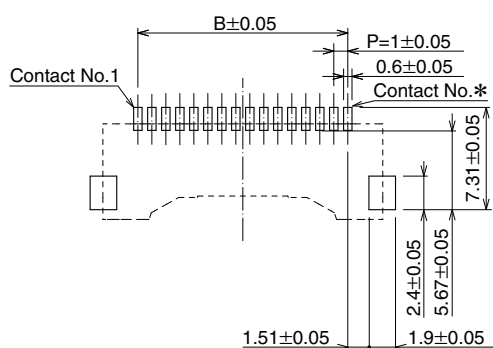
## ◆ Reel Condition Dimensions



## Single-row right angle pin header



## Recommended pattern schematic



\*: No. of Contacts

[Specification Number: \*\*, (\*\*) ]  
(51): Gold plating, embossed packaging

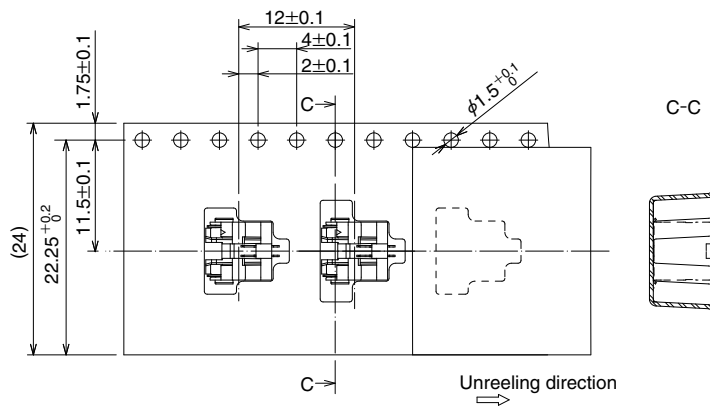
Unit : mm

| Product No.       | HRS No.          | No. of Contacts | A     | B  | C  |
|-------------------|------------------|-----------------|-------|----|----|
| DF50A-2P-1H (**)  | CL665-1031-4-**- | 2               | 6.81  | 1  | 6  |
| DF50A-3P-1H (**)  | CL665-1032-7-**- | 3               | 7.81  | 2  | 7  |
| DF50A-4P-1H (**)  | CL665-1033-0-**- | 4               | 8.81  | 3  | 8  |
| DF50A-5P-1H (**)  | CL665-1034-2-**- | 5               | 9.81  | 4  | 9  |
| DF50A-6P-1H (**)  | CL665-1035-5-**- | 6               | 10.81 | 5  | 10 |
| DF50A-8P-1H (**)  | CL665-1037-0-**- | 8               | 12.81 | 7  | 12 |
| DF50A-10P-1H (**) | CL665-1039-6-**- | 10              | 14.81 | 9  | 14 |
| DF50A-12P-1H (**) | CL665-1041-8-**- | 12              | 16.81 | 11 | 16 |
| DF50A-16P-1H (**) | CL665-1045-9-**- | 16              | 20.81 | 15 | 20 |

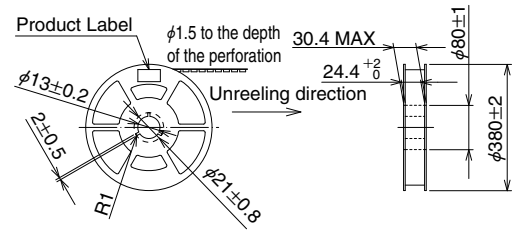
(Note) Please place orders for embossed packaged products by the multiple of the number of reels. (1,000 connectors per reel)

## ◆ Emboss tape dimensions (in conformity to JIS C 0806)

● DF50A-2P-1H to DF50A-6P-1H (Number of contacts : 2 to 6)

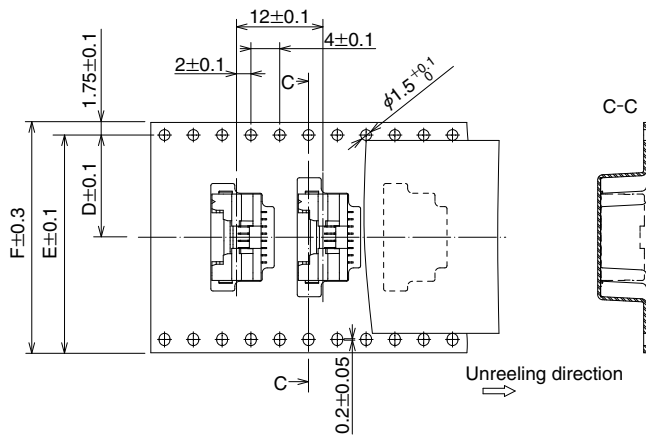


## ◆ Reel Condition Dimensions

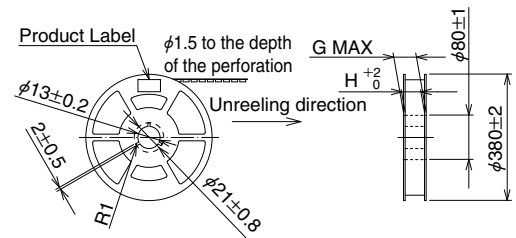


## ◆ Emboss tape dimensions (in conformity to JIS C 0806)

● DF50A-8P-1H to DF50A-16P-1H (Number of contacts : 8 to 16)



## ◆ Reel Condition Dimensions

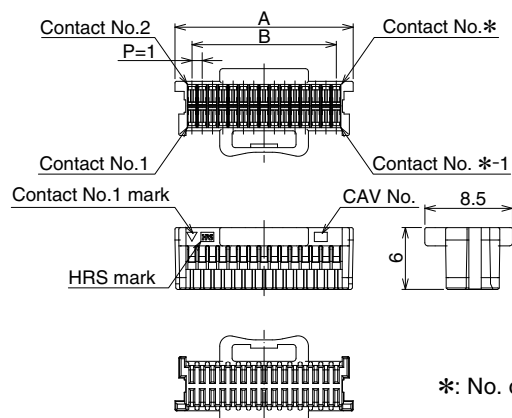


Unit : mm

| Product No.       | HRS No.          | No. of Contacts | D    | E    | F  | G    | H    |
|-------------------|------------------|-----------------|------|------|----|------|------|
| DF50A-8P-1H (**)  | CL665-1037-0-**- | 8               | 14.2 | 28.4 | 32 | 38.4 | 32.4 |
| DF50A-10P-1H (**) | CL665-1039-6-**- | 10              | 20.2 | 28.4 | 32 | 38.4 | 32.4 |
| DF50A-12P-1H (**) | CL665-1041-8-**- | 12              | 20.2 | 28.4 | 32 | 38.4 | 32.4 |
| DF50A-16P-1H (**) | CL665-1045-9-**- | 16              | 20.2 | 40.4 | 44 | 50.4 | 44.4 |

(Note) Please place orders for embossed packaged products by the multiple of the number of reels. (1,000 connectors per reel)

## Double-row crimp socket

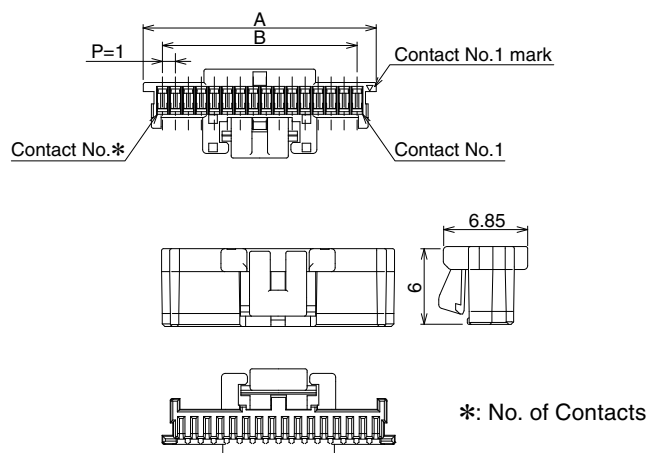


Unit : mm

| Product No.   | HRS No.         | No. of Contacts | A     | B  |
|---------------|-----------------|-----------------|-------|----|
| DF50S-20DS-1C | CL665-0020-2-00 | 20              | 12.28 | 9  |
| DF50S-30DS-1C | CL665-0021-5-00 | 30              | 17.28 | 14 |
| DF50S-40DS-1C | CL665-0022-8-00 | 40              | 22.28 | 19 |
| DF50S-50DS-1C | CL665-0012-4-00 | 50              | 27.28 | 24 |

(Note) Sold in 100 piece units.

## Single-row crimp socket

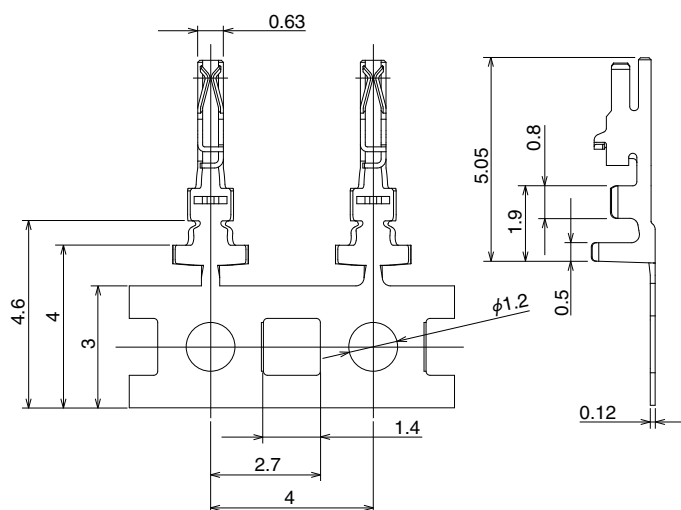
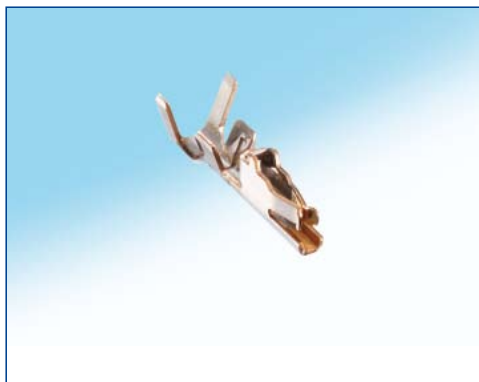


Unit : mm

| Product No.  | HRS No.         | No. of Contacts | A     | B  |
|--------------|-----------------|-----------------|-------|----|
| DF50A-2S-1C  | CL665-1002-6-00 | 2               | 3.95  | 1  |
| DF50A-3S-1C  | CL665-1005-4-00 | 3               | 4.95  | 2  |
| DF50A-4S-1C  | CL665-1007-0-00 | 4               | 5.95  | 3  |
| DF50A-5S-1C  | CL665-1009-5-00 | 5               | 6.95  | 4  |
| DF50A-6S-1C  | CL665-1011-7-00 | 6               | 7.95  | 5  |
| DF50A-7S-1C  | CL665-1013-2-00 | 7               | 8.95  | 6  |
| DF50A-8S-1C  | CL665-1015-8-00 | 8               | 9.95  | 7  |
| DF50A-9S-1C  | CL665-1100-5-00 | 9               | 10.95 | 8  |
| DF50A-10S-1C | CL665-1018-6-00 | 10              | 11.95 | 9  |
| DF50A-11S-1C | CL665-1020-8-00 | 11              | 12.95 | 10 |
| DF50A-12S-1C | CL665-1022-3-00 | 12              | 13.95 | 11 |
| DF50A-13S-1C | CL665-1024-9-00 | 13              | 14.95 | 12 |
| DF50A-14S-1C | CL665-1026-4-00 | 14              | 15.95 | 13 |
| DF50A-15S-1C | CL665-1028-0-00 | 15              | 16.95 | 14 |
| DF50A-16S-1C | CL665-1030-1-00 | 16              | 17.95 | 15 |

(Note) Sold in 100 piece units.

## ■Crimp contact



| Product No.    | HRS No.           | Type         | Quantity               | Treatment    |
|----------------|-------------------|--------------|------------------------|--------------|
| DF50-2830SCFA  | CL665-0002-0-00   | Reel contact | 30,000 pieces per reel | Gold plating |
| DF50K-2830SCFA | CL665-0017-8-00   | Reel contact | 30,000 pieces per reel | Gold plating |
| DF50-3032SCFA  | Under development | —            | —                      | —            |

(Note) As this product is sold per (30,000 piece) reel, please place orders by the multiple of the number of reels.

## ●Applicable wire (Tinned Annealed Copper Wire)

| Product No.    | HRS No.          | Recommended wire |                                             |                              |
|----------------|------------------|------------------|---------------------------------------------|------------------------------|
|                |                  | Cable name       | Conductor size (Core structure)             | Diameter of the wire         |
| DF50-2830SCFA  | CL0665-0002-0-00 | UL1061           | AWG28<br>(7pieces / $\phi 0.127\text{mm}$ ) | $\phi 0.8$ to $0.9\text{mm}$ |
|                |                  | UL1061           | AWG30<br>(7pieces / $\phi 0.102\text{mm}$ ) |                              |
| DF50K-2830SCFA | CL0665-0017-8-00 | UL1571           | AWG28<br>(7pieces / $\phi 0.13\text{mm}$ )  | $\phi 0.58\text{mm}$         |

(Note) Please contact our Sales Department when you are using wires other than applicable wires.

## ●Strip length

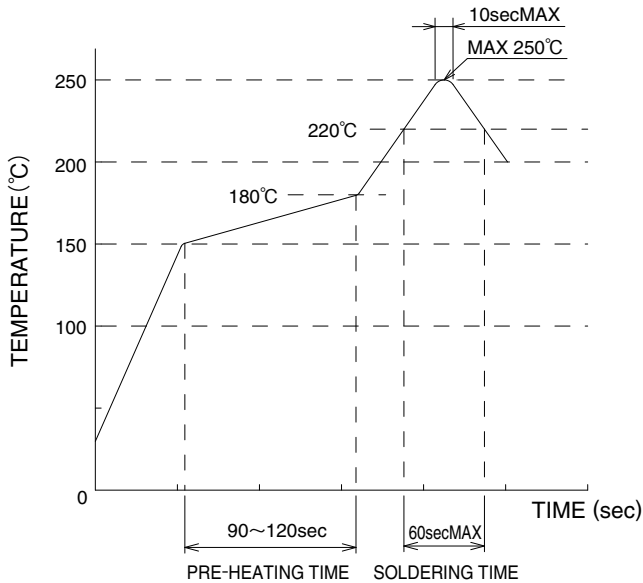
1.3 to 1.7mm

## ■Applicable crimping tool

| Type          | Product No.       | HRS No.      | Applicable contact |
|---------------|-------------------|--------------|--------------------|
| Applicator    | AP105-DF50-2830S  | CL901-4616-0 | DF50-2830SCFA      |
| Press body    | CM-105            | CL901-0005-4 | —                  |
| Hand tool     | HT305/DF50-2830HC | CL902-4634-8 | DF50-2830SCFA      |
| Pull-out tool | DF-C-PO(B)        | CL550-0179-2 | DF50-2830SCFA      |

(Note) Problems caused by tools other than our specified ones are out of warranty events.

## ◆Precautions

|                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1.Recommended Temperature Profile<br/>(Compatible with lead-free soldering)</p> |  <p>[Applicable Conditions]</p> <ol style="list-style-type: none"> <li>1.Peak temperature: a maximum of 250°C for no more than 10 seconds</li> <li>2.Heating unit: no less than 220°C for no more than 60 seconds</li> <li>3.Preheating unit: 150 to 180°C for 90 to 120 seconds</li> <li>4.Number of times: no more than 2 times</li> </ol> <p>* Measurement is conducted at the contact lead part<br/>As it may change depending on the conditions such as solder paste types, manufacturers, PCB size, and other soldering materials, please fully check the mounting conditions before use.</p> <p>(Note 1) This temperature profile is a recommended value.</p> |
| <p>2.Recommended hand soldering conditions</p>                                     | <p>Temperature of soldering iron: 350±10°C, soldering time: 3 to 4 seconds</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>3.Recommended screen thickness and aperture ratio (Pattern surface ratio)</p>   | <p>Thickness: 0.1mm, aperture ratio: 100%</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>4.Warpage of the Board</p>                                                      | <p>A maximum of 0.02mm at the center of connector, as measured from either end of the connector</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>5.Cleaning Conditions</p>                                                       | <p>IPA cleaning is allowed. (Cleaning is not recommended because cleaning may change the push/pull feeling etc. Please contact us when you use other cleaning agents. )</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>6.Precautions</p>                                                               | <ul style="list-style-type: none"> <li>■ When inserting a crimp contact into a crimp socket, do not insert it at a slanted angle in order to maintain the reliability of its performance.</li> <li>■ Please refrain from pushing/pulling operation when the PCB is not mounted. It may cause breakage, contact deformation, etc.</li> <li>■ Please refrain from pushing/pulling operation with wires in your hand. It may cause damage.</li> <li>■ During hand soldering, do not apply flux which will cause flux oozing on connector.</li> <li>■ This product may have a little difference in its molded color depending on the production lot, but the difference doesn't have any influence on the performance.</li> </ul>                          |

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