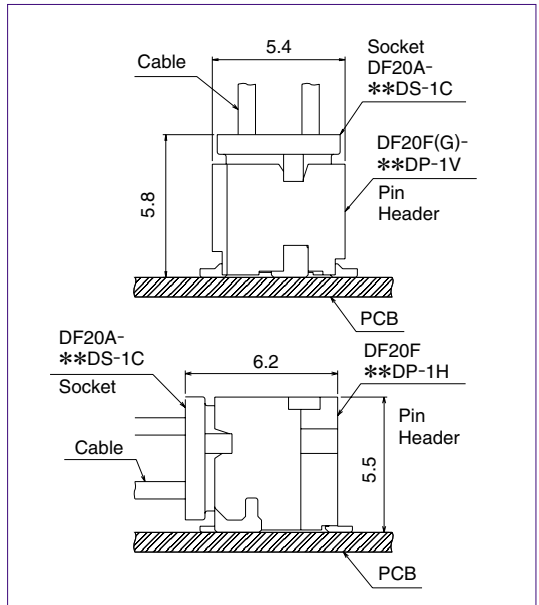


# 1 mm Pitch Double Rows Low Profile Board-to-Cable Connectors

## DF20 series



### ■ Features

#### 1. Contact Pitch

1 mm contact pitch allows reliable solder and cable termination.

#### 2. Low profile

Total mating height above the board is 5.8 mm for the straight type and 5.5 mm for the right angle type.

#### 3. Reliable electrical connection wipe

Effective electrical connection is assured with a 1mm wipe of mating contacts.

#### 4. Narrower external width and length

Redesigned metal fittings decreased the overall length of the board-mount receptacle and permit end-to-end mounting of several connectors.

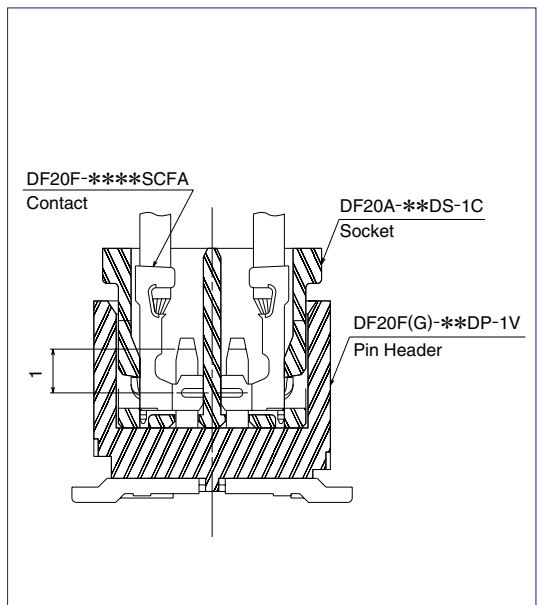
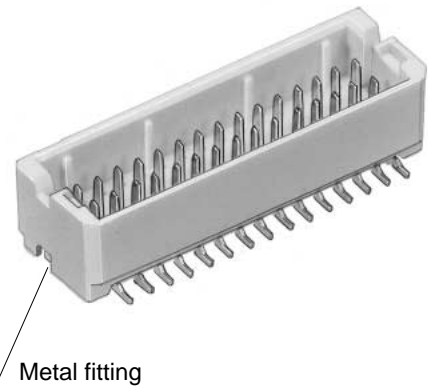
#### 5. Automatic equipment board placement

Straight type pin headers are supplied with a 5.4 mm X 4.6mm flat platform to allow vacuum pick-up and placement on the board.

#### 6. Product variations

- (1) Available with 10, 20, 30, 40, and 50 contacts.
- (2) Pin headers are available in two types: with or without board positioning bosses.
- (3) Depending on specific application pin headers can be ordered in straight or right angle types.

### Narrower external width and length



### ■ Applications

Notebook PC, small office automation equipment, small consumer devices, portable devices.

Any application requiring low profile reliable board-to-cable connection with a AWG #28, AWG#30, AWG#32 conductors.

#### 1mm Pitch, Double Rows



## Product Specifications

|        |               |   |                             |                          |                           |                        |
|--------|---------------|---|-----------------------------|--------------------------|---------------------------|------------------------|
| Rating | Rated current | AWG#28 : 1A<br>AWG#30 : 0.9A<br>AWG#32 : 0.7A | Operating temperature range | -35°C to 85°C (Note 1,2) | Storage temperature range | -10°C to 60°C (Note 2) |
|        | Rated voltage | 100V AC                                       | Operating humidity range    | 20% to 80%               | Storage humidity range    | 40% to 70%             |

| Item  | Specifications   | Conditions   |
|---|--|--|
| 1. Insulation resistance                    | 500MΩ min.   | Measured at 100V DC  |
| 2. Withstanding voltage                     | No flashover or insulation breakdown                                 | Conduction of 300V AC applied for 1 minute   |
| 3. Contact resistance                       | 30mΩ max.  | Measure at 100mA.  |
| 4. Insertion-Extraction force (per contact) | Min. 0.2 N (20 gf), Max. 2 N (200 gf)                                | Measured with a steel pin of 0.2 ±0.005 thickness  |
| 5. Vibration                                | No electrical discontinuity of 1μs min.                              | Frequency of 10 to 55 Hz, single amplitude of 0.75 mm, in 3 directions for 2hours                                |
| 6. Humidity                                 | Contact resistance of 30mΩ max., insulation resistance of 100MΩ min. | Temperature of 40±2°C, humidity of 90% to 95%, left standing for 96 hours  |
| 7. Temperature cycle                        | Contact resistance of 30mΩ max., insulation resistance of 500MΩ min. | (-55°C:30min → 5°C to 35°C: 2 to 3min → 85°C:30min → 5°C to 35°C:2 to 3min) for 5 cycles                         |
| 8. Mechanical operation                     | Contact resistance of 30mΩ max.                                      | 50 cycles  |
| 9. Resistance to Soldering heat             | No deformation of the insulator parts that will affect performance   | Reflow: At the recommended temperature profile, manual solder: Soldering iron temperature of 300°C for 3 seconds |

Note1: Includes temperature rise caused by current flow.

Note2: The term "storage" refers to products stored for long periods of time prior to mounting and use.

Operating temperature range and Humidity range covers non-conducting conditions of installed connectors in storage, shipment or transportation.

## Materials

| Item           | Part          | Material        | Finish   | Remarks |
|----------------|---------------|-----------------|--|---------|
| Socket         | Insulator     | Polyamide       | Color : Beige  | UL94V-0 |
| Socket contact | Contact       | Phosphor bronze | Gold plating   | —       |
| Pin header     | Insulator     | Polyamide       | Color : Beige  | UL94V-0 |
|                | Contact       | Phosphor bronze | Gold plating   | —       |
|                | Metal Fitting | Brass           | V type: Solder plating<br>H type: Tin-Copper plating (Pb free) |         |

## Ordering Information

### Connectors

**DF 20 # - \* DS - 1 C**

① ② ③ ④ ⑤ ⑥ ⑦

|   |  |
|---|--|
| ① Series name : DF  | ⑤ Connector type<br>DS: Double-row socket<br>DP: Double-row pin header                               |
| ② Series No. : 20   | ⑥ Contact pitch: 1 mm  |
| ③ Boss Type<br>■ Pin header<br>F: Without boss<br>G: With boss<br>■ Crimp socket: A | ⑦ Type of housing, header<br>C: Crimp housing<br>V: Straight SMT header<br>H: Right angle SMT header |
| ④ Number of contacts: 10, 20, 30, 40, 50  |  |

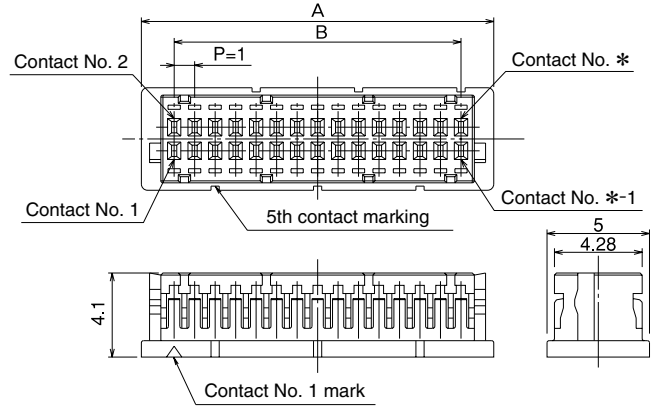
### Contacts

**DF20 F - 2830 SCF A (\* \*)**

① ② ③ ④ ⑤

|  |  |   |
|--|--|---|
| ① F  | ③ Contact & packaging type<br>SCF: Socket contact reel | ⑤ Packaging Specifications<br>Blank: 1 reel = 10,000 pieces<br>41: 1 reel = 20,000 pieces |
| ② Applicable wire size<br>2830: AWG #28 to 30<br>3032: AWG #30 to 32 | ④ Plating type<br>A: Gold plating                      |   |

## Double Row Socket



Unit: mm

| Product No.   | CL No.     | Number of Contacts | A    | B    |
|---------------|------------|--------------------|------|------|
| DF20A-10DS-1C | 686-0020-3 | 10                 | 7.2  | 4.0  |
| DF20A-20DS-1C | 686-0021-6 | 20                 | 12.2 | 9.0  |
| DF20A-30DS-1C | 686-0022-9 | 30                 | 17.2 | 14.0 |
| DF20A-40DS-1C | 686-0023-1 | 40                 | 22.2 | 19.0 |
| DF20A-50DS-1C | 686-0024-4 | 50                 | 27.2 | 24.0 |

[Specifications number]-\*, (\*\*)  
(59): Gold plating, embossed tape packaging

Note: Sales quantities are by the package unit (containing 100 pieces). Please order by package unit.

## Socket Crimp Contacts

| Product No.        | CL No.         | Type of contacts | Quantity                         | Plating type |
|--------------------|----------------|------------------|----------------------------------|--------------|
| DF20F-2830SCFA(**) | 686-0042-6-*** | Reel contacts    | See specifications number column | Gold plating |
| DF20F-3032SCFA(**) | 686-0043-9-*** |                  |                                  |              |

[Specifications number] -, (\*\*)  
Blank 1 reel : 10,000 pieces  
41 1 reel : 20,000 pieces

### ●Applicable Wire (Tin plated solid soft conductor)

| Applicable Wire Size (Stranded wire conductor) | Jacket diameter |
|--|-----------------|
| AWG #28 (7/0.127 mm)                           | 0.5mm to 0.6 mm |
| AWG #30 (7/0.1 mm)                             |                 |
| AWG #32 (7/0.08 mm)                            |                 |

- Recommended wire UL1571
- Strip length 1.2 to 1.9 mm

Note: When using other than the recommended wire, contact your nearest Hirose representative.

### ●Applicable Crimping Tools

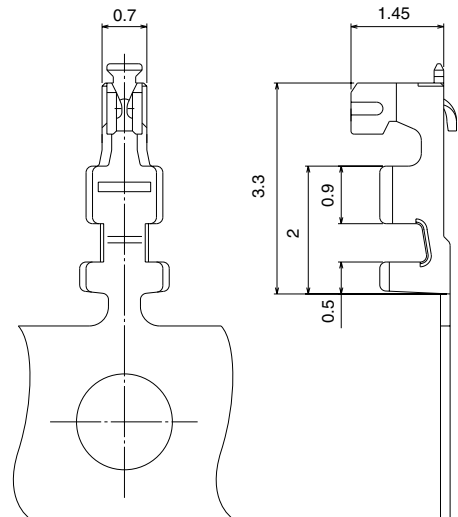
| Type                 | CL No.     | Product No.       |
|----------------------|------------|-------------------|
| Applicator           | 901-4572-6 | AP105-DF20-2830S  |
| Press                | 901-0005-4 | CM-105            |
| Manual crimping tool | 901-4540-6 | HT302/DF20B-2830S |

Note 1: Hirose Electric will not be responsible for any problems caused by use of tools other than specified.

Note 2: The manual crimping tool can be also used for cutting-off individual contacts from the reel.

Note 3: Customers that already have DF13 Series Hirose's press units and applicators will be able to use them for DF20 Series crimp terminations by replacing of only crimper and anvil.

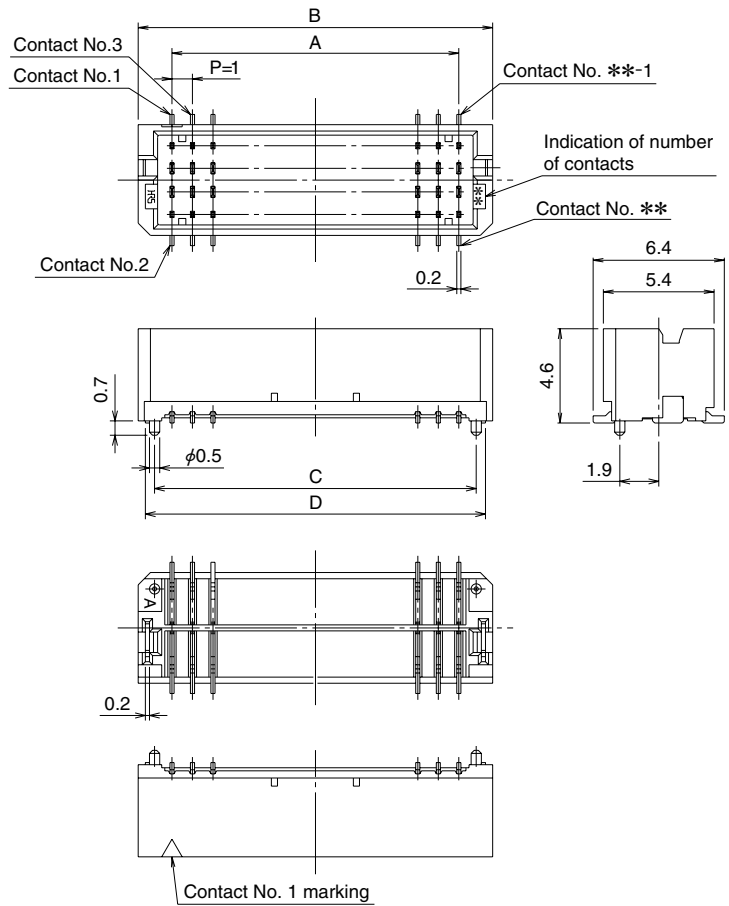
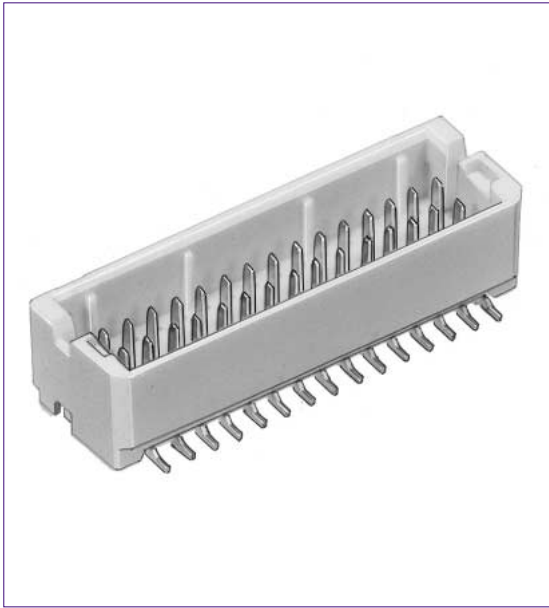
Note4: The crimping tool for the DF20F-3032SCFA can also be used with the DF20F-2830SCFA.



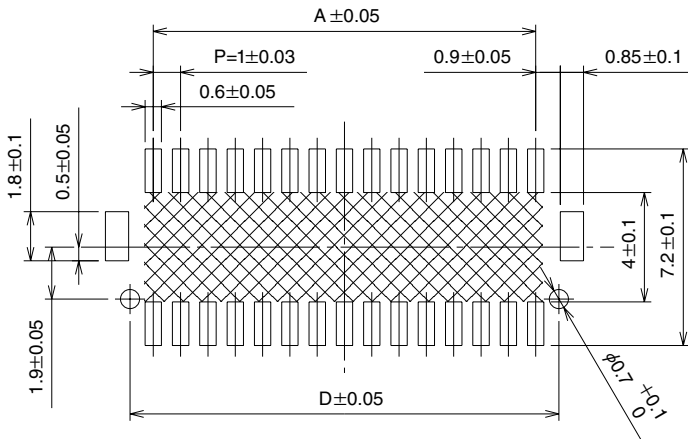
## Replacement Parts List for Applicator

| Type                            | Product No.          | CL No.        |
|---------------------------------|----------------------|---------------|
| Insulation crimper              | AP105-DF20-2830S(61) | 901-4572-6-61 |
| Wire crimper                    | AP105-DF20-2830S(62) | 901-4572-6-62 |
| Insulation anvil and wire anvil | AP105-DF20-2830S(63) | 901-4572-6-63 |

## Double Row Straight Pin header



## PCB Footprints



Note 1: Shaded area must be free of any electrically conductive traces to avoid contact with soldered pin header terminations.

Note 2: Required only for pin headers supplied with the positioning boss.

Unit: mm

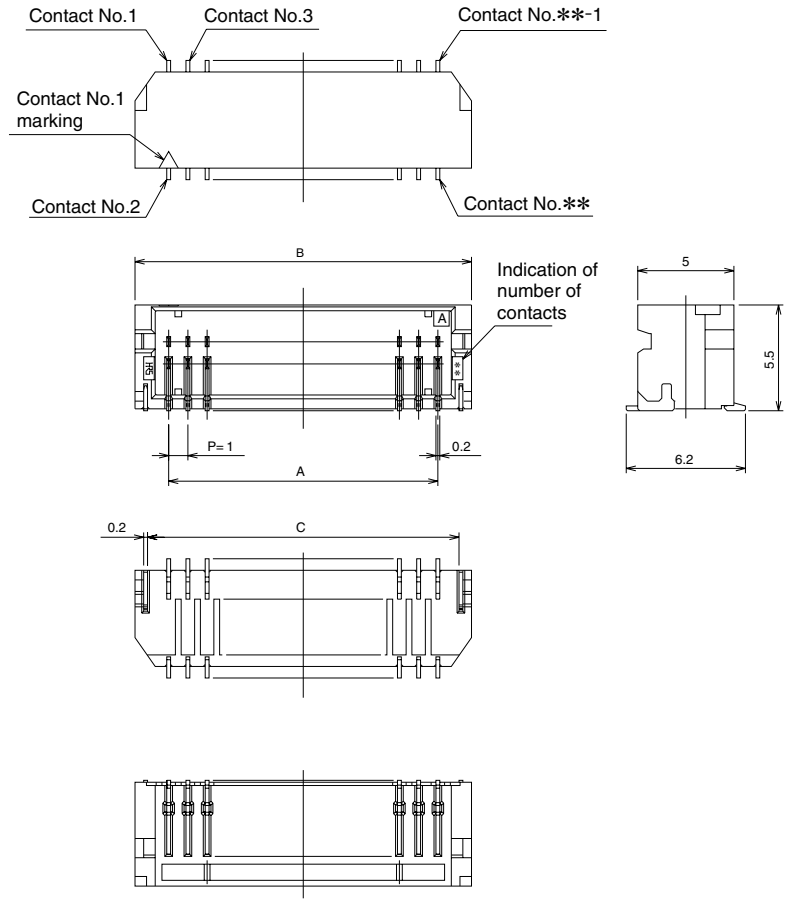
| Product No.        | CL No.           | Number of contacts | A    | B    | C    | D    | Remarks      |
|--------------------|------------------|--------------------|------|------|------|------|--------------|
| DF20F-10DP-1V (**) | CL686-0032-2- ** | 10                 | 4.0  | 7.3  | —    | 5.7  | Without boss |
| DF20F-20DP-1V (**) | CL686-0033-5- ** | 20                 | 9.0  | 12.3 | —    | 10.7 |              |
| DF20F-30DP-1V (**) | CL686-0034-8- ** | 30                 | 14.0 | 17.3 | —    | 15.7 |              |
| DF20F-40DP-1V (**) | CL686-0035-0- ** | 40                 | 19.0 | 22.3 | —    | 20.7 |              |
| DF20F-50DP-1V (**) | CL686-0036-3- ** | 50                 | 24.0 | 27.3 | —    | 25.7 |              |
| DF20G-10DP-1V (**) | CL686-0037-6- ** | 10                 | 4.0  | 7.3  | 6.6  | 5.7  | With boss    |
| DF20G-20DP-1V (**) | CL686-0038-9- ** | 20                 | 9.0  | 12.3 | 11.6 | 10.7 |              |
| DF20G-30DP-1V (**) | CL686-0039-1- ** | 30                 | 14.0 | 17.3 | 16.6 | 15.7 |              |
| DF20G-40DP-1V (**) | CL686-0040-0- ** | 40                 | 19.0 | 22.3 | 21.6 | 20.7 |              |
| DF20G-50DP-1V (**) | CL686-0041-3- ** | 50                 | 24.0 | 27.3 | 26.6 | 25.7 |              |

Note1: Order embossed tape packaging items by the reel. (1 reel contains 1,000 pieces)

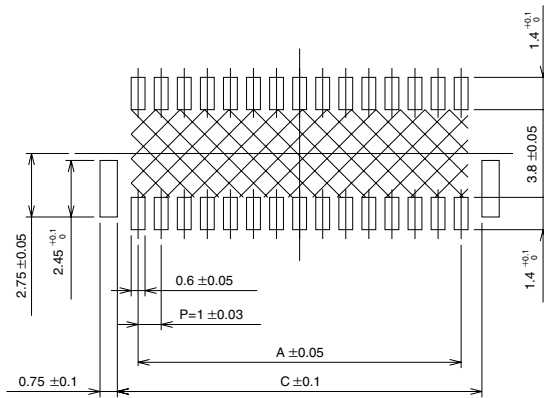
Note2: Vacuum pick-up platforms are included with embossed tape packaged connectors.

[Specifications number]-\*, (\*\*)  
(59): Gold plating, embossed tape packaging

## Double Row Right angle Pin header



## PCB Footprints



Note : Shaded area must be free of any electrically conductive traces to avoid contact with soldered pin header terminations.

Unit: mm

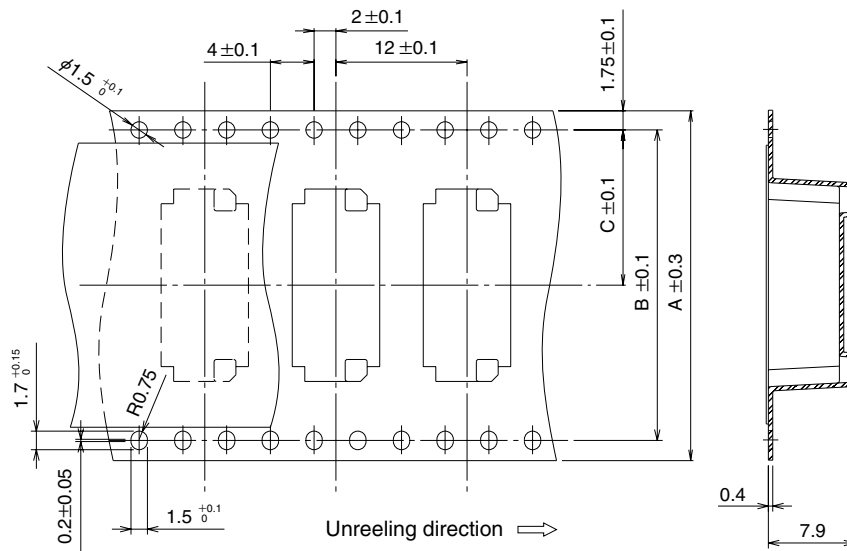
| Product No.           | HRS No.                        | Number of contacts | A    | B    | C    | Remarks      |
|-----------------------|--------------------------------|--------------------|------|------|------|--------------|
| DF20F -10DP-1H ( ** ) | 686-0027-2 ( ** )              | 10                 | 4.0  | 7.5  | 6.2  | Without boss |
| DF20F -20DP-1H ( ** ) | 686-0028-5 ( ** )              | 20                 | 9.0  | 12.5 | 11.2 |              |
| DF20F -30DP-1H ( ** ) | 686-0029-8 ( ** )              | 30                 | 14.0 | 17.5 | 16.2 |              |
| DF20F -40DP-1H ( ** ) | Reserved for product expansion | 40                 | 19.0 | 22.5 | 21.2 |              |
| DF20F -50DP-1H ( ** ) | Reserved for product expansion | 50                 | 24.0 | 27.5 | 26.2 |              |

[Specifications number]-\*, (\*\*)  
(59): Gold plating,  
embossed tape packaging

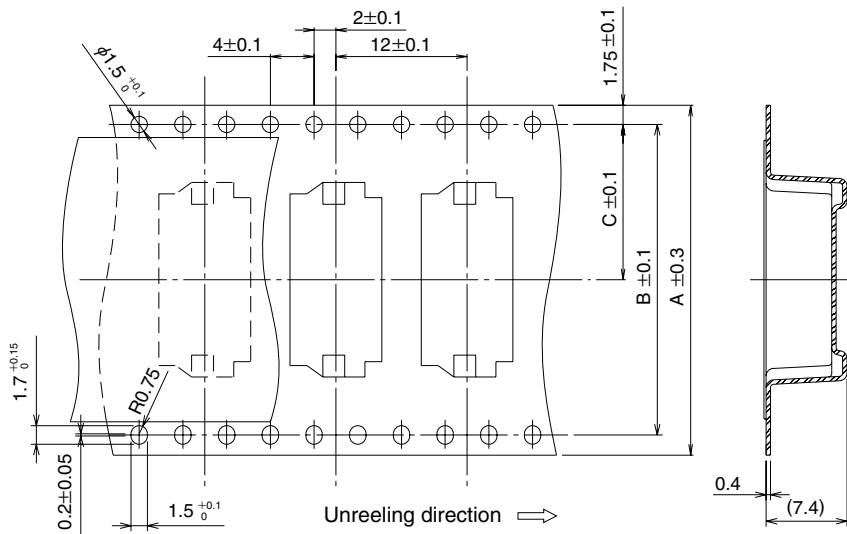
Note: Order embossed tape packaging items by the reel. (1 reel contains 1,000 pieces)

## ◆ Embossed Carrier Tape Dimensions

### ● Straight pin header



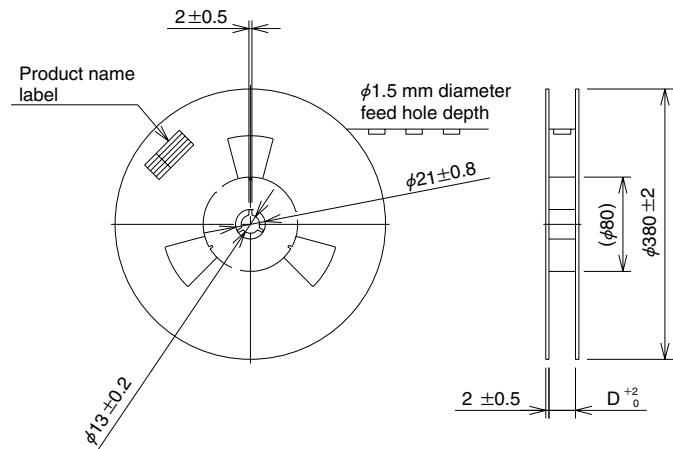
### ● Right angle pin header



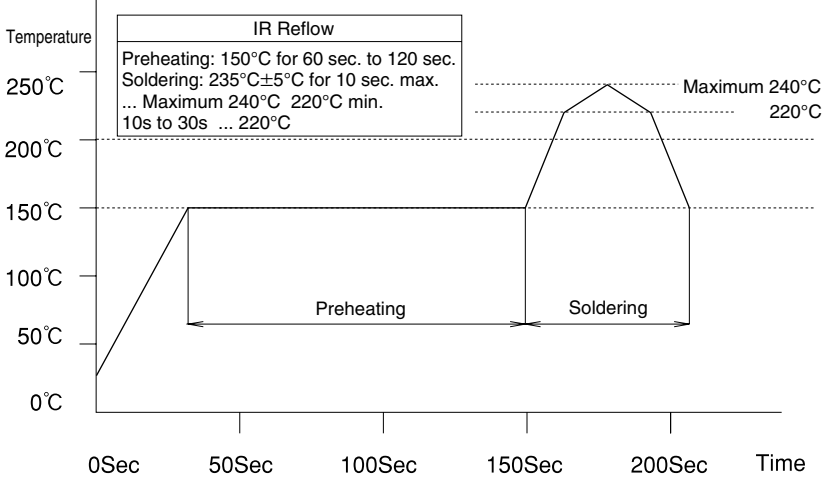
### ● Reel dimensions

| Product No.      | Number of Contacts | A  | B    | C    | D    |
|------------------|--------------------|----|------|------|------|
| DF20F(G)-10DP-1V | 10                 | 16 | —    | 7.5  | 16.4 |
| DF20F(G)-20DP-1V | 20                 | 24 | —    | 11.5 | 24.4 |
| DF20F(G)-30DP-1V | 30                 | 32 | 28.4 | 14.2 | 32.4 |
| DF20F(G)-40DP-1V | 40                 | 44 | 40.4 | 20.2 | 44.4 |
| DF20F(G)-50DP-1V | 50                 | 44 | 40.4 | 20.2 | 44.4 |
| DF20F-10DP-1H    | 10                 | 16 | —    | 7.5  | 16.4 |
| DF20F-20DP-1H    | 20                 | 24 | —    | 11.5 | 24.4 |
| DF20F-30DP-1H    | 30                 | 32 | 28.4 | 14.2 | 32.4 |
| * DF20F-40DP-1H  | 40                 | 44 | 40.4 | 20.2 | 44.4 |
| * DF20F-50DP-1H  | 50                 | 44 | 40.4 | 20.2 | 44.4 |

\* Reserved for product expansion



## ◆ Usage recommendation

|  |   |
|--|---|
| <p>1. Recommended Soldering<br/>Temperature Profile for IR Reflow.</p> |  <p>The graph shows a temperature profile for IR reflow. The y-axis is Temperature in °C (0 to 250) and the x-axis is Time in seconds (0 to 200). The profile starts at 0°C, rises to 150°C at 30 seconds, and remains at 150°C for 120 seconds (labeled 'Preheating'). It then rises to a peak of 240°C at 180 seconds (labeled 'Soldering') and falls back to 150°C at 200 seconds. A box titled 'IR Reflow' contains the following text: 'Preheating: 150°C for 60 sec. to 120 sec. Soldering: 235°C±5°C for 10 sec. max. ... Maximum 240°C 220°C min. 10s to 30s ... 220°C'. Horizontal dashed lines indicate the 240°C peak and the 220°C level.</p> <p>Note 1: Up to 2 cycles of reflow soldering are possible under the same conditions, provided that there is a return to normal temperature between the first and second cycle.<br/>Note 2: The temperature indicates the board surface temperature at the points of contacts with the connector terminals.</p> |
| <p>2. Recommended Manual Soldering Conditions</p>                      | <p><b>Soldering temperature: 290°C ±10°C, Soldering time: within 3 sec.</b></p>   |
| <p>3. Recommended Solder Screen Thickness</p>                          | <p>0.15mm</p>   |
| <p>4. Board Warping</p>  | <p>Maximum of 0.03 mm at the connector center section, with both ends of the connector as reference points.</p>   |
| <p>5. Cleaning Conditions</p>  | <p>Refer to "Nylon Connector Use Handbook."</p>   |
| <p>6. Wiring Termination Conditions</p>                                | <p>Refer to "Nylon Connector Use Handbook."<br/>Crimp contacts should be handled with care as not to cause any deformation or damage affecting the performance or termination.</p>  |
| <p>7. Mating / un-mating precautions</p>                               | <p>Excessive twisting and pulling on wires during mating/un-mating should be avoided as it may cause damage to connectors.</p>  |