

# 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. Reliable electrical connection wipe

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

#### 3. 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.

#### 4. 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.

#### 5. Product variations

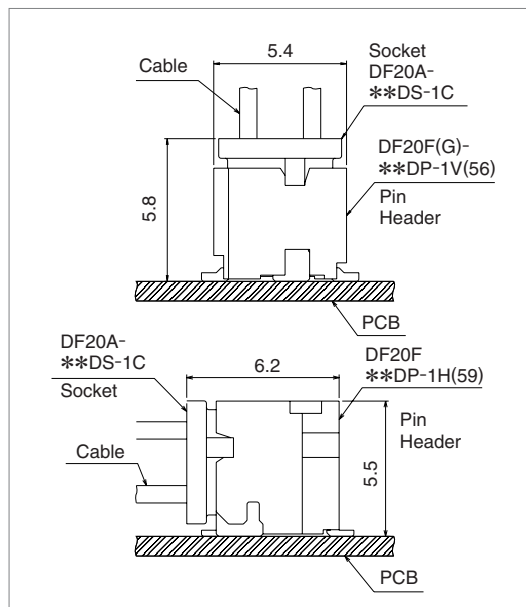
- (1) Available with 10, 20, 30, 40, and 50 contacts.
- (2) Pin headers are available in two types: with or without board positioning bosses.
- (3) Depending on specific application pin headers can be ordered in straight or right angle types.

### ■ Applications

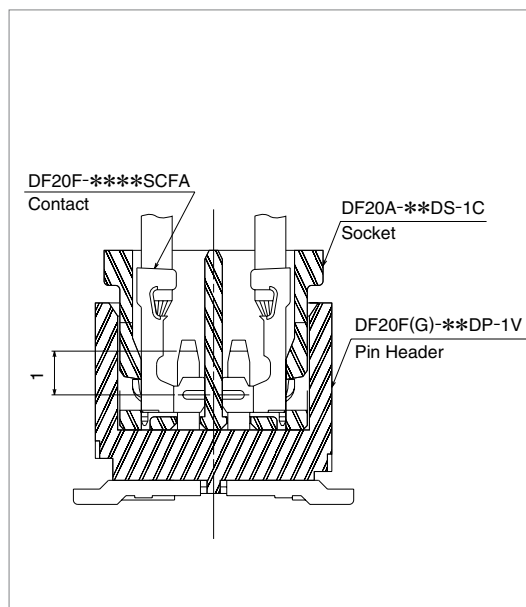
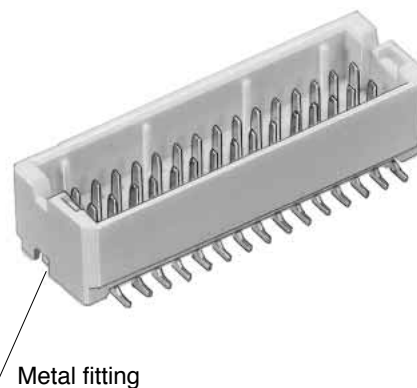
Notebook PC, small office automation equipment, small consumer devices, portable devices.

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

#### 1mm Pitch, Double Rows



#### Narrower external width and length



## 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    | 40% 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) | 0.2 N Min., 2 N Max.                                                 | 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.

Note3: Information contained in this catalog represents general requirements for this Series. Contact us for the drawings and specifications for a specific part number shown.

## 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

**DF20 # - \* DS - 1 C**  
 ① ② ③ ④ ⑤ ⑥

|                                                                                     |                                                                                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| ① Series name : DF20                                                                | ④ Connector type<br>DS: Double-row socket<br>DP: Double-row pin header                               |
| ② Boss Type<br>■ Pin header<br>F: Without boss<br>G: With boss<br>■ Crimp socket: A | ⑤ Contact pitch: 1 mm                                                                                |
| ③ Number of contacts: 10, 20, 30, 40, 50                                            | ⑥ Type of housing, header<br>C: Crimp housing<br>V: Straight SMT header<br>H: Right angle SMT header |

### Contacts

**DF20 F - 2830 SCF A ( \* \* )**  
 ① ② ③ ④ ⑤

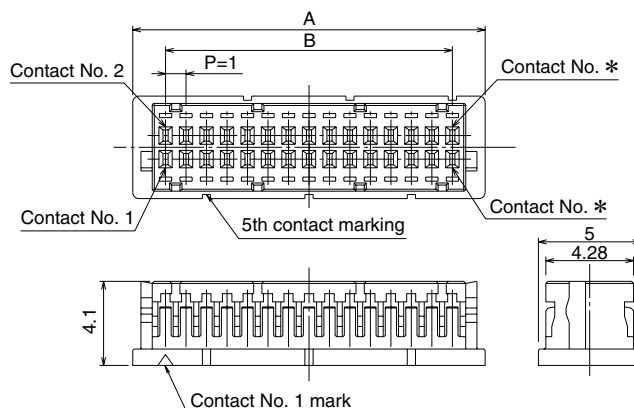
|                                                                      |                                                        |                                                                                           |
|----------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 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                      |                                                                                           |

## DF20 Series 1 mm Pitch Double Rows Low Profile Board-to-Cable Connectors

### Double Row Socket



Shown with terminated and installed contacts



Unit: mm

| Part Number   | CL No.     | Number of Contacts | A    | B    | RoHS |
|---------------|------------|--------------------|------|------|------|
| DF20A-10DS-1C | 686-0020-3 | 10                 | 7.2  | 4.0  | YES  |
| 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 | RoHS |
|--------------------|----------------|------------------|----------------------------------|--------------|------|
| DF20F-2830SCFA(**) | 686-0042-6-*** | Reel contacts    | See specifications number column | Gold plating | YES  |
| DF20F-3032SCFA(**) | 686-0043-9-*** |                  |                                  |              |      |
| DF20F-36SCFA(**)   | 686-0051-7-*** |                  |                                  |              |      |

[Specifications number] -, (\*\*)  
 (04): 10,000 pieces / reel  
 (44): 20,000 pieces / reel

#### ●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

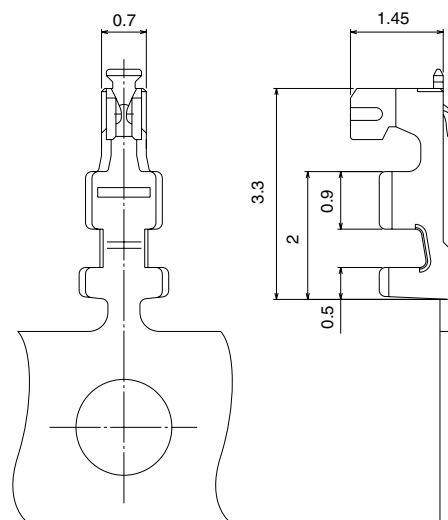
| Type       | CL No.     | Product No.      |
|------------|------------|------------------|
| Applicator | 901-4572-6 | AP105-DF20-2830S |
| Press      | 901-0005-4 | CM-105           |

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.

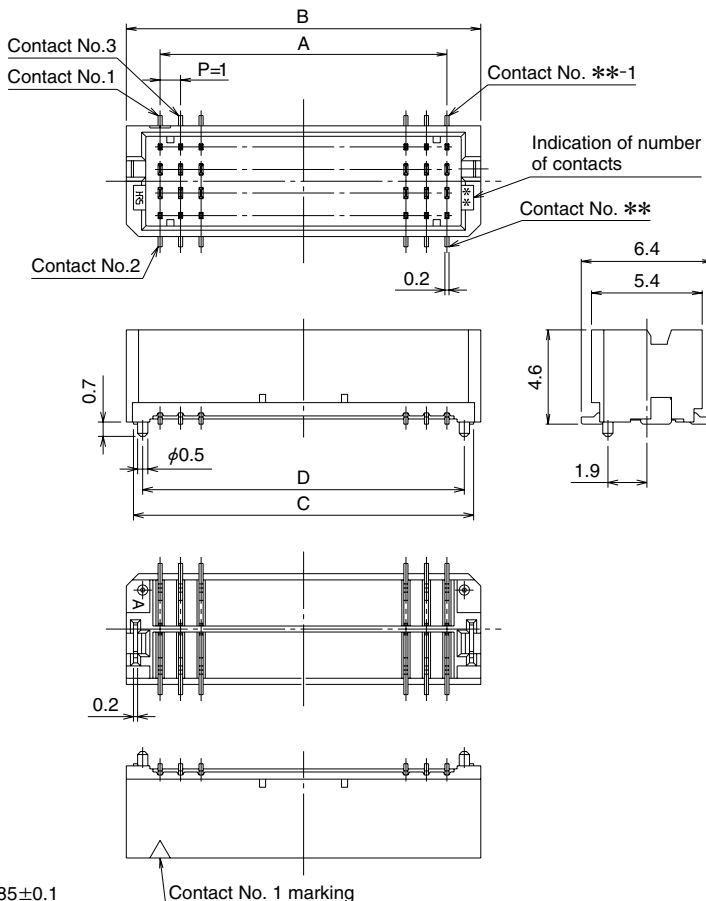
Note 4: The crimping tool for the DF20F-3032SCFA can also be used with the DF20F-2830SCFA.



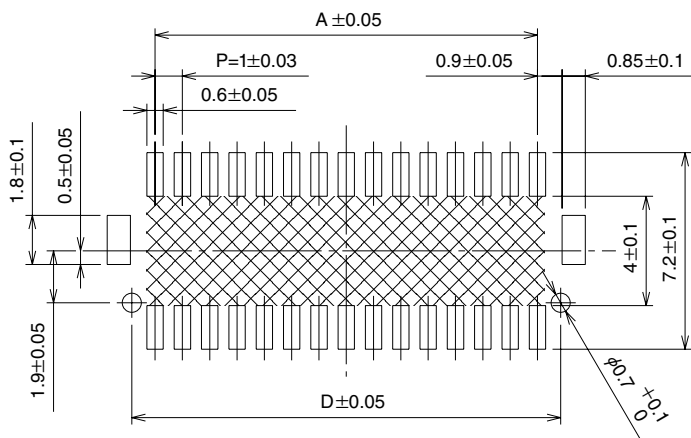
### Replacement Parts List for Applicator

| 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

| Part Number        | CL No.          | No. of contacts | A    | B    | C    | D    | Remarks      | RoHS |
|--------------------|-----------------|-----------------|------|------|------|------|--------------|------|
| DF20F -10DP-1V(56) | CL686-0032-2-56 | 10              | 4.0  | 7.3  | 6.6  | —    | Without boss | YES  |
| DF20F -20DP-1V(56) | CL686-0033-5-56 | 20              | 9.0  | 12.3 | 11.6 | —    |              |      |
| DF20F -30DP-1V(56) | CL686-0034-8-56 | 30              | 14.0 | 17.3 | 16.6 | —    |              |      |
| DF20F -40DP-1V(56) | CL686-0035-0-56 | 40              | 19.0 | 22.3 | 21.6 | —    |              |      |
| DF20F -50DP-1V(56) | CL686-0036-3-56 | 50              | 24.0 | 27.3 | 26.6 | —    |              |      |
| DF20G-10DP-1V(56)  | CL686-0037-6-56 | 10              | 4.0  | 7.3  | 6.6  | 5.7  | With boss    |      |
| DF20G-20DP-1V(56)  | CL686-0038-9-56 | 20              | 9.0  | 12.3 | 11.6 | 10.7 |              |      |
| DF20G-30DP-1V(56)  | CL686-0039-1-56 | 30              | 14.0 | 17.3 | 16.6 | 15.7 |              |      |
| DF20G-40DP-1V(56)  | CL686-0040-0-56 | 40              | 19.0 | 22.3 | 21.6 | 20.7 |              |      |
| DF20G-50DP-1V(56)  | CL686-0041-3-56 | 50              | 24.0 | 27.3 | 26.6 | 25.7 |              |      |

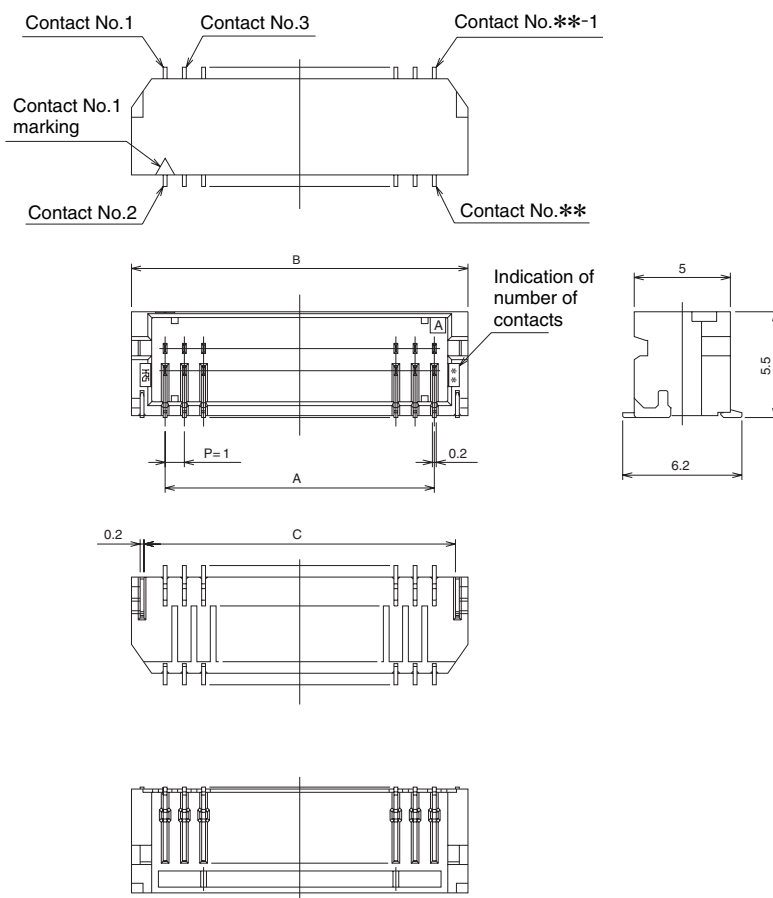
Note1: Order embossed tape packaging items by the reel. (1 reel contains 1,000 pieces)

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

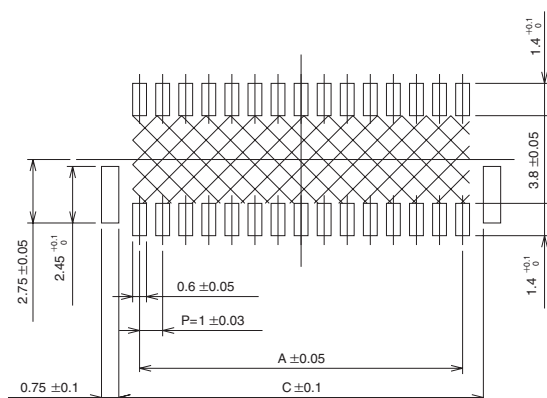
[Specifications number]-\*, (\*\*)  
 (56): Gold plating, embossed tape packaging

## DF20 Series 1 mm Pitch Double Rows Low Profile Board-to-Cable Connectors

### 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

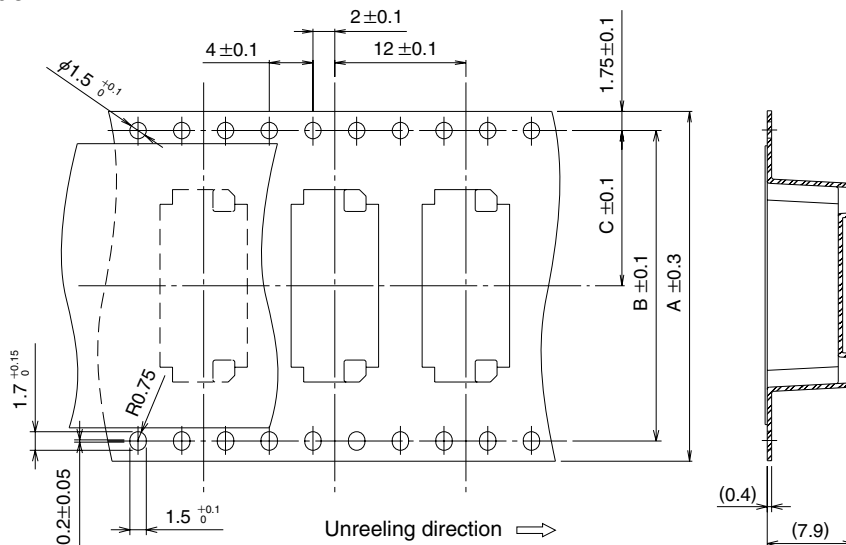
| Part Number        | CL No.         | No. of contacts | A    | B    | C    | Remarks      | RoHS |
|--------------------|----------------|-----------------|------|------|------|--------------|------|
| DF20F -10DP-1H(59) | 686-0027-2(59) | 10              | 4.0  | 7.5  | 6.2  | Without boss | YES  |
| DF20F -20DP-1H(59) | 686-0028-5(59) | 20              | 9.0  | 12.5 | 11.2 |              |      |
| DF20F -30DP-1H(59) | 686-0029-8(59) | 30              | 14.0 | 17.5 | 16.2 |              |      |
| DF20F -40DP-1H(59) | 686-0030-7(59) | 40              | 19.0 | 22.5 | 21.2 |              |      |

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

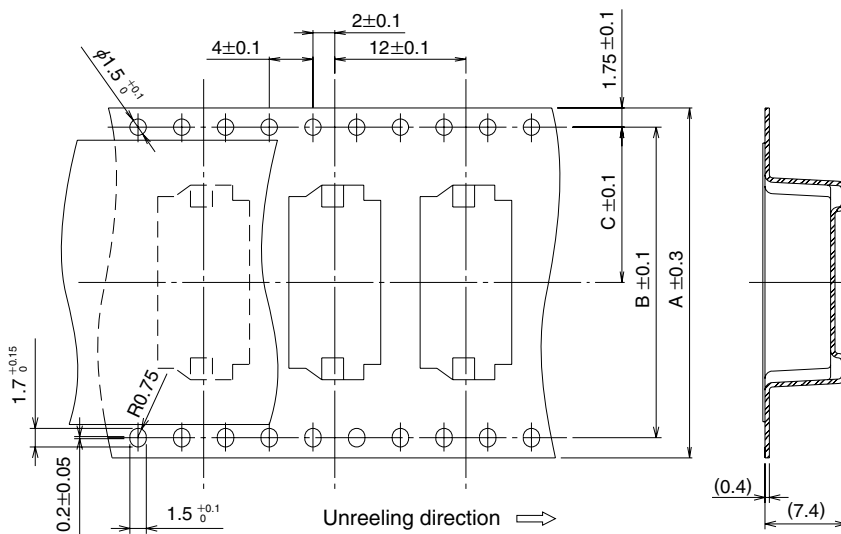
Note: Order embossed tape packaging items by the reel. (1 reel contains 1,000 pieces)

## ◆ Embossed Carrier Tape Dimensions

- Straight pin header

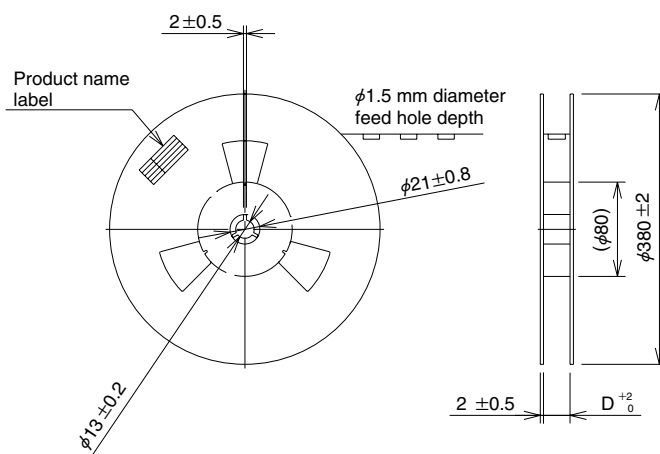


●Right angle pin header



## ● Reel dimensions

| Part Number          | No. of Contacts | A  | B    | C    | D    |
|----------------------|-----------------|----|------|------|------|
| DF20F(G)-10DP-1V(56) | 10              | 16 | —    | 7.5  | 16.4 |
| DF20F(G)-20DP-1V(56) | 20              | 24 | —    | 11.5 | 24.4 |
| DF20F(G)-30DP-1V(56) | 30              | 32 | 28.4 | 14.2 | 32.4 |
| DF20F(G)-40DP-1V(56) | 40              | 44 | 40.4 | 20.2 | 44.4 |
| DF20F(G)-50DP-1V(56) | 50              | 44 | 40.4 | 20.2 | 44.4 |
| DF20F - 10DP-1H(59)  | 10              | 16 | —    | 7.5  | 16.4 |
| DF20F - 20DP-1H(59)  | 20              | 24 | —    | 11.5 | 24.4 |
| DF20F - 30DP-1H(59)  | 30              | 32 | 28.4 | 14.2 | 32.4 |
| DF20F - 40DP-1H(59)  | 40              | 44 | 40.4 | 20.2 | 44.4 |



DF20 Series 1 mm Pitch Double Rows Low Profile Board-to-Cable Connectors

Usage recommendation

|                                                             |                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Recommended Soldering Temperature Profile for IR Reflow. | <div> <div>DF20F-<b>*DP-1H(59)</b></div> <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.</p> <p>Note 2: The temperature indicates the board surface temperature at the points of contacts with the connector terminals.</p> </div> |
| 2. Recommended Manual Soldering Conditions                  | Soldering temperature: 290°C ±10°C, Soldering time: within 3 sec.                                                                                                                                                                                                                                                                                                  |
| 3. Recommended Solder Screen Thickness                      | 0.15mm                                                                                                                                                                                                                                                                                                                                                             |
| 4. Board Warping                                            | Maximum of 0.03 mm at the connector center section, with both ends of the connector as reference points.                                                                                                                                                                                                                                                           |
| 5. Cleaning Conditions                                      | Refer to "Nylon Connector Use Handbook."                                                                                                                                                                                                                                                                                                                           |
| 6. Wiring Termination Conditions                            | 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.                                                                                                                                                                                         |
| 7. Mating / un-mating precautions                           | Excessive twisting and pulling on wires during mating/un-mating should be avoided as it may cause damage to connectors.                                                                                                                                                                                                                                            |