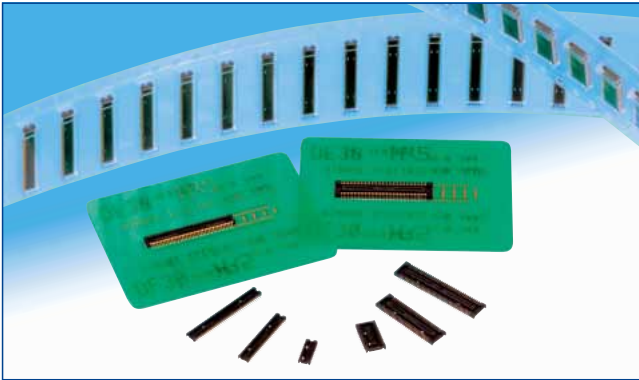


# 0.4 mm Pitch, 0.9 mm Height, Board-to-Board / Board-to-FPC Connectors

## DF30 Series



### Space-saving design

Connector footprint is minimized.  
<40 contacts, mated>

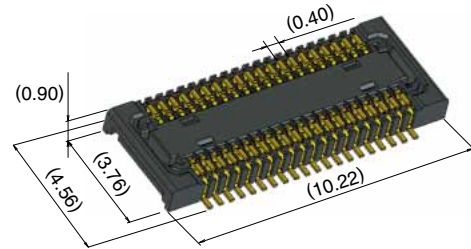


Fig.1

## ■ Features

### 1. High-density mounting

This connector offers a space-saving design that reduces the connector footprint.

The low stacking height of 0.9 mm is highly suited for applications that require a low mounted height. (Fig.1)

### 2. High contact reliability

Projections on the header terminals increase the wiping ability and provide superior mating reliability. During mating, the projections of the header terminals produce a tactile click, which helps to confirm proper insertion. (Fig.2)

### 3. Self-alignment feature

A self-alignment range of 0.3 mm is provided on the receptacle and allows for easier mating in tight spaces. (Fig.3)

### 4. Wide selection of pin counts

Standard pin counts are 20, 22, 24, 30, 34, 40, 50, 60, 70, and 80 positions. Smaller pin counts are also available that are applicable to LCD and camera modules in cell phones.

In addition, reinforced types are available for each pin count model. (The external shape is the same for both standard and reinforced types.)

### 5. Suitable for automatic mounting

Although this connector is extremely small, it still has a sufficient vacuum area for pick-and-place machines to hold the part.

Receptacle area: 1.12 mm

Header area: 1.11 mm

### 6. Test connectors

Highly durable test connectors are available which allow mounted production parts to be tested for electrical performance. Test connectors feature a higher number of insertions and removals cycles. These test connectors are for test purposes only and cannot be used for production requirements. For details, please contact your Hirose sales representative.

### High contact reliability

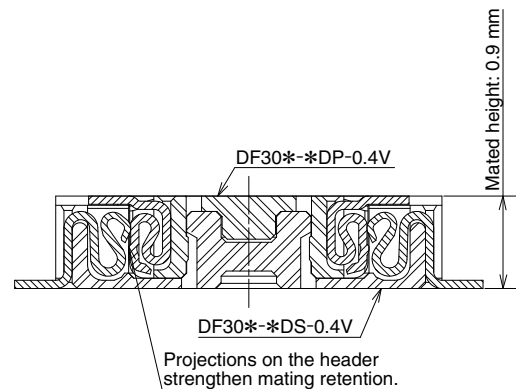


Fig.2

### Wide self-alignment range: 0.3 mm

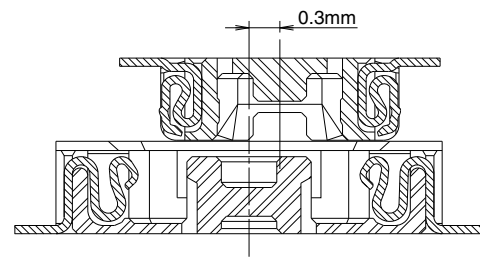


Fig.3

## Product Specifications

| Rating                                    | Rated current 0.3A<br>Rated voltage 30V AC                           | Operating temperature range : -35℃ to 85℃ (Note 1)<br>Operating humidity range : Relative humidity 20% to 80% | Storage temperature range -10℃ to 60℃ (Note 2)<br>Storage humidity range Relative humidity 40% to 70% (Note 2) |
|-------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Item                                      | Specification                                                        | Conditions                                                                                                    |                                                                                                                |
| 1. Insulation resistance                  | 50 MΩ min.                                                           | 100V DC                                                                                                       |                                                                                                                |
| 2. Withstanding voltage                   | No flashover or insulation breakdown.                                | 100V AC / one minute                                                                                          |                                                                                                                |
| 3. Contact resistance                     | 100 mΩ max.                                                          | 100 mA                                                                                                        |                                                                                                                |
| 4. Vibration                              | No electrical discontinuity of 1 μs or more                          | Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 2 hours, 3 axis                                           |                                                                                                                |
| 5. Humidity                               | Contact resistance: 100 mΩ max.<br>Insulation resistance: 25 MΩ min. | 96 hours at temperature of 40℃±2℃ and RH of 90% to 95%                                                        |                                                                                                                |
| 6. Temperature cycle                      | Contact resistance: 100 mΩ max.<br>Insulation resistance: 50 MΩ min. | Temperature: -55℃→+5℃ to +35℃→+85℃→+5℃ to +35℃<br>Duration: 30→10→30→10(Minutes)<br>5 cycles                  |                                                                                                                |
| 7. Durability<br>(insertions/withdrawals) | Contact resistance: 100 mΩ max.                                      | 50 cycles<br>(Connector for conductivity tests: 500 cycles)                                                   |                                                                                                                |
| 8. Resistance to soldering heat           | No deformation of components affecting performance.                  | Reflow: At the recommended temperature profile<br>Manual soldering: 350℃ for 3 seconds                        |                                                                                                                |

Note 1: Includes temperature rise caused by current flow.

Note 2: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating temperature range and humidity range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

## Materials

| Connectors              | Component      | Material        | Finish        | Remarks |
|-------------------------|----------------|-----------------|---------------|---------|
| Receptacles and Headers | Insulator      | LCP             | Color : Black | UL94V-0 |
|                         | Contacts       | Phosphor bronze | Gold plated   | _____   |
|                         | Metal fittings | Phosphor bronze | Tin plated    | _____   |

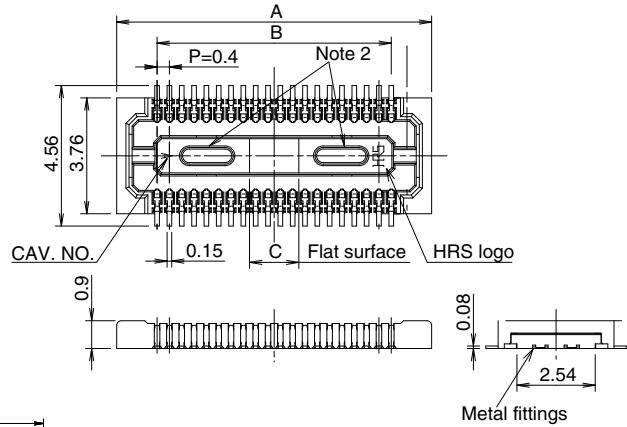
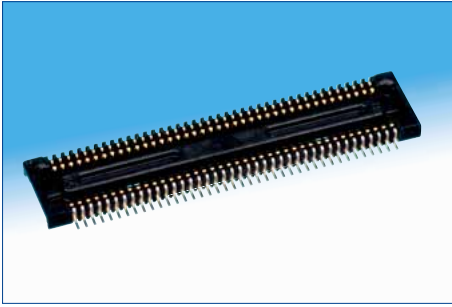
## Product Number Structure

### ● Receptacles and Headers

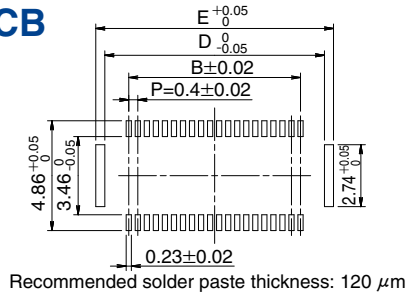
**DF30**   **FC**   **\***   **DS - 0.4**   **V**   **(\*\*)**

|                                                                                                                                                        |                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| ① Series name: DF30                                                                                                                                    | ⑤ Contact pitch: 0.4 mm                                                                                         |
| ② Configuration<br>FB/RB: With metal fittings, without bosses<br>FC/RC: Without metal fittings, without bosses<br>CJ: Connector for conductivity tests | ⑥ Termination section<br>V: Straight SMT                                                                        |
| ③ Number of contacts: 20, 22, 24, 30, 34, 40, 50, 60, 70, 80                                                                                           | ⑦ Packaging<br>(81): Embossed tape packaging (5,000 pcs/reel)<br>(82): Embossed tape packaging (1,000 pcs/reel) |
| ④ Connector type<br>DS: Double row receptacle<br>DP: Double row header                                                                                 |                                                                                                                 |

## Receptacles (with metal fittings)



## Recommended PCB mounting pattern



Recommended solder paste thickness: 120 μm

[Specification number] -\*\*, (\*\*)

(81): Embossed tape packaging (5,000 pcs/reel)

(82): Embossed tape packaging (1,000 pcs/reel)

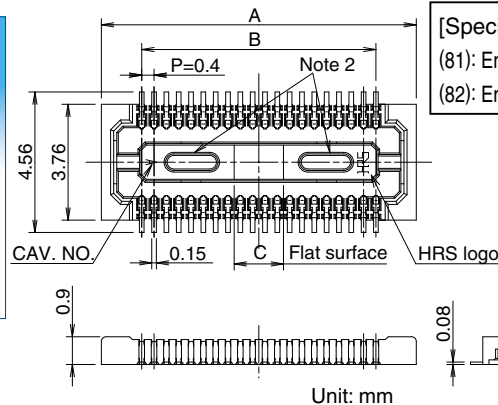
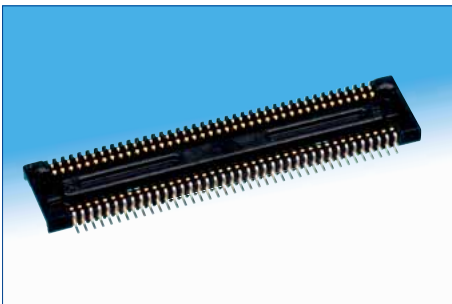
Unit: mm

| Part No.             | HRS No.       | No. of contacts | A     | B    | C    | D     | E     | RoHS |
|----------------------|---------------|-----------------|-------|------|------|-------|-------|------|
| DF30FB-20DS-0.4V(**) | 684-1098-3 ** | 20              | 6.22  | 3.6  | 1.2  | 5.72  | 6.52  | Yes  |
| DF30FB-22DS-0.4V(**) | 684-1099-6 ** | 22              | 6.62  | 4.0  |      | 6.12  | 6.92  |      |
| DF30FB-24DS-0.4V(**) | 684-1100-3 ** | 24              | 7.02  | 4.4  |      | 6.52  | 7.32  |      |
| DF30FB-30DS-0.4V(**) | 684-1101-6 ** | 30              | 8.22  | 5.6  |      | 7.72  | 8.52  |      |
| DF30FB-34DS-0.4V(**) | 684-1102-9 ** | 34              | 9.02  | 6.4  | 1.36 | 8.52  | 9.32  |      |
| DF30FB-40DS-0.4V(**) | 684-1103-1 ** | 40              | 10.22 | 7.6  | 1.6  | 9.72  | 10.52 |      |
| DF30FB-50DS-0.4V(**) | 684-1104-4 ** | 50              | 12.22 | 9.6  | 2.0  | 11.72 | 12.52 |      |
| DF30FB-60DS-0.4V(**) | 684-1105-7 ** | 60              | 14.22 | 11.6 | 2.4  | 13.72 | 14.52 |      |
| DF30FB-70DS-0.4V(**) | 684-1106-0 ** | 70              | 16.22 | 13.6 | 2.8  | 15.72 | 16.52 |      |
| DF30FB-80DS-0.4V(**) | 684-1107-2 ** | 80              | 18.22 | 15.6 | 3.2  | 17.72 | 18.52 |      |

Note 1: Order by number of reels.

Note 2: Receptacles with 24 or fewer contacts positions will not have recessed areas.

## Receptacles (without metal fittings)



[Specification number] -\*\*, (\*\*)

(81): Embossed tape packaging (5,000 pcs/reel)

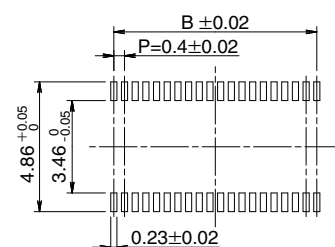
(82): Embossed tape packaging (1,000 pcs/reel)

| Part No.             | HRS No.       | No. of contacts | A     | B    | C    | RoHS |
|----------------------|---------------|-----------------|-------|------|------|------|
| DF30FC-20DS-0.4V(**) | 684-1109-8 ** | 20              | 6.22  | 3.6  | 1.2  | Yes  |
| DF30FC-22DS-0.4V(**) | 684-1110-7 ** | 22              | 6.62  | 4.0  |      |      |
| DF30FC-24DS-0.4V(**) | 684-1111-0 ** | 24              | 7.02  | 4.4  |      |      |
| DF30FC-30DS-0.4V(**) | 684-1112-2 ** | 30              | 8.22  | 5.6  |      |      |
| DF30FC-34DS-0.4V(**) | 684-1113-5 ** | 34              | 9.02  | 6.4  | 1.36 |      |
| DF30FC-40DS-0.4V(**) | 684-1078-6 ** | 40              | 10.22 | 7.6  | 1.6  |      |
| DF30FC-50DS-0.4V(**) | 684-1114-8 ** | 50              | 12.22 | 9.6  | 2.0  |      |
| DF30FC-60DS-0.4V(**) | 684-1082-3 ** | 60              | 14.22 | 11.6 | 2.4  |      |
| DF30FC-70DS-0.4V(**) | 684-1115-0 ** | 70              | 16.22 | 13.6 | 2.8  |      |
| DF30FC-80DS-0.4V(**) | 684-1116-3 ** | 80              | 18.22 | 15.6 | 3.2  |      |

Note 1: Order by number of reels.

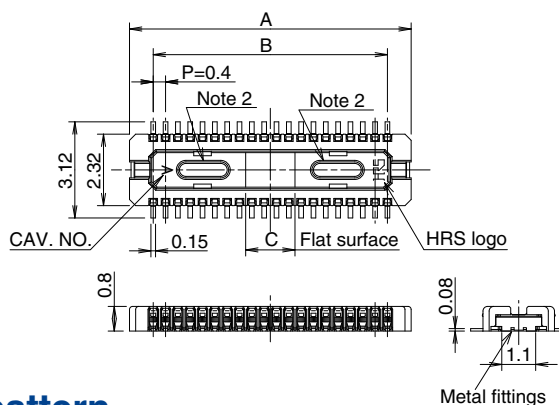
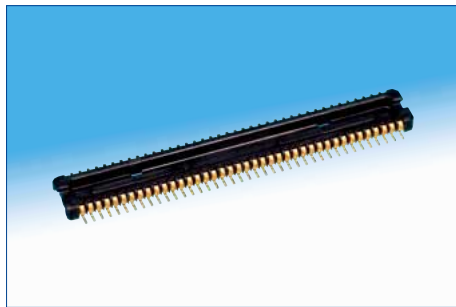
Note 2: Receptacles with 24 or fewer contacts positions will not have recessed areas.

## Recommended PCB mounting pattern

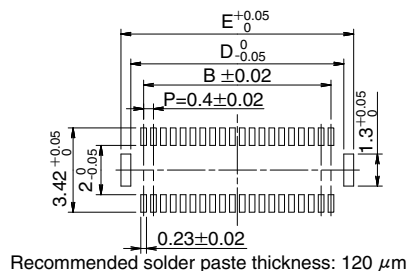


Recommended solder paste thickness: 120 μm

## Header (with metal fittings)



## Recommended PCB mounting pattern



[Specification number -\*\*, (\*\*)]

(81): Embossed tape packaging (5,000 pcs/reel)

(82): Embossed tape packaging (1,000 pcs/reel)

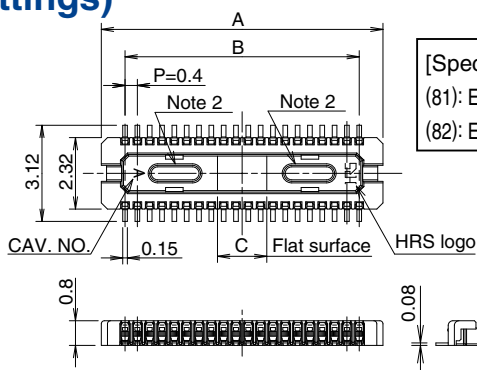
Unit: mm

| Part No.             | HRS No.       | No. of contacts | A     | B    | C    | D     | E     | RoHS |
|----------------------|---------------|-----------------|-------|------|------|-------|-------|------|
| DF30RB-20DP-0.4V(**) | 684-1279-8 ** | 20              | 5.14  | 3.6  | 1.2  | 4.64  | 5.44  | Yes  |
| DF30RB-22DP-0.4V(**) | 684-1280-7 ** | 22              | 5.54  | 4.0  |      | 5.04  | 5.84  |      |
| DF30RB-24DP-0.4V(**) | 684-1281-0 ** | 24              | 5.94  | 4.4  |      | 5.44  | 6.24  |      |
| DF30RB-30DP-0.4V(**) | 684-1282-2 ** | 30              | 7.14  | 5.6  |      | 6.64  | 7.44  |      |
| DF30RB-34DP-0.4V(**) | 684-1283-5 ** | 34              | 7.94  | 6.4  | 1.36 | 7.44  | 8.24  |      |
| DF30RB-40DP-0.4V(**) | 684-1284-8 ** | 40              | 9.14  | 7.6  | 1.6  | 8.64  | 9.44  |      |
| DF30RB-50DP-0.4V(**) | 684-1286-3 ** | 50              | 11.14 | 9.6  | 2.0  | 10.64 | 11.44 |      |
| DF30RB-60DP-0.4V(**) | 684-1287-6 ** | 60              | 13.14 | 11.6 | 2.4  | 12.64 | 13.44 |      |
| DF30FB-70DP-0.4V(**) | 684-1075-8 ** | 70              | 15.14 | 13.6 | 2.8  | 14.64 | 15.44 |      |
| DF30FB-80DP-0.4V(**) | 684-1136-0 ** | 80              | 17.14 | 15.6 | 3.2  | 16.64 | 17.44 |      |

Note 1: Order by number of reels.

Note 2: Headers with 24 or fewer contacts positions will not have protruding areas.

## Header (without metal fittings)



[Specification number] -\*\*, (\*\*)

(81): Embossed tape packaging (5,000 pcs/reel)

(82): Embossed tape packaging (1,000 pcs/reel)

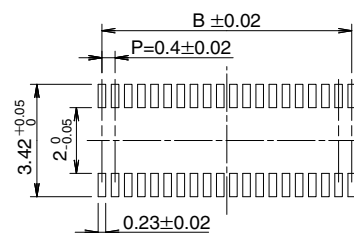
Unit: mm

| Part No.             | HRS No.       | No. of contacts | A     | B    | C    | RoHS |
|----------------------|---------------|-----------------|-------|------|------|------|
| DF30RC-20DP-0.4V(**) | 684-1268-1 ** | 20              | 5.14  | 3.6  | 1.2  | Yes  |
| DF30RC-22DP-0.4V(**) | 684-1269-4 ** | 22              | 5.54  | 4.0  |      |      |
| DF30RC-24DP-0.4V(**) | 684-1270-3 ** | 24              | 5.94  | 4.4  |      |      |
| DF30RC-30DP-0.4V(**) | 684-1271-6 ** | 30              | 7.14  | 5.6  |      |      |
| DF30RC-34DP-0.4V(**) | 684-1272-9 ** | 34              | 7.94  | 6.4  | 1.36 |      |
| DF30RC-40DP-0.4V(**) | 684-1273-1 ** | 40              | 9.14  | 7.6  | 1.6  |      |
| DF30RC-50DP-0.4V(**) | 684-1275-7 ** | 50              | 11.14 | 9.6  | 2.0  |      |
| DF30RC-60DP-0.4V(**) | 684-1276-0 ** | 60              | 13.14 | 11.6 | 2.4  |      |
| DF30FC-70DP-0.4V(**) | 684-1077-3 ** | 70              | 15.14 | 13.6 | 2.8  |      |
| DF30FC-80DP-0.4V(**) | 684-1144-9 ** | 80              | 17.14 | 15.6 | 3.2  |      |

Note 1: Order by number of reels.

Note 2: Receptacles with 24 or fewer contacts positions will not have recessed areas.

## Recommended PCB mounting pattern

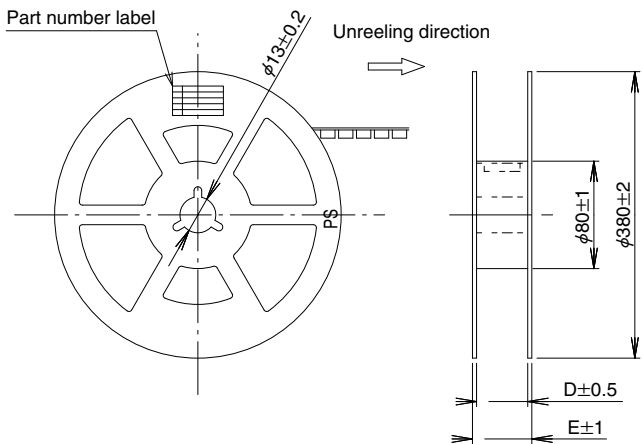
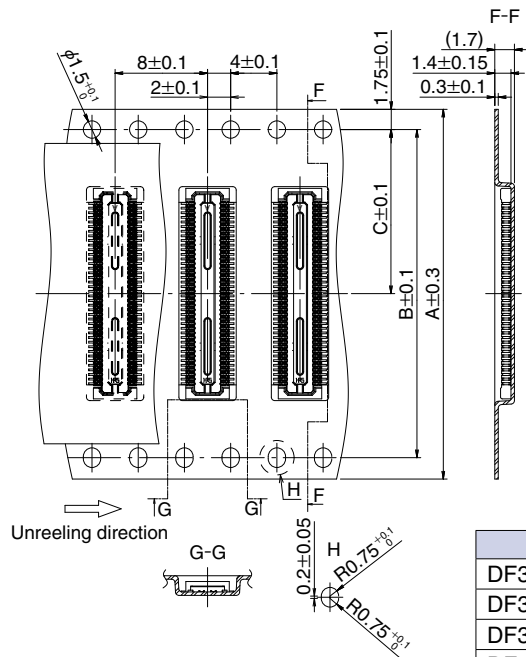


Recommended solder paste thickness: 120 μm

◆Packaging Specification

●Embossed Carrier Tape Dimensions - Receptacle

●Reel Dimensions



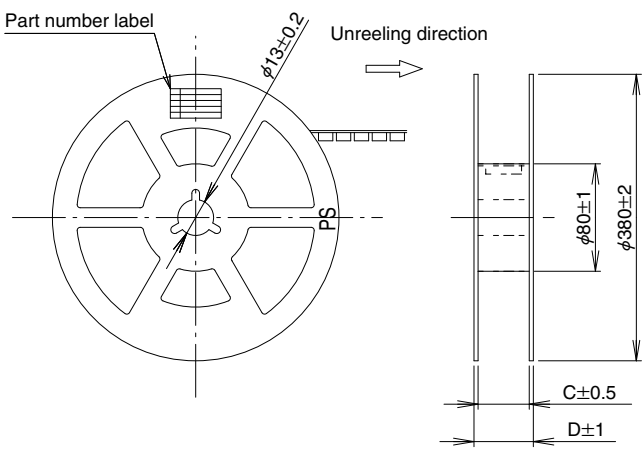
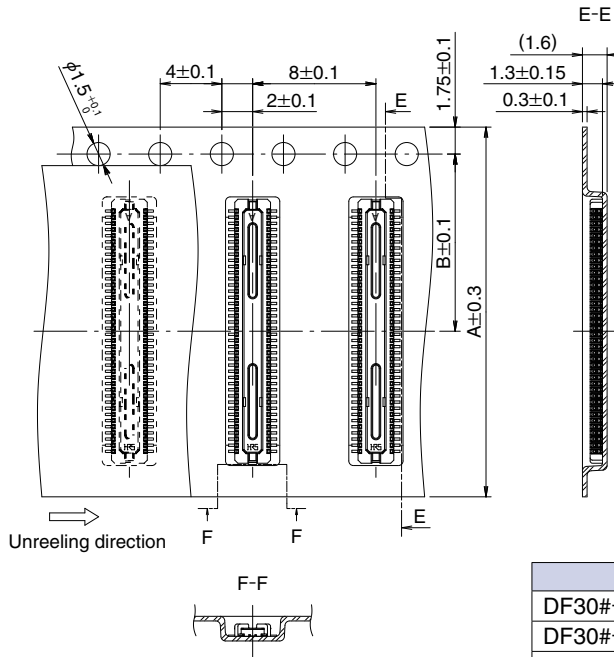
Unit: mm

| Part No.            | A    | B    | C    | D    | E    |
|---------------------|------|------|------|------|------|
| DF30#-20DS-0.4V(**) | 16.0 | —    | 7.5  | 17.5 | 21.5 |
| DF30#-22DS-0.4V(**) |      |      |      |      |      |
| DF30#-24DS-0.4V(**) |      |      |      |      |      |
| DF30#-30DS-0.4V(**) |      |      |      |      |      |
| DF30#-34DS-0.4V(**) | 24.0 | —    | 11.5 | 25.5 | 29.5 |
| DF30#-40DS-0.4V(**) |      |      |      |      |      |
| DF30#-50DS-0.4V(**) |      |      |      |      |      |
| DF30#-60DS-0.4V(**) |      |      |      |      |      |
| DF30#-70DS-0.4V(**) | 32.0 | 28.4 | 14.2 | 33.5 | 37.5 |
| DF30#-80DS-0.4V(**) |      |      |      |      |      |

Embossed tape 32mm or wider will have perforated feed holes on two sides.

●Embossed Carrier Tape Dimensions - Header

●Reel Dimensions



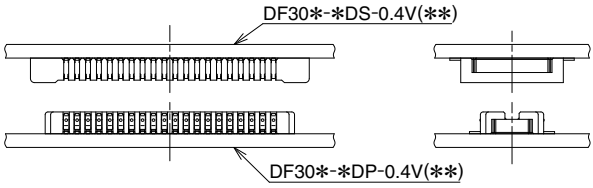
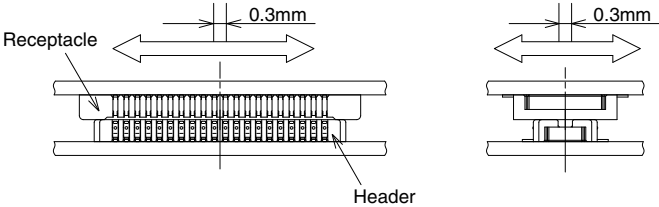
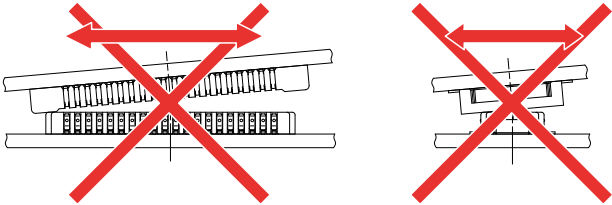
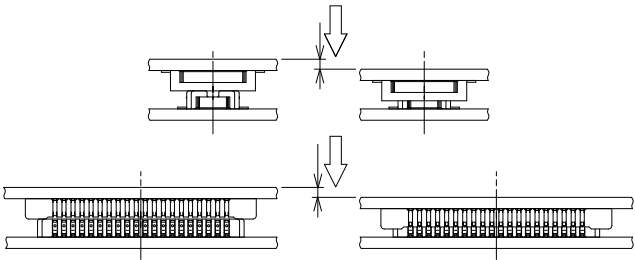
Unit: mm

| Part No.            | A    | B    | C    | D    |
|---------------------|------|------|------|------|
| DF30#-20DP-0.4V(**) | 16.0 | 7.5  | 17.5 | 21.5 |
| DF30#-22DP-0.4V(**) |      |      |      |      |
| DF30#-24DP-0.4V(**) |      |      |      |      |
| DF30#-30DP-0.4V(**) |      |      |      |      |
| DF30#-34DP-0.4V(**) | 24.0 | 11.5 | 25.5 | 29.5 |
| DF30#-40DP-0.4V(**) |      |      |      |      |
| DF30#-50DP-0.4V(**) |      |      |      |      |
| DF30#-60DP-0.4V(**) |      |      |      |      |
| DF30#-70DP-0.4V(**) | 32.0 | 28.4 | 14.2 | 33.5 |
| DF30#-80DP-0.4V(**) |      |      |      |      |

## ◆ Usage Recommendations

|                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Recommended temperature profile                                       | <div data-bbox="742 212 1228 638"> <p>● Ordinary solder cream</p> </div> <div data-bbox="742 672 1252 1108"> <p>● Lead-free solder cream</p> </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 profile indicates the board surface temperature at the point of contacts with the connector terminals.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2. Recommended manual soldering                                          | Manual soldering: $340 \pm 10^{\circ}\text{C}$ for 3 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3. Recommended screen thickness and open area ratio (Pattern area ratio) | Thickness: 0.12 mm<br>Opening are ratio: DS side 100%, DP side 84%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. Board warpage                                                         | Maximum of 0.02 mm at the connector center, with both ends of the connector as reference points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 5. Cleaning conditions                                                   | Please refer to the “Handbook on the Use of Wire-to-Board Connectors”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 6. Precautions                                                           | <ul style="list-style-type: none"> <li>■ Terminals are exposed on the header side. Please note that touching them with bare hands causes contact failure or static electricity, resulting in damage to the components.</li> <li>■ Note that mating/unmating when the product is not mounted on the PCB could cause damage or deformation of the terminal.</li> <li>■ Avoid supporting the PCB using only the connectors. Other means of support are needed.</li> <li>■ Care should be taken that excessive prying during mating/unmating could cause damage.</li> <li>■ In the case of hand soldering, please do not apply any flux, which could cause flux wicking.</li> <li>■ The product may differ slightly in color due to different production lots of the resin. This color variation has no influence on the performance.</li> <li>■ Please refer to the next page for the precautions for mating/unmating.</li> <li>■ Care should be taken to secure the mated connector and FPC within the device with housings and cushioning materials. This will help prevent disconnections or unmating in the event of dropping, other external forces or stressed routing of the FPC.</li> </ul> |

◆Handling Precautions when mating the connectors

|                                                                                     |                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                                                                                                                                                                                          |
|    | <p>Keep the connectors parallel to each other when positioning.</p>                                                                                                                                                      |
|  | <p>Do not attempt to mate the connectors starting at one end or side.</p>                                                                                                                                                |
|  | <p>Press-down evenly until slight resistance is felt. Overcoming this slight resistance will complete the mating of receptacle with the header. A definite "click" sensation will confirm the fully mated condition.</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Fully mated                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | Lift even one side, keeping both boards parallel to each other.                                                                                                                                                                                                                                                                                                                                                                                    |
|  | When handling circumstances prevent the connector from being kept level during un-mating, one end may be lifted separate as shown on Fig. A. However, to utilize this procedure the connector must be mounted on a sufficiently rigid circuit board. Any deflection of the board during this operation may result in damage to the connector or solder joints. Do not attempt the start of the un-mating of the connectors from one side (Fig. B). |
|  | When removal is from the width orientation as illustrated in the diagram to the left, damage could be caused to the connector. Do not perform removal from the width orientation.                                                                                                                                                                                                                                                                  |



**HIROSE ELECTRIC CO.,LTD.**

2-6-3,Nakagawa Chuoh,Tsuzuki-Ku,Yokohama-Shi 224-8540,JAPAN  
TEL: +81-45-620-3526 Fax: +81-45-591-3726  
<http://www.hirose.com>  
<http://www.hirose-connectors.com>