

## DF40GL Series

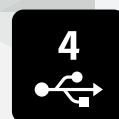
# 0.4mm Pitch / 1.5mm Height, Positive Lock, Shielded Board-to-Board / Board-to-FPC Connector



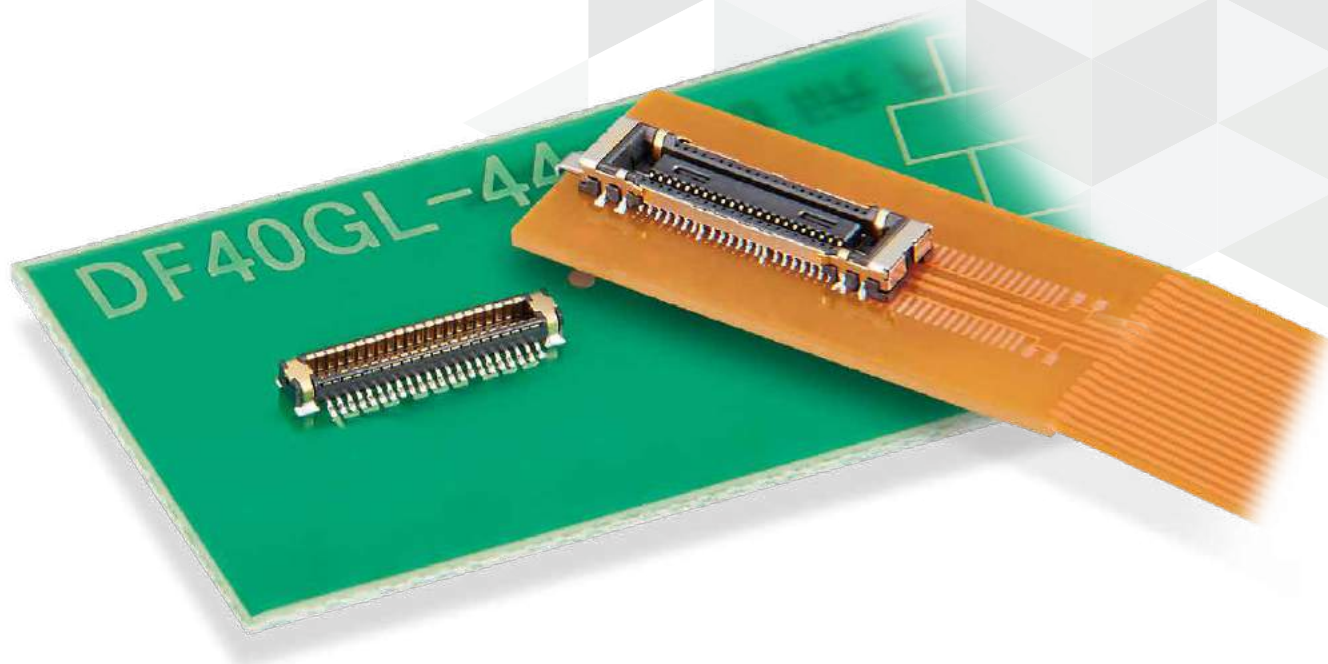
Positive-Lock



Robust



USB4

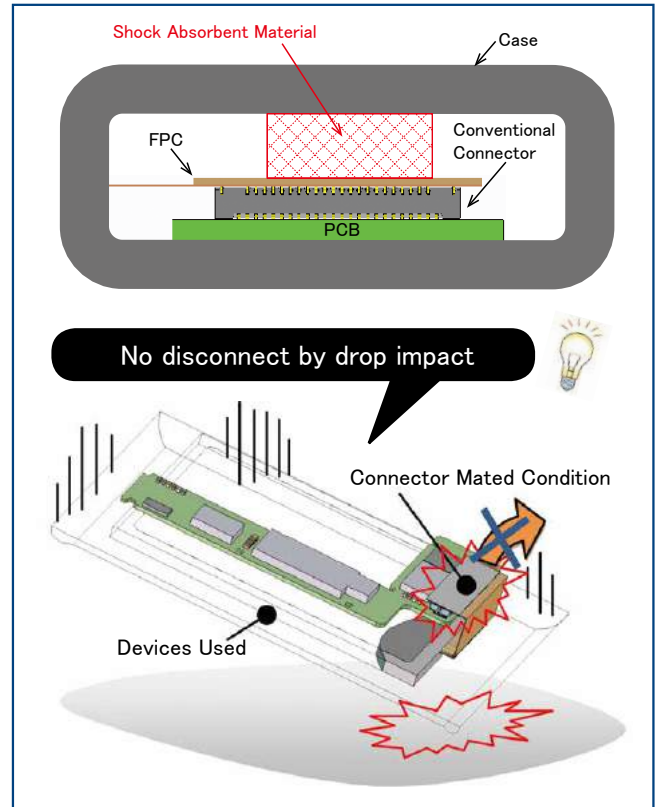


## Features

### 1. Positive Lock

Positive lock with blade lock design.  
Prevents coming off from mating condition due to impact.

Advantages of positive lock design :  
Conventional connectors needed shock absorbent material to prevent coming off due to impact.  
DF40GL Series eliminates the need for the shock absorbent material with a positive lock design.



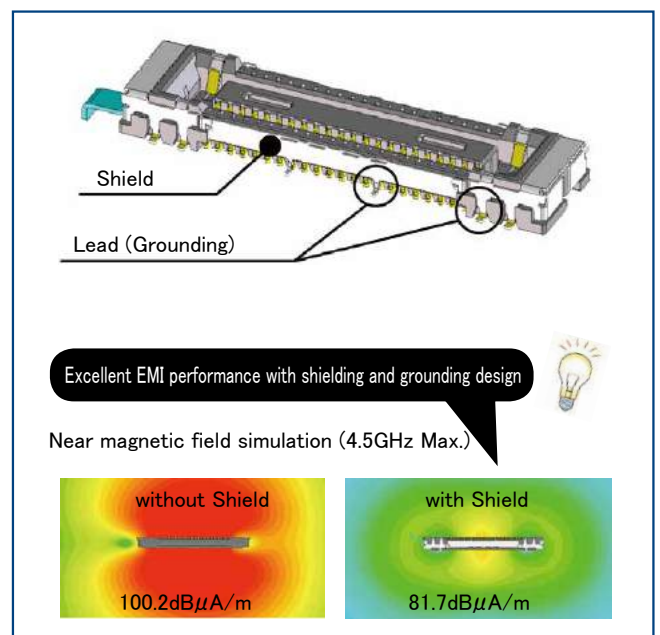
### 2. Supports High Speed Transmission

Meets USB Type C and PCIe Gen4 standards.

### 3. Shield and Grounding Design

Shielding and grounding to suppress EMI.

\*DF40GL Series has shield and lead ground producing excellent EMI performance.



Advantages of shielding and grounding design

## 4. Long Effective Mating Length

The world's longest effective mating length of 0.45mm, producing high contact reliability.

## 5. Smooth Mating Operation

Guidance ribs ensure 0.4mm self-alignment range. In addition, secure mating with clear tactile click.

## 6. Environmental Compatibility

·Halogen-free

No chlorine or bromine exceeding the standard values are used in this connector.

\*As defined by IEC 61249-2-21

Br : 900ppm Max., Cl : 900ppm Max.,

Br+Cl : 1500ppm Max.

## Application

It can be used in equipment that requires high mating reliability and shock resistance, such as automotive, medical equipment, portable equipment, etc.

## Product Specifications

|               |                |                                 |             |
|---------------|----------------|---------------------------------|-------------|
| Rated Current | Signal Contact | Operating Temperature (Note 1)  | -55 to +85℃ |
|               | 0.35A          | Storage Temperature (Note 2)    | -10 to +60℃ |
| Rated Voltage | 30V AC/DC      | Operating Humidity Range        | 20 to 80%   |
|               |                | Storage Humidity Range (Note 2) | 40 to 70%   |

| Item                   | Standards                                                           | Condition                                                                                                        |
|------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Insulation Resistance  | 50M Ω Min.                                                          | Measure at 100V DC                                                                                               |
| Withstanding Voltage   | No flashover or dielectric breakdown                                | 100V AC for 1 min.                                                                                               |
| Contact Resistance     | 90m Ω Max.                                                          | Measured at 20mV AC, 1kHz, 1mA                                                                                   |
| Vibration Resistance   | No electrical discontinuity of 1 μ s or more                        | frequency 10 to 55Hz, half amplitude of 0.75mm, 2 hours in each of 3 directions                                  |
| Humidity Resistance    | Contact Resistance: 90m Ω Max.<br>Insulation Resistance: 25M Ω Min. | Temperature 40 ± 2℃ , Humidity 90 to 95%, Left for 96 hours                                                      |
| Temperature Cycle      | Contact Resistance: 90m Ω Max.<br>Insulation Resistance: 50M Ω Min. | (-55℃ : 30 min. → +5 to +35℃ : 10 min. → +85℃ : 30 min. → +5 to +35℃ : 10 min.)<br>5 cycles                      |
| Mating Durability      | Contact Resistance: 90m Ω Max.                                      | 30 times                                                                                                         |
| Lock Strength          | 30N Min.                                                            | Apply pullout force vertically.                                                                                  |
| Solder Heat Resistance | No dissolution or resin melting that will affect performance        | Reflow : At the recommended temperature profile<br>Hand solder: Soldering iron temperature 350℃ within 3 seconds |

Note 1 : Includes temperature rise caused by current flow.  
Note 2 : Storage refers to the long-term storage condition for unused products before the board mounting.  
Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.

## Materials / Finish

| Item            | Component          | Material           | Finish       | Remarks |
|-----------------|--------------------|--------------------|--------------|---------|
| Receptacle/Plug | Insulator          | LCP                | Black        | UL94V-0 |
| Receptacle/Plug | Contact            | Phosphorous Bronze | Gold Plating | -       |
| Receptacle      | Shield             | Phosphorous Bronze | Gold Plating | -       |
| Receptacle      | Lock Lever         | Stainless Steel    | -            | -       |
| Plug            | Retention Tab Lock | Stainless Steel    | Gold Plating | -       |

## Product Number Structure

Refer to the chart below when determining the product specifications from the product number.  
Please select from the product numbers listed in this catalog when placing orders.

### ■ Receptacle/Plug

**DF40 GL - # DS - 0.4 V (##)**

1

2

3

4

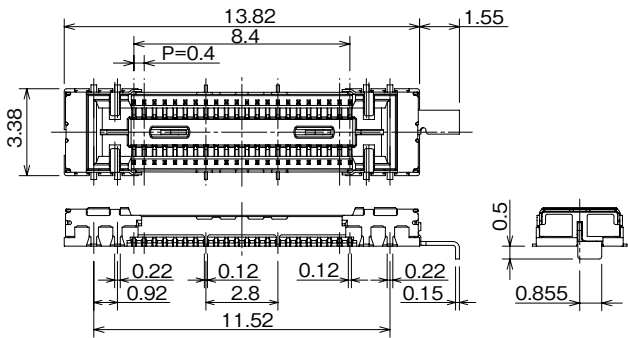
5

6

7

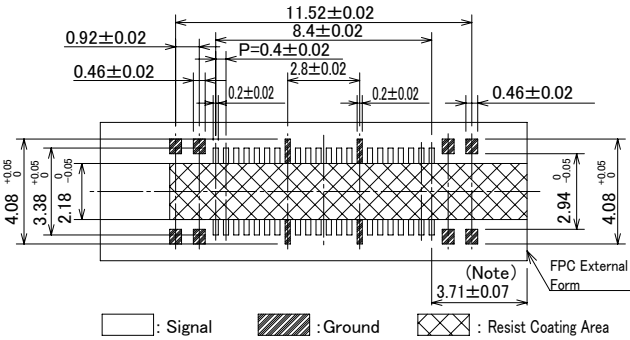
|                  |                                                   |                                                |                                                                                                                                                                                                                                        |
|------------------|---------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Series Name    | DF40                                              | 6 Contact Type                                 | Straight SMT                                                                                                                                                                                                                           |
| 2 Shape Symbol   | GL: Positive Lock Specifications with Shield      | 7 Specifications of Gold Plating and Packaging | (51): Gold Plating Thicknes : 0.05 μ m<br>Embossed Tape Packing<br>(Receptacle: 4,000 pcs/reel)<br>(Plug: 5,000 pcs/reel)<br><br>(58): Gold Plating Thicknes : 0.05 μ m<br>Embossed Tape Packing<br>(Receptacle, Plug: 1,000 pcs/reel) |
| 3 No. of Pos.    |                                                   |                                                |                                                                                                                                                                                                                                        |
| 4 Connector Type | DS: Double Row Receptacles<br>DP: Double Row Plug |                                                |                                                                                                                                                                                                                                        |
| 5 Contact Pitch  | 0.4mm                                             |                                                |                                                                                                                                                                                                                                        |

Receptacle



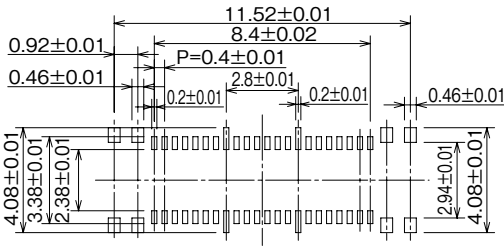
| Part No.             | HRS No.          | No. of Pos. | Purchase Unit<br>(#):(51) | Purchase Unit<br>(#):(58) |
|----------------------|------------------|-------------|---------------------------|---------------------------|
| DF40GL-44DS-0.4V(##) | CL0684-4411-0-## | 44          | 4,000pcs per reel         | 1,000pcs per reel         |

Recommended PCB Mounting Pattern

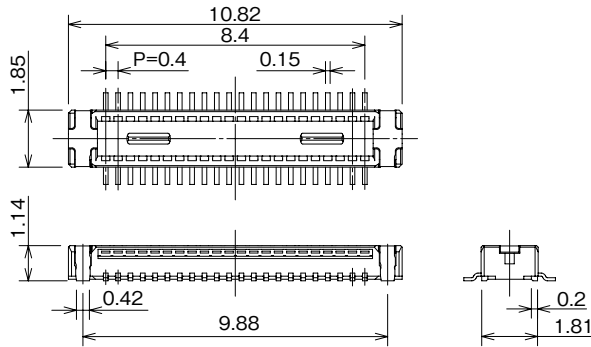


Note : To insure proper lock lever operation, the FPC needs to be within the dimensions specified.

Recommended Metal Mask Dimensions  
(Metal Mask Thickness 120μm)



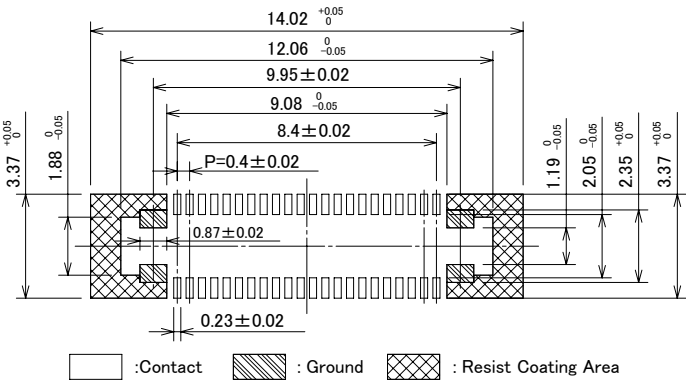
Plug



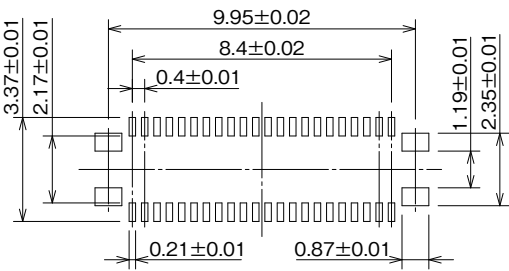
| Part No.             | HRS No.          | No. of Pos. | Purchase Unit<br>(##):(51) | Purchase Unit<br>(##):(58) |
|----------------------|------------------|-------------|----------------------------|----------------------------|
| DF40GL-44DP-0.4V(##) | CL0684-4412-0-## | 44          | 5,000pcs per reel          | 1,000pcs per reel          |

Note : This connector has no polarity.

■ Recommended PCB Mounting Pattern



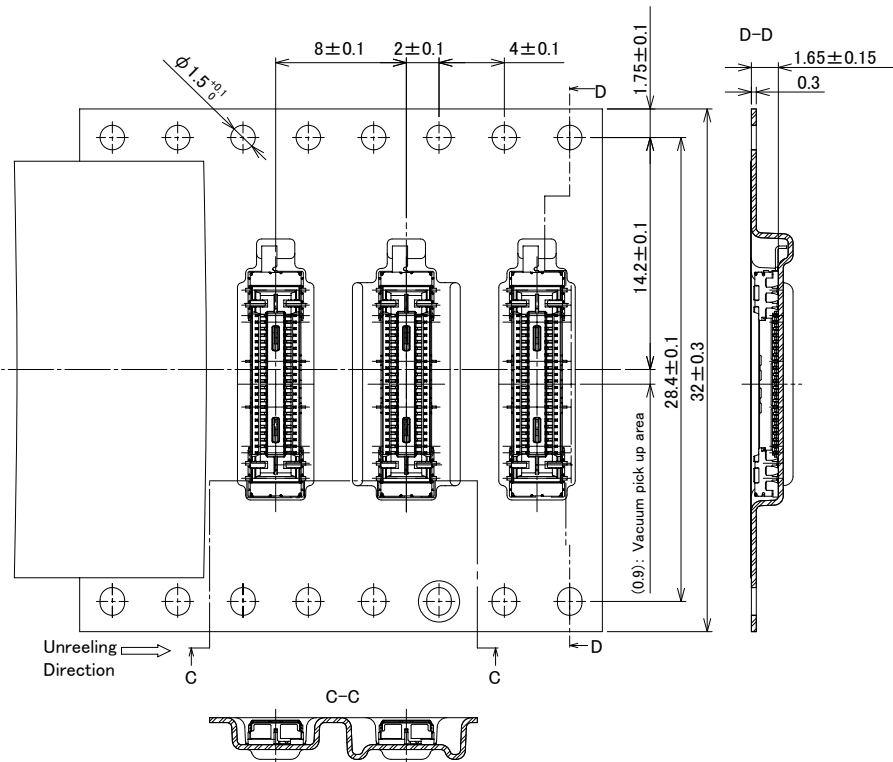
■ Recommended Metal Mask Dimensions  
(Metal Mask Thickness 120μm)



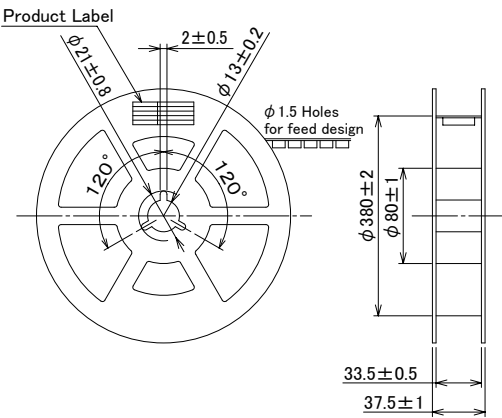
Packaging Specifications Diagram (JIS C 0806 Compliant)

Receptacle

● Embossed Carrier Tape Dimensions



● Reel Dimensions



| Part No.             | HRS No.          | No. of Pos. | Purchase Unit<br>(##):(51) | Purchase Unit<br>(##):(58) |
|----------------------|------------------|-------------|----------------------------|----------------------------|
| DF40GL-44DS-0.4V(##) | CL0684-4411-0-## | 44          | 4,000pcs per reel          | 1,000pcs per reel          |

## ● Embossed Carrier Tape Dimensions



Product Label

$\phi 21 \pm 0.8$

$2 \pm 0.5$

$\phi 13 \pm 0.2$

$120^\circ$

$120^\circ$

$\phi 1.5$  Holes for feed design

$\phi 380 \pm 2$

$\phi 80 \pm 1$

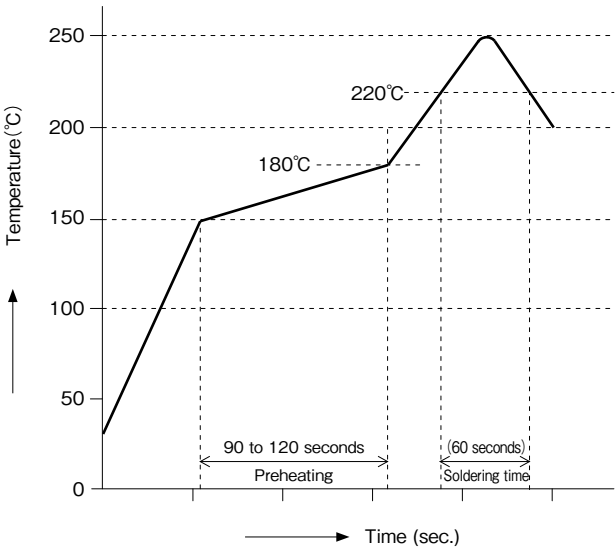
$25.5 \pm 0.5$

$29.5 \pm 1$

9

Precautions

Recommended  
Temperature Profile  
(Lead-Free Mounting)



【Conditions】

- 1. Peak Temperature : 250°C Max.
- 2. Heating : 220°C Min., within 60sec.
- 3. Preheating : 150 to 180°C , 90 to 120sec.
- 4. Number of Reflow Cycles : 2 cycles Max.

\* Temperature refers to the surface temperature of the board near the connector lead.

Recommended  
Manual Soldering Conditions

Soldering iron temperature : 340 ± 10°C , Soldering Time : Within 3 sec.

Recommended Metal Mask  
Thickness and Open Area to  
PCB Pattern (Area Ratio)

Thickness : 0.12mm,  
Aperture Ratio : DS(Contact Part) 80%, DP(Shield Part) 100%  
DP(Contact Part) 80%, (Retention Tab) 100%

Board Warpage

Max. of 0.02mm at the center in reference to both ends of the connector.

Cleaning

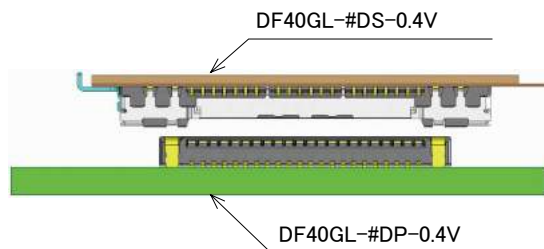
Cleaning is not recommended.  
If you clean this product, please evaluate its performance before using it.  
(Cleaning may impair the mating/unmating properties and lower resistance to environmental factors.)

Precautions

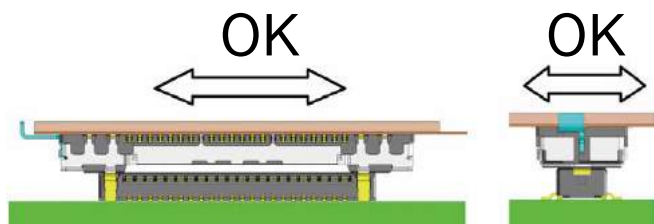
- Be careful when mating/unmating the connector when it is not mounted on the PCB as it may cause damage/deformation to contacts.
- Avoid supporting the PCB only with the connectors. Support it by other means such as bolts, screws, posts, etc.
- Excessive wrenching during unmating/mating may result in damage.
- In the case of hand soldering, please do not apply any flux which could cause flux wicking.
- This product may have slight color differences due to production lot variability, but this does not affect the performance.
- Please refer to the following page for handling precautions when inserting and removing.

## Handling Precautions for Connector Insertion

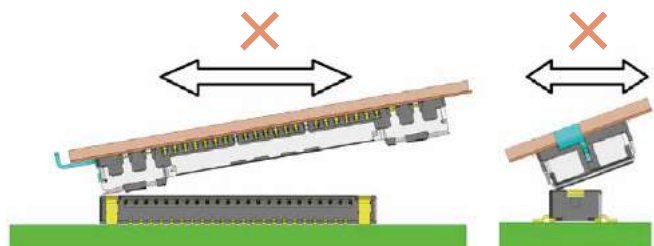
[Connector Mating]



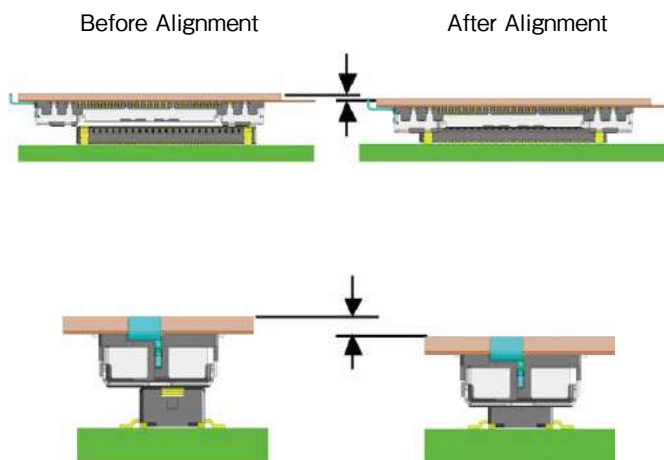
- 1) When aligning, look for the guide port by moving the connector in X and Y directions parallel to the mating connector.



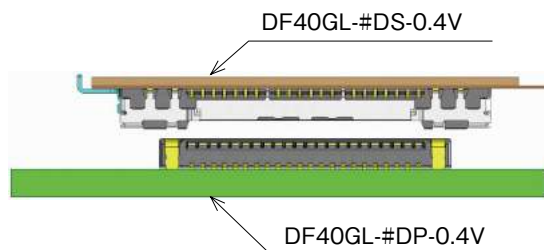
- 2) If pressure is applied in the Z direction when the connectors are not parallel, the connector may get damaged or shaved.



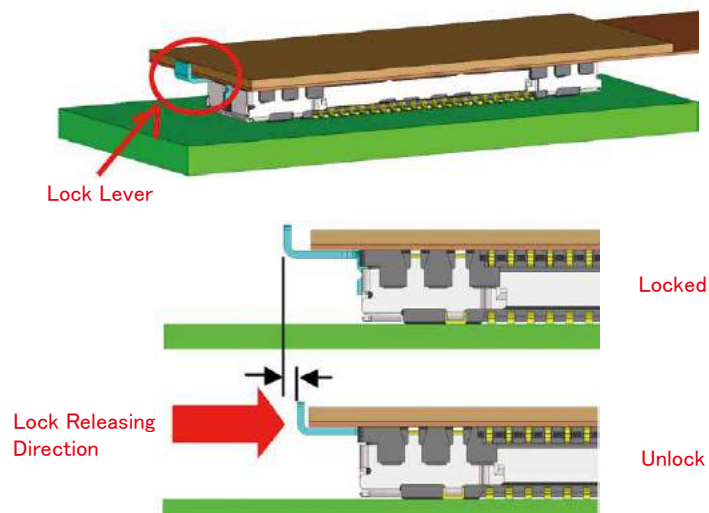
- 3) When the connector is correctly aligned, it is guided and lowers into place, which can be felt by the operator. Afterwards the connectors are aligned and cannot be moved in the X and Y axis, completing the mating operation.



## Handling Precautions for Connector Removal

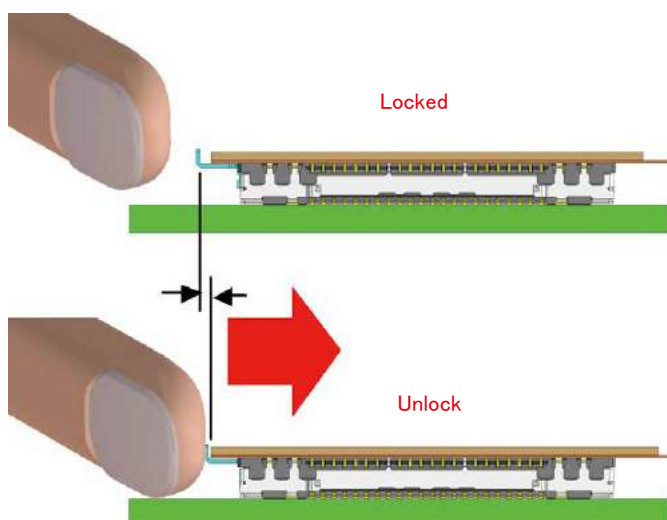


- 1) To unmate, release the lock by pressing down on the lock lever in the unlock direction. Unmate the connector with the lock released.



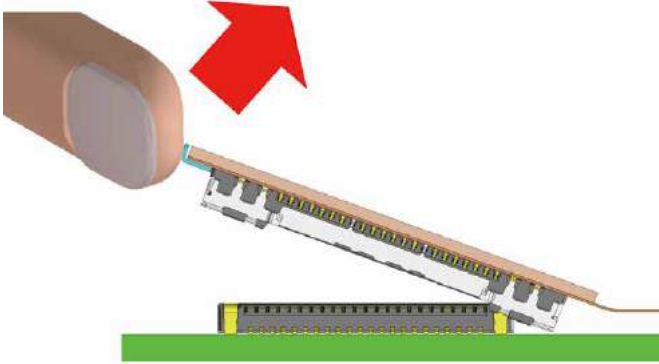
- 2) Push the lock lever to release the lock.  
When pressing the edge of the FPC with a finger, the lock lever is also pressed at the same time to release the lock.

Step 1

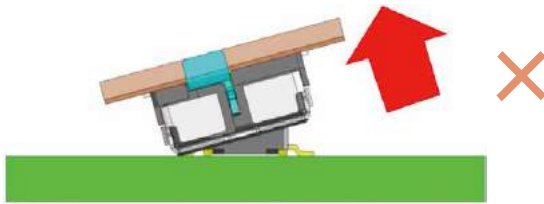


- 3) Lift the FPC upwards while pressing on the lock lever.

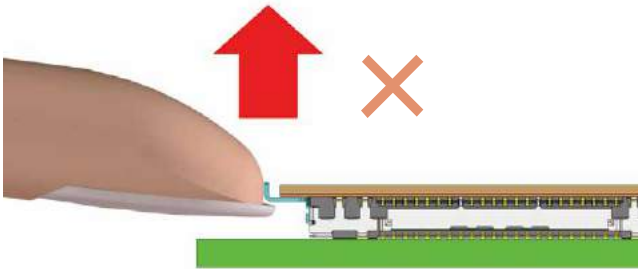
Step 2



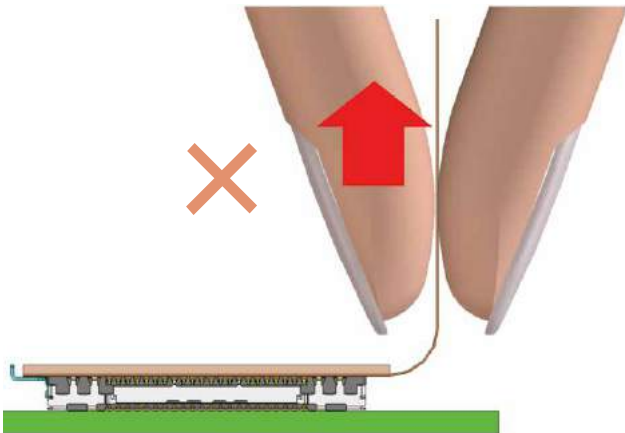
- 4) Caution: If unmated forcefully, the connector may be damaged.



- 5) Attempting to unmate the connector without releasing the lock could cause damage.

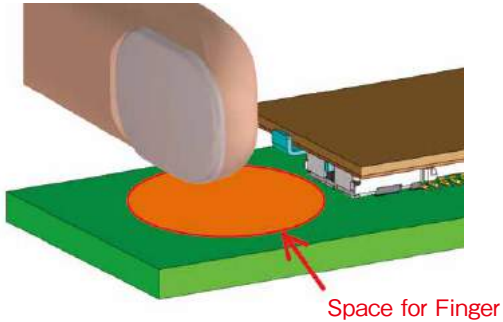


- 6) Pulling the FPC without releasing the lock could cause damage.

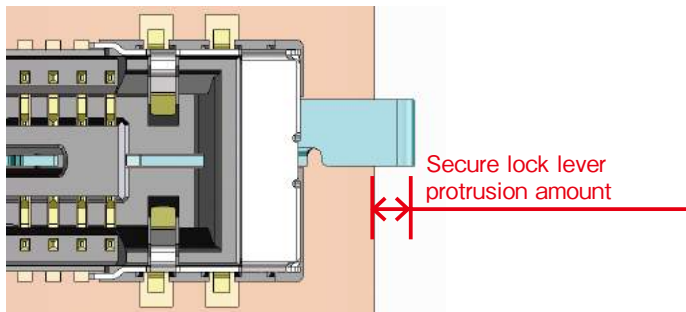


## PCB Layout

- 1) Enough space for a finger to fit is required to operate the lock lever.  
Consider the PCB layout when placing parts around the connector.



- 2) The lock lever must protrude beyond the FPC to allow the lock lever to operate properly.  
When designing FPC, please refer to the note of Recommended PCB Mounting Pattern of Receptacle.



## While Taking into Consideration

Specifications mentioned in this catalog are reference values.

When considering to order or use this product, please review the Drawing and Product Specifications sheets.

Use an appropriate cable when using the connector in combination with cables.

If considering usage of a non-specified cable, please contact your sales representative.

If assembly process is done by jigs & tools which are not identified by Hirose, the warranty of the product may be affected.

If considering usage for below mentioned applications, please contact your sales representative.

In cases where the application will demand a high level of reliability, such as automotive, medical instruments, public infrastructure, aerospace/defense etc. Hirose must review before assurance of reliability can be given.

**HIROSE****HIROSE ELECTRIC CO.,LTD.**2-6-3 Nakagawa Chuoh, Tsuzuki-Ku, Yokohama-Shi 224-8540, JAPAN  
<https://www.hirose.com>

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