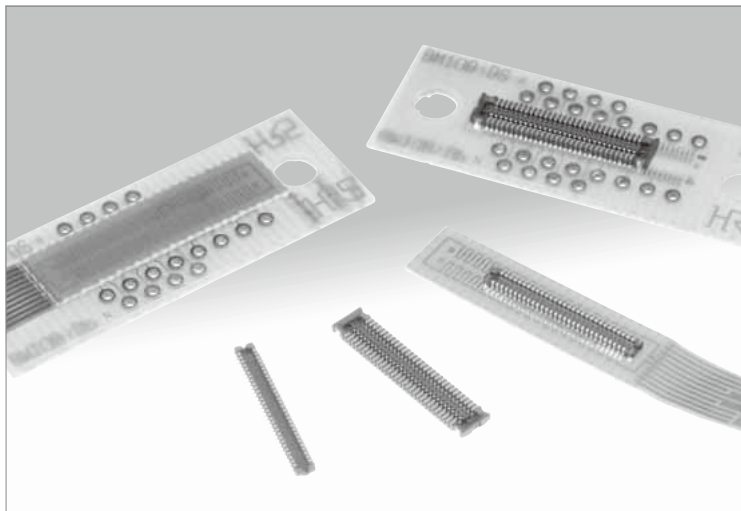


# 0.4mm Contact Pitch, Stacking Height 0.8mm Board-to-Board / Board-to-FPC Connectors

## BM10 Series



### Decrease in the board-occupied area

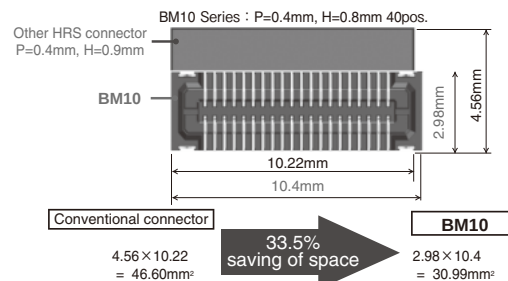


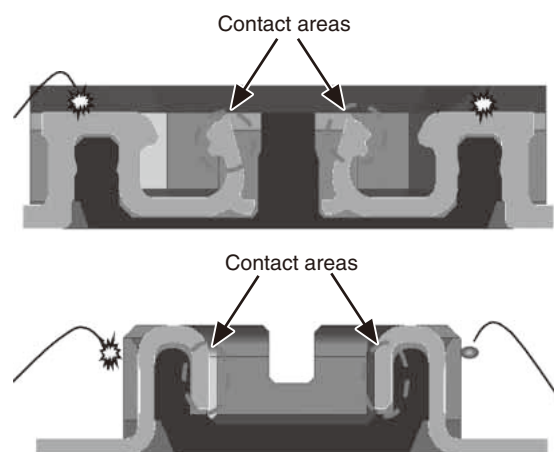
figure.1

### High contact reliability



figure.2

### Splatter protection



Contact areas are not exposed to the outside penetration of the flux or other physical particles.

figure.3

## ■Features

### 1.Higher density of the board-mounted components

Extremely small board mounting pattern and low above the-board profile makes the connectors ideally suited for small device applications.

Globally unrivalled compact depth : when mated 2.98mm  
Header 2.46mm

Length - world's smallest class : 10.4mm

### 2.Reliable electrical and mechanical connection

Despite its small mated height, unique contact configuration, with a 2-point contacts and effective mating length of 0.2mm (height 0.8mm), assures highly reliable connection while confirming a complete mating with a definite tactile feel.

### 3.Large self-alignment distance

The connectors will self-align within 0.3 mm.

### 4.Built-in shock absorbing feature

The protrusions and indents in the insulator bodies protect the connectors from failures when exposed to sudden impact.

### 5.Solder wicking prevention

Nickel barriers prevent un-intentional solder wicking.

### 6.Contamination protection

Insulator walls protect the contact areas against flux splatter or other physical particles contamination.

### 7.Conductive traces on the PCB can run under the connector

No exposed contacts on the bottom of the connector.

■Specifications

|         |                |            |                             |                         |                           |                         |
|---------|----------------|------------|-----------------------------|-------------------------|---------------------------|-------------------------|
| Ratings | Current rating | 0.3A       | Operating temperature range | -35°C to +85°C (Note 1) | Storage temperature range | -10°C to +60°C (Note 2) |
|         | Voltage rating | 30V AC, DC | Operating humidity range    | RH 20% to 80%           | Storage humidity range    | RH 40% to 70% (Note 2)  |

| Item                           | Specification                                                                                           | Conditions                                                                                  |
|--------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1.Insulation resistance        | 50MΩ min                                                                                                | 100V DC                                                                                     |
| 2.Withstanding voltage         | No flashover or insulation breakdown                                                                    | 100V AC / 1minute                                                                           |
| 3.Contact resistance           | 100mΩ max.                                                                                              | 20mV AC, 1kHz, 1mA                                                                          |
| 4.Vibration                    | No electrical discontinuity of 1μs or longer<br>No damage or parts dislocation                          | Frequency : 10 to 55 Hz, 5min, single amplitude of 0.75 mm, 10cycles, for each directions.  |
| 5.Humidity                     | Contact resistance : 100mΩ max.,<br>Insulation resistance : 25MΩ min.                                   | 96hours at 40 ±2°C and humidity of 90 to 95%<br>No damage or parts dislocation              |
| 6.Temperature cycle            | Contact resistance : 100mΩ max.,<br>Insulation resistance : 50MΩ min.<br>No damage or parts dislocation | -55°C → 5 to 35°C → 85°C → 5 to 35°C<br>Time : 30min. → 10min. → 30min. → 10min.<br>5cycles |
| 7.Durability                   | Contact resistance : 100mΩ max.                                                                         | 10cycles                                                                                    |
| 8.Resistance to soldering heat | No deformation of components affecting performance                                                      | Reflow : At the recommended temperature profile<br>Manual soldering : 350°C for 3 seconds   |

Note 1 : Includes temperature rise caused by current flow.

Note 2 : The term "storage" here refers to products stored for a long period prior to board mounting and use.  
The operating temperature and humidity range covers the non-conducting condition of connectors after board mounting and the temporary storage conditions of transportation, etc.

Note 3 : Information contained in this catalog represents general requirements for this Series. Contact us for the drawings and specifications for a specific part number shown.

■Material

| Product    | Part      | Material        | Finish      | Remarks |
|------------|-----------|-----------------|-------------|---------|
| Receptacle | Insulator | LCP             | Color:Black | UL94V-0 |
| Header     | Contacts  | Phosphor bronze | Gold plated | ——      |

■Ordering information

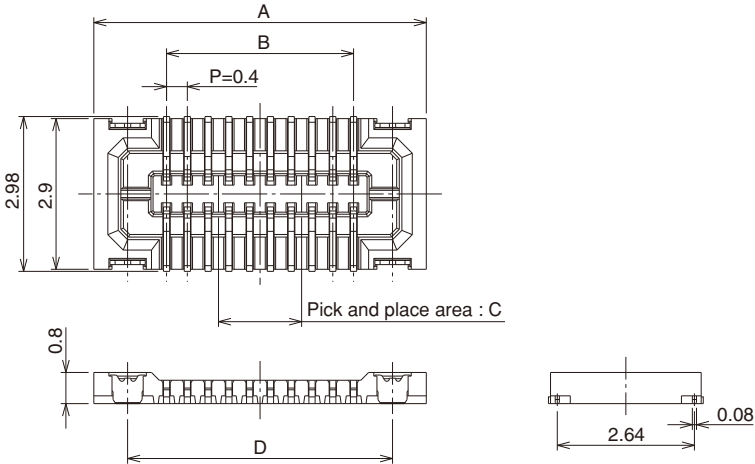
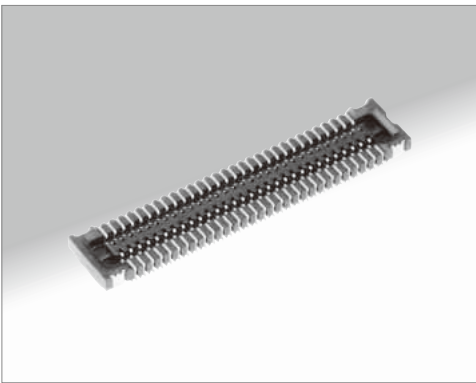
●Receptacles / Headers

BM 10 # (0.8) - \* DS - 0.4 V (\*\*)

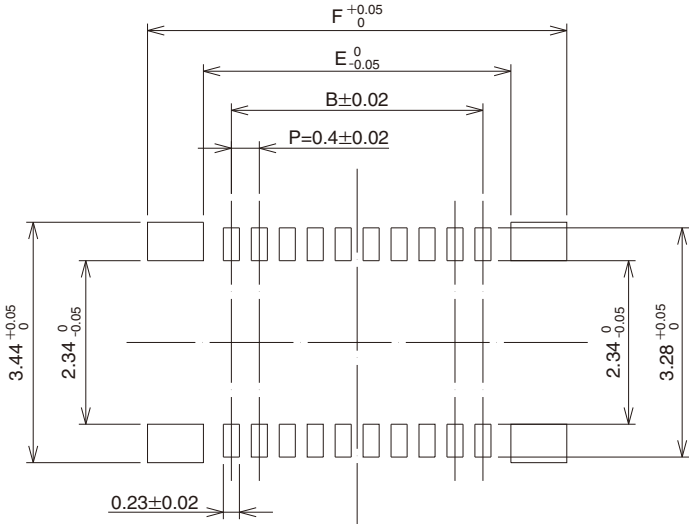
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

|                                                                          |                                                                                                                                 |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| ① Series name : BM                                                       | ⑥ Connector style<br>DS : Double-row receptacle<br>DP : Double-row header                                                       |
| ② Series No. : 10                                                        |                                                                                                                                 |
| ③ Configuration<br>B : With mettal fittings<br>NB : With mettal fittings | ⑦ Contact pitch : 0.4mm                                                                                                         |
|                                                                          | ⑧ Termination type V...SMT vertical mount                                                                                       |
| ④ Stacking Height : 0.8mm                                                | ⑨ Packaging<br>(51) : Embossed tape packaging (8,000 pieces per reel)<br>(53) : Embossed tape packaging (1,000 pieces per reel) |
| ⑤ Number of contacts.10 to 60                                            |                                                                                                                                 |

■H=0.8mm Receptacles (With metal fittings)



■Recommended PCB mounting pattern

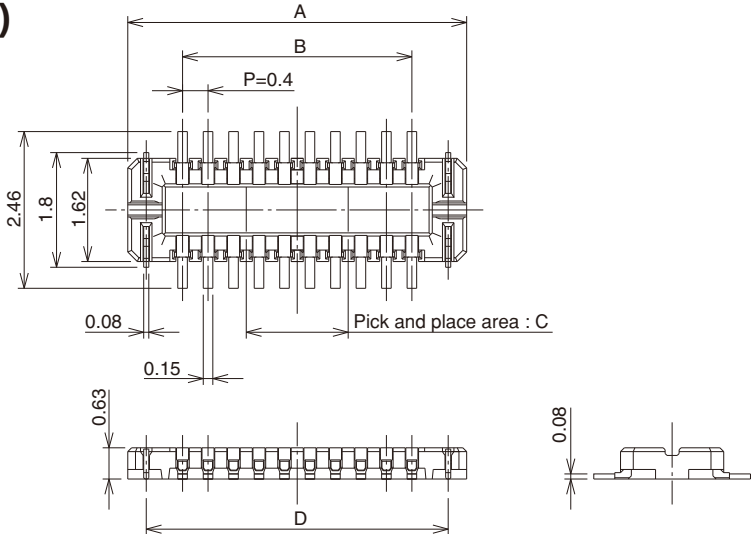
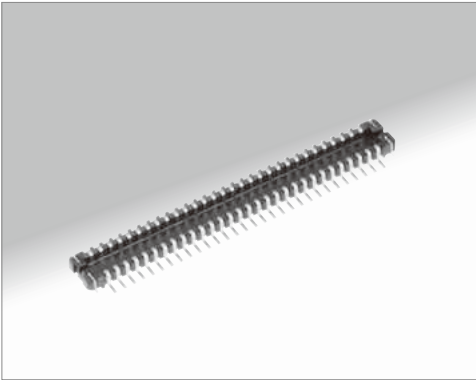


All dimensions : mm

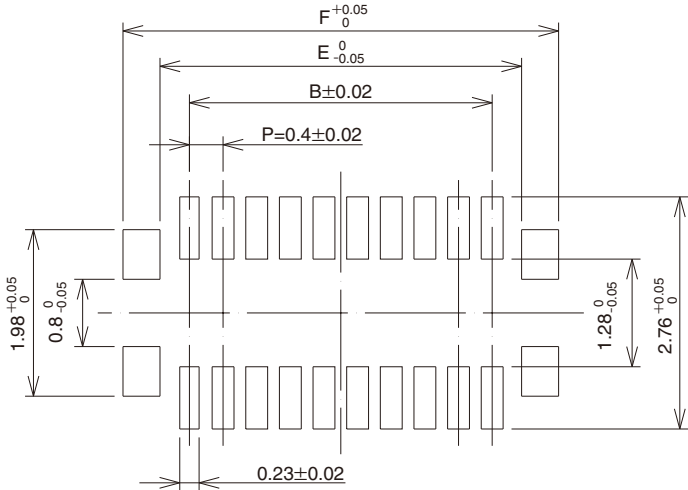
| Part Number               | HRS No.       | Number of Contacts | A    | B    | C   | D    | E     | F     |
|---------------------------|---------------|--------------------|------|------|-----|------|-------|-------|
| BM10NB(0.8)-10DS-0.4V(51) | 684-6100-0 51 | 10                 | 4.4  | 1.6  | 0.8 | 3.1  | 2.18  | 4.02  |
| BM10NB(0.8)-16DS-0.4V(51) | 684-6110-4 51 | 16                 | 5.6  | 2.8  | 1.6 | 4.3  | 3.38  | 5.22  |
| BM10NB(0.8)-20DS-0.4V(51) | 684-6105-4 51 | 20                 | 6.4  | 3.6  | 1.6 | 5.1  | 4.18  | 6.02  |
| BM10NB(0.8)-24DS-0.4V(51) | 684-6101-3 51 | 24                 | 7.2  | 4.4  | 2   | 5.9  | 4.98  | 6.82  |
| BM10NB(0.8)-30DS-0.4V(51) | 684-6106-7 51 | 30                 | 8.4  | 5.6  | 2   | 7.1  | 6.18  | 8.02  |
| BM10NB(0.8)-34DS-0.4V(51) | 684-6108-2 51 | 34                 | 9.2  | 6.4  | 2.4 | 7.9  | 6.98  | 8.82  |
| BM10NB(0.8)-40DS-0.4V(51) | 684-6107-0 51 | 40                 | 10.4 | 7.6  | 2.4 | 9.1  | 8.18  | 10.02 |
| BM10NB(0.8)-44DS-0.4V(51) | 684-6109-5 51 | 44                 | 11.2 | 8.4  | 2.8 | 9.9  | 8.98  | 10.82 |
| BM10NB(0.8)-50DS-0.4V(51) | 684-6102-6 51 | 50                 | 12.4 | 9.6  | 2.8 | 11.1 | 10.18 | 12.02 |
| BM10NB(0.8)-60DS-0.4V(51) | 684-6103-9 51 | 60                 | 14.4 | 11.6 | 3.2 | 13.1 | 12.18 | 14.02 |

Note 1 : Order by number of reels.  
Note 2 : This connector is NOT polarized.

■Headers (With metal fittings)



■Recommended metal mask dimensions



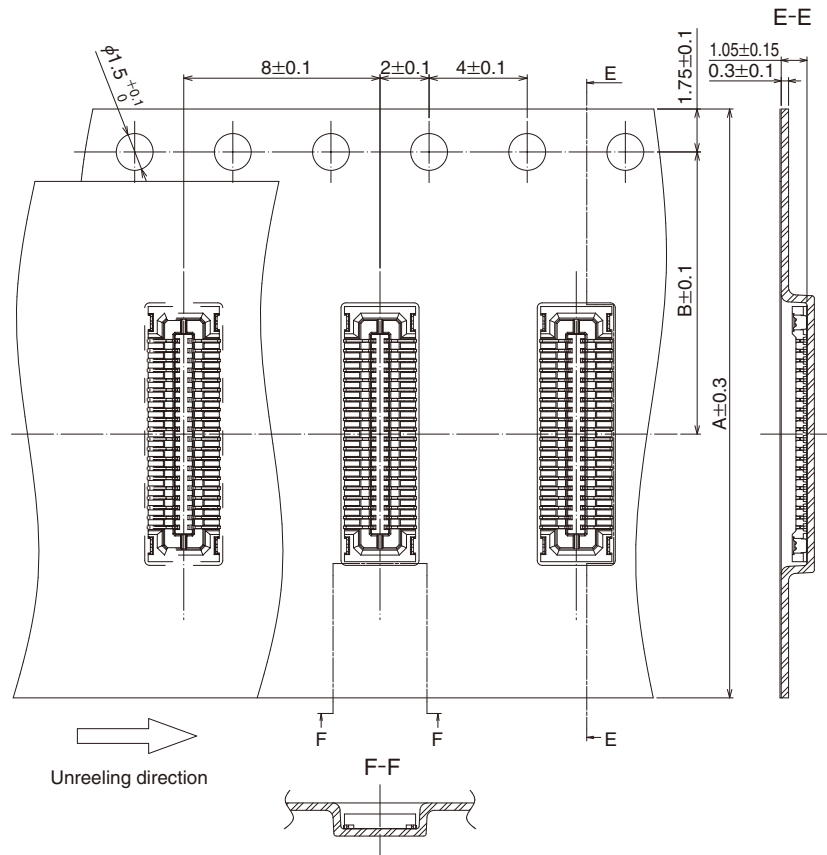
All dimensions : mm

| Part Number              | HRS No.       | Number of Contacts | A     | B    | C   | D     | E    | F     |
|--------------------------|---------------|--------------------|-------|------|-----|-------|------|-------|
| BM10B(0.8)-10DP-0.4V(51) | 684-6007-5 51 | 10                 | 3.32  | 1.6  | 0.8 | 2.74  | 2.3  | 3.18  |
| BM10B(0.8)-16DP-0.4V(51) | 684-6047-0 51 | 16                 | 4.52  | 2.8  | 1.6 | 3.94  | 3.5  | 4.38  |
| BM10B(0.8)-20DP-0.4V(51) | 684-6009-0 51 | 20                 | 5.32  | 3.6  | 1.6 | 4.74  | 4.3  | 5.18  |
| BM10B(0.8)-24DP-0.4V(51) | 684-6011-2 51 | 24                 | 6.12  | 4.4  | 2   | 5.54  | 5.1  | 5.98  |
| BM10B(0.8)-30DP-0.4V(51) | 684-6013-8 51 | 30                 | 7.32  | 5.6  | 2   | 6.74  | 6.3  | 7.18  |
| BM10B(0.8)-34DP-0.4V(51) | 684-6015-3 51 | 34                 | 8.12  | 6.4  | 2.4 | 7.54  | 7.1  | 7.98  |
| BM10B(0.8)-40DP-0.4V(51) | 684-6003-4 51 | 40                 | 9.32  | 7.6  | 2.4 | 8.74  | 8.3  | 9.18  |
| BM10B(0.8)-44DP-0.4V(51) | 684-6039-1 51 | 44                 | 10.12 | 8.4  | 2.8 | 9.54  | 9.1  | 9.98  |
| BM10B(0.8)-50DP-0.4V(51) | 684-6017-9 51 | 50                 | 11.32 | 9.6  | 2.8 | 10.74 | 10.3 | 11.18 |
| BM10B(0.8)-60DP-0.4V(51) | 684-6001-9 51 | 60                 | 13.32 | 11.6 | 3.2 | 12.74 | 12.3 | 13.18 |

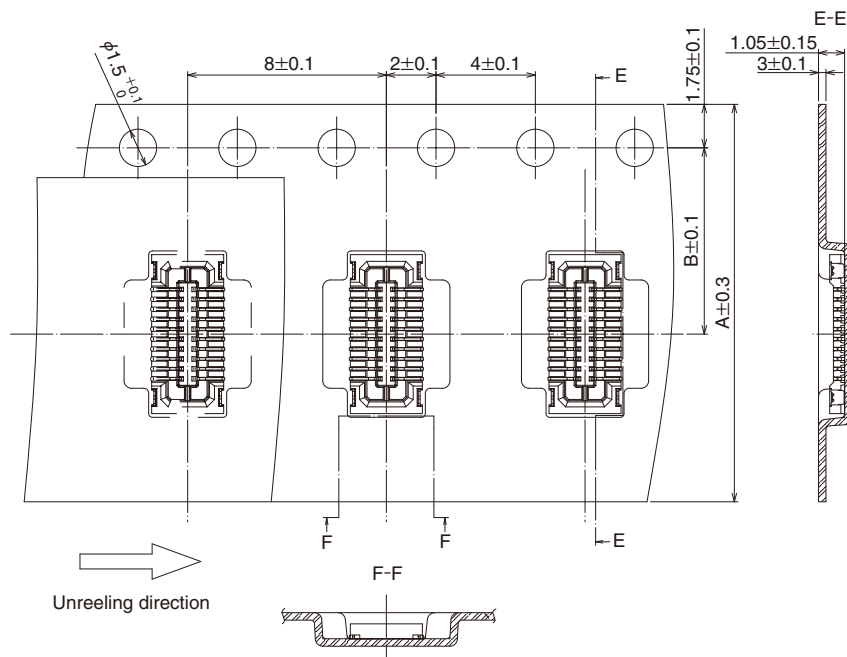
Note 1 : Order by number of reels.  
Note 2 : This connector is NOT polarized.

## ■ Embossed Carrier Tape Dimensions

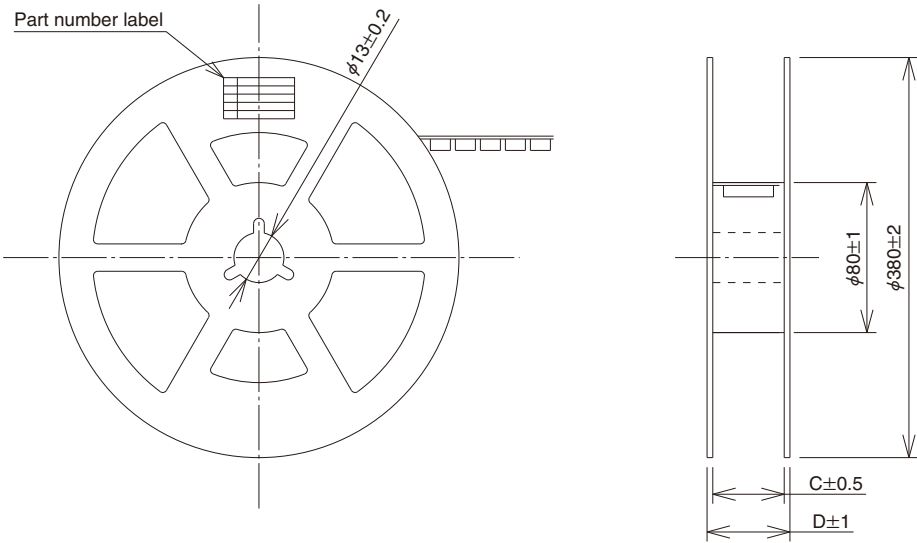
### ● Receptacle (24 and above positions)



### ● Receptacle (less than 24 positions)



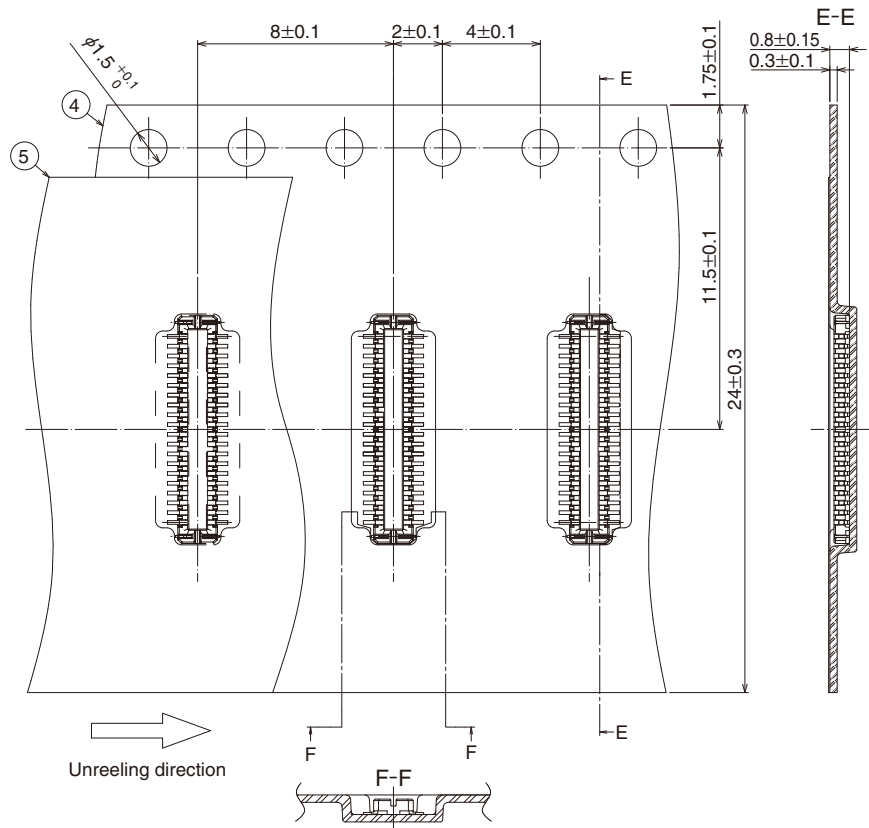
■Reel dimensions (Receptacles)



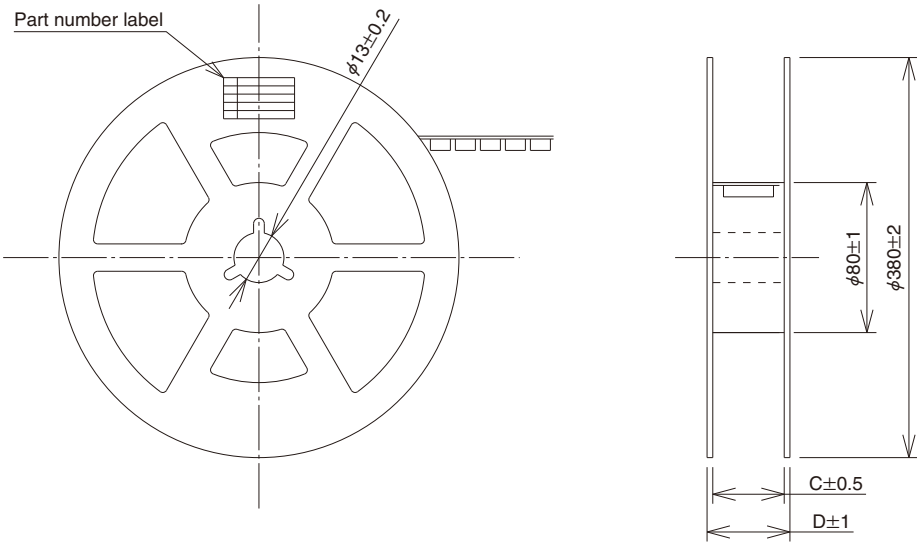
Unit : mm

| Part Number              | A  | B    | C    | D    |
|--------------------------|----|------|------|------|
| BM10#(0.8)-10DS-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-16DS-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-20DS-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-24DS-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-30DS-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-34DS-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-40DS-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-44DS-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-50DS-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-60DS-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |

● Header



■Reel dimensions (Header)

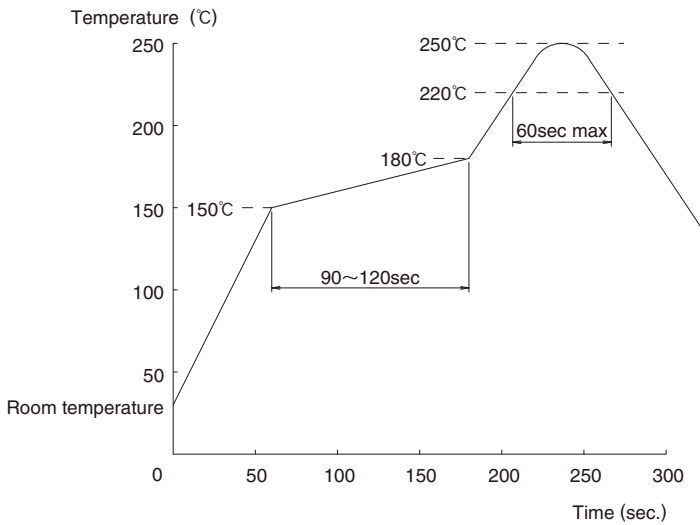


Unit : mm

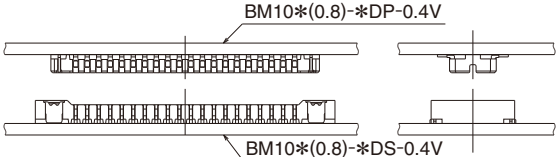
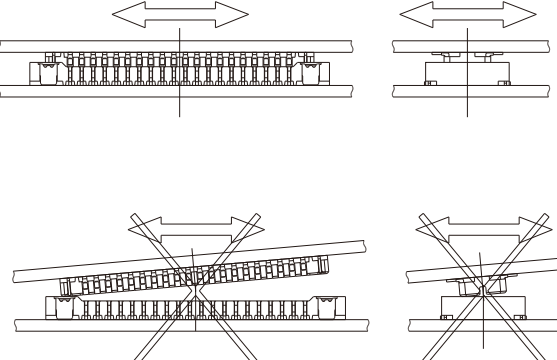
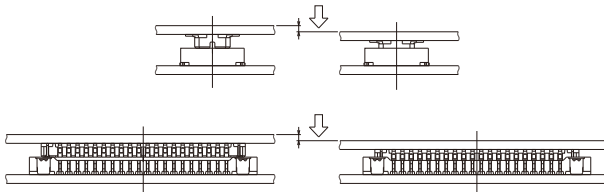
| Part Number              | A  | B    | C    | D    |
|--------------------------|----|------|------|------|
| BM10#(0.8)-10DP-0.4V(51) | 12 | 5.5  | 13.5 | 17.5 |
| BM10#(0.8)-16DP-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-20DP-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-24DP-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-30DP-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-34DP-0.4V(51) | 16 | 7.5  | 17.5 | 21.5 |
| BM10#(0.8)-40DP-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-44DP-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-50DP-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |
| BM10#(0.8)-60DP-0.4V(51) | 24 | 11.5 | 25.5 | 29.5 |



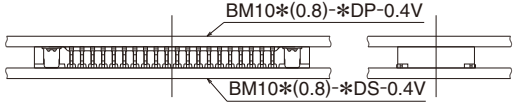
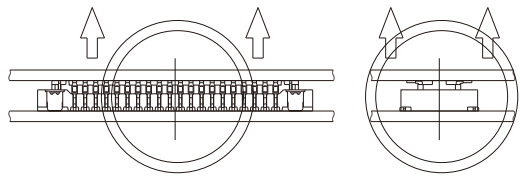
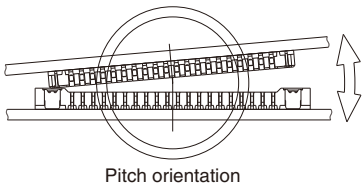
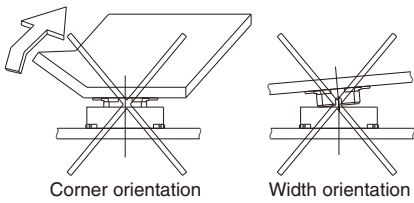
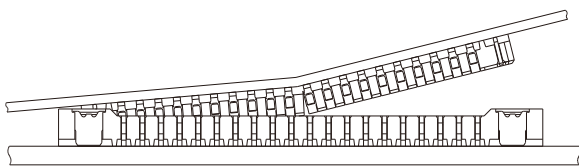
## ■ Usage Recommendations

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.Recommended temperature profile                                       |  <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) | Header, Receptacle : Thickness 0.12mm<br>: Open area ratio 100%<br>* When using nitrogen-reflow, 75% only at the header side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4.Board warpage                                                         | Maximum of 0.02mm at the connector center, with both ends of the connector as reference points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5.Cleaning conditions                                                   | Cleaning is not recommended.<br>If you clean this product, please evaluate its performance before using it.<br>(Cleaning may impair the mating/unmating properties and lower resistance to environmental factors.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 6.Precautions                                                           | <ul style="list-style-type: none"> <li>■ Be careful when mating/unmating the connector when it is not mounted on the PCB as it may cause damage/deformation to contacts.</li> <li>■ Avoid supporting the PCB only with the connectors.<br/>Support it by other means such as bolts, screws, posts, etc.</li> <li>■ Excessive prying during unmating/mating may result in damage.</li> <li>■ In the case of hand soldering, please do not apply any flux which could cause flux wicking.</li> <li>■ This product may have slight color differences due to production lot variability, but this does not affect the performance.</li> <li>■ Please refer to the following page for handling precautions when inserting and removing.</li> <li>■ Because the product can disengage if dropped (or other impact), or by FPC routing, it is advised to secure the mated connectors to the board with housings and cushioning materials</li> </ul> |

■Handling Precautions when Mating Connectors

|                                                                                     |                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                                                                                                                                                                        |
|   | <p>Keep the connectors parallel to each other when positioning. The connectors will self-align in horizontal directions.</p> <p>Do not attempt to mate the connectors starting at one end or side.</p> |
|  | <p>Press-down even until fully mated.</p>                                                                                                                                                              |

## ■CHandling Precautions When Un-mating Connectors

|                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | <p>Fully mated</p>                                                                                                                                                                                                                                                                                                                                                                            |
|                                                     | <p>Lift even, keeping both connectors parallel to each other</p>                                                                                                                                                                                                                                                                                                                              |
|  <p>Pitch orientation</p>                         | <p>When handling, circumstances may prevent the connectors from being kept parallel when un-mating. One end may be lifted as shown. However, to use this procedure the connector must be mounted on sufficiently rigid circuit board.</p> <p>Any deflection of the board during this operation may result in damage to the connector or solder joints.</p>                                    |
|  <p>Corner orientation      Width orientation</p> | <p>Do not attempt to start the un-mating of the connectors from one side or corner.</p> <p>Failure to exercise caution when un-mating the connectors mounted on the non-rigid FPC may also result in connector breakage.</p> <p>It is the responsibility of the user to perform verification of the repeated mating / un-mating cycles with the connectors mounted on the applicable FPC.</p> |
|                                                   | <p>When the rigidity of the FPC is low, there is a risk that the connector could break as illustrated in the diagram at left.</p> <p>Please use the connectors after performing a check of repeated operation with the FPC that the customer will be using.</p> <p>Evaluative results of FPC rigidity and various items are available. Please inquire.</p>                                    |

MEMO :

Handwriting practice lines (dotted lines).

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