PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

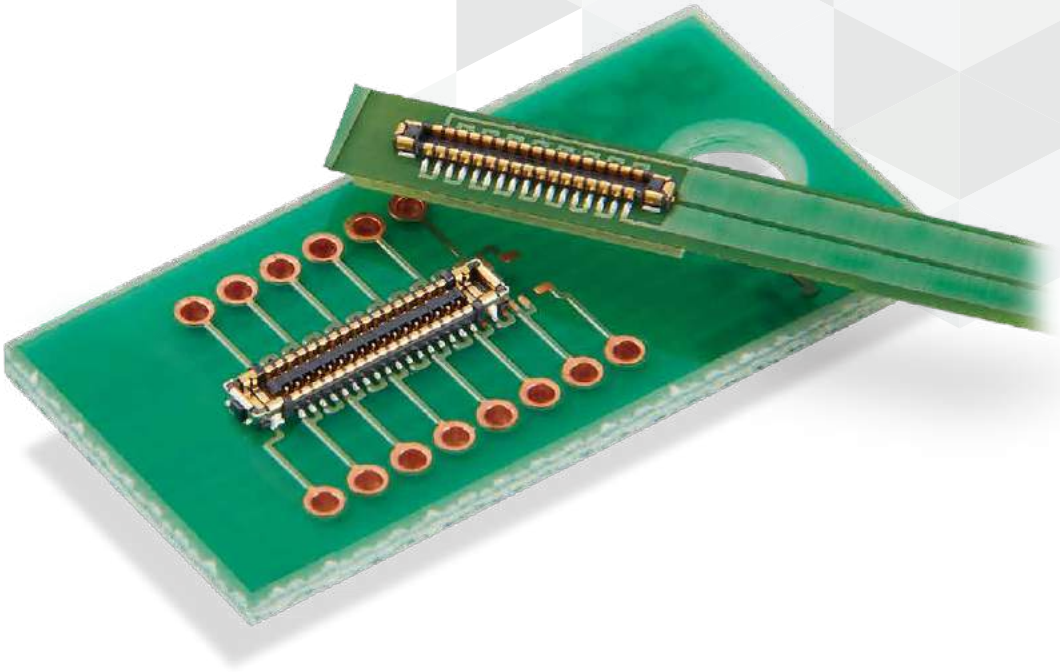
BM28 Series

0.35mm Pitch, 0.6mm Stacking Height, FPC-to-Board Connectors Supporting Up to 5A

Power / Signal

Robust

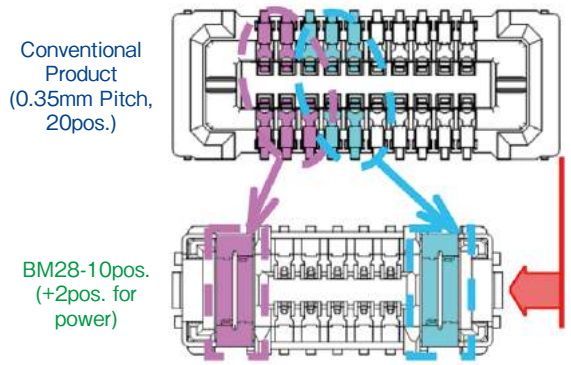
Compact



Features

1. 5A Rated Current

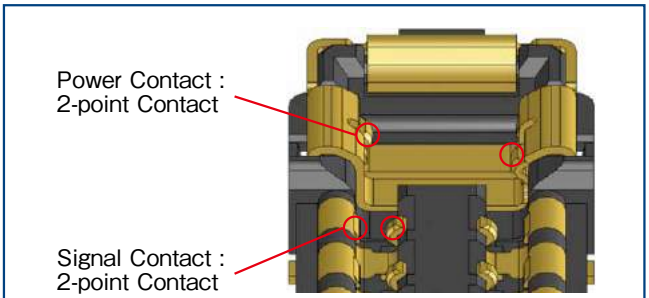
2 Power contacts up to 5A with 0.2A contacts for signal, space-saving connector.



Power Lines are Concentrated into 2 Power Contacts Instead of Conventional Multiple Signal Contacts.

2. Highly Reliable Contact Design

2-point contact design for both power and signal ensures a highly reliable contact.



3. Superior Mating Operability

Guide ribs ensure 0.3mm self-alignment. Clear tactile click prevents partial mating, increases mating operability.

4. Supports USB4 Gen.2 (10Gbps) Transmission

Signal contacts support USB4 Gen.2 (10Gbps) transmission signals.

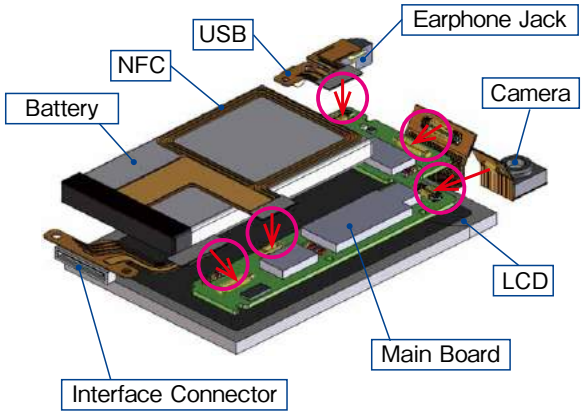
5. Environmental Compatibility

・Halogen Free
Connector does not contain chlorine or bromine exceeding the standard value.

* As defined by IEC 61249-2-21
Br : 900ppm max., Cl : 900ppm max., Br+Cl : 1500ppm max.

Applications

Devices that require low-profile, compact design such as mobile phone, wearable terminals and tablet PCs.



Product Specifications

Rated Current (Note 1)	40pos. or Less	44pos. or More	Operating Temperature (Note 2)	-40 to +85℃
	Signal Contact : 0.3A Power Contact : 5A	Signal Contact : 0.2A Power Contact : 5A	Storage Temperature (Note 3)	-10 to +60℃
Rated Voltage	30V AC/DC		Operating Humidity Range	20-80%
			Storage Humidity Range (Note 3)	40-70%

Note 1 : The total current capacity for connectors with 50 or more signal contacts is 10A for all contacts. (Signal contact only)
Note 2 : Includes temperature rise caused by current flow.
Note 3 : The term "storage" refers to products stored for long period of time prior to mounting and use.
Operating Temperature and Humidity Range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

Items	Specifications	Conditions
Contact Resistance	Signal contact : 100mΩ Max. Power contact : 30mΩ Max.	Measured at 20mV AC, 1kHz, and 1mA
Insulation Resistance	1000MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or dielectric breakdown	150V AC for 1 min.
Mating Durability	Contact resistance : Signal contact : 100mΩ Max. Power contact : 30mΩ Max.	10 cycles
Vibration	No electrical discontinuity for more than 1 μs.	Frequency : 10 to 55Hz ; half amplitude of 0.75mm, 10 cycles in each of 3 axis directions for 5 minutes/cycle
Shock Resistance	No electrical discontinuity of 1 μs or more.	Acceleration : 450m/s^2, duration : 11ms, 3-axis half-sine wave in both directions, 3 cycles for each
Humidity Resistance	Contact resistance : Signal contact : 100mΩ Max. Power contact : 30mΩ Max. Insulation resistance : 100MΩ Min.	96 hours at a temperature of 40 ± 2℃ and a humidity range from 90 to 95%
Temperature Cycle	Contact resistance : Signal contact : 100mΩ Max. Power contact : 30mΩ Max. Insulation resistance : 100MΩ Min.	-55 ± 3℃ : 30 minutes → +85 ± 2℃ : 30 minutes, 5 cycles
Solder Heat Resistance	No dissolution or resin melting that will affect performance.	Reflow : Recommended temperature profile ; Hand solder : Solder iron temperature of 350℃ for 3 seconds Max.

Materials / Finish

Product	Part	Materials	Finish	UL Standard
Header Receptacle	Insulator	LCP	Black	UL94V-0
	Signal Contact	Copper Alloy	Gold Plated	-
	Power Contact	Copper Alloy	Gold Plated	-

Product Number Structure

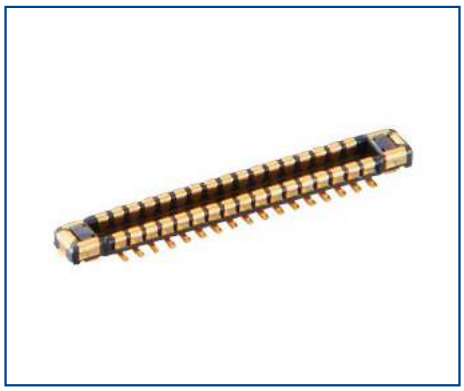
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

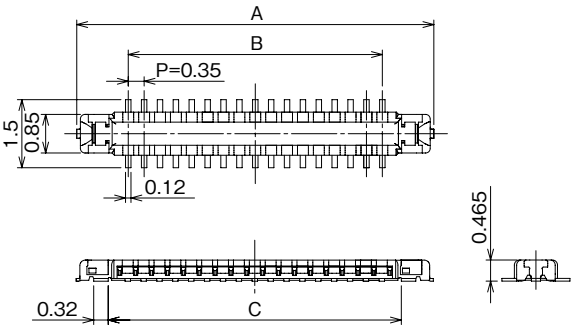
■ Header/Receptacle

BM28 B 0.6 - # DS / 2 - 0.35 V (##)
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

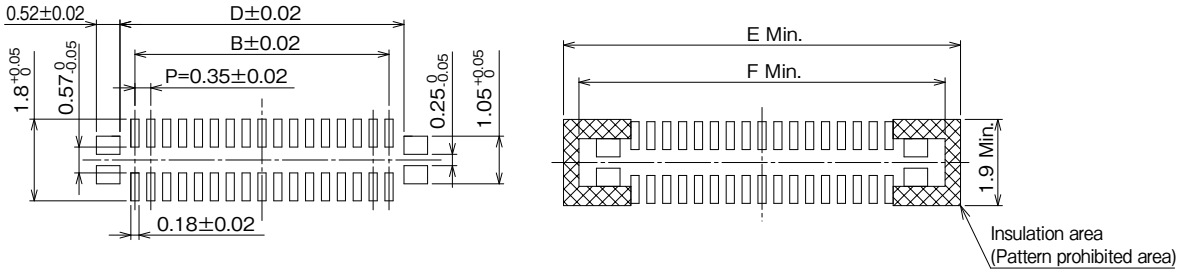
❶ Series Name	BM28	❺ Number of Power Contacts	2
❷ Stacking Height	0.6mm	❻ Contact Pitch	0.35mm
❸ Number of Signal Contacts	6, 10, 16, 18, 20, 24, 30, 34, 36, 40, 44, 46, 50, 58, 60	❼ Termination Type	V : Straight SMT
❹ Connector Type	DP : Header DS : Receptacle	❽ Gold Plated Specification and Packaging	(51) : Gold Plate Thickness 0.05 μm Embossed Tape Packaging (20,000pcs per reel) (53) : Gold Plate Thickness 0.05 μm Embossed Tape Packaging (1,000pcs per reel)

Header

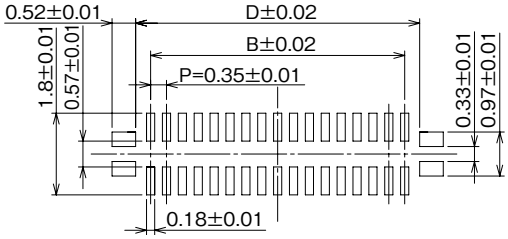




■ Recommended PCB Layout



■ Recommended Metal Mask Dimensions (Mask Thickness : 0.08mm)

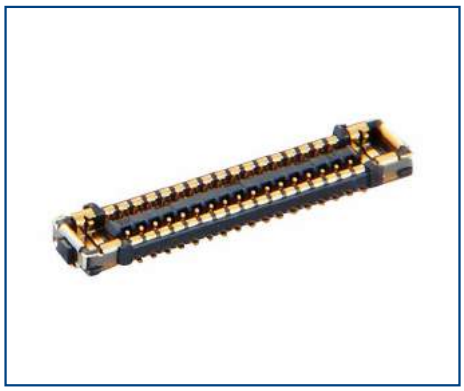


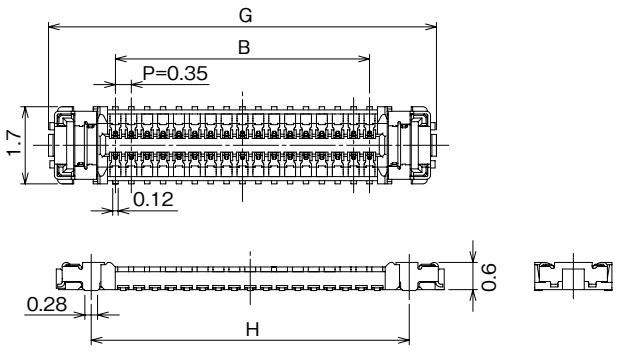
Unit : mm

Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM28B0.6-6DP/2-0.35V(##)	CL0673-5047-0-##	6	2.97	0.70	1.56	1.36	3.85	3.17	20,000pcs per reel	1,000pcs per reel
BM28B0.6-10DP/2-0.35V(##)	CL0673-5043-0-##	10	3.67	1.40	2.26	2.06	4.55	3.87		
BM28B0.6-16DP/2-0.35V(##)	CL0673-5066-0-##	16	4.72	2.45	3.31	3.11	5.60	4.92		
BM28B0.6-18DP/2-0.35V(##)	CL0673-5093-0-##	18	5.07	2.80	3.66	3.46	5.95	5.27		
BM28B0.6-20DP/2-0.35V(##)	CL0673-5039-0-##	20	5.42	3.15	4.01	3.81	6.30	5.62		
BM28B0.6-24DP/2-0.35V(##)	CL0673-5024-0-##	24	6.12	3.85	4.71	4.51	7.00	6.32		
BM28B0.6-30DP/2-0.35V(##)	CL0673-5020-0-##	30	7.17	4.90	5.76	5.56	8.05	7.37		
BM28B0.6-34DP/2-0.35V(##)	CL0673-5064-0-##	34	7.87	5.60	6.46	6.26	8.75	8.07		
BM28B0.6-36DP/2-0.35V(##)	CL0673-5026-0-##	36	8.22	5.95	6.81	6.61	9.10	8.42		
BM28B0.6-40DP/2-0.35V(##)	CL0673-5018-0-##	40	8.92	6.65	7.51	7.31	9.80	9.12		
BM28B0.6-44DP/2-0.35V(##)	CL0673-5049-0-##	44	9.62	7.35	8.21	8.01	10.50	9.82		
BM28B0.6-46DP/2-0.35V(##)	CL0673-5097-0-##	46	9.97	7.70	8.56	8.36	10.85	10.17		
BM28B0.6-50DP/2-0.35V(##)	CL0480-0397-0-##	50	10.67	8.40	9.26	9.06	11.55	10.87		
BM28B0.6-58DP/2-0.35V(##)	CL0480-0378-0-##	58	12.07	9.80	10.66	10.46	12.95	12.27		
BM28B0.6-60DP/2-0.35V(##)	CL0673-5037-0-##	60	12.42	10.15	11.01	10.81	13.30	12.62		

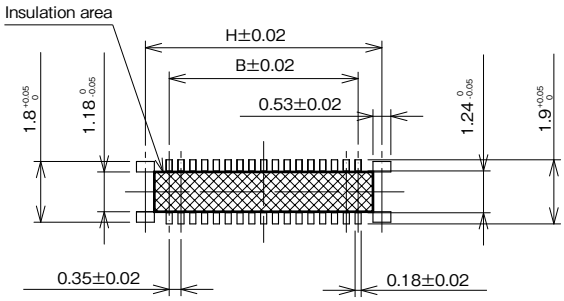
Note : This connector has no polarity.

Receptacle

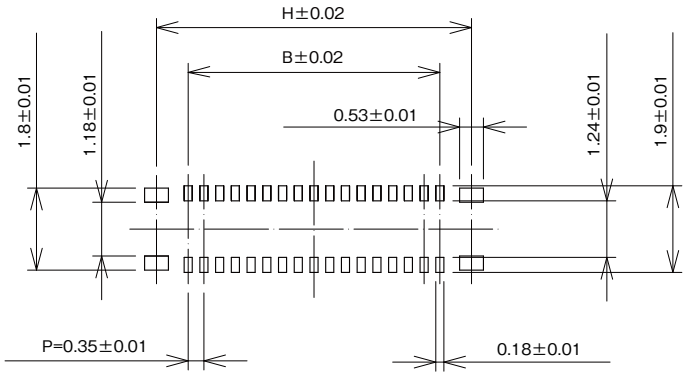




■ Recommended PCB Layout



■ Recommended Metal Mask Dimensions (Mask Thickness : 0.08mm)



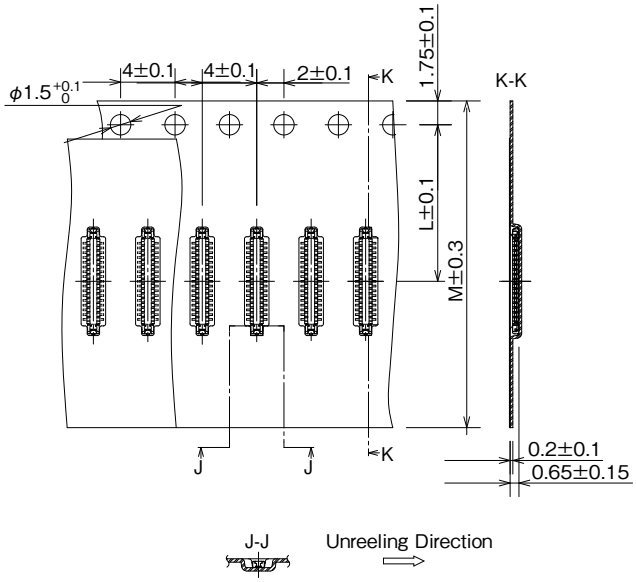
Unit : mm

Part No.	HRS No.	No. of Pos.	B	G	H	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM28B0.6-6DS/2-0.35V(##)	CL0673-5048-0-##	6	0.70	3.65	2.11	20,000pcs per reel	1,000pcs per reel
BM28B0.6-10DS/2-0.35V(##)	CL0673-5044-0-##	10	1.40	4.35	2.81		
BM28B0.6-16DS/2-0.35V(##)	CL0673-5067-0-##	16	2.45	5.40	3.86		
BM28B0.6-18DS/2-0.35V(##)	CL0673-5092-0-##	18	2.80	5.75	4.21		
BM28B0.6-20DS/2-0.35V(##)	CL0673-5040-0-##	20	3.15	6.10	4.56		
BM28B0.6-24DS/2-0.35V(##)	CL0673-5025-0-##	24	3.85	6.80	5.26		
BM28B0.6-30DS/2-0.35V(##)	CL0673-5021-0-##	30	4.90	7.85	6.31		
BM28B0.6-34DS/2-0.35V(##)	CL0673-5065-0-##	34	5.60	8.55	7.01		
BM28B0.6-36DS/2-0.35V(##)	CL0673-5027-0-##	36	5.95	8.90	7.36		
BM28B0.6-40DS/2-0.35V(##)	CL0673-5019-0-##	40	6.65	9.60	8.06		
BM28B0.6-44DS/2-0.35V(##)	CL0673-5050-0-##	44	7.35	10.30	8.76		
BM28B0.6-46DS/2-0.35V(##)	CL0673-5098-0-##	46	7.70	10.65	9.11		
BM28B0.6-50DS/2-0.35V(##)	CL0480-0396-0-##	50	8.40	11.35	9.81		
BM28B0.6-58DS/2-0.35V(##)	CL0480-0377-0-##	58	9.80	12.75	11.21		
BM28B0.6-60DS/2-0.35V(##)	CL0673-5038-0-##	60	10.15	13.10	11.56		

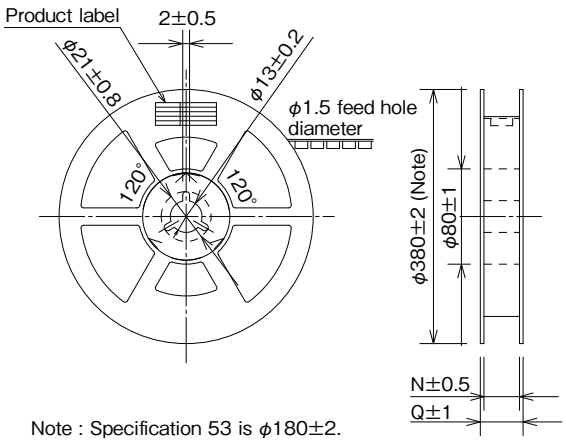
Note : This connector has no polarity.

Embossed Tape Dimensions (Complies with IEC 60286-3, JIS C 0806)

● Header



● Reel Dimensions

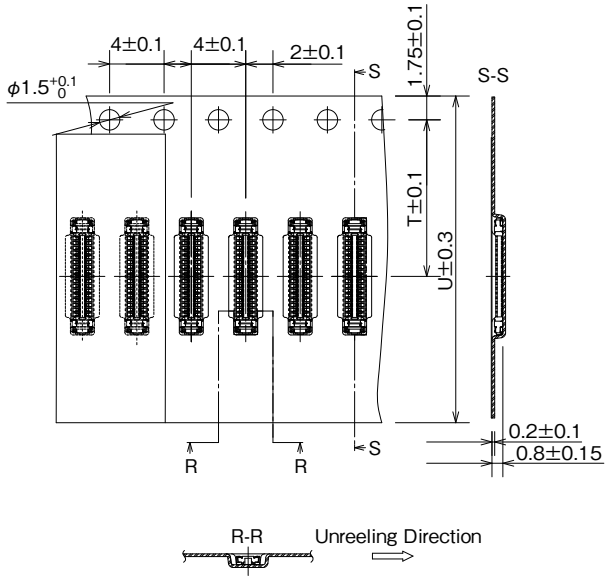


Note : Specification 53 is φ180±2.

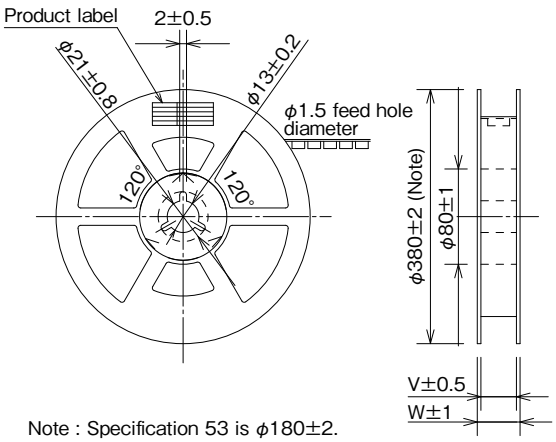
Unit : mm

Part No.	No. of Pos.	L	M	N	Q
BM28B0.6-6DP/2-0.35V(##)	6	5.5	12	13.5	17.5
BM28B0.6-10DP/2-0.35V(##)	10	5.5	12	13.5	17.5
BM28B0.6-16DP/2-0.35V(##)	16	7.5	16	17.5	21.5
BM28B0.6-18DP/2-0.35V(##)	18	7.5	16	17.5	21.5
BM28B0.6-20DP/2-0.35V(##)	20	7.5	16	17.5	21.5
BM28B0.6-24DP/2-0.35V(##)	24	7.5	16	17.5	21.5
BM28B0.6-30DP/2-0.35V(##)	30	7.5	16	17.5	21.5
BM28B0.6-34DP/2-0.35V(##)	34	11.5	24	25.4	29.4
BM28B0.6-36DP/2-0.35V(##)	36	11.5	24	25.4	29.4
BM28B0.6-40DP/2-0.35V(##)	40	11.5	24	25.4	29.4
BM28B0.6-44DP/2-0.35V(##)	44	11.5	24	25.4	29.4
BM28B0.6-46DP/2-0.35V(##)	46	11.5	24	25.4	29.4
BM28B0.6-50DP/2-0.35V(##)	50	11.5	24	25.4	29.4
BM28B0.6-58DP/2-0.35V(##)	58	11.5	24	25.4	29.4
BM28B0.6-60DP/2-0.35V(##)	60	11.5	24	25.4	29.4

● Receptacle



● Reel Dimensions

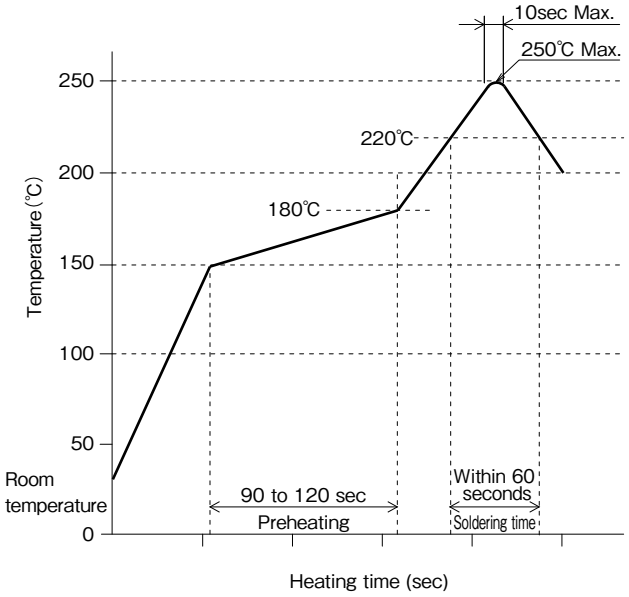


Note : Specification 53 is φ180±2.

Unit : mm

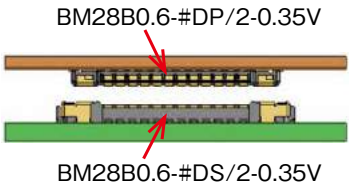
Part No.	No. of Pos.	T	U	V	W
BM28B0.6-6DS/2-0.35V(##)	6	5.5	12	13.5	17.5
BM28B0.6-10DS/2-0.35V(##)	10	7.5	16	17.5	21.5
BM28B0.6-16DS/2-0.35V(##)	16	7.5	16	17.5	21.5
BM28B0.6-18DS/2-0.35V(##)	18	7.5	16	17.5	21.5
BM28B0.6-20DS/2-0.35V(##)	20	7.5	16	17.5	21.5
BM28B0.6-24DS/2-0.35V(##)	24	7.5	16	17.5	21.5
BM28B0.6-30DS/2-0.35V(##)	30	11.5	24	25.4	29.4
BM28B0.6-34DS/2-0.35V(##)	34	11.5	24	25.4	29.4
BM28B0.6-36DS/2-0.35V(##)	36	11.5	24	25.4	29.4
BM28B0.6-40DS/2-0.35V(##)	40	11.5	24	25.4	29.4
BM28B0.6-44DS/2-0.35V(##)	44	11.5	24	25.4	29.4
BM28B0.6-46DS/2-0.35V(##)	46	11.5	24	25.4	29.4
BM28B0.6-50DS/2-0.35V(##)	50	11.5	24	25.4	29.4
BM28B0.6-58DS/2-0.35V(##)	58	11.5	24	25.4	29.4
BM28B0.6-60DS/2-0.35V(##)	60	11.5	24	25.4	29.4

Usage Precautions

Recommended Temperature Profile	 [Conditions] 1. Peak Temperature : Maximum of 250℃ 2. Heating : 220℃ min. for 60 sec. max. 3. Preheating : 150 to 180℃ , 90 to 120 sec. 4. Number of Reflow Cycles : 2 cycles max. Note : The temperature refers to the surface temperature of the board near the connector lead. Reflow mounting in a nitrogen environment is recommended.
Recommended Manual Soldering Conditions	Soldering Iron Temperature : 340 ± 10℃ ; Soldering Time : within 3 seconds
Recommended Metal Mask Thickness and Open Area to PCB Pattern Area Ratio	Thickness : 0.08mm Aperture Ratio : Header Side : (Signal Contact) 100%, (Power Contact) 80%, Receptacle Side : 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 prying 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. · 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. · Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if connector usage in conditions other than those described in the specifications and the guidelines is being considered.

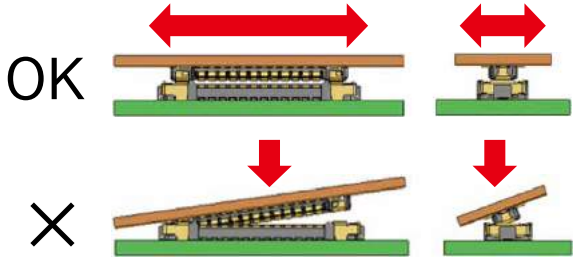
Connector Handling Precautions

Mating Method



1) When aligning, look for the guide port without applying excessive force. If excessive force is applied, the housing may be damaged or shaved resulting in poor contact resistance, so please be careful.

Alignment method



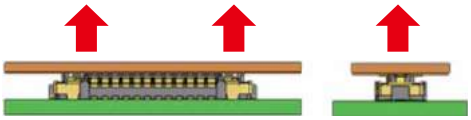
2) When fully aligned the connectors are parallel to each other with restricted longitudinal and lateral movement. Mate them parallel to each other.

Fully Aligned

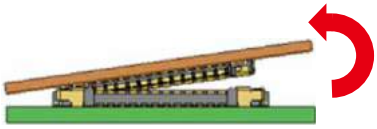
Mated

Handling Precautions for Connector Removal

1) Pull out the connector parallel to each other.

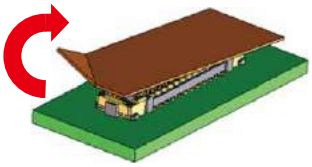
OK 

2) If the connector cannot be removed by pulling it out parallel to its mating partner, it can be removed by extracting the connector diagonally in the direction of the pitch as shown in the below figure.
However, there is a risk that the connector may break if the FPC is not rigid. Please confirm the FPC rigidity at the time of trial production.

OK 

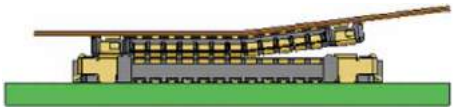
Pitch Direction

3) Do not remove the connector by pulling from the FPC corner as shown below. Pulling from the FPC corner may result in connector and contact damage.

× 

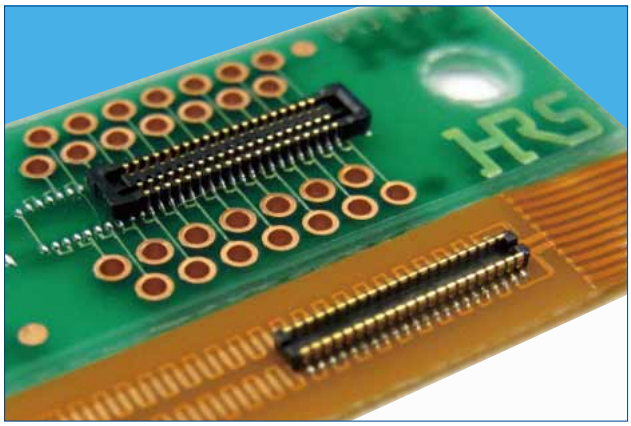
Corner Direction

4) Please provide a reinforcing plate for the FPC.
Insufficient FPC rigidity may result in connector breakage as shown in the below figure. Please check the repeated mechanical operation of the FPC before use.
A reinforcing plate of 0.3mm or thicker made of glass epoxy material is recommended, or 0.2mm or thicker stainless steel is recommended.



0.4mm Pitch, 0.6 and 0.8mm Height, Board-to-Board and Board-to-FPC Connectors

BM20 Series



■Features

1. High density mounting capability

A space saving design that keeps the connector compact, but still maintains an adequate vacuum area (no less than 0.7mm wide).
Depth DS : 2.3mm DP : 1.78mm

2. Reliable contact performance

Even though the mated height is low, the BM20 still leads it class in maximum effective mating lengths for each mating height.
<Effective Mating Length>
Height 0.8mm : 0.2mm
Height 0.6mm : 0.15mm
The addition of the two point contact system adds more reliability to the contacts.

3. No restrictions to PCB pattern design for the 0.8 mm height connector *1

This series utilizes a thin wall to insulate the bottom surface of the connector and maintains an effective mating length of 0.2mm. This removes any restriction for PCB pattern layout design under the connector.
Note *1: There are some restrictions for the 0.6 mm height style.

4. Enhanced mating operations

The structure uses guide ribs to ease the mating process and offers a self alignment range of up to 0.3mm. A clear tactile click is used as an indicator to the user that the mating process was completed.

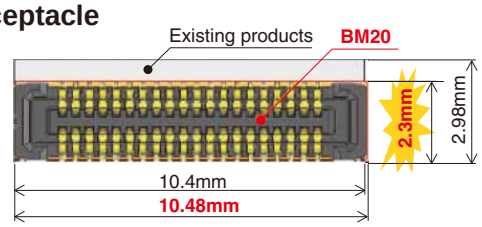
5. Drop and shock resistant structure

Dimples were designed into the contacts to increase their retention force and to absorb the shock delivered from a drop or other impact.

6. Debris resisting design

When mated, the connector's design covers the contacts which help to keep dust and other debris away from the contacts. The SMT leads are kept very close to the connector housing which also helps to prevent shorts caused by debris on the exposed contacts

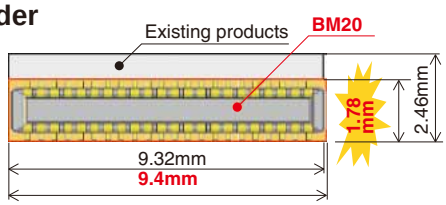
■Receptacle



A 22.3% reduction in size!

Existing products	BM20
2.98 × 10.4 =About 31.0mm²	2.3 × 10.48 = About 24.1mm²

■Header

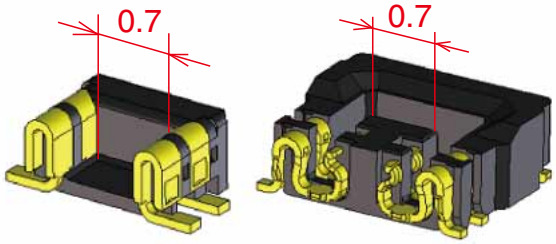


Board occupied area

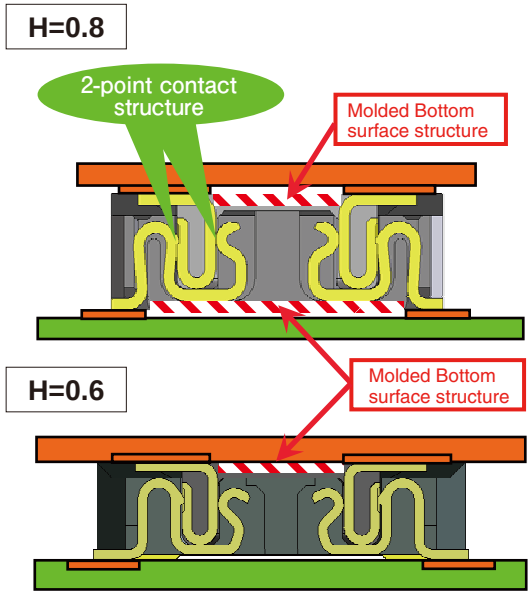
A 27.1% reduction in size!

Existing products	BM20
2.46 × 9.32 = About 22.9mm²	1.78 × 9.4 = About 16.7mm²

Vaccum pick-up



Mating diagram (cross section)



■Product Specifications

Ratings	Rated Current	0.3A	Operating Temperature Range	- 35 ～ 85°C (Note 1)	Storage Temperature Range	- 10 ～ 60°C (Note 2)
	Rated Voltage	AC, DC 30V	Operating Humidity Range	20 ～ 80%	Storage Humidity Range	40 ～ 70% (Note 2)

Items	Specifications	Conditions
1. Insulation Resistance	Minimum of 50MΩ	Measured with DC 100V
2. Withstanding Voltage	No flashover or breakdown	Apply AC 100V for 1 minute
3. Contact Resistance	Maximum of 100mΩ	Measured with AC 20 mV, 1 kHz and 1 mA
4. Vibration Resistance	No electrical discontinuity of 1μs or greater	Frequency 10-55 Hz, half amplitude 0.75mm, 3 directions for 2 hours
5. Humidity Resistance	Contact resistance Maximum of 100mΩ Insulation resistance Minimum of 25mΩ	Left at temperature 40±2℃, humidity 90 to 95%, 96 hours
6. Temperature Cycles	Contact resistance Maximum of 100mΩ Insulation resistance Minimum of 50mΩ	(-55°C : 30 minutes → 5～35℃ : 10 minutes → 85°C : 30 minutes → 5～35℃ : 10 minutes) 5 cycles
7. Durability	Contact Resistance: maximum of 100mΩ	10 mating cycles
8. Soldering Heat Resistance	Should be no melting of resin parts that affects its performance	Reflow : according to the Recommended Solder Profile Hand solder : Soldering iron temperature 350°C, no more than 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-energized condition of connectors after board mounting and the temporary storage conditions during transportation, etc.

■Materials

Product	Component	Materials	Finish	UL Regulation
Receptacle	Insulator	LCP	Black	UL94V-0
Header	Contact	Phosphorous bronze	Gold plating	————

■Product Number Structure

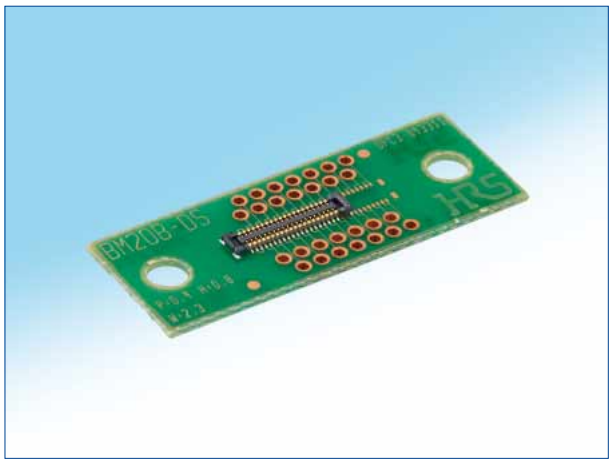
Refer to this page when determining product specifications by model types. Please place orders with part numbers listed in this catalog. The characteristics and specifications of the product described in this catalog are reference values. Please make sure to check the latest delivery specifications at the time of product use.

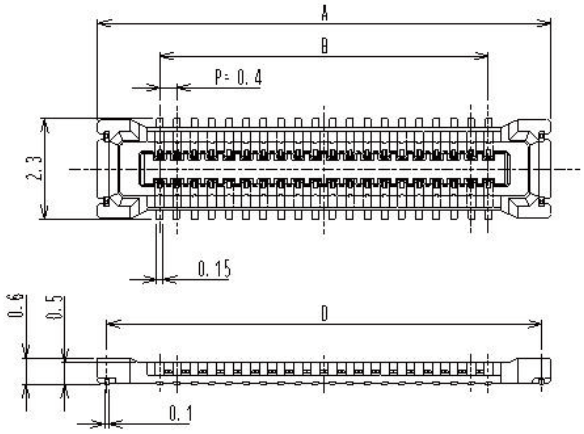
●Receptacle/Header

BM ❶ 20 ❷ # ❸ (**) ❹ - * ❺ DS ❻ - 0.4 ❼ V ❽ (51) ❾

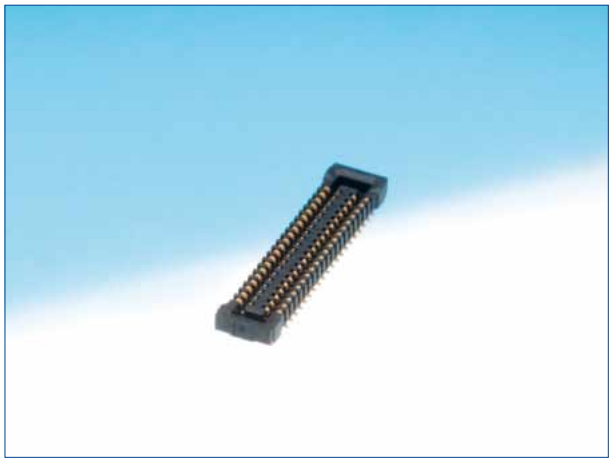
❶ Series Name : BM	❻ Connector Type DS : Double row receptacle DP : Double row header
❷ Series No. : 20	
❸ Shape Symbols B : With reinforcing metal fitting	❼ Contact Pitch : 0.4mm
❹ Stack height : 0.6mm, 0.8mm	❽ Terminal Shape V : Vertical SMT
❺ No. of Contacts : Please refer to page 3 and after.	❾ Packaging (51) : Embossed tape package (8,000 pieces per reel)

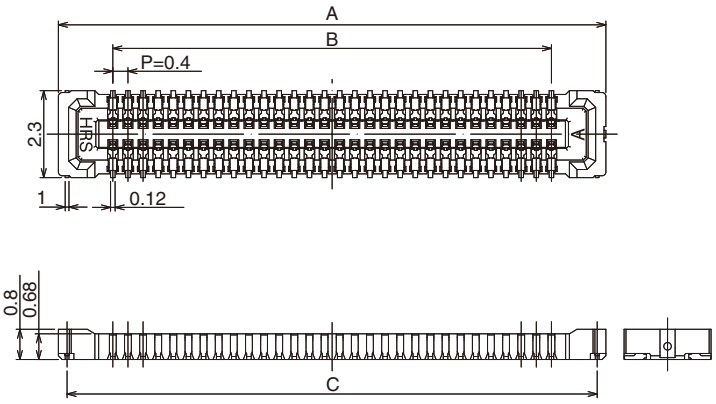
■H=0.6mm receptacle



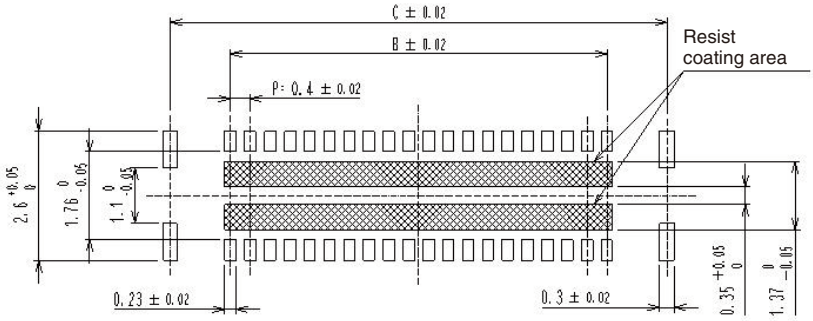


■H=0.8mm receptacle

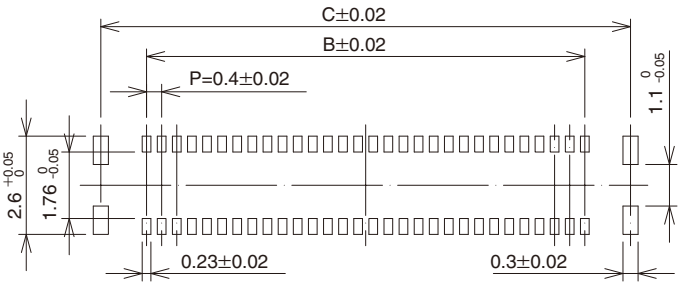




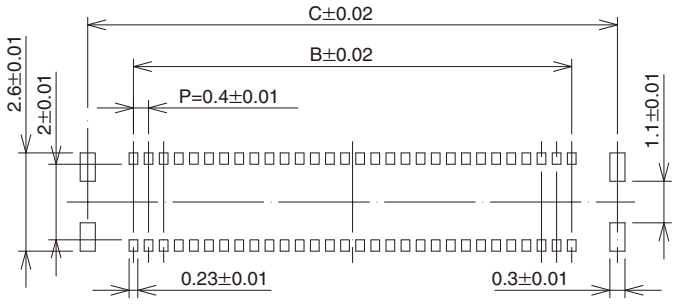
◆Recommended PCB layout【H= 0.6mm】



◆Recommended PCB layout【H= 0.8mm】



◆Recommended metal mask size (Mask thickness 100 μm)【0.6 mm and 0.8 mm common】



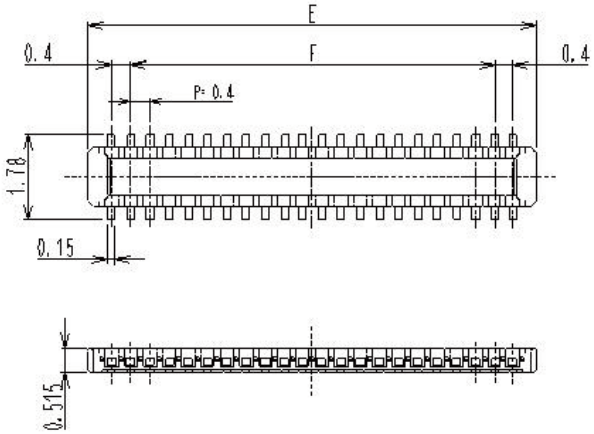
Unit : mm

Part No.	HRS No.	No. of Contacts	A	B	C	D
BM20B(0.6)-10DS-0.4V(51)	0684-9308-8 51	10	4.48	1.6	4.02	4.06
BM20B(0.6)-20DS-0.4V(51)	0684-9309-0 51	20	6.48	3.6	6.02	6.06
BM20B(0.6)-24DS-0.4V(51)	0684-9310-0 51	24	7.28	4.4	6.82	6.86
BM20B(0.6)-30DS-0.4V(51)	0684-9311-2 51	30	8.48	5.6	8.02	8.06
BM20B(0.6)-34DS-0.4V(51)	0684-9312-5 51	34	9.28	6.4	8.82	8.86
BM20B(0.6)-40DS-0.4V(51)	0684-9313-8 51	40	10.48	7.6	10.02	10.06
BM20B(0.6)-50DS-0.4V(51)	0684-9314-0 51	50	12.48	9.6	12.02	12.06
BM20B(0.6)-60DS-0.4V(51)	0684-9315-3 51	60	14.48	11.6	14.02	14.06

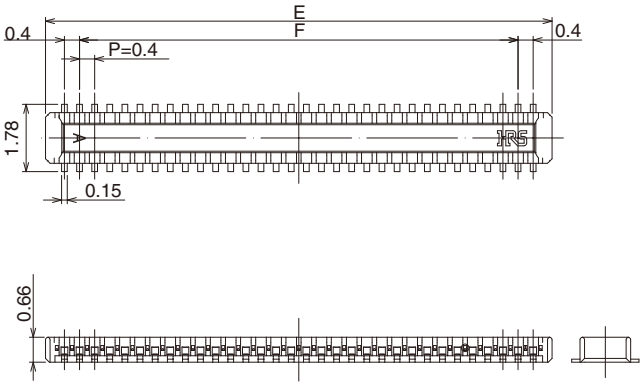
Part No.	HRS No.	No. of Contacts	A	B	C
BM20B(0.8)-10DS-0.4V(51)	0684-9008-4 51	10	4.48	1.6	4.02
BM20B(0.8)-16DS-0.4V(51)	0684-9041-0 51	16	5.68	2.8	5.22
BM20B(0.8)-20DS-0.4V(51)	0684-9009-7 51	20	6.48	3.6	6.02
BM20B(0.8)-24DS-0.4V(51)	0684-9010-6 51	24	7.28	4.4	6.82
BM20B(0.8)-30DS-0.4V(51)	0684-9011-9 51	30	8.48	5.6	8.02
BM20B(0.8)-34DS-0.4V(51)	0684-9020-0 51	34	9.28	6.4	8.82
BM20B(0.8)-40DS-0.4V(51)	0684-9012-1 51	40	10.48	7.6	10.02
BM20B(0.8)-50DS-0.4V(51)	0684-9013-4 51	50	12.48	9.6	12.02

Note 1 : This product is sold by full reel quantities of 8,000 pieces per reel. Please place orders in full reel quantities.
Note 2 : This connector is NOT polarized.

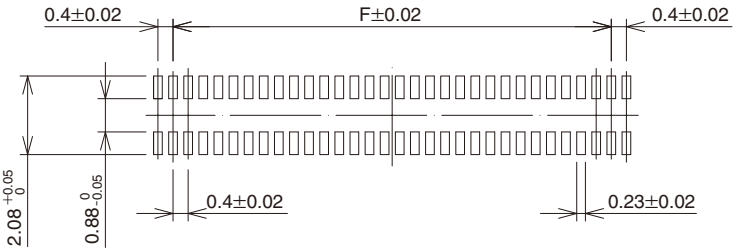
■H=0.6mm header



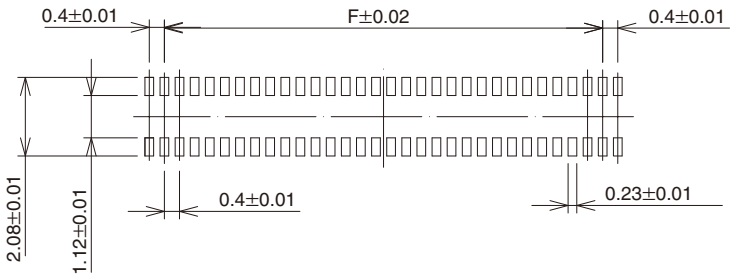
■H=0.8mm header



◆Recommended PCB layout【0.6mm and 0.8mm common】



◆Recommended metal mask size (Mask thickness 100μm)【0.6mm and 0.8mm common】



Unit : mm

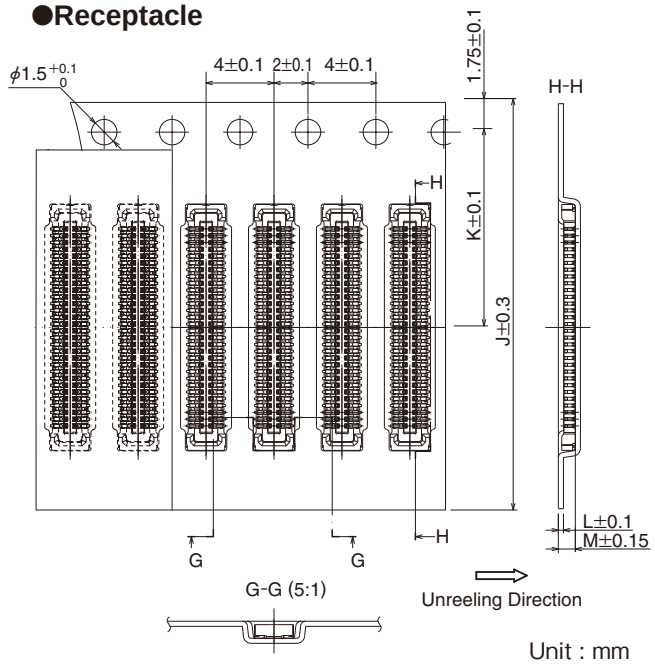
Part No	HRS No.	No. of Contacts	E	F
BM20B(0.6)-10DP-0.4V(51)	0684-9300-6 51	10	3.4	1.6
BM20B(0.6)-20DP-0.4V(51)	0684-9301-9 51	20	5.4	3.6
BM20B(0.6)-24DP-0.4V(51)	0684-9302-1 51	24	6.2	4.4
BM20B(0.6)-30DP-0.4V(51)	0684-9303-4 51	30	7.4	5.6
BM20B(0.6)-34DP-0.4V(51)	0684-9304-7 51	34	8.2	6.4
BM20B(0.6)-40DP-0.4V(51)	0684-9305-0 51	40	9.4	7.6
BM20B(0.6)-50DP-0.4V(51)	0684-9306-2 51	50	11.4	9.6
BM20B(0.6)-60DP-0.4V(51)	0684-9307-5 51	60	13.4	11.6

Part No	HRS No.	No. of Contacts	E	F
BM20B(0.8)-10DP-0.4V(51)	0684-9001-5 51	10	3.4	1.6
BM20B(0.8)-16DP-0.4V(51)	0684-9040-7 51	16	4.6	2.8
BM20B(0.8)-20DP-0.4V(51)	0684-9002-8 51	20	5.4	3.6
BM20B(0.8)-24DP-0.4V(51)	0684-9003-0 51	24	6.2	4.4
BM20B(0.8)-30DP-0.4V(51)	0684-9004-3 51	30	7.4	5.6
BM20B(0.8)-34DP-0.4V(51)	0684-9019-0 51	34	8.2	6.4
BM20B(0.8)-40DP-0.4V(51)	0684-9005-6 51	40	9.4	7.6
BM20B(0.8)-50DP-0.4V(51)	0684-9006-9 51	50	11.4	9.6

Note 1 : This product is sold by full reel quantities of 8,000 pieces per reel. Please place orders in full reel quantities.
Note 2 : This connector is NOT polarized.

◆Embossed Carrier Tape Dimensions (JIS C 0806 compliant)

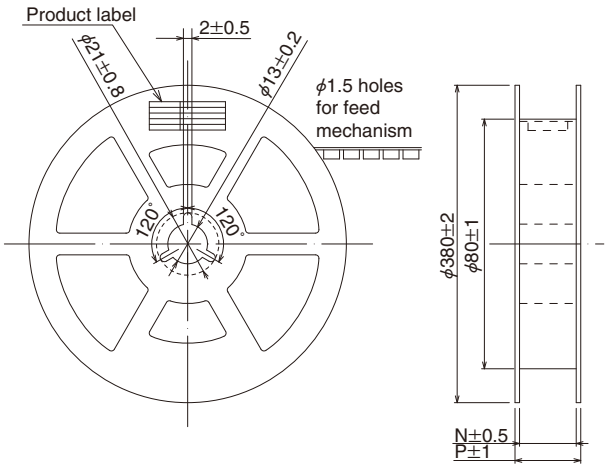
●Receptacle



Unit : mm

Part No.	J	K	L	M	N	P
BM20B(0.6)-10DS-0.4V(51)	16	7.5	0.25	0.8	17.5	21.5
BM20B(0.6)-20DS-0.4V(51)	16	7.5	0.25	0.8	17.5	21.5
BM20B(0.6)-24DS-0.4V(51)	16	7.5	0.25	0.8	17.5	21.5
BM20B(0.6)-30DS-0.4V(51)	24	11.5	0.25	0.8	25.5	29.5
BM20B(0.6)-34DS-0.4V(51)	24	11.5	0.25	0.8	25.5	29.5
BM20B(0.6)-40DS-0.4V(51)	24	11.5	0.25	0.8	25.5	29.5
BM20B(0.6)-50DS-0.4V(51)	24	11.5	0.25	0.8	25.5	29.5
BM20B(0.6)-60DS-0.4V(51)	24	11.5	0.25	0.8	25.5	29.5

● Reel Condition Dimensions

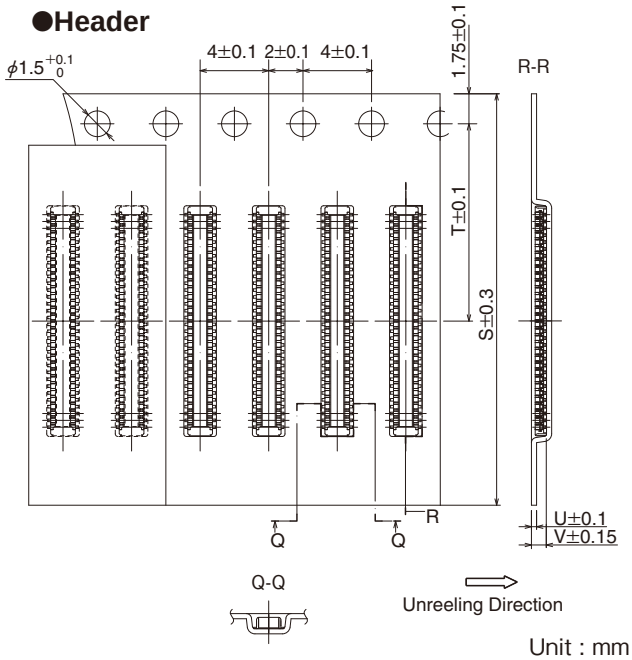


Unit : mm

Part No.	J	K	L	M	N	P
BM20B(0.8)-10DS-0.4V(51)	16	7.5	0.3	1	17.5	21.5
BM20B(0.8)-16DS-0.4V(51)	16	7.5	0.3	1	17.5	21.5
BM20B(0.8)-20DS-0.4V(51)	16	7.5	0.3	1	17.5	21.5
BM20B(0.8)-24DS-0.4V(51)	16	7.5	0.3	1	17.5	21.5
BM20B(0.8)-30DS-0.4V(51)	24	11.5	0.3	1	25.5	29.5
BM20B(0.8)-34DS-0.4V(51)	24	11.5	0.3	1	25.5	29.5
BM20B(0.8)-40DS-0.4V(51)	24	11.5	0.3	1	25.5	29.5
BM20B(0.8)-50DS-0.4V(51)	24	11.5	0.3	1	25.5	29.5

◆Embossed Carrier Tape Dimensions (JIS C 0806 compliant)

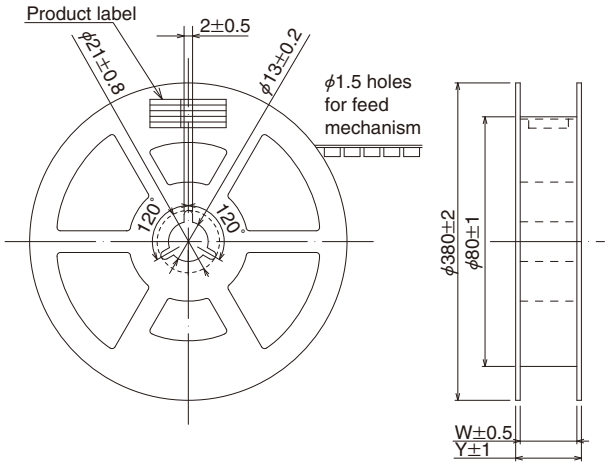
●Header



Unit : mm

Part No.	S	T	U	V	W	Y
BM20B(0.6)-10DP-0.4V(51)	12	5.5	0.25	0.65	13.5	17.5
BM20B(0.6)-20DP-0.4V(51)	16	7.5	0.25	0.65	17.5	21.5
BM20B(0.6)-24DP-0.4V(51)	16	7.5	0.25	0.65	17.5	21.5
BM20B(0.6)-30DP-0.4V(51)	16	7.5	0.25	0.65	17.5	21.5
BM20B(0.6)-34DP-0.4V(51)	24	11.5	0.25	0.65	25.5	29.5
BM20B(0.6)-40DP-0.4V(51)	24	11.5	0.25	0.65	25.5	29.5
BM20B(0.6)-50DP-0.4V(51)	24	11.5	0.25	0.65	25.5	29.5
BM20B(0.6)-60DP-0.4V(51)	24	11.5	0.25	0.65	25.5	29.5

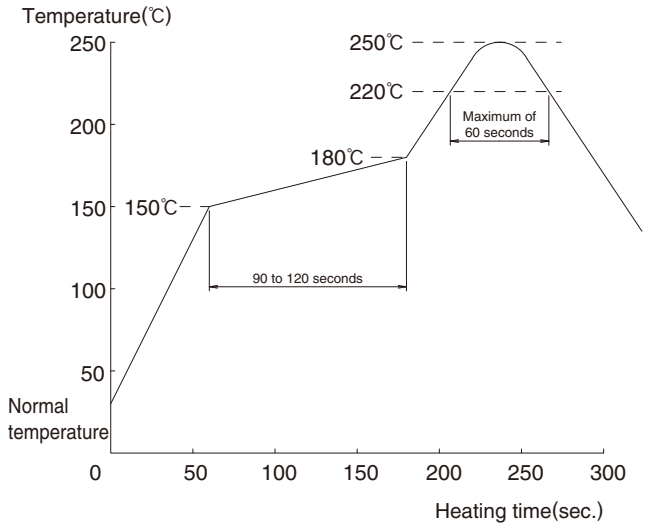
●Reel Dimensions



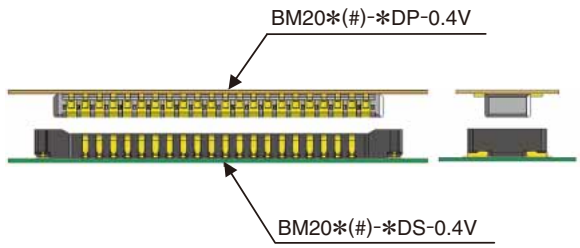
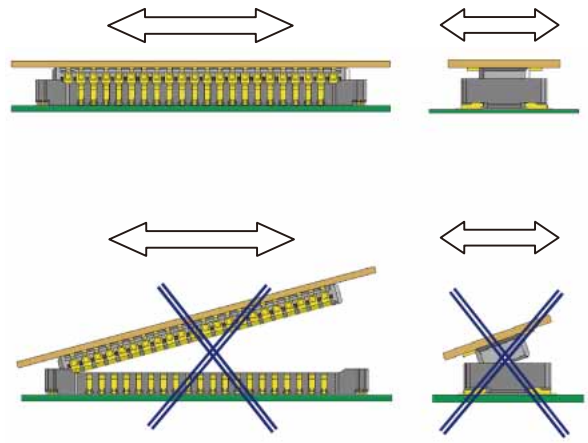
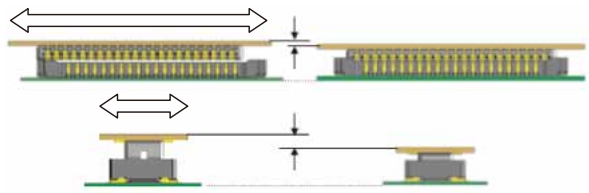
Unit : mm

Part No.	S	T	U	V	W	Y
BM20B(0.8)-10DP-0.4V(51)	12	5.5	0.3	0.88	13.5	17.5
BM20B(0.8)-16DP-0.4V(51)	16	7.5	0.3	0.88	17.5	21.5
BM20B(0.8)-20DP-0.4V(51)	16	7.5	0.3	0.88	17.5	21.5
BM20B(0.8)-24DP-0.4V(51)	16	7.5	0.3	0.88	17.5	21.5
BM20B(0.8)-30DP-0.4V(51)	16	7.5	0.3	0.88	17.5	21.5
BM20B(0.8)-34DP-0.4V(51)	16	7.5	0.3	0.88	17.5	21.5
BM20B(0.8)-40DP-0.4V(51)	24	11.5	0.3	0.88	25.5	29.5
BM20B(0.8)-50DP-0.4V(51)	24	11.5	0.3	0.88	25.5	29.5

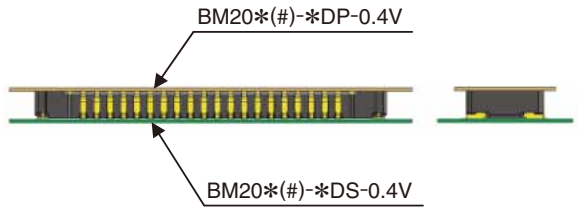
◆Operating Precautions

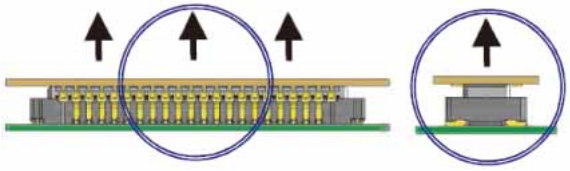
1. Recommended Solder Profile	 **[Applicable Conditions]** 1. Peak temperature : 250°C peak 2. Heating parts : 220°C or above, within 60 seconds 3. Preheating parts : 150 to 180°C, 90 to 120 seconds 4. Number of times : Maximum of 2 reflow cycles (Note 1)The temperatures mentioned above refer to the PCB surface temperature near the connector leads. (Note 2)When using nitrogen reflow please implement 1,000 [ppm] or higher oxygen density. Please contact the sales representative of our company in case of less than 1,000 [ppm].
2. Recommended hand solder conditions	The temperature of the soldering iron should fall within the range of 340 ±10°C and should not make contact for longer than 3 seconds
3. Recommended screen thickness: Opening ratio (pattern area ratio)	Thickness : 0.1mm Opening ratio: DS side 70% DP side 80%(H=0.8mm) DP side 70%(H=0.6mm)
4. Leaning of PCB	Maximum of 0.02mm at the center of connector (using both edges of connector as criteria)
5. Washing	Cleaning is not recommended for this connector. Cleaning agents can deteriorate the mechanical operation and the environmental resistance of this connector.
6. Precautions	■Do not mate or unmate these connectors until they are mounted, failure to follow this precaution can lead to deformation or damage to these connectors. ■Provide another form of support to the PCB, this connector was not designed to be the main form of support. ■Using excessive force to mate or unmate this connector can damage the contacts. ■Do not apply excessive amounts of flux as it may cause the solder and flux to wick. ■There may be a slight variance in the color of the molding between production lots, this variance will not affect the performance of the connector. ■Refer to the next page for the handling precautions when mating and unmating the connectors. ■If the connector becomes disconnected due to impact, a fall or a counterforce to the FPC, it may be necessary to hold the connector in place with an addition to the device's case or other cushioning material to hold the connector in place.

●Handling precautions when mating

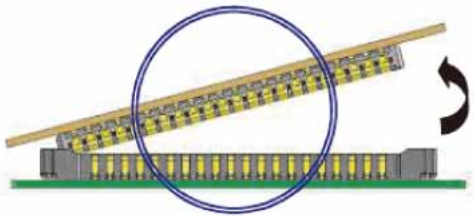
	
	Prior to mating, locate the guidance ribs and align the header. Do not apply excessive force during the mating process as it may damage the contacts.
	Make sure that the connector is parallel to the other side, then press it down until it is fully mated while maintaining the angle.

●Handling precautions for unmating



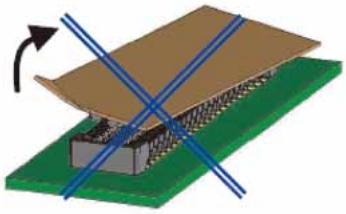


To unmate this connector, lift evenly across the header. Make sure that each side of the connector stays parallel to the other.



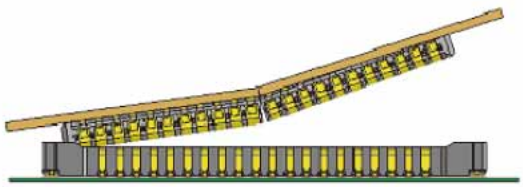
Pitch direction

If circumstances prevent the connectors from staying parallel to each other, then one side may be lifted as shown in the diagram. This method is only approved if the connector is mounted onto an extremely rigid circuit board. If the board were to warp during this process it may result in damage to the connector or its solder joints.



Corner direction

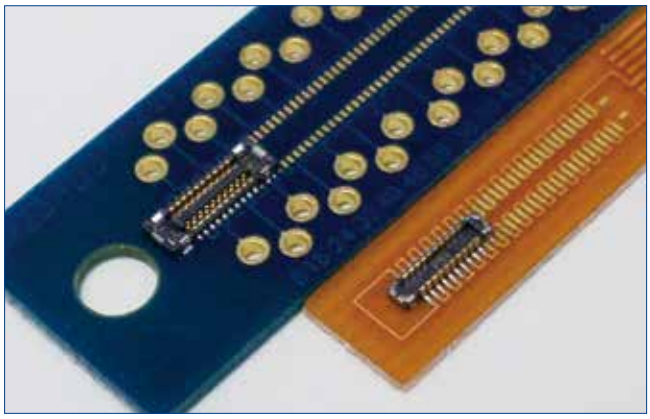
Do not try to disconnect these connectors by pulling on one side or a single corner, or to unmate it when it is hasn't been securely mounted onto a rigid FPC. These actions may lead to deformities and ultimately a damaged connector. Prior to the mounting of these connectors we recommend that you check the rigidity of your FPC to ensure that it meets the standards needed to support these connectors.



If the FPC is not strong enough by itself, a stiffening backing may be applied. If the FPC has a low rigidity the connector may break (as shown in the illustration to the left).
We recommend a backing of no less than 0.3mm of glass epoxy and 0.2mm of stainless material.

0.35mm Pitch, 0.6 and 0.8mm Height, Board to Board or Board to FPC Connectors

BM23FR Series



■Features

1. Space-saving design

Compact design ideal for mobile devices (See Fig.1)
・Pitch : 0.35mm, Width : 1.98mm, Stacking height : 0.6/0.8mm

2. Robust [Breaking Strength : 90N]

Metal guides prevent housing damage due to incorrect mating. (See Fig.2)

3. Highly reliable contact design

2-point contact design for signal contact ensures high reliability. (See Fig.3)

4. Good mating operation

Wide self alignment range with metal guides offers enhanced mating operation.
(0.4mm in pitch direction, 0.35mm in width direction)
Furthermore, a clear tactile click generated by the unique locking contact design insures complete mating.

5. Supports USB 3.1 Gen.2 (10Gbps) transmission

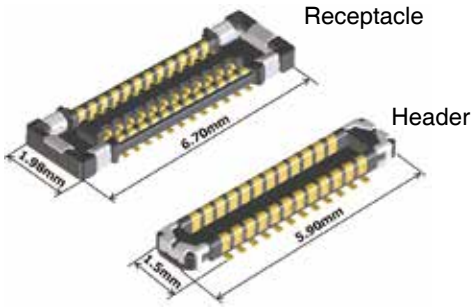
Signal contacts support USB3.1 Gen.2 transmission speed.

■Environmental

・Halogen-free*
As defined by IEC 61249-2-21
Br : 900ppm max., Cl : 900ppm max.
Br+Cl : 1,500ppm max.

Space-saving

Dimension Example : 24 Pos.

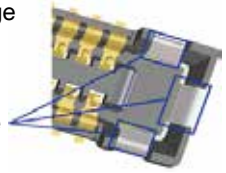


Narrow width design allows for use in small spaces.

Fig.1

Robust design

Metal guides are designed to reduce connector damage even if mated incorrectly.



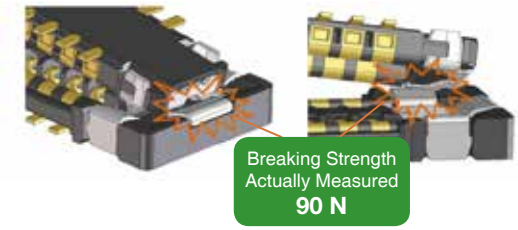
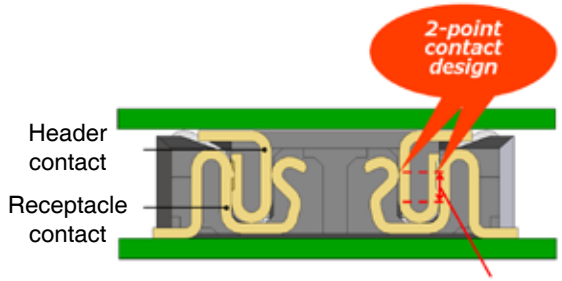


Fig.2

Cross-sectional view of mated contact



Effective mating length
• BM23FR0.6 : 0.15mm
• BM23FR0.8 : 0.20mm

Fig.3

■Product Specifications

Ratings	Rated current	0.3A	Operating temperature range	-55°C to 85°C (Note1)	Storage temperature range	-10°C to 60°C (Note2)
	Rated voltage	30V AC/DC	Operating humidity range	20% to 80%	Storage humidity range	40% to 70% (Note2)

Items	Specifications	Conditions
1. Contact resistance	100mΩ max.	Measured at 20mV AC, 1kHz, and 1mA
2. Insulation resistance	50MΩ min.	Measured at 100V DC
3. Withstanding voltage	No flashover or insulation breakdown	100V AC for 1 minute
4. Durability	Contact resistance: 100mΩ max.	10 mating cycles
5. Vibration	No electrical discontinuity for more than 1μs.	Frequency: 10 to 55Hz, single amplitude : 0.75mm in 3 axis directions for 5 minutes, 10 cycles
6. Shock resistance	No electrical discontinuity of 1μs or more.	Acceleration : 490m/s^2, duration of pulse : 11ms at 3 times for 3 directions
7. Humidity	Contact resistance : 100mΩ max. Insulation resistance : 25mΩ min.	96 hours at temperature of 40±2°C and a humidity range from 90 to 95%
8. Temperature cycle	Contact resistance: 100mΩ max. Insulation resistance: 50MΩ min.	-55°C for 30 minutes → 85°C for 30 minutes, 5 cycles
9. Soldering heat resistance	No dissolution or melting of the resin that will affect the performance.	Reflow: with recommended temperature profile; Hand soldering at soldering iron temperature of 350°C for 3 seconds max.

Note 1 : Includes temperature rise caused by current flow.
Note 2 : Storage refers to long-term-storage of unused items before they are mounted on the PCB.
Operating temperature/humidity range applies to the state of temporary storage such as non-powered after mounting on the PCB, and during transportation, etc.

■Materials / Finish

Product	Part	Material	Finish	UL Regulation
Receptacle Header	Insulator	LCP	Black	UL94V-0
	Contact	Copper alloy	Gold plating	——
	Metal Fitting	Copper alloy	Gold plating	——

■Product Number Structure

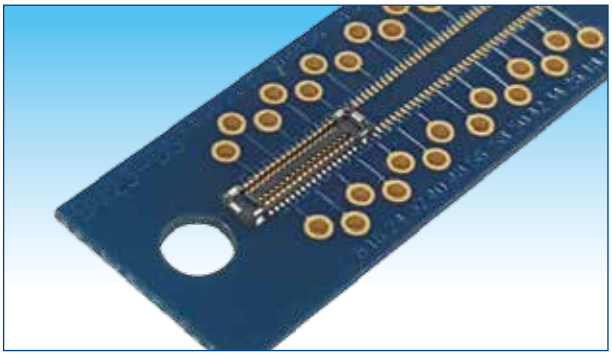
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders

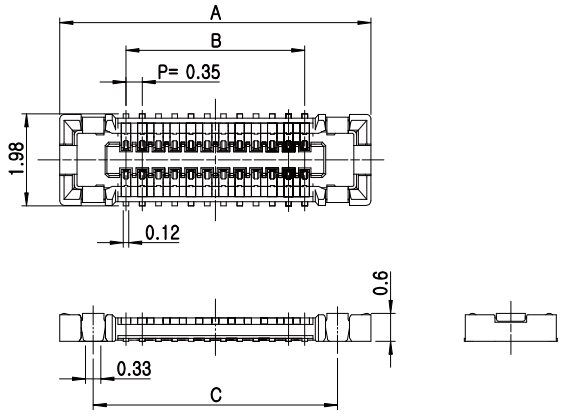
●Receptacle / Header

BM 23 FR ** - * DS - 0.35 V (***)
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

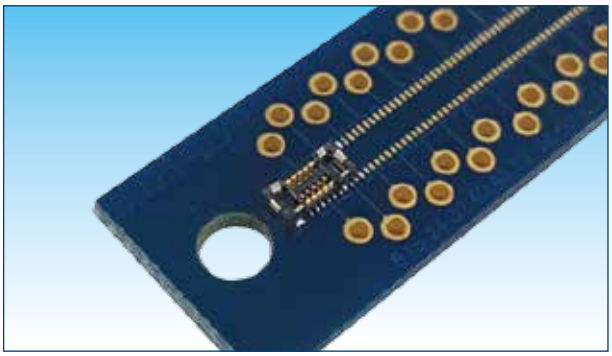
❶ Series Name: BM	❻ Connector Type DS: Receptacle DP: Header
❷ Series No. : 23	❼ Contact Pitch : 0.35mm
❸ Shape Symbols FR: With locking metal fitting	❽ Terminal type V : Straight SMT
❹ Stacking Height : 0.6mm, 0.8mm	❾ Gold plated specification and packaging status (51) : Gold plate thickness 0.05μm Embossed tape packaging (10,000pcs/reel) (895) : Gold plate thickness 0.05μm Embossed tape packaging (1,000pcs/reel)
❺ Number of Contacts	

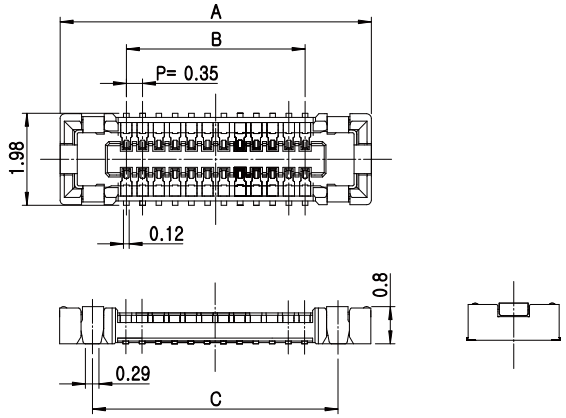
■H=0.6mm Receptacle



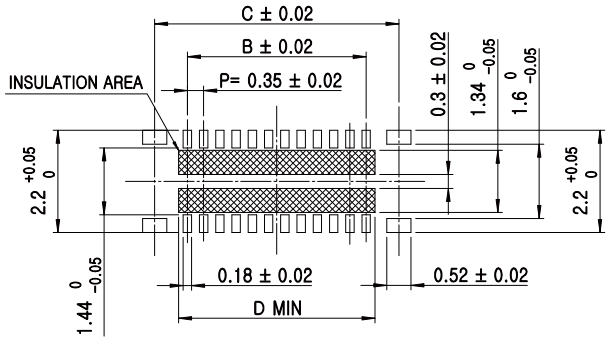


■H=0.8mm Receptacle

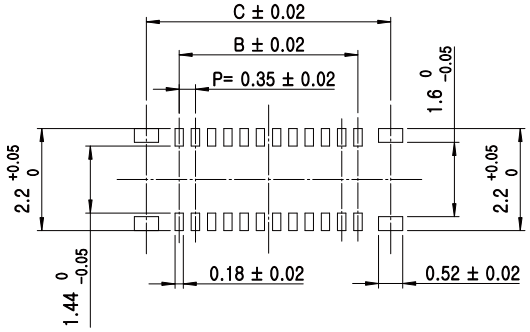




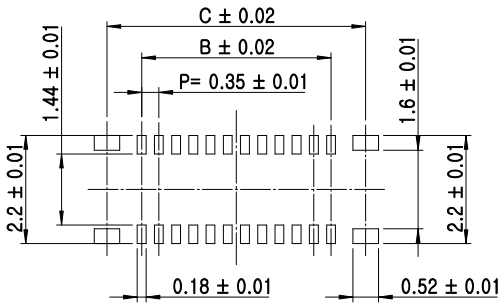
◆Recommended PCB layout [H=0.6 mm]



◆Recommended PCB layout [H=0.8 mm]



◆ Recommended metal mask dimensions (mask thickness : 100µm) [0.6mm and 0.8mm common]



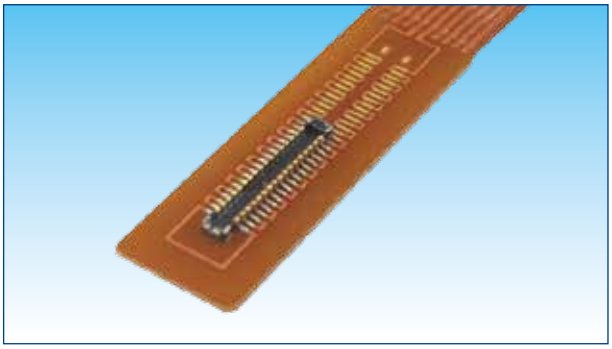
Unit : mm

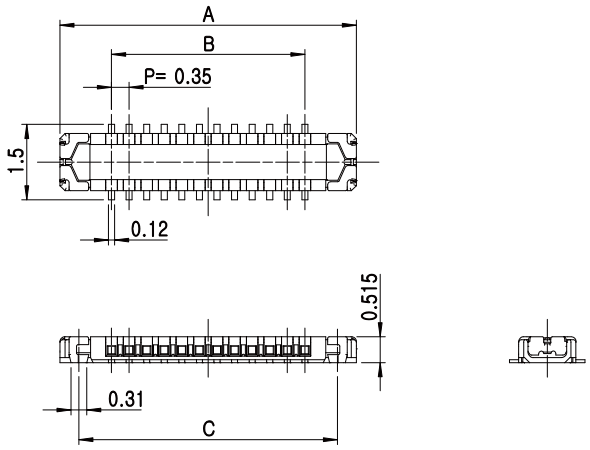
Part No.	HRS No.	No. of contacts	A	B	C	D
BM23FR0.6-6DS-0.35V(***)	480-0287-0 **	6	3.55	0.70	2.11	1.08
BM23FR0.6-8DS-0.35V(***)	480-0360-0 **	8	3.90	1.05	2.46	1.43
BM23FR0.6-10DS-0.35V(***)	480-0258-0 **	10	4.25	1.40	2.81	1.78
BM23FR0.6-12DS-0.35V(***)	480-0371-0 **	12	4.60	1.75	3.16	2.13
BM23FR0.6-16DS-0.35V(***)	480-0295-0 **	16	5.30	2.45	3.86	2.83
BM23FR0.6-20DS-0.35V(***)	480-0272-0 **	20	6.00	3.15	4.56	3.53
BM23FR0.6-24DS-0.35V(***)	480-0260-0 **	24	6.70	3.85	5.26	4.23
BM23FR0.6-30DS-0.35V(***)	480-0327-0 **	30	7.75	4.90	6.31	5.28
BM23FR0.6-34DS-0.35V(***)	480-0274-0 **	34	8.45	5.60	7.01	5.98
BM23FR0.6-40DS-0.35V(***)	480-0390-0 **	40	9.50	6.65	8.06	7.03
BM23FR0.6-50DS-0.35V(***)	480-0382-0 **	50	11.25	8.40	9.81	8.78

Part No.	HRS No.	No. of contacts	A	B	C
BM23FR0.8-10DS-0.35V(***)	480-0298-0 **	10	4.25	1.40	2.81
BM23FR0.8-18DS-0.35V(***)	480-0469-0 **	18	5.65	2.80	4.21
BM23FR0.8-60DS-0.35V(***)	480-0300-0 **	60	13.00	10.15	11.56

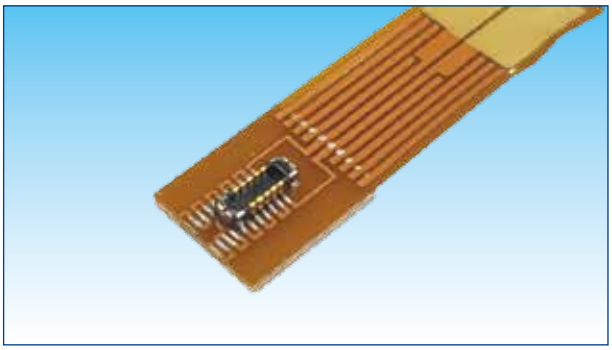
Note 1 : Please place orders in full reel quantities.
Note 2 : This connector has no polarity.
Note 3 : The specification number(895) in the Part No. changes to(95) in the HRS No.

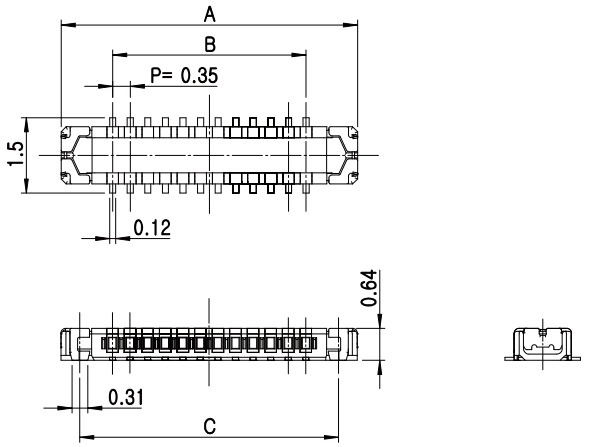
■H=0.6mm Header



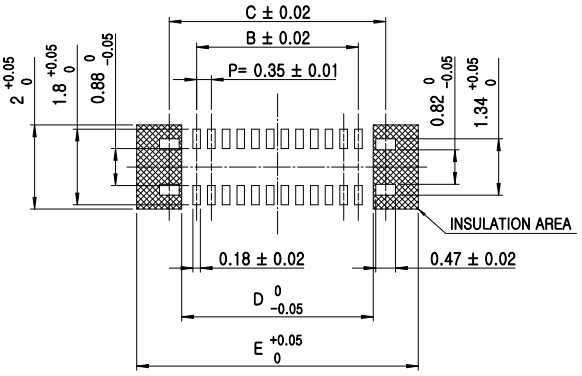


■H=0.8mm Header

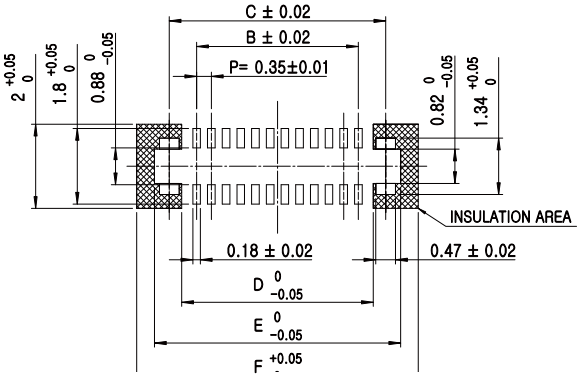




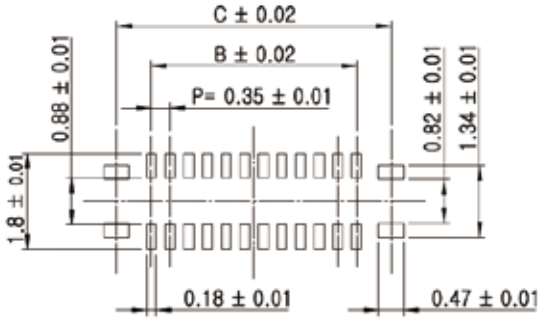
◆Recommended PCB layout [H=0.6mm]



◆Recommended PCB layout [H=0.8mm]



Recommended metal mask dimensions (mask thickness : 100μm) [0.6mm and 0.8mm common]



Unit : mm

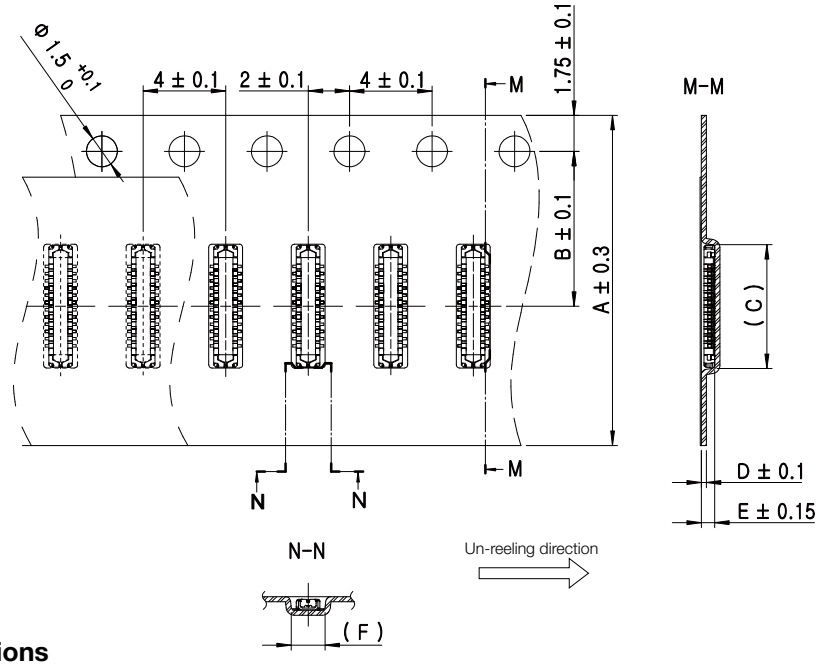
Part No.	HRS No.	No. of contacts	A	B	C	D	E
BM23FR0.6-6DP-0.35V(***)	480-0286-0 **	6	2.75	0.70	2.00	1.41	3.55
BM23FR0.6-8DP-0.35V(***)	480-0361-0 **	8	3.10	1.05	2.35	1.76	3.90
BM23FR0.6-10DP-0.35V(***)	480-0257-0 **	10	3.45	1.40	2.70	2.11	4.25
BM23FR0.6-12DP-0.35V(***)	480-0364-0 **	12	3.80	1.75	3.05	2.46	4.60
BM23FR0.6-16DP-0.35V(***)	480-0290-0 **	16	4.50	2.45	3.75	3.16	5.30
BM23FR0.6-20DP-0.35V(***)	480-0273-0 **	20	5.20	3.15	4.45	3.86	6.00
BM23FR0.6-24DP-0.35V(***)	480-0259-0 **	24	5.90	3.85	5.15	4.56	6.70
BM23FR0.6-30DP-0.35V(***)	480-0328-0 **	30	6.95	4.90	6.20	5.61	7.75
BM23FR0.6-34DP-0.35V(***)	480-0275-0 **	34	7.65	5.60	6.90	6.31	8.45
BM23FR0.6-40DP-0.35V(***)	480-0391-0 **	40	8.70	6.65	7.95	7.36	9.50
BM23FR0.6-50DP-0.35V(***)	480-0383-0 **	50	10.45	8.40	9.70	9.11	11.25

Part No.	HRS No.	No. of contacts	A	B	C	D	E	F
BM23FR0.8-10DP-0.35V(***)	480-0297-0 **	10	3.45	1.40	2.70	2.11	3.41	4.25
BM23FR0.8-18DP-0.35V(***)	480-0468-0 **	18	4.85	2.80	4.10	3.51	4.81	5.65
BM23FR0.8-60DP-0.35V(***)	480-0299-0 **	60	12.20	10.15	11.45	10.86	12.16	13.00

Note 1 : Please place orders in full reel quantities.
Note 2 : This connector has no polarity.
Note 3 : The specification number(895) in the Part No. changes to(95) in the HRS No.

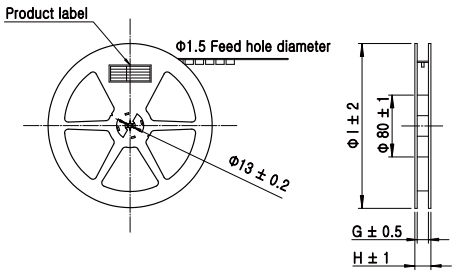
Embossed Tape Dimensions (IEC 602286-3, with JIC C 0806)

● Receptacle

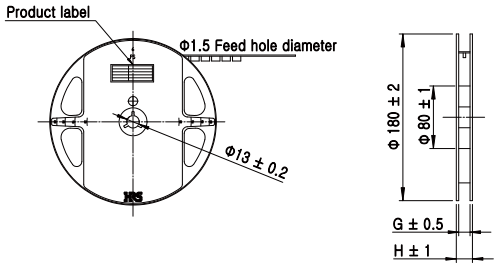


● Reel Dimensions

▸10,000pcs/reel



▸1,000pcs/reel



Unit : mm

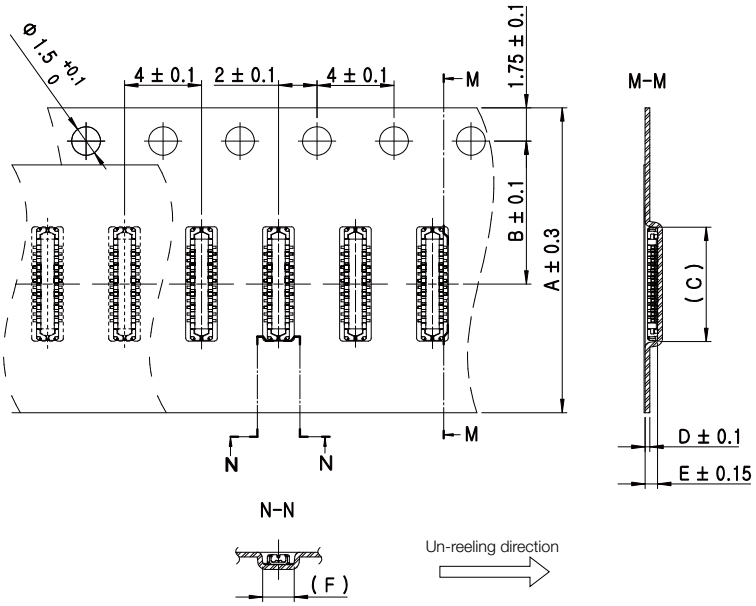
Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G	H	I
BM23FR0.6-6DS-0.35V(***)	480-0287-0 **	6	12	5.5	3.66	0.25	0.8	2.07	13.5	17.5	330
BM23FR0.6-8DS-0.35V(***)	480-0360-0 **	8	12	5.5	4.01	0.25	0.8	2.07	13.5	17.5	330
BM23FR0.6-10DS-0.35V(***)	480-0371-0 **	10	16	7.5	4.36	0.25	0.8	2.07	17.5	21.5	380
BM23FR0.6-12DS-0.35V(***)	480-0295-0 **	12	16	7.5	4.71	0.25	0.8	2.07	17.5	21.5	330
BM23FR0.6-16DS-0.35V(***)	480-0272-0 **	16	16	7.5	5.41	0.25	0.8	2.07	17.5	21.5	330
BM23FR0.6-20DS-0.35V(***)	480-0260-0 **	20	16	7.5	6.11	0.25	0.8	2.07	17.5	21.5	380
BM23FR0.6-24DS-0.35V(***)	480-0327-0 **	24	16	7.5	6.81	0.25	0.8	2.07	17.5	21.5	380
BM23FR0.6-30DS-0.35V(***)	480-0274-0 **	30	24	11.5	7.86	0.25	0.8	2.07	25.5	29.5	330
BM23FR0.6-34DS-0.35V(***)	480-0390-0 **	34	24	11.5	8.56	0.25	0.8	2.07	25.5	29.5	380
BM23FR0.6-40DS-0.35V(***)	480-0382-0 **	40	24	11.5	9.61	0.25	0.8	2.07	25.5	29.5	330
BM23FR0.6-50DS-0.35V(***)	480-0371-0 **	50	24	11.5	11.36	0.25	0.8	2.07	25.5	29.5	330

Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G	H	I
BM23FR0.8-10DS-0.35V(***)	480-0298-0 **	10	16	7.5	4.36	0.3	1.0	2.07	17.5	21.5	330
BM23FR0.8-18DS-0.35V(***)	480-0469-0 **	18	16	7.5	5.76	0.3	1.0	2.07	17.5	21.5	330
BM23FR0.8-60DS-0.35V(***)	480-0300-0 **	60	24	11.5	13.11	0.3	1.0	2.07	25.5	29.5	330

Note 1 : The specification number(895) in the Part No. changes to(95) in the HRS No.

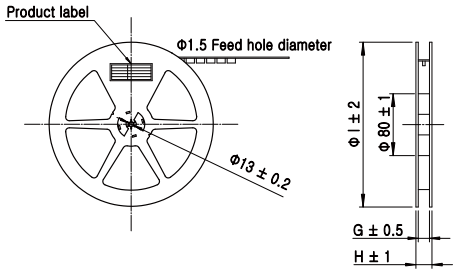
Embossed Tape Dimensions (IEC 602286-3, with JIC C 0806)

● Header

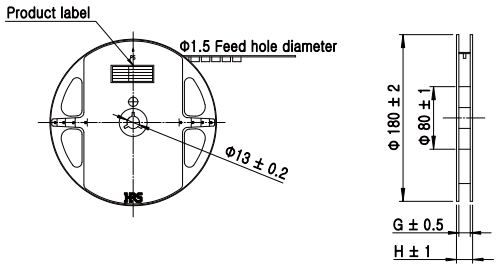


● Reel Dimensions

▸10,000pcs/reel



▸1,000pcs/reel



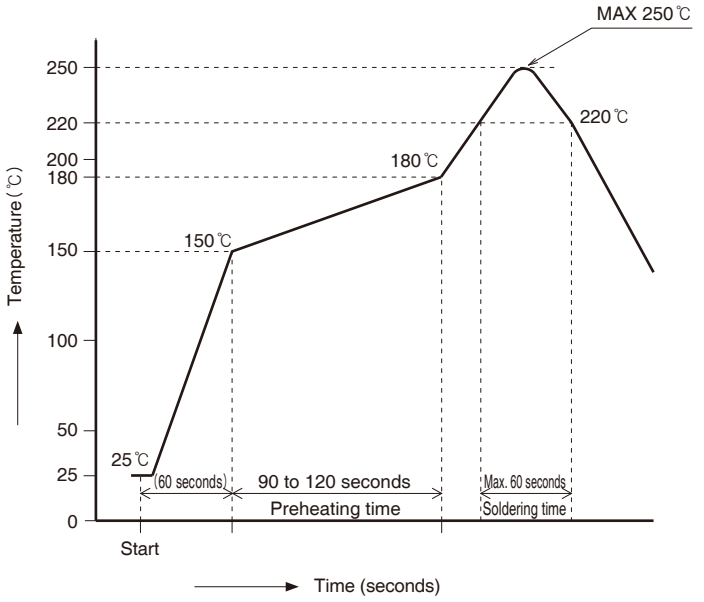
Unit : mm

Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G	H	I
BM23FR0.6-6DP-0.35V(***)	480-0286-0 **	6	12	5.5	2.85	0.25	0.65	1.58	13.5	17.5	330
BM23FR0.6-8DP-0.35V(***)	480-0361-0 **	8	12	5.5	3.20	0.25	0.65	1.58	13.5	17.5	330
BM23FR0.6-10DP-0.35V(***)	480-0257-0 **	10	12	5.5	3.55	0.25	0.65	1.64	13.5	17.5	380
BM23FR0.6-12DP-0.35V(***)	480-0364-0 **	12	12	5.5	3.90	0.25	0.65	1.64	13.5	17.5	330
BM23FR0.6-16DP-0.35V(***)	480-0290-0 **	16	16	7.5	4.60	0.25	0.65	1.64	17.5	21.5	330
BM23FR0.6-20DP-0.35V(***)	480-0273-0 **	20	16	7.5	5.30	0.25	0.65	1.64	17.5	21.5	380
BM23FR0.6-24DP-0.35V(***)	480-0259-0 **	24	16	7.5	6.00	0.25	0.65	1.64	17.5	21.5	380
BM23FR0.6-30DP-0.35V(***)	480-0328-0 **	30	16	7.5	7.05	0.25	0.65	1.64	17.5	21.5	330
BM23FR0.6-34DP-0.35V(***)	480-0275-0 **	34	16	7.5	7.75	0.25	0.65	1.64	17.5	21.5	380
BM23FR0.6-40DP-0.35V(***)	480-0391-0 **	40	24	11.5	8.80	0.25	0.65	1.64	25.5	29.5	330
BM23FR0.6-50DP-0.35V(***)	480-0383-0 **	50	24	11.5	10.55	0.25	0.65	1.64	25.5	29.5	330

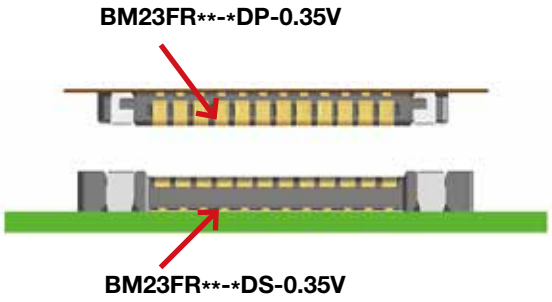
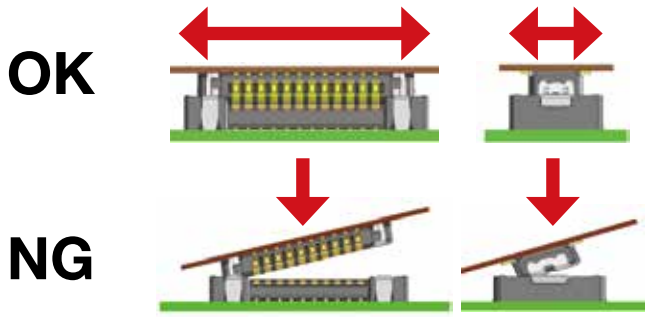
Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G	H	I
BM23FR0.8-10DP-0.35V(***)	480-0297-0 **	10	12	5.5	3.55	0.3	0.78	1.64	13.5	17.5	330
BM23FR0.8-18DP-0.35V(***)	480-0468-0 **	18	16	7.5	4.95	0.3	0.78	1.64	17.5	21.5	330
BM23FR0.8-60DP-0.35V(***)	480-0299-0 **	60	24	11.5	12.30	0.3	0.78	1.64	25.5	29.5	330

Note 1 : The specification number (895) in the Part No. changes to (95) in the HRS No.

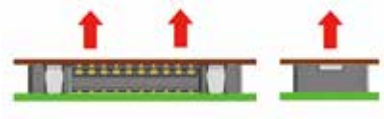
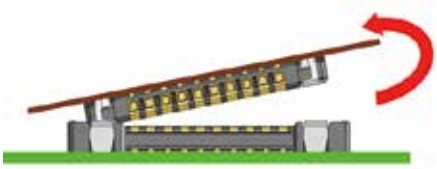
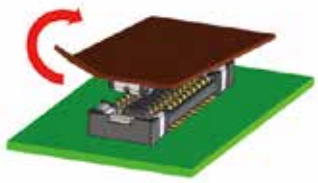
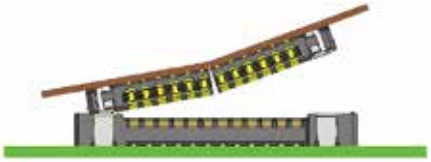
Precautions

1. Recommended solder temperature profile	 **[Conditions]** 1. Peak temperature : Maximum of 250℃ 2. Heat section : 220℃ min., within 60 seconds 3. Preheat section : 150 to 180℃, 90 to 120 seconds 4. Number of reflow cycles : Maximum of 2 cycles Note 1 : The temperature is the surface temperature of the PCB in the vicinity of the connector lead part. Note 2 : When using nitrogen reflow process, please mount the product with the oxygen concentration at a minimum of 1,000[ppm]. Please contact Hirose if the concentration is below 1,000 [ppm].
2. Recommended manual soldering conditions	Soldering iron temperature: 340±10℃ Soldering time : within 3 seconds
3. Recommended screen thickness and open area ratio to PCB pattern area	Thickness : 0.1mm Aperture ratio : 100% on the DS side, 100% on the DP side
4. Warpage of the PCB	A maximum of 0.02mm at the center part of the connector based on both ends of the connector.
5. Cleaning	Not recommended. If this product is cleaned, please evaluate the performance before using it. Cleaning may cause a change in the mating/unmating properties as well as environmental resistance.
6. Notes	■ Care sholud be taken when mating/unmating the connector and when it is not mounted on the PCB. Damage or deformation of the contacts may occur. ■ Avoid supporting the PCB only with the connectors. Support it by other means such as bolts, screws, posts, etc. ■ Care should be taken to avoid excessive prying mating/unmating that could cause damage. ■ During manual soldering, do not apply flux which will cause flux oozing on connector. ■ This product may have slight color differences due to production lot variability, but this does not have any effect on the performance. ■ Please refer to the next page for precautions regarding mating/unmating. ■ Because the product can disengage if dropped (or other impact), and by FPC routing, it is advised to secure the mated connectors to the board with housings and cushioning materials. ■ Caution! Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and the guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if using the connector under conditions other than those described in the specifications and the guidelines is being considered.

● Handle with care when mating a connector

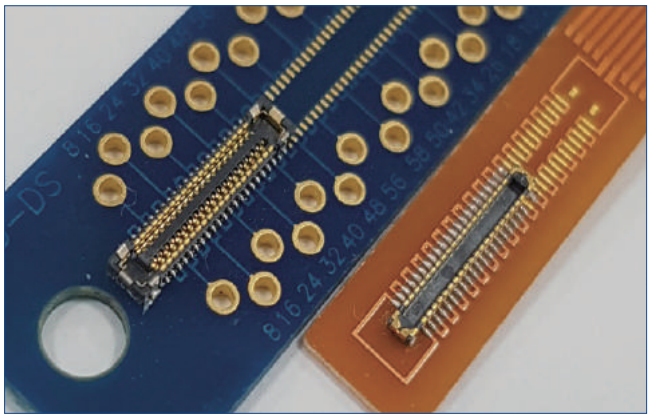
<table>
<tr>
<td> 
</td>
<td></td>
</tr>
<tr>
<td>Alignment method
 
</td>
<td>When aligning, look for the guide port without applying excessive force.
Caution! If excessive force is applied, the connector could crack or be shaved which could lead to a defect in contact resistance.</td>
</tr>
<tr>
<td>Guiding condition
 
Mated condition
  </td>
<td>When guided, the connectors are aligned parallel to each other with longitudinal and lateral movements restricted. Mate them parallel to each other.</td>
</tr>
</table>

● Handle with care when un-mating connectors

OK 	Un-mate connectors parallel to each other.
OK  Pitch direction	If the connector cannot be un-mated parallel, it can be removed diagonally from the pitch direction, as shown in the left figure. However, the connector can be broken if the FPC is not rigid. Please confirm rigidity of the FPC at the time of trial production.
NG  Corner direction	Do not pull from the corner. If it is pulled from the corner as shown in the left figure, the contact and connector could be damaged.
NG 	Please provide a reinforcing plate for the FPC. If the rigidity of the FPC is not sufficient, the connector may break as shown in the left figure. Please check the action of the FPC to be used repeatedly. A reinforcing plate of 0.3mm or thicker made of glass epoxy material, or 0.2mm or thicker stainless steel is recommended

0.35mm Pitch, 0.8mm Height, Board to Board or Board to FPC Connectors with Rated Current Up to 5A

BM23PF Series



■Features

1. Rated current : 5A

Equipped with power contacts capable of handling up to 5A current. (See Fig.1)

・Rated current : 5A (Power contact), 0.3A (Signal contact)

2. Space saving design

Compact design ideal for mobile devices. (See Fig.2)

・Pitch : 0.35mm, Width : 1.98mm, Stacking height : 0.8mm

3. Robust [Breaking Strength : 90N]

Metal guides prevent housing damage due to incorrect mating. (See Fig.3)

4. Highly reliable contact design

2-point contact design for both power and signal contact ensures high reliability. (See Fig.4)

5. Good mating operation

Wide self alignment range with metal guides offers enhanced mating operation.
(0.4mm in pitch direction, 0.35mm in width direction)
Furthermore, a clear tactile click generated by the unique locking contact design insures complete mating.

6. Supports USB 3.1 Gen.2 (10Gbps) transmission

Signal contacts support USB3.1 Gen.2 transmission speed.

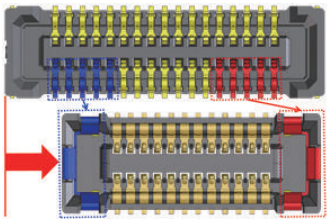
■Environmental

・Halogen-free*
As defined by IEC 61249-2-21
Br : 900ppm max., Cl : 900ppm max.
Br+Cl :1,500ppm max.

High current applicable

Conventional product
(P=0.35mm, 34pos.)

BM23PF-24pos.
(+2pos. for power)

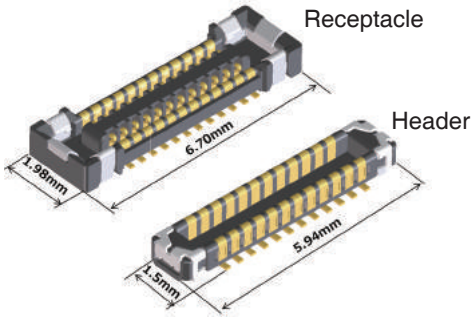


Power lines are concentrated into 2 power contacts (Up to 5A/line) instead of conventional multiple signal contacts.

Fig.1

Space-saving

Dimension Example : 24 Pos.

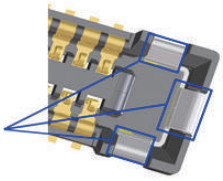


The narrower and shorter, yet flexible design allows tight installation (Pitch : 0.35mm, Width : 1.98mm)

Fig.2

Robust design

Metal guide prevents connector damage even if mated incorrectly.



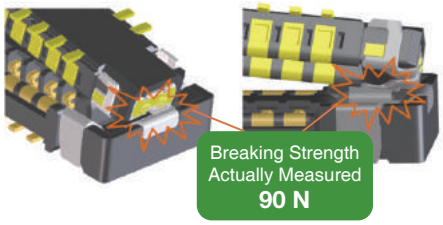


Fig.3

Cross-sectional view of mated contacts

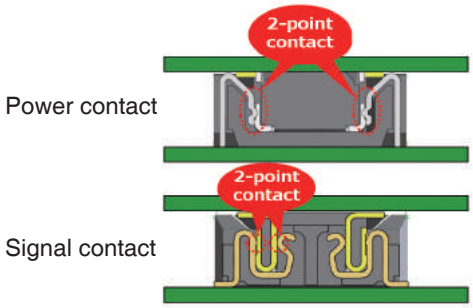


Fig.4

■Product Specifications

Ratings	Rated current	Signal contact : 0.3A (Note1) Power contact : 5A	Operating temperature range	-55°C to 85°C (Note2)	Storage temperature range	-10°C to 60°C (Note3)
	Rated voltage	30V AC/DC	Operating humidity range	20% to 80%	Storage humidity range	40% to 70% (Note3)

Items	Specifications	Conditions
1. Contact resistance	Signal contact : 90mΩ max. Power contact : 30mΩ max.	Measured at 20mV AC, 1kHz, and 1mA
2. Insulation resistance	50MΩ min.	Measured at 100V DC
3. Withstanding voltage	No flashover or insulation breakdown	100V AC for 1 minute
4. Durability	Contact resistance : Signal contact : 90mΩ max. Power contact : 30mΩ max.	10 mating cycles
5. Vibration	No electrical discontinuity for more than 1μs.	Frequency: 10 to 55Hz, single amplitude : 0.75mm in 3 axis directions for 5 minutes, 10 cycles
6. Shock resistance	No electrical discontinuity of 1μs or more.	Acceleration : 490m/s^2, duration of pulse: 11ms at 3 times for 3 directions.
7. Humidity	Contact resistance : Signal contact : 90mΩ max. Power contact : 30mΩ max. Insulation resistance : 25MΩ min.	96 hours at temperature of 40±2°C and a humidity range from 90 to 95%
8. Temperature cycle	Contact resistance : Signal contact : 90mΩ max. Power contact: 30mΩ max. Insulation resistance : 50MΩ min.	-55°C for 30minutes → 85°C for 30minutes, 5 cycles
9. Soldering heat resistance	No dissolution or melting of the resin that will affect the performance.	Reflow : with recommended temperature profile; Hand soldering at soldering iron temperature of 350°C for 3 seconds max.

Note 1 : The total current capacity for the connector with 40 or more signal contacts is 12A for all contacts.(Signal contact only)
Note 2 : Includes temperature rise caused by current flow.
Note 3 : Storage refers to long-term-storage of unused items before they are mounted on the PCB.
Operating temperature/humidity range applies to the state of temporary storage such as non-powered after mounting on the PCB, and during transportation, etc.

■Materials / Finish

Product	Part	Material	Finish	UL Regulation
Receptacle Header	Insulator	LCP	Black	UL94V-0
	Signal Contact	Copper alloy	Gold plating	——
	Power Contact	Copper alloy	Gold plating	——

■Product Number Structure

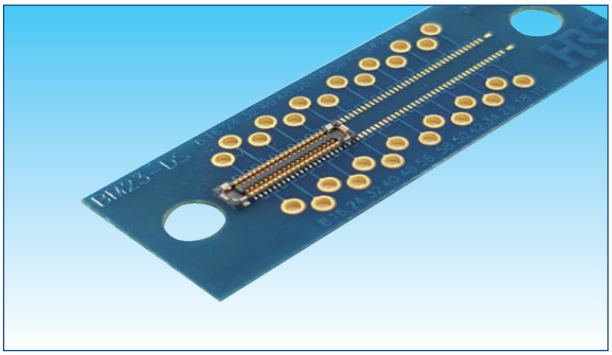
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

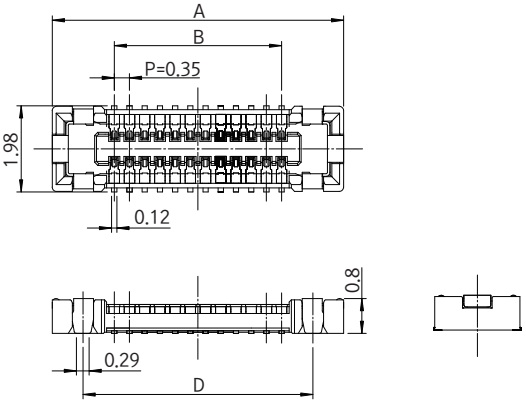
●Receptacle / Header

BM ❶ 23 ❷ PF ❸ 0.8 ❹ - * ❺ DS ❻ - 0.35 ❼ V ❽ (***) ❾

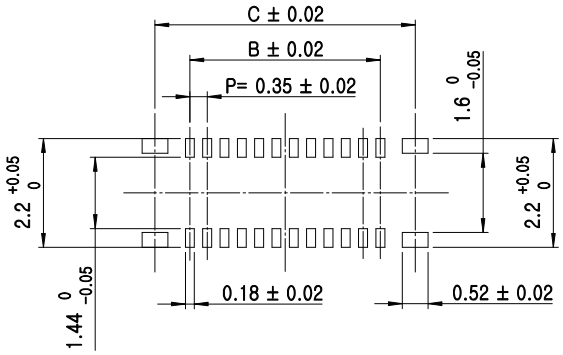
❶ Series Name: BM	❻ Connector Type DS: Receptacle DP: Header
❷ Series No. : 23	❼ Contact Pitch : 0.35mm
❸ Shape Symbols PF: Power contact type	❽ Terminal type V : Straight SMT
❹ Stacking Height : 0.8mm	❾ Gold plated specification and packaging status (51) : Gold plate thickness 0.05μm Embossed tape packaging(10,000pcs/reel) (895) : Gold plate thickness 0.05μm Embossed tape packaging (1,000pcs/reel)
❺ Number of Contacts	

■Receptacle

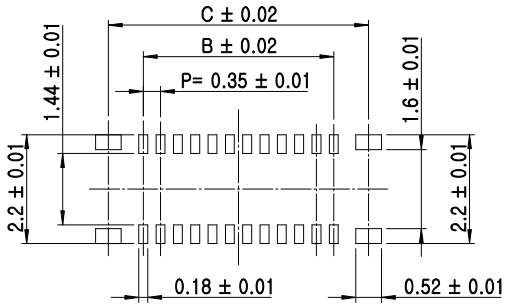




◆Recommended PCB layout



◆Recommended metal mask dimensions (mask thickness : 100μm)

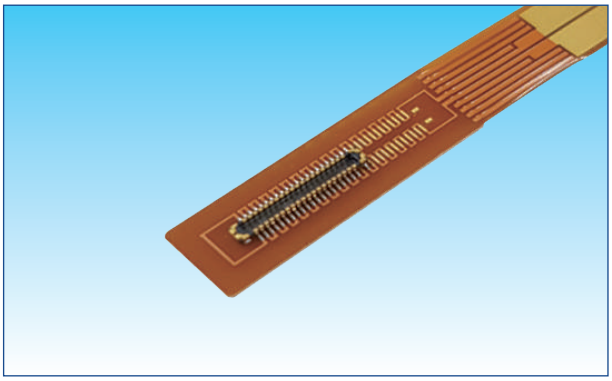


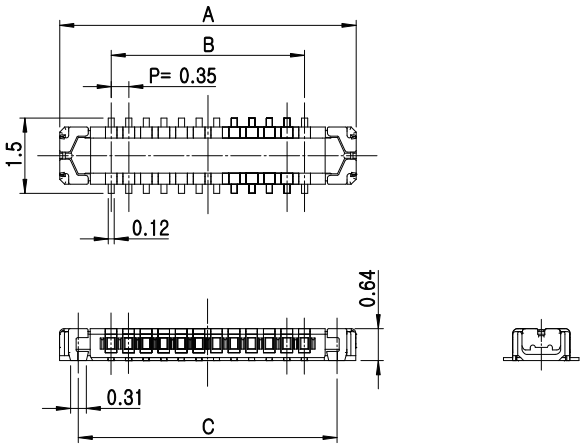
Unit : mm

Part No.	HRS No.	No. of contacts	A	B	C	D
BM23PF0.8-10DS-0.35V(***)	480-0312-0 **	10	4.25	1.40	2.81	2.84
BM23PF0.8-14DS-0.35V(***)	480-0367-0 **	14	4.95	2.10	3.51	3.54
BM23PF0.8-20DS-0.35V(***)	480-0434-0 **	20	6.00	3.15	4.56	4.59
BM23PF0.8-24DS-0.35V(***)	480-0368-0 **	24	6.70	3.85	5.26	5.29
BM23PF0.8-30DS-0.35V(***)	480-0472-0 **	30	7.75	4.90	6.31	6.34
BM23PF0.8-40DS-0.35V(***)	480-0369-0 **	40	9.50	6.65	8.06	8.09
BM23PF0.8-42DS-0.35V(***)	480-0436-0 **	42	9.85	7.00	8.41	8.44
BM23PF0.8-46DS-0.35V(***)	480-0402-0 **	46	10.55	7.70	9.11	9.14
BM23PF0.8-54DS-0.35V(***)	480-0370-0 **	54	11.95	9.10	10.51	10.54

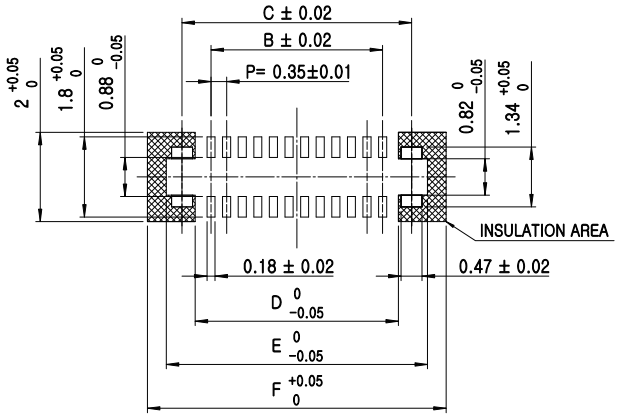
Note 1 : Please place orders in full reel quantities.
Note 2 : This connector has no polarity.
Note 3 : The specification number(895) in the Part No. changes to(95) in the HRS No.

■Header

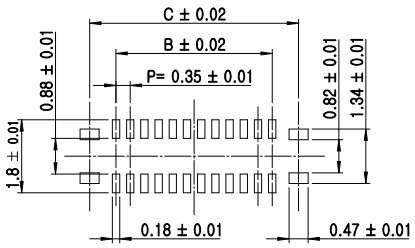




◆Recommended PCB layout



◆Recommended metal mask dimensions (mask thickness : 100μm)



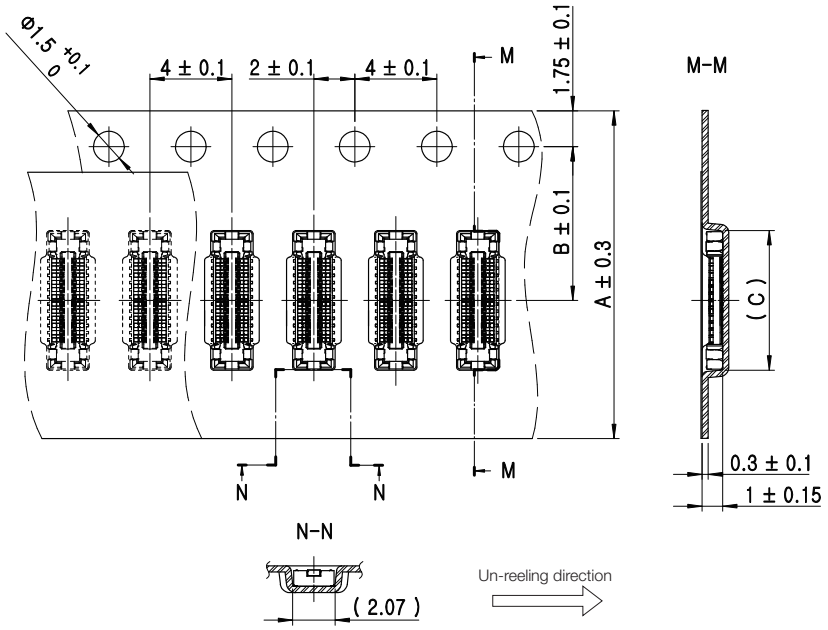
Unit : mm

Part No.	HRS No.	No. of contacts	A	B	C	D	E	F
BM23PF0.8-10DP-0.35V(***)	480-0306-0 **	10	3.49	1.40	2.70	2.11	3.41	4.25
BM23PF0.8-14DP-0.35V(***)	480-0366-0 **	14	4.19	2.10	3.40	2.81	4.11	4.95
BM23PF0.8-20DP-0.35V(***)	480-0433-0 **	20	5.24	3.15	4.45	3.86	5.16	6.00
BM23PF0.8-24DP-0.35V(***)	480-0291-0 **	24	5.94	3.85	5.15	4.56	5.86	6.70
BM23PF0.8-30DP-0.35V(***)	480-0426-0 **	30	6.99	4.90	6.20	5.61	6.91	7.75
BM23PF0.8-40DP-0.35V(***)	480-0317-0 **	40	8.74	6.65	7.95	7.36	8.66	9.50
BM23PF0.8-42DP-0.35V(***)	480-0435-0 **	42	9.09	7.00	8.30	7.71	9.01	9.85
BM23PF0.8-46DP-0.35V(***)	480-0401-0 **	46	9.79	7.70	9.00	8.41	9.71	10.55
BM23PF0.8-54DP-0.35V(***)	480-0303-0 **	54	11.19	9.10	10.40	9.81	11.11	11.95

Note 1 : Please place orders in full reel quantities.
Note 2 : This connector has no polarity.
Note 3 : The specification number(895) in the Part No. changes to(95) in the HRS No.

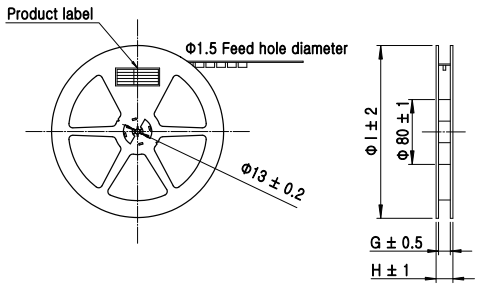
Embossed Tape Dimensions (IEC 602286-3, with JIC C 0806)

● Receptacle

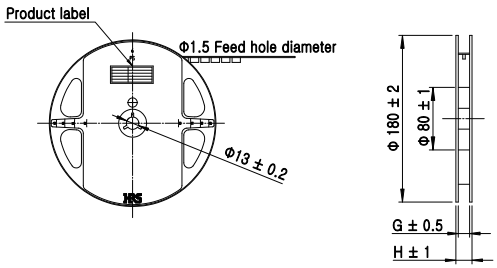


● Reel Dimensions

▸10,000pcs/reel



▸1,000pcs/reel



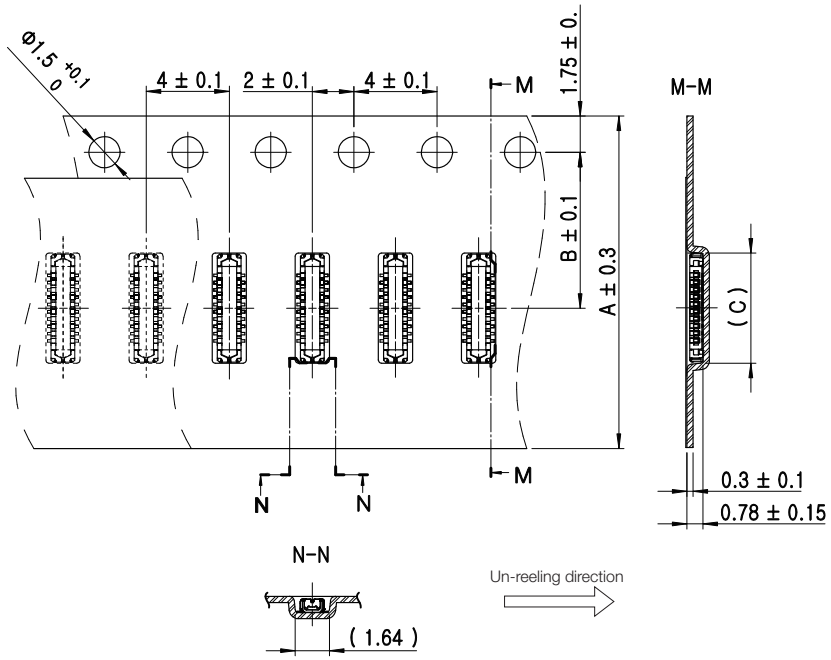
Unit : mm

Part No.	HRS No.	No. of contacts	A	B	C	G	H	I
BM23PF0.8-10DS-0.35V(***)	480-0312-0 **	10	16	7.5	4.36	17.5	21.5	330
BM23PF0.8-14DS-0.35V(***)	480-0367-0 **	14	16	7.5	5.06	17.5	21.5	330
BM23PF0.8-20DS-0.35V(***)	480-0434-0 **	20	16	7.5	6.11	17.5	21.5	330
BM23PF0.8-24DS-0.35V(***)	480-0368-0 **	24	16	7.5	6.81	17.5	21.5	330
BM23PF0.8-30DS-0.35V(***)	480-0472-0 **	30	16	7.5	7.86	17.5	21.5	330
BM23PF0.8-40DS-0.35V(***)	480-0369-0 **	40	24	11.5	9.61	25.5	29.5	330
BM23PF0.8-42DS-0.35V(***)	480-0436-0 **	42	24	11.5	9.96	25.5	29.5	330
BM23PF0.8-46DS-0.35V(***)	480-0402-0 **	46	24	11.5	10.66	25.5	29.5	330
BM23PF0.8-54DS-0.35V(***)	480-0370-0 **	54	24	11.5	12.06	25.5	29.5	330

Note 1 : The specification number(895) in the Part No. changes to(95) in the HRS No.

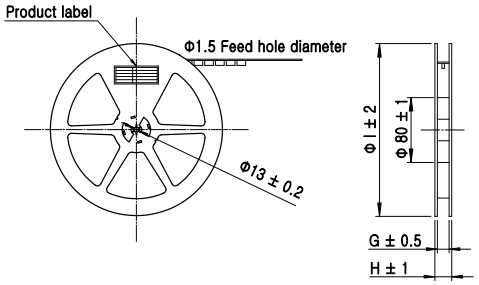
Embossed Tape Dimensions (IEC 602286-3, with JIC C 0806)

● Header

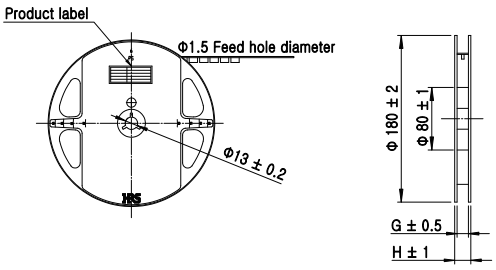


● Reel Dimensions

▸10,000pcs/reel



▸1,000pcs/reel

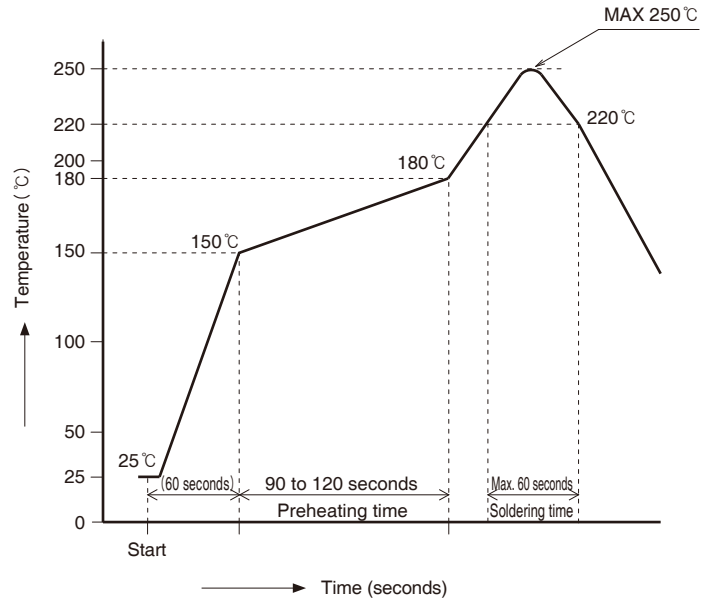


Unit : mm

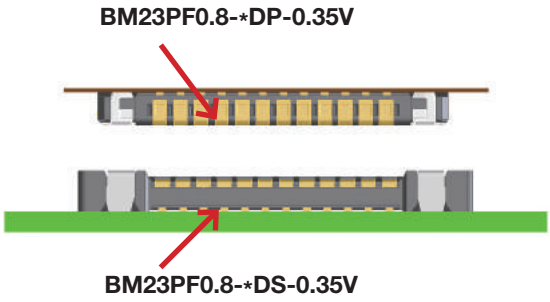
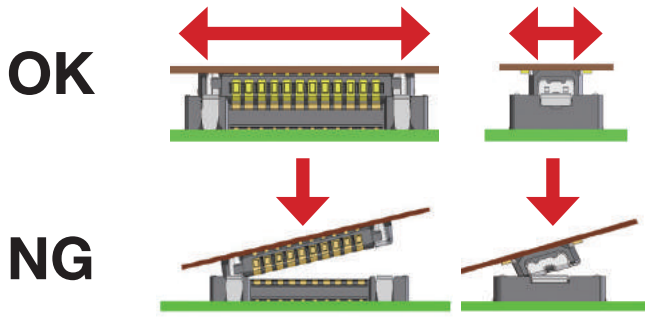
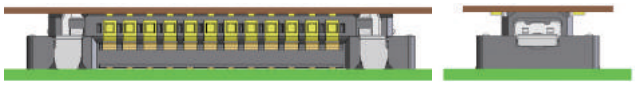
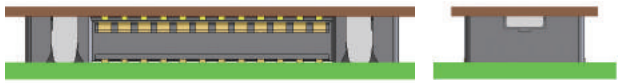
Part No.	HRS No.	No. of contacts	A	B	C	G	H	I
BM23PF0.8-10DP-0.35V(***)	480-0306-0 **	10	12	5.5	3.65	13.5	17.5	330
BM23PF0.8-14DP-0.35V(***)	480-0366-0 **	14	16	7.5	4.35	17.5	21.5	330
BM23PF0.8-20DP-0.35V(***)	480-0433-0 **	20	16	7.5	5.4	17.5	21.5	330
BM23PF0.8-24DP-0.35V(***)	480-0291-0 **	24	16	7.5	6.10	17.5	21.5	330
BM23PF0.8-30DP-0.35V(***)	480-0426-0 **	30	16	7.5	7.15	17.5	21.5	330
BM23PF0.8-40DP-0.35V(***)	480-0317-0 **	40	24	11.5	8.90	25.5	29.5	330
BM23PF0.8-42DP-0.35V(***)	480-0435-0 **	42	24	11.5	9.25	25.5	29.5	330
BM23PF0.8-46DP-0.35V(***)	480-0401-0 **	46	24	11.5	9.95	25.5	29.5	330
BM23PF0.8-54DP-0.35V(***)	480-0303-0 **	54	24	11.5	11.35	25.5	29.5	330

Note 1: The specification number(895) in the Part No. changes to(95) in the HRS No.

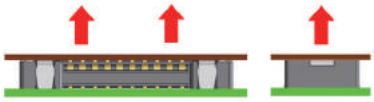
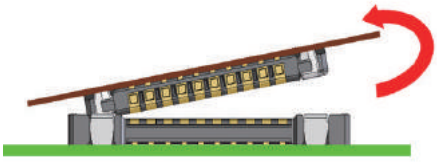
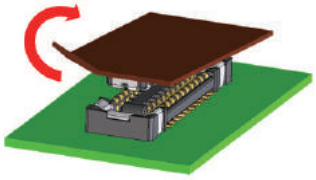
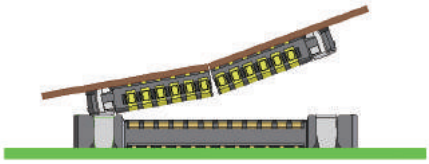
Precautions

1. Recommended solder temperature profile	 **[Conditions]** 1. Peak temperature : Maximum of 250℃ 2. Heat section : 220℃ min., within 60 seconds 3. Preheat section : 150 to 180℃, 90 to 120 seconds 4. Number of reflow cycles : Maximum of 2 cycles Note 1 : The temperature is the surface temperature of the PCB in the vicinity of the connector lead part. Note 2 : When using nitrogen reflow process, please mount the product with the oxygen concentration at a minimum of 1,000[ppm]. Please contact Hirose if the concentration is below 1,000[ppm]
2. Recommended manual soldering conditions	Soldering iron temperature: 340±10℃ Soldering time : within 3 seconds
3. Recommended screen thickness and open area ratio to PCB pattern area	Thickness : 0.1mm Aperture ratio : 100% on the DS side, 100% on the DP side
4. Warpage of the PCB	A maximum of 0.02mm at the center part of the connector on both ends of the connector.
5. Cleaning	Not recommended. If this product is cleaned, please evaluate the performance before using it. Cleaning may cause a change in the mating/unmating properties as well as environmental resistance.
6. Notes	■ Care sholud be taken when mating/unmating the connector and when it is not mounted on the PCB. Damage or deformation of the contacts may occur. ■ Avoid supporting the PCB only with the connectors. Support it by other means such as bolts, screws, posts, etc. ■ Care should be taken to avoid excessive prying mating/unmating that could cause damage. ■ During manual soldering, do not apply flux which will cause flux oozing on connector. ■ This product may have slight color differences due to production lot variability, but this does not have any effect on the performance. ■ Please refer to the next page for precautions regarding mating/unmating. ■ Because the product can disengage if dropped (or other impact), and by FPC routing, it is advised to secure the mated connectors to the board with housings and cushioning materials. ■ Caution! Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and the guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if using the connector under conditions other than those described in the specifications and the guidelines is being considered.

● Handle with care when mating a connector

<table>
<tr>
<td> 
</td>
<td></td>
</tr>
<tr>
<td>Alignment method
 
</td>
<td>When aligning, look for the guide port without applying excessive force.
Caution! If excessive force is applied, the connector could crack or be shaved which could lead to a defect in contact resistance.</td>
</tr>
<tr>
<td>Guiding condition
 
Mated condition
  </td>
<td>When guided, the connectors are aligned parallel to each other with longitudinal and lateral movements restricted. Mate them parallel to each other.</td>
</tr>
</table>

● Handle with care when un-mating connectors

OK 	Un-mate connectors parallel to each other.
OK  Pitch direction	If the connector cannot be un-mated parallel, it can be removed diagonally from the pitch direction, as shown in the left figure. However, the connector can be broken if the FPC is not rigid. Please confirm rigidity of the FPC at the time of trial production.
NG  Corner direction	Do not pull from the corner. If it is pulled from the corner as shown in the left figure, the contact and connector could be damaged.
NG 	Please provide a reinforcing plate for the FPC. If the rigidity of the FPC is not sufficient, the connector may break as shown in the left figure. Please check the action of the FPC to be used repeatedly. A reinforcing plate of 0.3mm or thicker made of glass epoxy material, or 0.2mm or thicker stainless steel is recommended

PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

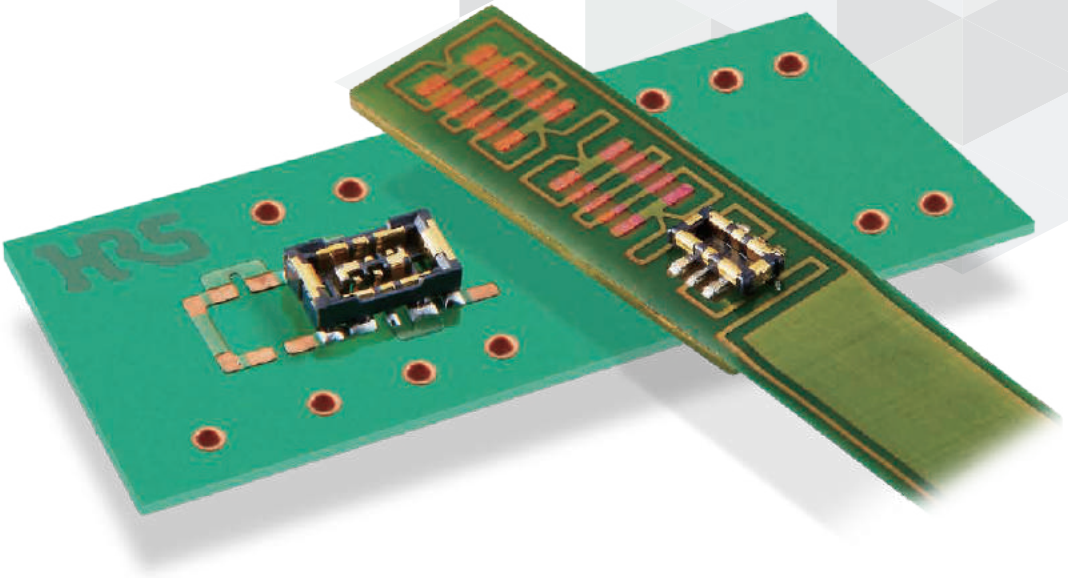
BM29 Series

Ultra-Small, Power/Signal Contact Design for Board-to-Board/ FPC-to-Board Providing 3A Max. Current

Ultra Miniature

Power / Signal

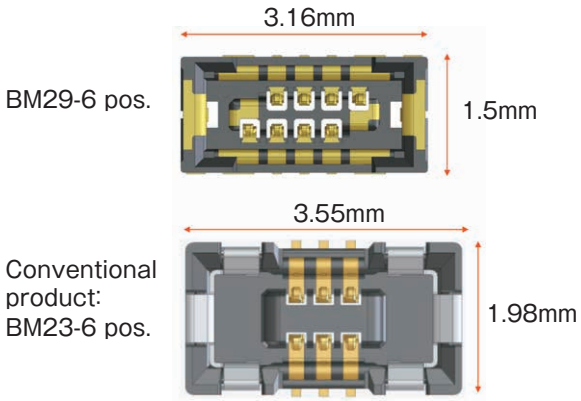
Robust



Features

1. Space-Saving Design

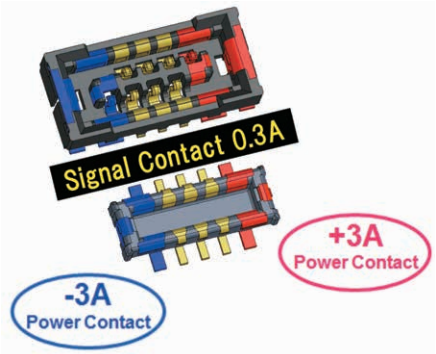
Compact and flexible design ideal for mobile devices.
Pitch : 0.35mm, Depth : 1.5mm,
Stacking Height : 0.6mm



20% reduction in size compared to HRS's conventional products.

2. Equipped with Power Contacts Capable of Handling up to 3A Current.

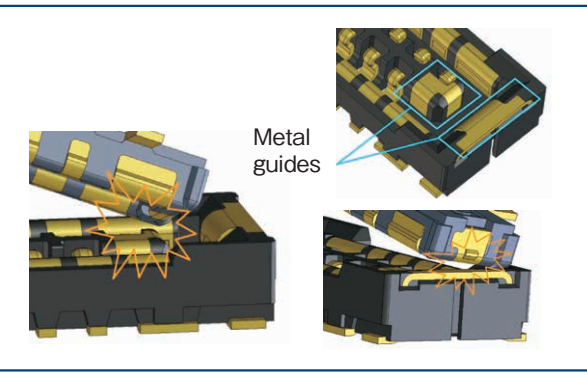
Rated current : 3A (Power Contact),
0.3A (Signal Contact)



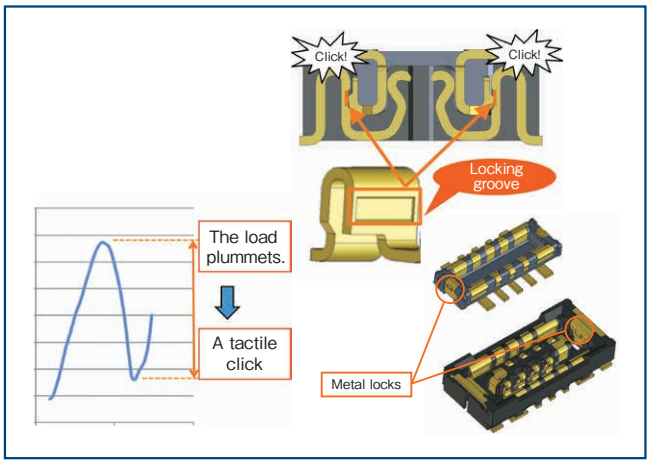
Combination Power / Signal Contact Design

3. The proprietary metal guide prevents the connector from being damaged against offset mating.

Even when mated in a misaligned state, metal-to-metal contact reduces the risk of damage to the connector.



4. A tactile click ensures secure mating.



The contact is designed to provide a tactile click.

5. High Contact Reliability with 2-Points Contact

Product Specifications

Rated Current	2, 4, 6pos.	12, 24pos.	Operating Temperature (Note 1)	-40 to +85℃
	Power Contact : 3A Signal Contact : 0.3A	Power Contact : 2A Signal Contact : 0.3A	Storage Temperature (Note 2)	-10 to +60℃
Rated Voltage	30V AC/DC			

Operating Humidity Range (Note 3)	90% RH Max.	Storage Humidity Range (Note 2, 3)	90% RH Max.

Item	Standards	Condition
Insulation Resistance	1,000MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or dielectric breakdown	150V AC for 1 min.
Contact Resistance	Signal Contact: 100mΩ Power Contact: 30mΩ	Measured at 20mV AC, 1kHz, 1mA
Vibration Resistance	No electrical discontinuity of 1μs or more	Frequency 10 to 55Hz, Half amplitude 0.75mm, 1 cycle for 5 min., 3 axial, 10 cycles
Humidity Resistance	Contact Resistance Signal Contact:100mΩ, Power Contact: 30mΩ Insulation Resistance: 100MΩ Min.	Temperature 40±2 ℃, Humidity 90 to 95%, Left for 96 hours
Temperature Cycle	Contact Resistance Signal Contact:100mΩ, Power Contact: 30mΩ Insulation Resistance: 100MΩ Min.	(-55℃ : 30 min. -- > 5 to 35℃ : 10 min. -- > 85℃ : 30 min. -- > 5 to 35℃ : 10 min.) 5 cycles
Mating Durability	Contact Resistance: 100mΩ Max.	10 times
Solder Heat Resistance	No dissolution or resin melting that will affect performance.	Reflow: In recommended Temperature Profile, 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.
Note 3 : Use without condensation.

Materials / Finish

Item	Component	Material	Finish/Color	Remarks
Receptacle Plug	Insulator	LCP	Black	UL94V-0
	Signal Contact	Phosphorous Bronze	Gold Plating	-
	Power Contact	Phosphorous Bronze	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

BM29B 0.6 - # DS/ 2 - 0.35 V (##)
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

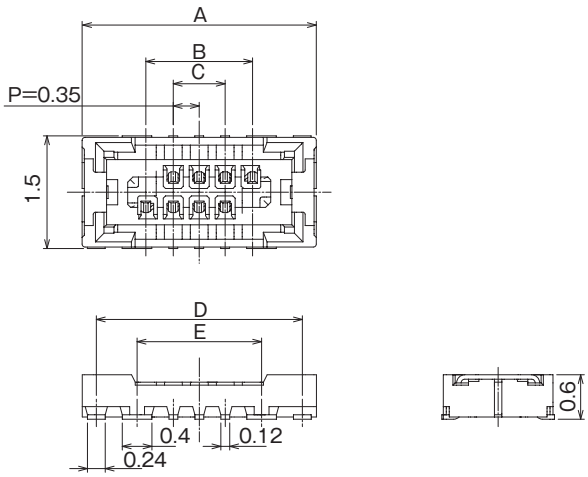
❶ Series Name	BM29B	❺ No. of Pos. (Power Contact)	2 pos.
❷ Stacking Height		❻ Contact Pitch	0.35mm
❸ No. of Pos. (Signal Contact)	2, 4, 6, 12 and 24 pos.	❼ Terminal Design V	Straight SMT
❹ Connector Type	DS: Receptacle	❽ Specifications of Gold Plating and Packaging	Packaging (51): Embossed Tape Packaging (20,000 pcs per reel) (53): Embossed Tape Packaging (1,000 pcs per reel)

■ Plug

BM29B - # DP 2 - 0.35 V (##)
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series Name	BM29B	❺ Contact Pitch	0.35mm
❷ No. of Pos. (Signal Contact)	2 pos.	❻ Terminal Design V	Straight SMT
❸ Connector Type	DP: Plug	❼ Specifications of Gold Plating and Packaging	Packaging (51): Embossed Tape Packaging (20,000 pcs per reel) (53): Embossed Tape Packaging (1,000 pcs per reel)
❹ No. of Pos. (Power Contact)	2, 4, 6, 12 and 24 pos.		

Receptacle



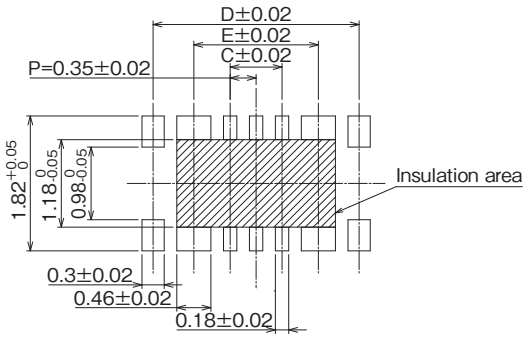
Recommended metal mask thickness : 80 μ m, Aperture ratio : 100%

Unit : mm

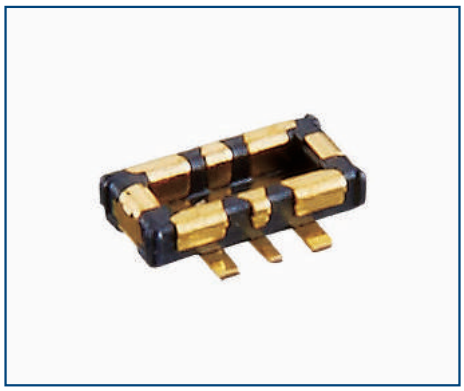
Part No.	HRS No.	No. of Pos.		A	B	C	D	E	Purchase Unit (##):(51)	Purchase Unit (##):(53)
		Signal	Power							
BM29B0.6-2DS/2-0.35V(##)	CL0673-7001-0-##	2	2	2.46	0.7	–	2.08	0.98	20,000pcs per reel	1,000pcs per reel
BM29B0.6-4DS/2-0.35V(##)	CL0673-7063-0-##	4	2	2.81	1.09	0.35	2.43	1.33		
BM29B0.6-6DS/2-0.35V(##)	CL0673-7003-0-##	6	2	3.16	1.44	0.7	2.78	1.68		
BM29B0.6-12DS/2-0.35V(##)	CL0673-7080-0-##	12	2	4.21	2.49	1.75	3.83	2.73		
BM29B0.6-24DS/2-0.35V(##)	CL0673-7053-0-##	24	2	6.31	4.59	3.85	5.93	4.83		

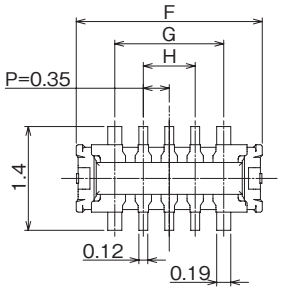
Note : This connector has no polarity.

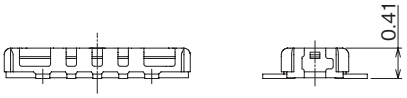
■ Recommended PCB Pattern



Plug







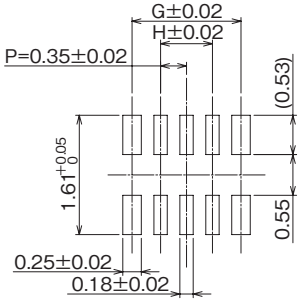
Recommended metal mask thickness : 80 μ m, Aperture ratio : 80%

Unit : mm

Part No.	HRS No.	No. of Pos.		F	G	H	Purchase Unit (##):(51)	Purchase Unit (##):(53)
		Signal	Power					
BM29B-2DP/2-0.35V(##)	CL0673-7002-0-##	2	2	1.81	0.77	–	20,000pcs per reel	1,000pcs per reel
BM29B-4DP/2-0.35V(##)	CL0673-7064-0-##	4	2	2.16	1.12	0.35		
BM29B-6DP/2-0.35V(##)	CL0673-7004-0-##	6	2	2.51	1.47	0.7		
BM29B-12DP/2-0.35V(##)	CL0673-7081-0-##	12	2	3.56	2.52	1.75		
BM29B-24DP/2-0.35V(##)	CL0673-7052-0-##	24	2	5.66	4.62	3.85		

Note : This connector has no polarity.

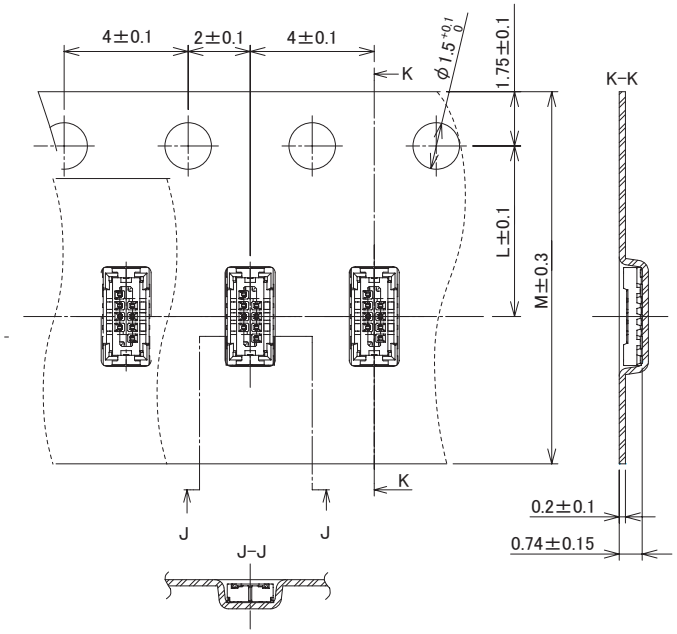
■ Recommended PCB Pattern



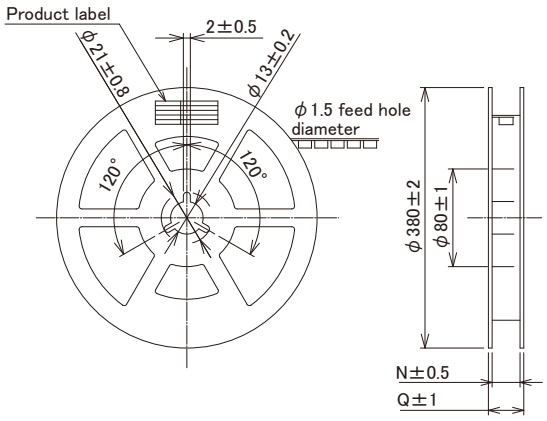
Packaging Specifications Diagram (JIS C 0806 Compliant)

Receptacle

● Embossed Carrier Tape Dimensions



● Reel Dimensions

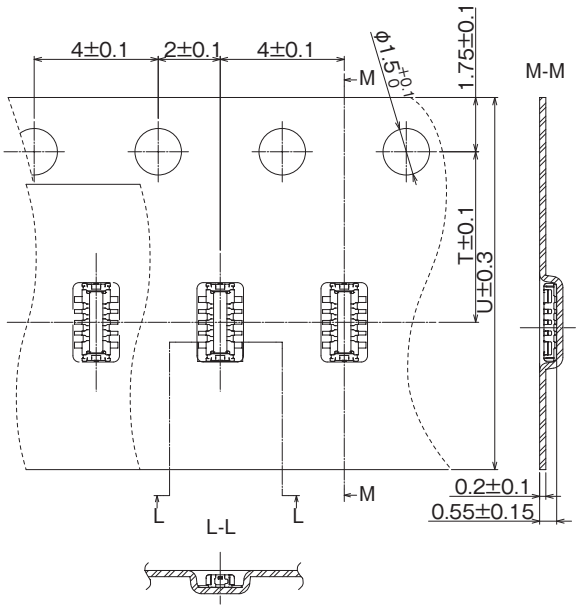


Unit : mm

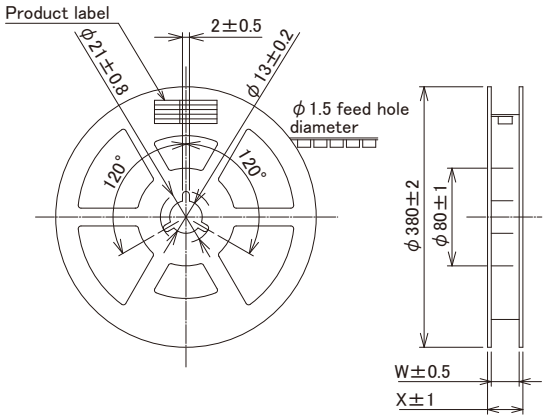
Part No.	HRS No.	No. of Pos.		L	M	N	Q	Purchase Unit (##):(51)	Purchase Unit (##):(53)
		Signal	Power						
BM29B0.6-2DS/2-0.35V(##)	CL0673-7001-0-##	2	2	5.5	12	13.5	17.5	20,000pcs per reel	1,000pcs per reel
BM29B0.6-4DS/2-0.35V(##)	CL0673-7063-0-##	4	2	5.5	12	13.5	17.5		
BM29B0.6-6DS/2-0.35V(##)	CL0673-7003-0-##	6	2	5.5	12	13.5	17.5		
BM29B0.6-12DS/2-0.35V(##)	CL0673-7080-0-##	12	2	7.5	16	17.5	21.5		
BM29B0.6-24DS/2-0.35V(##)	CL0673-7053-0-##	24	2	7.5	16	17.4	21.4		

Plug

● Embossed Carrier Tape Dimensions



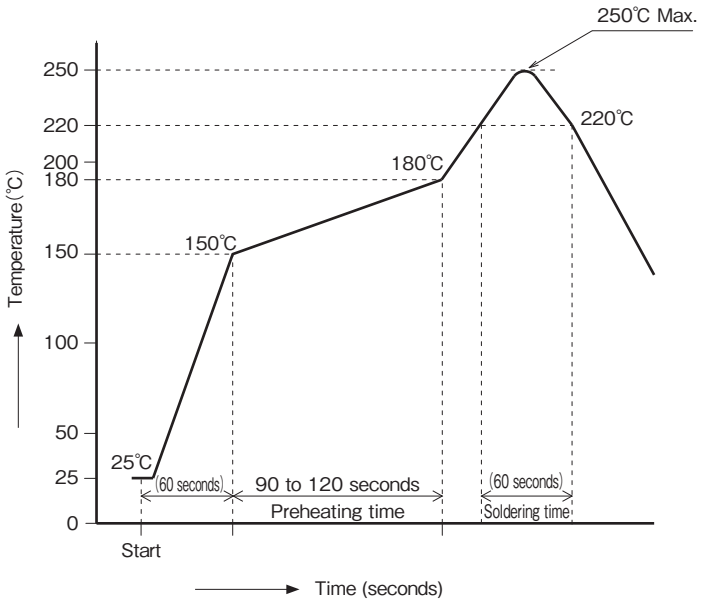
● Reel Dimensions



Unit : mm

Part No.	HRS No.	No. of Pos.		T	U	W	X	Purchase Unit (##):(51)	Purchase Unit (##):(53)
		Signal	Power						
BM29B-2DP/2-0.35V(##)	CL0673-7002-0-##	2	2	5.5	12	13.5	17.5	20,000pcs per reel	1,000pcs per reel
BM29B-4DP/2-0.35V(##)	CL0673-7064-0-##	4	2	5.5	12	13.5	17.5		
BM29B-6DP/2-0.35V(##)	CL0673-7004-0-##	6	2	5.5	12	13.5	17.5		
BM29B-12DP/2-0.35V(##)	CL0673-7081-0-##	12	2	5.5	12	13.5	17.5		
BM29B-24DP/2-0.35V(##)	CL0673-7052-0-##	24	2	7.5	16	17.4	21.4		

Precautions

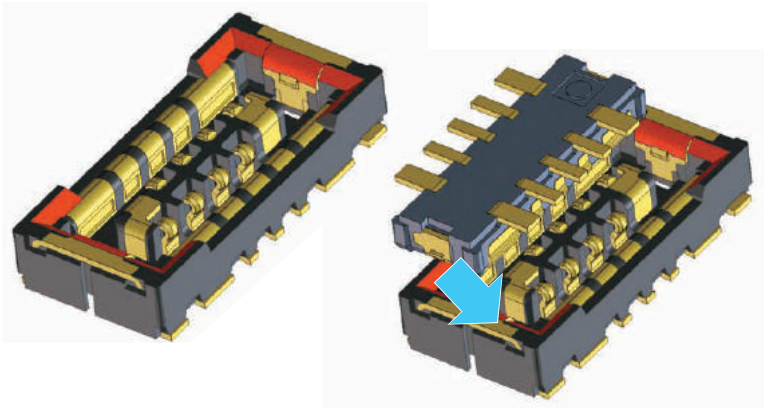
Recommended Temperature Profile	 【Conditions】 1. Peak Temperature : 250℃ Max. 2. Heating : 220℃ Min., within 60sec. 3. Preheating : 150 to 180℃ , 90 to 120sec. 4. Number of Reflow Cycles : 2 cycles Max. Note 1: Temperature refers to the surface temperature of the board near the connector lead. Note 2: When using nitrogen reflow, please mount the oxygen concentration at 1000[ppm] or higher. If less than 1000[ppm], please contact us.
Recommended Manual Soldering Conditions	Soldering iron temperature : 340 ± 10℃ , Soldering Time : Within 3 sec.
Recommended Metal Mask Thickness and Open Area to PCB Pattern (Area Ratio)	Thickness : 0.08mm, Aperture Ratio : DS 100%, DP 80%
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. ■ 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.

Handling Precautions for Connector Insertion

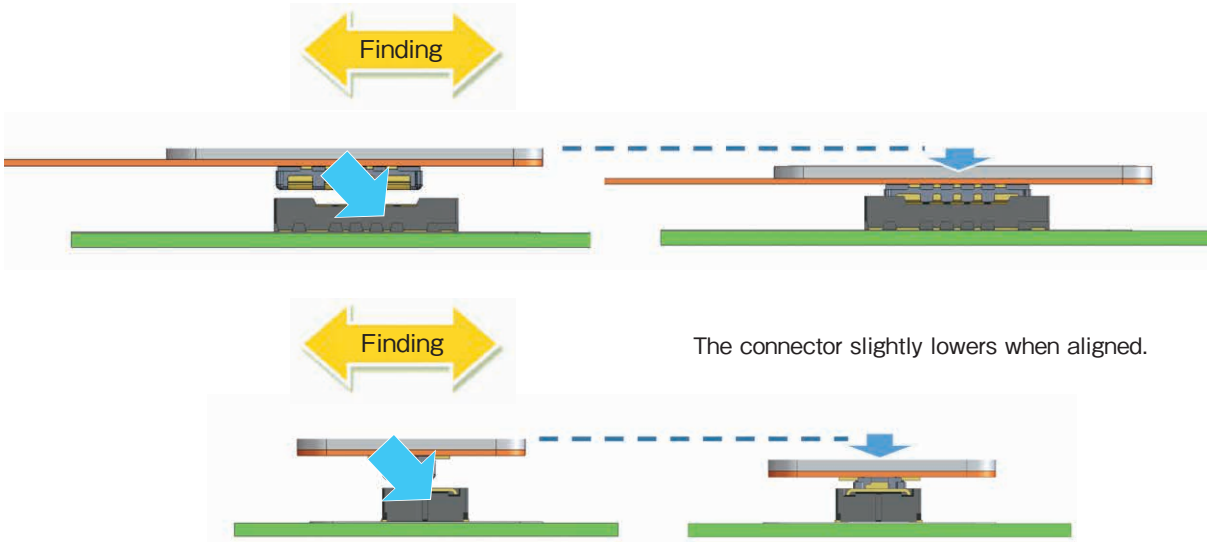
Be sure to mate this product manually.

Mating Procedure

1) Align the connector at the guide.
A guide rib (tapered metal) is provided on the outer wall of the connector for mating support.
Align the connector to this guide rib.



2) The connector enters automatically.
The connector slightly lowers when aligned correctly.
Find the guide by moving the connector in the X and Y directions.

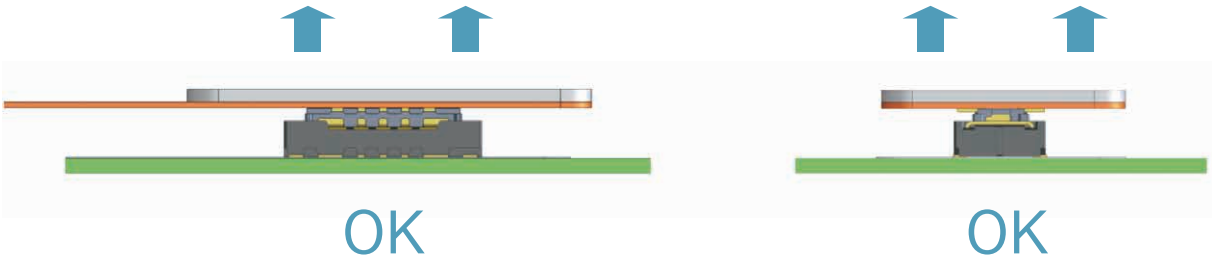


3) Once aligned, mate the connector fully.
The connector becomes parallel when aligned. You cannot move it laterally and longitudinally.

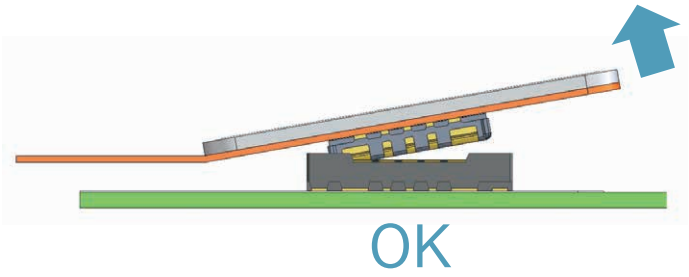
4) Confirm the mated connector.
If incorrectly mated, remove, and mate it again.

Handling Precautions for Connector Removal

1) Vertical direction
When removing the connector, remove it vertically. Number of contacts, FPC thickness, or other factors may make the vertical removal difficult.

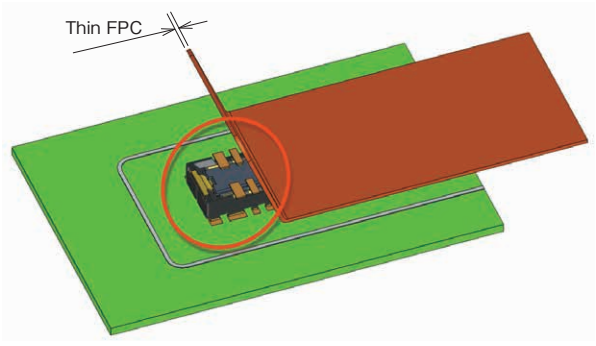


2) Longitudinal removal
Remove the connector in the pitch direction in a slanted manner.



3) Lateral removal
Pull out the tip end of the FPC in the vertical direction.
Applying a large force horizontally could deform the contacts.

4) Evaluate the mated state for thin FPCs.
Connector breakage or peeling off at soldering area could occur if the FPC does not have enough rigidity, please check the action in advance on the same type of FPC.



0.35mm Pitch, 2.0mm Depth, 0.6mm Stacking Height Multi-RF Compatible Board-to-Board Connector

BM46 Series

■Features

1. **Multi-RF capable Board-to-Board connector, World's smallest width class**
   Pitch : 0.35mm, Width : 2.0mm, Stacking height : 0.6mm
2. **Contact design ideal for both high speed digital transmission and RF signal**
3. **Superior RF Signal Transmission**
   V.S.W.R. 0-3GHz : 1.3 Max.
   3-6GHz : 1.4 Max.
   6-12GHz : 1.6 Max.
4. **Center shield prevents signal noise between opposing rows**
5. **Robust metal mating guides**

■Applications

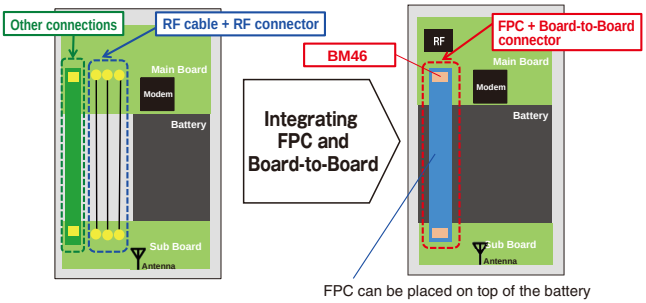
Thin devices such as cell phones, tablet PCs, routers, etc. that require space-saving components.

Conventional Internal Connection

RF connection : RF cable + RF connector
Other connections : FPC + Board-to-Board connector

New Proposed Design

Connect RF and other signals with FPC and Board-to-Board

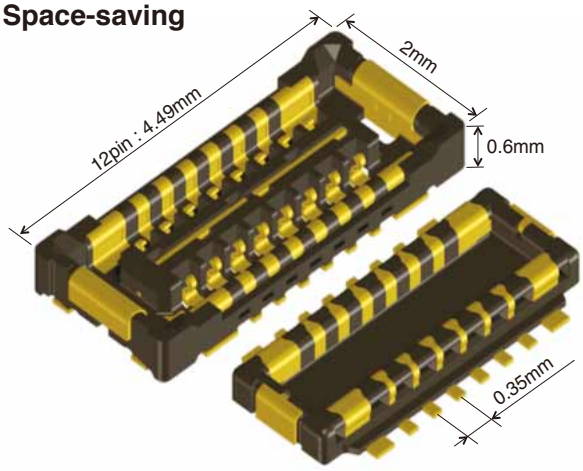


■Environmental

- **Halogen-free***

  In accordance with IEC 61249-2-21
  Br : 900ppm max, Cl : 900ppm max
  Br+Cl : 1500ppm max

Space-saving

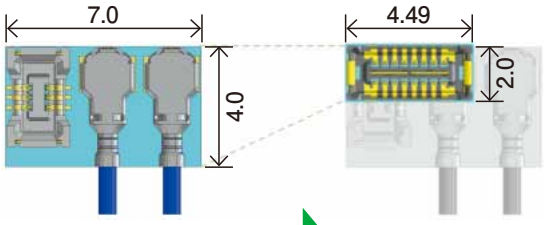


Conventional Connection

1 Board-to-Board Connector + 2 RF Connectors

BM46

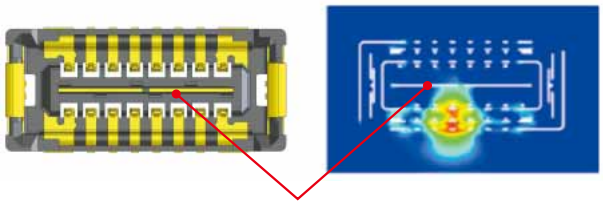
Support multiple RF and digital signals with 1 Board-to-Board connector



PCB Mounting Space **28mm²** → **68% Size Reduction** → PCB Mounting Space **8.98mm²**

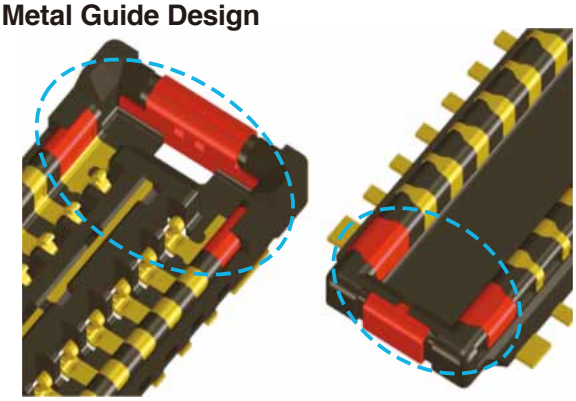
Noise Prevention Design : Center Shield

EMI Stimulation Result



Center Shield

Metal Guide Design



■Product Specifications

Rated Current : Signal Contact : 0.3A	Operating Temperature : -55 to +85℃ (Note 1)	Storage Temperature Range : -10 to +60℃
Rated Voltage 30V AC/DC	Operating Humidity Range : 90% RH Max. (Note 3)	Operating Humidity Range : 90% RH Max. (Note 2, 3)
Characteristic Impedance : 50Ω	Rated Frequency : DC to 12 GHz	

Item	Specifications	Conditions
1. Contact Resistance	Signal Contact 100mΩ Max.	Measured at 20mV AC, 1kHz, and 1mA
2. Insulation Resistance	100MΩ Min.	Measured at 100V DC
3. Withstanding Voltage	No flashover or dielectric breakdown	150V AC for 1 minute
4. Mating Durability	Signal Contact 100mΩ Max.	10 Mating Cycles
5. Vibration	No electrical discontinuity of 1μs or more.	Frequency : 10 to 55Hz ; half amplitude of 0.75mm,10 cycles in each of 3 axis directions for 5 minutes/cycle, 30 cycles total
6. Shock Resistance	No electrical discontinuity of 1μs or more.	Acceleration : 490m/s², duration : 11ms, 3-axis half sine wave in both directions, 3 cycles for each
7. Humidity	Signal Contact : 100mΩ Max. Insulation Resistance : 50MΩ Min.	Left for 96 hours at a temperature of 40 ±2℃ and a humidity range from 90 to 95%
8. Temperature Cycle	Signal Contact : 100mΩ Max. Insulation Resistance : 100MΩ Min.	-55±3℃ : 30 minutes → 85±2℃ : 30 minutes, 5 cycles
9. Solder Heat Resistance	No dissolution or melting of the resin that will affect performance.	Reflow : with recommended temperature profile ; Hand soldering at soldering iron temperature of 350℃ for 3 seconds max.
10. V.S.W.R.	1.3 Max. 1.4 Max. 1.6 Max.	0-3GHz 3-6GHz 6-12GHz

Note 1 : Includes temperature rise caused by current flow.
Note 2 : Storage refers to long-term-storage of unused items before they are mounted on the PCB.
Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.
Note 3 : Use without condensation.

■Materials/ Finish

Product	Part	Materials	Finish	UL Regulation
Header / Receptacle	Insulator	LCP	Black	UL94V-0
	Contact	Phosphor Bronze	Gold Plated	—

■Product Number Structure

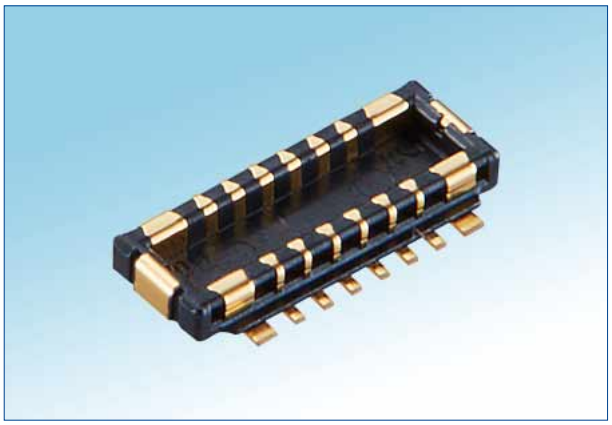
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

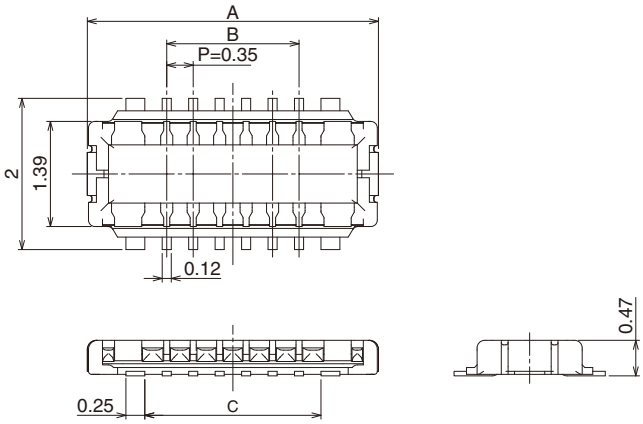
●Header / Receptacle

BM46 B - ＊ DP - 0.35 V (＊＊)
❶ ❷ ❸ ❹ ❺ ❻

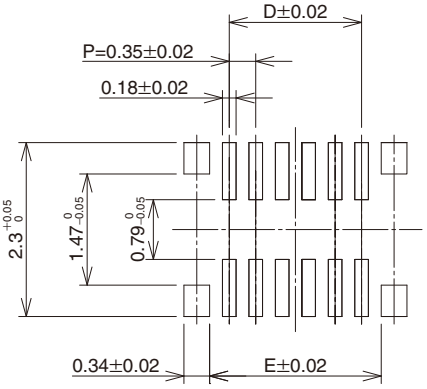
❶Series Name	: BM46
❷No. of Signal Contacts	: 12
❸Connector Type	DP : Header DS : Receptacle
❹Contact Pitch	: 0.35mm
❺Termination Type	: Straight SMT
❻Gold plating and packaging conditions (51) : Gold plating Embossed tape packaging (20,000 pcs/reel) (53) : Gold plating Embossed tape packaging (1,000 pcs/reel)	

■Header

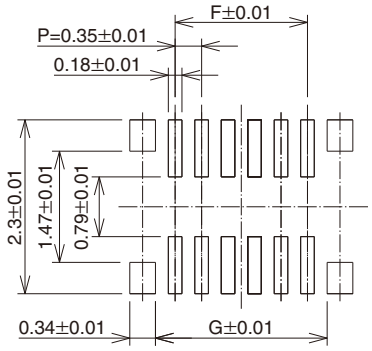




■Recommended PCB Layout



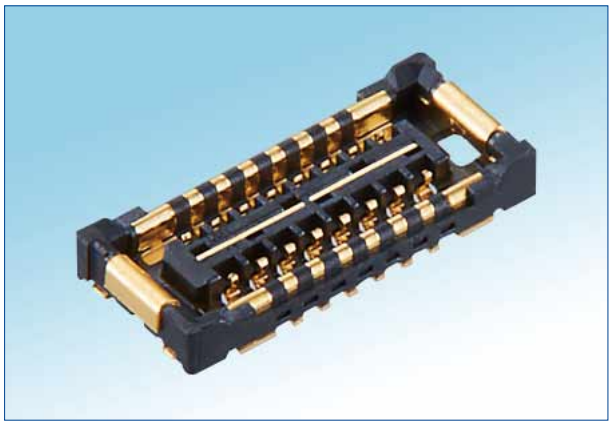
■Recommended Metal Mask Dimensions (Mask Thickness : 80μm)

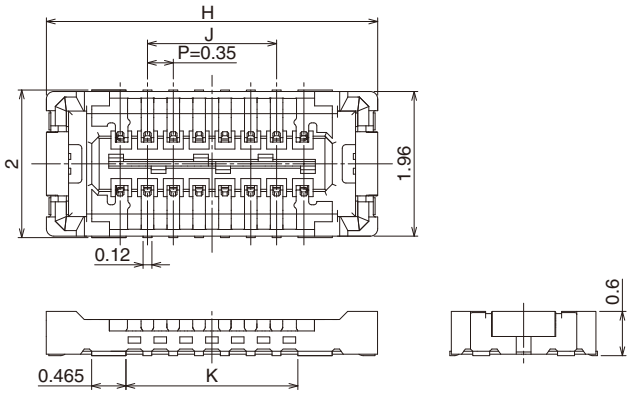


Part No.	HRS No.	No. of contacts	A	B	C	D	E	F	G
BM46B-12DP-0.35V(**)	673-7055-0 **	12	3.85	1.75	2.33	1.75	2.27	1.75	2.27

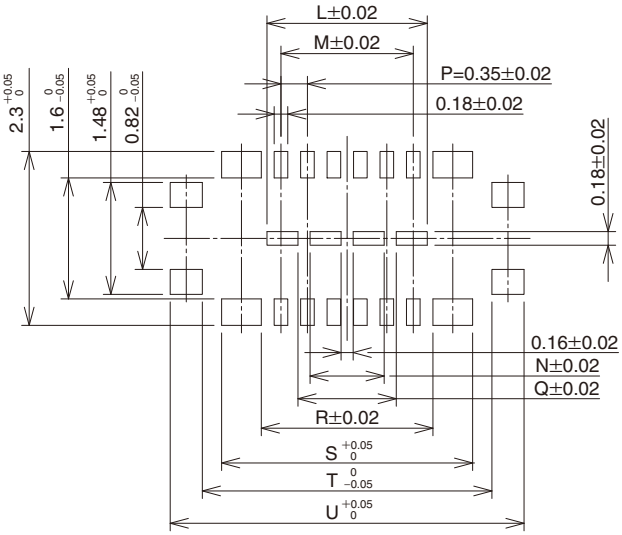
Note 1 : Please place orders in full reel quantities.
Note 2 : This connector has no polarity.

■Receptacle

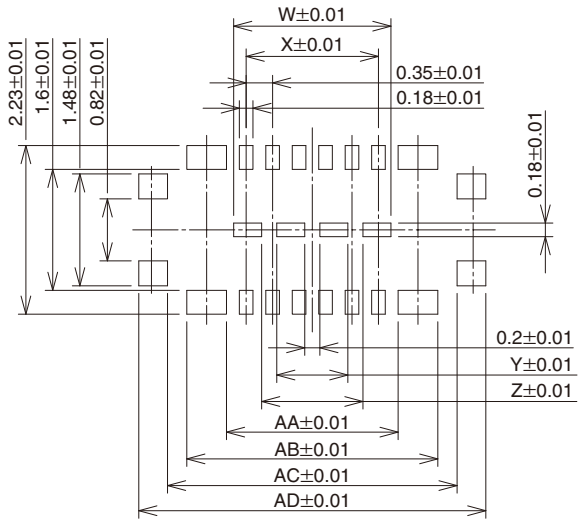




■Recommended PCB Layout



■Recommended Metal Mask Dimensions (Mask Thickness : 80µm)

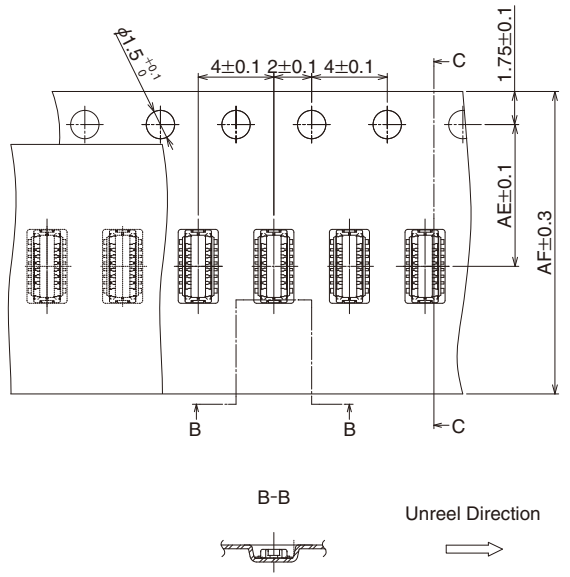


Part No.	HRS No.	No. of contacts	H	J	K	L	M	N	Q	R	S	T
BM46B-12DS-0.35V(**)	673-7054-0 **	12	4.49	1.75	2.33	2.12	1.75	0.98	1.3	2.27	3.32	3.83
			U	W	X	Y	Z	AA	AB	AC	AD	
			4.68	2.08	1.75	0.94	1.34	2.27	3.32	3.83	4.59	

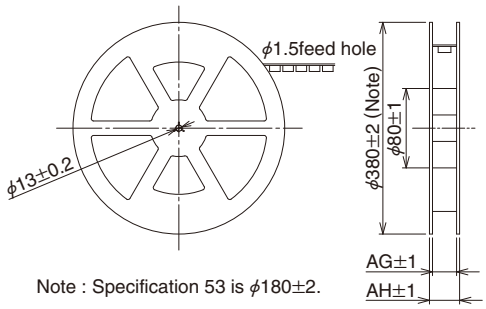
Note 1 : Please place orders in full reel quantities.
Note 2 : This connector has no polarity.

■Embossed Tape Dimensions (IEC 60286-3, JIS C 0806)

●Header



●Reel Dimensions

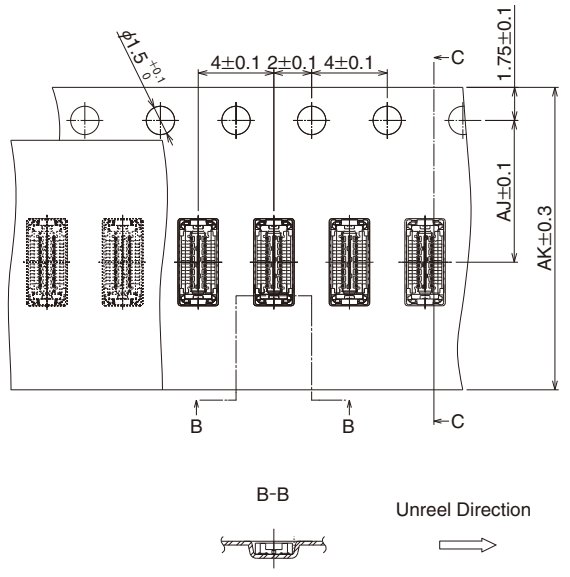


Note : Specification 53 is φ180±2.

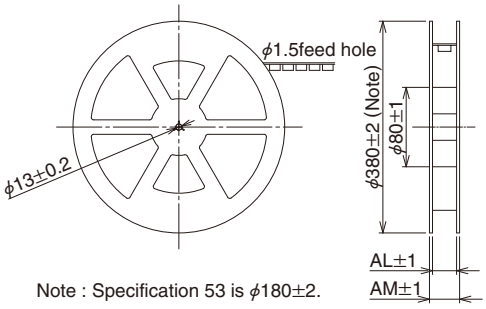
Part No.	No. of Contacts	AE	AF	AG	AH
BM46B-12DP-0.35V(**)	12	7.5	16	17.4	21.4

■Embossed Tape Dimensions (IEC 60286-3, JIS C 0806)

●Receptacle



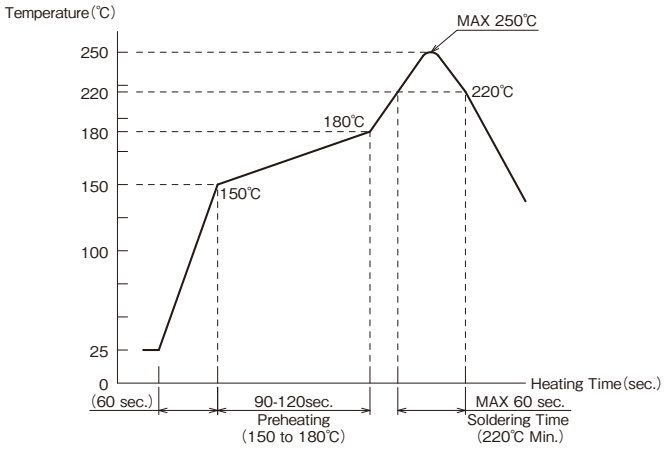
●Reel Dimensions



Note : Specification 53 is φ180±2.

Part No.	No. of Contacts	AJ	AK	AL	AM
BM46B-12DS-0.35V(**)	12	7.5	16	17.4	21.4

◆Precautions

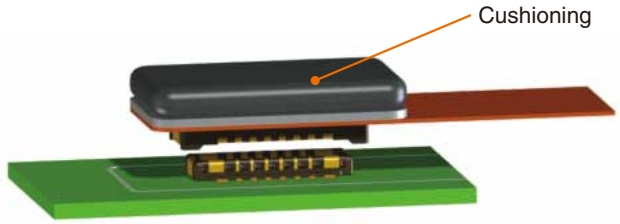
1. Recommended Solder Temperature Profile	 [Conditions] 1. Peak temperature : Maximum of 250℃ 2. Heating : 220℃ min., within 60 sec 3. Preheating : 150 to 180℃, 90 to 120 sec 4. Number of Reflow Cycles : Maximum of 2 cycles Note 1 : The temperature refers to the surface temperature of the PCB near the connector lead. Note 2 : When using nitrogen reflow, oxygen concentration must be 1000 [ppm] or more for mounting. If it is less than 1000 [ppm], please contact a Hirose representative.
2. Recommended Manual Soldering Conditions	Soldering iron temperature : 340 ± 10°C ; Soldering time : within 3 seconds
3. Recommended Stencil Thickness and Open Area to PCB Pattern Area Ratio	Thickness : 0.08mm Aperture Ratio : Receptacle Side : 100%, Header Side:100%
4. Board Warpage	A maximum of 0.02mm at the center of the connector relative to each end of the connector.
5. Cleaning Conditions	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)
6. Precautions	■Care should be taken 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 prying 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. ■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. ■Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if connector usage in conditions other than those described in the specifications and the guidelines is being considered.

●Connector Handling Precautions

Disengagement Prevention

Please use cushioning

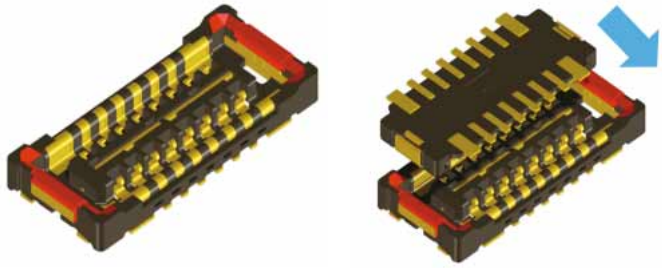
The connector may come off due to impact such as dropping.
Cushioning should be large enough to cover the entire connector.



Mating Method

1) Locate the guide port and align.

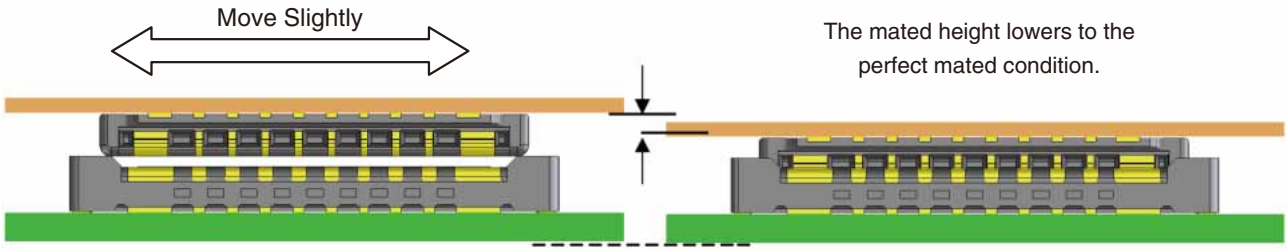
This product has a guide rib on the receptacle side to ensure proper engagement.
Align the connector based on the guide rib.



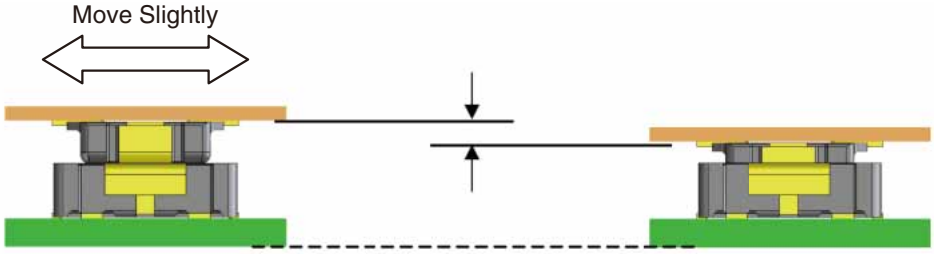
2)Once aligned, the connector engages.

You can feel the mated height of the connector lower.

Move the connector forward and backward,
left and right to find the guide port.



3)In the engaged state, the connectors are parallel to each other, and the connectors cannot move forward, backward, left, or right. Complete mating from this state.

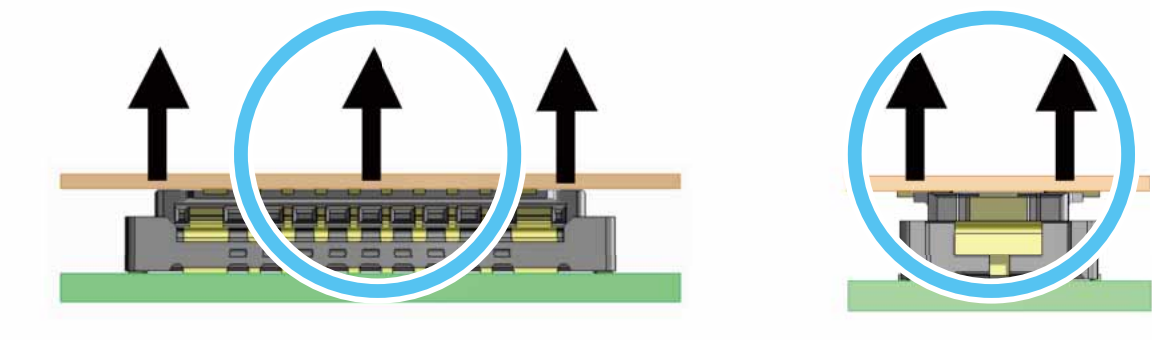


4) Check that mating is completed.

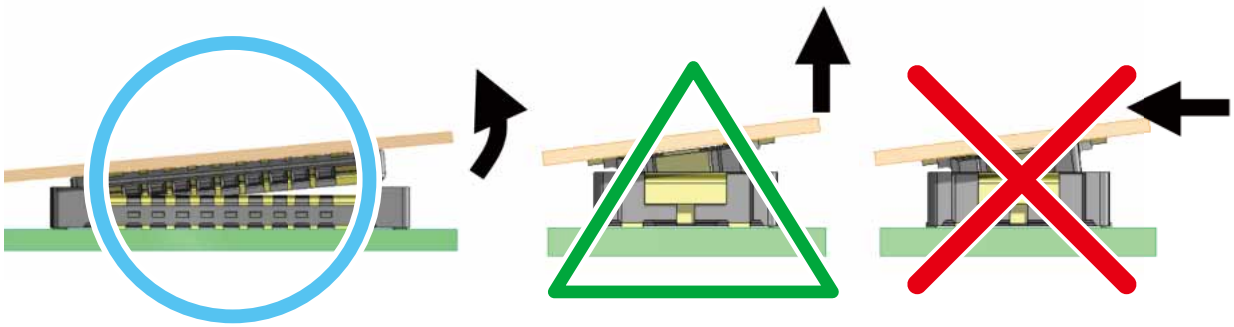
If one side is floating, or if it is mated diagonally, remove and re-mate.

●Handling Precautions for Connector Removal

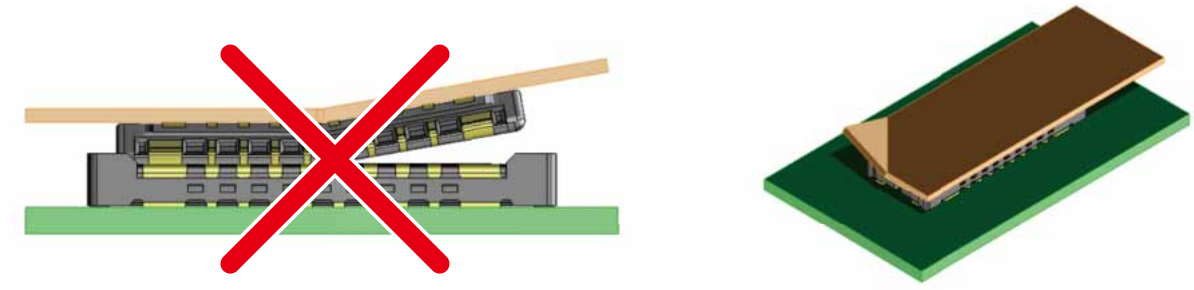
1) When removing the connector, it is preferable to pull it out in the upward direction from the connector mounting surface.
However when removing the FPC from the circuit board it becomes more difficult to remove it vertically with higher pin counts and thin FPCs.



2) If difficult to remove, extract the connector diagonally in the direction of the pitch.
Note that removal from the widthwise side will apply a large load to the contacts. When removing from the width direction, pull the end of the FPC in the upward direction.
(When a force is applied in the horizontal direction, a large load is applied to the contact.)



3) If the FPC does not have sufficient rigidity, solder stripping or connector breakage may occur. Please use it after checking the repetitive operation with the flexible board you during a trial manufacture run. Refrain from holding the corner of the flexible board and removing it diagonally as it will result in a large load to the contacts.



PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

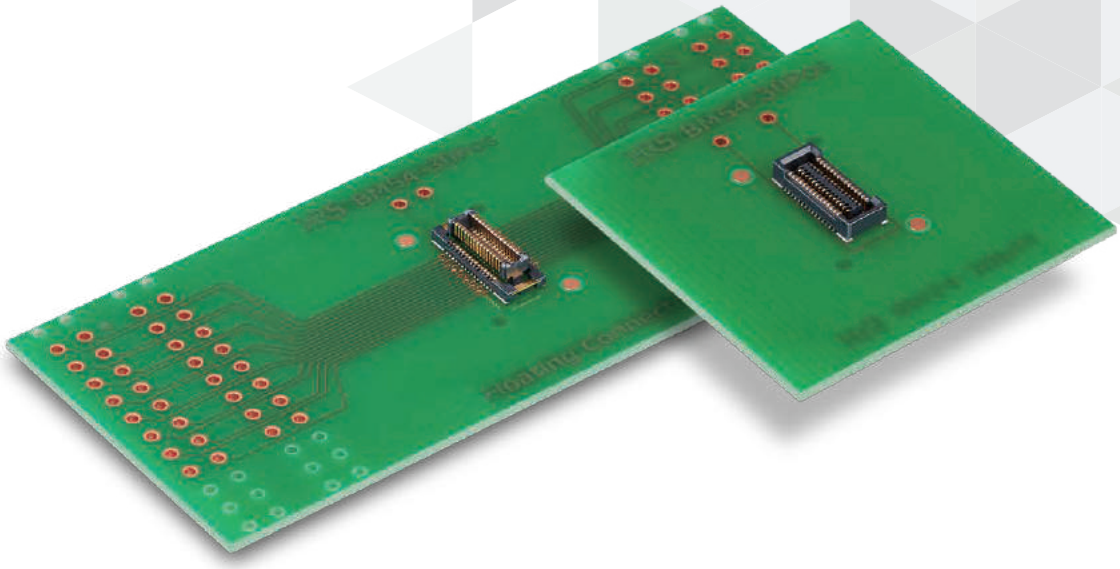
BM54 Series

Small Floating Board-to-Board Connector, 125°C Heat Resistance, For Automotive Applications

Compact

Floating

125℃ High Temp



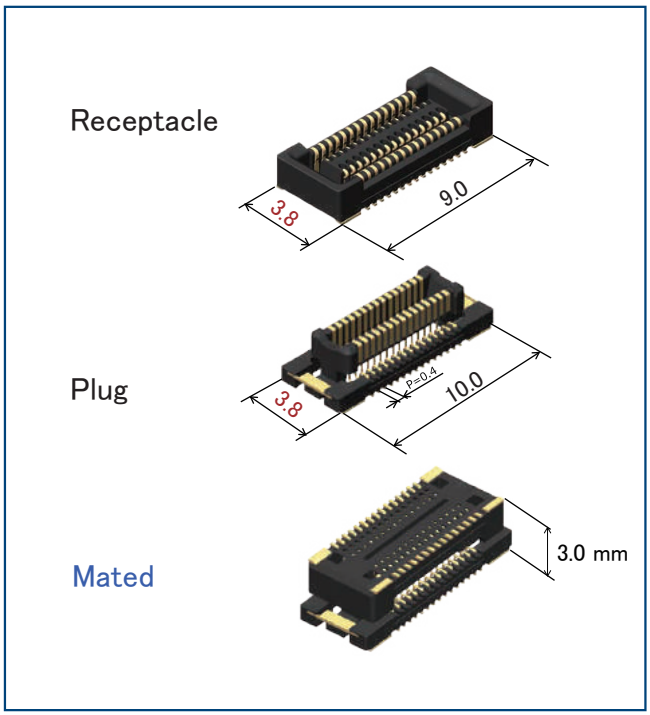
NEW

Oct.2023

Features

1. Stacking Height 3.0 to 4.5mm, Floating Range ±0.4mm, World's Smallest Width Class in Floating Board-to-Board Connectors

0.4mm Pitch, 3.8mm Width,
it contributes to making board design space-saving. Significantly reduces the area occupied on mounting part.



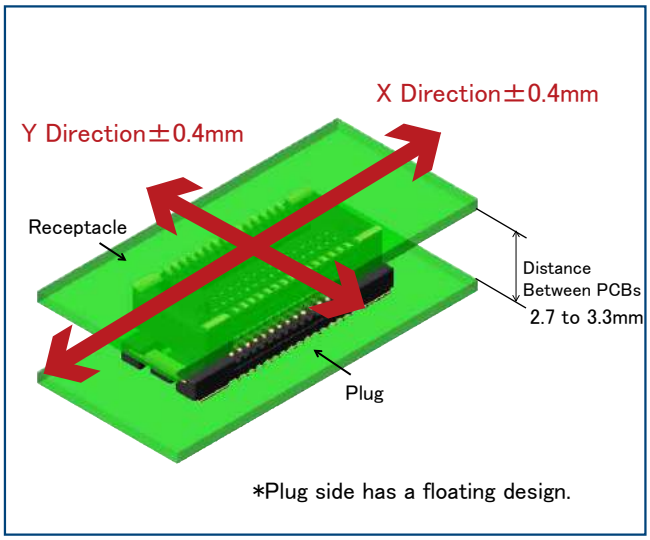
e.g. Stacking Height : 3.0mm, 30pos.

2. Absorption of Misalignment

X and Y Directions :
Floating Range ±0.4mm

Z Direction :
Effective Mating Length
±0.3mm (3.0mm Stacking Height)
±0.4mm (3.5, 4.0, 4.5mm Stacking Height)

The board mounting misalignment can be absorbed by the connector.

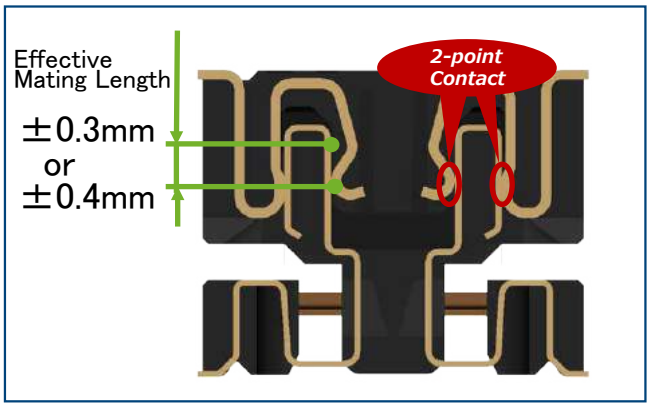


e.g. Stacking Height : 3.0mm

3. 125°C Heat Resistance for Automotive Specifications

4. High Contact Reliability with Two-Point Contact

Industry's First Two-Point Contact Design of Low-Profile Floating Board to Board Connector



5. Supports PCI-ex Gen4 (16Gbps) and MIPI D-PHY Ver.2.1

PCI-ex Gen4 (16Gbps)
-Pin Assign : GGGSSGSSGGG
-Reference Impedance : 85Ω

MIPI D-PHY Ver.2.1 (4.5Gbps)
-Pin Assign : GGSGSGSGSGG
-Reference Impedance : 100Ω

Applications

It can be used for in-vehicle applications for front cameras, Rear/Side Cameras, Millimeter-Wave Radar, LiDAR and other devices that require misalignment absorption of the substrate by small size floating.
It can also be used in devices that require absorption of the substrate misalignment for consumer and industrial equipment.

Product Specifications

Rated Current	0.3A	Operating Temperature (Note 1)(Note 2)	-55 to +125℃
Rated Voltage	50V AC/DC	Storage Temperature (Note 3)	-10 to +60℃

Item	Standards	Condition
Contact Resistance	Initial : 80mΩ Max. After the Test : 100mΩ Max.	Measured at 20mV AC, 1kHz, 1mA
Insulation Resistance	100MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or dielectric breakdown	100V AC rms for 1 min.
Mating Durability	Contact Resistance : 100 mΩ Max. No damage, cracks, or parts dislocation	10 times
Vibration Resistance	No electrical discontinuity of 1 μs or more	Frequency 10 to 500Hz, Acceleration 49m/s^2 Swept speed 1oct/min 8 hours each of 3-axis direction
Heat Resistance	Contact Resistance : 100 mΩ Max. Insulation Resistance : 100MΩ Min.	Left for 1000 hours at temperature 125± 2℃
Humidity Resistance	Contact Resistance : 100 mΩ Max. Insulation Resistance : 50MΩ Min.	Temperature -10→ +65℃ , RH In 90 to 96% Left for 10 cycles (240 hours)
Temperature Cycle	Contact Resistance : 100 mΩ Max. Insulation Resistance : 100MΩ Min.	Temperature -55℃ : 30 min. → +125℃ : 30 min., 1000 cycles (Tank transfer time : 2 to 3 min.)
Solder Heat Resistance	No deformation in appearance or significant damage to contacts	Reflow : See recommended temperature profile Manual soldering : 350℃ within 3 seconds

Note 1 : Includes the temperature rise due to current flow.
Note 2 : Use without condensation.
Note 3 : Storage refers to long-term storage of unused items before they are mounted on the PCB.
Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.

Materials/Finish

Component	Material	Color/Finish	Remarks
Insulator	LCP	Black	-
Contact	Copper Alloy	Gold Plating (nickle underplating)	-
Retention Tab	Copper Alloy	Gold Plating (nickle underplating)	-

Product Number Structure

Please utilize the below part number chart when selecting.

■ 3.0mm Stacking Height

●Plug

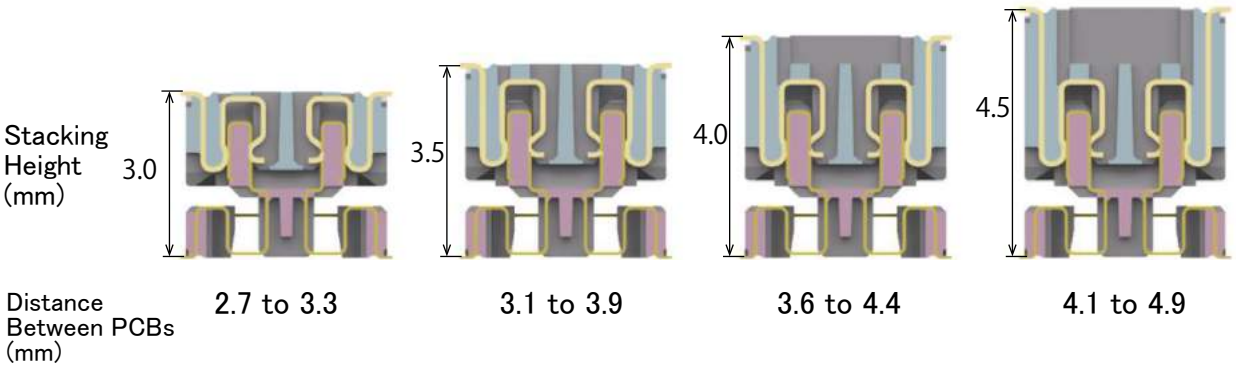
BM54 F 3.0 - ## DP - 0.4 V (##)
❶ ❷ ❸ ❹ ❺ ❻ ❼

●Receptacle

BM54 B 3.0 - ## DS - 0.4 V (##)
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series Name	BM54	❺ Contact Pitch	0.4mm
❷ Stacking Height	3.0 mm	❻ Contact Type	V : Straight SMT
❸ No. of Pos.	20, 30, 40	❼ Packaging Type	(51) : Embossed Packaging BM54F 3,000pcs/Reel BM54B 4,000pcs/Reel (53) : Embossed Packaging 500pcs/Reel (For trial production)
❹ Connector Type	DP : Double Row Plug DS : Double Row Receptacle		

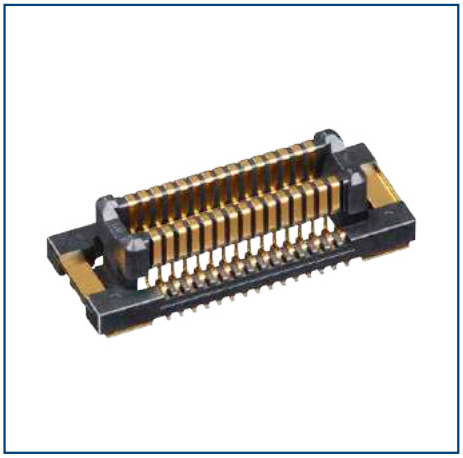
Combinations

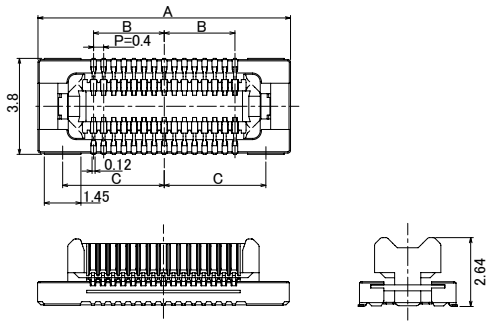


Unit : mm

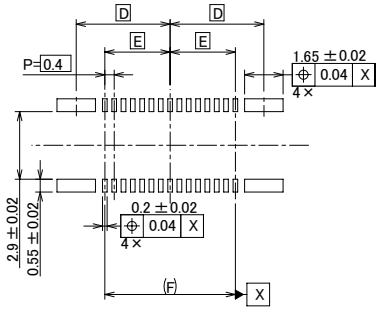
Receptacle / Plug	BM54F3.0-##DP-0.4V	BM54MF-##DP-0.4V
BM54B3.0-##DS-0.4V	3.0	-
BM54MB3.5-##DS-0.4V	-	3.5
BM54MB4.0-##DS-0.4V	-	4.0
BM54MB4.5-##DS-0.4V	-	4.5

BM54 Plug (3.0mm Stacking Height)





●Recommended PCB Layout

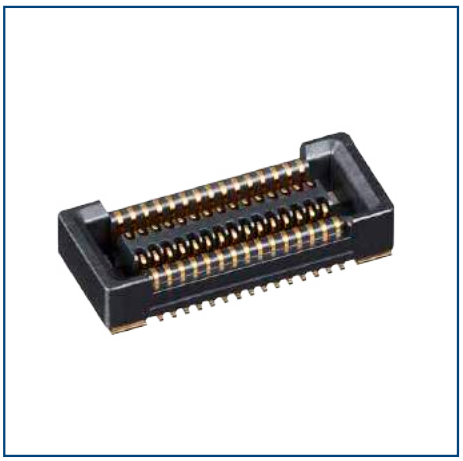


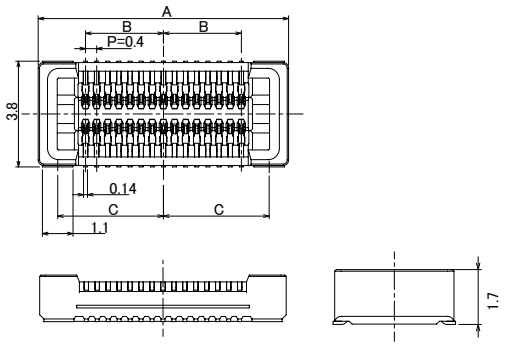
Unit : mm

Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM54F3.0-20DP-0.4V(##)	Under Planning (Note1)	20	8.0	1.8	3.025	3.025	1.8	3.6	3,000pcs per reel	500pcs per reel
BM54F3.0-30DP-0.4V(##)	CL0684-4603-0-##	30	10.0	2.8	4.025	4.025	2.8	5.6		
BM54F3.0-40DP-0.4V(##)	Under Planning (Note1)	40	12.0	3.8	5.025	5.025	3.8	7.6		

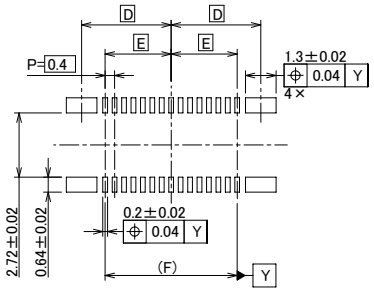
Note 1 : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.
Note 2 : This connector has no polarity.

BM54 Receptacle (3.0mm Stacking Height)





●Recommended PCB Layout



Unit : mm

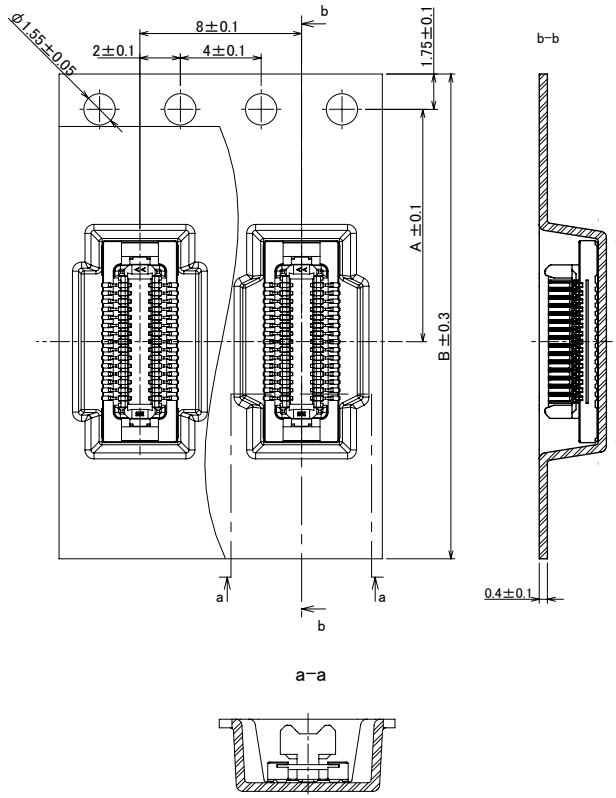
Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM54B3.0-20DS-0.4V(##)	Under Planning (Note1)	20	7.0	1.8	2.8	2.8	1.8	3.6	4,000pcs per reel	500pcs per reel
BM54B3.0-30DS-0.4V(##)	CL0684-4602-0-##	30	9.0	2.8	3.8	3.8	2.8	5.6		
BM54B3.0-40DS-0.4V(##)	Under Planning (Note1)	40	11.0	3.8	4.8	4.8	3.8	7.6		

Note 1 : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.
Note 2 : This connector has no polarity.

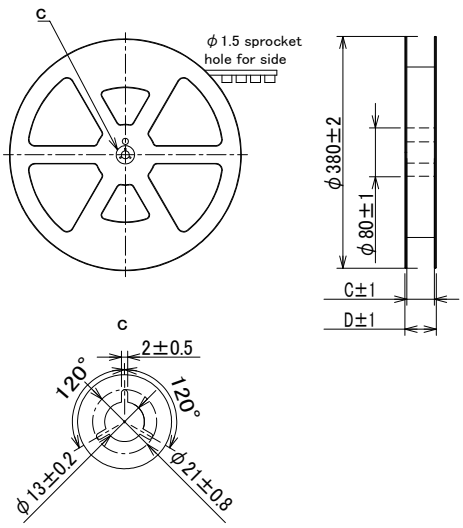
Packaging Specifications Diagram (JIS C 0806, IEC 60286-3 Compliant)

■BM54 Plug (3.0mm Stacking Height)

●Embossed Tape Dimensions



●Reel Dimensions



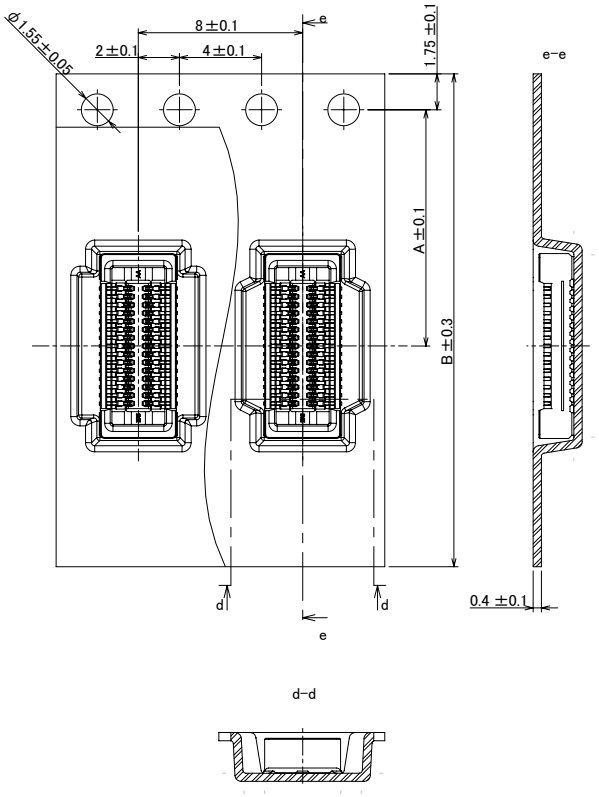
Unit : mm

Part No.	HRS No.	A	B	C	D	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM54F3.0-20DP-0.4V(##)	Under Planning (Note)	11.5	24.0	25.4	31.4	3,000pcs per reel	500pcs per reel
BM54F3.0-30DP-0.4V(##)	CL0684-4603-0-##						
BM54F3.0-40DP-0.4V(##)	Under Planning (Note)						

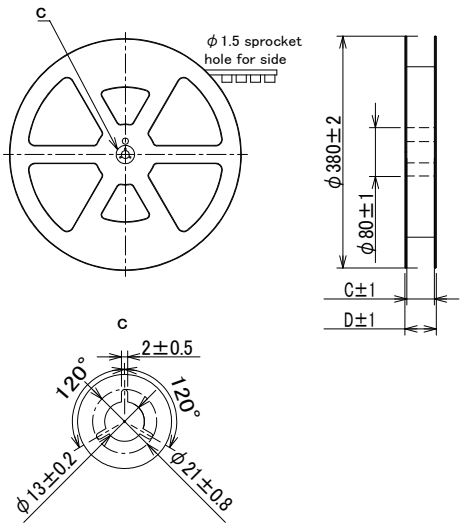
Note : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.

■BM54 Receptacle (3.0mm Stacking Height)

●Embossed Tape Dimensions



●Reel Dimensions

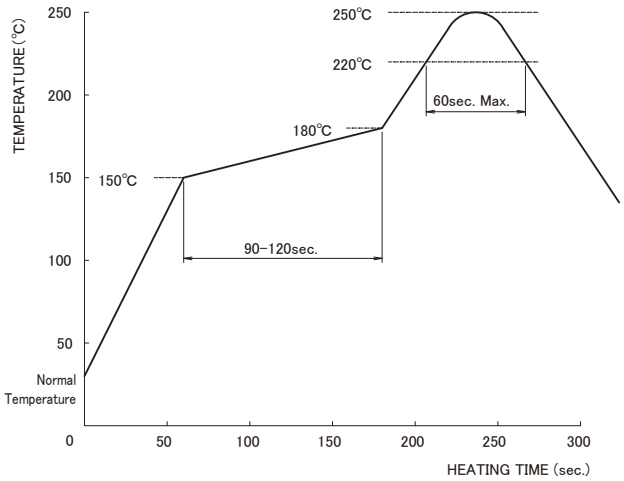


Unit : mm

Part No.	HRS No.	A	B	C	D	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM54B3.0-20DS-0.4V(##)	Under Planning (Note)	11.5	24.0	25.4	31.4	4,000pcs per reel	500pcs per reel
BM54B3.0-30DS-0.4V(##)	CL0684-4602-0-##						
BM54B3.0-40DS-0.4V(##)	Under Planning (Note)						

Note : Contact positions without HRS No. are currently under planning.
Please contact a Hirose representative regarding questions on pin count variation development.

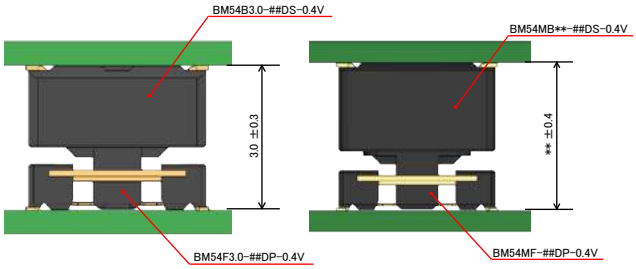
Precautions

Recommended Temperature Profile	 【Conditions】 1. Peak Temperature : 250℃ 2. Heating : 220℃ Min. for 60 sec. Max. 3. Preheating : 150 to 180℃, 90 to 120 sec. 4. Number of Reflow Cycles : 2 cycles Max. ＊Temperature refers to the surface temperature of the board near the connector lead. We recommend reflow mounting in a nitrogen environment.
Recommended Manual Soldering Conditions	Soldering iron temperature : 340 ± 10℃ , Soldering Time : Within 3 sec.
Recommended Metal Mask Thickness and Open Area to PCB Pattern (Area Ratio)	Thickness : 0.1mm, Aperture Ratio : DS 80% DP 90%
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 prying 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. ・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. ・Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if connector usage in conditions other than those described in the specifications and the guidelines is being considered.

Precautions for Handling During Use

●About Setting The Distance Between PCBs

Use within the specified dimensions between PCBs below.

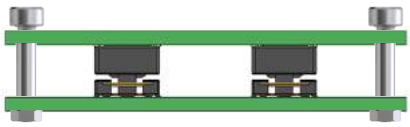


Stacking Height	Specified Dimensions Between PCBs	Plug	Receptacle
3.0mm	2.7 to 3.3mm	BM54F3.0-##DP-0.4V	BM54B3.0-##DS-0.4V
3.5mm	3.1 to 3.9mm	BM54MF-##DP-0.4V	BM54MB3.5-##DS-0.4V
4.0mm	3.6 to 4.4mm		BM54MB4.0-##DS-0.4V
4.5mm	4.1 to 4.9mm		BM54MB4.5-##DS-0.4V

●Securing PCBs

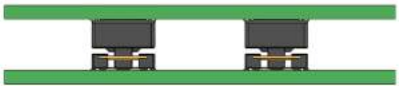
This connector can absorb misalignment between PCBs, but not vibration.
If you support PCBs only with the connectors without taking any fixing measures, the load on the connectors will be excessive and may cause broken or contact failure.
Be sure to secure PCBs except for the connectors as shown below to prevent the board from moving.
This connector connects the board to the board.
When using mounting to FPC, fasten the board and FPC to the case separately.

Fixing PCBs with a Spacer or Case



OK

Do not use the product without fixing PCBs together.

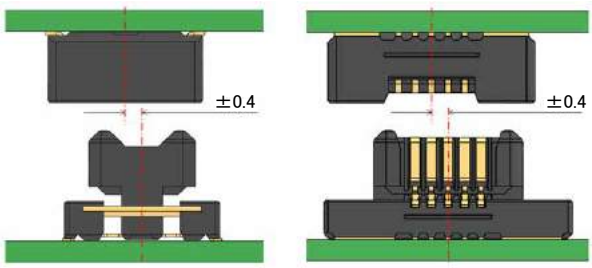


×

●Mating Precautions

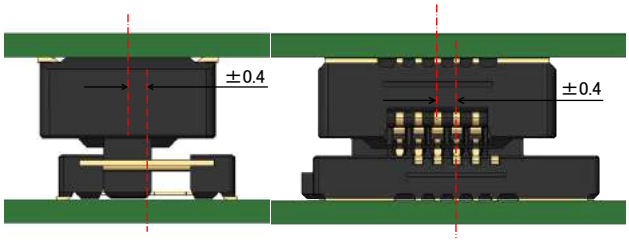
1. Mating

The alignment dimension is ±0.4 mm in the X and Y directions.
After the start of mating, follow the alignment and mate perpendicularly to the board without applying an overloading to the connector.



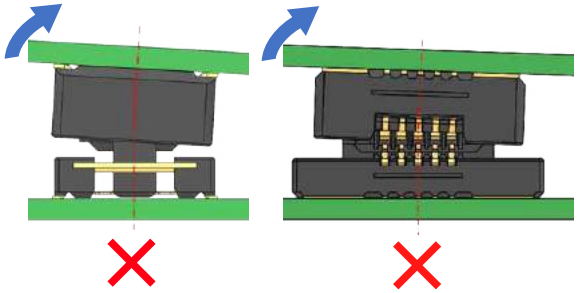
2. Misalignment Allowance in Mated Condition (Floating Range)

Because of floating design, this connector has a ±0.4mm board misalignment tolerance in the X and Y directions when mated. However, it is not suitable for absorption when the range of misalignment constantly changes due to vibration, etc. The number of repetitions of floating movable operations is stipulated to be no more than 10 times.



3. Removing

When removing the connector, pull it out in parallel.
If it is removed in an inclined position, connector may deform.



PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

BM55 Series

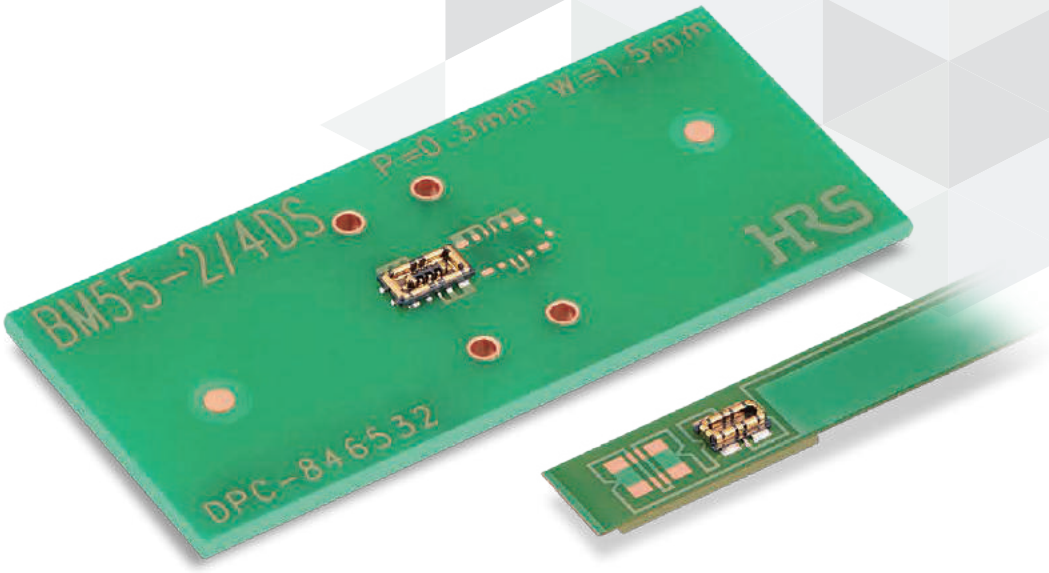
0.3mm Pitch, 0.5mm Stacking Height, Ultra Compact Hybrid FPC-to-Board Connector Supporting 5A

This product was selected as a **CES Innovation Awards Honoree**

P= 0.3 mm
P= 0.3mm

Full
Full Armored

High-Current



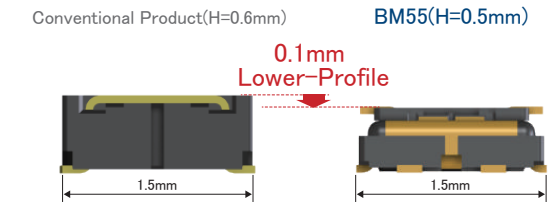
NEW

Features

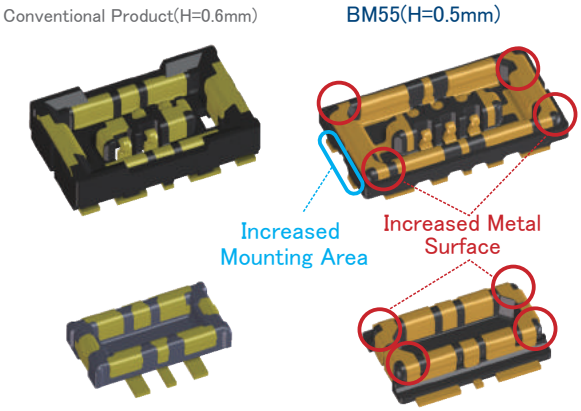
1. Low-profile, Space-saving and High-strength Design

While height decreases from 0.6mm to 0.5mm, the strength increases by increasing the metal surface and mounting area on the mating surface side compared to Ultra small conventional product.

A lower-profile design with H=0.5mm than the conventional product.



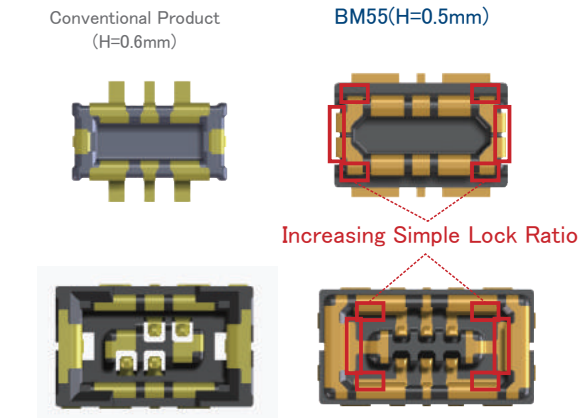
High-strength design by increasing mounting area and metal surface.



2. Small, High Extraction Force and Clear Tactile Click

Small and high extraction force by increasing metal surface in spite of decreasing the height.

Hight extraction force and clear tactile click by increasing simple lock area.

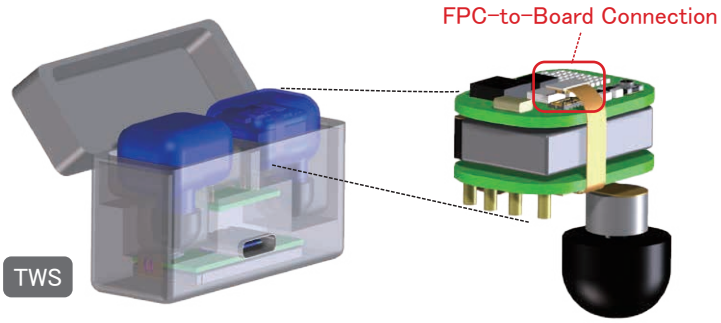


3. Halogen-free

No chlorine or bromine exceeding the standard value is used in the connector.
*In accordance with IEC 61249-2-21
Br : 900ppm max., Cl : 900ppm max., Br+Cl : 1500ppm max.

Applications

Devices that require low-profile, compact design such as wearable terminals (Smartphones, Smartwatches, TWS).



Used for the internal connection of small mobile devices such as TWS, Smartwatches and Smartphones.

Product Specifications

Rated Current	Power Contact : 5A Signal Contact : 0.3A	Operating Temperature (Note 1)	-55 to + 85℃
Rated Voltage	30V AC/DC	Operating Humidity Range (Note 2)	90%RH Max.
		Storage Temperature (Note 3)	-10 to + 60℃
		Storage Humidity Range (Note 2)(Note 3)	90%RH Max.

Item	Specifications	Conditions
Contact Resistance	Signal Contact : 50m Ω Max. Power Contact : 30m Ω Max.	Measured at 20mV AC, 1kHz, 1mA
Insulation Resistance	50M Ω Min.	Measured at 100V DC
Withstand Voltage	No Flashover or Breakdown	150V AC for 1 min.
Mating Durability	Contact Resistance : Signal Contact 50m Ω Max. Power Contact 30m Ω Max.	10 times
Vibration Resistance	No electrical discontinuity for more than 1 μs.	Frequency 10 to 55Hz single amplitude of 0.75mm 10 cycles in each of 3 axis directions for 5 minutes/ cycle
Moisture Resistance	Contact Resistance : Signal Contact 50m Ω Max. Power Contact 30m Ω Max. Insulation Resistance : 25M Ω Min.	96 hours at temperature of 40 ± 2℃ and humidity range from 90 to 95%RH
Temperature Cycles	Contact Resistance : Signal Contact 50m Ω Max. Power Contact 30m Ω Max. Insulation Resistance : 50M Ω Min.	-55℃ for 30min. → +85℃ for 30 min. for 5 Cycles (Tank transfer time: within 2 to 3 min.)
Solder Heat Resistance	No dissolution or resin melting that will affect performance.	Reflow : At recommended temperature profile Hand Soldering : 350℃ within 3 sec.

Note 1 : Includes the temperature rise due to current flow.
Note 2 : Use without condensation.
Note 3 : Storage refers to long-term storage of unused items before they are mounted on the PCB. Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.
Note 4 : 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 / Finish

Product	Component	Material	Finish
Header Receptacle	Housing	LCP	Black
	Signal Contact	Copper Alloy	Gold Plated
	Power Contact	Copper Alloy	Gold Plated

Product Number Structure

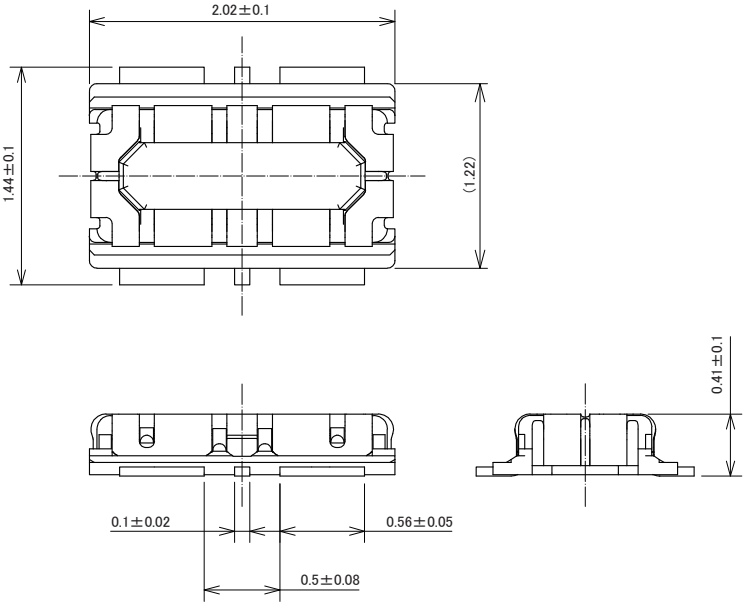
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

●Header/Receptacle

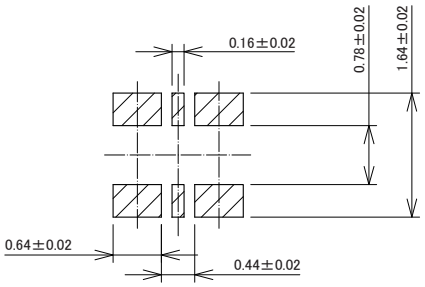
BM55 R 0.5 - 2 DS / 2 - 0.3 V (51)
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Series Name	BM55	❻ No. of Power Contacts	2pos.
❷ Series No.	R	❼ Contact Pitch	0.3mm
❸ Stacking Height	0.5 : 0.5mm	❽ Terminal Design	V : Straight SMT
❹ Number of Signal Contacts	2	❾ Plating Specifications and Packaging	(51) : Gold Plate Thickness 0.05 μm Embossed Tape Packaging (30,000pcs per reel)
❺ Connector Type	DP : Header DS : Receptacle		

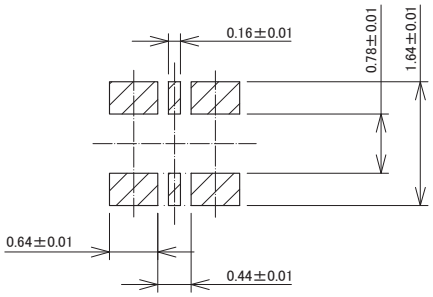
Header



●Recommended PCB Layout



●Recommended Metal Mask Dimensions (Mask Thickness : 0.08mm)

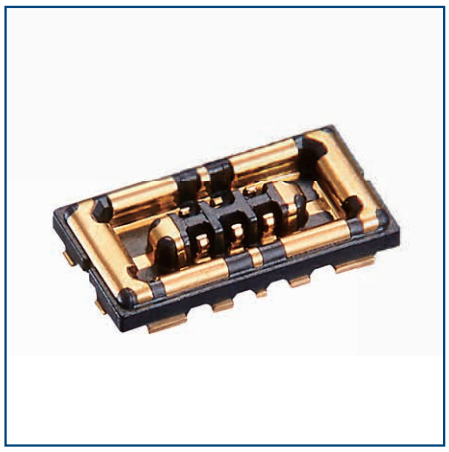


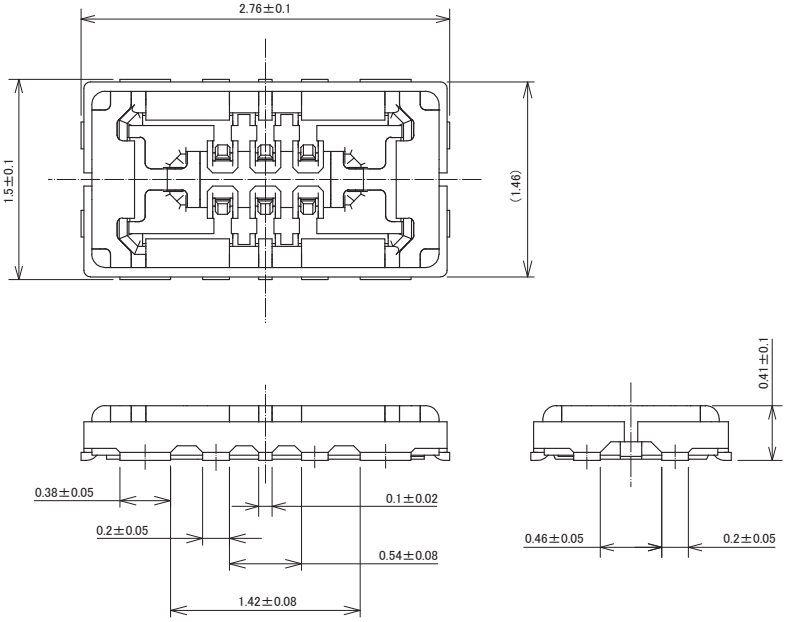
Unit : mm

Part No.	HRS No.	No. of Pos.	Purchase Unit
BM55R0.5-2DP/2-0.3V(##)	CL0673-7801-0-##	Signal Contact 2 Power Contact 2	30,000pcs per reel

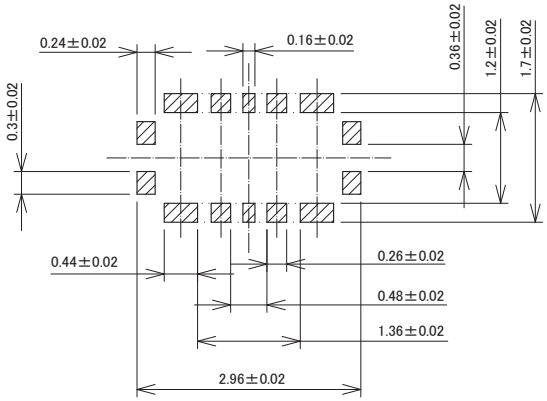
Note 1 : Please order embossed tape packaged items by the reel.
Note 2 : This connector has no polarity.

Receptacle

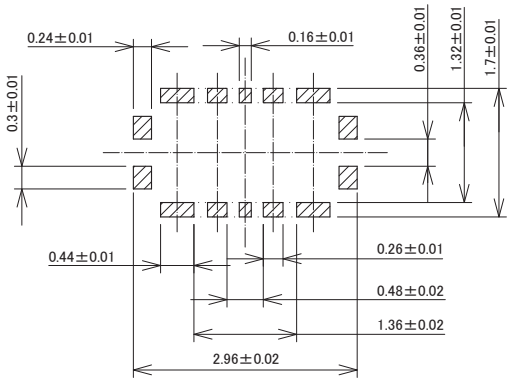




●Recommended PCB Layout



●Recommended Metal Mask Dimensions (Mask Thickness : 0.08mm)



Unit : mm

Part No.	HRS No.	No. of Pos.	Purchase Unit
BM55R0.5-2DS/2-0.3V(##)	CL0673-7800-0-##	Signal Contact 2 Power Contact 2	30,000pcs per reel

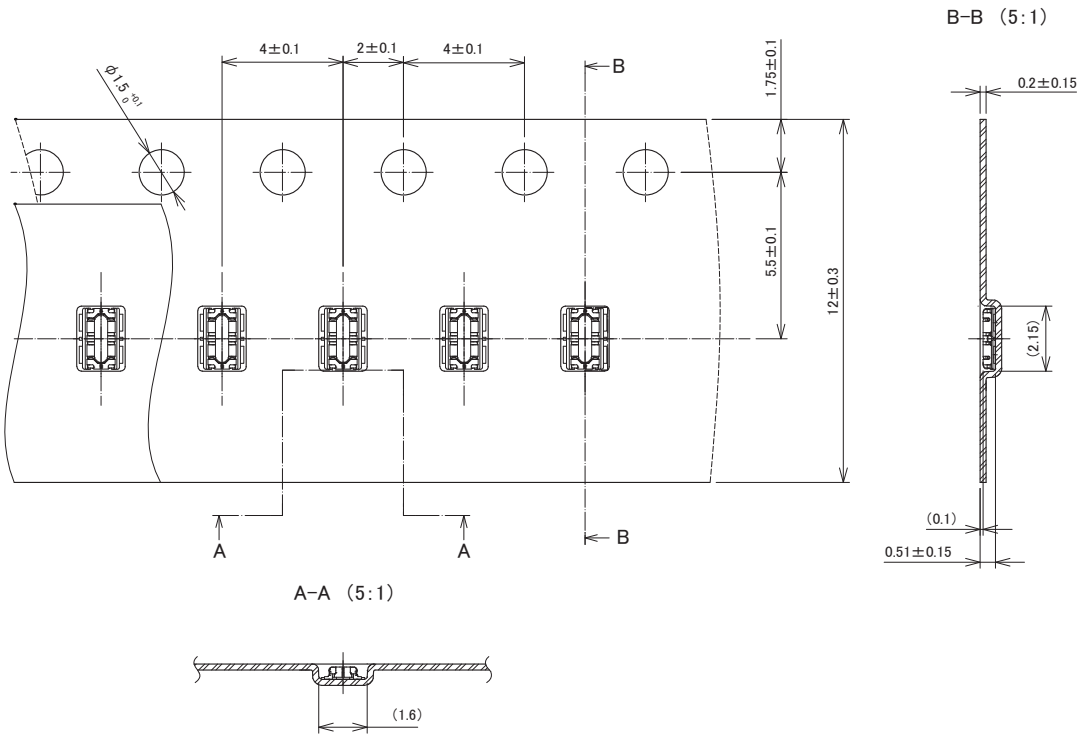
Note 1 : Please order embossed tape packaged items by the reel.
Note 2 : This connector has no polarity.

Packaging Specification

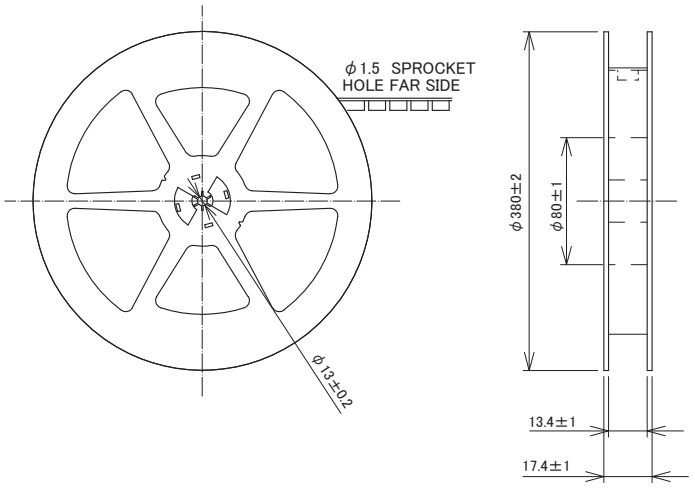
IEC 60286-3, JIS C 0806 Compliant

Header

●Embossed Tape Dimensions

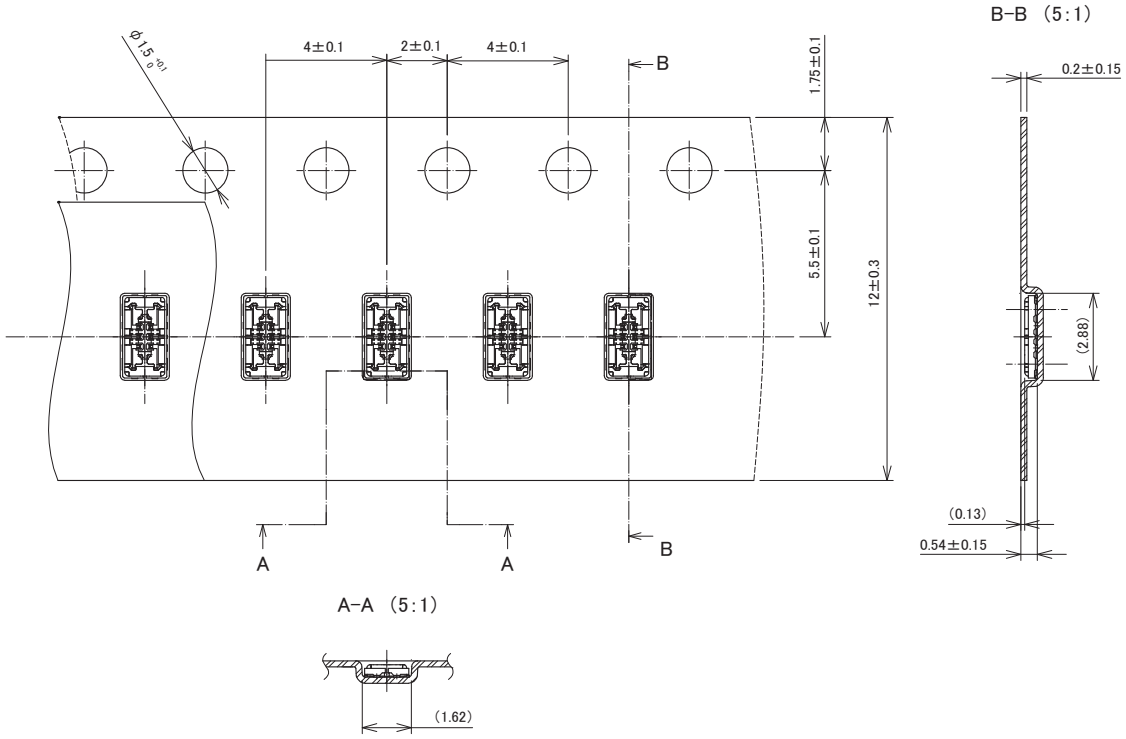


●Reel Dimensions

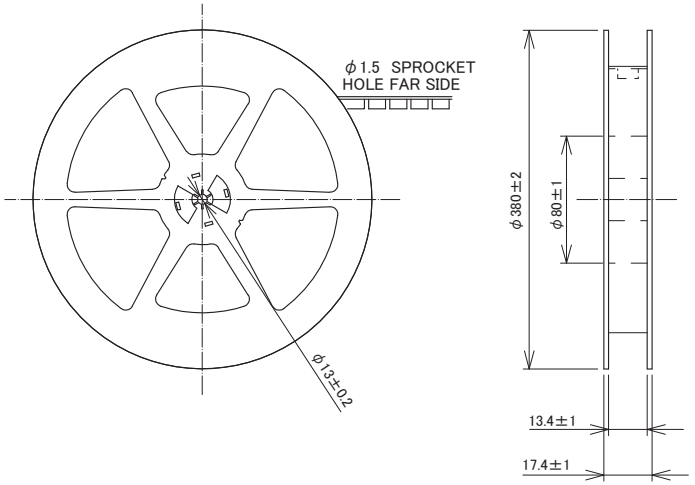


Receptacle

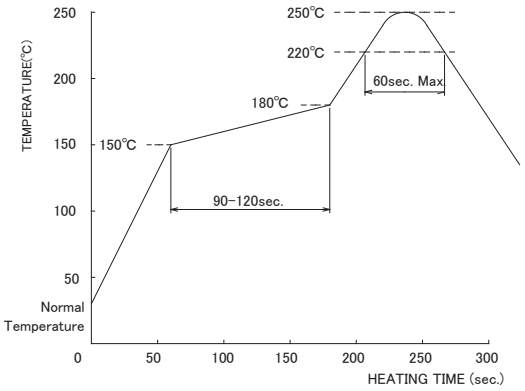
●Embossed Tape Dimensions



●Reel Dimensions



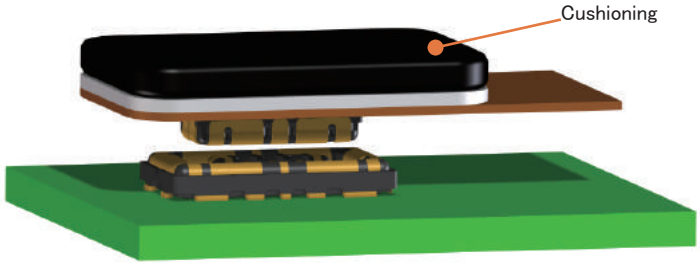
Precautions

Recommended Temperature Profile	 【Conditions】 1. Peak Temperature : 250℃ 2. Heating : 220℃ Min. for 60sec. Max. 3. Preheating : 150 to 180℃, 90 to 120sec. 4. Number of Reflow Cycles : 2 cycles Max. (Note 1) Temperature referes to the surface temperature of the board near the connector lead.
Recommended Manual Soldering Conditions	Soldering iron temperature : 340 ± 10℃ , Soldering Time : Within 3sec.
Recommended Metal Mask Thickness and Open Area to PCB Pattern (Area Ratio)	Thickness : 0.08mm Aperture Ratio : Header Side 100%, Receptacle Side Signal/Power Part 80%, Longitudinal PCB Side 100%
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 prying 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. · 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. · Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if connector usage in conditions other than those described in the specifications and the guidelines is being considered.

Connector Handling Precautions

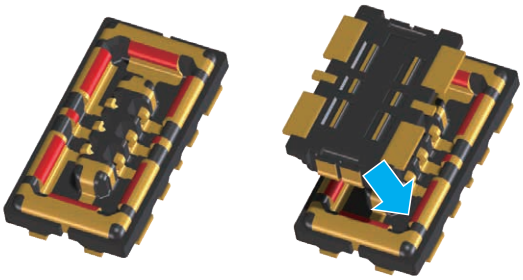
【Handling Warning When Mating the Connector】

Mating Disengagement Prevention
Please use cushioning.
The connector may come off due to impact such as dropping.
Cushioning should be large enough to cover the entire connector.

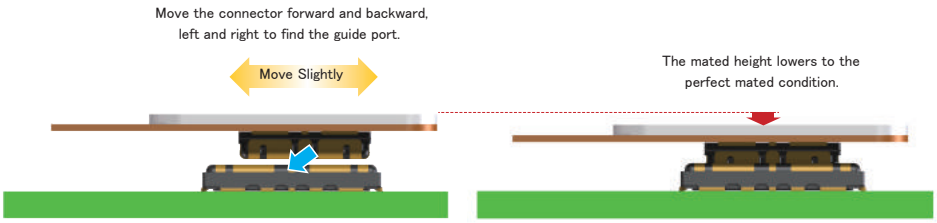


【Mating Method】

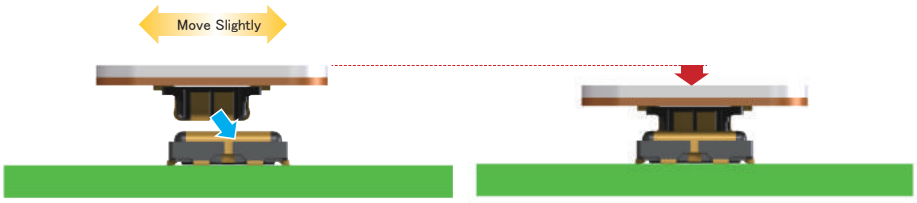
1. Locate the guide port and align.
   This product has a guide rib on the header side to ensure proper engagement.
   Align the connector so that it is in this position.



2. Once aligned, the connector engages.
   You can feel the mated height of the connector lower.



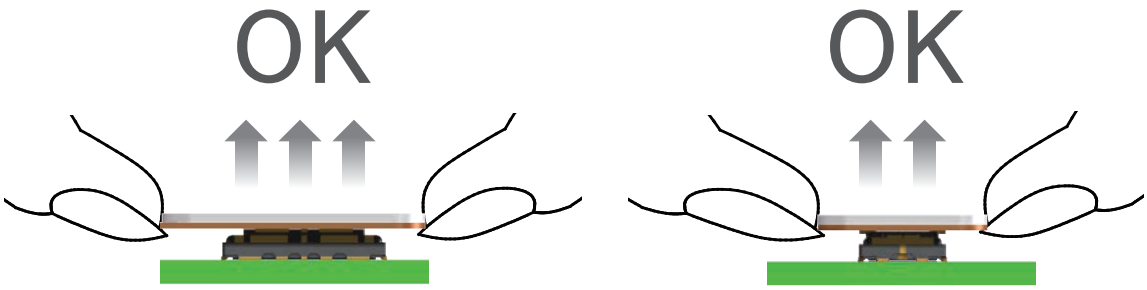
3. In the engaged state, the connectors are parallel to each other,
   and the connectors cannot move forward, backward, left, or right. Complete mating from this state.



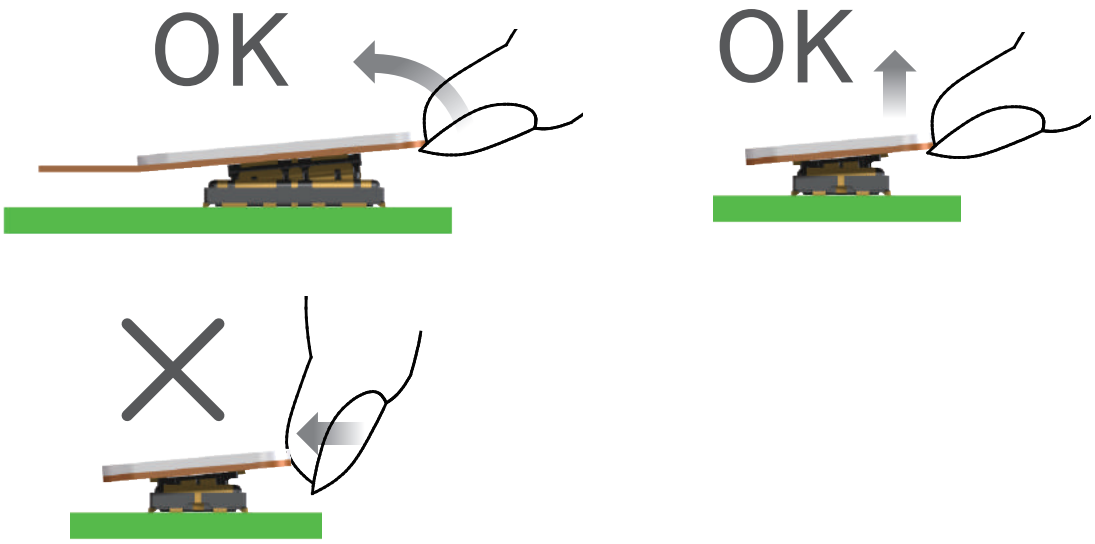
4. Check that mating is completed.
   If one side is floating, or if it is mated diagonally, remove and re-mate.

【Handling When Removing Connector】

1. When removing the connector, it is preferable to pull it out in the upward direction from the connector mounting surface. However, when removing the FPC from the circuit board it becomes more difficult to remove it vertically with higher pin counts and thin FPCs.



2. If difficult to remove, extract the connector diagonally in the direction of the pitch.
   Note that removal from the widthwise side will apply a large load to the contacts.
   When removing from the width direction, pull the end of the FPC in the upward direction.
   (When a force is applied in the horizontal direction, a large load is applied to the contact.)



PRODUCT CATALOG

HIROSE ELECTRIC CO.,LTD.

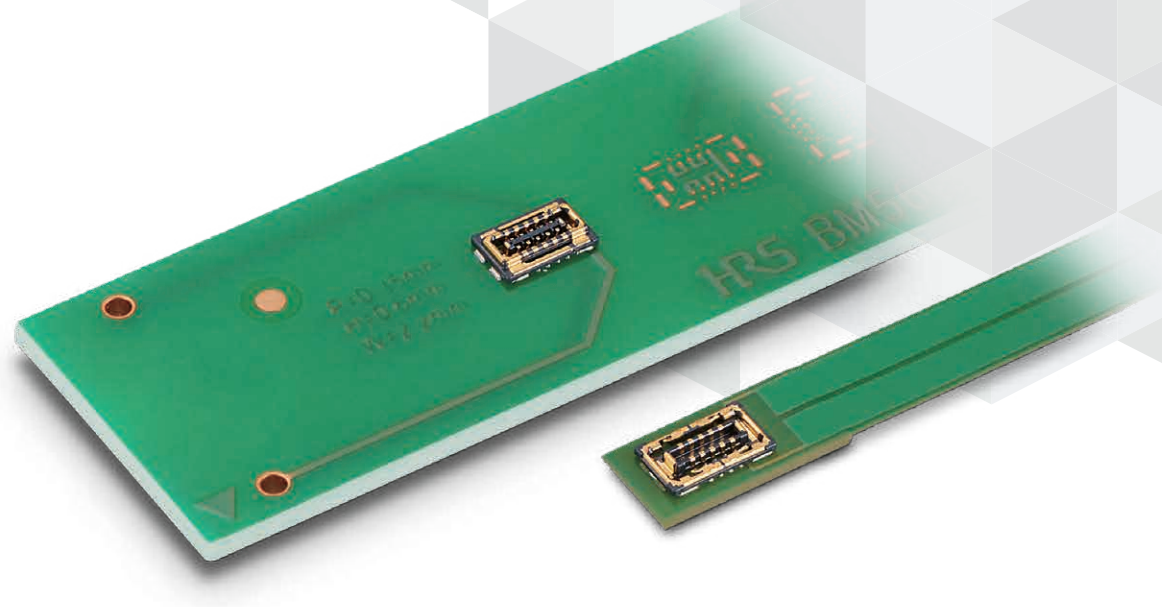
BM56 Series

0.35mm Pitch, 2.2mm Width, 0.6mm Stacking Height, Multi-RF Compatible FPC-to-Board Connector

Multi-RF

EMI Prevention

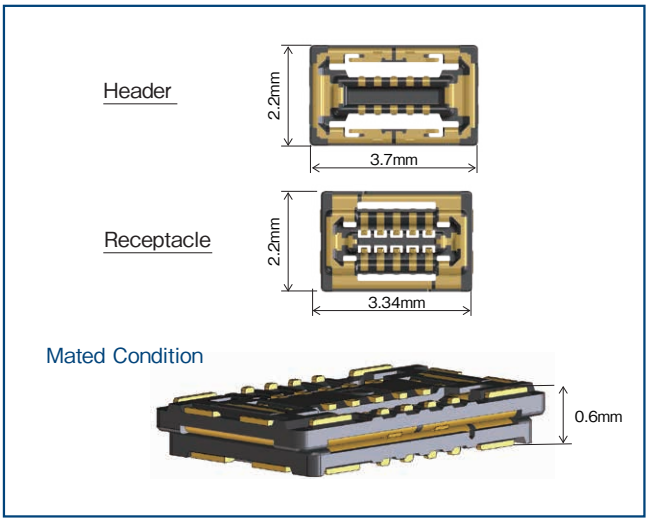
Full Armored



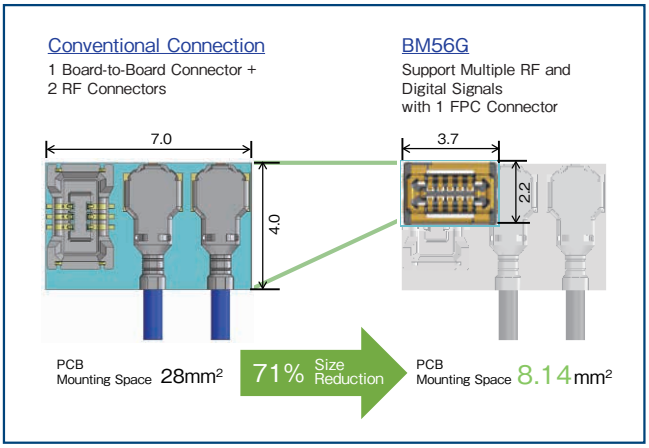
Features

1. Compact, Multi-RF capable FPC Connector, World's Smallest Width Class

Pitch : 0.35mm, Width: 2.2mm,
Stacking Height : 0.6mm



2. Contact Design Ideal for Both Digital and RF Signal

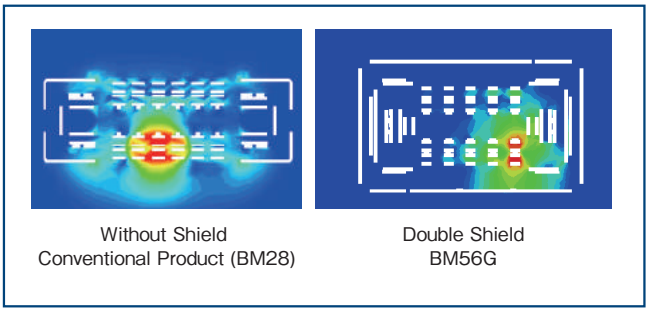


Digital and RF Signals Combined

3. Superior RF Signal Transmission

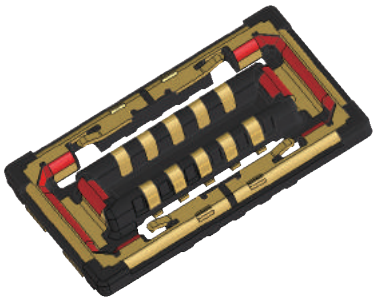
V.S.W.R.
DC to 1GHz : 1.2 Max.
1 to 6GHz : 1.3 Max.
6 to 20GHz : 1.5 Max

4. Double Shield Enhances EMI Prevention



Good EMI Resistance

5. Robust Mating Guides



Metal Guide Design

6. Halogen-free

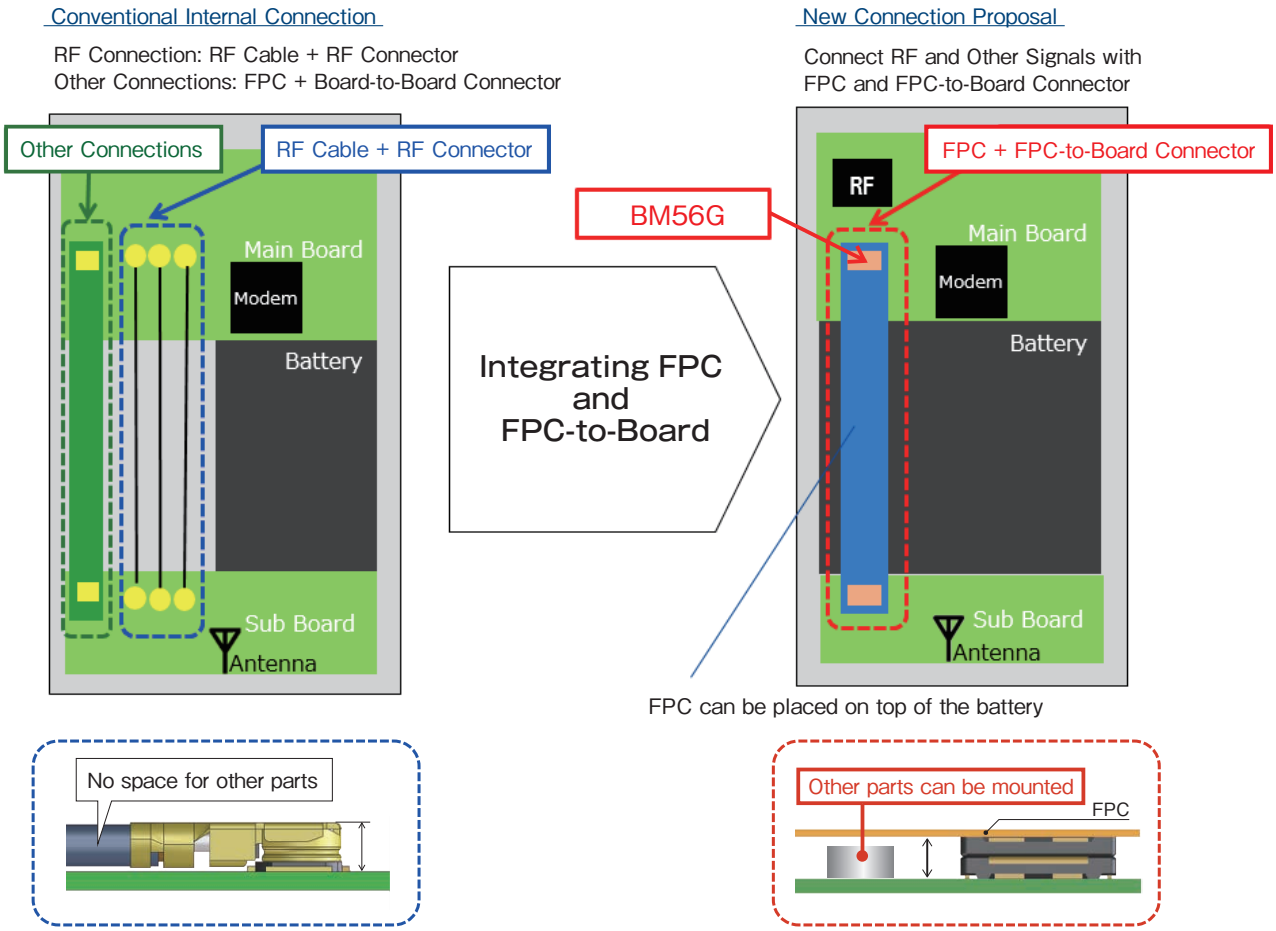
No chlorine or bromine exceeding the standard values are used in this connector.

In accordance with IEC 61249-2-21

Br : 900ppm max, Cl : 900ppm max, Br+Cl : 1500ppm max

Applications

Devices that require low-profile, compact design such as smartphones, wearable terminals and tablet PCs.



Product Specifications

Rated Current	Signal Contact : 1.0A	Operating Temperature (Note 1)	-55 to +85℃
Rated Voltage	30V AC/DC	Operating Humidity Range (Note 2)	90% RH Max.
		Storage Temperature Range (Note 3)	-10 to +60℃
		Storage Humidity Range (Note 2)(Note 3)	90% RH Max.

Characteristic Impedance	50Ω	Rated Frequency	DC to 20GHz

Items	Specifications	Conditions
Contact Resistance	Signal Contact 50mΩ Max.	Measured at 20mV AC, 1kHz, and 1mA
Insulation Resistance	100MΩ Min.	Measured at 100V DC
Withstanding Voltage	No flashover or dielectric breakdown	150V AC for 1 min.
Mating Durability	Signal Contact 50mΩ Max.	10 cycles
Vibration Resistance	No electrical discontinuity of 1μs or more.	Frequency : 10 to 55Hz ; half amplitude of 0.75mm,10 cycles in each of 3 axis directions for 5 minutes/cycle, 10 cycles each, 30 cycles total
Shock Resistance	No electrical discontinuity of 1μs or more.	Acceleration : 450m/s^2, duration : 11ms, 3-axis half sine wave in 3 directions, 3 cycles for each
Humidity Resistance	Signal Contact : 50mΩ Max. Insulation Resistance : 50MΩ Min.	Left for 96 hours at a temperature of 40±2℃ and a humidity range from 90 to 95%
Temperature Cycle	Signal Contact : 50mΩ Max. Insulation Resistance : 50MΩ Min.	-55℃ for 30 minutes → +85 for 30 minutes, 5 cycles
Solder Heat Resistance	No dissolution or resin melting that will affect performance.	Reflow : At recommended temperature profile Hand solde : Solder iron temperature of 350℃ for 3 seconds Max.
V.S.W.R.	DC to 1GHz : 1.2 Max. 1 to 6GHz : 1.3 Max. 6 to 20GHz : 1.5 Max	

Note 1 : Includes temperature rise caused by current flow.
Note 2 : Use without condensation.
Note 3 : Storage refers to long-term storage of unused items before they are mounted on the PCB.
Operating temperature and humidity range apply when the product is not powered after PCB mounting and when temporarily stored during transportation.

Materials / Finish

Part	Component	Materials	Finish	UL Standard
Header Receptacle	Insulator	LCP	Black	UL94V-0
	Contact	Copper Alloy	Gold Plated	-
	Shield	Copper Alloy	Gold Plated	-

Product Number Structure

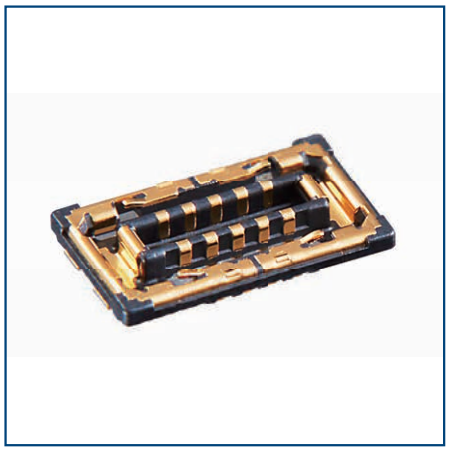
Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

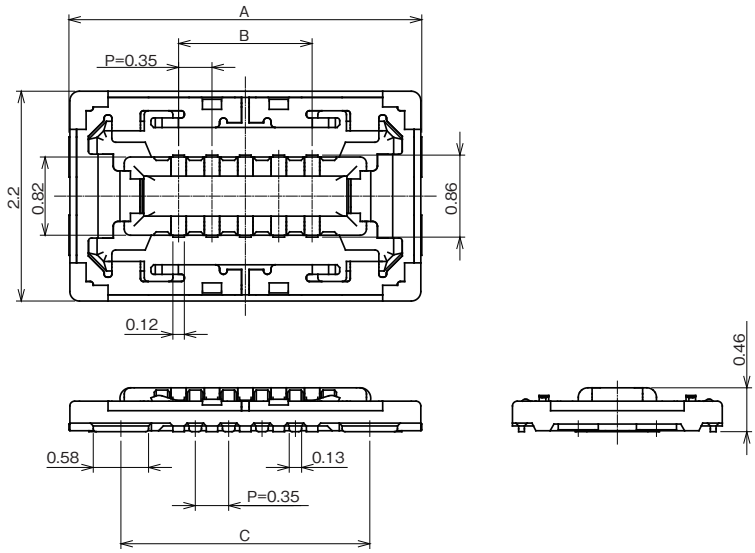
●Header/Receptacle

BM56G - 10 DP - 0.35 V (##)
❶ ❷ ❸ ❹ ❺ ❻

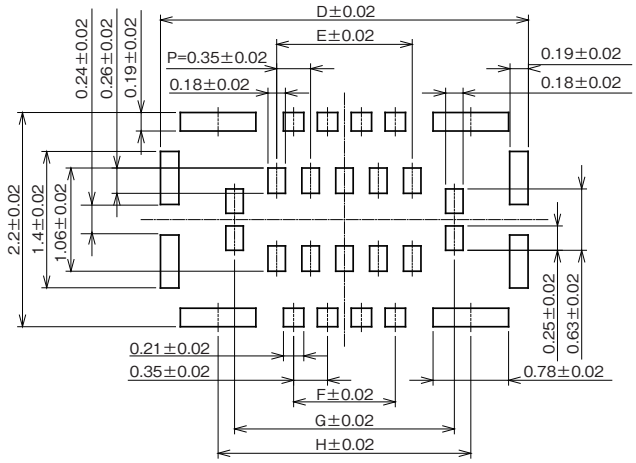
❶ Series Name	BM56G	❹ Contact Pitch	0.35mm
❷ No. of Signal Contacts	10	❺ Terminal Design	V : Straight SMT
❸ Connector Type	DP : Header DS : Receptacle	❻ Plating Specifications and Packaging	(51) : Standard, Embossed Packaging (20,000pcs per reel) (53) : Embossed Packaging (1,000pcs per reel)

Header

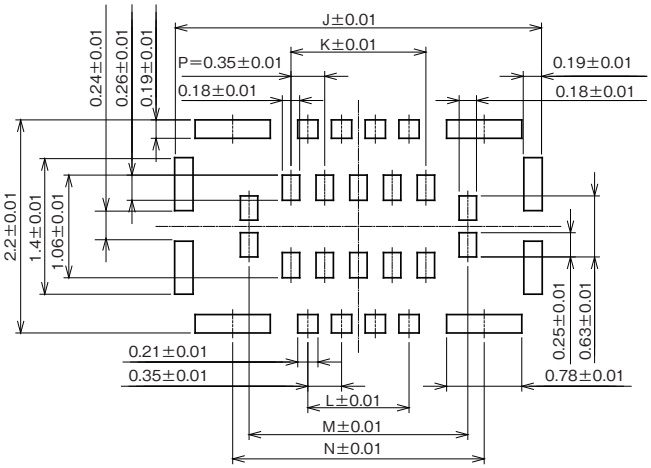




●Recommended PCB Layout



●Recommended Metal Mask Dimensions (Mask Thickness : 0.08mm)

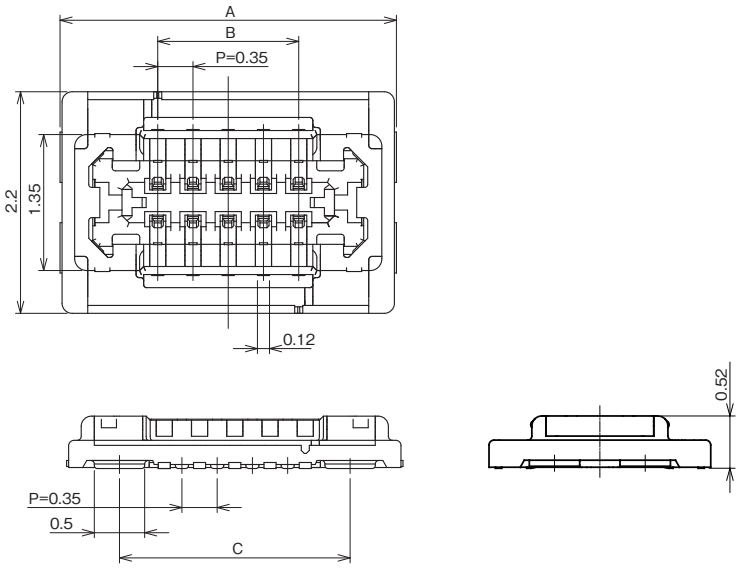


Unit : mm

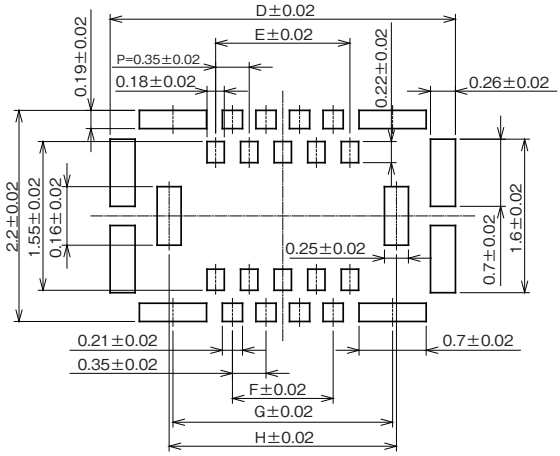
Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	G	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM56G-10DP-0.35V(##)	CL0673-7500-0-##	10	3.7	1.4	2.61	3.8	1.4	1.05	2.27	20,000pcs per reel	1,000pcs per reel
			H	J	K	L	M	N			
			2.61	3.8	1.4	1.05	2.27	2.61			

Note : This connector has no polarity.

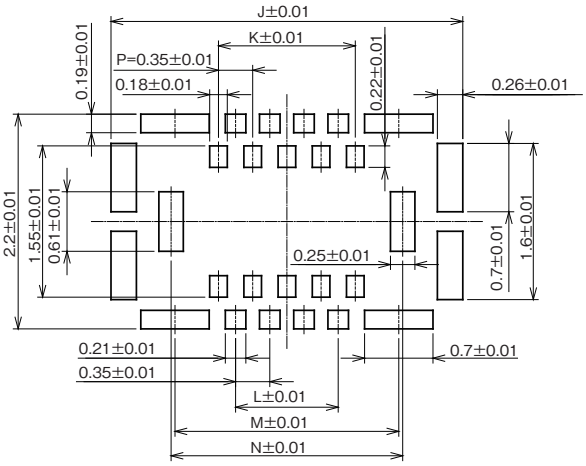
Receptacle



●Recommended PCB Layout



●Recommended Metal Mask Dimensions (Mask Thickness : 0.08mm)



Unit : mm

Part No.	HRS No.	No. of Pos.	A	B	C	D	E	F	G	Purchase Unit (##) : (51)	Purchase Unit (##) : (53)
BM56G-10DS-0.35V(##)	CL0673-7501-0-##	10	3.34	1.4	2.29	3.6	1.4	1.05	2.29	20,000pcs per reel	1,000pcs per reel
			H	J	K	L	M	N			
			2.37	3.6	1.4	1.05	2.29	2.37			

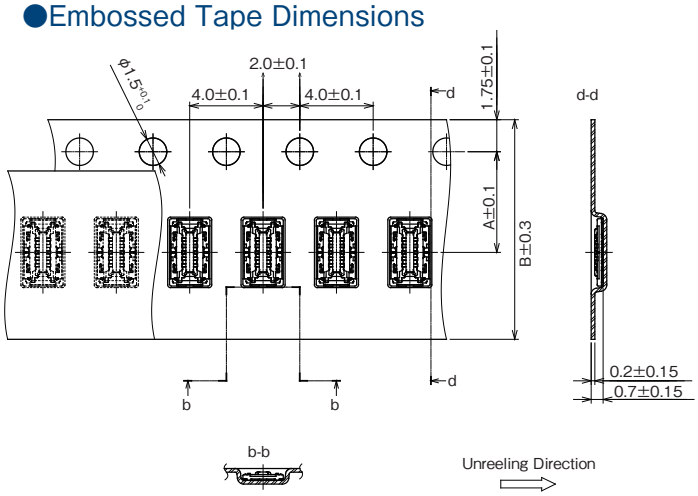
Note : This connector has no polarity.

Packaging Specifications Diagram

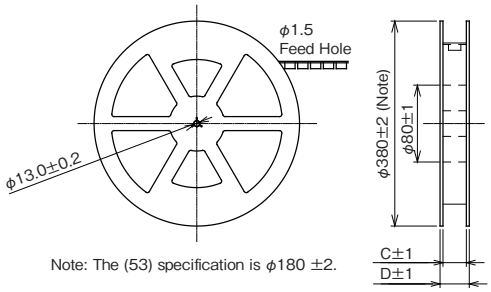
IEC 60286-3, JIS C 0806 Compliant

Header

●Embossed Tape Dimensions



●Reel Dimensions



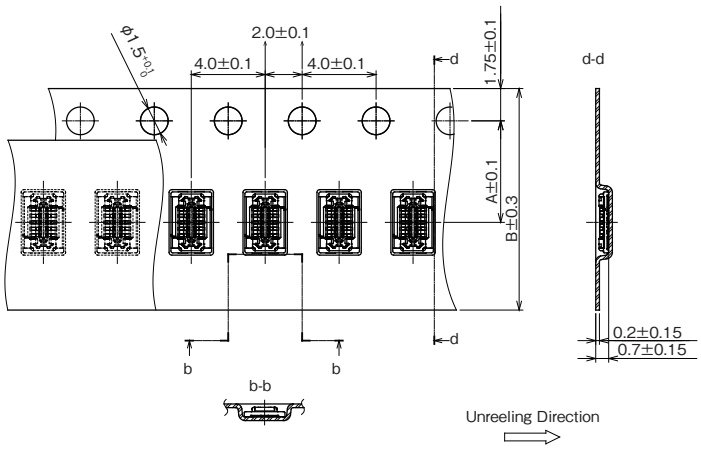
Note: The (53) specification is φ180 ±2.

Unit : mm

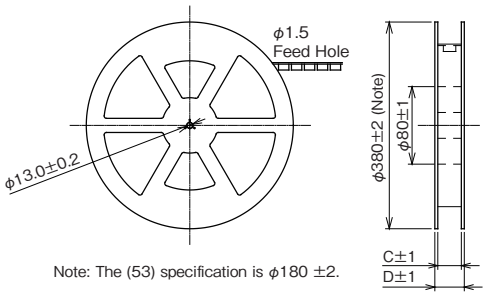
Part No.	No. of Pos.	A	B	C	D
BM56G-10DP-0.35V(##)	10	5.5	12.0	13.4	17.4

Receptacle

●Embossed Tape Dimensions



●Reel Dimensions

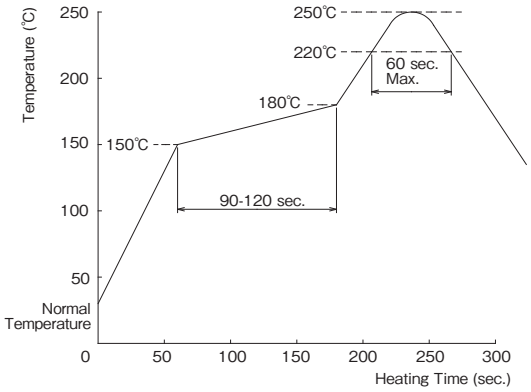


Note: The (53) specification is φ180 ±2.

Unit : mm

Part No.	No. of Pos.	A	B	C	D
BM56G-10DS-0.35V(##)	10	5.5	12.0	13.4	17.4

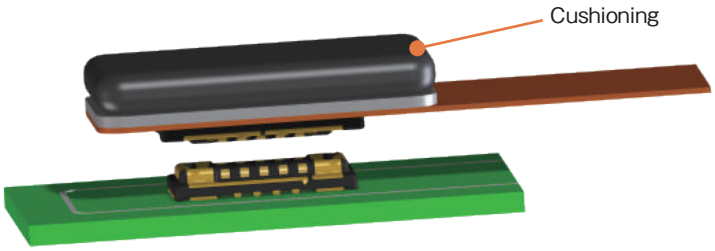
Usage Precautions

Recommended Temperature Profile	 【Conditions】 1. Peak Temperature : 250℃ 2. Heating : 220℃ min. for 60 sec. max. 3. Preheating : 150 to 180℃, 90 to 120 sec. 4. Number of Reflow Cycles : 2 cycles max. Note 1 : Temperature refers to the surface temperature of the board near the connector lead. Note 2 : When using nitrogen reflow, oxygen concentration must be 1000 [ppm] or more for mounting. If it is less than 1000 [ppm], please contact a Hirose representative.
Recommended Manual Soldering Conditions	Soldering iron temperature : 340 ± 10℃ ; Soldering time : within 3 seconds
Recommended Metal Mask Thickness and Open Area to PCB Pattern Area Ratio	Thickness : 0.08mm Aperture Ratio : Header Side : 100%, Receptacle Side : 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 prying 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. · 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. · Do not use the connector in non-recommended conditions (i.e., rated current, rated voltage, PCB design and operating environment, etc.). Such usage could lead to material outgassing, ignition, or short-circuit, etc. Refer to the specifications and guidelines for board pattern dimensions, board cautions, and connector treatment. Please contact Hirose if connector usage in conditions other than those described in the specifications and the guidelines is being considered.

Connector Handling Precautions

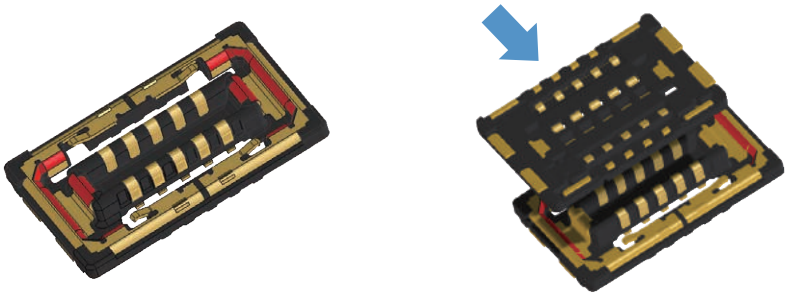
【Mating Disengagement Prevention】

Please use cushioning.
This connector may come off due to impact such as dropping.
Cushioning should be large enough to cover the entire connector.

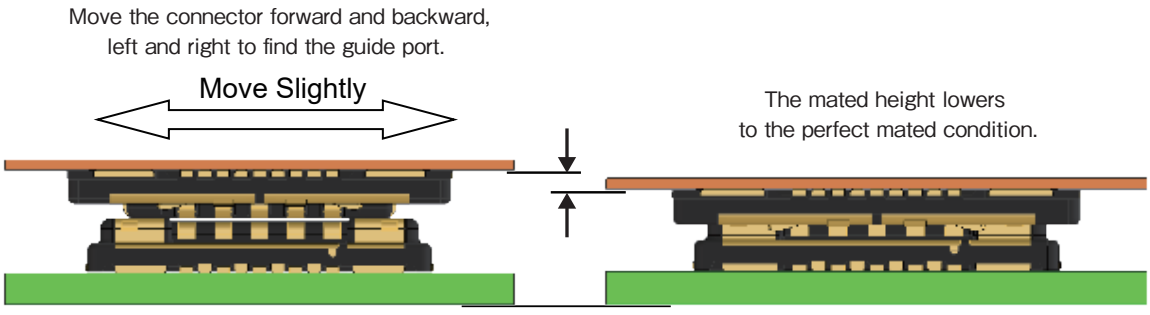


【Mating Method】

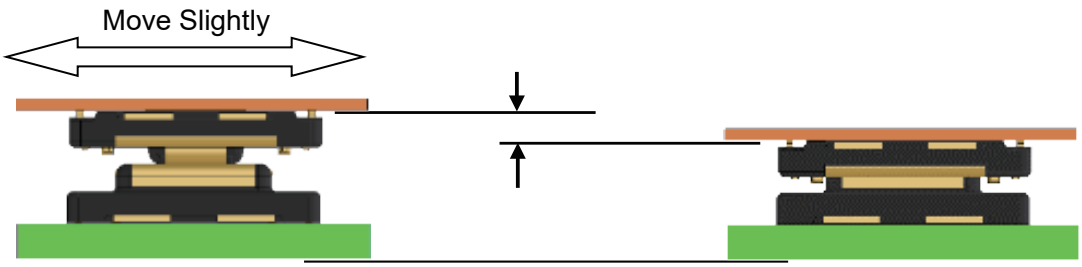
1. Locate the guide port and align. This product has a guide rib on the header to ensure proper engagement.
   Align the connector so that it is in this position.



2. Once aligned, the connector engages. You can feel the mated height of the connector lower.



3. In the engaged state, the connectors are parallel to each other, and the connectors cannot move forward, backward, left, or right. Complete mating from this state.



4. Check that mating is completed.
   If one side is floating, or if it is mated at a diagonal, remove and re-mate.