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| TITLE: | BM29 Series Guideline | ETAD-H1017-00 |
| PRODUCT: | HYBRID BOARD TO FPC CONNECTOR, Pitch: 0.35mm, Width: 1.5mm, Stacking height: 0.6mm, Power: 2-3A | PAGE: 1 OF 16 |

BM29 Series Guideline

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| | 担当 | 査閲 | 承認 |
| | | | DATE |
| | | | |



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1. Notice for Device Handling

1.1 Notice for mechanical designing

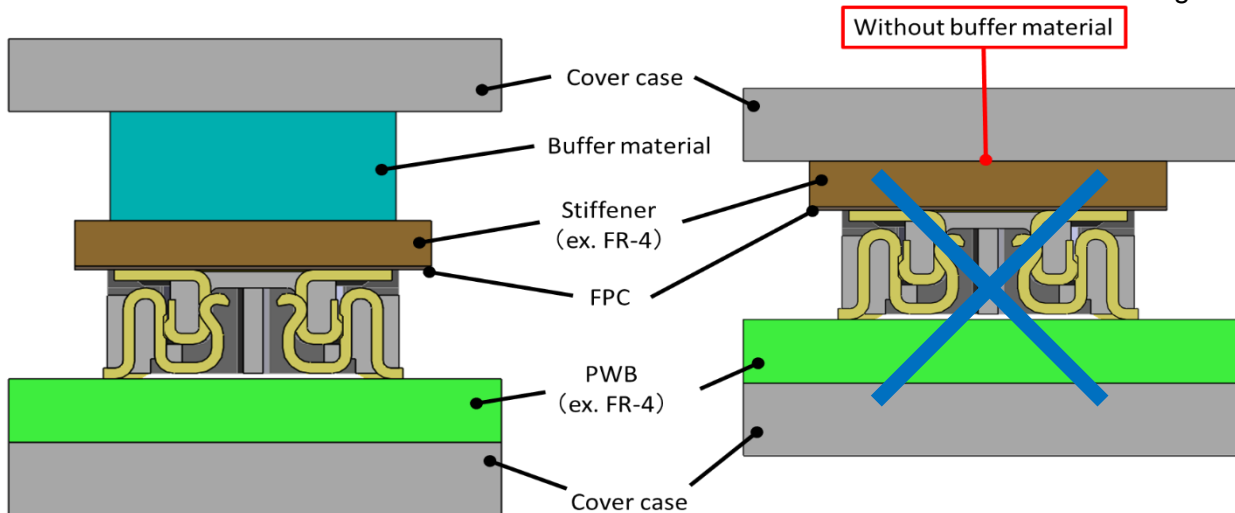
1.1.1 Disengaging prevention

Please use buffer material.

There is still possibility that connectors are disengaged if strong impact, such as dropping, is put against connectors in use. In order to prevent connectors from disengaging, please make sure to put buffer material between a connector and a cover case to hold down the connector pair to the mating direction.

If a connector is directly pressed down by a cover case, there is a possibility that the cover case is bent and it may cause connector disengagement when the device is dropped. Please avoid a design that the connector is directly pressed by cover case, instead, use put the buffer material to press down the connector.

Buffer material must be the size which is able to cover all over the connector mounting area.

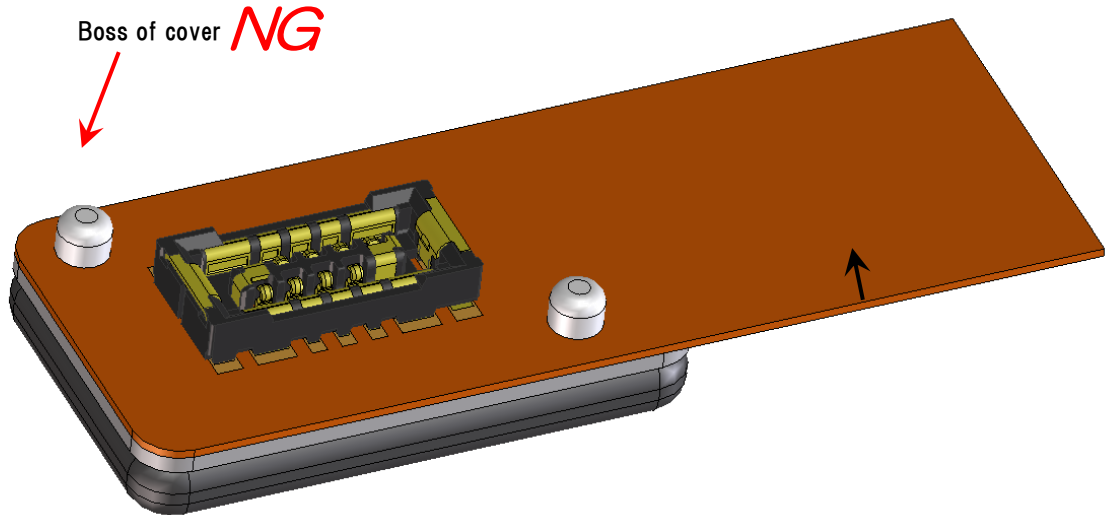


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1.1.2 FPC fixing

Do not completely fix the FPC position.

If FPC position is fixed, connector will get direct stress from dropping impact.



1.1.3 Allocation of other components around connector

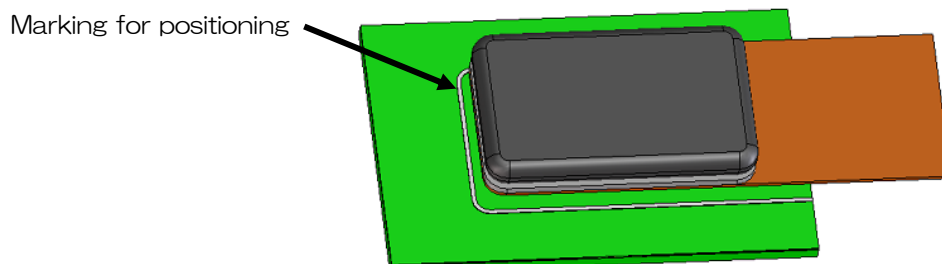
Please do not locate any material which may affect on connector mating around the connectors.

It may cause a misalignment or breakage.

1.1.4 Marking for mating position

Putting some marking to indicate the exact mating position is recommended.

It can support smooth mating.





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1.2 Notice for PWB designing

1.2.1 Recommended PWB pattern

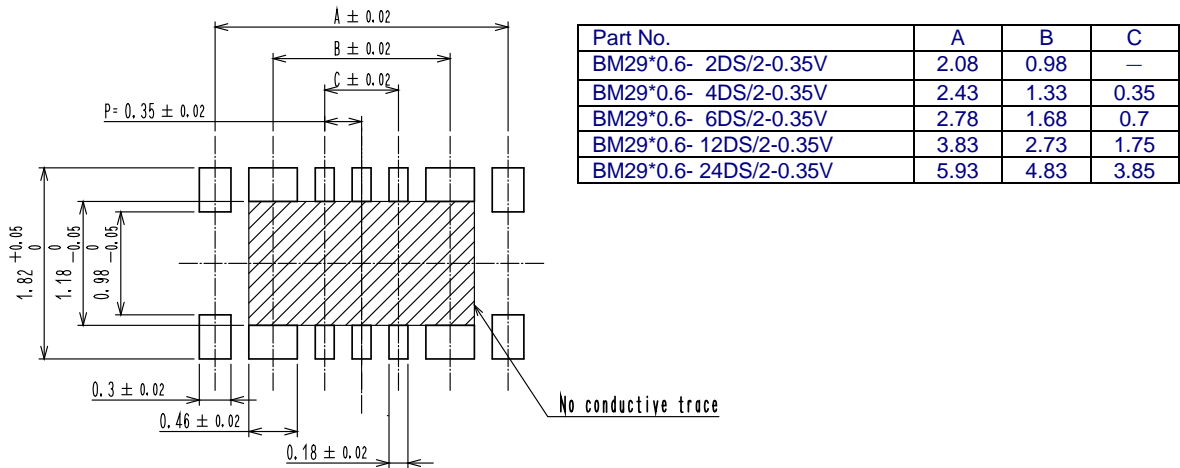


Fig 1.2.1(1) Receptacle (BM29 * 0.6- * DS/2-0.35V) Recommended PWB layout

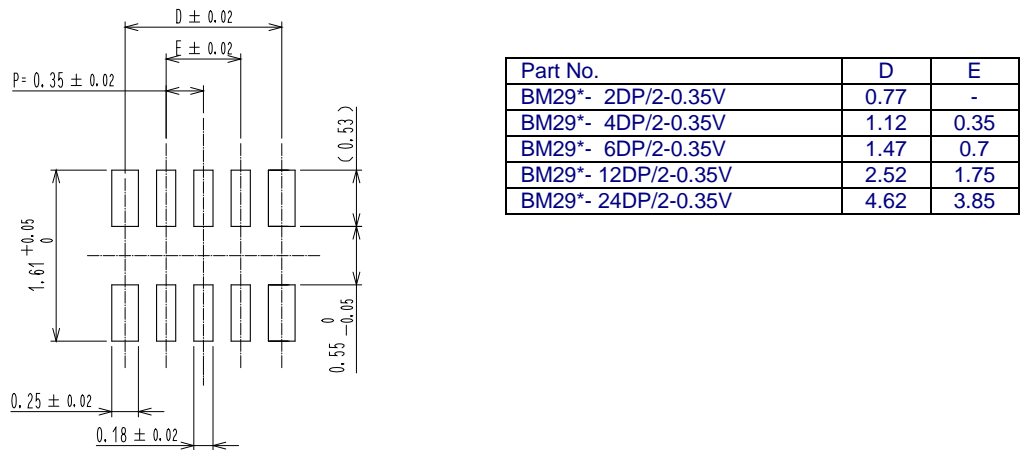


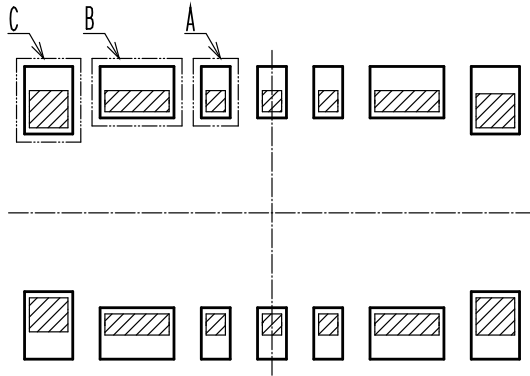
Fig 1.2.1(2) Plug (BM29 * - * DP/2-0.35V) Recommended PWB layout



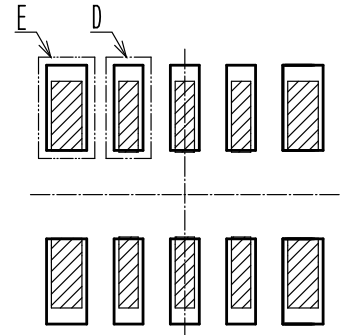
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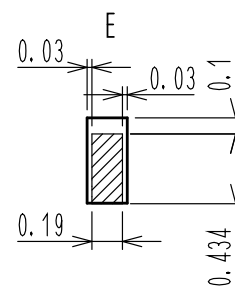
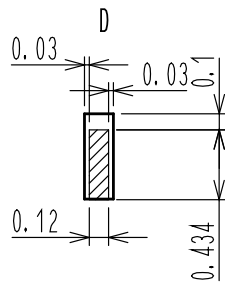
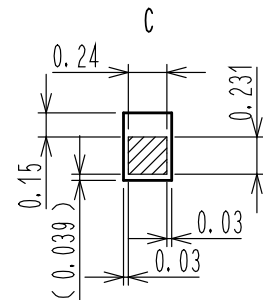
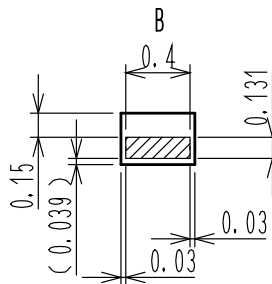
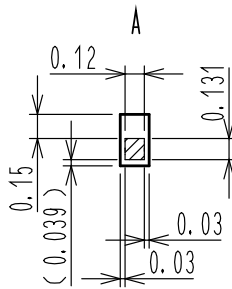
1.2.2 PWB pad layout and connector location



BM29 * 0.6- * DS/2-0.35V Layout



BM29 * - * DP/2-0.35V Layout



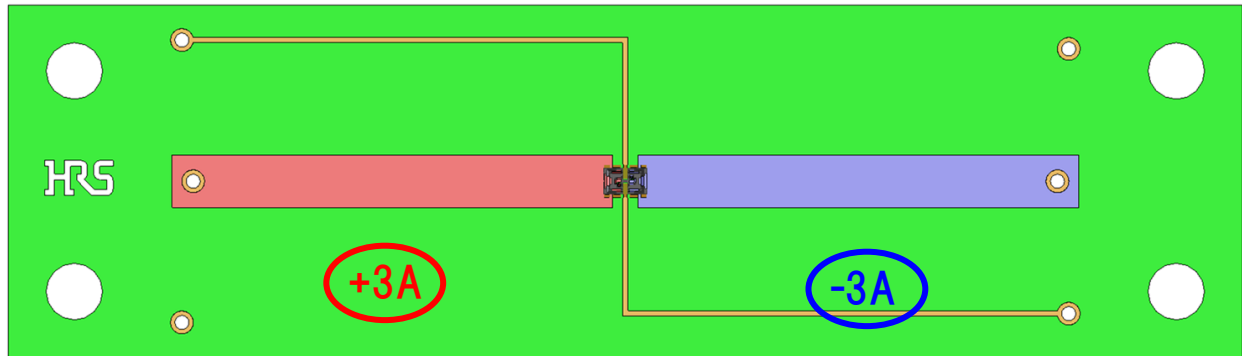
 Connector read on PWB layout
 PWB layout

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1.2.3 Notice for PWB design

- Recommended PWB pattern width is 1mm ([Copper foil](#) thickness=35 μ m) /1A

PWB Specifications for temperature rise evaluations are as follows.



1.2.3(1) PWB for [temperature rise evaluations](#) of

[Material](#) : FR-4

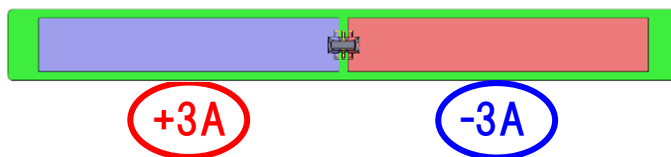
PAD : Recommended pattern

Recommended Power contact pattern width : 3mm

Recommended [Signal](#) contact pattern width : 0.3mm

[Copper foil](#) thickness : 35 μ m

PWB size 70 \times 20 \times 0.8mm



[Material](#) : [polyimide](#) (single layer)

stiffener : FR-4

PAD : Recommended pattern

Recommended Power contact pattern width : 3mm

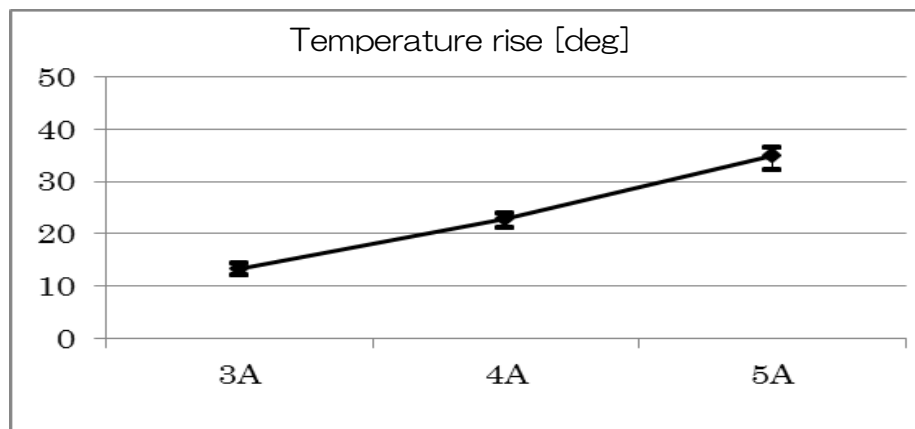
Recommended [Signal](#) contact pattern width : 0.23mm

[Copper foil](#) thickness : 35 μ m

PWB size : 38 \times 4 \times 0.435mm

*including stiffener

1.2.3(2) PWB for [temperature rise evaluations](#) of plug

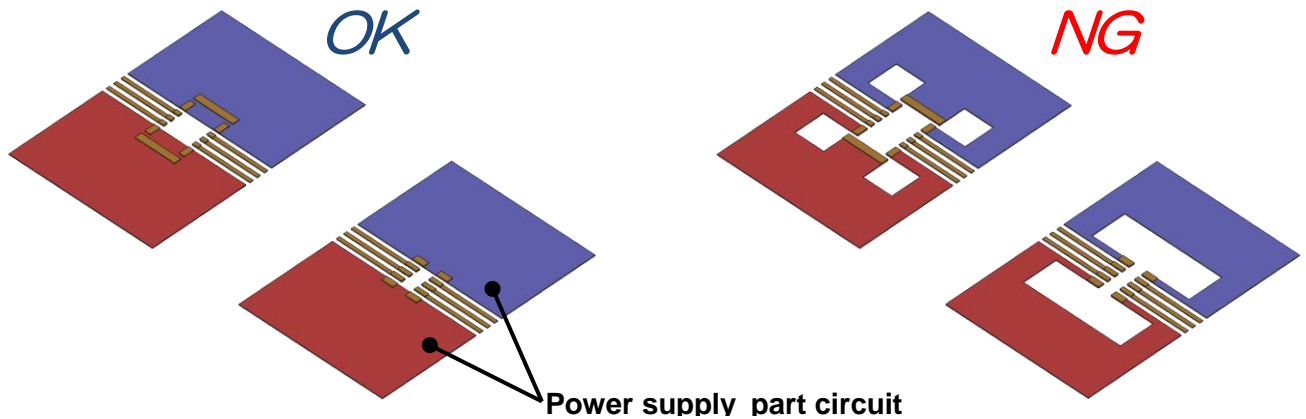


| | 3A | 4A | 5A |
|-----|-------|-------|-------|
| MAX | 14.3 | 23.9 | 36.5 |
| MIN | 12.1 | 21.0 | 32.1 |
| AVG | 13.40 | 22.87 | 34.83 |

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• **Please design circuit of power supply pad without splitting current flow**

Electric current might be concentrated in a certain circuit and cause over current

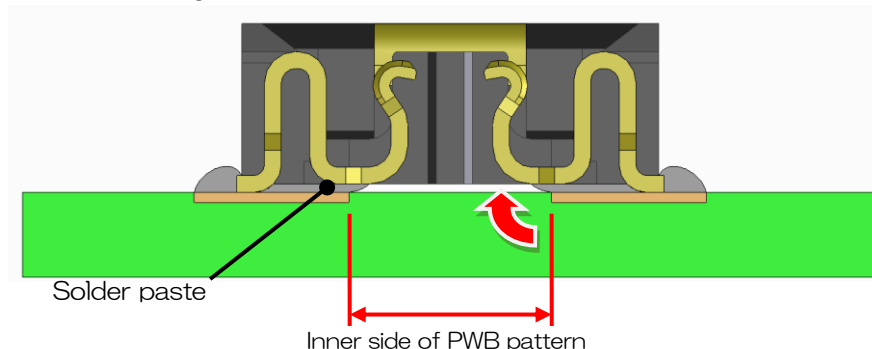


• **Please design PWB layout properly so that fillet are properly formed.**

The recommended PWB layout is designed so that the connector can be soldered to the PWB.

• **Please comply with our recommended inner side of PWB pattern of receptacle**

It may cause solder wicking.



• **Please note pattern and the height of VIA hole.**

In case there's PWB pattern or VIA HOLE with too much height underneath the onnector, there is a possibility to cause soldering failure.

1.2.4 FPC designing

• **Please make sure to put a stiffener on the backside of the FPC.**

It may cause the connector to peel-off or break.

[note] If using a thinner stiffener than our recommendation, please contact and discuss with your Hirose contact window.

Recommended stiffener
FR-4 : t=0.3mm MIN
SUS : t=0.2mm MIN

• **When mounting the connector, please consider the bending of FPC by heating, and use FPC with low risk of bending.**

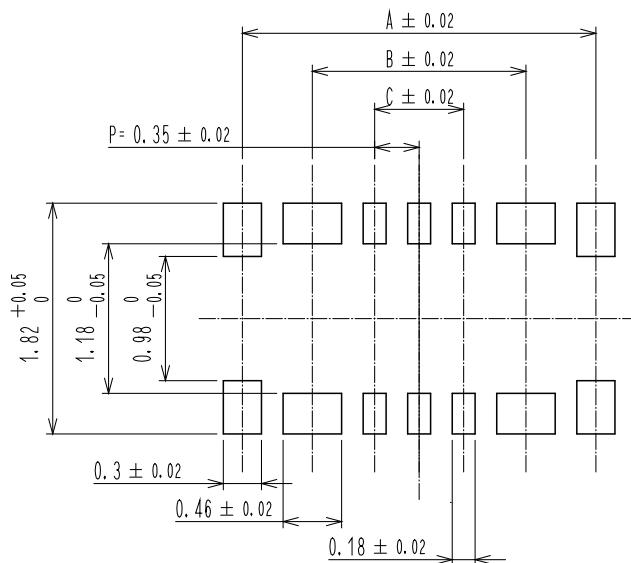
It may cause bending when heating.

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2. Notice for Mounting

2.1 Metal mask design

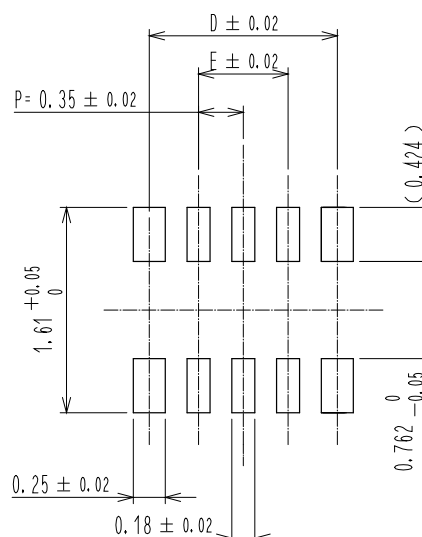
Make sure the latest specification when designing.



| Part No. | A | B | C |
|------------------------|------|------|------|
| BM29*0.6- 2DS/2-0.35V | 2.08 | 0.98 | — |
| BM29*0.6- 4DS/2-0.35V | 2.43 | 1.33 | 0.35 |
| BM29*0.6- 6DS/2-0.35V | 2.78 | 1.68 | 0.7 |
| BM29*0.6- 12DS/2-0.35V | 3.83 | 2.73 | 1.75 |
| BM29*0.6- 24DS/2-0.35V | 5.93 | 4.83 | 3.85 |

Recommended stencil
thickness: 0.08mm
Open ratio:100%

Fig 2-1.(1) Recommended stencil layout of receptacle(BM29 * 0.6- * DS/2-0.35V)



| Part No. | D | E |
|---------------------|------|------|
| BM29*- 2DP/2-0.35V | 0.77 | - |
| BM29*- 4DP/2-0.35V | 1.12 | 0.35 |
| BM29*- 6DP/2-0.35V | 1.47 | 0.7 |
| BM29*- 12DP/2-0.35V | 2.52 | 1.75 |
| BM29*- 24DP/2-0.35V | 4.62 | 3.85 |

Recommended stencil
thickness : 0.08mm
Open ratio :80%

Fig 2-1.(2) Recommended stencil layout of plug (BM29 * - * DP/2-0.35V)

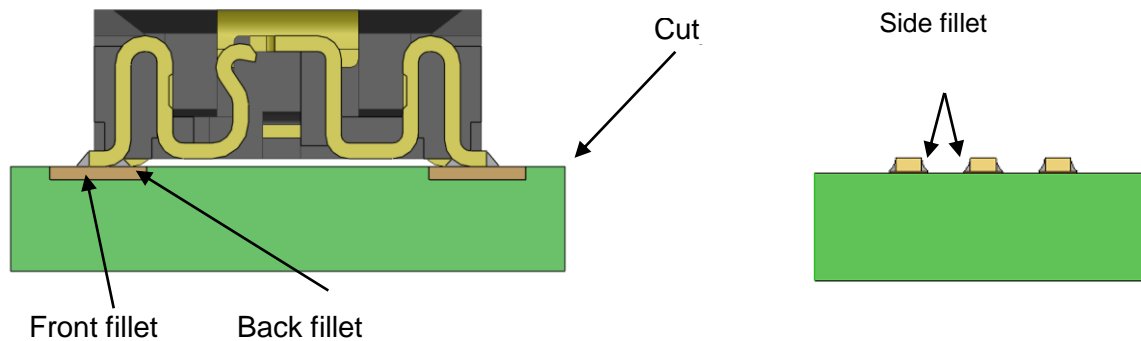
Notice :

If the soldering paste exceeds the recommended amount, there is a possibility of solder swelling. 【note】 Please refer to “Solder paste swelling” on page 10.

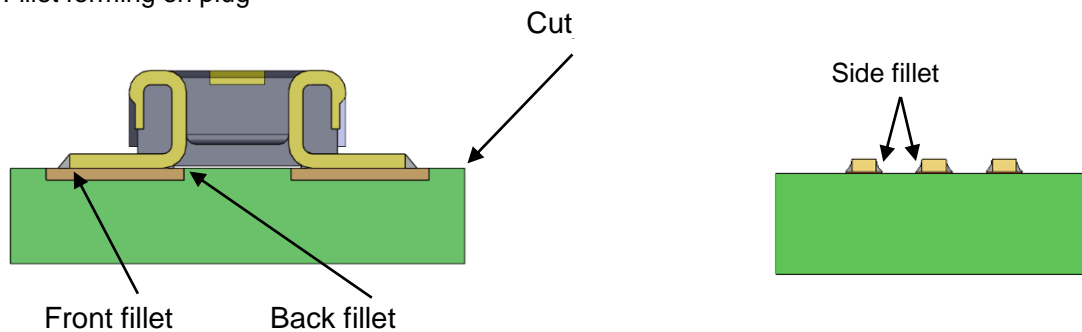
| | | |
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2.2 Fillet forming

Fillet forming on receptacle



Fillet forming on plug



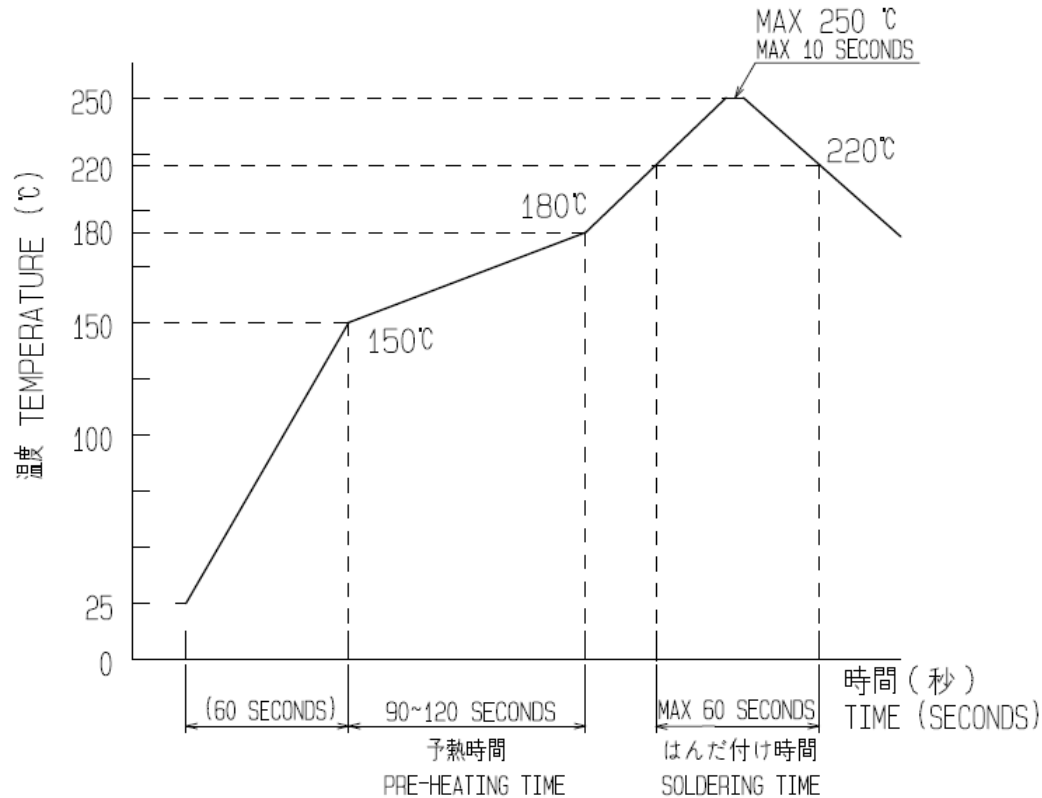
The receptacle contact leading edge where the “front fillet” is formed has a metal cut surface. Therefore, phosphor bronze is exposed. The exposed area easily develops thermal oxidation from reflow heating, so it may be difficult for soldering paste to get wet and be spread over the area. If the fillet formation needs to be judged defective/not defective, please judge by the “side fillet” formatio



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2.3 Reflow profile



Profile measuring point

The temperature profile indicates the board surface temperature at the point of contact with the connector terminals.

- Reflow cycles
Up to 2 cycles of reflow soldering are possible under the same conditions.
*Temperature between 1st and 2nd reflow must be cooled down to room temperature.
- Reflow heating method and condition
Far-infrared heater and hot convective blowers used in combination, normal atmosphere, or nitrogen atmosphere

Notifications for N₂ reflow

Set O₂ concentration more than 1000[ppm] (HRS recommendation) in SMT. Please feel free to contact Hirose when it is less than 1000[ppm].

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2.4 Repairing (hand soldering)

2.4.1 Repair Condition

Receptacle

Repairing condition:

- Soldering iron 350° C, 3seconds MAX

Notice:

- Please do not put stress on contacts.
- Please do not touch housing with a soldering iron.

Plug

Repairing condition:

- Soldering iron 350° C, 3seconds MAX

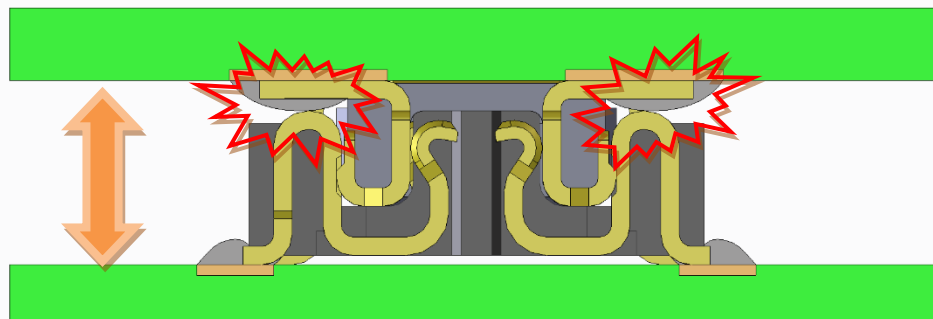
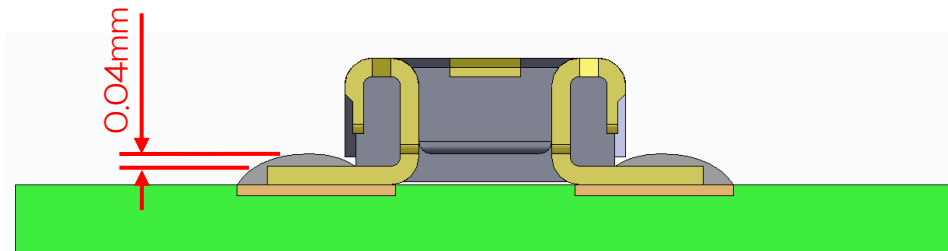
Notice:

- Please do not put stress on contacts.
- Please do not touch housing with a soldering iron.
- Please protect contact from flux or soldering paste splashing (ex. set a cover over the contact area).

2.4.1 Solder swelling

- Please keep the soldering paste height less than 0.04mm.

It may effect on the board to board distance.



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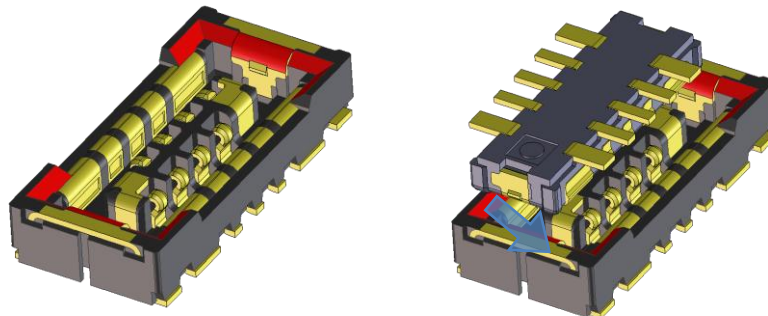
3. Operation Methods of Connectors

3.1 Insertion methods

Please mate BM29 connectors by hand
Manual for inserting operation

- 1) Find the alignment area with hand to locate the connector in the appropriate mating position.

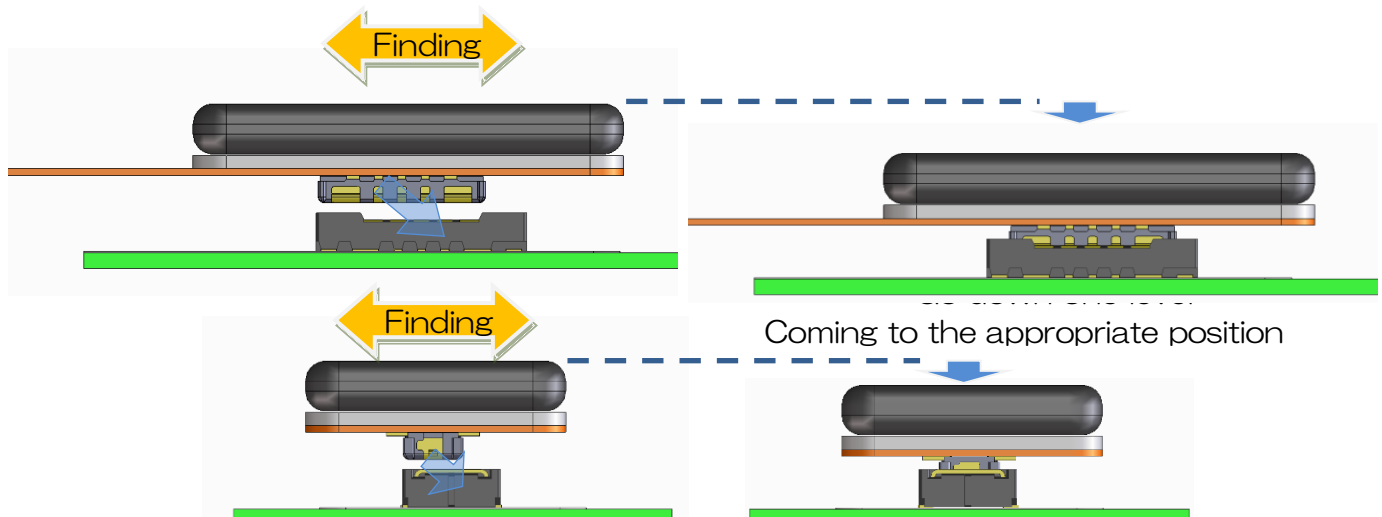
BM29 Series have guidance ribs on receptacle side for smooth mating.
Put the connector on these ribs so that they can be self-aligned.



- 2) When the connector comes to the appropriate position, the connector comes into the aligned position.

If the connector comes into aligned position, it can be recognized by hand that the connector goes down one level.

Find the appropriate position moving the connector back and forth



- 3) Mate when the connectors are in alignment position

When the connectors are in alignment position, the connector pair cannot be moved back and forth and around as they are mated in a parallel position.

- 4) Please make sure connectors are mated completely.

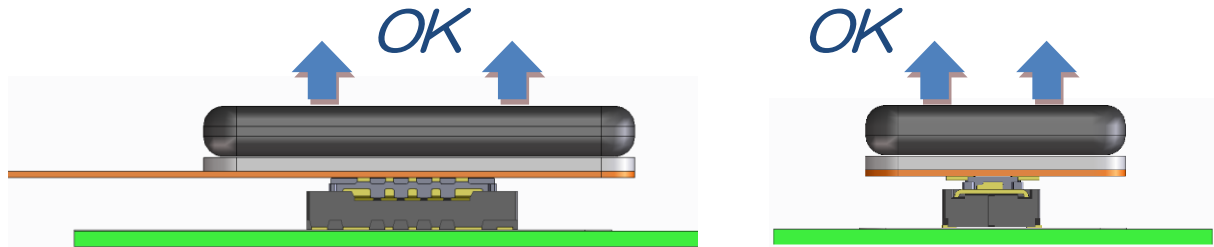
If one side is floating or the connectors are mated at a slant, please unmate once, and then mate them once again, following the procedures above from the beginning.

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3.2 Un-mating methods

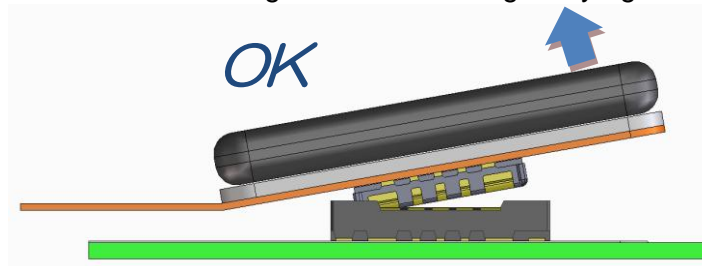
1) Vertical Direction

It may be difficult to unmate from vertical direction due to FPC thickness or large pin count.



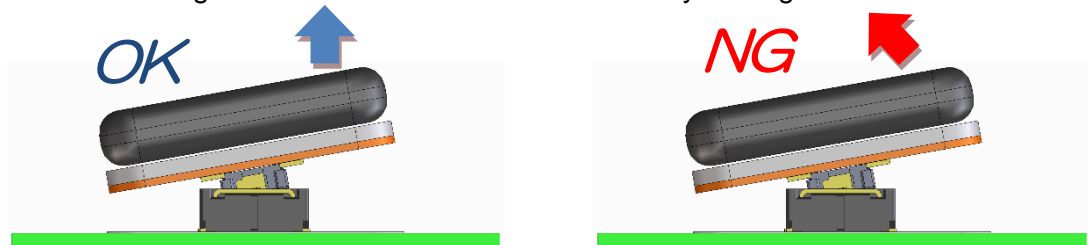
2) Extraction from length direction

Please unmate the connector lifting one side of it diagonally against the contact pitch direction.

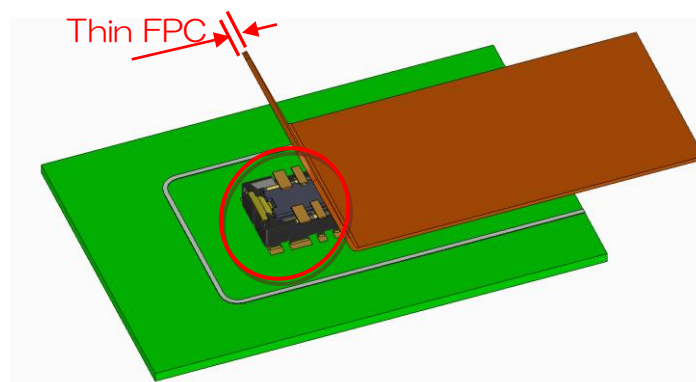


3) Extraction from width direction

When removing from width side, please pull the edge of FPC board for vertical direction. Please avoid withdrawing the connector from width side. It may damage the contacts.



4) If the FPC is not strong enough, conduct the test on FPC to repeat operation. FPC If FPC is not strong enough, there is a possibility that contacts may be pulled off or broken. Please make sure to conduct the test on FPC to repeat operation several times in an early stage build.





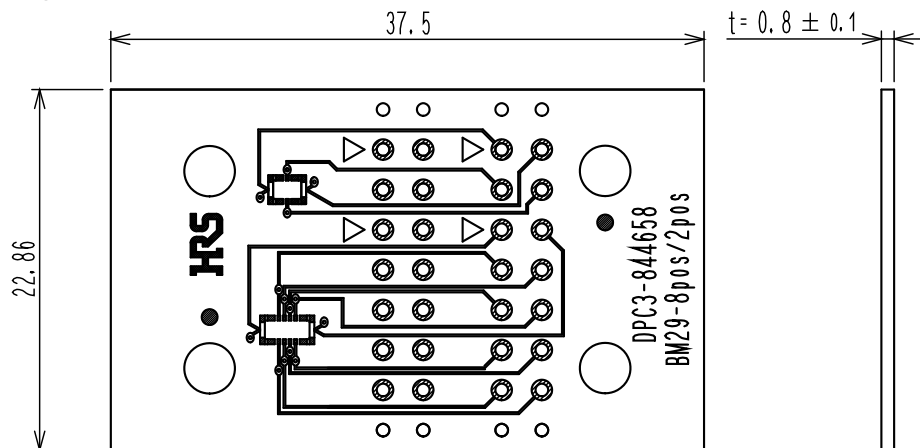
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4. PWB and Solder Paste for Evaluation Test

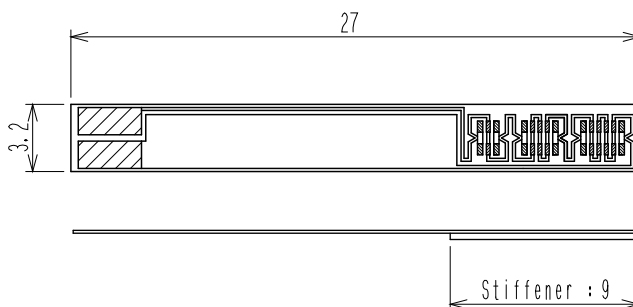
4.1 Contact Resistance Measurement

◆PWB for Receptacle (PWB)



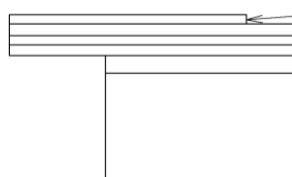
Copper foil thickness : $35 \mu\text{m}$

◆PWB for Plug (FPC)



Copper foil thickness
: $35 \mu\text{m}$

FPC Material Configuration

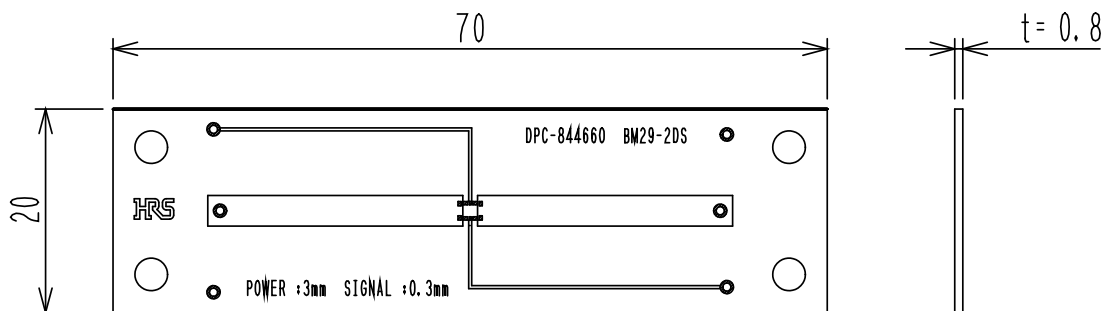


| | | [μm] |
|-----------|------------------------|-------------------|
| Layer | Material | Thickness |
| Resist | Ink | 15 |
| Cu foil | | 35 |
| Adhesive | | 20 |
| Base film | Polimide | 25 |
| Adhesive | Thermoplastic adhesive | 30~40 |
| Stiffener | FR-4 | 300 |
| | SUS | 200 |
| Total | | 325~435 |

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4.2 Temperature Rising Test

◆PWB for Receptacle (PWB)



[Material](#) : FR-4

PAD : Recommended pattern

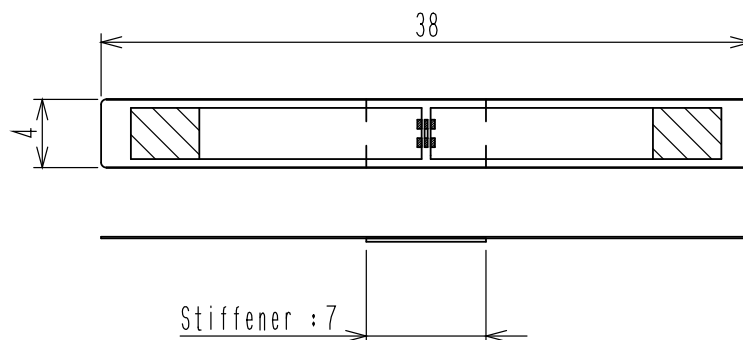
Recommended Power terminal : 3mm

Recommended [Signal terminal](#) : 0.3mm

[Copper foil](#) thickness : 35μm

PWB size 70×20×0.8mm

◆PWB for Plug (FPC)



[Material](#) : polyimide ([stratum](#))

[reinforcing plate](#) : FR-4

PAD : Recommended pattern

Recommended Power terminal : 3mm

Recommended [Signal terminal](#) : 0.18mm

[Copper foil](#) thickness : 35μm

PWB size : 38×4×0.435mm

*include reinforcement

board pressure

[reinforcing plate](#) size : 7×4×0.3mm

End of report