HIROSE ELECTRIC CO.,LTD.

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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TABLE OF CONTENTS

Page Number

1. Notice for Device Designing 3

1.1 Notice for mechanical designing 3
1.1.1 Disengaging prevention 3
1.1.2 FPC fixing 4
1.1.3 Allocation of other components around connector 4
1.1.4 Marking for mating position 4

1.2 Notice for PWB designing 5
1.2.1 Recommended PWB pattern 5
1.2.2 PWB pad layout and connector location 6
1.2.3 PWB designing 7
1.2.4 FPC designing 8

2. Notice for mounting 9

2.1 Metal mask design 9

2.2 Fillet forming 10

2.3 Reflow profile 11

2.4 Repairing (hand soldering) 12
2.4.1 Repair Condition 12
2.4.2 Solder swelling 12

3. Operation Methods of Connectors

3.1 Insertion methods 13

3.2 Un-mating methods 14

4. PWB and Solder Paste for Evaluation Test 15

4.1 PWB for evaluation test 15

5. RF Evaluation Board Design Information 17

5.1 Examples of board layers, patterns, and cutout dimensions 17

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1. Notice for Device Handling

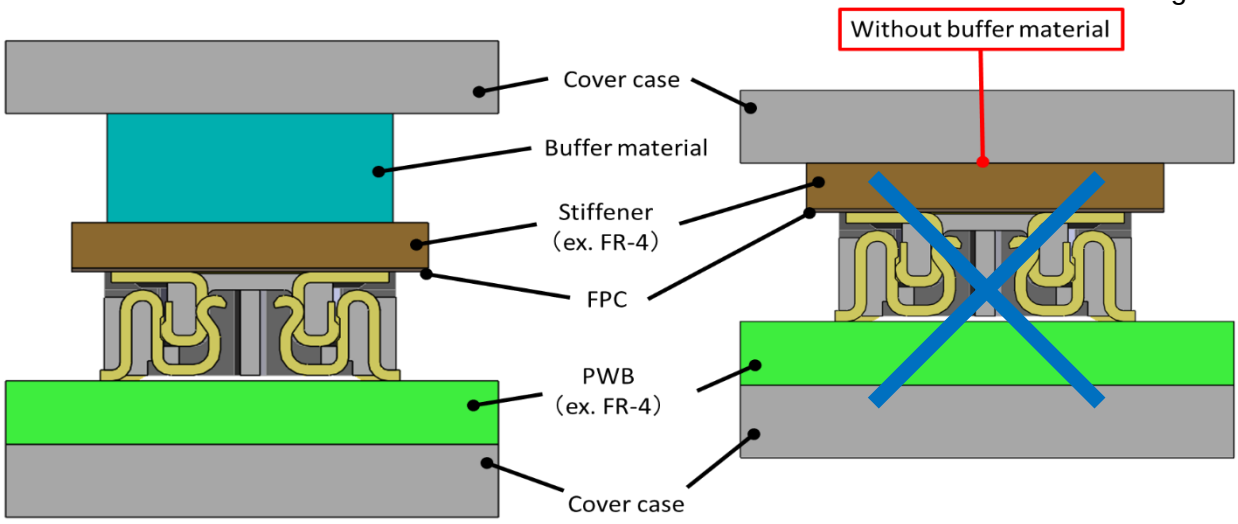
1.1 Notice for mechanical designing

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.

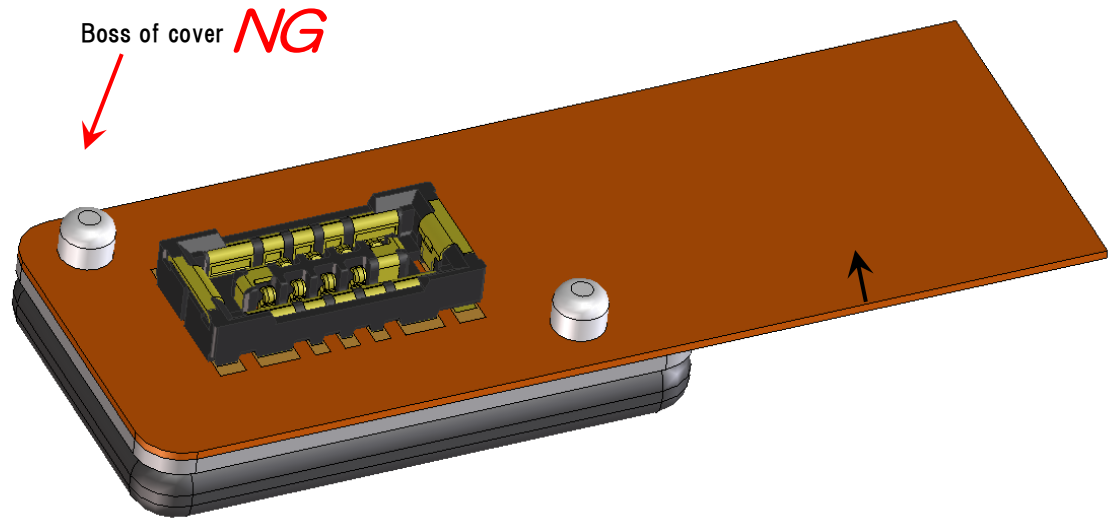


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1.1.2 FPC fixing

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

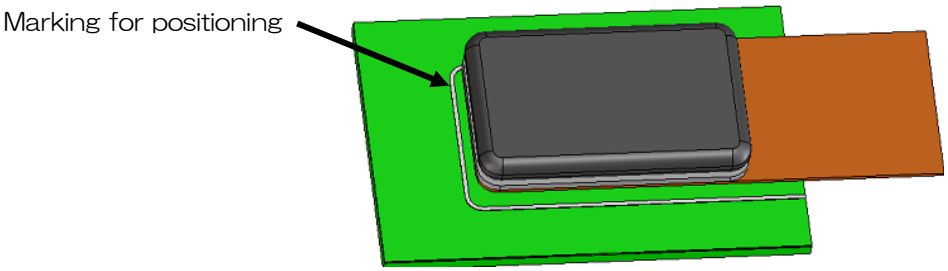
Please do not locate any material which may affect on connector mating around the connectors.

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.

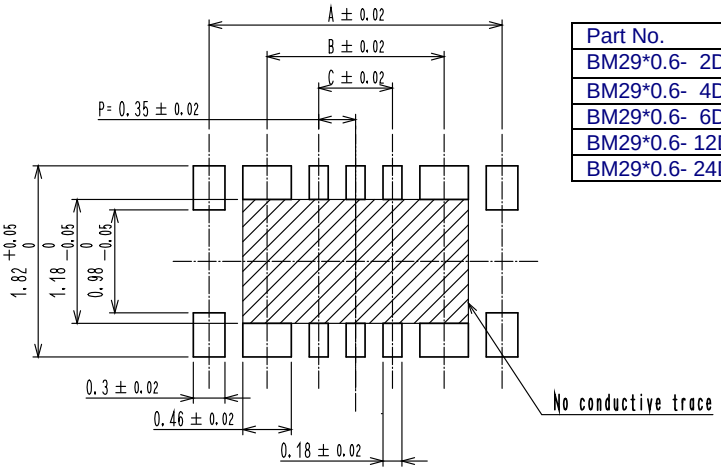
It can support smooth mating.



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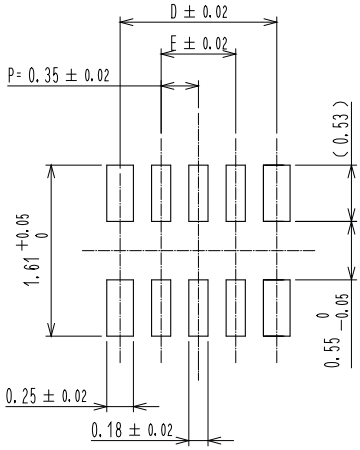
1.2 Notice for PWB designing

1.2.1 Recommended PWB pattern



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

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

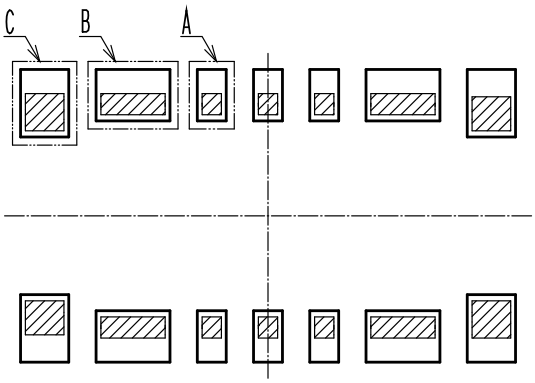


Part No.	D	E
BM29*- 2DP/2-0.35V	0.77	-
BM29*- 4DP/2-0.35V	1.12	0.35
BM29*- 6DP/2-0.35V	1.47	0.7
BM29*- 12DP/2-0.35V	2.52	1.75
BM29*- 24DP/2-0.35V	4.62	3.85

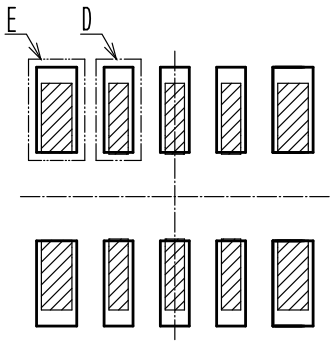
Fig 1.2.1(2) Plug (BM29＊-＊DP/2-0.35V) Recommended PWB layout

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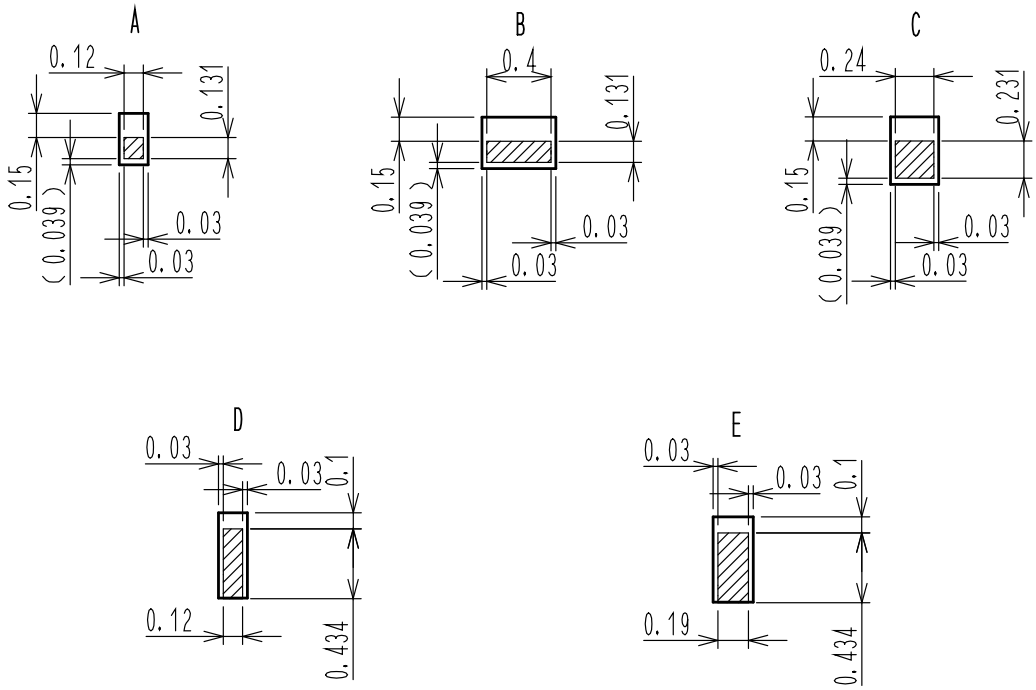
1.2.2 PWB pad layout and connector location



BM29＊0.6-＊DS/2-0.35V Layout



BM29＊-＊DP/2-0.35V Layout



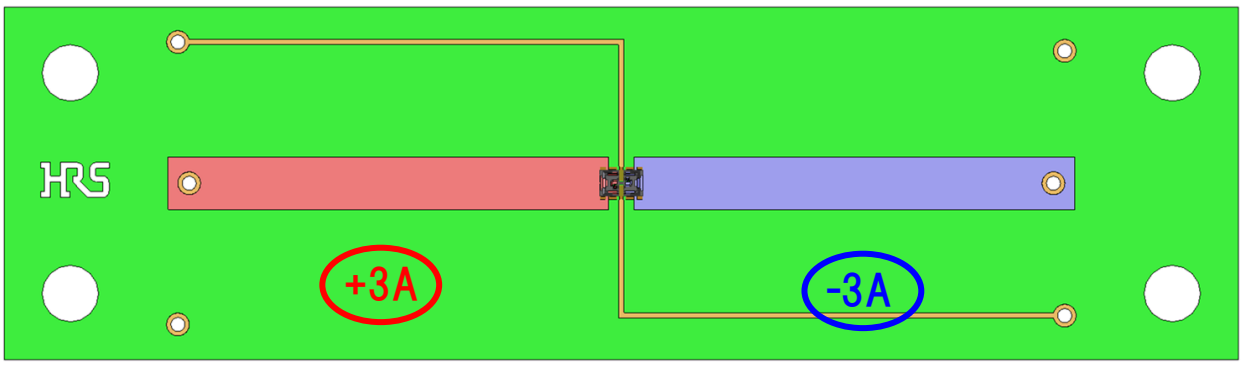
Connector read on PWB layout
PWB layout

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1.2.3 Notice for PWB design

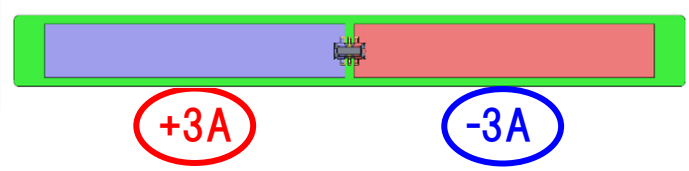
- **Recommended PWB pattern width is 1mm（Copper foil thickness=35μm）/1A**

PWB Specifications for temperature rise evaluations are as follows.



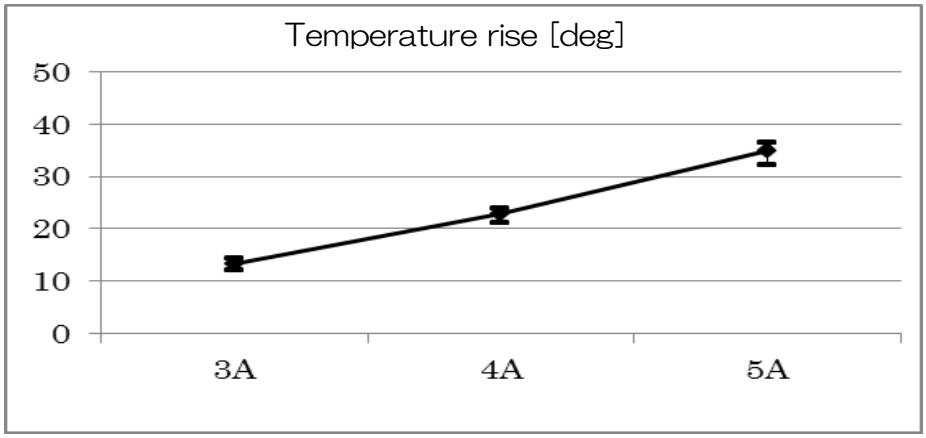
1.2.3(1) PWB for temperature rise evaluations of

Material：FR-4
PAD：Recommended pattern
Recommended Power contact pattern width：3mm
Recommended Signal contact pattern width ：0.3mm
Copper foil thickness：35μm
PWB size 70×20×0.8mm



1.2.3(2) PWB for temperature rise evaluations of plug

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：35μm
PWB size：38×4×0.435mm
*including stiffener



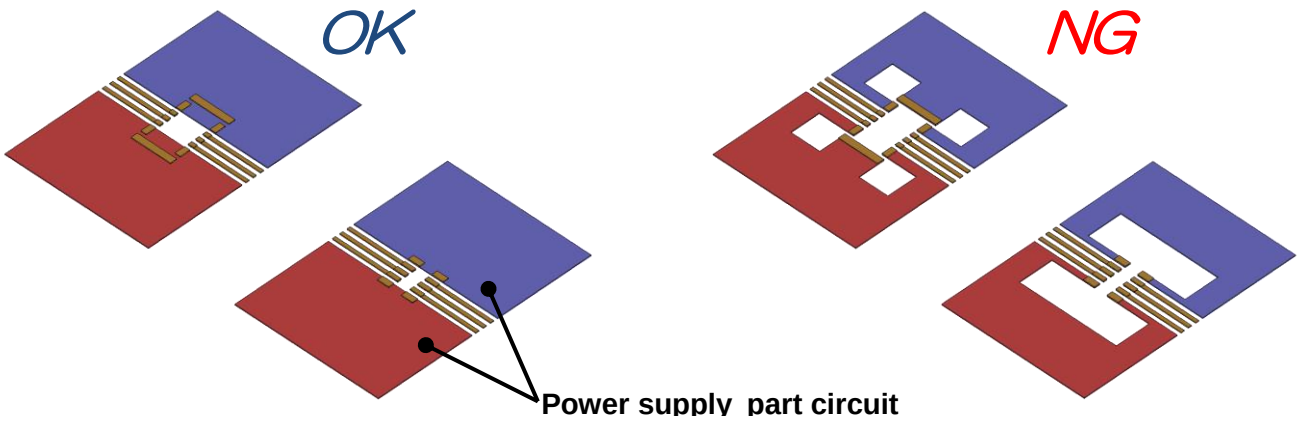
	3A	4A	5A
MAX	14.3	23.9	36.5
MIN	12.1	21.0	32.1
AVG	13.40	22.87	34.83

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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

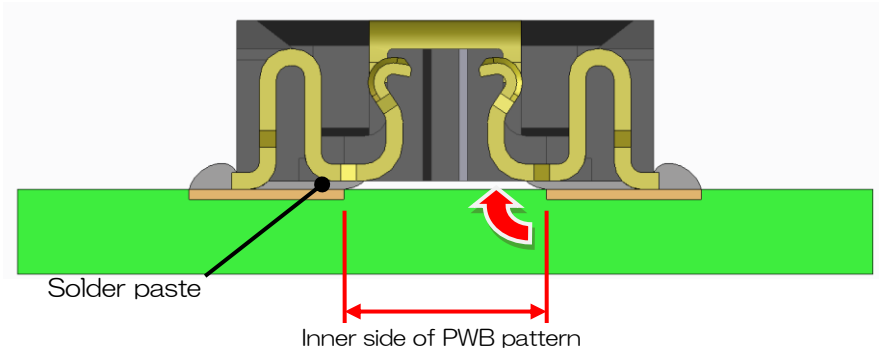


• Please design PWB layout properly so that fillet are properly formed.

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

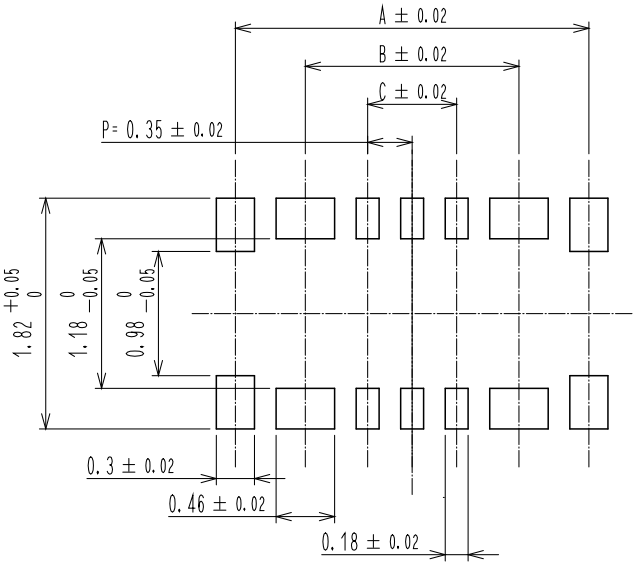
• When mounting the connector, please consider the bending of FPC by heating, and use FPC with low risk of bending.

It may cause bending when heating.

2. Notice for Mounting

2.1 Metal mask design

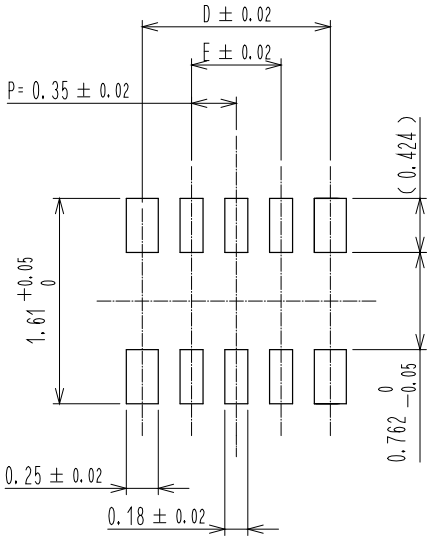
Make sure the latest specification when designing.



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%

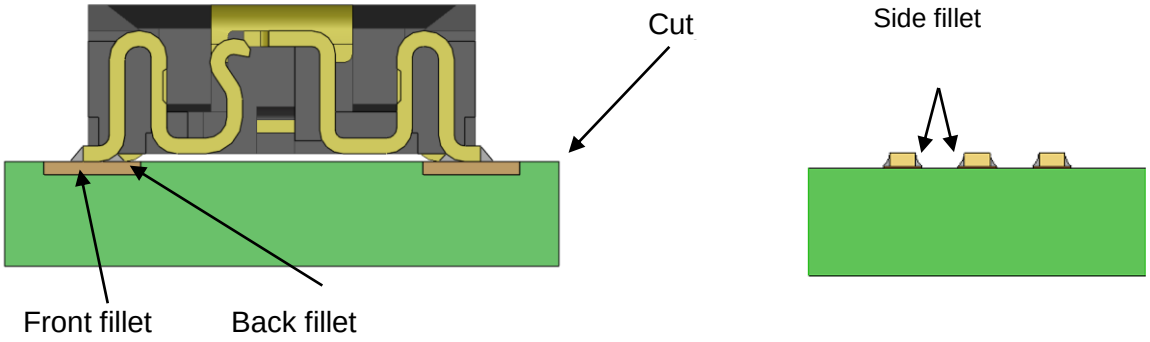
Fig 2-1.(2) Recommended stencil layout of plug (BM29＊-＊DP/2-0.35V)

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.

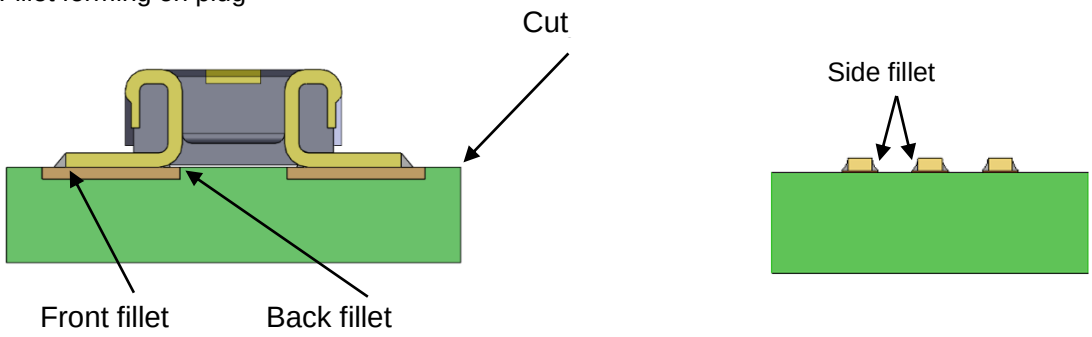
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2.2 Fillet forming

Fillet forming on receptacle



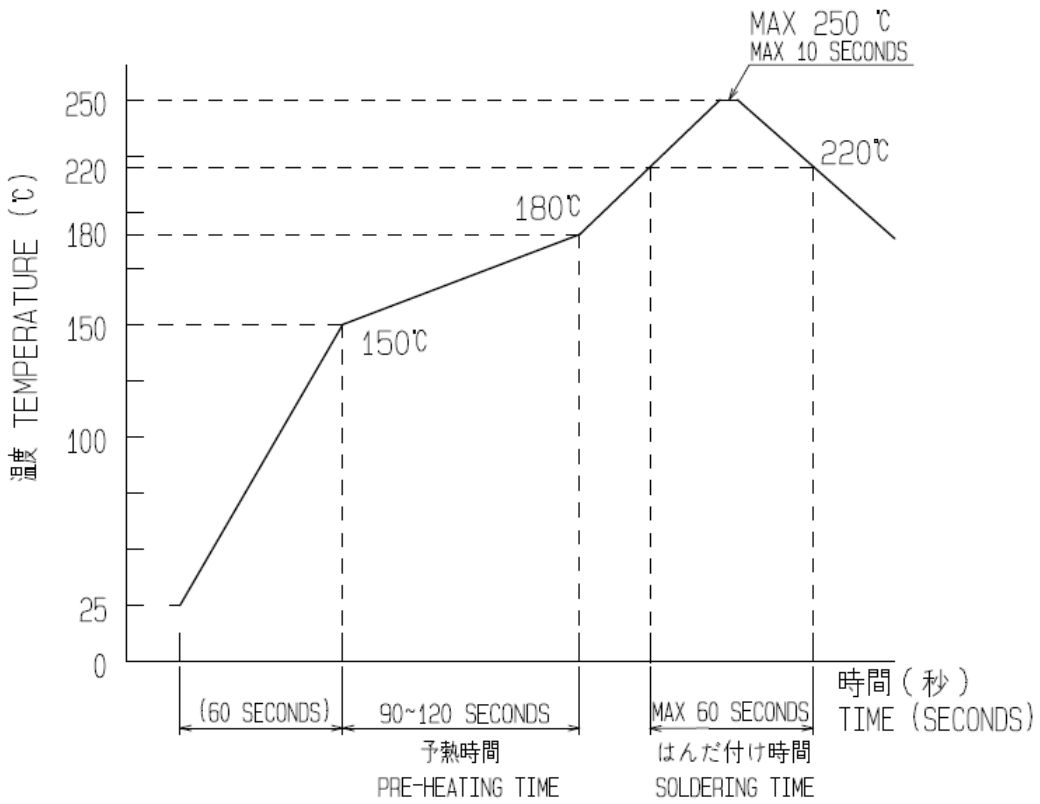
Fillet forming on plug



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 N_2 reflow

Set O_2 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

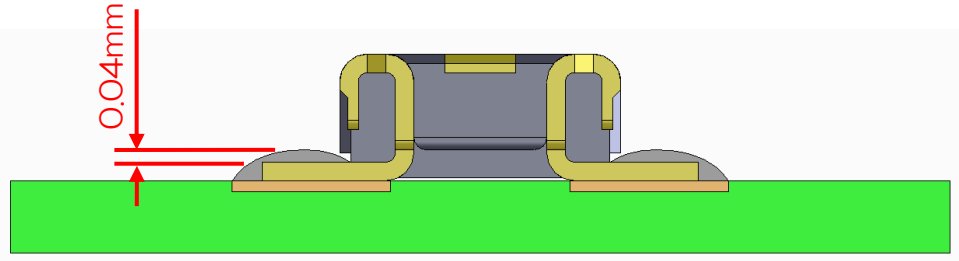
Repairing condition:
・Soldering iron 350° C, 3seconds MAX
Notice:
・Please do not put stress on contacts.
・Please do not touch housing with a soldering iron.

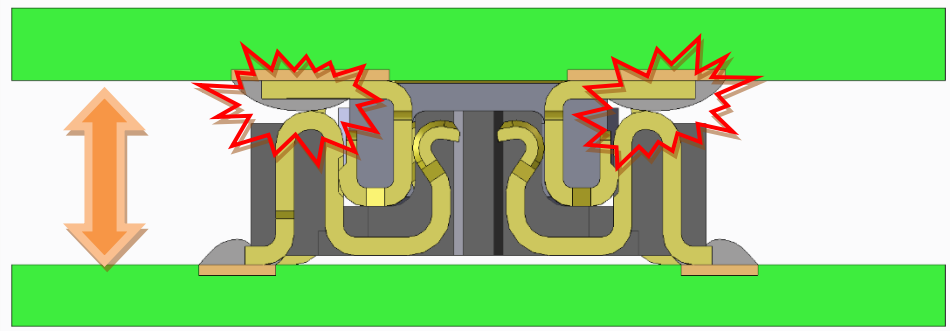
Plug

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

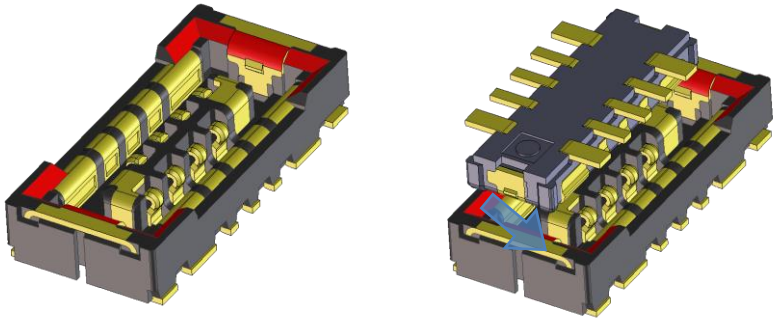
3.1 Insertion methods

Please mate BM29 connectors by hand

Manual for inserting operation

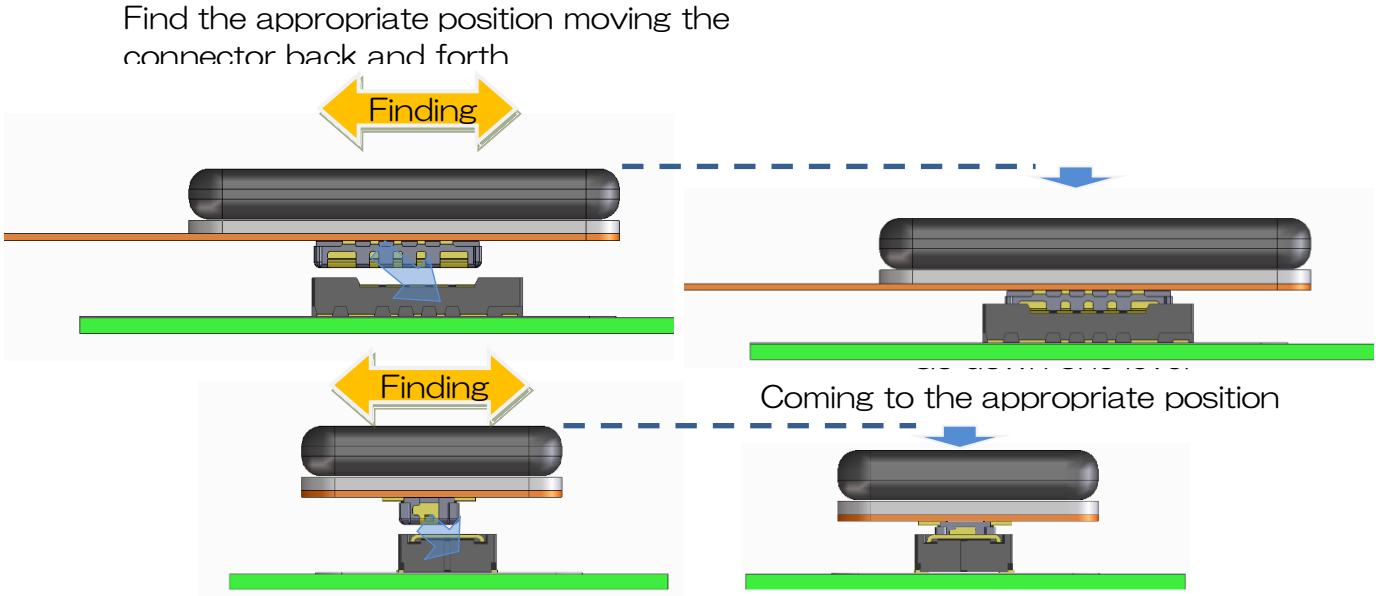
1） **Find the alignment area with hand to locate the connector in the appropriate mating position.**

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.



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.**

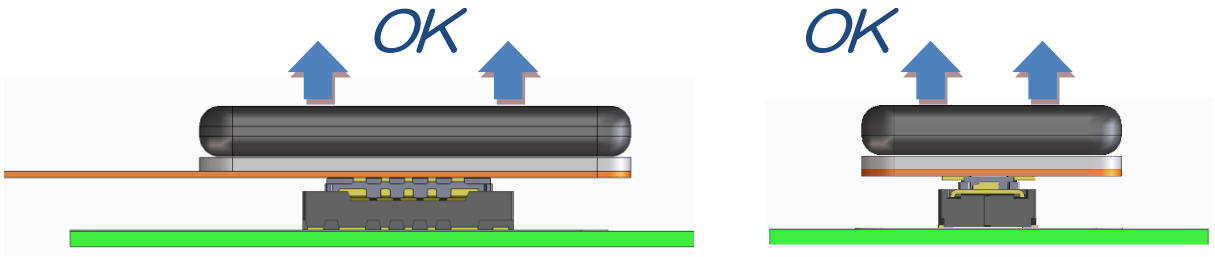
If one side is floating or the connectors are mated at a slant, please unmate once, and then mate them once again, following the procedures above from the beginning.

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3.2 Un-mating methods

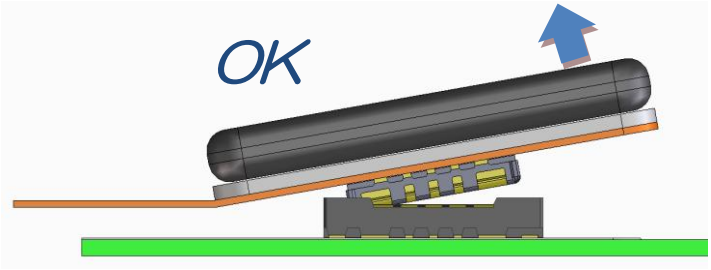
1）Vertical Direction

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.

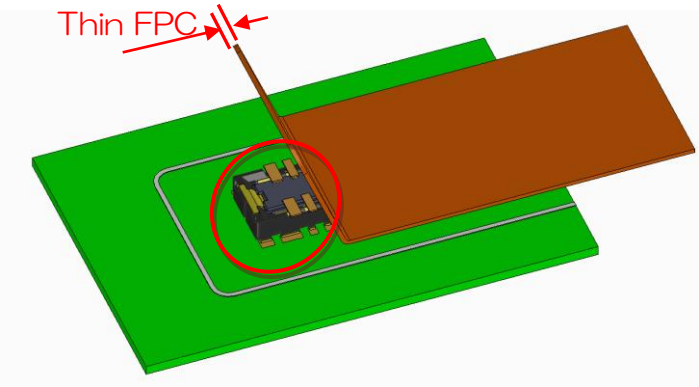


3）Extraction from width direction

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.

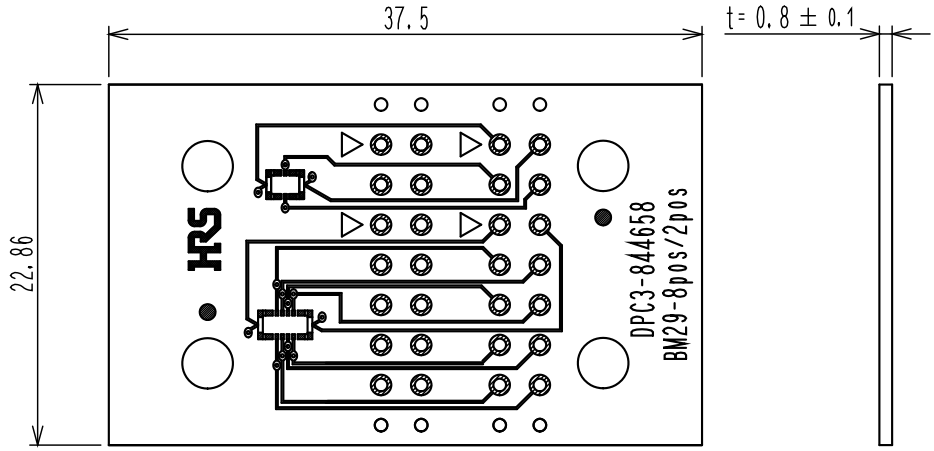


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4. PWB and Solder Paste for Evaluation Test

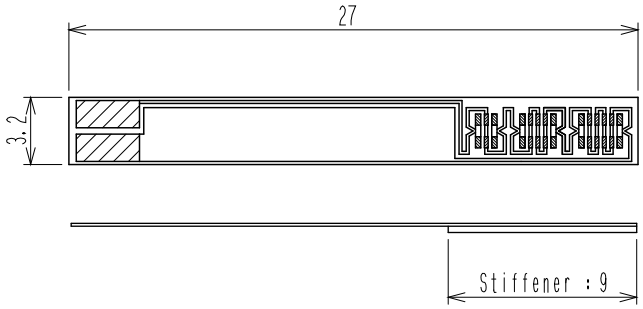
4.1 Contact Resistance Measurement

◆PWB for Receptacle（PWB）



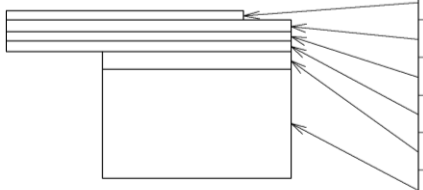
Copper foil thickness：35μm

◆PWB for Plug（FPC）



Copper foil thickness
：35μ

FPC Material Configuration



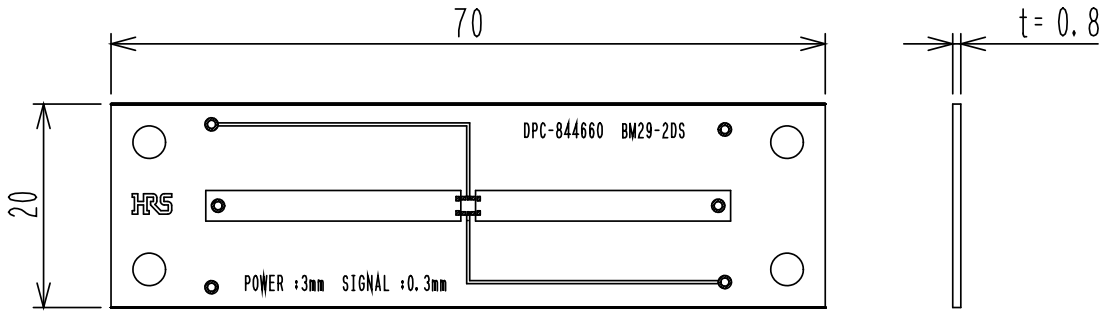
[μm]

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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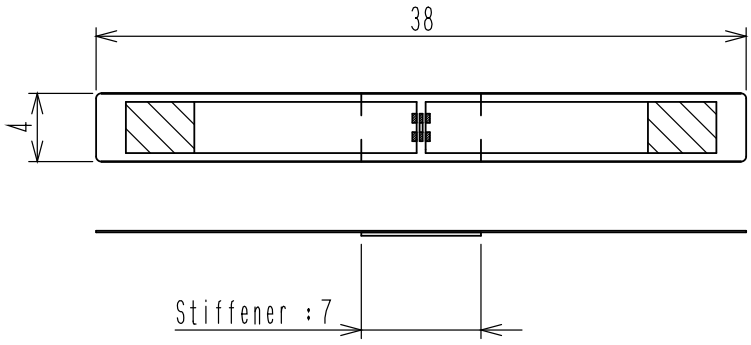
4.2 Temperature Rising Test

◆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

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