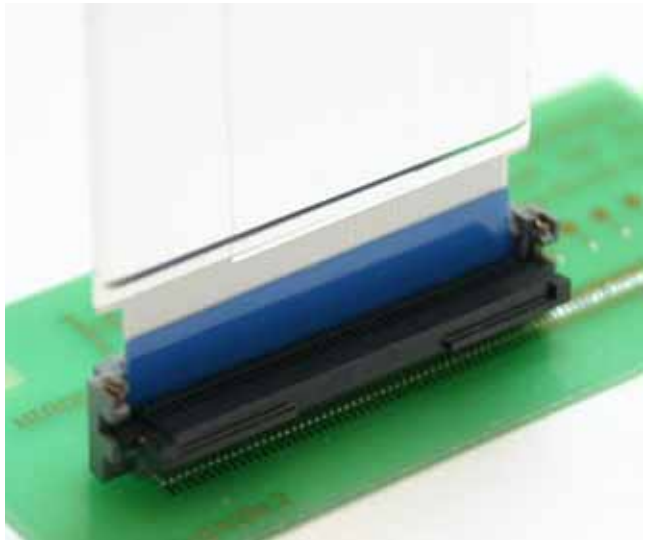
FH48 Series

0.5 mm Pitch, Robust Vertical Mount, High Speed Transmission Shield FFC Connector



Supports next gen. chip V-by-One® HS* by THine

*High speed serial interface technology for picture transmission

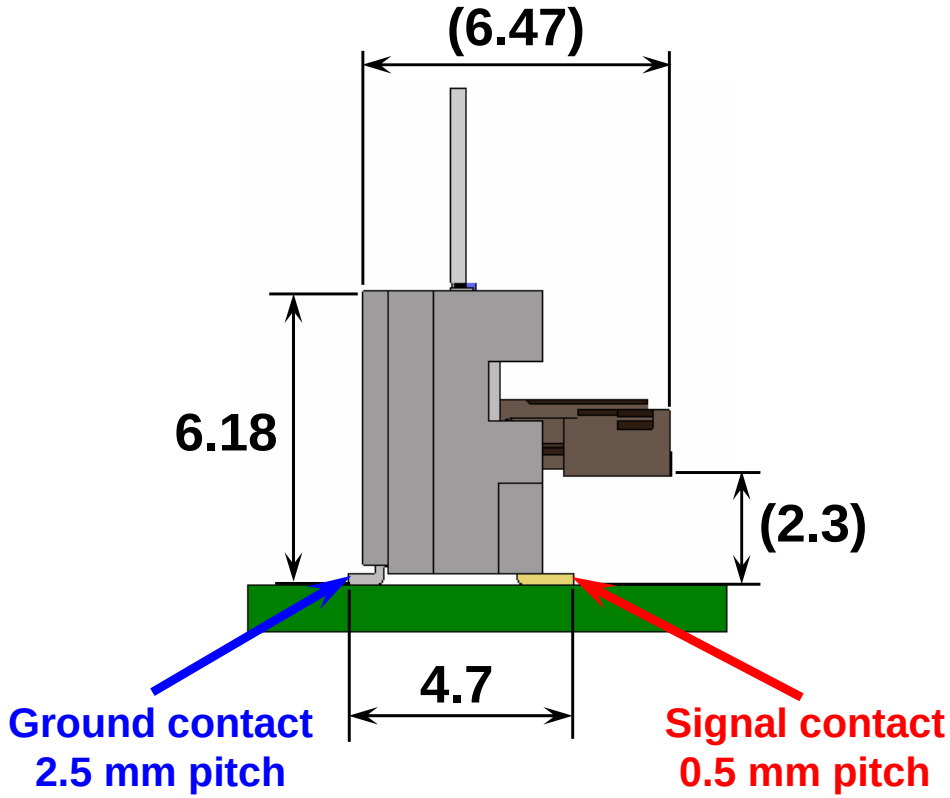
V-by-One HS

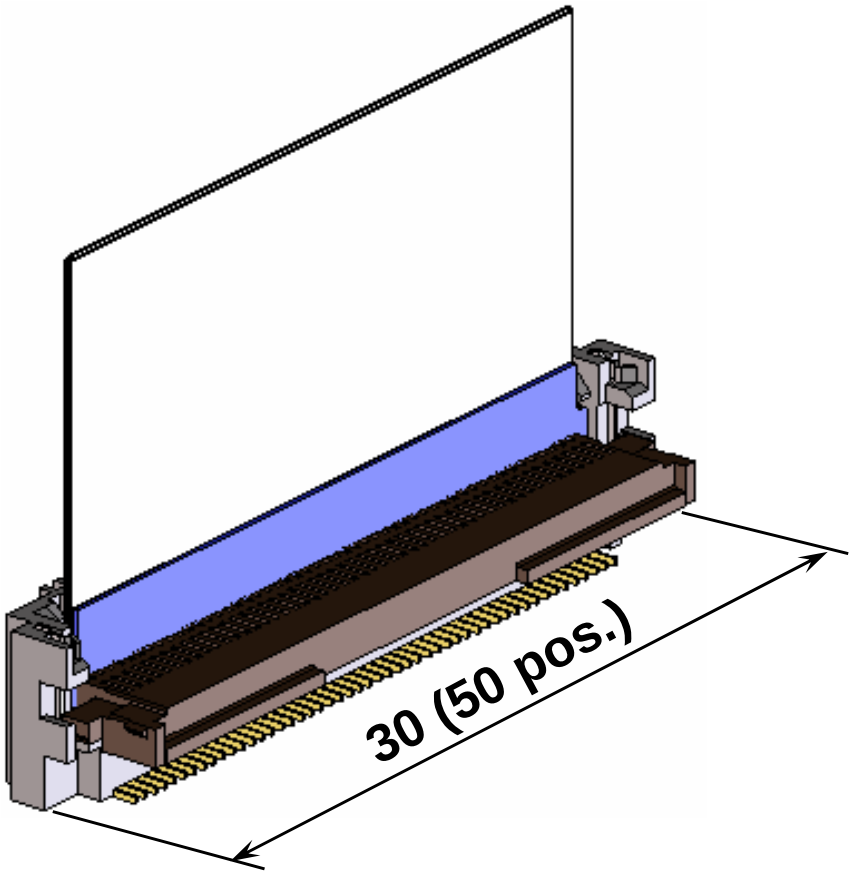
♦Features

1. Accepts impedance matched shielded FFC with ground contacts
2. Differential impedance 100 Ω ± 10 % (1 Gbps+)
3. Firm & clear tactile click to confirm lock completion
4. Robust lock structure
5. LIF structure and FFC tabs allow high connection reliability
6. Utilizes same FFC as horizontal FH41
7. Solder wicking prevention
8. Visible SMT leads for visual check
9. RoHS compliant, Halogen-free product*

*This product satisfies halogen free requirements defined as 900 ppm maximum chlorine, 900 ppm maximum bromine, and 1500 ppm maximum total of chlorine and bromine.

Dimensions





FFC:
t (Contact area for signal) = 0.3 mm ± 0.05
t (Contact area for grounding) = 0.5 mm ± 0.05

[Locked position]

All dimensions in millimeters.

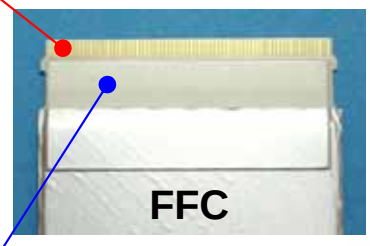
HIROSE ELECTRIC CO.,LTD.

High Speed Transmission Capability

Impedance Matched Shielded FFC

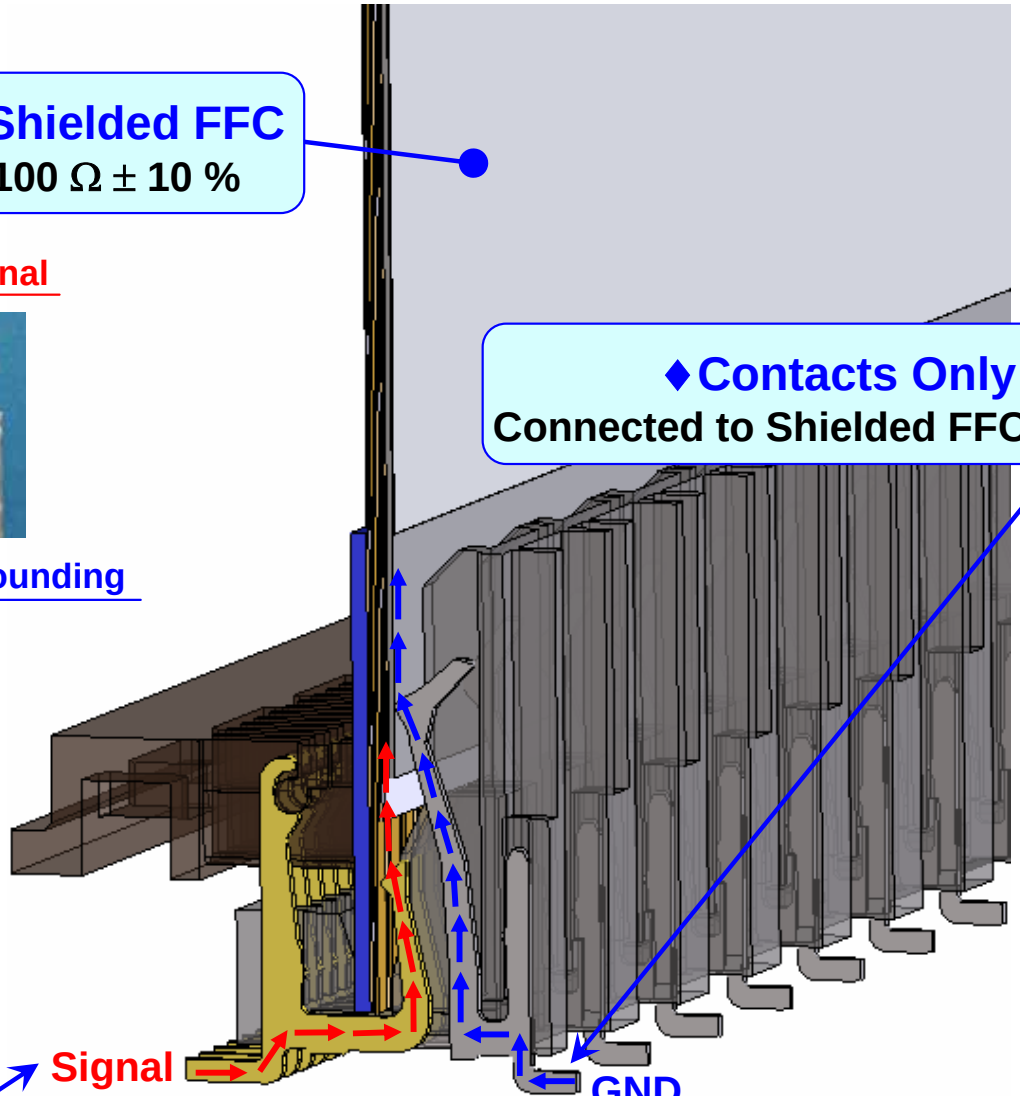
♦**Impedance Matched Shielded FFC**
Differential Impedance: 100 Ω ± 10 %

Contact area for signal



Contact area for grounding

♦**Contacts Only for Grounding**
Connected to Shielded FFC for Impedance Matching



♦**Impedance Controlled Contact Design**
Differential Impedance: 100 Ω ± 10 %

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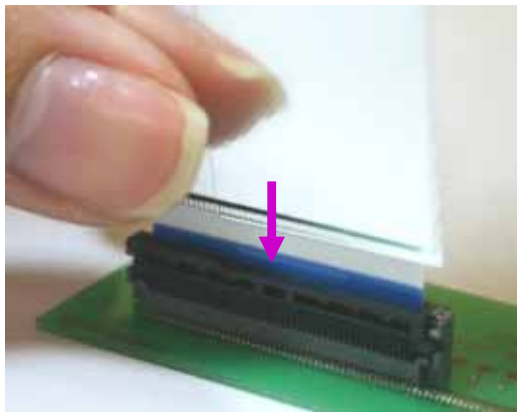
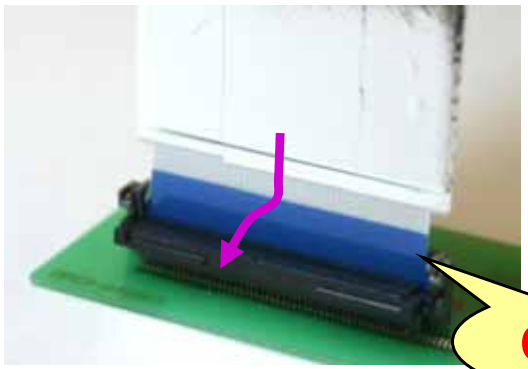
Easy FFC Insertion & Smooth Locking

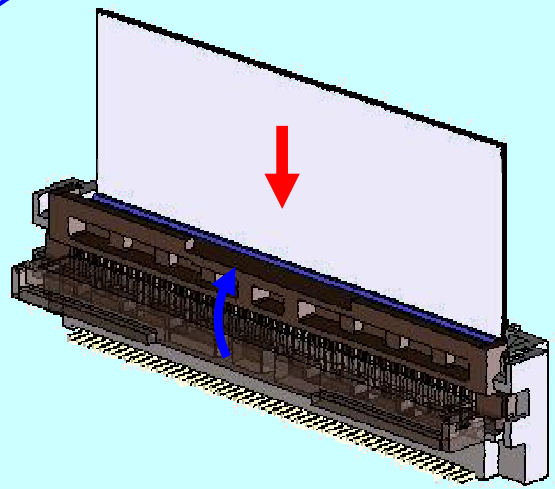
From insertion to locking, in a single stroke!

Insert FFC

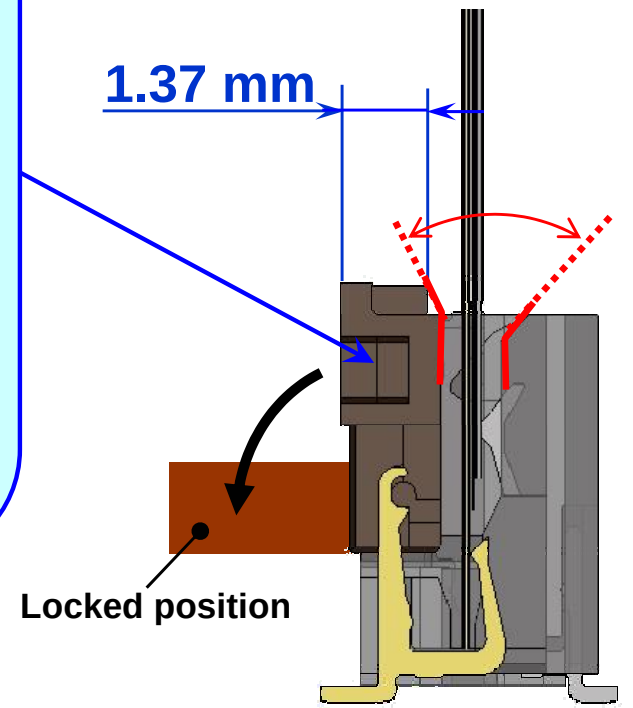


Close actuator to lock





Actuator is flipped up by inserted FFC even when the actuator is in closed position, which even broadens the FFC insertion opening.



[Delivered with actuator in open position]

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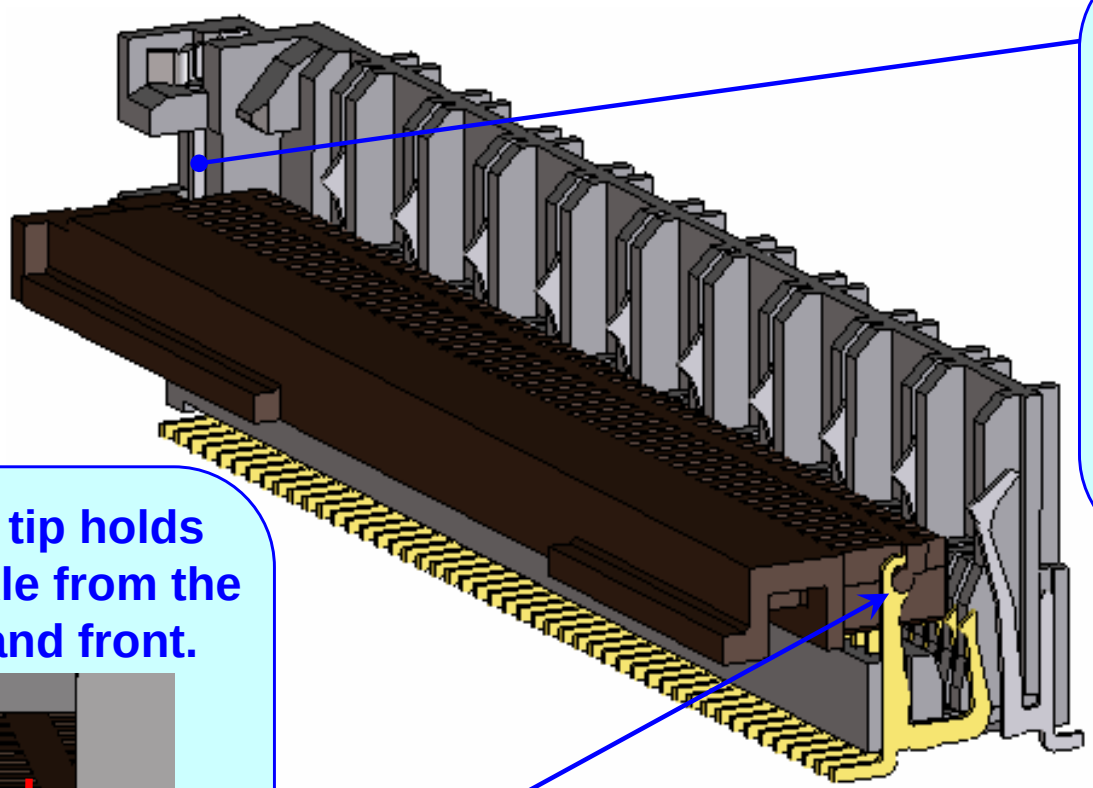
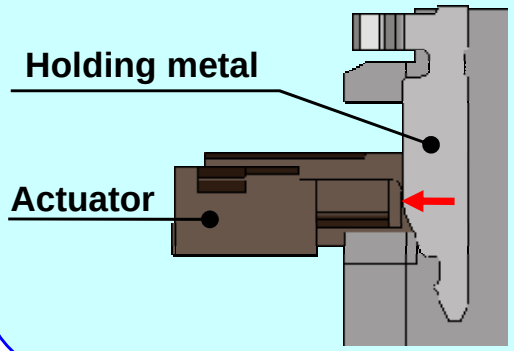
Robust Lock Structure

♦Robust actuator

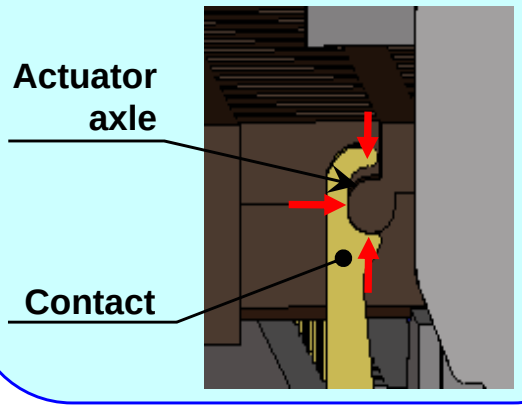
Actuator is supported by contact and holding metal for stabilized operation.



Holding metal firmly supports rotating actuator from the back.



Each contact tip holds the actuator axle from the top, bottom and front.



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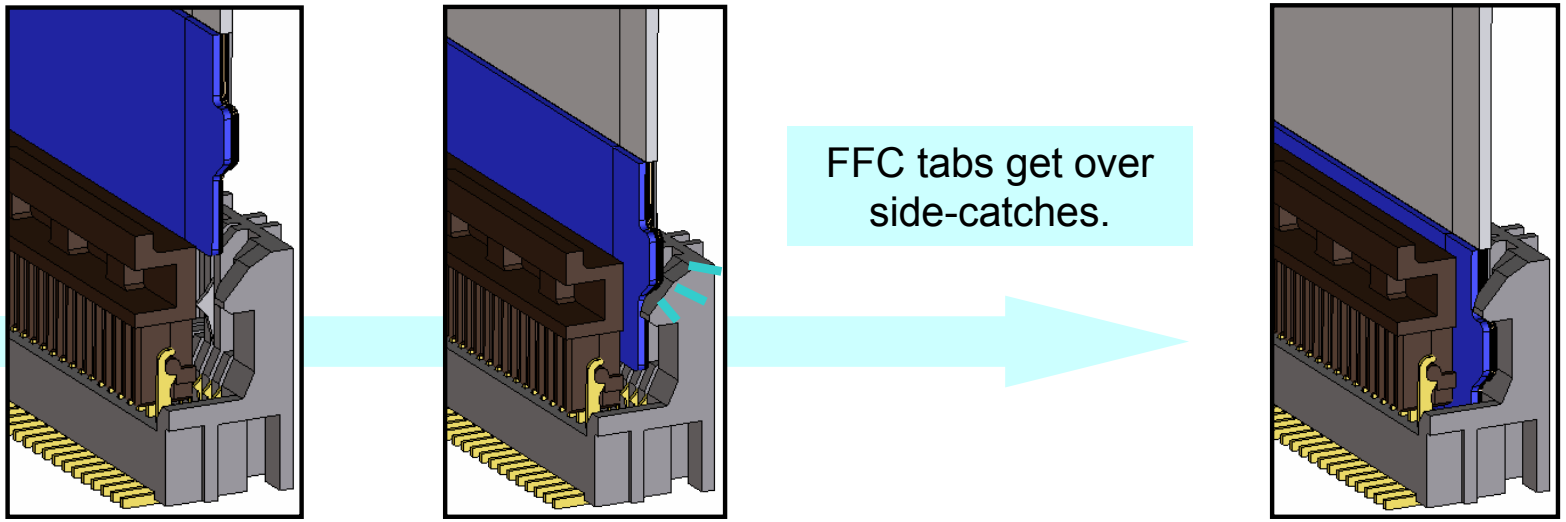
LIF Structure for High Reliability

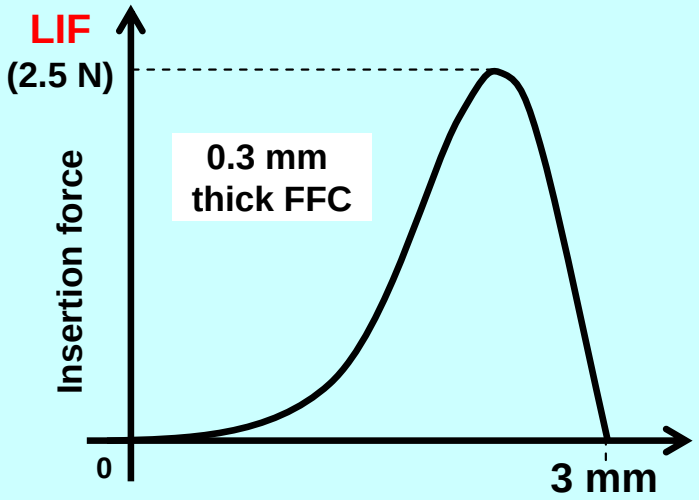
Insertion

Stable temporary holding state



FFC tabs get over side-catches.

FFC insertion load curve (Image)

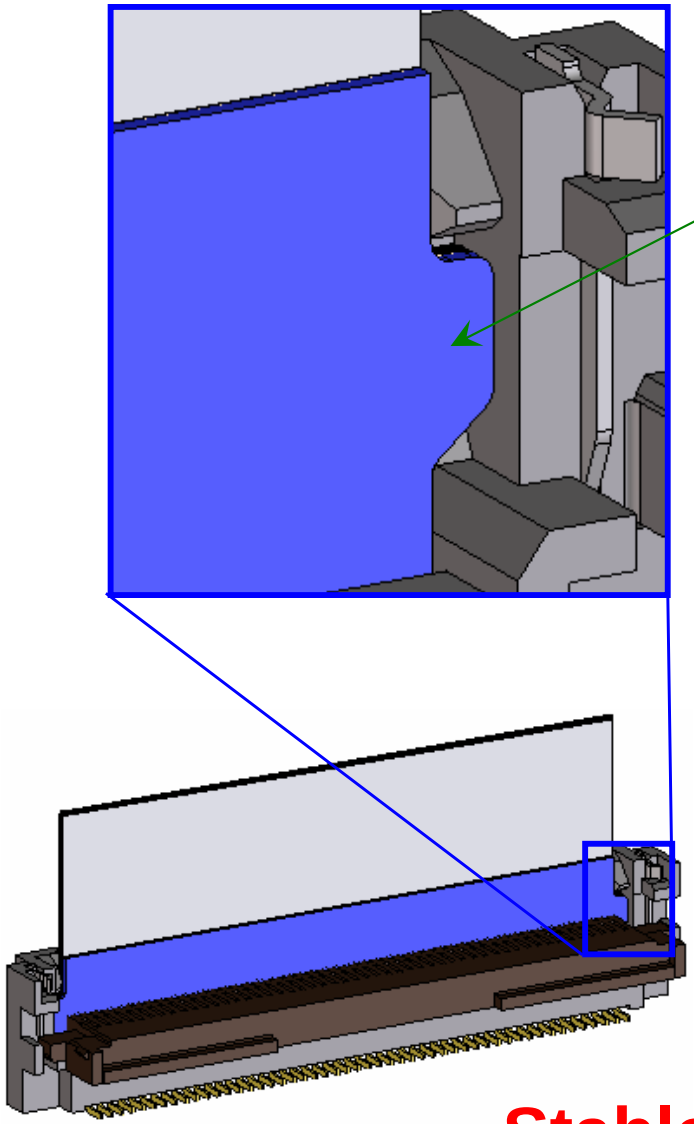


Advantages of LIF structure

FFC is pushed to the mated position immediately after the insertion force reaches the peak.

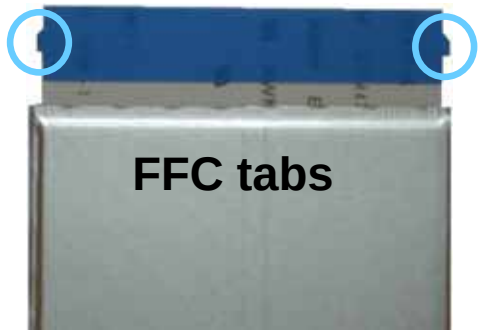
Incomplete insertion prevention

FFC Side Catches



Side-Catches
catch the FFC tabs in place

- Stable FFC temporary holding
- Easy and accurate FFC guided positioning
- Consistent connection quality with all operators
- High FFC retention force
  40 N Min. (Upward direction, 50 pos.)



Stable & Reliable Connection

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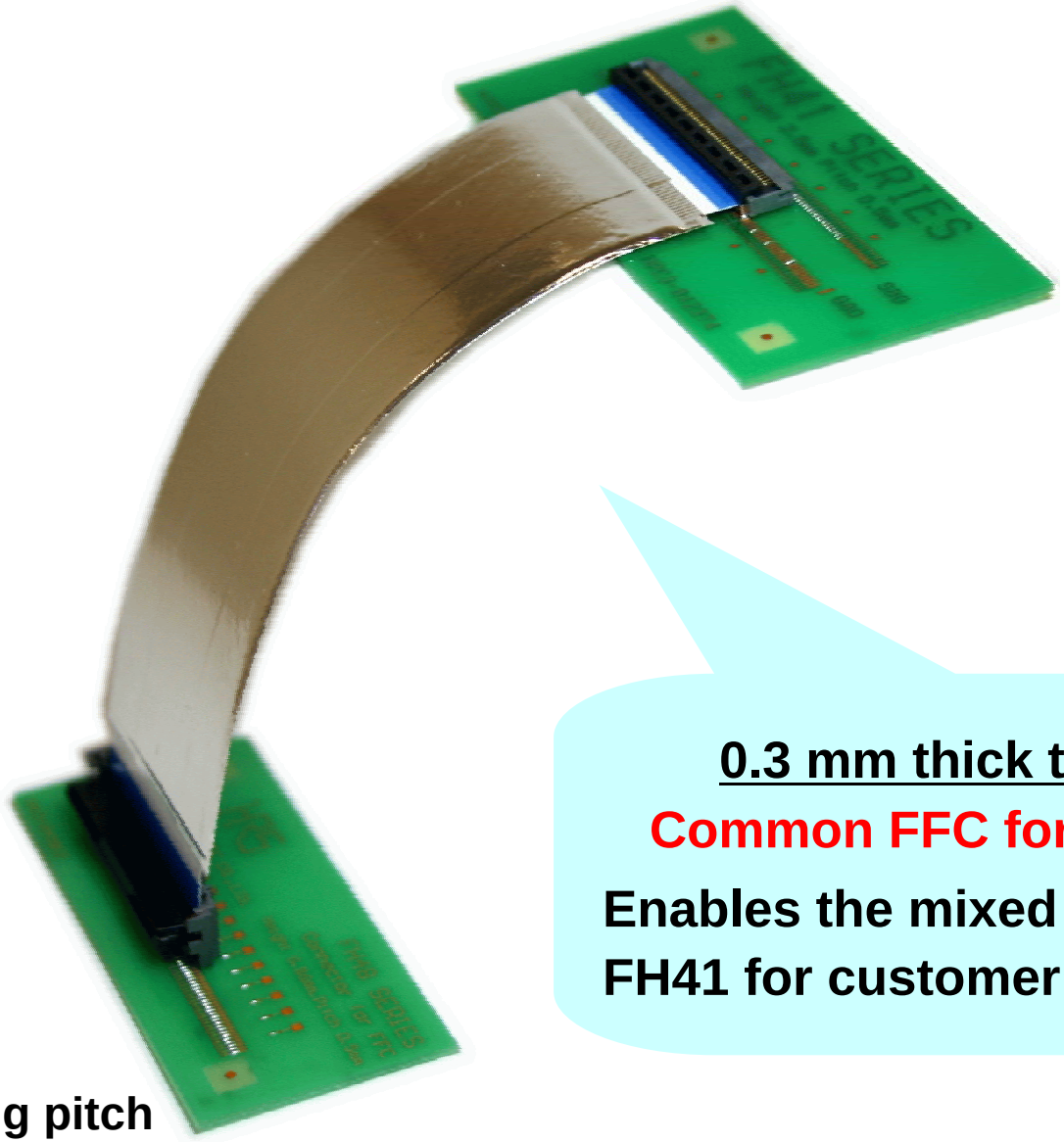
Compatible FFC with FH41



FH41

Horizontal type

0.5 mm pitch
2.5 mm grounding pitch
2.5 mm height

0.3 mm thick tabbed FFC

Common FFC for FH48 and FH41

Enables the mixed use of FH48 and FH41 for customer's convenience.

FH48

Vertical type

0.5 mm pitch
2.5 mm grounding pitch
6.18 mm height

***PCB layout is not compatible with FH41.**

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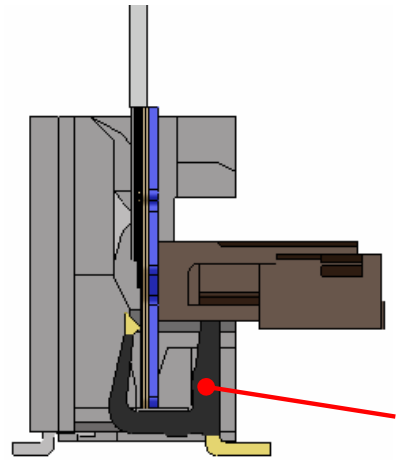
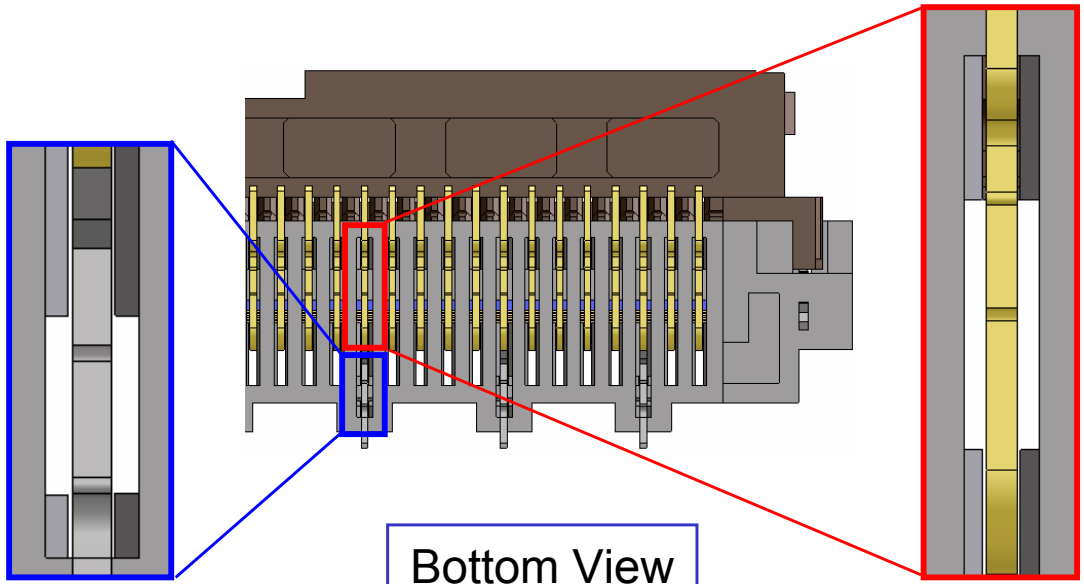
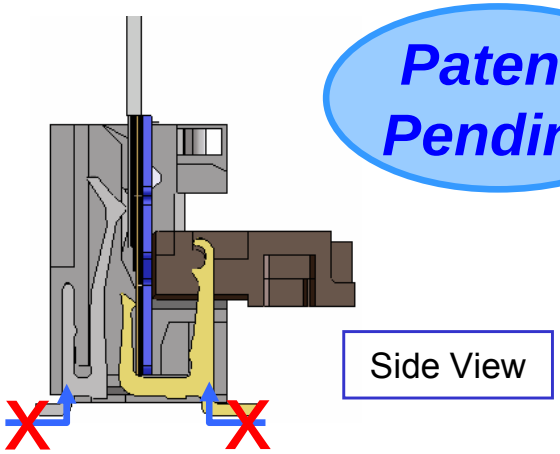
Solder Wicking Prevention

♦Partially exposed nickel under plating on the contacts avoids solder wicking



♦Wide gap between contacts and housing





Patent Pending

Wide gap between contacts and housing prevents capillary phenomenon which delivers solder and flux to the contact point.

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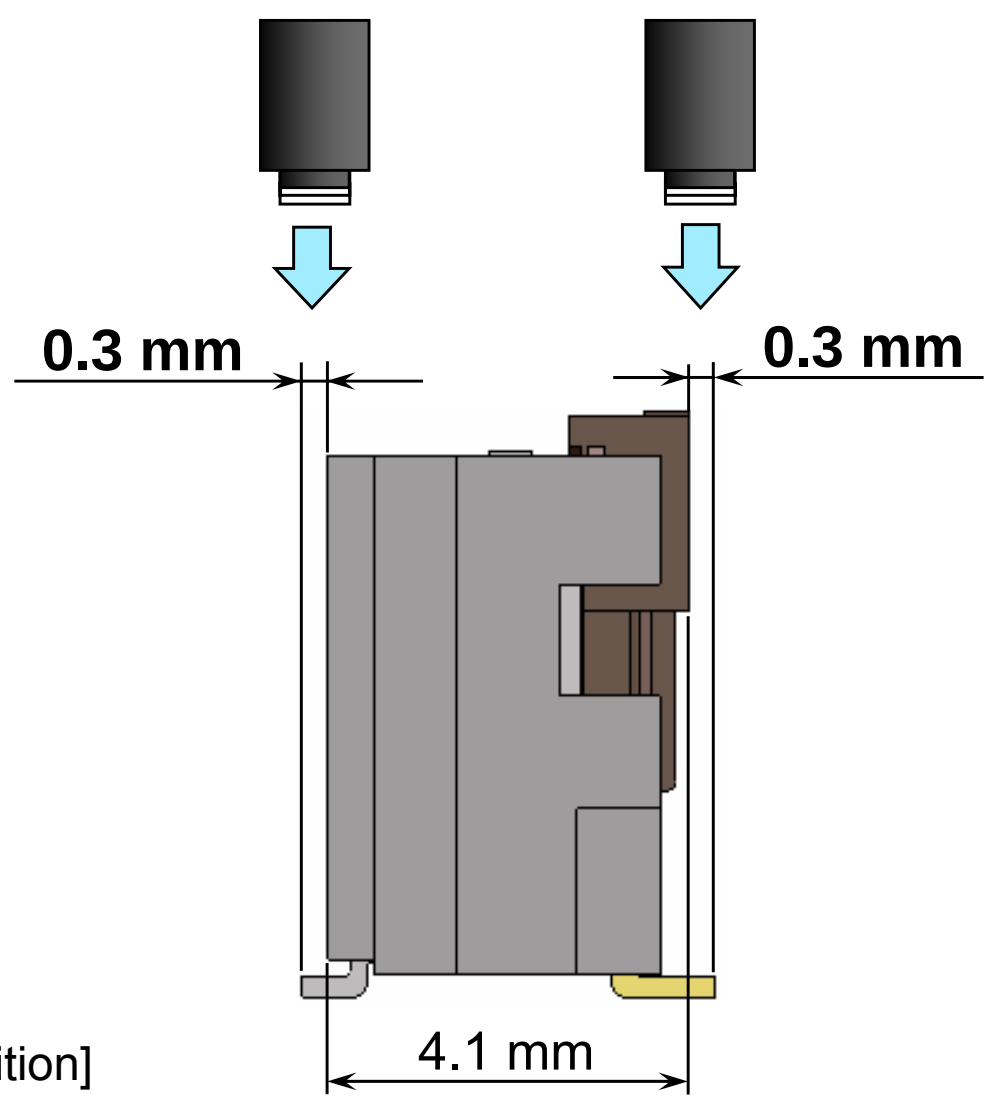
Visible SMT Lead for Visual Check

♦The solder joints can be visually checked from above.



[Opened position]

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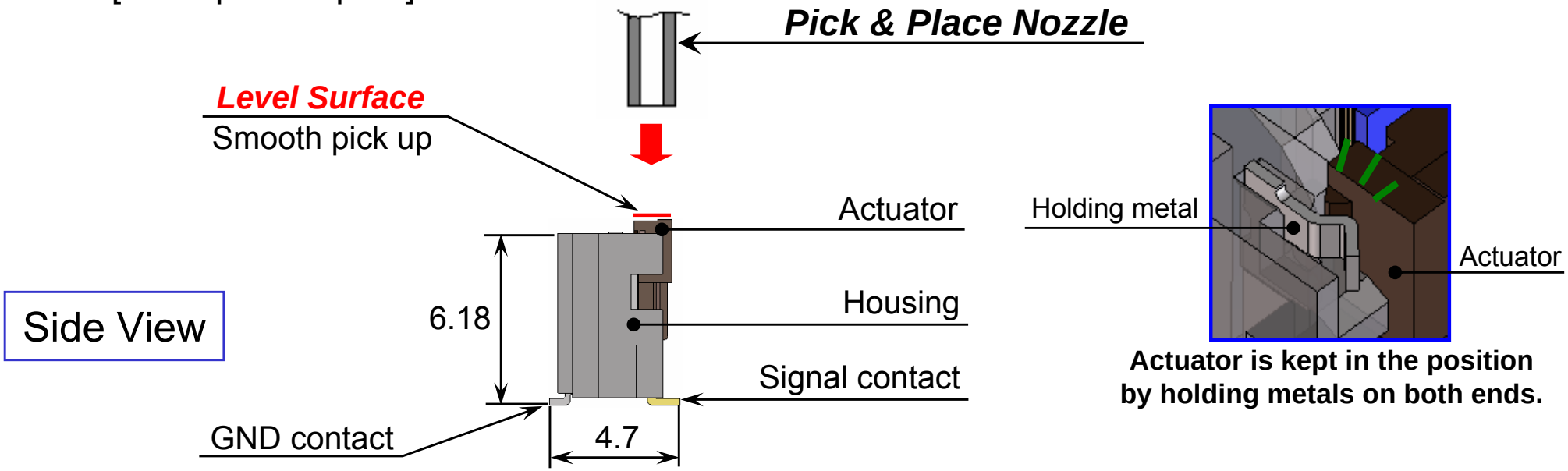
Automatic Mounting

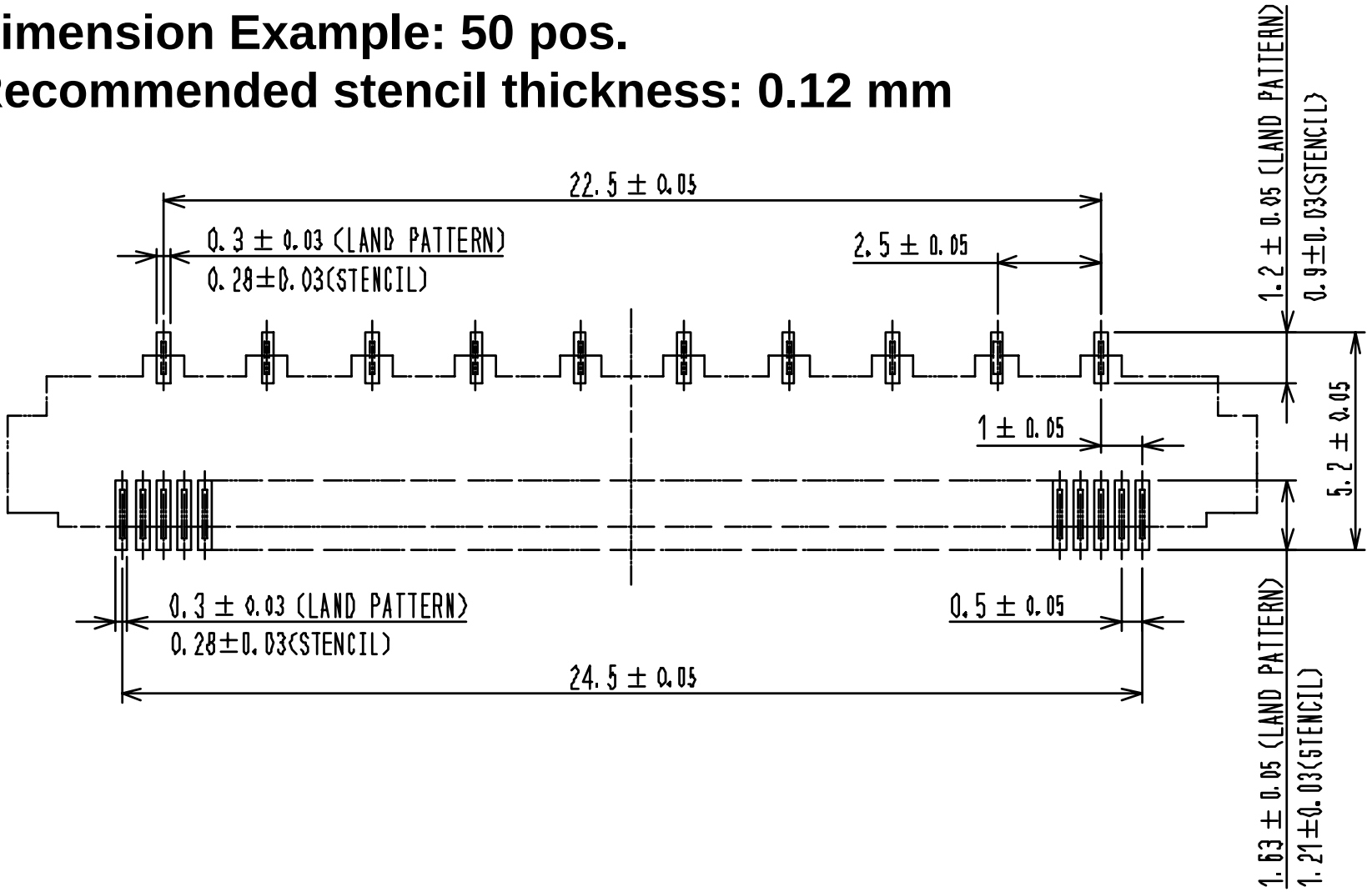
♦Recommended Vacuum Pick Up Area

[Example: 50 pos.]



Recommended PCB Layout

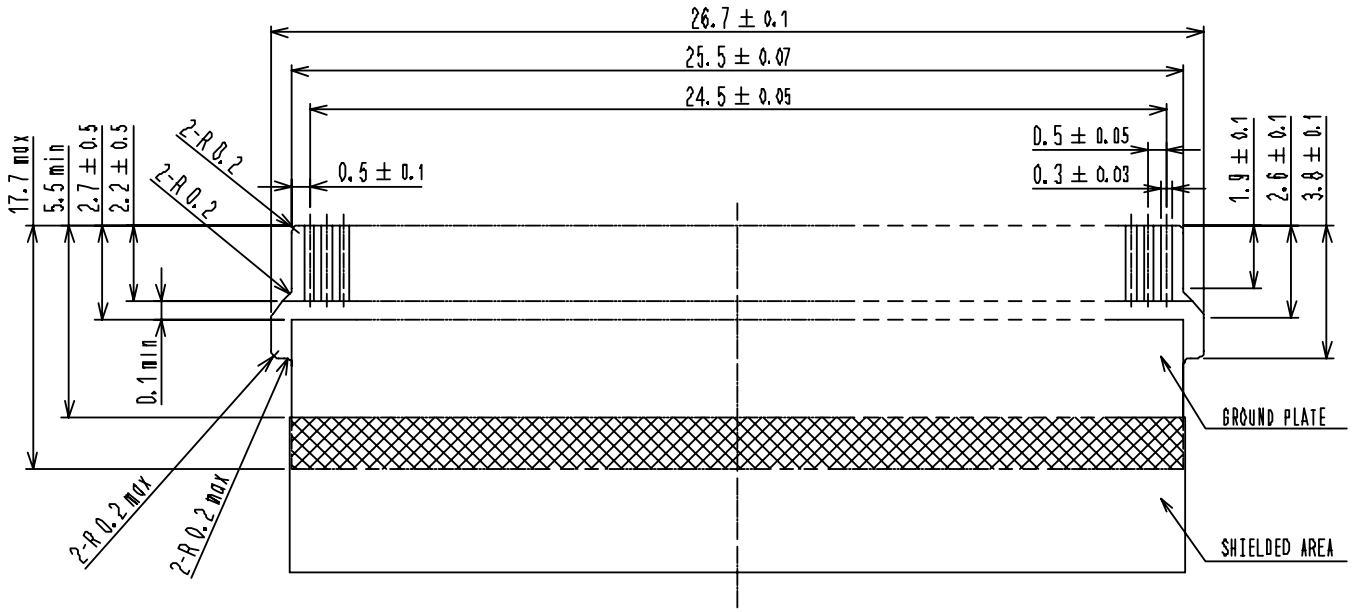
♦**Dimension Example: 50 pos.**
Recommended stencil thickness: 0.12 mm

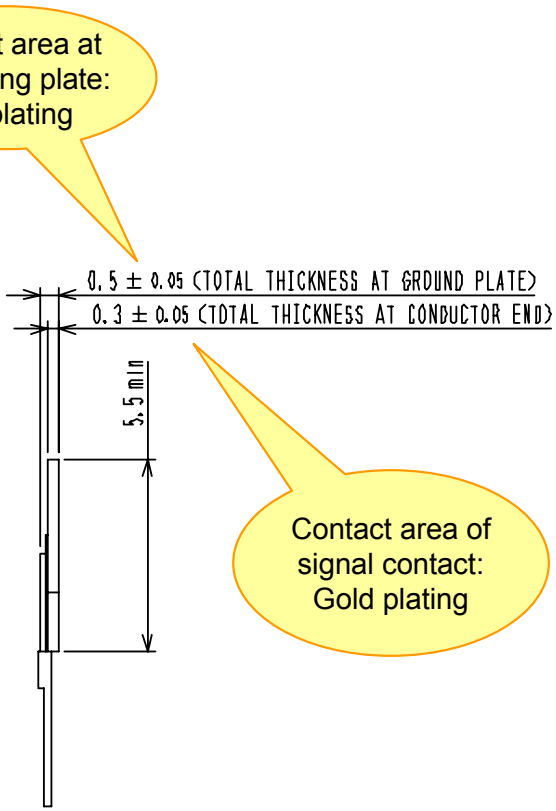


(All dimensions in millimeters)

Recommended FFC Layout

♦Dimension Example: 50 pos.





(All dimensions in millimeters)

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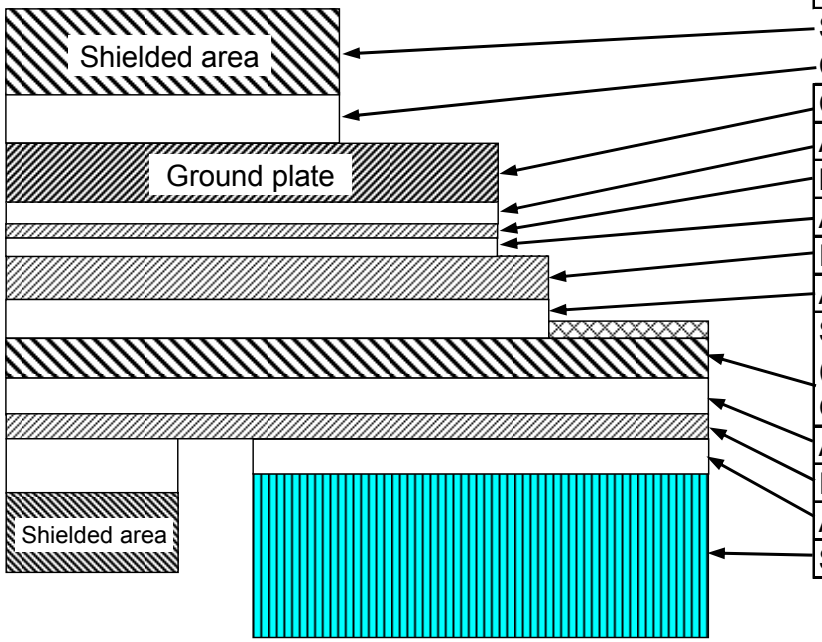
FFC Material Configuration Examples

This specifies the recommended FFC configuration mating area.
The applicable FFC mating area thickness: Contact area for signal = 0.3 mm ± 0.05
Contact area for grounding = 0.5 mm ± 0.05

Single-sided



Layer	Material	Total Thickness at Ground Plate (µm)	Total Thickness at Conductor End (µm)
Shielding Material			
Conductive Adhesive	Polyester Type		
Copper Foil (Tin plating)		70	
Adhesive	Acrylic Type	24	
Base Film	Polyester Type	12	
Adhesive	Acrylic Type	24	
Insulator Layer	Polyester Type	25	
Adhesive	Polyester Type	35	
Soft Copper Foil (Nickel Under Plating / Gold Plating)		35	35
Adhesive	Polyester Type	35	35
Insulator Layer	Polyester Type	25	25
Adhesive	Polyester Type	30	30
Stiffener	Polyester Type	188	188
	Total	**503**	**313**

1. This configuration example is for reference.
2. Please consult FFC suppliers for configuration details.

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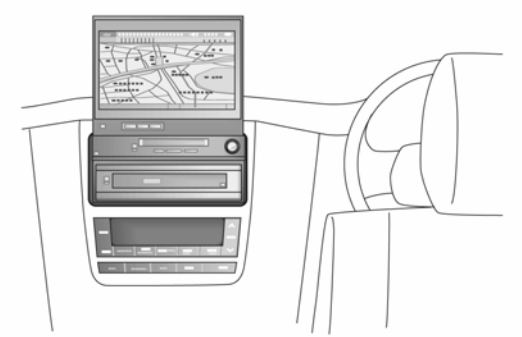
Application Examples

Car Navigation, Car Audio



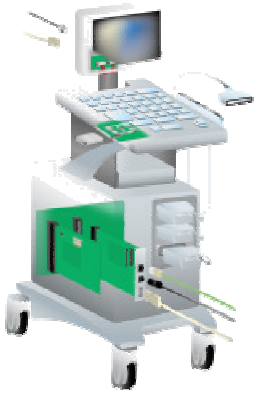
Notebook PC

LCD TV PDP, Digital TV

DVD Player / Recorder

Game Machine

Medical Equipment



Industrial Equipment

PPC, MFP

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Specifications

• Material and Finish

Component	Material	Finish & Remarks
Housing	LCP*1	Gray / UL94V-0
Actuator	LCP*1	Black / UL94V-0
Signal Contact	Phosphor Bronze	Contact area: Gold plated over Nickel under plating Other: Nickel plated
Ground Contact	Phosphor Bronze	Tin plated over Nickel and Copper under plating
Holding Metal	Phosphor Bronze	Nickel plated

• Performance Characteristics

Contact resistance*2	100 mΩ MAX.
Withstanding voltage	AC 150 V for 1 MIN.
Insulation resistance	500 MΩ MIN. (DC 100 V)
Rated current	0.5 Amp
Rated voltage	AC / DC 50 V

*1: This product satisfies halogen free requirements defined as 900 ppm maximum chlorine, 900 ppm maximum bromine, and 1500 ppm maximum total of chlorine and bromine.
*2: Includes FFC conductor resistance (L = 8 mm)

- **Applicable FFC thickness required at mating area: 0.3 ± 0.05 mm**
- **Variation: 21, 31, 40 and 50 pos.** Contact Hirose for available contact positions.

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High Speed Transmission Characteristics

- Differential Impedance
- Eye Diagram
- EMI Characteristics

Issued: Mar. 30, 2011

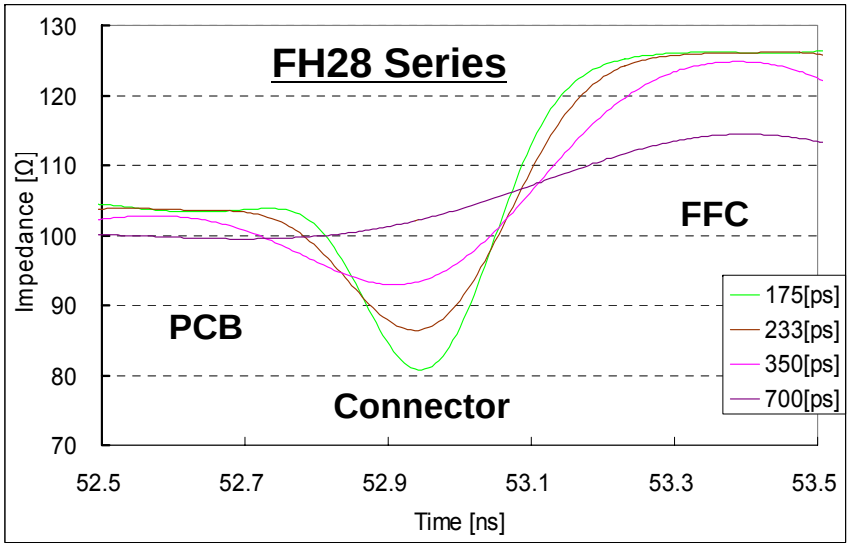
High Speed Transmission Characteristics
Differential Impedance

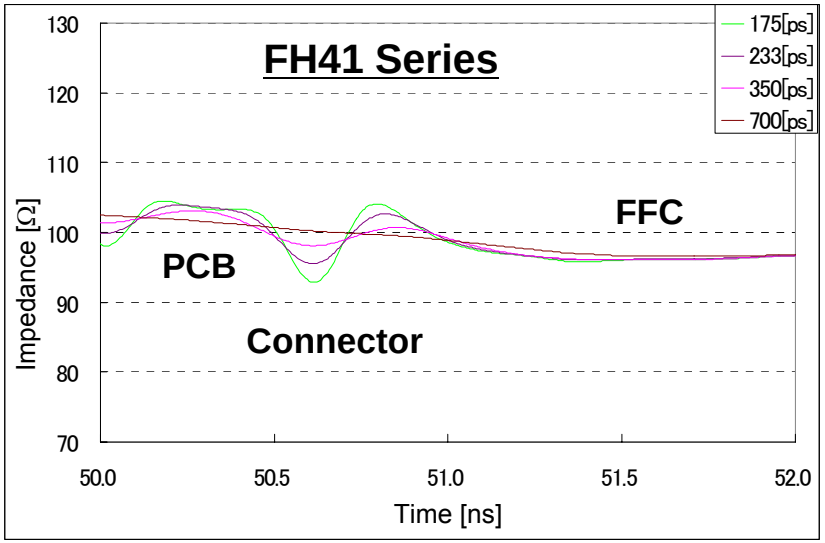
Input signal	Offset voltage: S+ 200 mV, S- 200 mV
	Rise time (Tr: 10 % - 90 %): 175 ps, 233 ps, 350 ps, 700 ps

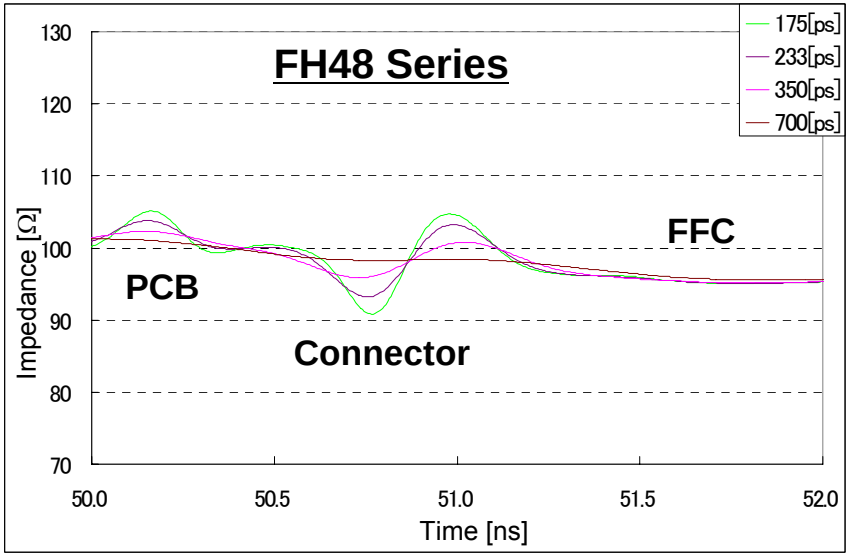
(Ω)

Tr	175 [ps]	233 [ps]	350 [ps]	700 [ps]
FH28-Normal FFC	81	86	93	99
FH41 HS FFC*	92.8	95.5	96.1	96.6
FH48 HS FFC*	90.8	93.3	95.2	95.6

*Manufactured by Hitachi Cable.







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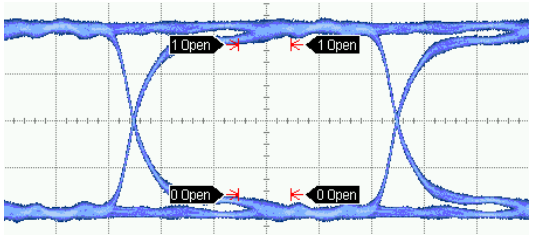
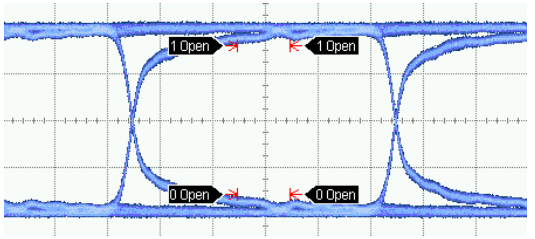
High Speed Transmission Characteristics
Eye Diagram -FH28 and FH41-

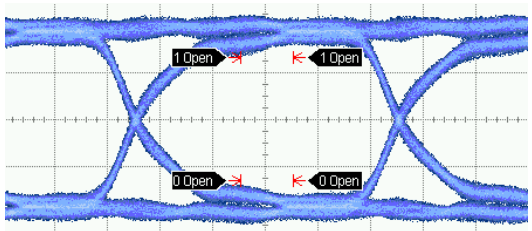
FH28 - Normal FFC (80 mm)

FH41- High Speed FFC (80 mm)

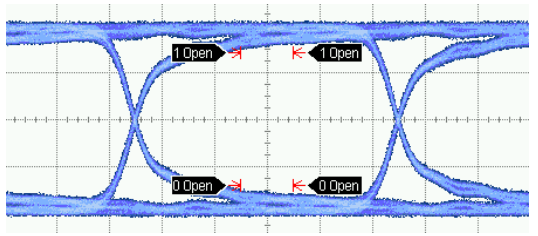


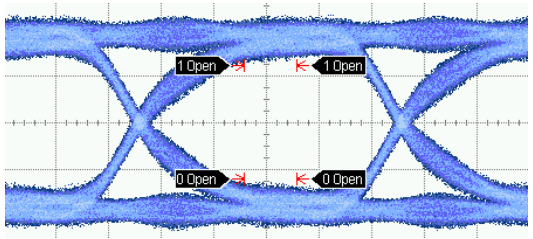
1 Gbps



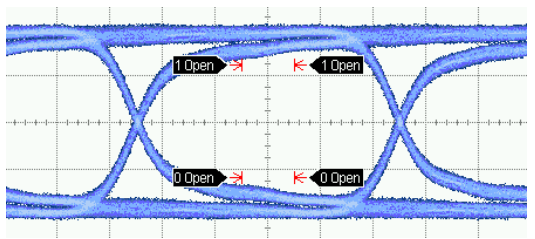


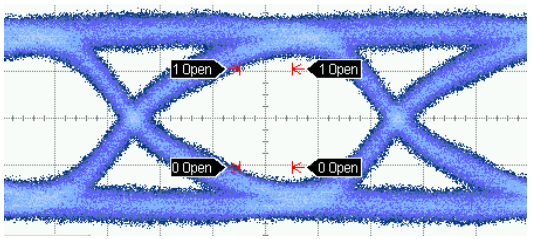
2 Gbps



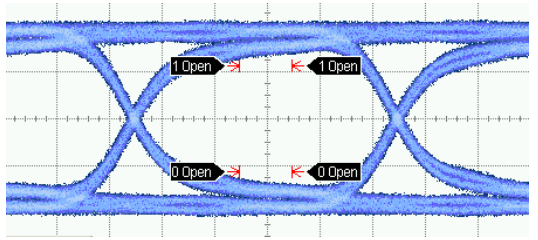


3 Gbps



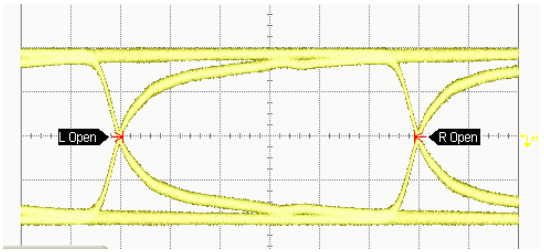


4 Gbps

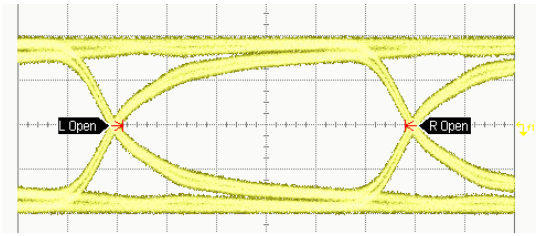


High Speed Transmission Characteristics
Eye Diagram -FH41 and FH48-

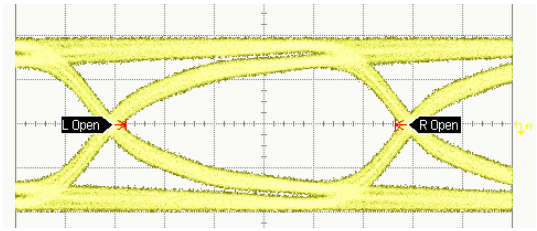
FH41 - High Speed FFC (500 mm)



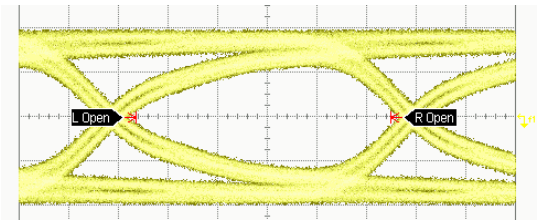
1 Gbps



2 Gbps

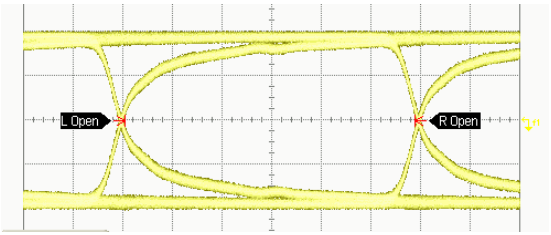


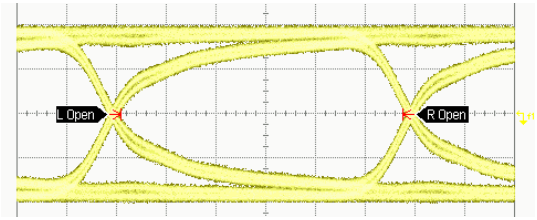
3 Gbps

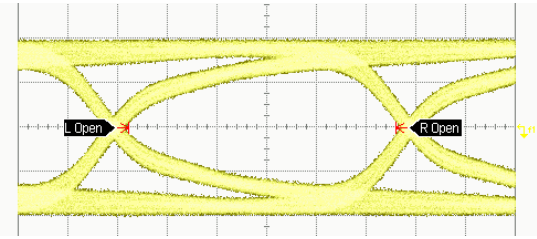


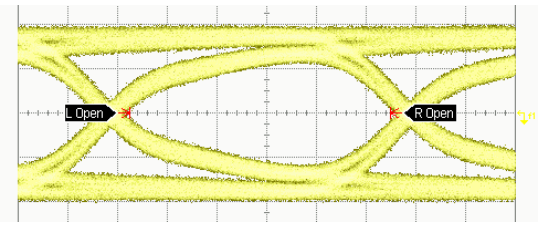
3.75 Gbps

FH48- High Speed FFC (500 mm)









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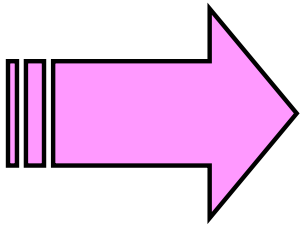
EMI Characteristics
Magnetic Near-Field Measurement Method

FH28 - Normal FFC

Measured area

EMI Map

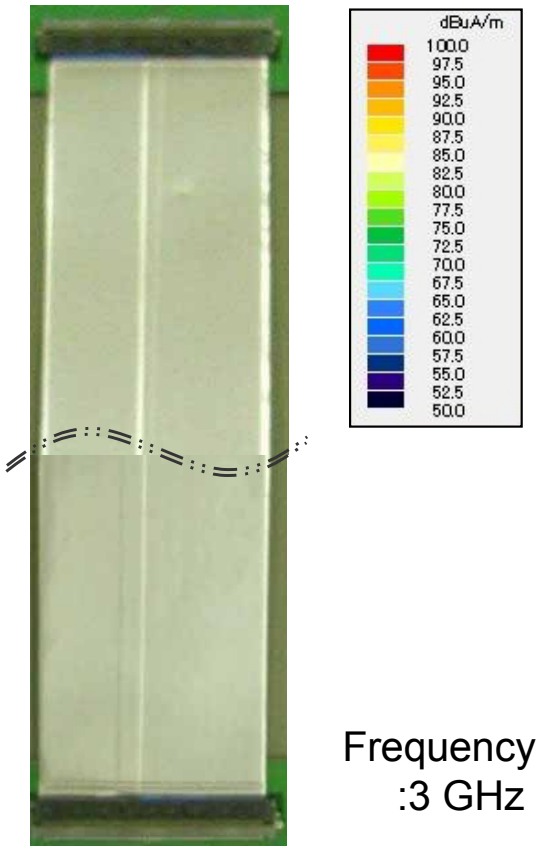


Drastic reduction of Noise

FH41 / FH48 – High Speed FFC

EMI Map

Measured area



Frequency
:3 GHz

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