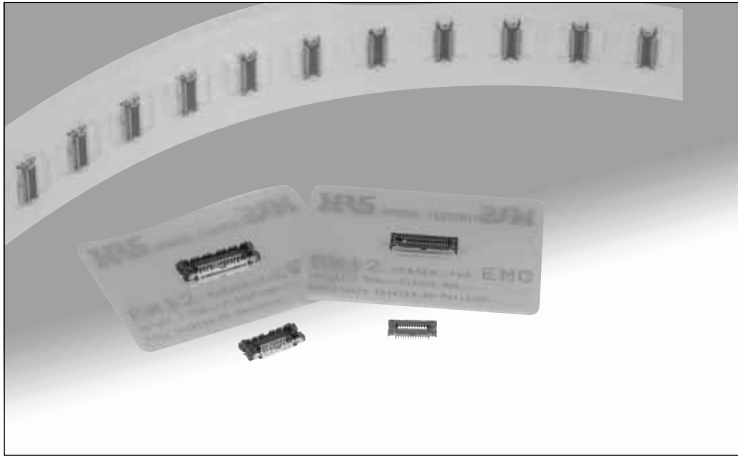
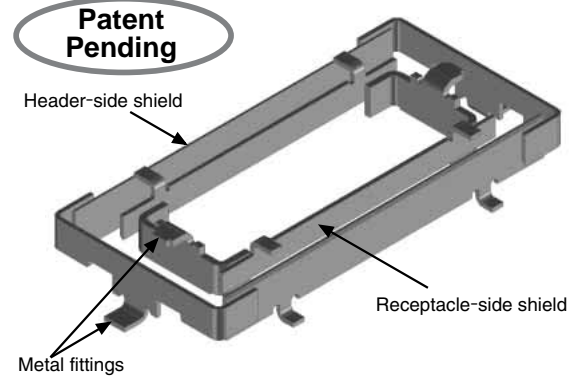


# 0.4 mm Pitch, 1.5 mm Board-to-Board Connectors with Dual Shields

## FX12 Series



### Dual Shields (when mated)



### ■ Features

#### 1. Dual shields

Built-in shield plates and metal fittings in the plugs and receptacles prevent electromagnetic emission and external interference on the entire 360° periphery of mated connectors.

#### 2. Low-Profile

Board-to-Board distance of 1.5 mm and reduced PCB mounting pattern allows use in applications where space is limited.

#### 3. Self alignment

Built-in self-alignment feature in the plug and receptacle allows mating / un-mating in limited spaces.

#### 4. Consistent mated retention force

Indents in the shield plates and contact configuration assure consistency of the mated retention forces irrespective of the contact numbers. Positive “click” sensation confirms fully mated condition.

#### 5. Solder wicking prevention

Nickel plating barrier on the contacts prevents solder compound intrusion (wicking) into the contact engagement areas.

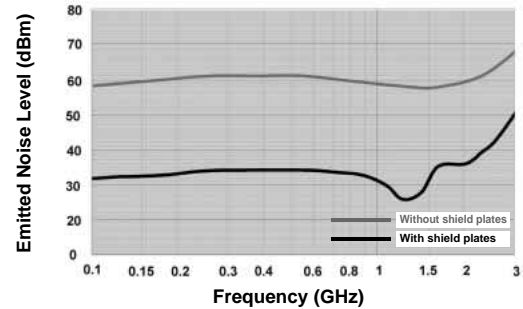
#### 6. Board placement with automatic equipment

Packaged on tape-and-reel, the connectors have flat areas (0.8mm) to allow use of vacuum nozzles.

#### 7. RoHS Compliant

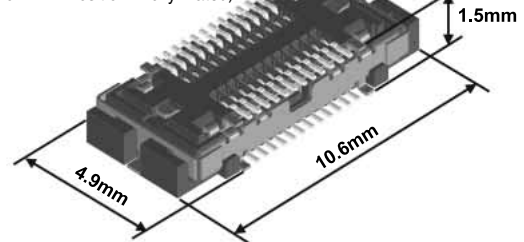
All components and materials comply with the requirements of the EU Directive 2002/95/EC.

### High Shielding Effectiveness

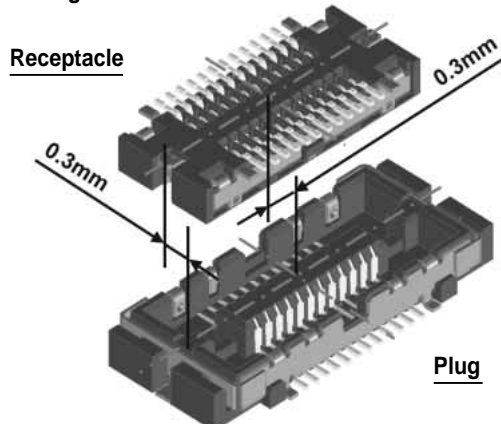


### Low-Profile, Space-Saving with Reduced Connector Footprint

(Shown 24-Position – fully mated)



### Self Alignment of 0.3 mm



## FX12 Series 0.4 mm Pitch, 1.5 mm Board-to-Board Connectors with Dual Shields

### Specifications

Rating	Current rating 0.3A Voltage rating 30V AC	Operating temperature range -55°C to +85°C (Note 1)	Storage temperature range -10°C to +60°C (Note 2) Storage humidity range Relative humidity 95% max. (No condensation)
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Item	Specification	Conditions
1. Insulation resistance	50 MΩ min.	100V DC
2. Withstanding voltage	No flashover or insulation breakdown.	100V AC/one minute
3. Contact resistance	100 mΩ max.	100 mA
4. Vibration	No electrical discontinuity of 1 μs or more. No damage, cracks or parts dislocation.	Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 3 axis, 10 cycles
5. Shock	No electrical discontinuity of 1 μs or more. No damage, cracks or parts dislocation.	Acceleration of 490 m/s <sup>2</sup> , 11 ms duration, sine half-wave waveform, 3 cycles / each of 3 axis
6. Humidity	Contact resistance: 120 mΩ max. Insulation resistance: 25 MΩ min. No damage, cracks or parts dislocation.	96 hours at 40°C, 90% to 95% R.H.
7. Temperature cycle	Contact resistance: 120 mΩ max. Insulation resistance: 50 MΩ min. No damage, cracks or parts dislocation.	Temperature: -55°C → +15°C to 35°C → +85°C → +15°C to +35°C Time: 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles
8. Durability (mating / un-mating)	Contact resistance: 120 mΩ max. No damage, cracks or parts dislocation.	30 cycles
9. Resistance to soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 360°C for 5 seconds

Note 1: Includes temperature rise caused by current flow.

Note 2: The term “storage” refers to products stored for long period of time prior to mounting and use. Operating temperature range and humidity range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

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

### Materials

Part	Material	Finish	Remarks
Insulator	Polyamide	Color: Black	UL94V-0
Contacts	Phosphor bronze	Plug	Selective gold plated
		Receptacle	
Ground plates		Gold plated	—
Metal fittings		Tin plated	—

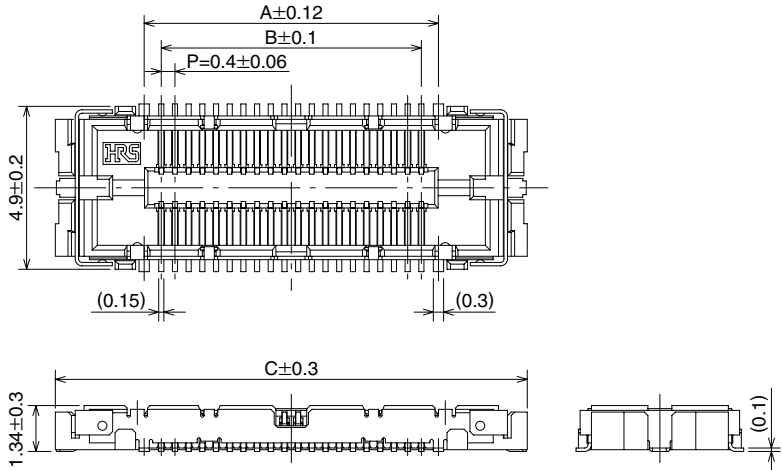
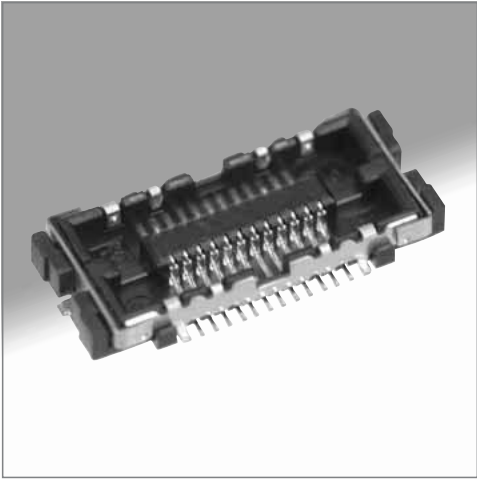
### Ordering information

**FX12**   **B** - **24**   **P** - **0.4**   **SV**

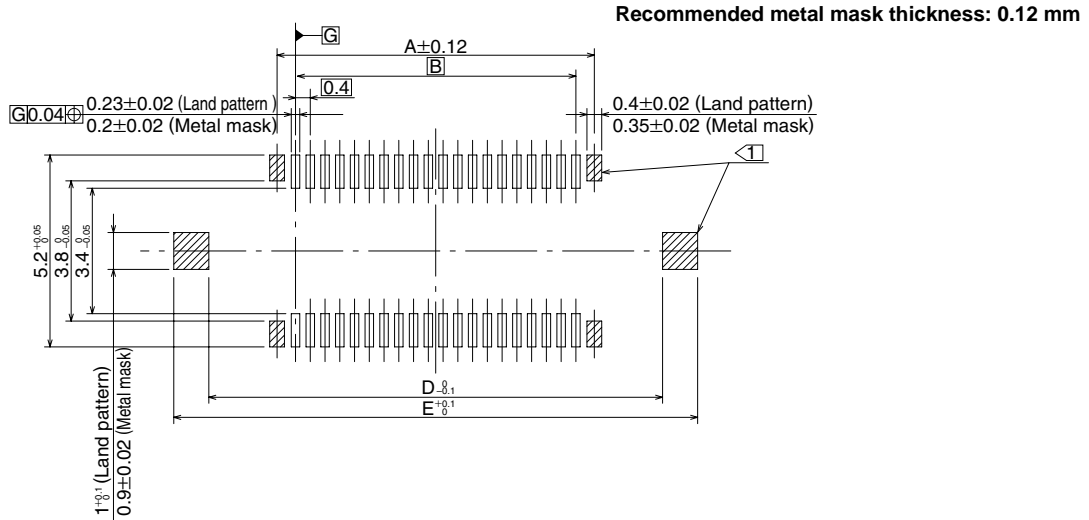
①   ②   ③   ④   ⑤   ⑥

① Series name: FX12	④ Connector type P: Plug S: Receptacle
② Configuration B: Without guide post	
③ Number of positions: 24, 40, 60	⑤ Contact pitch: 0.4 mm
	⑥ Termination configuration SV: SMT

## Plugs



## Recommended PCB Mounting Pattern and Metal Mask Dimensions



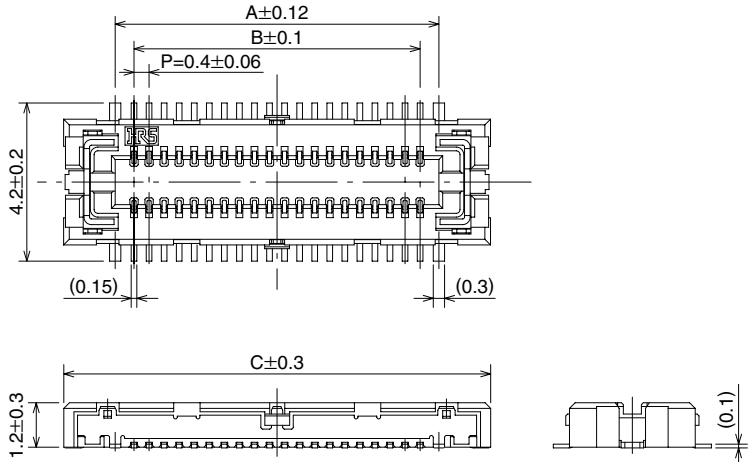
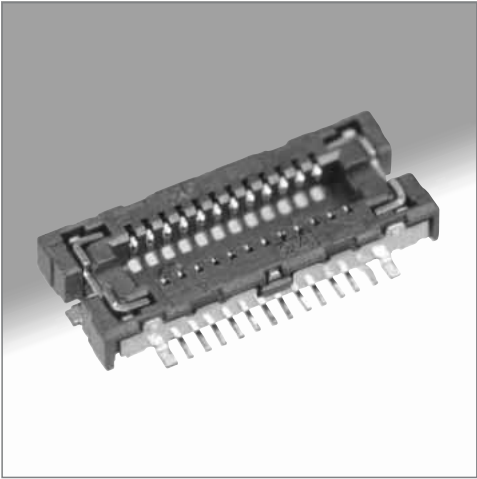
### Notes:

- ① Positions marked indicate a ground circuit connections.
- 2 The co-planarity of SMT terminations is 0.1 maximum.
- 3 No polarity orientation for board mounting.
- 4 Dimensions in parentheses ( ) are reference dimensions.
- 5 All dimensions in mm.

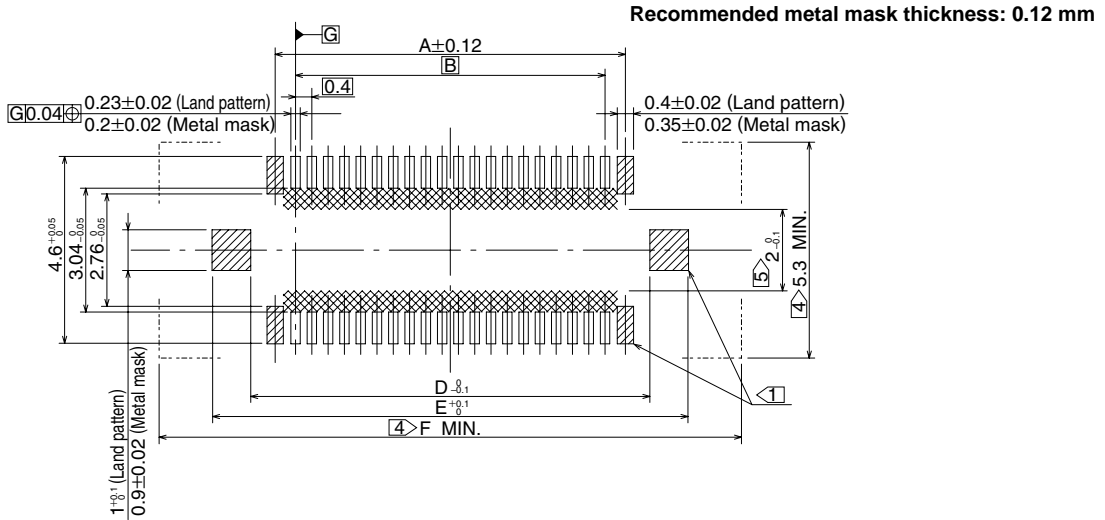
Part number	CL No.	Number of positions	A	B	C	D	E	RoHS
FX12B-24P-0.4SV	573-1005-0	24	5.4	4.4	10.6	9.1	11.0	YES
FX12B-40P-0.4SV	573-1001-0	40	8.6	7.6	13.8	12.3	14.2	
FX12B-60P-0.4SV	573-1007-6	60	12.6	11.6	17.79	16.3	18.2	

Packaging : 3,000 pieces per reel

## ■ Receptacles



## ◆ Recommended PCB Mounting Pattern and Metal Mask Dimensions



### Notes:

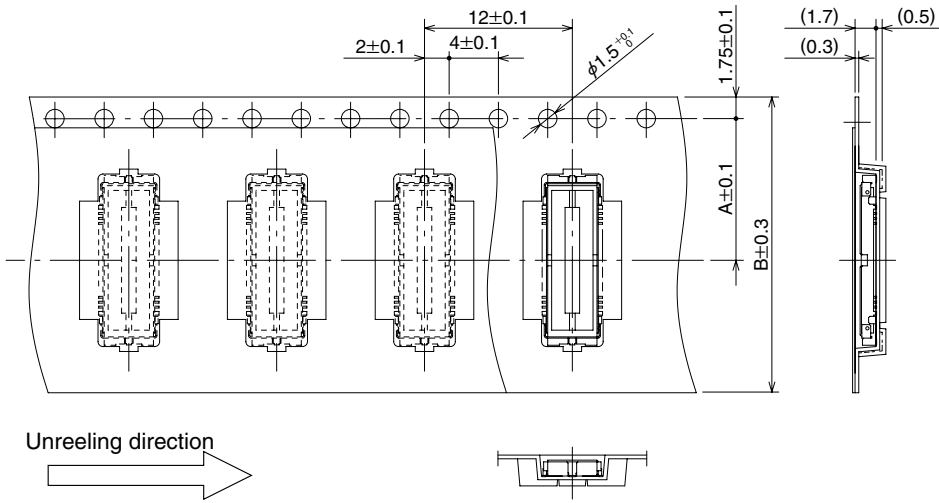
- Positions marked indicate a ground circuit connections.
- The co-planarity of SMT terminations is 0.1 maximum.
- No polarity orientation for board mounting.
- Do NOT place any components within area indicated by the broken line .
- Do NOT place conductive traces in areas indicated by .
- Dimensions in parentheses ( ) are reference dimensions.
- All dimensions in mm.

Part number	CL No.	Number of positions	A	B	C	D	E	F	RoHS
FX12B-24S-0.4SV	573-1006-3	24	5.4	4.4	8.14	6.6	8.5	11.1	YES
FX12B-40S-0.4SV	573-1002-2	40	8.6	7.6	11.34	9.8	11.7	14.3	
FX12B-60S-0.4SV	573-1008-9	60	12.6	11.6	15.34	13.8	15.7	18.3	

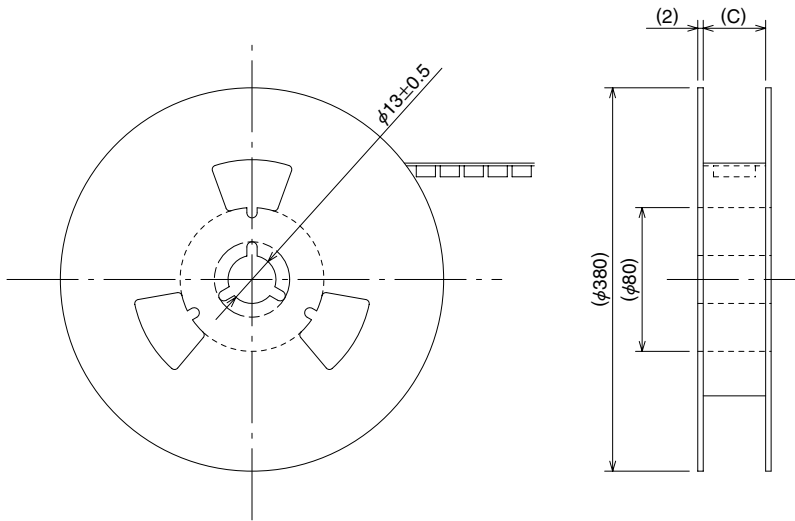
Packaging : 3,000 pieces per reel

## ■ Packaging Specifications

### ● Plug



### ● Reel dimensions



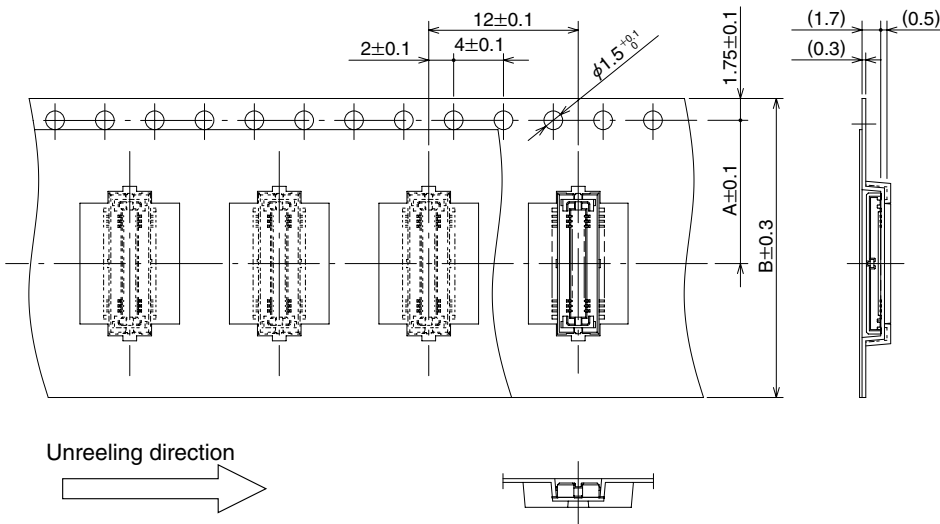
Part number	A	B	C
FX12B-24P-0.4SV	11.5	24.0	24.4
FX12B-40P-0.4SV	11.5	24.0	24.4
FX12B-60P-0.4SV	14.2	32.0	32.4

All dimensions in mm

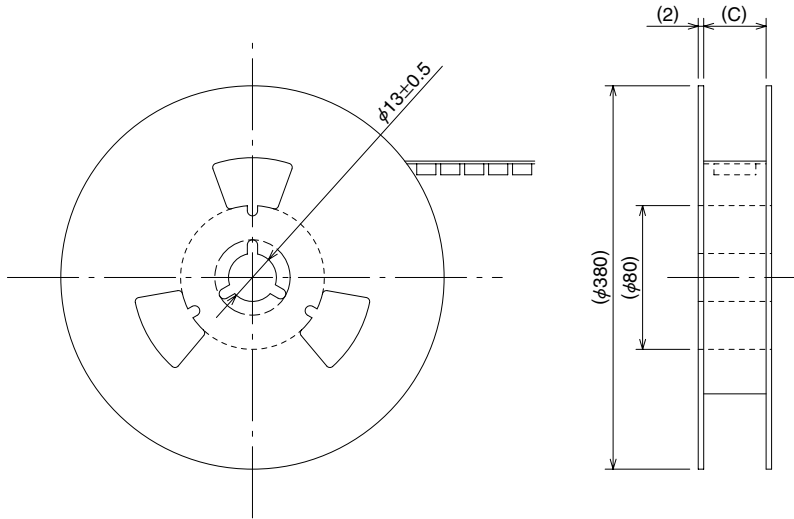
**FX12 Series 0.4 mm Pitch, 1.5 mm Board-to-Board Connectors with Dual Shields**

**■ Packaging Specifications**

**● Receptacle**



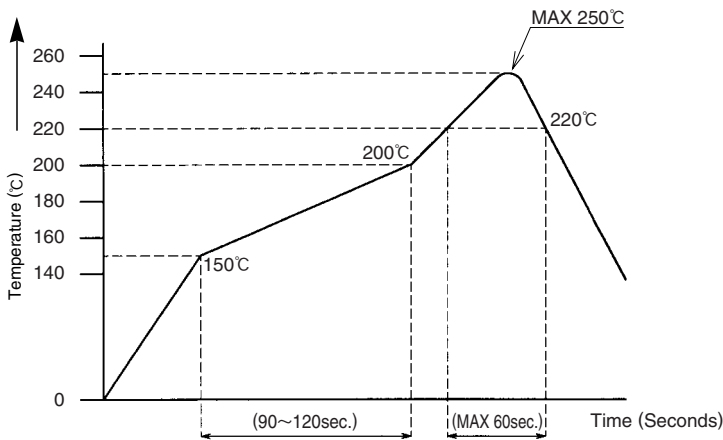
**● Reel dimensions**



Part number	A	B	C
FX12B-24S-0.4SV	11.5	24.0	24.4
FX12B-40S-0.4SV	11.5	24.0	24.4
FX12B-60S-0.4SV	11.5	24.0	24.4

All dimensions in mm

## ◆ Recommended solder temperature profile.



### < HRS test conditions >

Solder method	:Reflow
Environment	:Room air
Solder paste	:96.5%Sn/3.0%Ag/0.5%Cu
Test board	:Glass epoxy 40mm×30mm×1mm thick
Metal mask	:0.12mm thick
Reflow cycles	:2cycles

The temperature profiles shown are based on the above conditions.

In individual applications the actual temperature may vary, depending on solder paste type, volume / thickness and board size/ thickness. Consult your solder paste and equipment manufacture for specific recommendations.

Note: The temperature profile indicates the maximum temperature of the connector surfaces at the highest point from the PCB mounting surface.

## ◆ Cleaning recommendations

### Organic solvent cleaning

Solvent type	Room temperature cleaning	Heated cleaning
IPA (Isopropyl alcohol)	YES	YES
HCFC (Hydrochlorofluorocarbon)	YES	YES

### Water based cleaning

When using water based cleaning agents (e.g., terpene, alkali saponifiers), select the cleaning agent based on the documentation issued by the various manufacturers of cleaning agents which describes it's affects on metals, platings and plastics. Remove any moisture after cleaning. Residual flux or cleaning agents in the contact areas may affect electrical performance.

## ◆ Handling Precautions when mating mounted connectors.

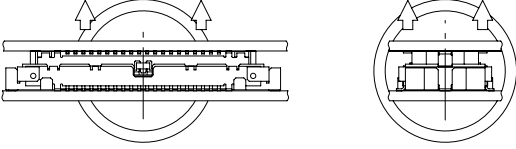
<p>MAX 0.3          FX12*-*-S-0.4SV          Fig.1          FX12*-*-P-0.4SV</p>	<p>Start the engagement of the connectors within the specified self-alignment range of 0.3 mm, while keeping the boards parallel to each other.</p>
	<p>Do NOT start mating of the mounted connectors under an angle.          Correctly position the connectors over each other and assure that both boards are parallel to each other.</p>
<p>0.5mm          0.5mm</p>	<p>When the connectors are correctly aligned (and both boards are parallel to each other) apply even force until full mating is confirmed by the “click” sensation.</p>

**Caution**

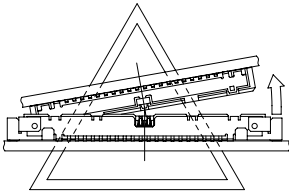
When the connectors are mounted on the FPC, special care should be exercised NOT to have the forces of the FPC's bend or twist affecting the fully mated connectors.  
 Device case or cushioning material should be used to keep connectors fully mated.



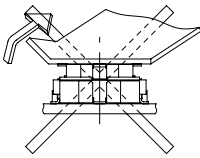
## ◆ Handling Precautions when un-mating



Keep the boards (with mounted connectors) parallel to each other.

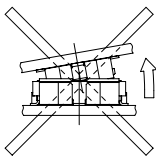


**Fig. A**



**Fig. B**

If parallel disconnection is impossible, start un-mating at one end exercising extreme caution to apply force at the center of the connector itself, away from the solder joint rows (Ref. Fig A and Fig. B)

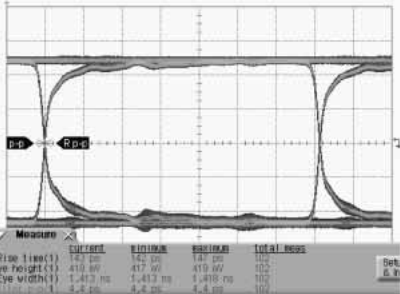


Do NOT start disconnection at the sides as the connector can be damaged, voiding the warranty and making the re-engagement impossible.

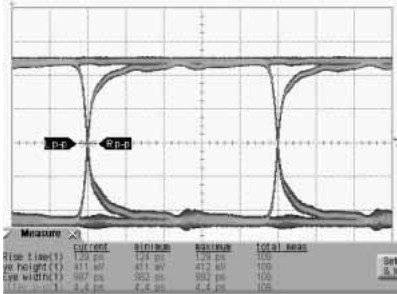
## ◆ Technical Documentation

### ● Eye Pattern Output Waveform

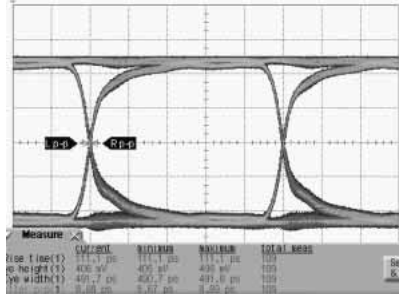
[700MHz]



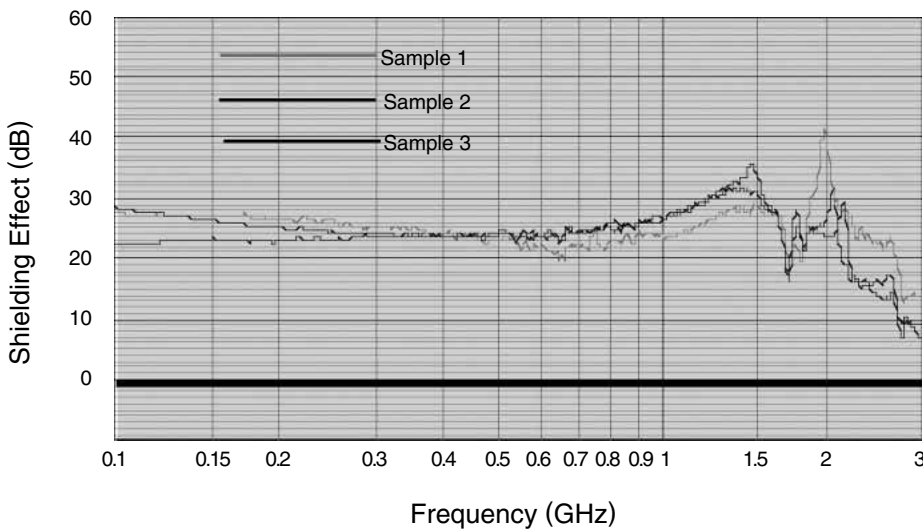
[1GHz]



[2GHz]



### ● Shielding Characteristics (1) (Measurement Results Using a 2-Chamber Shielded Room)

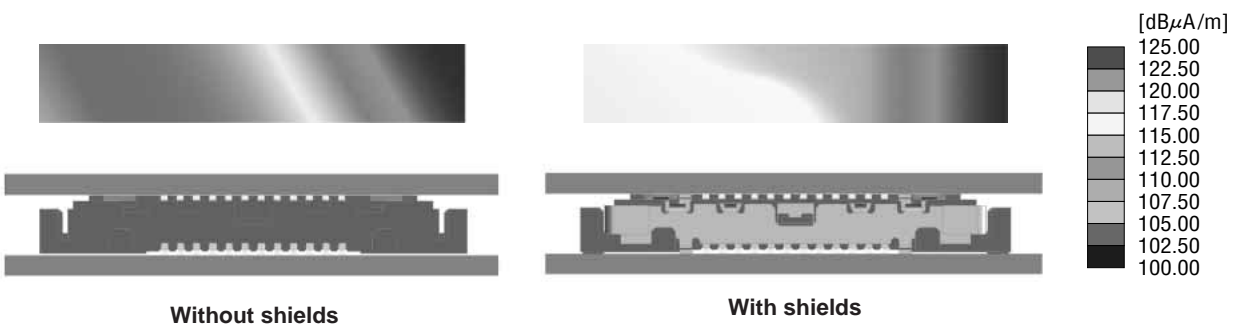


#### Explanatory Note

Measurement values of the unshielded connectors were set as the zero level of the vertical axis of the graph. The graph uses unshielded connectors as the reference and indicates the noise leakage suppression (shielding) effect of the shielded connectors as a relative comparison value.

In comparison to the unshielded connectors there was a noise suppression effect of 10 dB to 30 dB over the frequency range of 100 MHz to 3 GHz.

### ● Shielding Characteristics (2) (Board-to-Board Shielding Comparison Using a Magnetic Field Probe Method: IEC 61967-6 Compliance)



#### Explanatory Note

A signal of the 266 MHz operating frequency was transmitted through all contacts, over a frequency range of 10 MHz to 3 GHz. The magnetic field leaking to the surroundings from the gap between the boards was measured with a magnetic probe to provide the (mapping data) results.