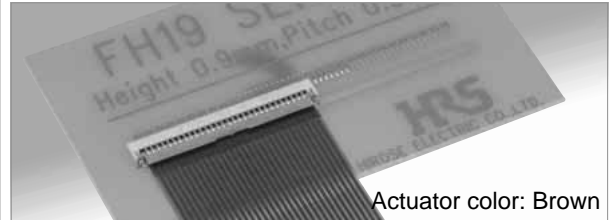
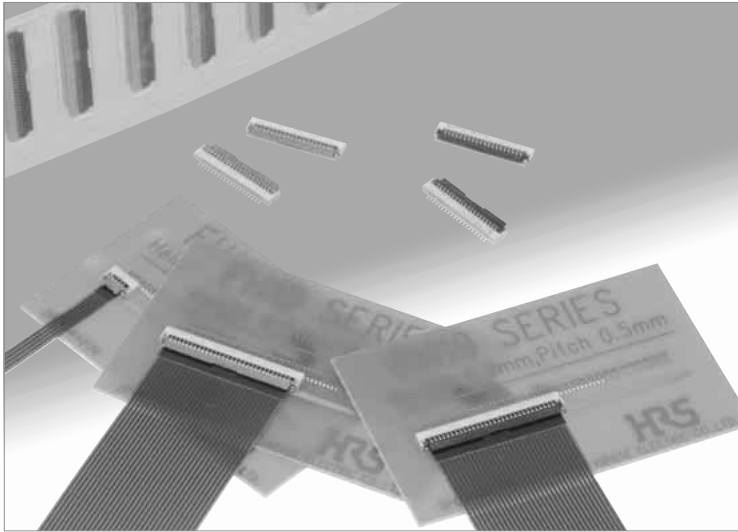
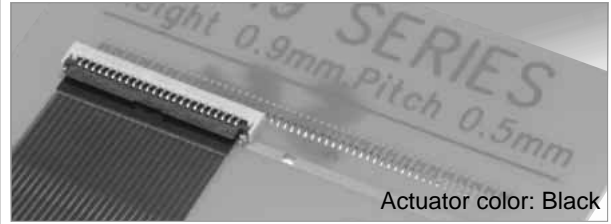


# 0.5mm pitch, 0.9mm above the board, Flexible Printed Circuit & Flexible Flat Cable ZIF Connectors

## FH19C & FH19SC Series



FH19SC – FPC/FFC thickness:  $0.3 \pm 0.03\text{mm}$



### ■ Features

#### 1. Low-profile 0.5mm pitch FPC/FFC Connectors

Miniaturization of portable equipment and personal mobile devices has created increased demand for a low profile, high density, and high reliability connectors.

\*The design of this connector has been made thinner and smaller, with a height of 0.9mm and width of 3mm.

\*PCB footprint: Reduced approximately 48% (as compared with Hirose Electric's 0.5mm pitch FH12 Series connectors)

\*Connector weight: Reduced approximately 78% (as compared with Hirose Electric's 0.5mm pitch FH12 Series connectors)

#### 2. Conductive traces on the PCB can run under the connector

All bottom surface of the connector is solid, without any exposure of the contact.

#### 3. Proven Flip-Lock Actuator System assures easy and reliable operation

Rotating actuator permits easy insertion and reliable connection with the FPC & FFC.

Tactile sensation confirms complete mechanical locking of the actuator and the electrical connection.

#### 4. Accepts 0.2mm & 0.3mm thick FPC/FFC

No exposed contacts on the bottom of the connector.

The connector will also terminate with 0.2mm thick Flat Flexible Cable (FFC).

#### 5. Board placement with automatic equipment

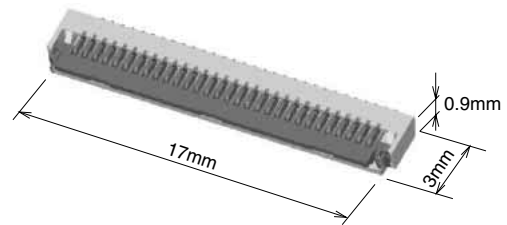
Flat upper surface and tape and reel packaging facilitate vacuum pick-up and placement. Standard reel packaging contains 5000 connectors.

#### 6. Halogen-free \* (FH19C, FH19SC(11 to 50pos.))

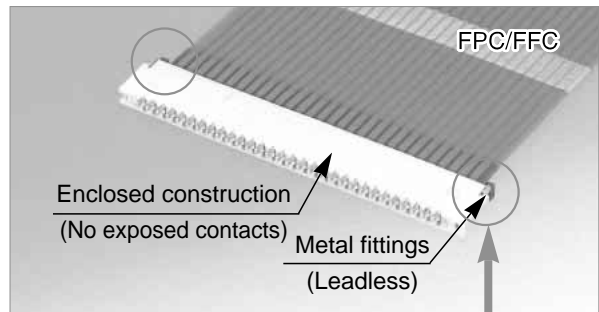
\*As defined by IEC61249-2-21

Br-900ppm maximum, Cl-900ppm maximum,

#### ● 0.9mm high



#### ● Can be mounted over conductive traces



#### ● Metal Fittings (Leadless Type)

No protrusions on the sides allows close side-by-side board placement.



#### ● Actuator Temporary Hold Mechanism



Actuator stays open during insertion of the FPC/FFC.

## Product Specifications

Rating	Current rating 0.5 A (Note1)	Operating temperature range -55°C to +85°C (Note 2)	Storage temperature range -10°C to +50°C (Note 3)
	Voltage rating 50 V AC	Operating humidity range Relative humidity 90% max. (No condensation)	Storage humidity range Relative humidity 90% max. (No condensation)

Recommended FPC, FFC	FH19C Series	Thickness: = 0.2 ± 0.03mm Gold plated
	FH19SC Series	Thickness: = 0.3 ± 0.03mm Gold plated

Item	Specification	Conditions
1. Insulation resistance	500 M ohms min.	100 V DC
2. Withstanding voltage	No flashover or insulation breakdown	150 V AC/1 minute
3. Contact resistance	100 m ohms max. *Including FPC/FFC conductor resistance	1 mA
4. Durability (insertion/ withdrawal)	Contact resistance: 100 m ohms max. No damage, cracks, or parts dislocation.	20 cycles
5. Vibration	No electrical discontinuity of 1 μs or more. Contact resistance: 100 m ohms max. No damage, cracks, or parts dislocation.	Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 10 cycles in each of the 3 directions
6. Shock	No electrical discontinuity of 1 μs. min. Contact resistance: 100 m ohms max. No damage, cracks, or parts dislocation.	Acceleration of 981 m/s <sup>2</sup> , 6 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis.
7. Humidity (Steady state)	Contact resistance: 100 m ohms max. Insulation resistance: 100 M ohms min. No damage, cracks, or parts dislocation.	96 hours at temperature of 40°C and humidity of 90 to 95%
8. Temperature cycle	Contact resistance: 100 m ohms max. Insulation resistance: 100 M ohms 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
9. Resistance to soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 350°C±5°C for 5 seconds

Note 1: When passing the current through all of the contacts, use 70% of the current rating.

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 Range and Humidity range covers non- conducting condition of installed connectors in storage, shipment or during transportation. Information

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.

## Materials

Part	Material	Finish	Remarks
Insulator	LCP	Color: Beige	UL94V-0
Actuator	PPS/LCP	Color: Brown (FH19C Series) Color: Black (FH19SC Series)	
Contacts	Phosphor bronze	Gold plated	—
Metal fittings	Phosphor bronze	Pure tin reflow plated	—

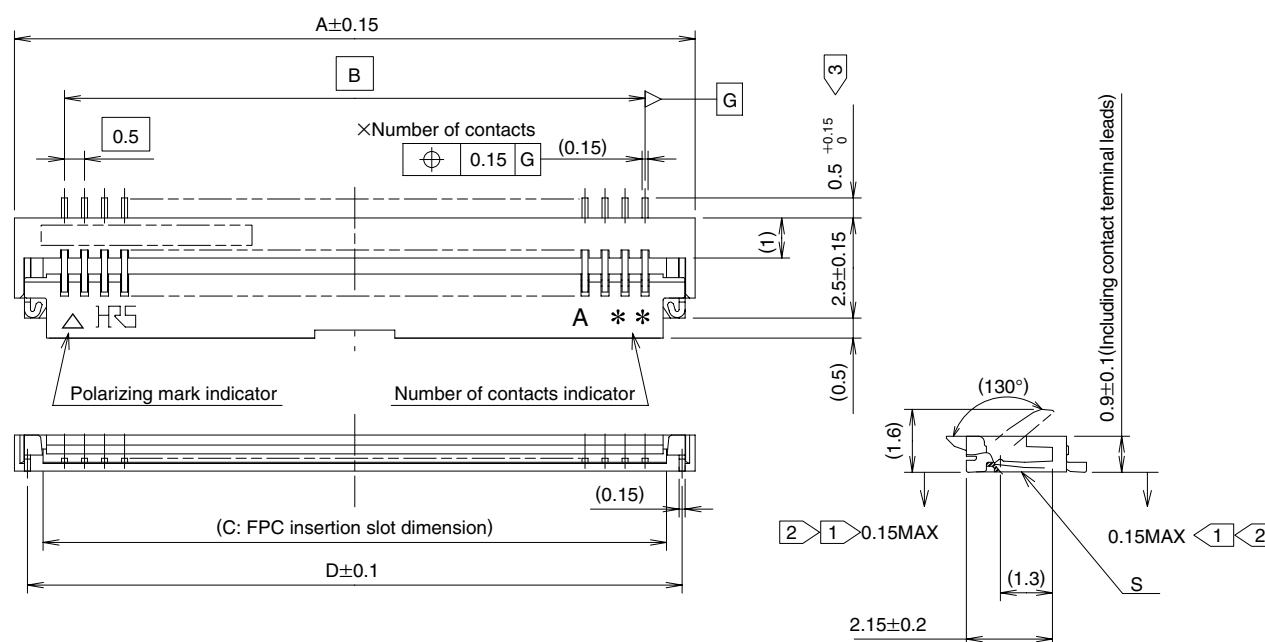
## Ordering information

**FH 19 C - 30S - 0.5 SH (05)**  
 ①    ②    ③                    ④                    ⑤    ⑥    ⑦

① Series name : FH	⑤ Contact pitch : 0.5mm																													
② Series No. : 19	⑥ Terminal type SH: SMT horizontal mounting type																													
③ C : FPC/FFC thickness : 0.2mm SC : FPC/FFC thickness : 0.3mm	⑦ Material and plating specifications :																													
④ No. of contacts : 4 to 50																														
<table border="1" style="width: 100%;"> <thead> <tr> <th colspan="2">Actuator material</th> <th>PPS</th> <th>LCP</th> <th>Halogen Free</th> </tr> </thead> <tbody> <tr> <td rowspan="2">FH19C</td> <td>Contact: Gold plated</td> <td>—</td> <td>(05)</td> <td rowspan="2">YES</td> </tr> <tr> <td>Contact: Gold plating with nickel barrier</td> <td>—</td> <td>(10)</td> </tr> <tr> <td rowspan="2">FH19SC</td> <td>Contact: Gold plated</td> <td>(05)</td> <td>—</td> <td rowspan="2">NO</td> </tr> <tr> <td>Contact: Gold plating with nickel barrier</td> <td>(06)</td> <td>—</td> </tr> <tr> <td rowspan="2">4 to 10 pos.</td> <td>Contact: Gold plated</td> <td>—</td> <td>(05)</td> <td rowspan="2">YES</td> </tr> <tr> <td>Contact: Gold plating with nickel barrier</td> <td>—</td> <td>(09)</td> </tr> </tbody> </table>		Actuator material		PPS	LCP	Halogen Free	FH19C	Contact: Gold plated	—	(05)	YES	Contact: Gold plating with nickel barrier	—	(10)	FH19SC	Contact: Gold plated	(05)	—	NO	Contact: Gold plating with nickel barrier	(06)	—	4 to 10 pos.	Contact: Gold plated	—	(05)	YES	Contact: Gold plating with nickel barrier	—	(09)
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FH19C	Contact: Gold plated	—	(05)	YES																										
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FH19SC	Contact: Gold plated	(05)	—	NO																										
	Contact: Gold plating with nickel barrier	(06)	—																											
4 to 10 pos.	Contact: Gold plated	—	(05)	YES																										
	Contact: Gold plating with nickel barrier	—	(09)																											

## ■ Connector Dimension

[FH19C Series]



- Notes
- ① The coplanarity of each terminal lead and metal fitting is within 0.1
  - ② The contact terminal lead position indicates the dimension from the bottom surface of the insulator body.
  - ③ Difference between terminal contact to be max. 0.1mm.
  - 4 Packaged on tape and reel only. Check packaging specification.
  - 5 Any discoloration of the plastic compound will NOT AFFECT form, fit or function of the connector.
  - 6 After reflow, the terminal plating may change color, however this does not represent a quality issue.

Unit: mm

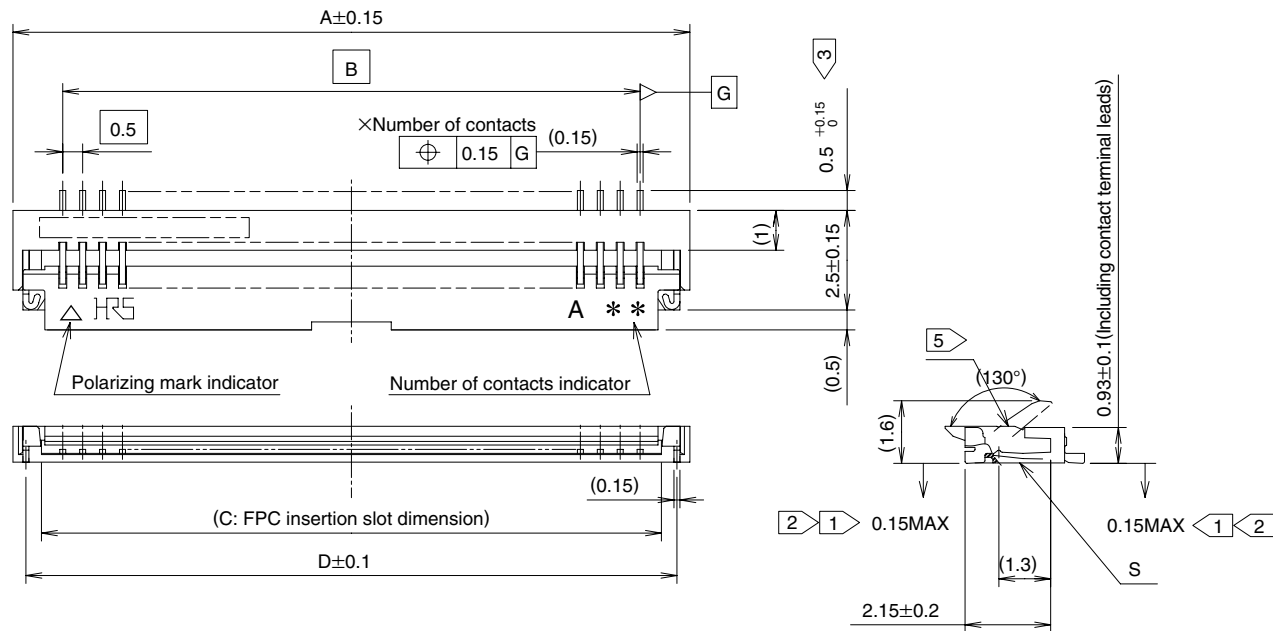
Part Number	CL No.	Number of Contacts	A	B	C	D
FH19C- 4S-0.5SH(**)	580-0410-1-**-	4	4	1.5	2.57	3.35
FH19C- 5S-0.5SH(**)	580-0418-3-**-	5	4.5	2	3.07	3.85
FH19C- 6S-0.5SH(**)	580-0409-2-**-	6	5	2.5	3.57	4.35
FH19C- 7S-0.5SH(**)	580-0411-4-**-	7	5.5	3	4.07	4.85
FH19C- 8S-0.5SH(**)	580-0404-9-**-	8	6	3.5	4.57	5.35
FH19C- 9S-0.5SH(**)	580-0403-6-**-	9	6.5	4	5.07	5.85
FH19C-10S-0.5SH(**)	580-0412-7-**-	10	7	4.5	5.57	6.35
FH19C-12S-0.5SH(**)	580-0413-0-**-	12	8	5.5	6.57	7.35
FH19C-13S-0.5SH(**)	580-0405-1-**-	13	8.5	6	7.07	7.85
FH19C-15S-0.5SH(**)	580-0406-4-**-	15	9.5	7	8.07	8.85
FH19C-17S-0.5SH(**)	580-0408-0-**-	17	10.5	8	9.07	9.85
FH19C-20S-0.5SH(**)	580-0402-3-**-	20	12	9.5	10.57	11.35
FH19C-21S-0.5SH(**)	580-0414-2-**-	21	12.5	10	11.07	11.85
FH19C-24S-0.5SH(**)	580-0407-7-**-	24	14	11.5	12.57	13.35
FH19C-27S-0.5SH(**)	580-0401-0-**-	27	15.5	13	14.07	14.85
FH19C-30S-0.5SH(**)	580-0400-8-**-	30	17	14.5	15.57	16.35
FH19C-34S-0.5SH(**)	580-0419-6-**-	34	19	16.5	17.57	18.35
FH19C-40S-0.5SH(**)	580-0416-8-**-	40	22	19.5	20.57	21.35
FH19C-50S-0.5SH(**)	580-0417-0-**-	50	27	24.5	25.57	26.35

Note1: Embossed tape reel packaging (5,000 pieces/reel).

Order by number of reels.

Note2: \*\*Specification. Refer to ordering information.

[FH19SC Series]



- Notes
- 1 The coplanarity of each terminal lead and metal fitting is within 0.1
  - 2 The contact terminal lead position indicates the dimension from the bottom surface of the insulator body.
  - 3 Difference between terminal contact to be max. 0.1mm.
  - 4 Any discoloration of the plastic compound will NOT AFFECT form, fit or function of the connector.
  - 5 The contacts are protruding 0.03mm max. from the housing top surface.
  - 6 Packaged on tape and reel only. Check packaging specification.
  - 7 After reflow, the terminal plating may change color, however this does not represent a quality issue.

Unit: mm

Part Number	CL No.	Number of Contacts	A	B	C	D
FH19SC- 4S-0.5SH(**)	580-0517-5-**-	4	4	1.5	2.57	3.35
FH19SC- 5S-0.5SH(**)	580-0515-0-**-	5	4.5	2	3.07	3.85
FH19SC- 6S-0.5SH(**)	580-0501-5-**-	6	5	2.5	3.57	4.35
FH19SC- 8S-0.5SH(**)	580-0520-0-**-	8	6	3.5	4.57	5.35
FH19SC- 9S-0.5SH(**)	580-0507-1-**-	9	6.5	4	5.07	5.85
FH19SC-10S-0.5SH(**)	580-0508-4-**-	10	7	4.5	5.57	6.35
FH19SC-12S-0.5SH(**)	580-0512-1-**-	12	8	5.5	6.57	7.35
FH19SC-13S-0.5SH(**)	580-0518-8-**-	13	8.5	6	7.07	7.85
FH19SC-14S-0.5SH(**)	580-0509-7-**-	14	9	6.5	7.57	8.35
FH19SC-15S-0.5SH(**)	580-0503-0-**-	15	9.5	7	8.07	8.85
FH19SC-16S-0.5SH(**)	580-0521-2-**-	16	10	7.5	8.57	9.35
FH19SC-17S-0.5SH(**)	580-0504-3-**-	17	10.5	8	9.07	9.85
FH19SC-18S-0.5SH(**)	580-0519-0-**-	18	11	8.5	9.57	10.35
FH19SC-20S-0.5SH(**)	580-0502-8-**-	20	12	9.5	10.57	11.35
FH19SC-21S-0.5SH(**)	580-0505-6-**-	21	12.5	10	11.07	11.85
FH19SC-22S-0.5SH(**)	580-0506-9-**-	22	13	10.5	11.57	12.35
FH19SC-24S-0.5SH(**)	580-0511-9-**-	24	14	11.5	12.57	13.35
FH19SC-26S-0.5SH(**)	580-0510-6-**-	26	15	12.5	13.57	14.35
FH19SC-27S-0.5SH(**)	580-0516-2-**-	27	15.5	13	14.07	14.85
FH19SC-28S-0.5SH(**)	580-0513-4-**-	28	16	13.5	14.57	15.35
FH19SC-30S-0.5SH(**)	580-0500-2-**-	30	17	14.5	15.57	16.35
FH19SC-32S-0.5SH(**)	580-0514-7-**-	32	18	15.5	16.57	17.35
FH19SC-40S-0.5SH(**)	580-0522-5-**-	40	22	19.5	20.57	21.35
FH19SC-45S-0.5SH(**)	580-0523-8-**-	45	24.5	22	23.07	23.85
FH19SC-50S-0.5SH(**)	580-0524-0-**-	50	27	24.5	25.57	26.35

Note1: Embossed tape reel packaging (5,000 pieces/reel) .

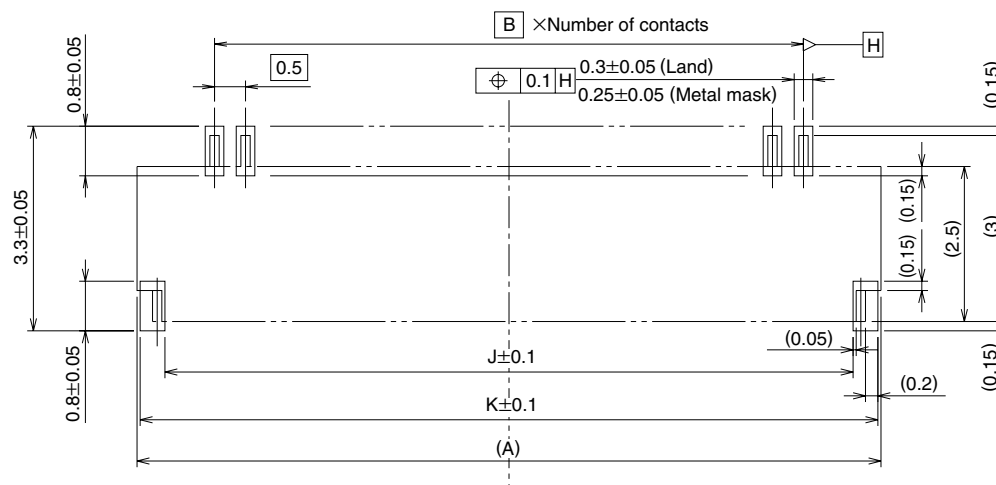
Order by number of reels.

Note2: \*\*Specification. Refer to ordering information.

## Recommended PCB Land and Metal Mask Dimensions

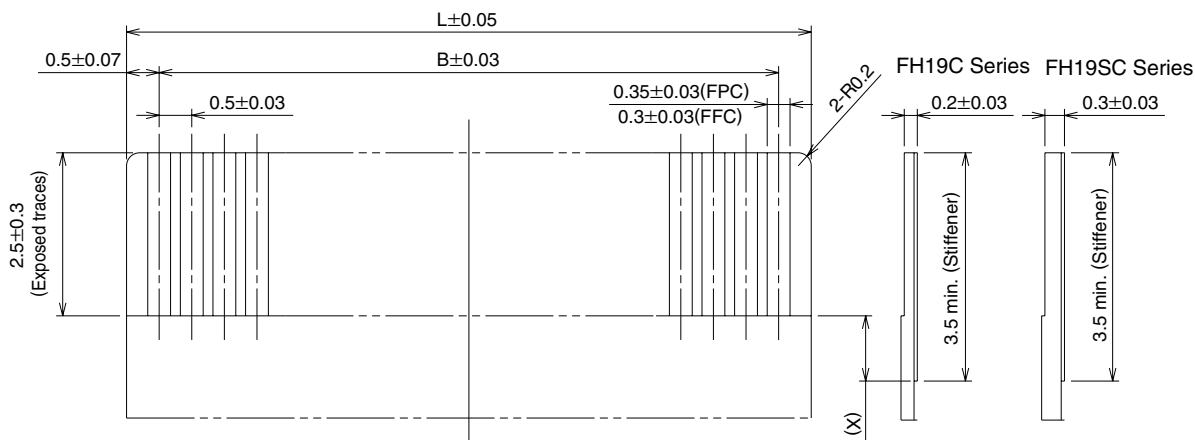
[Common to FH19C & FH19SC Series]

Recommended metal mask thickness: 0.10 mm.



## Recommended FPC, FFC Dimensions

[Common to FH19C & FH19SC Series]



Note 1: Stiffener dimension should be 3.5mm min., and X dimension should be 0.5mm for improved flexibility of FPC.

Unit: mm

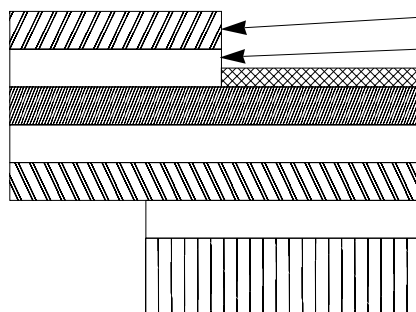
Number of Contacts	A	B	J	K	L
4	4.0	1.5	3.1	3.9	2.5
5	4.5	2.0	3.6	4.4	3.0
6	5.0	2.5	4.1	4.9	3.5
7	5.5	3.0	4.6	5.4	4.0
8	6.0	3.5	5.1	5.9	4.5
9	6.5	4.0	5.6	6.4	5.0
10	7.0	4.5	6.1	6.9	5.5
12	8.0	5.5	7.1	7.9	6.5
13	8.5	6.0	7.6	8.4	7.0
14	9.0	6.5	8.1	8.9	7.5
15	9.5	7.0	8.6	9.4	8.0
16	10.0	7.5	9.1	9.9	8.5
17	10.5	8.0	9.6	10.4	9.0
18	11.0	8.5	10.1	10.9	9.5

Unit: mm

Number of Contacts	A	B	J	K	L
20	12.0	9.5	11.1	11.9	10.5
21	12.5	10.0	11.6	12.4	11.0
22	13.0	10.5	12.1	12.9	11.5
24	14.0	11.5	13.1	13.9	12.5
26	15.0	12.5	14.1	14.9	13.5
27	15.5	13.0	14.6	15.4	14.0
28	16.0	13.5	15.1	15.9	14.5
30	17.0	14.5	16.1	16.9	15.5
32	18.0	15.5	17.1	17.9	16.5
34	19.0	16.5	18.1	18.9	17.5
40	22.0	19.5	21.1	21.9	20.5
45	24.5	22.0	23.6	24.4	23.0
50	27.0	24.5	26.1	26.9	25.5

## ■FH19C & FH19SC Series FPC/FFC Construction (Recommended Specifications)

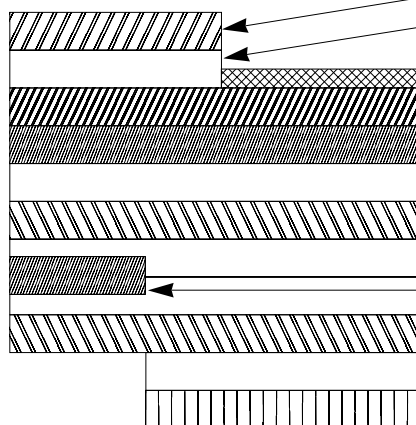
### 1. Using Single-sided FPC



### FPC : Flexible Printed Circuit

Material Name	Material	Thickness ( $\mu\text{m}$ )	
		FH19C	FH19SC
Covering layer film	Polyimide 1 mil thick	(25)	(25)
Cover adhesive		(25)	(25)
Surface treatment	Nickel under plated 1 to $5\mu\text{m}$ / Gold plated $0.2\mu\text{m}$	3	3
Copper foil	Cu 1oz	35	35
Base adhesive	Thermosetting adhesive	25	25
Base film	Polyimide 1 mil thick	25	25
Reinforcement material adhesive	Thermosetting adhesive	30	30
Stiffener	Polyimide FH19C : 3mil FH19SC : 7mil	75	175
Total		193	293

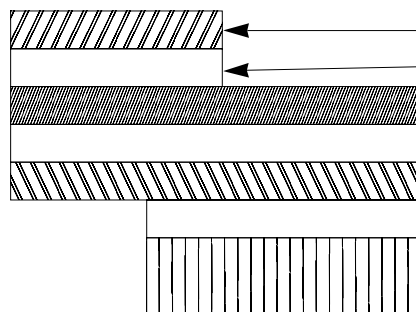
### 2. Using Double-sided FPC



### FPC : Flexible Printed Circuit

Material Name	Material	Thickness ( $\mu\text{m}$ )	
		FH19C	FH19SC
Covering layer film	Polyimide 1 mil thick	(25)	(25)
Cover adhesive		(25)	(25)
Surface treatment	Nickel under plated 1 to $5\mu\text{m}$ / Gold plated $0.2\mu\text{m}$	3	3
Through-hole copper	Cu	15	15
Copper foil	Cu 1/2oz	18	18
Base adhesive	Thermosetting adhesive	18	18
Base film	Polyimide 1 mil thick	25	25
Base adhesive		18	18
Copper foil	Cu 1/2oz	18	18
Cover adhesive	Thermosetting adhesive	25	25
Covering layer film	Polyimide 1 mil thick	25	25
Reinforcement material adhesive	Thermosetting adhesive	25	50
Stiffener	Polyimide FH19C : 1mil FH19SC : 4mil	25	100
Total		197	297

### 3. Using FFC (Flexible Flat Cable)



### FFC : Flexible Flat Cable

Material Name	Material	Thickness ( $\mu\text{m}$ )	
		FH19C	FH19SC
Polyester film		(12)	(12)
Adhesive	Polyester thermoplastic type	(30)	(30)
(Nickel under plated / Gold plated), soft copper film		35	35
Adhesive	Polyester	30	30
Polyester		12	12
Adhesive	Polyester	30	30
Stiffener	Polyester	100	188
Total		207	295

\* Practical tolerance of thickness dimension is  $\pm 20\mu\text{m}$  (i.e., 187 to  $227\mu\text{m}$ ).

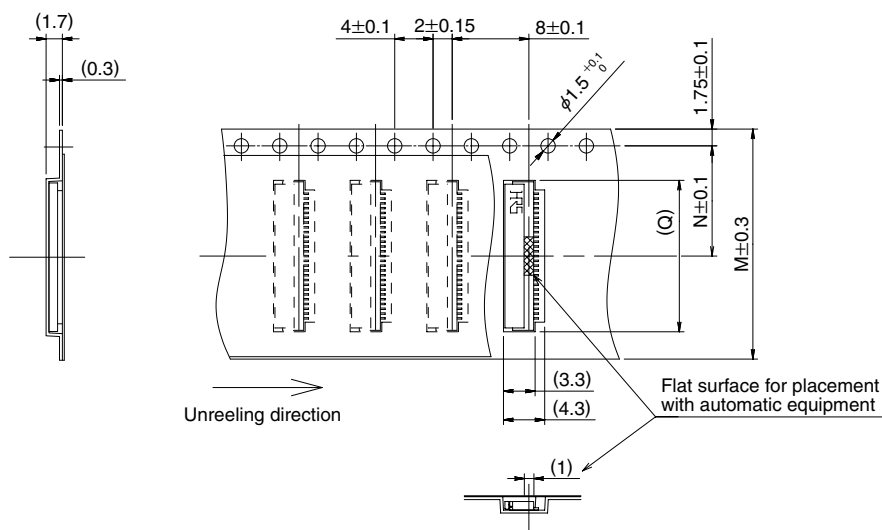
### 4. Precautions

1. This specification is a recommendation for the construction of the FH19C/ Series FPC and FFC ( $t=0.2\pm 0.03$ ).
2. For details about the construction, please contact the FPC/FFC manufacturers.

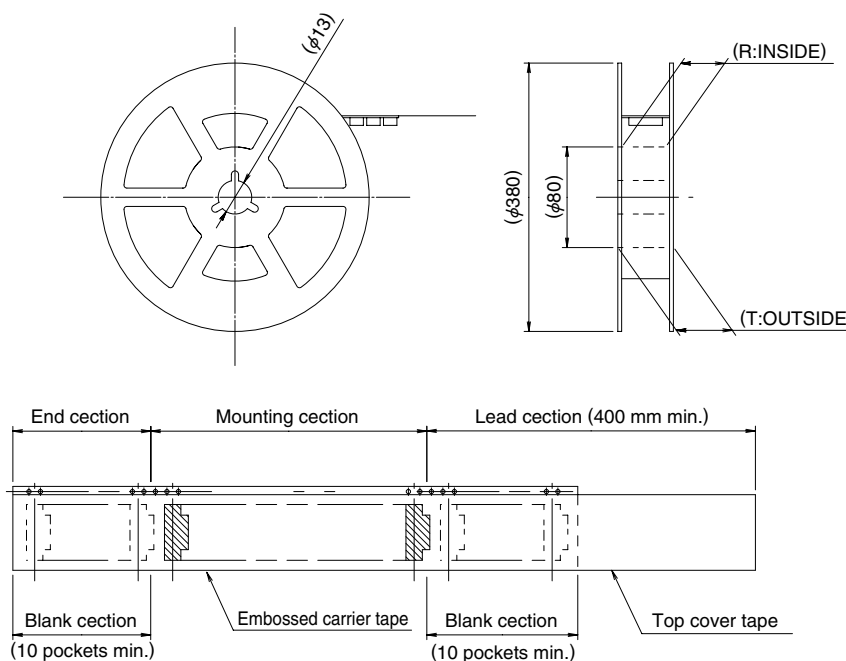
## ■ Packaging Specifications

[Common to FH19C & FH19SC Series]

### ● Embossed Carrier Tape Dimensions



### ● Reel Dimensions



Unit: mm

Number of Contacts	M	N	Q	R	T
4	16	7.5	4.3	17.4	21.4
5	16	7.5	4.8	17.4	21.4
6	16	7.5	5.3	17.4	21.4
7	16	7.5	5.8	17.4	21.4
8	16	7.5	6.3	17.4	21.4
9	16	7.5	6.8	17.4	21.4
10	16	7.5	7.3	17.4	21.4
12	16	7.5	8.3	17.4	21.4
13	16	7.5	8.8	17.4	21.4
14	16	7.5	9.3	17.4	21.4
15	16	7.5	9.8	17.4	21.4
16	24	11.5	10.3	25.4	29.4
17	24	11.5	10.8	25.4	29.4
18	24	11.5	11.3	25.4	29.4

Unit: mm

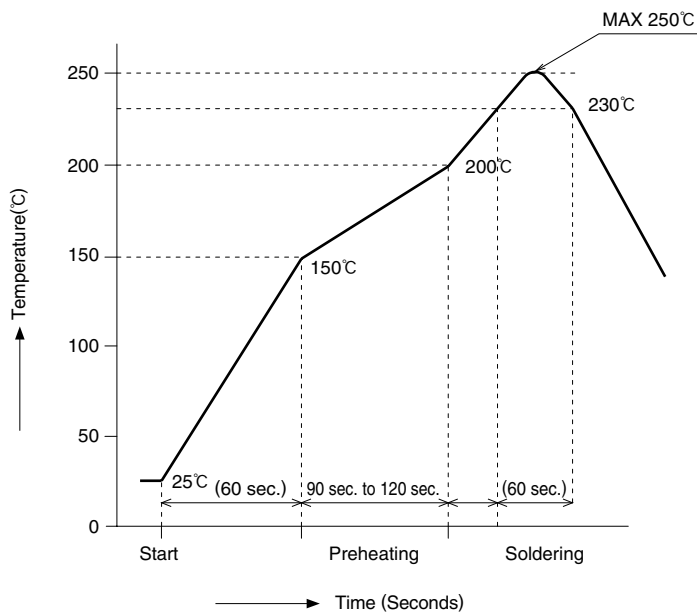
Number of Contacts	M	N	Q	R	T
20	24	11.5	12.3	25.4	29.4
21	24	11.5	12.8	25.4	29.4
22	24	11.5	13.3	25.4	29.4
24	24	11.5	14.3	25.4	29.4
26	24	11.5	15.3	25.4	29.4
27	24	11.5	15.8	25.4	29.4
28	24	11.5	16.3	25.4	29.4
30	24	11.5	17.3	25.4	29.4
32	32	14.2	18.3	33.4	37.4
34	32	14.2	19.3	33.4	37.4
40	44	20.2	22.3	45.4	49.4
45	44	20.2	24.8	45.4	49.4
50	44	20.2	27.3	45.4	49.4

Note: 5,000 pieces per reel.

Embossed tape 32 mm or wider will have perforated feed holes on two sides.

## ■ Recommended Temperature Profile

[For FH19C & FH19SC Series]



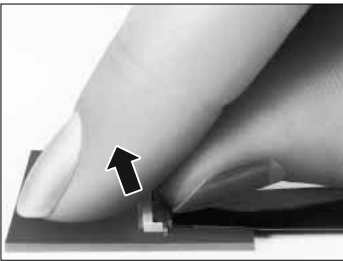
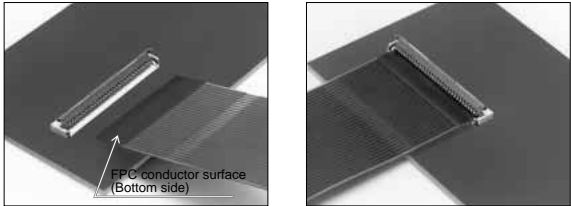
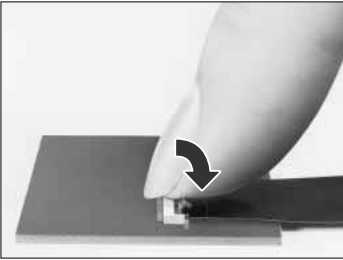
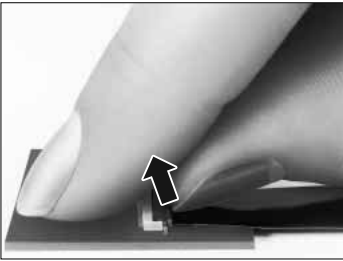
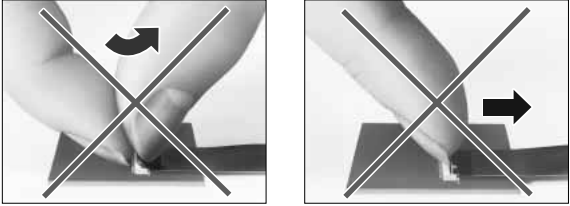
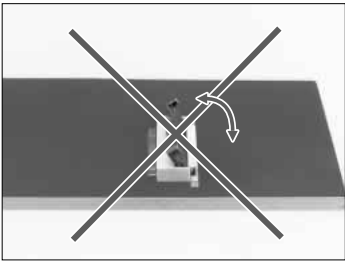
### HRS test condition

Solder method	:Reflow, IR/hot air
Solder composition	:Paste, 96.5%Sn/3.0%Ag/0.5%Cu (Senju Metal Industry, Co., Ltd.'s Part Number:M705-221CM5-32-10.5)
Test board	:Glass epoxy 45mm×100mm×1.6mm thick
Land dimensions	:0.3mm×0.8mm
Metal mask	:0.25mm×0.8mm×0.1mm

This temperature profile is 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  
manufacturer for specific recommendations.



## ■ Operation and Precautions

Operation	Precautions
<p><b>1. FPC/FFC Termination procedure. Connector installed on the board.</b></p> <p>1) Lift up the actuator. Use thumb or index finger.</p>  <p>2) Assure that the FPC/FFC is fully inserted parallel to mounting surface, with the exposed conductive traces facing down.</p>  <p>3) Rotate down the actuator until firmly closed. It is critical that the inserted FPC/FFC is not moved and remains fully inserted. Should the FPC/FFC be moved, open the actuator and repeat the process, starting with Step 1 above.</p>  <p><b>2. FPC/FFC Removal</b></p> <p>1) Lift up the actuator. 2) Carefully remove the FPC/FFC.</p> 	<p>1) Do not apply excessive force or use any type of tool to operate the actuator.</p>  <p>2) The connector will assure reliable performance when the actuator is open to 130° maximum. Do not exceed this angle, as this may cause permanent damage to the connector.</p>  <p>3) Application of excessive force to the inserted FPC/FFC may cause damage to connector and may affect the reliability of electrical connection. If specific application requires continuous or repeated pull or bend of the inserted FPC/FFC, assure that the forces are NOT transmitted directly to the connector.</p> 