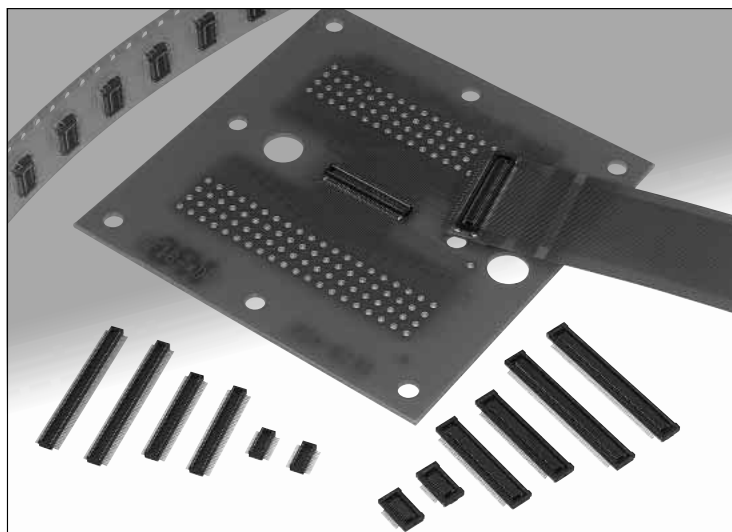


# 0.4mm Contact Pitch, 1.5mm above the board, Board-to-Board / Board-to-FPC Connectors

## DF18 Series



### ■ Features

#### 1. Allows higher mounting density of board components

Extremely small board mounting pattern and low above-the-board profile makes the connector suitable for small device applications.

#### 2. High Contact Reliability

Despite its small size and low profile the contacts have large deflection distance, guaranteeing reliable electrical performance.

#### 3. Good Mating Characteristics

Large lead-in distance of 0.33 mm in horizontal directions and tactile "click" confirms fully mated condition of connectors.

#### 4. Optional Additional Board Retention

For applications requiring extra-strong hold of connectors to the board connectors can be ordered with optional metal hold-down.

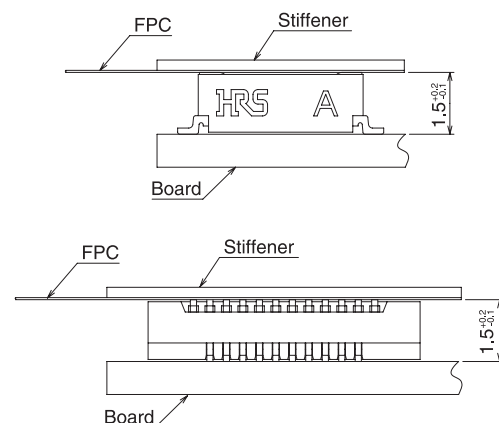
#### 5. Automatic Board Placement

Connectors have large flat width (Plug: 1.4 mm, Receptacle: 1.44mm) to accommodate pick-up with automatic placement machines.

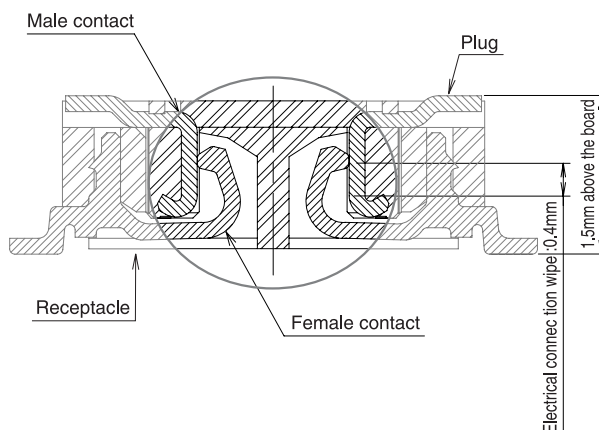
### ■ Applications

Digital video cameras, Digital still cameras, cellular phones, miniature displays, cameras portable equipment and other applications requiring small reliable board-to-board and FPC-to-Board connections.

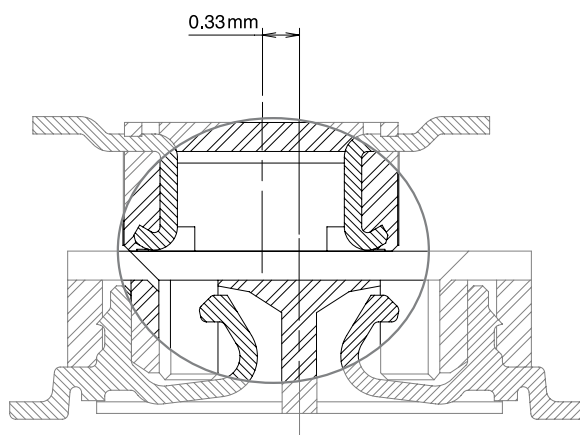
#### Low profile – Board-to-board distance of 1.5 mm



#### High Contact Reliability – Effective connection wipe of 0.4 mm



#### Self-alignment distance: 0.33 mm



DF18 Series 0.4mm Contact Pitch, 1.5mm above the board, Board-to-Board / Board-to-FPC Connectors

Product Specifications

Rating	Current rating	0.3A	Operating temperature range	-35℃ to +85℃ (Note 1)	Storage temperature range	-10℃ to +60℃ (Note 2)
	Voltage rating	30V AC	Operating humidity range	40% to 80% (Note 2)	Storage humidity range	40% to 70% (Note 2)

Item	Specification	Condition
1. Insulation resistance	50 M ohms min.	100 V DC
2. Withstanding voltage	No flashover or insulation breakdown.	100 V AC / one minute
3. Contact resistance	60 m ohms max.	1 mA AC, 20mv max., 1KHz
4. Vibration	No electrical discontinuity of 1 ms or more.	Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours / 3 axis.
5. Humidity	Contact resistance: 60 m ohms max. Insulation resistance: 25 M ohms min.	96 hours at temperature of 40 ± 2℃ and humidity of 90 to 95%
6. Temperature cycle	Contact resistance: 60 m ohms max. Insulation resistance: 50 M ohms min.	Temperature : -55℃ → +15℃ to +35℃ → +85℃ → +15℃ to 35℃ Duration : 30 → 2 to 3 → 30 → 2 to 3 (Minutes) 5 cycles
7. Durability (insertion/ withdrawal)	Contact resistance: 60 m ohms max.	50cycles
8. Resistance to soldering heat	No deformation of any component. No affect on contacts.	Reflow: At the recommended temperature profile Manual soldering: 350℃ for 3 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

Product	Part	Material	Finish	Remarks
Receptacles Plugs	Insulator	LCP	Color: Black	UL94V0
	Contacts	Copper alloy	Gold plated	_____
	Metal fittings	Brass	Tin plated	_____

Ordering Information

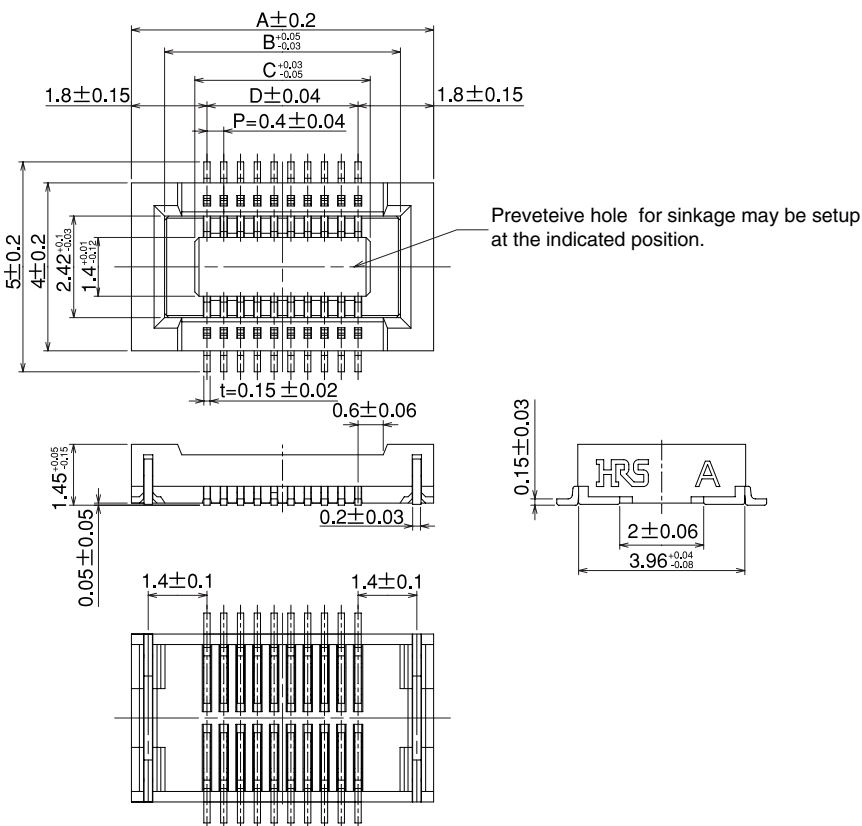
Receptacles / Plugs

DF18 # - \* DS - 0.4 V (\*\*)

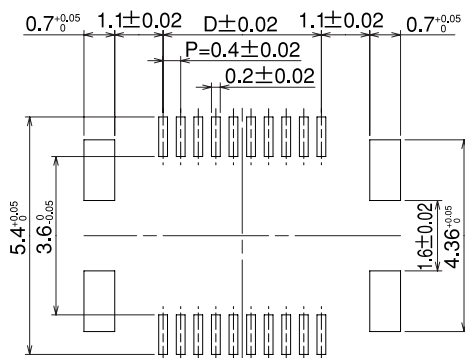
① ② ③ ④ ⑤ ⑥ ⑦

① Series name: DF18	③ Number of Contacts: 20, 30, 40, 50, 60, 70, 80, 100, 120	⑦ Packaging type (51): Plug,embossed tape packaging (2,000 pieces per reel) (81): Receptacle,embossed tape packaging (2,000 pieces per reel)
② Hold-down bracket type B: With metal hold-down (receptacles only) C: With added hold-down contacts D: With added hold-down contacts,increased Removal Force Type(receptacle only) E: With added hold-down contacts,increased Removal Force Type(receptacle only)	④ Connector type DS: Double-row receptacle DP: Double-row plug	
	⑤ Contact pitch 0.4 mm	
	⑥ Terminal type V: SMT vertical mounting type	

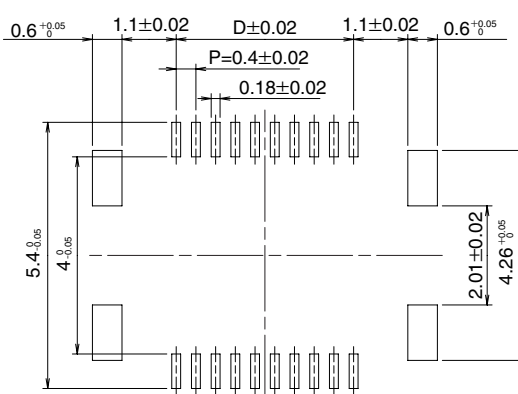
## Receptacles (with metal hold-down)



## PCB mounting pattern



## Metal mask dimensions



Part Number	CL No.	Number of Contacts	A	B	C	D	RoHS
DF18B - 20DS-0.4V (81)	684-0021-3-81	20	7.20	5.62	4.18	3.60	YES
DF18B - 30DS-0.4V (81)	684-0022-6-81	30	9.20	7.62	6.18	5.60	
DF18B - 40DS-0.4V (81)	684-0023-9-81	40	11.20	9.62	8.18	7.60	
DF18B - 50DS-0.4V (81)	684-0005-7-81	50	13.20	11.62	10.18	9.60	
DF18B - 60DS-0.4V (81)	684-0006-0-81	60	15.20	13.62	12.18	11.60	
DF18B - 70DS-0.4V (81)	684-0024-1-81	70	17.20	15.62	14.18	13.60	
DF18B - 80DS-0.4V (81)	Reserved for product expansion	80	19.20	17.62	16.18	15.60	
DF18B - 100DS-0.4V (81)	684-0008-5-81	100	23.20	21.62	20.18	19.60	
DF18B - 120DS-0.4V (81)	Reserved for product expansion	120	27.20	25.62	24.18	23.60	

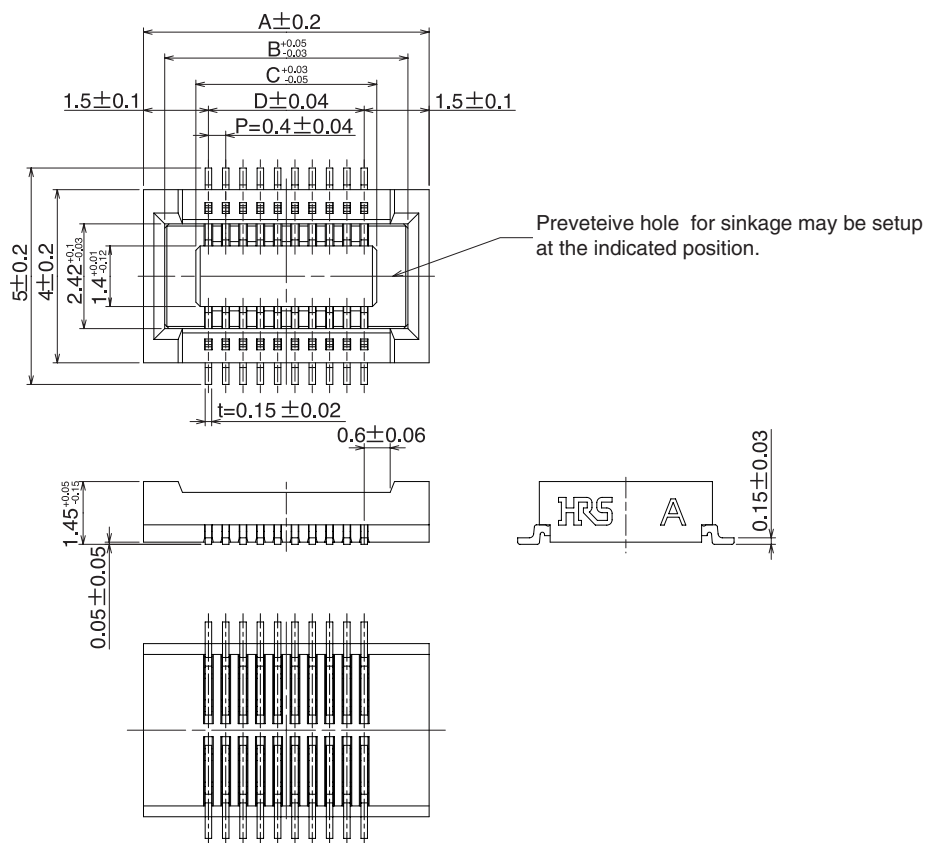
Note: Embossed tape reel packaging(2,000 pieces/reel)  
 Order by the number of reels.

## DF18 Series 0.4mm Contact Pitch, 1.5mm above the board, Board-to-Board / Board-to-FPC Connectors

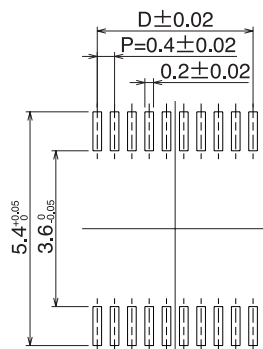
### ■ Receptacles (without metal hold-down)



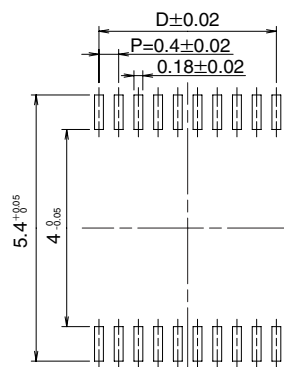
Note: Please specify metal fittings when connecting rigid PCB's.



### ◆ PCB mounting pattern



### ◆ Metal mask dimensions



Unit: mm

Part Number	CL No.	Number of Contacts	A	B	C	D	RoHS
DF18C - 20DS-0.4V (81)	684-0017-6-81	20	6.6	5.62	4.18	3.6	YES
DF18C - 30DS-0.4V (81)	684-0018-9-81	30	8.6	7.62	6.18	5.6	
DF18C - 40DS-0.4V (81)	684-0019-1-81	40	10.6	9.62	8.18	7.6	
DF18C - 50DS-0.4V (81)	684-0001-6-81	50	12.6	11.62	10.18	9.6	
DF18C - 60DS-0.4V (81)	684-0002-9-81	60	14.6	13.62	12.18	11.6	
DF18C - 70DS-0.4V (81)	684-0020-0-81	70	16.6	15.62	14.18	13.6	
DF18C - 80DS-0.4V (81)	684-0003-1-81	80	18.6	17.62	16.18	15.6	
DF18C-100DS-0.4V (81)	684-0004-4-81	100	22.6	21.62	20.18	19.6	
DF18C-120DS-0.4V (81)	684-0013-5-81	120	26.6	25.62	24.18	23.6	

Note: Embossed tape reel packaging (2,000 pieces/reel)  
 Order by the number of reels.

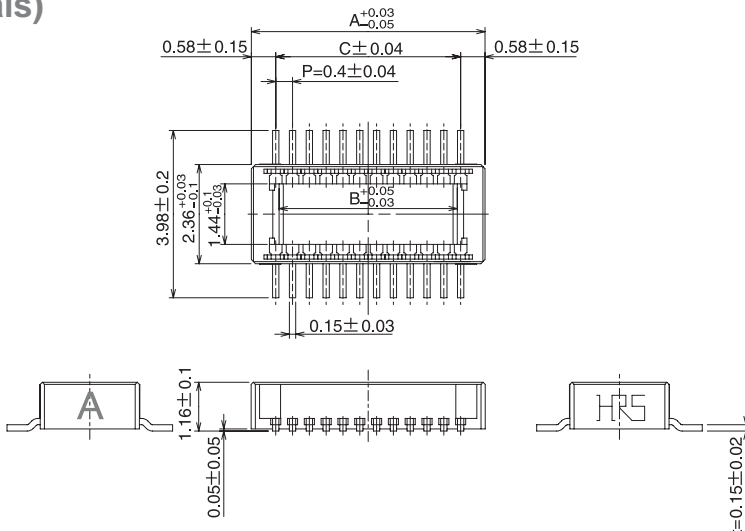


Figure 1: Schematic diagram of the proposed 2D array structure. The diagram shows a 2D array of vertical bars representing contacts. Dimensions are given in micrometers (μm). The total height is 6 μm. The top section has a height of  $4.38 \pm 0.05$  μm. The bottom section has a height of  $2.72 \pm 0.05$  μm. The top section contains two rows of contacts. The top row has a pitch of  $0.6 \pm 0.02$  μm and a width of  $0.6 \pm 0.02$  μm. The bottom row has a pitch of  $0.6 \pm 0.02$  μm and a width of  $0.6 \pm 0.02$  μm. The bottom section contains a single row of contacts with a pitch of  $0.6 \pm 0.02$  μm and a width of  $0.6 \pm 0.02$  μm. The bottom section is labeled 'D, E'.

D: When the corresponding connector is DF18B-\*DS-0.4V (\*\*)  
E: When the corresponding connector is DF18C-\*DS-0.4V (\*\*)

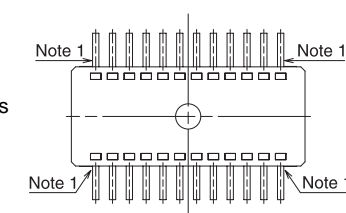


Figure 1 is a schematic diagram of a test specimen, showing its cross-section and dimensions. The specimen is symmetrical about a central vertical dashed line. The total width of the specimen is  $4.38 \pm 0.05$ . The width of the central section is  $3.09 \pm 0.05$ . The width of the side sections is  $2.72 \pm 0.05$ . The width of the top section is  $0.6 \pm 0.02$ . The width of the bottom section is  $0.6 \pm 0.02$ . The width of the central section is  $0.18 \pm 0.01$ . The width of the top section is  $(C-1.6) \pm 0.02$ . The width of the bottom section is  $0.6 \pm 0.02$ . The width of the central section is  $0.4 \pm 0.02$ .

Part Number	CL No.	Number of Contacts	A	B	C	D	E	RoHS
DF18D-20DP-0.4V (51)	684-0029-5-51	20	5.56	4.24	4.40	7.20	6.60	YES
DF18D-30DP-0.4V (51)	684-0030-4-51	30	7.56	6.24	6.40	9.20	8.60	

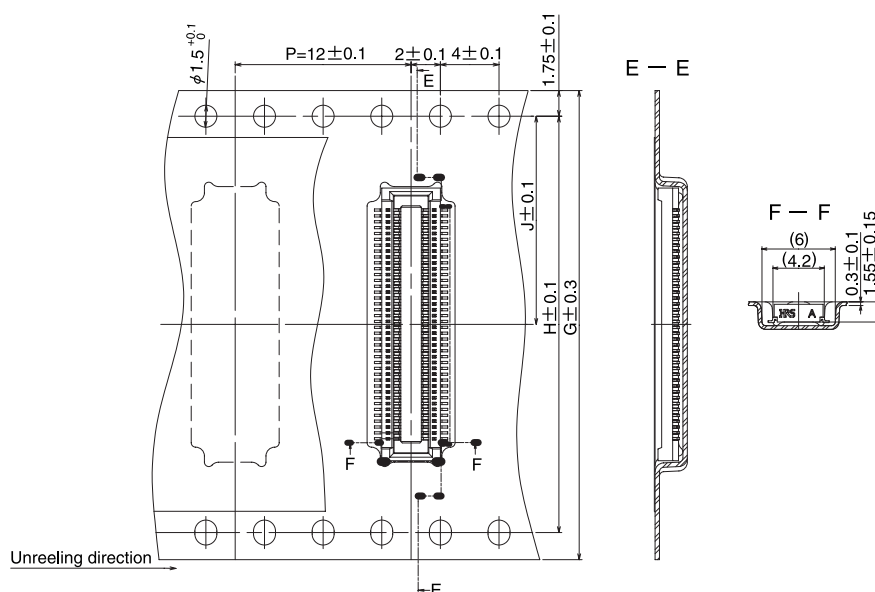
Part Number	CL No.	Number of Contacts	A	B	C	D	E	RoHS
DF18E-40DP-0.4V (51)	684-0031-7-51	40	9.56	8.24	8.40	11.20	10.60	YES
DF18E-50DP-0.4V (51)	684-0032-0-51	50	11.56	10.24	10.40	13.20	12.60	

Part Number	CL No.	Number of Contacts	A	B	C	D	E	RoHS
DF18C - 60DP-0.4V (51)	684-0010-7-51	60	13.56	12.24	12.40	15.20	14.60	YES
DF18C - 70DP-0.4V (51)	684-0028-2-51	70	15.56	14.24	14.40	17.20	16.60	
DF18C - 80DP-0.4V (51)	684-0011-0-51	80	17.56	16.24	16.40	19.20	18.60	
DF18C-100DP-0.4V (51)	684-0012-2-51	100	21.56	20.24	20.40	23.20	22.60	
DF18C-120DP-0.4V (51)	684-0014-8-51	120	25.56	24.24	24.40	27.20	26.60	

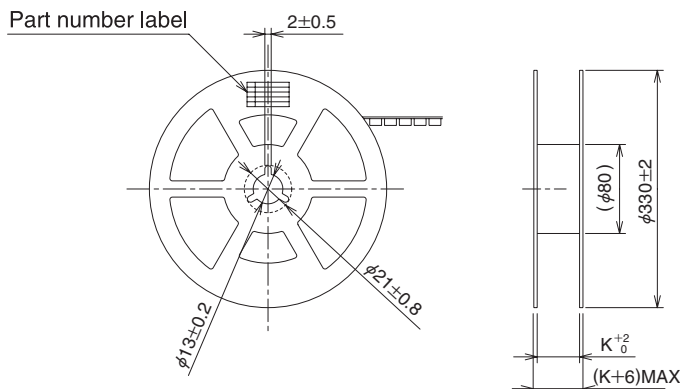
## DF18 Series 0.4mm Contact Pitch, 1.5mm above the board, Board-to-Board / Board-to-FPC Connectors

### ◆ Embossed Carrier Tape Dimensions

#### ● Receptacles



#### ● Reel dimensions

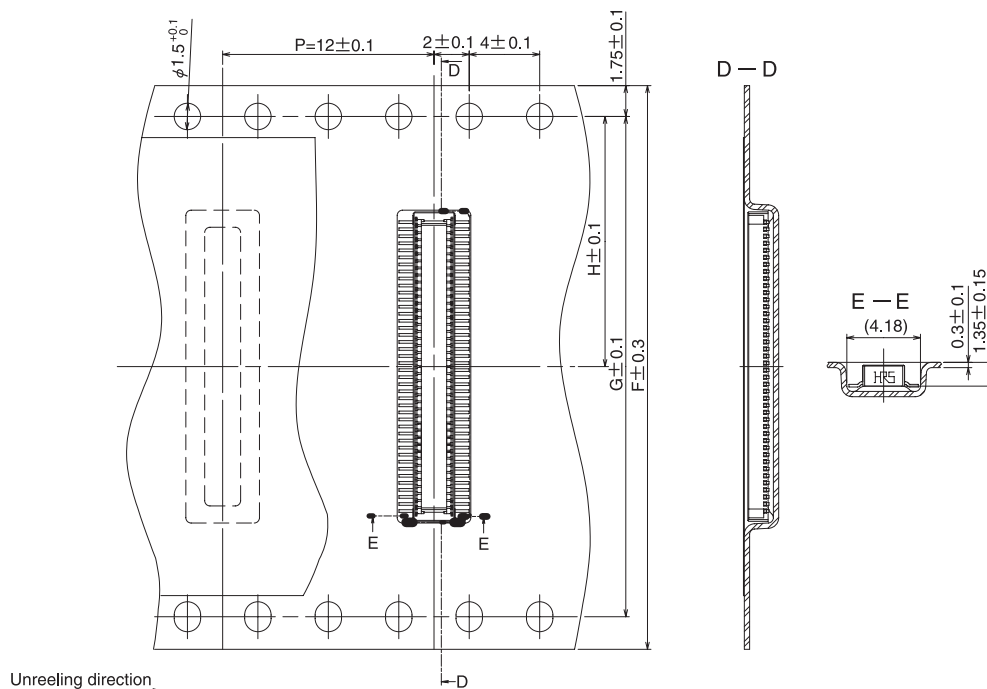


Part Number	G	H	J	K
DF18B - 20DS-0.4V	16.0	-	7.5	17.5
DF18C - 20DS-0.4V				
DF18B - 30DS-0.4V	24.0	-	11.5	25.5
DF18C - 30DS-0.4V	16.0			
DF18B - 40DS-0.4V	24.0	-	11.5	25.5
DF18C - 40DS-0.4V				
DF18B - 50DS-0.4V	24.0	-	11.5	25.5
DF18C - 50DS-0.4V				
DF18B - 60DS-0.4V	24.0	-	11.5	25.5
DF18C - 60DS-0.4V				
DF18B - 70DS-0.4V	32.0	28.4	14.2	33.5
DF18C - 70DS-0.4V	24.0	-	11.5	25.5
DF18B - 80DS-0.4V	32.0	28.4	14.2	33.5
DF18C - 80DS-0.4V				
DF18B-100DS-0.4V	44.0	40.4	20.2	45.5
DF18C-100DS-0.4V				
DF18B-120DS-0.4V	44.0	40.4	20.2	45.5
DF18C-120DS-0.4V				

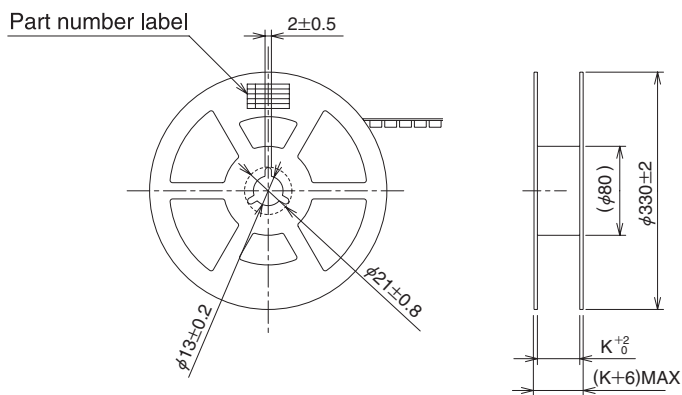
Note: Bottom side feed holes are added to embossed tape when G = 32.0 or greater.

## DF18 Series 0.4mm Contact Pitch, 1.5mm above the board, Board-to-Board / Board-to-FPC Connectors

### ●Plugs



### ●Reel dimensions



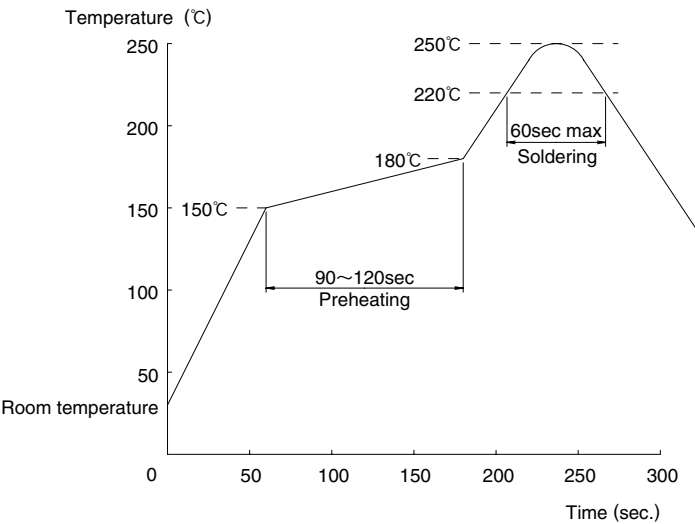
Part Number	F	G	H	K
DF18D - 20DP-0.4V	16.0	-	7.5	17.5
DF18D - 30DP-0.4V	16.0	-	7.5	17.5
DF18E - 40DP-0.4V	24.0	-	11.5	25.5
DF18E - 50DP-0.4V	24.0	-	11.5	25.5
DF18C - 60DP-0.4V	24.0	-	11.5	25.5
DF18C - 70DP-0.4V	24.0	-	11.5	25.5
DF18C - 80DP-0.4V	32.0	28.4	14.2	33.5
DF18C-100DP-0.4V	44.0	40.4	20.2	45.5
DF18C-120DP-0.4V	44.0	40.4	20.2	45.5

Note: Bottom side feed holes are added to embossed tape when  $F = 32.0$  or greater.

DF 16 Series 0.4mm Contact Pitch, 1.5mm above the board, Board-to-Board / Board-to-PC Connectors

◆ Usage Recommendations

1.Recommended Temperature Profile (SMT)



Note1: UP to 2 cycles of Reflow soldering are possible under the same conditions, provided that there is a return to normal temperature between the first and second cycle  
 Note2: The temperature profile indicates the board surface temperature at the point of contacts with the connector terminals.

2. Recommended soldering conditions	Soldering temperature: 350℃, soldering time: within 3 sec.
3. Recommended screen thickness and open area ratio (Pattern area ratio)	Thickness: 0.12 mm
4. Board warping	Maximum of 0.02mm at the connector center section, with both ends of the connector as reference points.
5. Cleaning conditions	Refer to "Nylon Connector Use Handbook".
6. Precautions	<div> <div>■</div> <div>Excessive twisting when mating/un-mating may cause damage to the connectors.</div> </div> <div> <div>■</div> <div>Specify receptacles with the metal hold-down when connecting rigid (non- flexible) printed circuit boards.</div> </div>



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