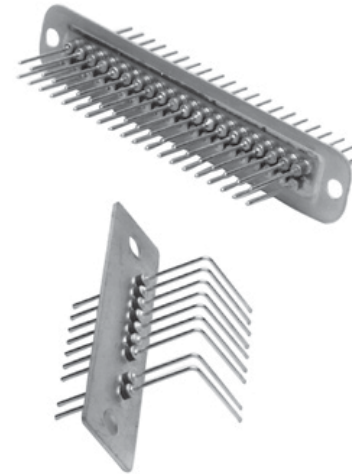


# Bolt-In Style Filter Plates

The bolt-in style plate provides an excellent method for electronic system interface and EMI filtering. Bolt-in filter plates are available in a variety of plate sizes and up to 74 lines per plate in high-density (2.00mm) and 60 pins per plate in standard density (.100"). On the larger plate sizes, APITech ensures structural integrity through a unique coining process. The drawing on the next page shows an electronic system utilizing bolt-in style filter plates.



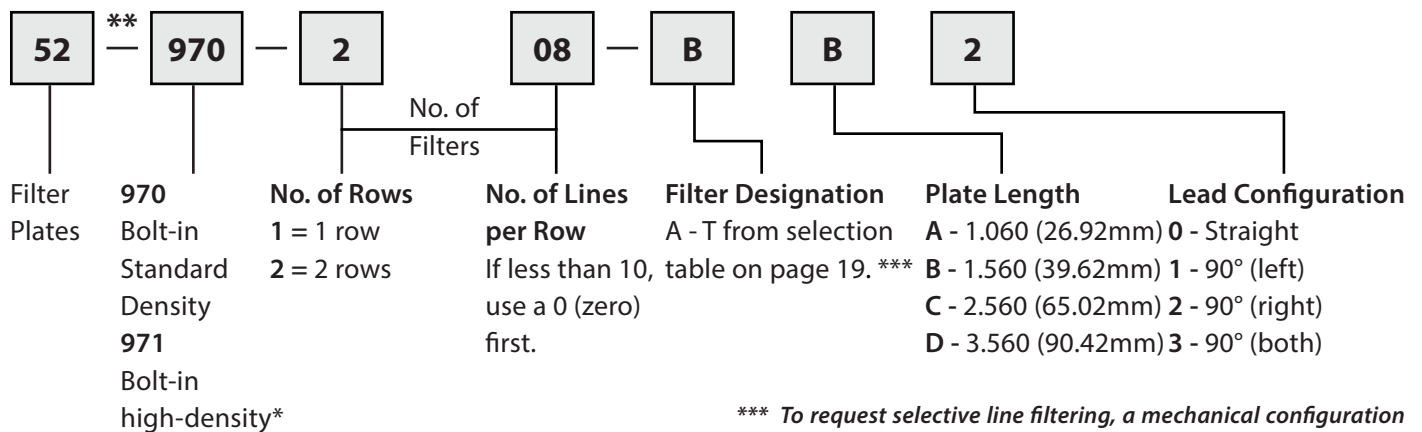
## Bolt-in Filter Plate Advantages

- Eliminates the need to assemble filters into a bulkhead
- Excellent filtering from 5 MHz to 1 GHz
- Total cost savings vs. customer installed discrete filter elements
- Ideal for isolation of electronic compartments to suppress EMI
- Outperforms surface mount filters over 50 MHz
- Improved reliability
- Mixed capacitance values and schematics
- Maximize real estate on PCB
- Available in RoHS compliant versions

## Ordering Information

Example: **52-970-208-BB2**

The part number shown represents a bolt-in style filter plate with 2 rows, 8 filters per row. Filters are C style with a capacitance value of 100pF. The plate length is 1.560", and the leads are bent 90° to the right side.



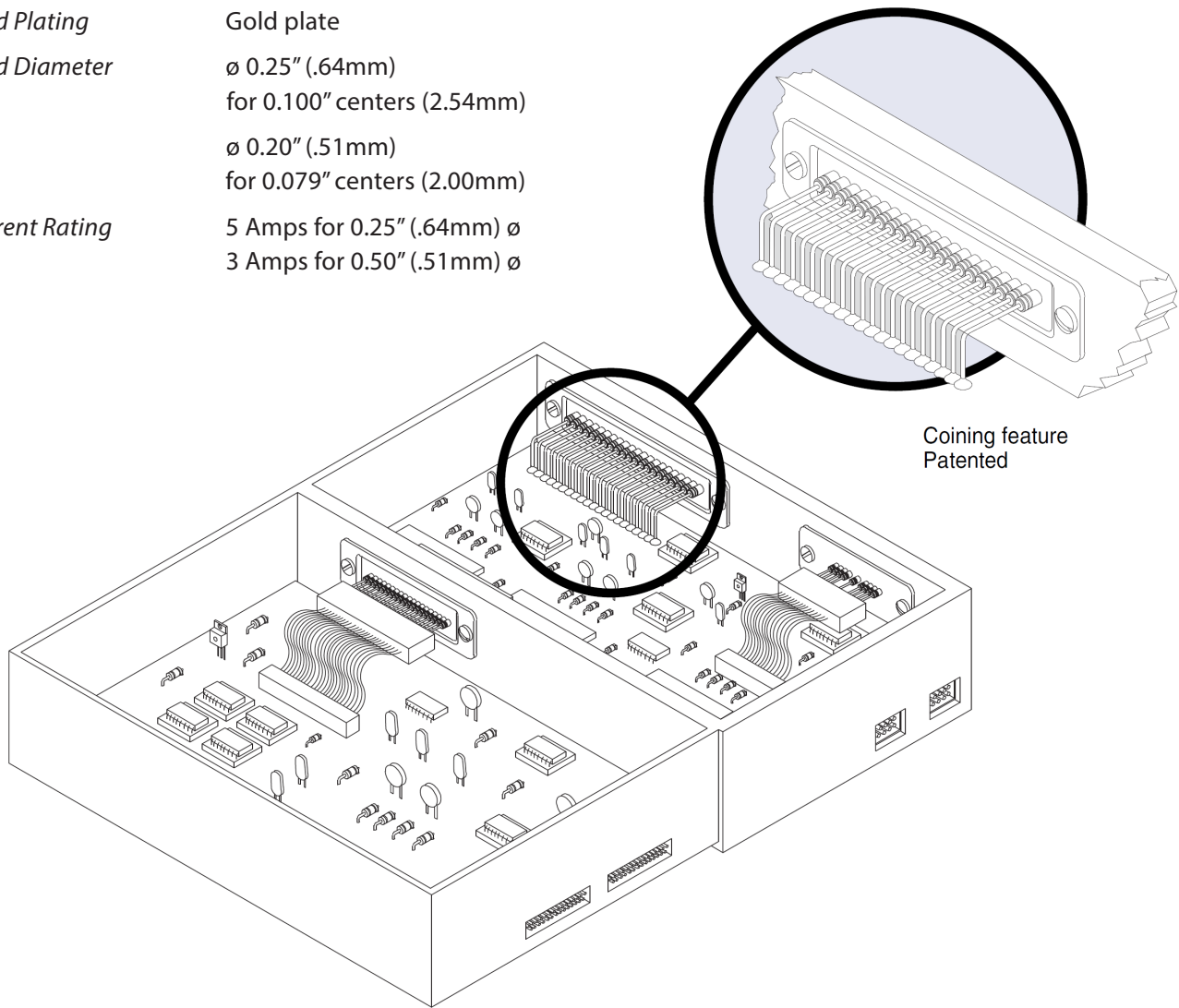
\* Maximum capacitance up 400pF C style filter.  
\*\* Replace "-" with "F" for RoHS compliant version.

\*\*\* To request selective line filtering, a mechanical configuration or material specification not shown in this catalog, please contact APITech. We will review your request and provide you with a part number.

# Bolt-In Style Filter Plates

## Mechanical Specifications

<i>Base Plate Material</i>	Brass UNS C26000/C27000
<i>Base Plate Thickness</i>	0.020 inches (.51mm)
<i>Plating</i>	Tin, RoHS version will be silver
<i>Lead Material</i>	Copper alloy
<i>Lead Plating</i>	Gold plate
<i>Lead Diameter</i>	$\varnothing$ 0.25" (.64mm) for 0.100" centers (2.54mm) $\varnothing$ 0.20" (.51mm) for 0.079" centers (2.00mm)
<i>Current Rating</i>	5 Amps for 0.25" (.64mm) $\varnothing$ 3 Amps for 0.50" (.51mm) $\varnothing$



# Bolt-In Style Filter Plates

Standard Density Centers .100"

**Dimensions** Inches and (mm)

**Lead Spacing** .100" (2.54mm)

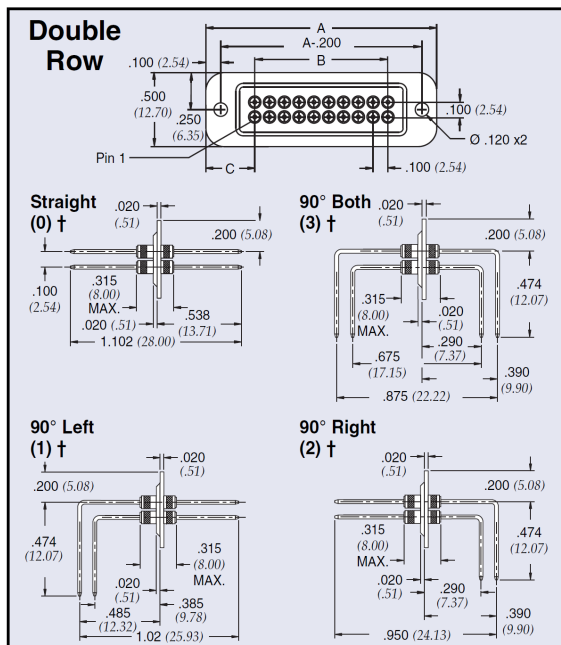
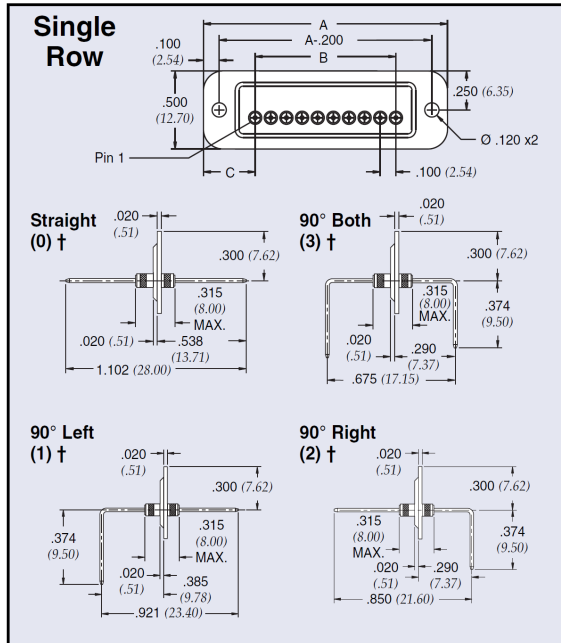


Plate length (A)	No. of filtered lines per row	52-970-XXX-XXX		
		B	C	
1.060* (26.92)	1	0 (0.00)	0.53 (13.46)	
	2	0.1 (2.54)	0.43 (10.92)	
	3	0.2 (5.08)	0.43 (10.92)	
	4	0.3 (7.62)	0.33 (8.38)	
	5	0.4 (10.16)	0.33 (8.38)	
1.560* (39.62)	1	0 (0.00)	0.73 (18.54)	
	2	0.1 (2.54)	0.73 (18.54)	
	3	0.2 (5.08)	0.63 (16.00)	
	4	0.3 (7.62)	0.63 (16.00)	
	5	0.4 (10.16)	0.53 (13.46)	
	6	0.5 (12.70)	0.53 (13.46)	
	7	0.6 (15.24)	0.43 (10.92)	
	8	0.7 (17.78)	0.43 (10.92)	
	9	0.8 (20.32)	0.33 (8.38)	
	10	0.9 (22.86)	0.33 (8.38)	
2.560 (65.02)	5	0.4 (10.16)	1.03 (26.16)	
	6	0.5 (12.70)	1.03 (26.16)	
	7	0.6 (15.24)	0.93 (23.62)	
	8	0.7 (17.78)	0.93 (23.62)	
	9	0.8 (20.32)	0.83 (21.08)	
	10	0.9 (22.86)	0.83 (21.08)	
	11	1.0 (25.40)	0.73 (18.54)	
	12	1.1 (27.94)	0.73 (18.54)	
	13	1.2 (30.48)	0.63 (16.00)	
	14	1.3 (33.02)	0.63 (16.00)	
	15	1.4 (35.56)	0.53 (13.46)	
	16	1.5 (38.10)	0.53 (13.46)	
	17	1.6 (40.65)	0.43 (10.92)	
	18	1.7 (43.18)	0.43 (10.92)	
	19	1.8 (45.72)	0.33 (8.38)	
	20	1.9 (48.26)	0.33 (8.38)	
	3.560 (90.42)	13	1.2 (30.48)	1.13 (27.70)
		14	1.3 (33.02)	1.13 (27.70)
		15	1.4 (35.56)	1.03 (26.16)
		16	1.5 (38.10)	1.03 (26.16)
17		1.6 (40.65)	0.93 (23.62)	
18		1.7 (43.18)	0.93 (23.62)	
19		1.8 (45.72)	0.83 (21.08)	
20		1.9 (48.26)	0.83 (21.08)	
21		2.0 (50.80)	0.73 (18.54)	
22		2.1 (53.34)	0.73 (18.54)	
23		2.2 (55.88)	0.63 (16.00)	
24		2.3 (58.42)	0.63 (16.00)	
25		2.4 (60.96)	0.53 (13.46)	
26		2.5 (63.50)	0.53 (13.46)	
27		2.6 (66.04)	0.43 (10.92)	
28	2.7 (68.58)	0.43 (10.92)		
29	2.8 (71.12)	0.33 (8.38)		
30	2.9 (73.66)	0.33 (8.38)		

Coining feature patented.

† Refers to lead configuration for part number/ordering information.

\* For plate widths 1.060 and 1.560 there will be no coining. For these plates, increase dimensions to the right .020". Thus, any dimension on left will be reduced by .020".

# Bolt-In Style Filter Plates

High-Density Centers 2.00mm

**Dimensions** Inches and (mm)  
**Lead Spacing** .079" (2.00mm)

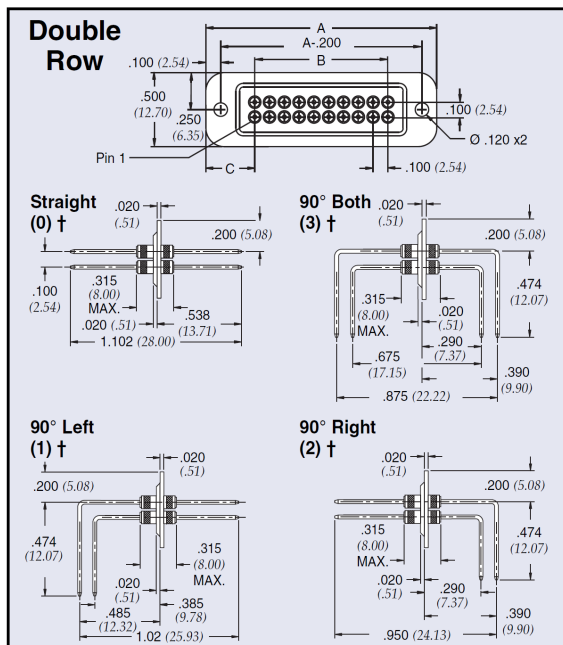
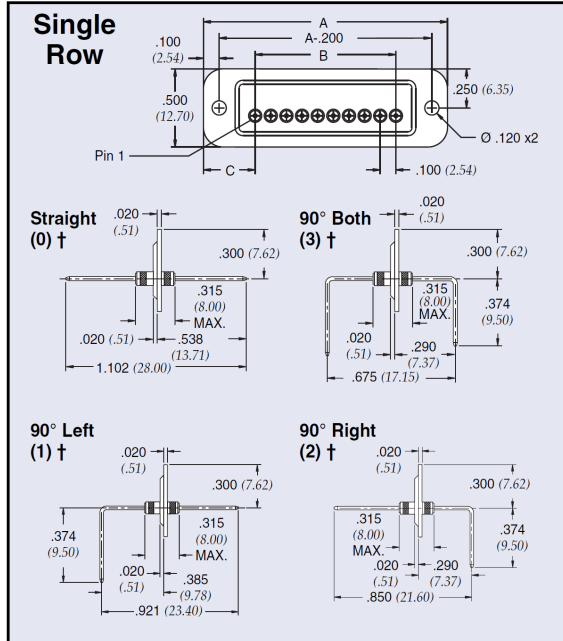


Plate length (A)	No. of filtered lines per row	52-970-XXX-XXX	
		B	C
1.060* (26.92)	1	0 (0.00)	0.53 (13.46)
	2	0.1 (2.54)	0.43 (10.92)
	3	0.2 (5.08)	0.43 (10.92)
	4	0.3 (7.62)	0.33 (8.38)
	5	0.4 (10.16)	0.33 (8.38)
1.560* (39.62)	1	0 (0.00)	0.73 (18.54)
	2	0.1 (2.54)	0.73 (18.54)
	3	0.2 (5.08)	0.63 (16.00)
	4	0.3 (7.62)	0.63 (16.00)
	5	0.4 (10.16)	0.53 (13.46)
	6	0.5 (12.70)	0.53 (13.46)
	7	0.6 (15.24)	0.43 (10.92)
	8	0.7 (17.78)	0.43 (10.92)
	9	0.8 (20.32)	0.33 (8.38)
	10	0.9 (22.86)	0.33 (8.38)
2.560 (65.02)	5	0.4 (10.16)	1.03 (26.16)
	6	0.5 (12.70)	1.03 (26.16)
	7	0.6 (15.24)	0.93 (23.62)
	8	0.7 (17.78)	0.93 (23.62)
	9	0.8 (20.32)	0.83 (21.08)
	10	0.9 (22.86)	0.83 (21.08)
	11	1.0 (25.40)	0.73 (18.54)
	12	1.1 (27.94)	0.73 (18.54)
	13	1.2 (30.48)	0.63 (16.00)
	14	1.3 (33.02)	0.63 (16.00)
	15	1.4 (35.56)	0.53 (13.46)
	16	1.5 (38.10)	0.53 (13.46)
	17	1.6 (40.65)	0.43 (10.92)
	18	1.7 (43.18)	0.43 (10.92)
	19	1.8 (45.72)	0.33 (8.38)
20	1.9 (48.26)	0.33 (8.38)	
3.560 (90.42)	13	1.2 (30.48)	1.13 (27.70)
	14	1.3 (33.02)	1.13 (27.70)
	15	1.4 (35.56)	1.03 (26.16)
	16	1.5 (38.10)	1.03 (26.16)
	17	1.6 (40.65)	0.93 (23.62)
	18	1.7 (43.18)	0.93 (23.62)
	19	1.8 (45.72)	0.83 (21.08)
	20	1.9 (48.26)	0.83 (21.08)
	21	2.0 (50.80)	0.73 (18.54)
	22	2.1 (53.34)	0.73 (18.54)
	23	2.2 (55.88)	0.63 (16.00)
	24	2.3 (58.42)	0.63 (16.00)
	25	2.4 (60.96)	0.53 (13.46)
	26	2.5 (63.50)	0.53 (13.46)
	27	2.6 (66.04)	0.43 (10.92)
28	2.7 (68.58)	0.43 (10.92)	
29	2.8 (71.12)	0.33 (8.38)	
30	2.9 (73.66)	0.33 (8.38)	

Coining feature patented.

† Refers to lead configuration for part number/ordering information.

\* For plate widths 1.060 and 1.560 there will be no coining. For these plates, increase dimensions to the right .020". Thus, any dimension on left will be reduced by .020".

# Filter Plate Filter Selection

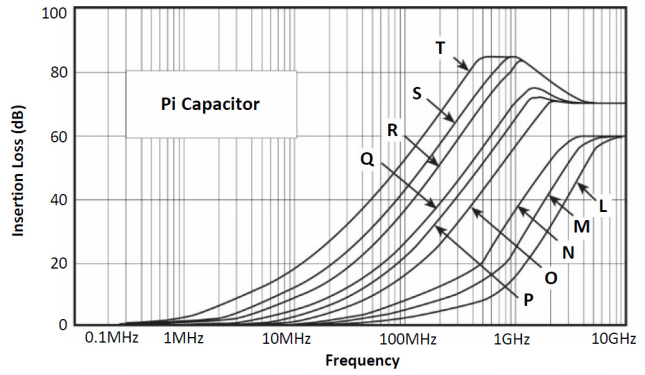
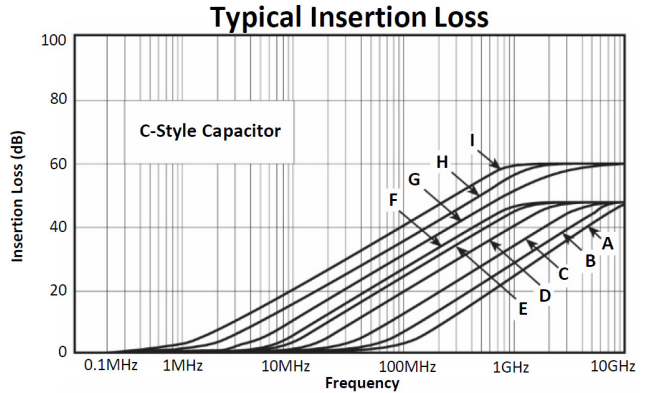
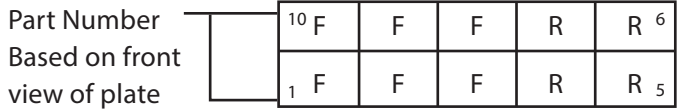
## EMI Filter Performance

The electrical characteristics table and insertion loss graphs indicate the performance of feedthrough capacitors and Pi type filters. Utilize this information to specify the EMI filtering components included in your filter plate.

## Custom Filtering

APItech filter plates are engineered to accommodate selective line filtering. Several different types of filters may be specified in a single, easy to install filter plate, allowing you to facilitate a wide range of filtering requirements.

For select line filtering, provide a sketch indicating the filters and positions required. The example below represents a 10-pin, 2-row plate with six 1000 pF feedthrough capacitors and four 1700 pF Pi type filters.



The above curves represent the application of proper grounding fundamentals.

Filter Designation	Filter** Circuits	Capacitance		3 dB Max Cut-off Frequency (MHz)	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load)							
		Value	Tolerance			5 MHZ	10 MHZ	20 MHZ	50 MHZ	100 MHZ	200 MHZ	500 MHZ	1 GHZ
A	C	68pF	+/-25%	73.9	100V	-	-	-	-	-	3	10	16
B	C	100pF	+/-25%	50.3	100V	-	-	-	-	1	6	13	19
C	C	135pF	+100/-0%	23.3	100V	-	-	-	1	5	10	16	20
D	C	470pF	+/-25%	10.7	100V	-	-	2	7	13	18	25	27
E	C	820pF	+/-25%	6.2	100V	-	1	5	12	18	23	30	33
F	C	1000pF	+/-25%	5.1	100V	-	2	7	14	20	25	32	35
G	C	1500pF	+/-25%	3.4	100V	1	4	10	16	22	29	36	37
H	C	2500pF	+100/-0%	1.26	100V	5	11	17	23	29	35	38	40
I	C	4000pF	+100/-0%	0.8	100V	9	15	21	27	34	38	42	46
J	Insulated	10pF	Max.	635	100V	-	-	-	-	-	-	-	-
K	Grounded					-	-	-	-	-	-	-	-
L	Pi	68	+/-25%	65.3	100V	-	-	-	-	1	3	8	19
M	Pi	100	+/-25%	45.1	100V	-	-	-	-	2	6	11	27
N	Pi	135	+100/-0%	22.0	100V	-	-	-	1	6	10	20	34
O	Pi	470	+/-25%	10.6	100V	-	-	-	8	14	21	36	43
P	Pi	820	+/-25%	6.2	100V	-	-	4	13	22	31	45	52
Q	Pi	1000	+/-25%	5.1	100V	-	2	6	14	22	33	51	59
R	Pi	1700	+100/-0%	1.9	100V	1	6	12	23	35	48	64	69
S	Pi	2500	+100/-0%	1.3	50V	4	9	15	28	41	54	70	70
T	Pi	5000	+100/-0%	0.65	100V	9	15	23	41	53	66	70	70

\* 3dB cut-off frequency calculated at the maximum capacitance.  
 \*\* For high-density centers (2mm) only C style filters are available, to maximum of 4000pF.