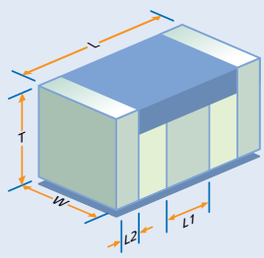
Surface Mount Pi Filters

SBSP

A new range of miniature surface mount pi-filters has been launched by Syfer Technology. In a size of only 1206, it offers an unbeatable combination of size and performance. With a 1A current rating, the SBSP range is available with working voltages up to 100Vdc. The use of X7R and C0G ceramic dielectrics allows capacitance values from 22pF to 150nF, making it suitable for both signal and power lines and ensuring impressive EMI filtering performance up to 1GHz and higher. Ideal for telecoms, power supplies and industrial electronic equipment, the operating temperature range of -55°C to 125°C ensures they are also suitable for mil/aerospace applications.

Circuit configuration

Pi



Electrical Specifications

	mm	(inches)
L	3.2mm ± 0.3	(0.126" ± 0.012")
W	1.6mm ± 0.3	(0.063" ± 0.012")
T	1.6mm ± 0.2	(0.063" ± 0.008")
L1	0.95 ± 0.3	(0.037" ± 0.012")
L2	0.5 ± 0.25	(0.020" ± 0.010")

Electrical Configuration	*Pi Filter*	
Capacitance Measurement	*At 1000hr point*	
Rated Current	*1 amp dc*	
Operating Temperature	*-55°C to 125°C*	
DC Resistance	*0.5 Ohms Max*	
Weight	*0.5g typical (0.18oz)*	
Dielectric Withstand Voltage	*Rated Voltage* *100Vdc* *50Vdc* *25Vdc*	*DWV* *250Vdc* *125Vdc* *63Vdc*
Ferrite Inductance	*0.25µH*	

Type No.	Capacitance (±20%)	Dielectric Code (Vd.c.)	Rated Voltage	Typical Insertion Loss (dB) 50 ohm System No Load Pi Section 0.1MHz	1MHz	10MHz	100MHz	1GHz
SBSPP1000220MC#¹	22pF	C0G	100	0	0	0	1	12
SBSPP1000470MC#¹	47pF	C0G	100	0	0	0	3	21
SBSPP1000101MC#¹	100pF	C0G	100	0	0	0	7	32
SBSPP1000221MC#¹	220pF	C0G	100	0	0	1	13	45
SBSPP1000471MC#¹	470pF	C0G	100	0	0	2	22	58
SBSPP1000102MX#¹	1nF	X7R	100	0	0	5	33	60+
SBSPP1000152MX#¹	1.5nF	X7R	100	0	0	9	40	60+
SBSPP1000222MX#¹	2.2nF	X7R	100	0	0	11	47	60+
SBSPP1000332MX#¹	3.3nF	X7R	100	0	0	14	54	60+
SBSPP1000472MX#¹	4.7nF	X7R	100	0	1	19	57	60+
SBSPP1000682MX#¹	6.8nF	X7R	100	0	2	24	60+	60+
SBSPP1000103MX#¹	10nF	X7R	100	0	5	29	60+	60+
SBSPP1000153MX#¹	15nF	X7R	100	0	7	36	60+	60+
SBSPP0500223MX#¹	22nF	X7R	50	0	11	42	60+	60+
SBSPP0500333MX#¹	33nF	X7R	50	0	14	51	60+	60+
SBSPP0500473MX#¹	47nF	X7R	50	1	16	57	60+	60+
SBSPP0500683MX#¹	68nF	X7R	50	3	19	60+	60+	60+
SBSPP0250104MX#¹	100nF	X7R	25	5	21	60+	60+	60+
SBSPP0250154MX#¹	150nF	X7R	25	8	23	60+	60+	60+

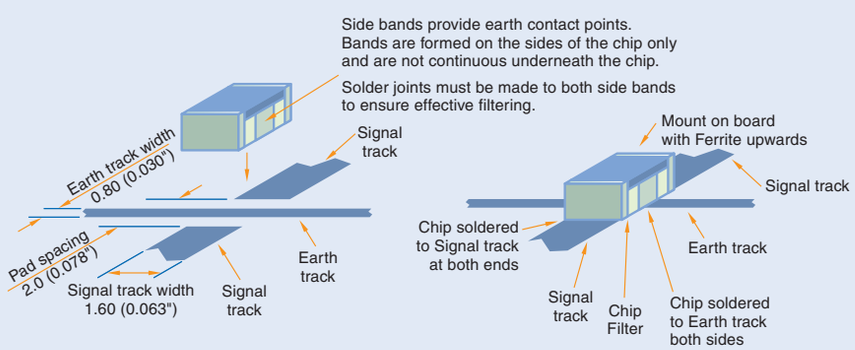
Note #¹ T = Taped, B = Bulk, R = Large Reel

Insertion loss figures quoted are for filters mounted within a partition, it should be noted that some degradation will occur at higher frequencies for filters which are not fully shielded.

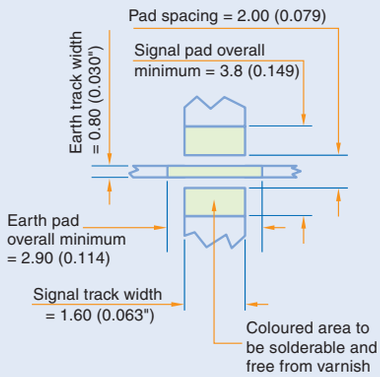
SBSP

Mounting Information and Soldering Procedures

SM Pi chip filter mounted to board and soldered in identical manner to chip capacitor. Solder connections made to each end (signal lines) and each side band (earth track).



Recommended Pad/Track details



notes

1. For effects of mounting method on Insertion Loss page 82.
2. For details of ordering see page 82.
3. For soldering and installation information see page 75.

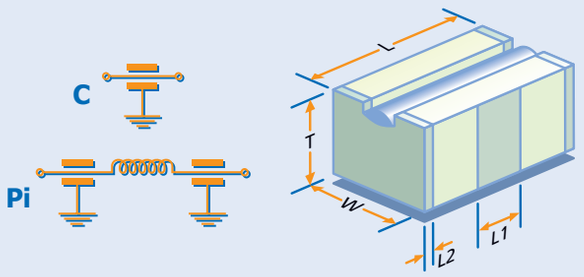
#¹ For taping on 7" reel insert "T", on 13" reel insert "R", if supplied in bulk insert "B". (For taped quantities see page 82).

SYFER TECHNOLOGY LIMITED
A ROVER Company

Surface Mount C and Pi Filters

SBSG

The SBSG range has a 5A current rating for the Pi type, and 10A rating for the C type. Suitable for pick-and-place, these miniature surface mount filters offer assembly savings compared with conventional panel mounted filters. The combination of high current, high capacitance and high voltage makes them suitable for a wide range of applications including telecoms, mil/aerospace and industrial.



Specifications

	mm	(inches)
L	5.25 ± 0.4	(0.207 ± 0.015)
W	3.20 ± 0.2	(0.126 ± 0.008)
T	2.50 ± 0.15	(0.098 ± 0.006)
L1	1.50 ± 0.4	(0.059 ± 0.015)
L2	0.30 ± 0.25	(0.012 ± 0.010)

Electrical Configuration	*C & Pi Filters*
Capacitance Measurement	*At 1000hr point*
Current Rating	*Pi Section 5 amps dc* *C Section 10 amps dc*
Temperature Rating	*-55°C to 125°C*
DC Resistance	*0.005 Ohms Max.*
Ferrite Inductance, typical	*0.5µH (Pi Section only)*
Weight	*0.2g typical (0.007oz)*

Type No. (* = Preferred Value)	Capacitance (M = +/-20%)	Dielectric Code	Rated Voltage (Vd.c.)	DWV (Vd.c.)	Typical Insertion Loss (dB) 50 ohm System No Load C Section 0.1MHz	1MHz	10MHz	100MHz	1GHz	Pi Section 0.1MHz	1MHz	10MHz	100MHz	1GHz
*SBSG#¹ 5000102MX#²	1.0nF	X7R	500	750	0	0	4	23	41	0	0	5	33	60+
SBSG#¹ 5000152MX#²	1.5nF	X7R	500	750	0	0	7	26	45	0	0	9	40	60+
*SBSG#¹ 5000222MX#²	2.2nF	X7R	500	750	0	0	10	30	50	0	0	11	47	60+
SBSG#¹ 5000332MX#²	3.3nF	X7R	500	750	0	0	13	33	52	0	0	14	54	60+
*SBSG#¹ 5000472MX#²	4.7nF	X7R	500	750	0	1	16	36	55	0	1	19	57	60+
SBSG#¹ 5000682MX#²	6.8nF	X7R	500	750	0	2	19	39	57	0	2	24	60+	60+
*SBSG#¹ 5000103MX#²	10nF	X7R	500	750	0	4	22	41	60+	0	5	29	60+	60+
*SBSG#¹ 5000153MX#²	15nF	X7R	500	750	0	7	25	44	60+	0	7	36	60+	60+
*SBSG#¹ 5000223MX#²	22nF	X7R	500	750	0	10	29	46	60+	0	11	42	60+	60+
SBSG#¹ 5000333MX#²	33nF	X7R	500	750	0	13	33	48	60+	0	14	51	60+	60+
*SBSG#¹ 5000473MX#²	47nF	X7R	500	750	1	16	35	50	60+	1	16	57	60+	60+
SBSG#¹ 2000683MX#²	68nF	X7R	200	500	2	19	39	54	60+	3	19	60+	60+	60+
*SBSG#¹ 1000104MX#²	100nF	X7R	100	250	4	22	41	57	60+	5	21	60+	60+	60+
*SBSG#¹ 1000154MX#²	150nF	X7R	100	250	7	25	45	60+	60+	8	23	60+	60+	60+
*SBSG#¹ 0500224MX#²	220nF	X7R	50	125	10	29	49	60+	60+	11	27	60+	60+	60+

Insertion loss figures quoted are for filters mounted within a partition. It should be noted that some degradation will occur at higher frequencies for filters which are not fully shielded.

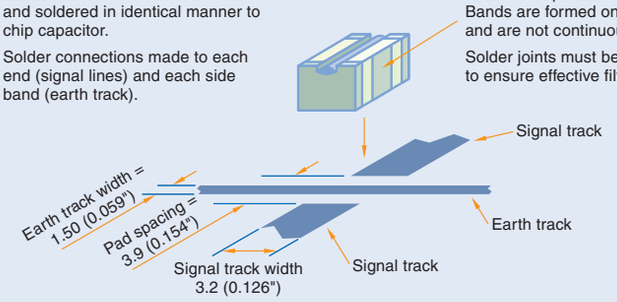
SBSG

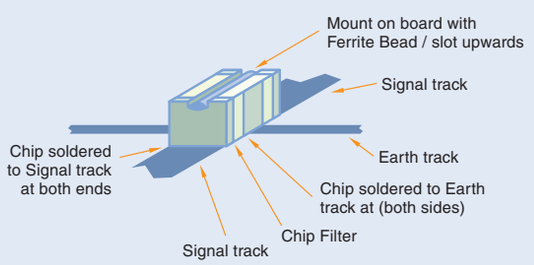
SM Pi or C filter mounted to board and soldered in identical manner to chip capacitor.

Solder connections made to each end (signal lines) and each side band (earth track).

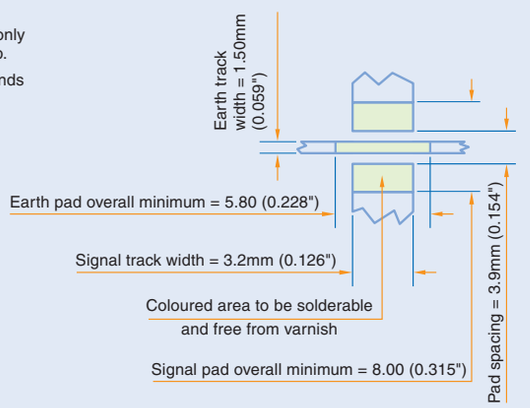
Side bands provide earth contact points. Bands are formed on the sides of the chip only and are not continuous underneath the chip.

Solder joints must be made to both side bands to ensure effective filtering.





PAD DIMENSIONS - C & Pi Filter



Notes on pad design

1. Pad / track design assumes 2oz copper track material.
2. Track width quoted allows for operation at max. rated current at 125°C.
3. Different operating conditions may allow alternative track designs to be used. Although any pad must be able to support continuous opertating current at max. operating temperature.

notes

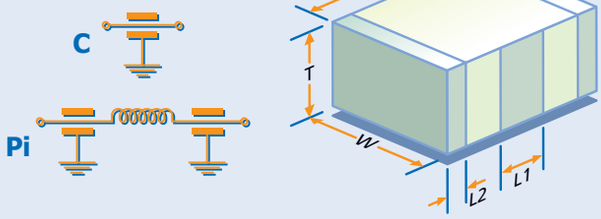
1. For effects of mounting method of Insertion Loss see page 82.
2. For details of ordering see page 82.
3. For soldering and installation information see page 75.

#¹ For C Filter insert "C", for Pi Filter insert "P".
#² For taping on 7" reel insert "T", on 13" reel insert "R", if supplied in bulk insert "B". (For taped quantities see page 82).

Surface Mount C and Pi Filters

SBSM

The SBSM range of surface mount EMI filters has been designed for use on pcbs, and is suitable for both signal and power lines. Capacitance values up to 470nF are available, with a 10A current rating for pi-section filters and 20A rating for 'C' types. The high capacitance, high current and high voltage ratings make them suitable for a wide range of applications including telecoms, mil/aerospace and industrial.



Specifications

	mm	(inches)
L	6.6 ± 0.4	(0.260 ± 0.015)
W	5.0 ± 0.4	(0.197 ± 0.015)
T	3.18 ± 0.13	(0.125 ± 0.005)
L1	2.25 ± 0.4	(0.088 ± 0.015)
L2	0.3 ± 0.25	(0.012 ± 0.01)

Electrical Configuration	*C & Pi Filters*
Capacitance Measurement	*At 1000hr point*
Current Rating	*Pi Section 10 amps dc* *C Section 20 amps dc*
Temperature Rating	*-55°C to 125°C*
DC Resistance	*0.005 ohms max*
Ferrite Inductance, typical	*0.5µH (Pi section only)*
Weight	*0.5g typical (0.18oz)*

Type No. (* = Preferred Value)	Capacitance (M = +/-20%)	Dielectric Code	Rated Voltage (Vd.c.)	DWV (Vd.c.)	Typical Insertion Loss (dB) 50 ohm System No Load C Section 0.1MHz	1MHz	10MHz	100MHz	1GHz	Pi Section 0.1MHz	1MHz	10MHz	100MHz	1GHz
*SBSM#¹ 5000102MX#²	1.0nF	X7R	500	750	0	0	4	23	41	0	0	5	33	60+
SBSM#¹ 5000152MX#²	1.5nF	X7R	500	750	0	0	7	26	45	0	0	9	40	60+
*SBSM#¹ 5000222MX#²	2.2nF	X7R	500	750	0	0	10	30	50	0	0	11	47	60+
*SBSM#¹ 5000332MX#²	3.3nF	X7R	500	750	0	0	13	33	52	0	0	14	54	60+
*SBSM#¹ 5000472MX#²	4.7nF	X7R	500	750	0	1	16	36	55	0	1	19	57	60+
SBSM#¹ 5000682MX#²	6.8nF	X7R	500	750	0	2	19	39	57	0	2	24	60+	60+
*SBSM#¹ 5000103MX#²	10nF	X7R	500	750	0	4	22	41	60+	0	5	29	60+	60+
*SBSM#¹ 5000153MX#²	15nF	X7R	500	750	0	7	25	44	60+	0	7	36	60+	60+
*SBSM#¹ 5000223MX#²	22nF	X7R	500	750	0	10	29	46	60+	0	11	42	60+	60+
SBSM#¹ 5000333MX#²	33nF	X7R	500	750	0	13	33	48	60+	0	14	51	60+	60+
*SBSM#¹ 5000473MX#²	47nF	X7R	500	750	1	16	35	50	60+	1	16	57	60+	60+
SBSM#¹ 5000683MX#²	68nF	X7R	500	750	2	19	39	54	60+	3	19	60+	60+	60+
*SBSM#¹ 2000104MX#²	100nF	X7R	200	500	4	22	41	57	60+	5	21	60+	60+	60+
SBSM#¹ 2000154MX#²	150nF	X7R	200	500	7	25	45	60+	60+	8	23	60+	60+	60+
*SBSM#¹ 1000224MX#²	220nF	X7R	100	250	10	29	49	60+	60+	11	27	60+	60+	60+
*SBSM#¹ 1000334MX#²	330nF	X7R	100	250	13	33	52	60+	60+	14	35	60+	60+	60+
*SBSM#¹ 0500474MX#²	470nF	X7R	50	125	16	35	55	60+	60+	17	41	60+	60+	60+

Insertion loss figures quoted are for filters mounted within a partition. It should be noted that some degradation will occur at higher frequencies for filters which are not fully shielded.

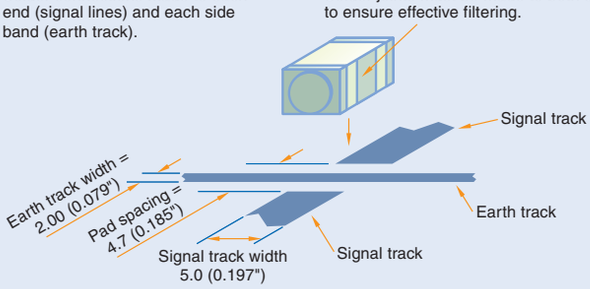
SBSM

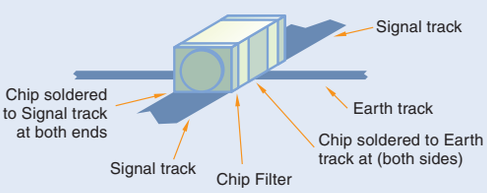
SM Pi or C filter mounted to board and soldered in identical manner to chip capacitor.

Solder connections made to each end (signal lines) and each side band (earth track).

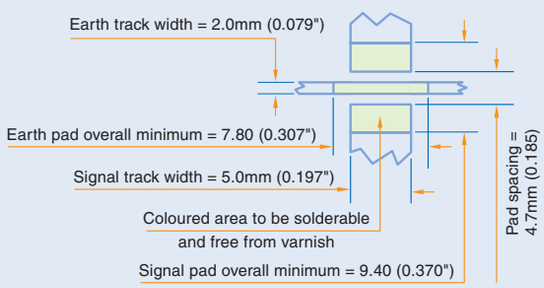
Side bands provide earth contact points. Bands are formed on the sides of the chip only and are not continuous underneath the chip.

Solder joints must be made to both side bands to ensure effective filtering.

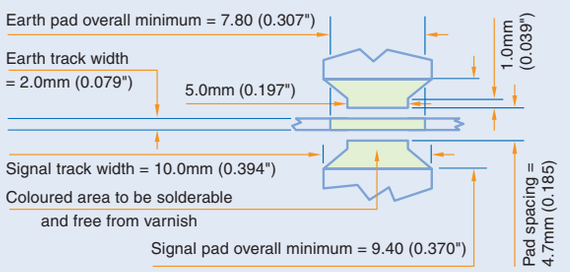




PAD DIMENSIONS - Pi Filter



PAD DIMENSIONS - C Filter



notes

1. For effects of mounting method on Insertion Loss page 82.
2. For details of ordering see page 82.
3. For soldering and installation information see page 75.

#¹ For C Filter insert "C", for Pi Filter insert "P".

#² For taping on 7" reel insert "T", on 13" reel insert "R", if supplied in bulk insert "B". (For taped quantities see page 82).

SYFER TECHNOLOGY LIMITED
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Surface Mount C and Pi Filters

Effects of mounting method on Insertion Loss

Whilst SBSG, SBSM and SBSP filters can be mounted conventionally on pcbs, they are also suitable for mounting in a wall or partition on a board. This greatly improves the screening between filter input and output, thereby enhancing the high frequency response.

The following insertion loss curves, based on actual measurements, show the effect. It can be seen that the filters conventionally mounted (Fig. 1) exhibit a drop in attenuation at higher frequencies. The types mounted in a partition, however (Fig. 2), maintain excellent suppression characteristics to 1GHz and above.

Figure 1. Filters mounted on open pcb

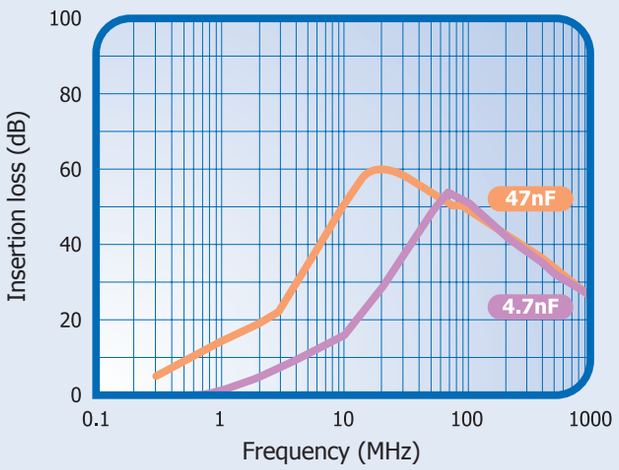
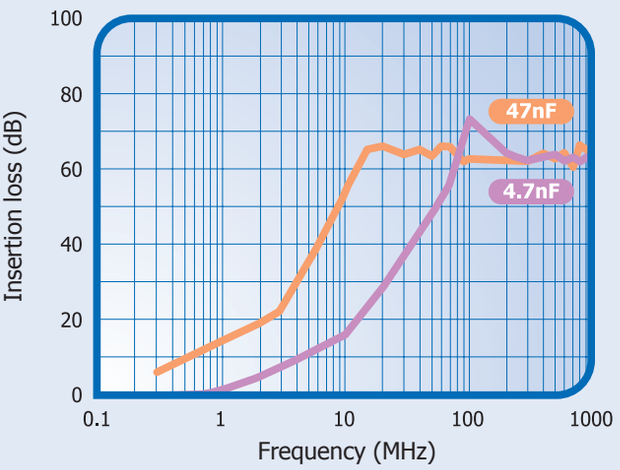


Figure 2. Filters mounted in wall or partition



Comparison of insertion loss curves for SBSP, SBSG, SBSM Pi Filters

Ordering Information

SBSP, SBSG, SBSM & Ranges

SB	S	M	P	500	0102	M	X	T
Syfer Board Filter	**Mounting** S= Surface Mount	**Size** P = 1206 G = 5.25 x 3.2mm M = 6.6 x 5.0mm	**Electrical Configuration** C=C Section P=Pi Section	**Voltage** 025 = 25Vdc 050 = 50Vdc 100 = 100Vdc 200 = 200Vdc 500 = 500Vdc	**Capacitance** Expressed in picofarads (pF). First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: 0472=4700pF.	**Capacitance Tolerance** M=±20% (Standard)	**Dielectric** C=C0G X=X7R	**Packaging** T=Taped on 178mm (7") reel R=Taped on 330mm (13") reel B=Bulk

Taped Quantities

	SBSP	SBSG/SBSM
Reel size	**Qty**	**Qty**
178mm (7")	1500	500
330mm (13")	6000	2000