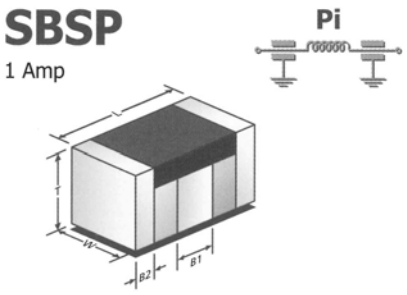
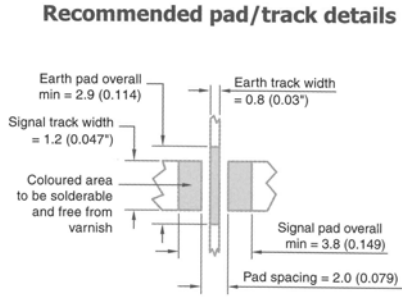
SBSP

Surface Mount EMI Filters

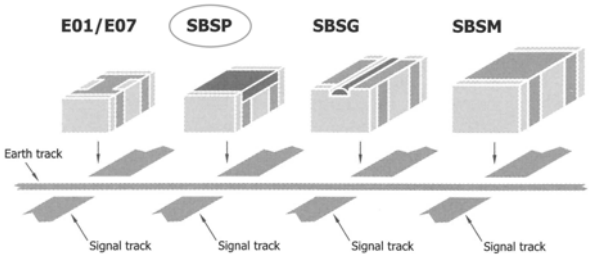
SYFER



	1206
L	3.2 ± 0.3 (0.126 ± 0.012)
W	1.6 ± 0.3 (0.063 ± 0.012)
T	1.6 ± 0.2 (0.063 ± 0.008)
B1	0.95 ± 0.3 (0.037 ± 0.012)
B2	0.5 ± 0.25 (0.02 ± 0.01)



Type		SBSPP
Chip Size		1206
Max Current		1A
Rated Voltage	Dielectric	Minimum and maximum capacitance values
25Vdc	C0G/NP0	-
	X7R	100nF-150nF
50Vdc	C0G/NP0	-
	X7R	22nF-68nF
100Vdc	C0G/NP0	22pF-470pF
	X7R	1nF-15nF



Effects of mounting method on insertion loss

C and Pi filters are mounted to PCBs and soldered in identical manner to chip capacitors. Solder connections made to each end (signal lines) and each side band (earth track).

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 (for SBSP, SBSG, SBSM Pi filters), 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. Improved shielding methods (Fig. 2), maintain excellent suppression characteristics to 1GHz and above. See below for application example.

Figure 1. Filters mounted on open pcb

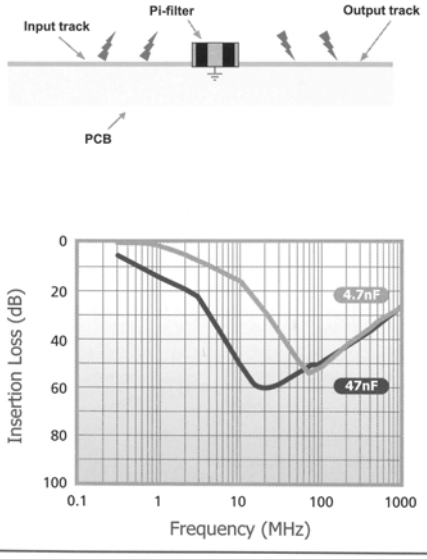
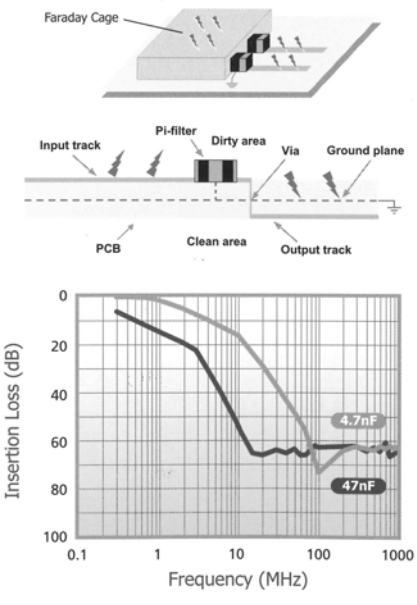


Figure 2. Improved shielding



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Insertion loss tables for surface mount EMI filters - Pi filter

							Typical No-Load Insertion Loss (dB)*				
Product Code	Packing	Capacitance (±20%)	Dielectric	Rated Voltage (dc)	DWV (dc)	Approximate Resonant Frequency (MHz)	0.1MHz	1MHz	10MHz	100MHz	1GHz
SBSPP1000220MC	B = Bulk Packed T = Tape-and-Reel (178mm / 7" reels) R = Tape-and-Reel (330mm / 13" reels)	22pF	C0G	100	250	1000	0	0	0	2	22
SBSPP1000470MC		47pF	C0G	100	250	620	0	0	0	4	16
SBSPP1000101MC		100pF	C0G	100	250	400	0	0	0	7	14
SBSPP1000221MC		220pF	C0G	100	250	260	0	0	1	14	12
SBSPP1000471MC		470pF	C0G	100	250	180	0	0	2	25	16
SBSPP1000102MX		1.0nF	X7R	100	250	120	0	0	4	37	16
SBSPP1000152MX		1.5nF	X7R	100	250	90	0	0	7	37	16
SBSPP1000222MX		2.2nF	X7R	100	250	72	0	0	9	37	16
SBSPP1000332MX		3.3nF	X7R	100	250	59	0	1	13	37	16
SBSPP1000472MX		4.7nF	X7R	100	250	50	0	2	14	37	16
SBSPP1000682MX		6.8nF	X7R	100	250	38	0	4	24	37	16
SBSPP1000103MX		10nF	X7R	100	250	33	0	5	24	37	16
SBSPP1000153MX		15nF	X7R	100	250	26	0	8	32	37	16
SBSPP0500223MX		22nF	X7R	50	125	21	0	10	38	37	16
SBSPP0500333MX		33nF	X7R	50	125	17	1	13	46	37	16
SBSPP0500473MX		47nF	X7R	50	125	13	2	16	50	37	16
SBSPP0500683MX		68nF	X7R	50	125	10	3	20	54	37	16
SBSPP0250104MX		100nF	X7R	25	67.5	8.5	6	19	52	37	16
SBSPP0250154MX		150nF	X7R	25	67.5	7	8	24	56	37	16

* - Insertion Loss performance quoted is measured on an open board mounted on a brass backplane in a 50Ω system. Performance curves can be supplied on request. Performance in circuit is liable to be different and is affected by board material, track layout, grounding efficiency and circuit impedances. Shielding can be used to improve high frequency performance.

Ordering Information

SBS	P	P	500	0473	M	X	T
Type	**Size**	**Configuration**	**Rated Voltage**	**Capacitance in Pico farads (pF)**	**Tolerance**	**Dielectric**	**Packaging**
Surface mount board filter	P = 1206	**P** = Pi Section	050 = 50Vdc 100 = 100Vdc 200 = 200Vdc 500 = 500Vdc	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: **0473** = 47nF	M = ±20%	X = X7R	T=178mm (7") reel R=330mm (13") reel B = Bulk

Reeled Quantities

178mm (7") reel	**1206**
	1500

330mm (13") reel	**1206**
	6000

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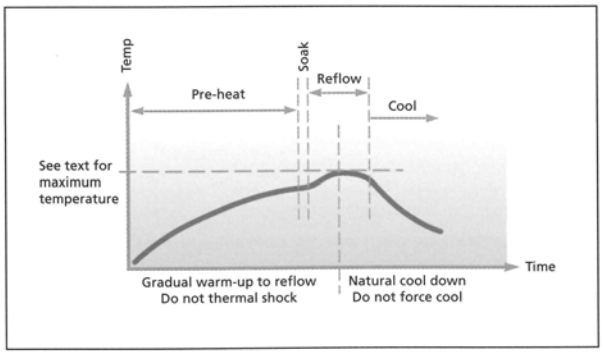
Surface mount and panel mount solder-in filters

Solder pad layouts are included with the detailed information for each part.

Recommended soldering profile



Soldering of filters

The soldering process should be controlled such that the filter does not experience any thermal shocks which may induce thermal cracks in the ceramic dielectric.

The pre-heat temperature rise of the filter should be kept to around 2°C per second. In practice successful temperature rises tend to be in the region of 1.5°C to 4°C per second dependent upon substrate and components.

The introduction of a soak after pre-heat can be useful as it allows temperature uniformity to be established across the substrate thus preventing substrate warping. The magnitude or direction of any warping may change on cooling imposing damaging stresses upon the filter.

E01, E03, E07 SBSP ranges are compatible with all standard solder types including lead-free, maximum temperature 260°C. For SBSG, SBSM and SFSS ranges, solder time should be minimised, and the temperature controlled to a maximum of 220°C. For SFSR, SFST and SFSU ranges the maximum temperature is 250°C.

Cooling to ambient temperature should be allowed to occur naturally. Natural cooling allows a gradual relaxation of thermal mismatch stresses in the solder joints. Draughts should be avoided. Forced air cooling can induce thermal breakage, and cleaning with cold fluids immediately after a soldering process may result in cracked filters.

Note: The use of FlexiCap™ terminations is strongly recommended to reduce the risk of mechanical cracking.

Soldering to axial wire leads

Soldering temperature

The tip temperature of the iron should not exceed 300°C.

Dwell time

Dwell time should be 3-5 seconds maximum to minimise the risk of cracking the capacitor due to thermal shock.

Heat sink

Where possible, a heat sink should be used between the solder joint and the body, especially if longer dwell times are required.

Bending or cropping of wire leads

Bending or cropping of the filter terminations should not be carried out within 4mm (0.157”) of the epoxy encapsulation, the wire should be supported when cropping.

A more comprehensive application note covering installation of all Syfer products is available on the Syfer website.

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