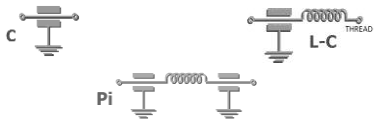
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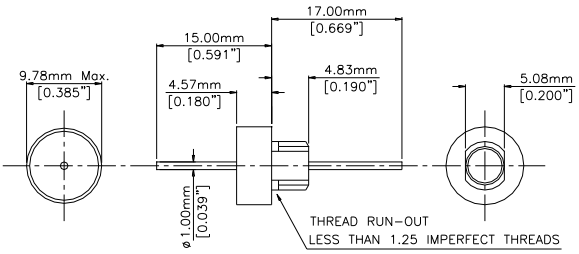
Feedthrough EMI Filter Datasheet

(¼-28 UNF Thread (5.08mm A/F) : 9.78mm Round Head)

Circuit Configurations Available



Dimensions mm (inches)



¼-28 UNF Class 2A Thread

Electrical Details	
Electrical Configuration	C Filter
Capacitance Measurement	@ 1000hr Point
Current Rating	15A
Insulation Resistance (IR)	10GΩ or 1000ΩF
Temperature Rating	-55°C to +125°C
Ferrite Inductance (Typical)	See relevant tables
Mechanical Details	
Head Diameter	9.8mm *(0.386")*
Nut A/F	7.92mm *(0.312")*
Washer Diameter	11.35mm *(0.447")*
Mounting Torque	0.9Nm *(7.97lbf in)* max.
Mounting Hole Diameter	 6.7mm O.D., 5.3mm A/F *(0.264" O.D., 0.217" A/F)*
Max. Panel Thickness	2.3mm *(0.091")*
Weight (Typical)	3.0g *(0.11oz)*
Finish ** (see notes below)	Silver plate on copper undercoat

C Configuration

Product Code	Hardware (Nuts & Washers etc.)	Capacitance ± 20%	Dielectric	Rated Voltage (dc)	DWV (dc)	Typical No-Load Insertion Loss (db) 0.01MHz	0.1MHz	1MHz	10MHz	100MHz	1GHz
SFJGC3K00101MC	1 = supplied with standard nut and wavy washer Other options available – please contact factory	100pF	C0G	3kV#	3.6kV					4	22
SFJGC3K00151MC		150pF	C0G	3kV#	3.6kV					7	25
SFJGC3K00221MC		220pF	C0G	3kV#	3.6kV					10	29
SFJGC2K00331MC		330pF	C0G	2kV#	2.4kV					13	33
SFJGC2K00471MC		470pF	C0G	2kV#	2.4kV				1	16	35
SFJGC2K00681MC		680pF	C0G	2kV#	2.4kV				2	19	39
SFJGC2K00102MC		1.0nF	C0G	2kV#	2.4kV				4	23	41
SFJGC2K00152MX		1.5nF	X7R	2kV#	2.4kV				7	26	45
SFJGC2K00222MX		2.2nF	X7R	2kV#	2.4kV				10	30	50
*SFJGC2K00332MX		3.3nF	X7R	2kV#	2.4kV				13	33	52
SFJGC2K00472MX		4.7nF	X7R	2kV#	2.4kV			1	16	36	55
*SFJGC2K00682MX		6.8nF	X7R	2kV#	2.4kV			2	19	39	57
*SFJGC2K00103MX		10nF	X7R	2kV#	2.4kV			4	22	41	60
SFJGC1K00153MX		15nF	X7R	1kV#	1.2kV			7	25	44	62
SFJGC1K00223MX		22nF	X7R	1kV#	1.2kV			10	29	46	65
*SFJGC1K00333MX		33nF	X7R	1kV#	1.2kV			13	33	48	68
SFJGC1K00473MX		47nF	X7R	1kV#	1.2kV		1	16	35	50	70
*SFJGC1K00683MX		68nF	X7R	1kV#	1.2kV		2	19	39	54	>70
SFJGC5000104MX		100nF	X7R	500#	750		4	22	41	57	>70
*SFJGC5000154MX		150nF	X7R	500#	750		7	25	45	60	>70
SFJGC5000224MX		220nF	X7R	500#	750		10	29	49	62	>70
*SFJGC5000334MX		330nF	X7R	500#	750		13	33	52	66	>70
SFJGC5000474MX		470nF	X7R	500	750	1	16	35	55	68	>70
SFJGC3000684MX		680nF	X7R	300	600	2	19	38	58	70	>70
*SFJGC2000105MX		1.0µF	X7R	200	500	4	22	41	61	>70	>70
*SFJGC1000155MX		1.5µF	X7R	100	250	7	25	45	64	>70	>70
*SFJGC1000225MX		2.2µF	X7R	100	250	10	29	48	66	>70	>70
SFJGC0500335MX		3.3µF	X7R	50	125	14	34	52	70	>70	>70

- Also rated for operation at 115Vac 400Hz. Self-heating will occur – evaluation in situ recommended
* Recommended values

Syfer Technology Ltd.
Old Stoke Road, Arminghall
Norwich, Norfolk, NR14 8SQ
United Kingdom

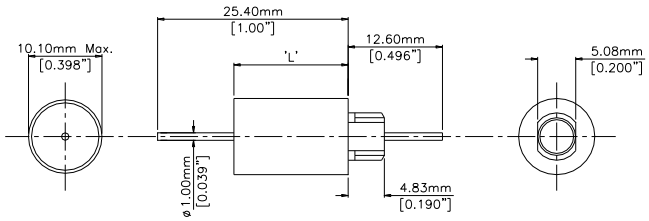
Tel: +44 1603 723300 | Email sales@syfer.co.uk | www.syfer.com

L-C Configuration

Ferrite Inductance (Typical) – 500nH @ 1MHz						Typical No-Load Insertion Loss (db)					
Product Code	Hardware (Nuts & Washers etc.)	Capacitance ± 20%	Dielectric	Rated Voltage (dc)	DWV (dc)	0.01MHz	0.1MHz	1MHz	10MHz	100MHz	1GHz
SFJGL3K00101MC	1 = supplied with standard nut and wavy washer Other options available – please contact factory	100pF	C0G	3kV#	3.6kV					7	24
SFJGL3K00151MC		150pF	C0G	3kV#	3.6kV					10	27
SFJGL3K00221MC		220pF	C0G	3kV#	3.6kV					12	30
SFJGL2K00331MC		330pF	C0G	2kV#	2.4kV				1	16	34
SFJGL2K00471MC		470pF	C0G	2kV#	2.4kV				2	19	38
SFJGL2K00681MC		680pF	C0G	2kV#	2.4kV				3	22	41
SFJGL2K00102MC		1.0nF	C0G	2kV#	2.4kV				6	25	44
SFJGL2K00152MX		1.5nF	X7R	2kV#	2.4kV				9	29	48
SFJGL2K00222MX		2.2nF	X7R	2kV#	2.4kV				12	31	51
*SFJGL2K00332MX		3.3nF	X7R	2kV#	2.4kV				15	35	54
SFJGL2K00472MX		4.7nF	X7R	2kV#	2.4kV			1	18	39	57
*SFJGL2K00682MX		6.8nF	X7R	2kV#	2.4kV			2	21	41	60
*SFJGL2K00103MX		10nF	X7R	2kV#	2.4kV			4	23	43	63
SFJGL1K00153MX		15nF	X7R	1kV#	1.2kV			7	27	46	66
SFJGL1K00223MX		22nF	X7R	1kV#	1.2kV			10	30	48	68
*SFJGL1K00333MX		33nF	X7R	1kV#	1.2kV			13	34	50	70
SFJGL1K00473MX		47nF	X7R	1kV#	1.2kV		1	17	37	51	>70
*SFJGL1K00683MX		68nF	X7R	1kV#	1.2kV		2	20	40	55	>70
SFJGL5000104MX		100nF	X7R	500#	750		4	22	44	60	>70
*SFJGL5000154MX		150nF	X7R	500#	750		7	25	47	62	>70
SFJGL5000224MX		220nF	X7R	500#	750		10	29	49	66	>70
*SFJGL5000334MX		330nF	X7R	500#	750		13	33	53	68	>70
SFJGL5000474MX		470nF	X7R	500	750	1	16	35	56	70	>70
SFJGL3000684MX		680nF	X7R	300	600	2	19	38	58	>70	>70
*SFJGL2000105MX		1.0µF	X7R	200	500	4	22	41	61	>70	>70
*SFJGL1000155MX		1.5µF	X7R	100	250	7	25	45	64	>70	>70
*SFJGL1000225MX		2.2µF	X7R	100	250	10	29	48	66	>70	>70
SFJGL0500335MX		3.3µF	X7R	50	125	14	34	52	70	>70	>70

- Also rated for operation at 115Vac 400Hz. Self-heating will occur – evaluation in situ recommended
* Recommended values

P Configuration



Ferrite Inductance (Typical) – 2.5µH @ 1MHz							Typical No-Load Insertion Loss (db)					
Product Code	Hardware (Nuts & Washers etc.)	Capacitance ± 20%	Dielectric	Rated Voltage (dc)	DWV (dc)	L (mm) ["]	0.01MHz	0.1MHz	1MHz	10MHz	100MHz	1GHz
SFJGP2K00661MC	1 = supplied with standard nut and wavy washer Other options available – please contact factory	660pF	C0G	2kV*	2.4kV	17.78 [0.7]				3	25	65
SFJGP2K00941MC		940pF	C0G	2kV*	2.4kV	17.78 [0.7]				5	31	68
SFJGP2K01N36MC		1.36nF	C0G	2kV*	2.4kV	17.78 [0.7]				7	37	>70
SFJGP2K00202MC		2.0nF	C0G	2kV*	2.4kV	17.78 [0.7]				10	44	>70
SFJGP2K00302MX		3.0nF	X7R	2kV*	2.4kV	17.78 [0.7]				13	51	>70
SFJGP2K00442MX		4.4nF	X7R	2kV*	2.4kV	17.78 [0.7]			1	17	59	>70
*SFJGP2K00662MX		6.6nF	X7R	2kV*	2.4kV	17.78 [0.7]			2	21	64	>70
SFJGP2K00942MX		9.4nF	X7R	2kV*	2.4kV	17.78 [0.7]			4	27	68	>70
*SFJGP2K013N6MX		13.6nF	X7R	2kV*	2.4kV	17.78 [0.7]			6	34	>70	>70
*SFJGP2K00203MX		20nF	X7R	2kV*	2.4kV	17.78 [0.7]			9	40	>70	>70
SFJGP1K00303MX		30nF	X7R	1kV*	1.2kV	17.78 [0.7]			12	48	>70	>70
SFJGP1K00443MX		44nF	X7R	1kV*	1.2kV	17.78 [0.7]		1	14	54	>70	>70
*SFJGP1K00663MX		66nF	X7R	1kV*	1.2kV	17.78 [0.7]		2	17	63	>70	>70
SFJGP1K00943MX		94nF	X7R	1kV*	1.2kV	17.78 [0.7]		4	18	68	>70	>70
*SFJGP1K0136NMX		136nF	X7R	1kV*	1.2kV	17.78 [0.7]		8	25	>70	>70	>70
SFJGP5000204MX		200nF	X7R	500*	750	15.24 [0.6]		10	27	>70	>70	>70
*SFJGP5000304MX		300nF	X7R	500*	750	15.24 [0.6]		13	30	>70	>70	>70
SFJGP5000444MX		440nF	X7R	500	750	15.24 [0.6]	1	14	45	>70	>70	>70
*SFJGP5000664MX		660nF	X7R	500	750	15.24 [0.6]	2	17	54	>70	>70	>70
SFJGP5000944MX		940nF	X7R	500	750	15.24 [0.6]	4	18	63	>70	>70	>70
SFJGP3001U36MX		1.36µF	X7R	300	600	15.24 [0.6]	8	25	68	>70	>70	>70
*SFJGP2000205MX		2.0µF	X7R	200	500	15.24 [0.6]	10	27	>70	>70	>70	>70
*SFJGP1000305MX		3.0µF	X7R	100	250	15.24 [0.6]	13	30	>70	>70	>70	>70
*SFJGP1000445MX		4.4µF	X7R	100	250	15.24 [0.6]	14	45	>70	>70	>70	>70
SFJGP0500665MX		6.6µF	X7R	50	125	15.24 [0.6]	17	54	>70	>70	>70	>70

- Also rated for operation at 115Vac 400Hz. Self-heating will occur – evaluation in situ recommended
* Recommended values

Ordering Information *Note: Ordering code can have up to 4 additional digits on the end to denote special requirements*

Type	Case Style	Thread	Electrical configuration	Voltage (dc)	Capacitance in picofarads (pF)	Capacitance Tolerance	Dielectric	Hardware
SF	J	G	P	050	0445	M	X	0
Syfer Filter	9.78mm Maximum Diameter	¼-28 UNF 5.08mm A/F	C = C Filter L = L-C Filter P = Pi Filter	050 = 50V 100 = 100V 200 = 200V 300 = 300V 500 = 500V 1K0 = 1kV 2K0 = 2kV 3K0 =3kV	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is the number of zeros following. Examples: 0101 = 100pF 0332 = 3300pF 0332 = 3.3µF	M = ± 20%	C = C0G/NP0 X = X7R	1 = With

Note: The addition of a 4-digit numerical suffix code can be used to denote changes to the standard part.

Options include for example: change of pin length / custom body dimensions or threads / alternative voltage rating / non-standard intermediate capacitance values / test requirements.

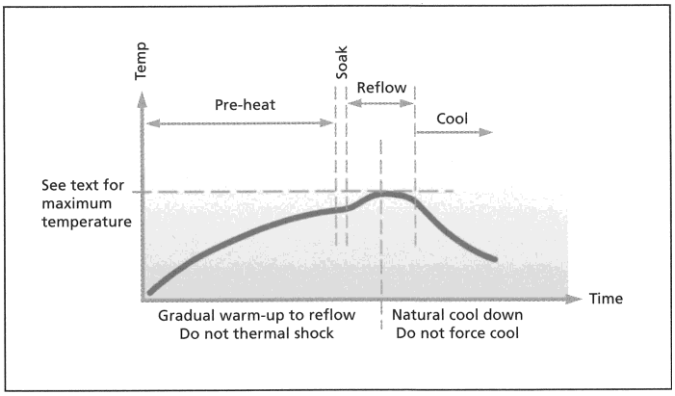
** Standard Option 90Sn/10Pb plating finish on all metalwork (body, pin, nut and wavy washer) specified by suffix code /0100

Please refer specific requests to the factory.

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.

Soldering irons should not be used for mounting surface mount filters as they can result in thermal shock damage to the chip capacitor.

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

Resin filled screw mounted EMI filters

General

The ceramic capacitor, which is the heart of the filter, can be damaged by thermal and mechanical shock, as well as by over-voltage. Care should be taken to minimise the risk of stress when mounting the filter to a panel and when soldering wire to the filter terminations.

Mounting to chassis

Mounting torque

It is important to mount the filter to the bulkhead or panel using the recommended mounting torque, otherwise damage may be caused to the capacitor due to distortion of the case. When a threaded hole is to be utilised, the maximum mounting torque should be 50% of the specified figure which relates to unthreaded holes. For details of torque figures for each filter range, please see below.

	Torque (max.)	
Thread	With nut	Into tapped hole
M2.5 & 4-40 UNC	-	0.15Nm (1.32lbf in)
M3	0.25Nm (2.21lbf in)	0.15Nm (1.32lbf in)
6-32 UNC	0.3Nm (2.65lbf in)	0.15Nm (1.32lbf in)
M3.5	0.35Nm (3.09lbf in)	0.18Nm (1.59lbf in)
M4 & 8-32 UNC	0.5Nm (4.42lbf in)	0.25Nm (2.21lbf in)
M5, 12-32 UNEF & 2BA	0.6Nm (5.31lbf in)	0.3Nm (2.65lbf in)
M6 & 1/4-28 UNF	0.9Nm (7.97lbf in)	-

Tools

Hexagonal devices should be assembled using a suitable socket. Round bodied filters may be fitted to the panel in one of two ways (and should not be fitted using pliers or other similar tools which may damage them):

- Round bodies with slotted tops are designed to be screwed in using a simple purpose-designed tool.
- Round bodies without slotted tops are intended to be inserted into slotted holes and retained with a nut.

Grounding

To ensure the proper operation of the filters, the filter body should be adequately grounded to the panel to allow an effective path for the interference. The use of locking adhesives is not recommended, but if used should be applied after the filter has been fitted.

Minimum plate thickness

Users should be aware that the majority of these filters have an undercut between the thread and the mounting flange of the body, equal to 1.5 x the pitch of the thread. Mounting into a panel thinner than this undercut length may result in problems with thread mating and filter position. It is recommended that a panel thicker than this undercut length be used wherever possible.

Maximum plate thickness

This is specified for each filter in order that the nut can be fully engaged even when using a washer.

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.

RoHS compliance

All surface mount filters, resin sealed panel mount filters and power filters are fully RoHS compliant through material exemption, although care must be taken not to exceed the maximum soldering temperatures of surface mount parts.

Standard hermetic sealed panel mount filters use SnPb solders as part of their assembly, and are intended for exempt applications such as aerospace or military. Substitution of the SnPb solder with Pb free solders is possible to create a RoHS compliant part – please contact factory for further details.