High selectivity low loss precision quartz filters

- **# Monolithic designs**
- **# Small size**
- **# Low insertion loss**
- **# Sharp selectivity**
- **# Standard and custom designs**

packaged tandem

Introduction

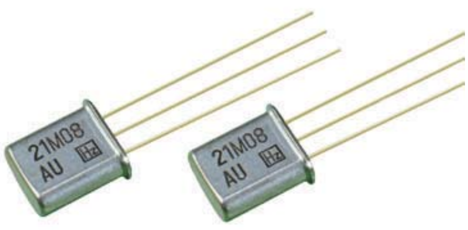
Sharp selectivity, small insertion loss and very high reliability characterise TFC monolithic quartz filters.

The range includes standard 10.70MHz, 21.40MHz, 45MHz fundamental and third overtone designs. Also six and eight pole block filters with the option of matching transformers.

Quartz is the ideal resonator for selective narrow band filters providing a temperature stable, high Q resonant source together with a low mass and small size.

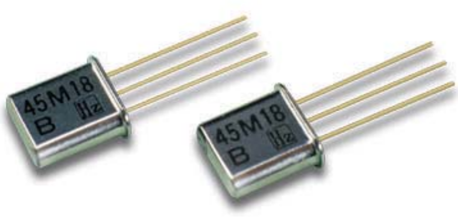
The TFC data includes a general range of filters available for applications with channel spacing requirements of between ±12.5kHz and ±50kHz complemented by single sideband filters and custom designs available for special applications.

The correct termination of quartz filters is of prime importance to realise the high performance for each design. TFC crystal filters are 100% tested and for custom manufactured product a test fixture, representing the correct load, is available for verification by the customer of the load conditions by goods inwards inspection or for engineering development to correctly correlate the load conditions. Selected pairs of filters are available and also an extended working temperature range for certain filters to special order.



21.40MHz monolithic duals

types 2113 and 2118, low profile smd



45MHz fundamental

Telephone: +44 (0)1903 740000, Fax: +44 (0)1903 742208,
e-mail: sales@tfc.co.uk, url: www.tfc.co.uk

ISO9001: 2008
RS13124
ISO14001: 2004
EMS53965

Terms and definitions

The following generalised definitions apply to the specification of a crystal filter with each parameter shown in Figure 1.

Centre frequency
The geometric mean of the cut-off frequency, (f_o) for standard filters or (f_c) for the carrier frequency in SSB filters.

Cut off frequency
The frequency in the pass band at which the relative pass band is specified, usually at the 3dB or 6dB points.

Pass band
The frequency band at which the relative attenuation is ≤ the specified attenuation.

Pass band width
A frequency range over which the relative attenuation is equal to the specified attenuation.

Stop band
The frequency band at which the relative attenuation is ≥ the specified attenuation.

Stop band width
A frequency range over which the relative attenuation is equal to the specified attenuation.

Insertion loss
The logarithmic ratio of the power supplied to the load impedance before insertion of the filter to the power supplied to the load impedance after the insertion of the filter expressed in decibels (dB).

Ripple
The maximum difference between the maximum and minimum attenuation values within the guaranteed pass band.

Guaranteed pass band
The guaranteed frequency band width over which the relative attenuation is not more than the specified value within the pass band.

Relative attenuation
The difference in attenuation between the attenuation at any specified frequency and the minimum attenuation within the pass band.

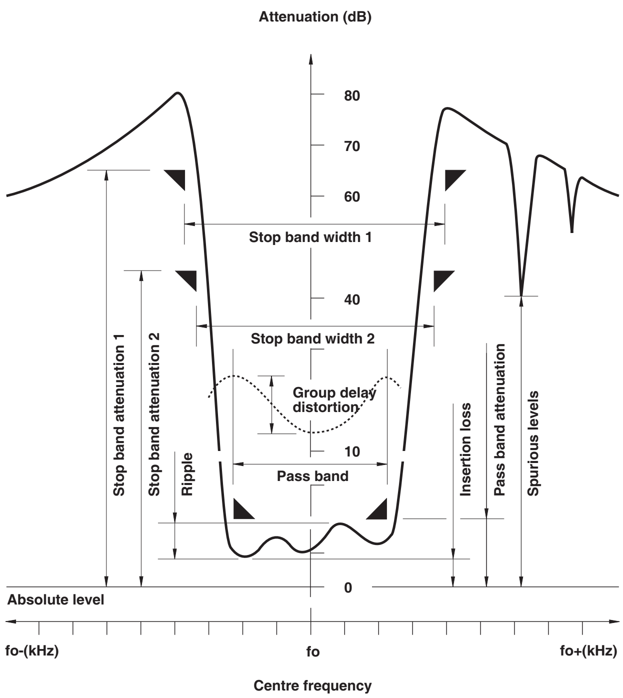
Guaranteed attenuation
The maximum guaranteed relative attenuation within the attenuation band.

Spurious response attenuation
The minimum guaranteed attenuation for any spurious response within a defined frequency range relative to the stop band. Spurious responses usually occur at frequencies higher than fo.

Input/output impedance
The impedance(Z_t) at the centre frequency presented by the filter when correctly terminated.

Group delay distortion
The difference between the maximum and the minimum group delay within the specified pass band.

Figure 1 Filter response curve



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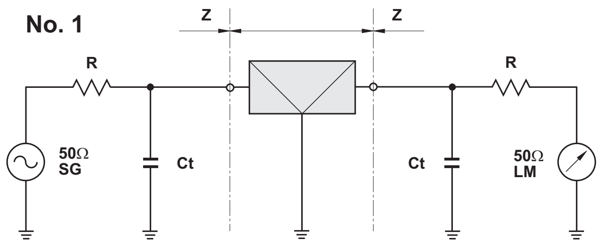
Test Circuits

No. 1



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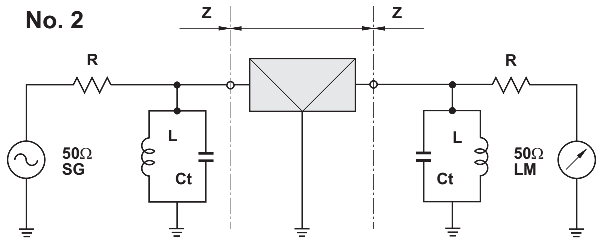

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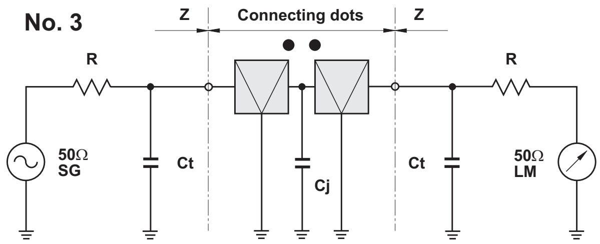

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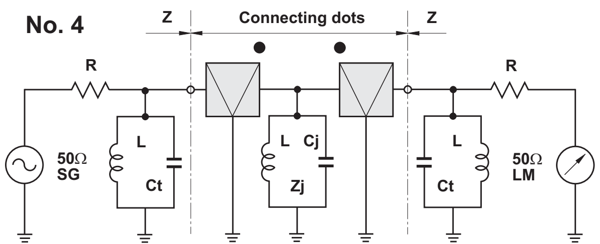
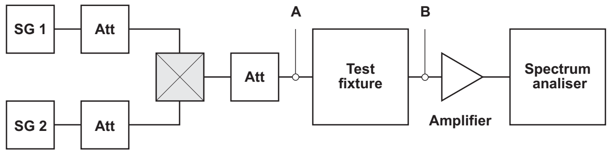
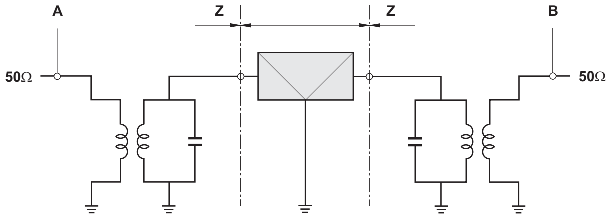
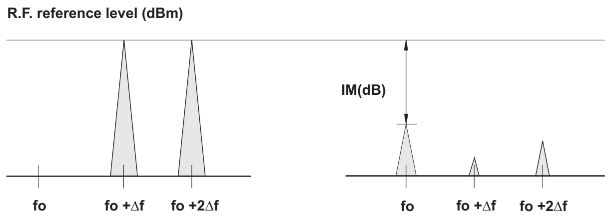


Intermodulation measurement



TEST FIXTURE





Junction capacitance(Cj)

Part No.	C_j(pF)
10M08B	15
10M08BM	15
10M12B	8
10M15B	5
10M15BM	5
10M15CM	5
10M20B	2
10M30B	1
22011B1	7
44211B1	16
21M08B	11
21M08BU	18
21M8LBU	8
21M12BU	9
21M15BU	7
21M15BU1	12
21M15B5	7
21M15B	12
21M20BU	6
21M20B	9

Part No.	C_j(pF)
16M08BU	18
16M13B	9
16M15B	7
16M15BU	7
45M08B1	18
45M10B1	22
45M12B1	18
45M13B1	18
45M15B1	15
45M18B1	12
45M35B1	5
47M20B1	11

 Mill Lane, Storrington, West Sussex, RH20 4NF, UK
Telephone: +44 (0)1903 740000, Fax: +44 (0)1903 742208,
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Custom specification sheet

Centre frequency f_o			MHz		±Hz
Bandwidth	±		kHz min. at		dB
Ripple	max.		dB in the range from ±		kHz
Insertion loss	max.		dB		
Attenuation			dB max. at f_o ±		kHz
			dB min. at f_o ±		kHz
			dB max. at f_o ±		kHz
			dB min. at f_o ±		kHz
Shape factor					
Ultimate attenuation			dB min., f_o ±(~)		Hz
			dB min., f_o ±(~)		Hz
Spurious response			dB min., f_o ±(~)		Hz
			dB min., f_o ±(~)		Hz
Group delay distortion T_g			µs max., f_o ±(~)		kHz
			µs max., f_o ±(~)		kHz
Level linearity					

Intermodulation	Input power P_o	dBm,	f_1	kHz,	f_2		kHz
	IM distortion	dB		IP3			dBm
Termination impedance	Input	Ω ±	%,	//	pF ±		pF
	Output	Ω ±	%,	//	pF ±		pF
Working temp. range	(~)°C						
Operable temp. range	(~)°C						
Storage temp. range	(~)°C						
Environmental conditions	Shock						
	Vibration						
Marking							
Case style							
Additional data							

Issue	Date	Name	
			Customer
			Equipment
			Customer ref.

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