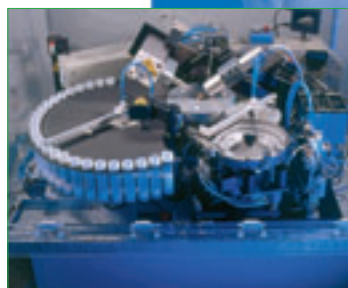
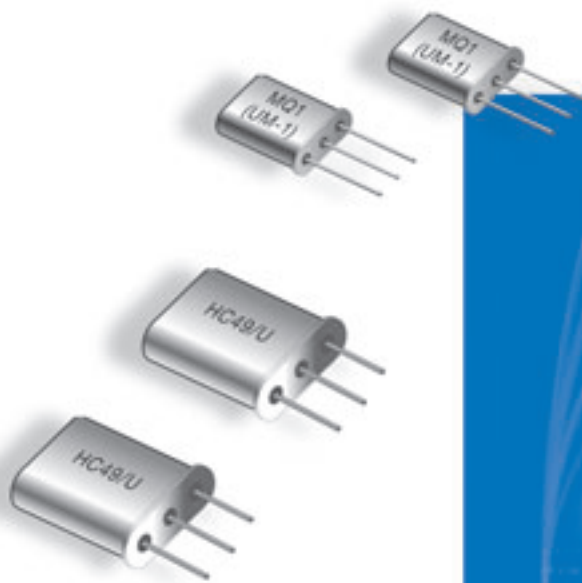


Monolythic Crystal Filters



Monolithic Crystal Filters

Filter Characteristics

Critical to the understanding of filter behavior is a definition of the vocabulary of the most frequently used terms and familiarity with the typical filter amplitude frequency response curve, (fig. 1).

Center Frequency (FO) – The frequency between the high and low cut off frequencies of a filter.

Bandwith (BW) – The difference between two cut off frequencies at a specified attenuation level (3dB or 6dB).

Attenuation – Reduction of signal in transmission through a filter. (Attenuation is usually indicated in decibels dB).

Decibel – Unit that shows the ratio between two powers, two voltages or two currents.

$$\left(10 \text{ Log } \frac{P_1}{P_2}, 20 \text{ Log } \frac{V_1}{V_2} \text{ or } 20 \text{ Log } \frac{I_1}{I_2} \right)$$

Shape Factor – Ratio of bandwidths at two different levels of attenuation.

Ripple – Is the difference between the passband maximum value and minimum loss.

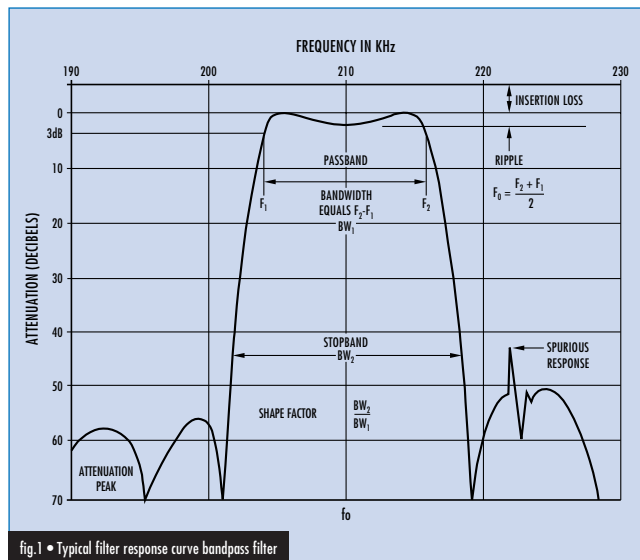
Insertion Loss – Power loss of the filter in the passband (in dB). Zero dB reference shall be the point of maximum output of the filter unless it is specified otherwise.

Termination Impedance – A value to terminate the filter input/output. It is generally expressed by resistance with parallel to capacitance which contains stray capacitance.

$$\text{Insertion Loss} = 10 \text{ Log } \frac{P_{in}}{P_{out}}$$

Load Impedance (Output termination) – The impedance connected to the output terminals of the filter in order to achieve the proper response.

Spurious Mode – Unwanted responses that occur in the filter due to resonant frequencies of the crystal other than the fundamental frequency.



Monolythic Crystal Filters

type	center Fr (MHz)	No. of poles	holder type	passband width (min)	stopband width(max)	insertion loss (max)	passband ripple (max)	coupling capacitance	termination impedance
10K7A	10.695	2	49U or 49T	6 dB \pm 3.5 KHz	20 dB \pm 10 KHz	2 dB	-	-	1 k Ω //11.5 pF
10K7.5A	10.700	2	49T	3 dB \pm 3.75 KHz	18 dB \pm 12.5 KHz	2 dB	1 dB	-	1.5 k Ω //5.5 pF
10K15A	10.700	2	49T	3 dB \pm 7.5 KHz	18 dB \pm 25 KHz	2 dB	1 dB	-	3 k Ω //2.5 pF
10K6B	10.700	4	2 x 49T	3 dB \pm 3.0 KHz	40 dB \pm 10 KHz	3 dB	1 dB	24 pF	1 k Ω //8.5 pF
10K7.5B	10.700	4	2 x 49T	3 dB \pm 3.75 KHz	40 dB \pm 12.5 KHz	2 dB	1 dB	15 pF	1.5 k Ω //3.5 pF
10K7.5B1	10.695	4	2 x 49T	3 dB \pm 3.75 KHz	40 dB \pm 12.5 KHz	2 dB	1 dB	15 pF	1.5 k Ω //3.5 pF
10K15B	10.700	4	2 x 49T	3 dB \pm 7.5 KHz	40 dB \pm 25 KHz	2 dB	1 dB	5.5 pF	3 k Ω //1.5 pF
21K15A	21.400	2	UM1 or UM5	3 dB \pm 7.5 KHz	18 dB \pm 25 KHz	2 dB	1 dB	-	1.5 k Ω //3.5 pF
21K7.5B	21.400	4	2x(UM1 or UM5)	3 dB \pm 3.75 KHz	40 dB \pm 14 KHz	2 dB	1 dB	20 pF	900 Ω //5.4 pF
21K15B1	21.400	4	2x(UM1 or UM5)	3 dB \pm 7.5 KHz	40 dB \pm 25 KHz	2 dB	1 dB	5 pF	1.5 k Ω //2.5
45K15B	45.000	4	2x(UM1)	3 dB \pm 7.5 KHz	40 dB \pm 25 KHz	3 dB	1 dB	8 pF	800 Ω //1.5 pF

