

ECS's Monolithic Crystal Filters have very high Q's and excellent temperature and aging characteristics. These filters offer narrow and intermediate bandwidths. The monolithic crystal filter is smaller and more cost effective than a discrete crystal filter. With the addition of coupling capacitors between two-pole sections. They can be cascaded to produce four, six, and eight (or more) pole filter responses.

Request a Sample

## ELECTRICAL CHARACTERISTICS (10.7 and 21.4 MHz)

### MCF Series



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For 12.5 KHz Channel Spacing (Operating Temperature -20 ~ +70°C)

| Model         | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case        |
|---------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|-------------|
| ECS-10.7-7.5A | 10.7                    | 2               | ±3.75                   | 0.5              | 1.5                      | 20 ±18                   |                          | 35 +300 ~ +1000<br>50 -200 ~ -1000    | 1800/5.0                        | HC-49/U     |
| ECS-10.7-7.5B | 10.7                    | 4               | ±3.75                   | 1.0              | 2.5                      | 40 ±14                   |                          | 65 +300 ~ +1000<br>80 -200 ~ -1000    | 1800/4.0                        | HC-49/U x 2 |
| ECS-10.7-7.5C | 10.7                    | 6               | ±3.75                   | 2.0              | 3.5                      | 45 ±8.75                 | 65 ±12.5                 | 65 ±12.5 ~ ±300                       | 1800/3.5                        | SC-3        |
| ECS-10.7-7.5D | 10.7                    | 8               | ±3.75                   | 2.0              | 4.0                      | 65 ±8.75                 | 90 ±12.5                 | 90 ±12.5 ~ ±300                       | 1800/3.5                        | SC-4        |
| ECS-21K7.5A   | 21.4                    | 2               | ±3.75                   | 0.5              | 2.0                      | 18 ±12.5                 |                          | 75 -910                               | 1500/6.0                        | UM-1        |
| ECS-21K7.5B   | 21.4                    | 4               | ±3.75                   | 1.0              | 2.5                      | 35 ±12.5                 |                          | 90 ±910                               | 850/5.0                         | UM-1 x 2    |
| ECS-21K7.5C   | 21.4                    | 6               | ±3.75                   | 2.0              | 3.0                      | 45 ±8.75                 | 65 ±12.5                 | 65 ±12.5 ~ ±300                       | 850/5.0                         | SC-1        |
| ECS-21K7.5D   | 21.4                    | 8               | ±3.75                   | 2.0              | 4.0                      | 65 ±9                    | 90 ±12.5                 | 90 ±12.5 ~ ±300                       | 850/5.0                         | SC-1        |

- High stability for wide temperature ranges
- Sharp cut-off
- RoHS Compliant (Pb Free)

For 20 KHz Channel Spacing (Operating Temperature -20 ~ +70°C)

| Model        | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case        |
|--------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|-------------|
| ECS-10.7-12A | 10.7                    | 2               | ±6.0                    | 0.5              | 2.0                      | 18 ±23                   |                          | 35 +300 ~ +1000<br>40 -200 ~ -1000    | 2500/2.5                        | HC-49/U     |
| ECS-10.7-12B | 10.7                    | 4               | ±6.0                    | 1.0              | 2.5                      | 40 ±20                   |                          | 65 +300 ~ +1000<br>80 -200 ~ -1000    | 2500/1.5                        | HC-49/U x 2 |
| ECS-10.7-12C | 10.7                    | 6               | ±6.0                    | 2.0              | 3.0                      | 45 ±14                   | 60 ±20                   | 65 ±20 ~ ±300                         | 2800/1.0                        | SC-3        |
| ECS-10.7-12D | 10.7                    | 8               | ±6.0                    | 2.0              | 4.0                      | 65 ±14                   | 90 ±20                   | 90 ±20 ~ ±300                         | 2800/1.0                        | SC-4        |
| ECS-21K12A   | 21.4                    | 2               | ±6.0                    | 0.5              | 2.0                      | 18 ±23                   |                          | 35 +350 ~ +1000<br>50 -200 ~ -1000    | 1200/3.0                        | UM-1        |
| ECS-21K12B   | 21.4                    | 4               | ±6.0                    | 1.0              | 2.5                      | 40 ±20                   |                          | 65 +350 ~ +1000<br>70 -200 ~ -1000    | 1200/2.5                        | UM-1 x 2    |
| ECS-21K12C   | 21.4                    | 6               | ±6.0                    | 2.0              | 3.0                      | 45 ±14                   | 65 ±20                   | 65 ±20 ~ ±300                         | 1200/2.5                        | SC-1        |
| ECS-21K12D   | 21.4                    | 8               | ±6.0                    | 2.0              | 4.0                      | 65 ±14                   | 90 ±20                   | 90 ±20 ~ ±300                         | 1200/2.5                        | SC-1        |

For 25 KHz Channel Spacing (Operating Temperature -20 ~ +70°C)

| Model        | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case        |
|--------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|-------------|
| ECS-10.7-15A | 10.7                    | 2               | ±7.5                    | 0.5              | 2.0                      | 18 ±25                   |                          | 35 +300 ~ +1000<br>40 -200 ~ -1000    | 3000/2.0                        | HC-49/U     |
| ECS-10.7-15B | 10.7                    | 4               | ±7.5                    | 1.0              | 2.5                      | 40 ±25                   |                          | 55 +300 ~ +1000<br>80 -200 ~ -1000    | 3000/2.0                        | HC-49/U x 2 |
| ECS-10.7-15C | 10.7                    | 6               | ±7.5                    | 2.0              | 3.0                      | 45 ±17.5                 | 65 ±25                   | 65 ±25 ~ ±300                         | 3000/1.5                        | SC-3        |
| ECS-10.7-15D | 10.7                    | 8               | ±7.5                    | 2.0              | 4.0                      | 70 ±17.5                 | 90 ±25                   | 90 ±25 ~ ±300                         | 3000/1.5                        | SC-4        |
| ECS-21K15A   | 21.4                    | 2               | ±7.5                    | 0.5              | 1.5                      | 18 ±25                   |                          | 35 +350 ~ +1000<br>50 -200 ~ -1000    | 1500/3.0                        | UM-1        |
| ECS-21K15B   | 21.4                    | 4               | ±7.5                    | 1.0              | 2.0                      | 40 ±25                   |                          | 65 +350 ~ +1000<br>80 -200 ~ -1000    | 1500/2.0                        | UM-1 x 2    |
| ECS-21K15C   | 21.4                    | 6               | ±7.5                    | 2.0              | 2.5                      | 45 ±17.5                 | 65 ±25                   | 65 ±25 ~ ±300                         | 1500/2.0                        | SC-1        |
| ECS-21K15D   | 21.4                    | 8               | ±7.5                    | 2.0              | 3.0                      | 65 ±17.5                 | 90 ±25                   | 90 ±25 ~ ±300                         | 1500/2.0                        | SC-1        |

### For 50 KHz Channel Spacing (Operating Temperature -20 ~ +70°C)

| Model        | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case        |
|--------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|-------------|
| ECS-10.7-30A | 10.7                    | 2               | ±15                     | 0.5              | 1.5                      | 15 ±50                   |                          | 30 +300 ~ +1000<br>40 -300 ~ -1000    | 5000//0                         | HC-49/U     |
| ECS-10.7-30B | 10.7                    | 4               | ±15                     | 1.0              | 2.5                      | 30 ±40                   |                          | 30 ±40 ~ ±300                         | 5500//1.0                       | HC-49/U x 2 |
| ECS-10.7-30C | 10.7                    | 6               | ±15                     | 2.0              | 3.0                      | 60 ±45                   |                          | 60 ±45 ~ ±300                         | 5500//1.0                       | SC-3        |
| ECS-10.7-30D | 10.7                    | 8               | ±15                     | 2.0              | 3.5                      | 70 ±40                   | 90 ±50                   | 90 ±50 ~ ±300                         | 5500//1.0                       | SC-4        |
| ECS-21K30A   | 21.4                    | 2               | ±15                     | 0.5              | 1.5                      | 15 ±45                   |                          | 35 +350 ~ +1000<br>45 -300 ~ -1000    | 1500//1.0                       | UM-1        |
| ECS-21K30B   | 21.4                    | 4               | ±15                     | 1.0              | 2.0                      | 40 ±50                   |                          | 65 +350 ~ +1000<br>80 -250 ~ -1000    | 1800//0.5                       | UM-1 x 2    |
| ECS-21K30C   | 21.4                    | 6               | ±15                     | 2.0              | 2.5                      | 45 ±35                   | 65 ±50                   | 65 ±50 ~ ±300                         | 2200//0.5                       | SC-1        |
| ECS-21K30D   | 21.4                    | 8               | ±15                     | 2.0              | 3.5                      | 70 ±35                   | 90 ±50                   | 90 ±50 ~ ±300                         | 2200//0.5                       | SC-1        |

### 45 MHz Monolithic Crystal Filters (Operating Temperature -20 ~ +70°C)

| Model       | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case     |
|-------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|----------|
| ECS-45K7.5A | 45.0                    | 2               | ±3.75                   | 1.0              | 2.0                      | 10 ±12.5                 |                          | 65 -910                               | 350//10.5                       | UM-1     |
| ECS-45K7.5B | 45.0                    | 4               | ±3.75                   | 1.0              | 4.0                      | 30 ±12.5                 |                          | 80 ±910                               | 350//6.5                        | UM-1 x 2 |
| ECS-45K15A  | 45.0                    | 2               | ±7.5                    | 1.0              | 2.0                      | 15 ±25                   |                          | 70 -910                               | 650//5.0                        | UM-1     |
| ECS-45K15B  | 45.0                    | 4               | ±7.5                    | 1.0              | 3.0                      | 30 ±25                   |                          | 80 ±910                               | 650//3.0                        | UM-1 x 2 |
| ECS-45K20A  | 45.0                    | 2               | ±10                     | 0.5              | 2.0                      | 15 ±30                   |                          | 65 -910                               | 910//2.5                        | UM-1     |
| ECS-45K20B  | 45.0                    | 4               | ±10                     | 1.0              | 3.0                      | 35 ±40                   |                          | 80 ±910                               | 910//2.5                        | UM-1 x 2 |
| ECS-45K30A  | 45.0                    | 2               | ±15                     | 1.0              | 2.0                      | 15 ±50                   |                          | 70 -910                               | 1200//1.5                       | UM-1     |
| ECS-45K30B  | 45.0                    | 4               | ±15                     | 1.0              | 3.0                      | 35 ±50                   |                          | 80 ±910                               | 1200//0.7                       | UM-1 x 2 |

### 55 MHz Monolithic Crystal Filters (Operating Temperature -20 ~ +70°C)

| Model      | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case     |
|------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|----------|
| ECS-55K15A | 55.0                    | 2               | ±7.5                    | 1.0              | 2.0                      | 15 ±25                   |                          | 70 -910                               | 600//3.0                        | UM-1     |
| ECS-55K15B | 55.0                    | 4               | ±7.5                    | 1.0              | 3.0                      | 30 ±25                   |                          | 90 ±910                               | 600//1.5                        | UM-1 x 2 |
| ECS-55K20A | 55.0                    | 2               | ±10                     | 1.0              | 2.0                      | 15 ±30                   |                          | 75 -910                               | 910//2.5                        | UM-1     |
| ECS-55K20B | 55.0                    | 4               | ±10                     | 1.0              | 3.0                      | 25 ±25                   |                          | 90 ±910                               | 910//1.0                        | UM-1 x 2 |
| ECS-55K30A | 55.0                    | 2               | ±15                     | 1.0              | 2.0                      | 15 ±50                   |                          | 70 -910                               | 1200//1.5                       | UM-1     |
| ECS-55K30B | 55.0                    | 4               | ±15                     | 1.0              | 3.0                      | 30 ±50                   |                          | 90 ±910                               | 1200//0.7                       | UM-1 x 2 |
| ECS-55K32A | 55.0                    | 2               | ±16                     | 0.5              | 2.5                      | 4 ±29.5                  |                          | 65 -910                               | 1250//1.3                       | UM-1     |
| ECS-55K32B | 55.0                    | 4               | ±16                     | 1.0              | 5.0                      | 30 ±52                   |                          | 80 ±910                               | 1250//0.5                       | UM-1 x 2 |

### 70 & 90 MHz Monolithic Crystal Filters (Operating Temperature -20 ~ +70°C)

| Model      | Normal Freq. (fo) (MHz) | Number of Poles | Passband 3Db Min. (KHz) | Ripple Max. (dB) | Insertion Loss Max. (dB) | Stopband Max. (dB) (KHz) | Stopband Max. (dB) (KHz) | Guaranteed Attenuation (dB) (fo ±KHz) | Terminating Impedance (Ohms/pF) | Case     |
|------------|-------------------------|-----------------|-------------------------|------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------|----------|
| ECS-70K15A | 70.0                    | 2               | ±7.5                    | 1.0              | 2.5                      | 15 ±25                   |                          | 35 -910                               | 2000//1.0                       | UM-1     |
| ECS-70K15B | 70.0                    | 4               | ±7.5                    | 1.0              | 4.0                      | 40 ±35                   |                          | 70 ±910                               | 2000//1.0                       | UM-1 x 2 |
| ECS-70K20A | 70.0                    | 2               | ±10                     | 1.0              | 2.5                      | 15 ±28                   |                          | 35 -910                               | 2500//1.0                       | UM-1     |
| ECS-70K20B | 70.0                    | 4               | ±10                     | 1.0              | 4.0                      | 35 ±40                   |                          | 70 ±910                               | 2500//1.0                       | UM-1 x 2 |
| ECS-90M20A | 90.0                    | 2               | ±10                     | 1.0              | 2.5                      | 15 ±30                   |                          | 35 -910                               | 2500//1.0                       | UM-1     |
| ECS-90M20B | 90.0                    | 4               | ±10                     | 1.0              | 4.0                      | 30 ±30                   |                          | 70 ±910                               | 2500//1.0                       | UM-1 x 2 |

## Package Dimensions and Electrical Diagrams (mm)

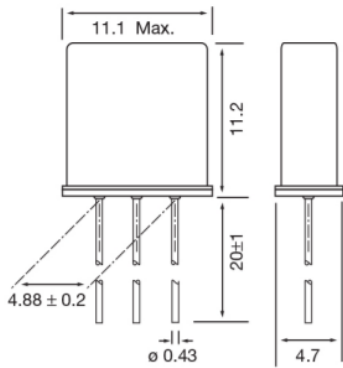


Figure 1) HC-49/U

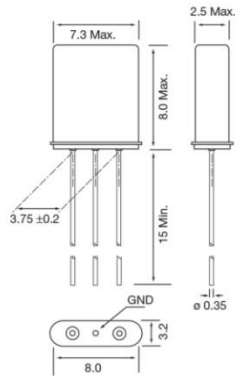


Figure 2) UM-1

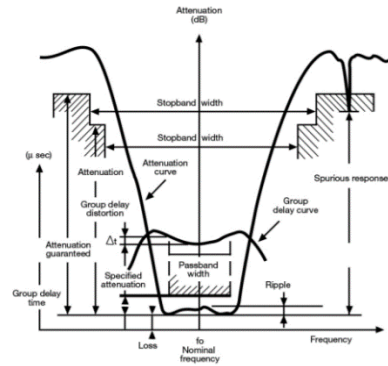
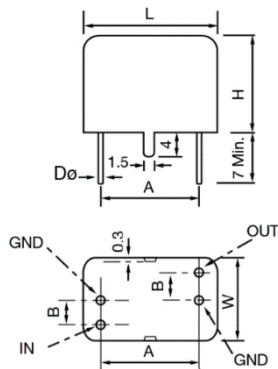


Figure 3) MCF Characteristics Curve



| Case | Dimensions (mm) |      |      |      |     |      |
|------|-----------------|------|------|------|-----|------|
|      | L               | W    | H    | A    | B   | D    |
| SC-1 | 11              | 8.5  | 11.5 | 7.4  | 2.0 | 0.30 |
| SC-2 | 13.4            | 8.5  | 11.5 | 9.8  | 2.0 | 0.30 |
| SC-3 | 15              | 12.0 | 15.0 | 9.0  | 2.5 | 0.43 |
| SC-4 | 18.5            | 12.0 | 15.0 | 13.4 | 2.5 | 0.43 |

Figure 4) SC Package with Dimensional Chart

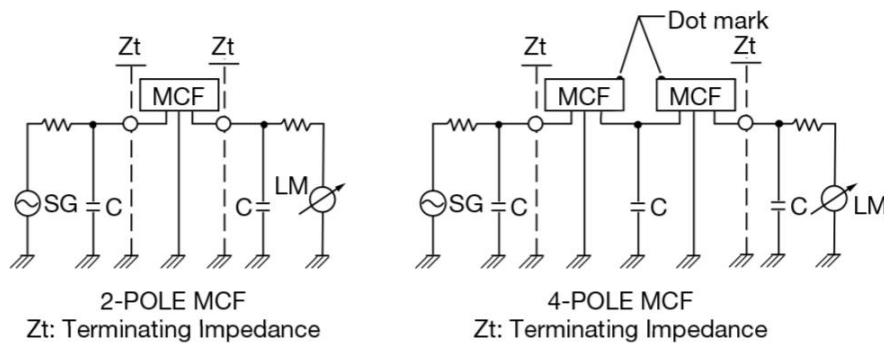


Figure 5) MCF Test Circuits

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