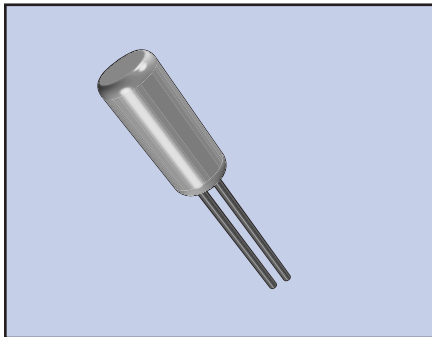




These products represent our selection of miniature tubular high frequency crystals. They feature outstanding shock/vibration resistance and environmental characteristics.

### FEATURES

- Cost effective
- Excellent aging
- Wide frequency range
- Excellent reliability
- PbFree/RoHS Compliant



### PART NUMBERING GUIDE "EXAMPLE"

| MANUFACTURER |   | FREQUENCY |   | LOAD CAPACITANCE* |   | PACKAGE TYPE** |
|--------------|---|-----------|---|-------------------|---|----------------|
| ECS          | - | 35        | - | 16                | - | 10X            |
| ECS          | - | 160       | - | 16                | - | 9X             |

\* Load capacitance (xx=xx pF, S= series resonance), \*\* Package Type examples (10X = 3x10, 9X = 3x9)

### OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

| PARAMETERS                   |                | ECS-3X10X                                                                                                                          | ECS-3X9X                                    | CONDITIONS                                  |
|------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------|
| FREQUENCY RANGE              | $f_0$          | 3.5MHz ~ 4MHz                                                                                                                      | 4MHz ~ 30MHz (fund), 30MHz ~ 70MHz (3rd OT) |                                             |
| FREQUENCY TOLERANCE          | $\Delta f/f_0$ | $\pm 50$ PPM                                                                                                                       |                                             | @ +25°C                                     |
| FREQUENCY VS. TEMP. CHARAC.  | $\Delta f/f_0$ | $\pm 50$ PPM                                                                                                                       |                                             | -10°C ~ +60°C                               |
| OPERATING TEMPERATURE RANGE  | $T_{OPR}$      | -10 ~ +60                                                                                                                          |                                             | °C                                          |
| STORAGE TEMP. RANGE          | $T_{STG}$      | -40 ~ +85                                                                                                                          |                                             | °C                                          |
| EQUIVALENT SERIES RESISTANCE | $R_1$          | See table                                                                                                                          |                                             |                                             |
| LOAD CAPACITANCE             | $C_L$          | 16.0 pF typ. (Customer Specified)                                                                                                  |                                             | pF                                          |
| SHUNT CAPACITANCE            | $C_0$          | 5.0 max.                                                                                                                           |                                             | pF                                          |
| DRIVE LEVEL                  | $D_L$          | 50μW ~ 100μW                                                                                                                       |                                             | μW                                          |
| INSULATION RESISTANCE        | IR             | 500MΩ min.                                                                                                                         |                                             | DC 100V ±15V                                |
| AGING (FIRST YEAR)           | $\Delta f/f_0$ | $\pm 5$ PPM max.                                                                                                                   |                                             | 25°C ±3°C                                   |
| SHOCK RESISTANCE             |                | $\pm 5$ PPM<br>Drop test of 3 times on a hard board from 75 cm height or shock test of 3000G x 0.3ms x 1/2 sin wave x 3 directions |                                             | Conditions will vary depending on frequency |

### EQUIVALENT SERIES RESISTANCE/ MODE OF OSCILLATION

| FREQUENCY MHz | EQUIVALENT SERIES RESISTANCE | MODE        |
|---------------|------------------------------|-------------|
| 3.5MHz ~ 4MHz | 200 Ω MAX.                   | Fundamental |
| 4MHz ~ 6MHz   | 150 Ω MAX.                   |             |
| 6MHz ~ 10MHz  | 100 Ω MAX.                   |             |
| 10MHz ~ 30MHz | 50 Ω MAX.                    |             |
| 30MHz ~ 36MHz | 100 Ω MAX.                   | 3rd O/T     |
| 36MHz ~ 70MHz | 80 Ω MAX.                    |             |

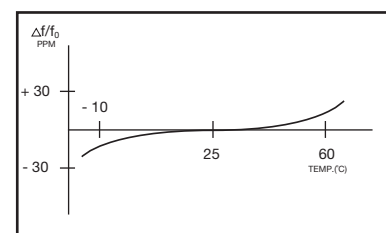


Figure 3) Frequency vs Temperature Curve

### PACKAGE DIMENSIONS (mm)

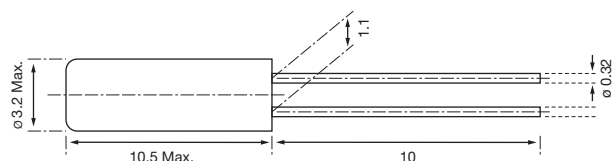


Figure 1) ECS-3x10X

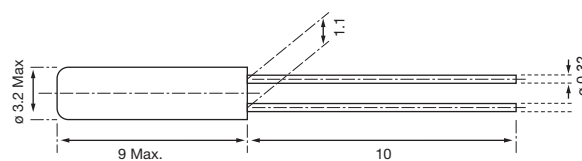


Figure 2) 3x9X

# Mouser Electronics

Authorized Distributor

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## ECS:

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[ECS-80-18-10X](#) [ECS-49-18-10X](#) [ECS-250-18-9X](#) [ECS-200-18-9X](#) [ECS-110.5-18-9X](#) [ECS-270-18-9X](#) [ECS-147-18-9X](#)  
[ECS-60-18-10X](#) [ECS-143-18-9X](#) [ECS-666-18-9X](#) [ECS-400-18-10X](#) [ECS-184-18-9X](#) [ECS-120-18-9X](#) [ECS-35-18-10X](#)  
[ECS-320-18-9X](#) [ECS-2457-18-9X](#) [ECS-500-18-9X](#) [ECS-098.3-18-9X](#) [ECS-240-18-9X](#) [ECS-400-18-9X](#)  
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[ECS-666-18-9](#) [ECS-98.3-18-10](#) [ECS-400-18-10](#) [ECS-196-18-9](#) [ECS-81-18-10](#) [ECS-245-18-9](#) [ECS-600-18-9](#)  
[ECS-81-18-9](#)