

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          | $\Delta f/f_0$ | ±50 PPM   |   | @ +25°C                                     |
| FREQUENCY VS. TEMP. CHARAC.  | $\Delta f/f_0$ | ±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                  | DL             | 50µW ~ 100µW  |   | µW  |
| INSULATION RESISTANCE        | IR             | 500MΩ min.  |   | DC 100V ±15V                                |
| AGING (FIRST YEAR)           | $\Delta f/f_0$ | ±5 PPM max.   |   | 25°C ±3°C                                   |
| SHOCK RESISTANCE             |                | ±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.                    |             |

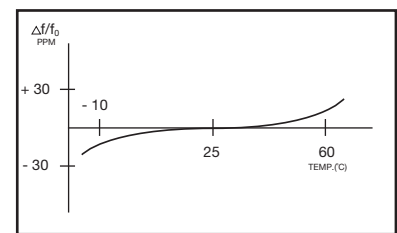


Figure 3) Frequency vs Temperature Curve

## PACKAGE DIMENSIONS (mm)

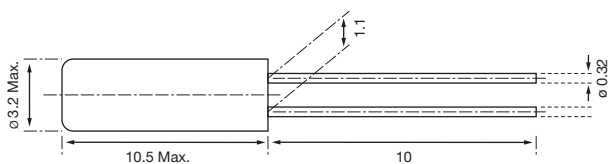


Figure 1) ECS-3x10X

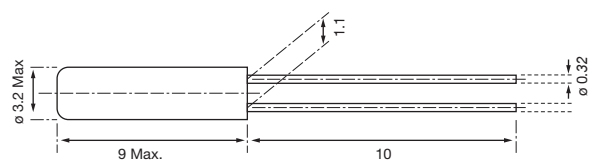


Figure 2) 3x9X