

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

### PART NUMBERING GUIDE *"EXAMPLE"*

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

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

### OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

PARAMETERS		ECS-3x10	ECS-3x9	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	$D_L$	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 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.	
36MHz ~ 70MHz	80 Ω MAX.	3rd O/T

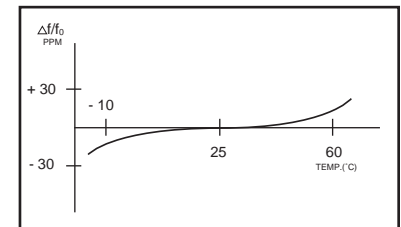


Figure 3) Frequency vs Temperature Curve

### PACKAGE DIMENSIONS (mm)

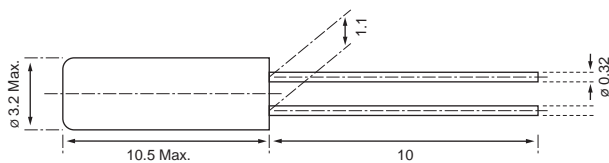


Figure 1) ECS-3x10

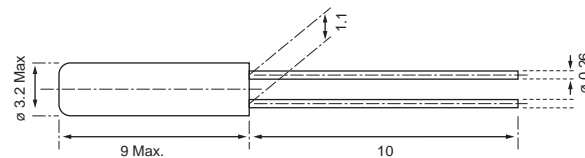


Figure 2) 3x9