

The ECS-31X Series low frequency tuning fork crystals offer low frequencies in a compact thru hole package.

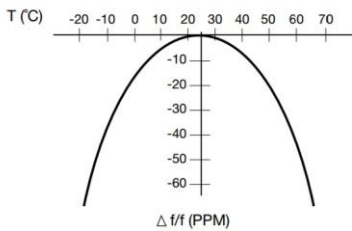
## OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS



- Miniature size
- Cost effective
- Long term stability
- PbFree/RoHS Compliant

PARAMETERS	CONDITIONS	ECS-31X			UNITS
		MIN	TYP	MAX	
Frequency Range	Fo	30		150	KHz
Frequency Tolerance	@ +25°C		±30		ppm
Temperature Coefficient			-0.034	-0.004	ppm/°C <sup>2</sup>
Shunt Capacitance	Co		0.8~1.7		pF
Load Capacitance	Specify in P/N		12.5		pF
Drive Level	DL			1.0	μW
Equivalent Series Resistance	R1			50K	Ω
Insulation Resistance	100V DC ±15V	500M			Ω
Turnover Temperature			+25		°C
Operating Temperature	T <sub>opr</sub>	-10		+60	°C
Storage Temperature	T <sub>stg</sub>	-40		+85	°C
Aging (First Year)	@ +25°C ±3°C			±5	ppm
Motional Capacitance			1 ~ 4		fF
Capacitance Ratio			425~800		τ

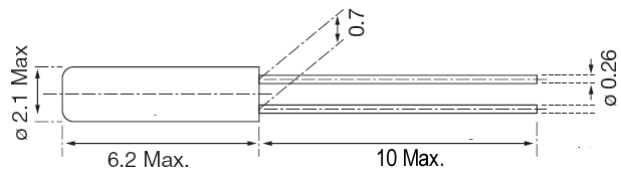
### PARABOLIC TEMPERATURE CURVE



To determine frequency stability, use parabolic curvature.  
For example: What is the stability at 45°C?

- 1) Change in T (°C) = 45 - 25 = 20°C
- 2) Change in frequency = -0.04 PPM × (ΔS T)<sup>2</sup>  
= -0.04 PPM × (20)<sup>2</sup>  
= -16.0 PPM

### DIMENSIONS (mm)



## PART NUMBERING GUIDE: Example ECS-.400-12.5-13X

ECS - FREQUENCY ABBREVIATION

LOAD  
CAPACITANCE

PACKAGE

ECS

.400 = 40.000 KHz

12.5 = 12.5 pF

13X = 2x6

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