

The ECS-.327-12.5-13X-C tuning fork type crystal is used as a clock source in communication equipment, measuring instruments, microprocessors and other time management applications. Their low power consumption makes these crystals ideal for portable equipment.

[Request a Sample](#)

OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS



- Cost Effective
- Tight Tolerance
- Long Term Stability
- Excellent Resistance and Environmental Characteristics
- Pb Free/RoHS Compliant

PARAMETERS		ECS-.327-12.5-13X-C	UNITS
Frequency	F_0	32.768	KHz
Frequency Tolerance	$\Delta f/f_0$	± 10	ppm
Load Capacitance	C_L	12.5	pF
Drive Level (max)	D_L	1	μW
Resistance At Series Resonance	R_1	35(max)	K Ω
Q-Factor	Q	70,000(typ.)	
Turnover Temperature	T_M	$+25 \pm 5$	$^{\circ}C$
Temperature Coefficient	β	$-0.040 \text{ ppm}/^{\circ}C^2 \text{ max.}$	PPM/ ΔC°
Shunt Capacitance	C_0	1.35 (typ.)	pF
Capacitance Ratio		450 (typ.)	
Operating Temp	T_{opr}	$-20 \sim +70$	$^{\circ}C$
Storage Temperature	T_{stg}	$-40 \sim +85$	$^{\circ}C$
Shock Resistance		Drop 3 times on hard wooden board from height of 75cm / ± 5 ppm max.	PPM
Insulation Resistance	IR	500 M Ω min./DC100V	M Ω
Aging (First Year)	$\Delta f/f_0$	± 3 ppm max. @ $+25^{\circ}C \pm 3^{\circ}C$	ppm
Motional Capacitance	C_1	0.0030(typ.)	pF

DIMENSIONS (mm)

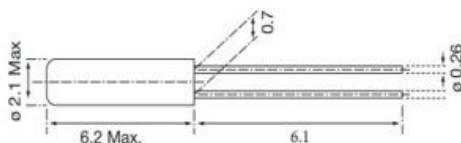
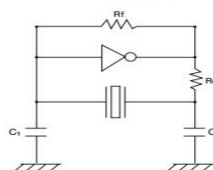


Figure 1) ECS-2X6X

RECOMMENDED OSCILLATION CIRCUIT

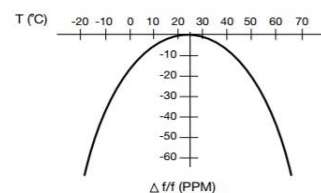


ELECTRICAL CHARACTERISTICS

IC: TC 4069P
 Rf: 10M Ω
 Rd: 330K Ω (As required)
 $C_1 = 22\text{pF}$, $C_2 = 22\text{pF}$
 $V_{DD} = 3.0V$

In this circuit, low drive level with a maximum of $1\mu W$ is recommended. If excessive drive is applied, irregular oscillation or quartz element fractures may occur.

PARABOLIC TEMPERATURE CURVE



To determine frequency stability, use parabolic curvature. For example: What is the stability at $45^{\circ}C$?

- 1) Change in $T (^{\circ}C)$ = $45 - 25 = 20^{\circ}C$
- 2) Change in frequency = $-0.04 \text{ PPM} \times (\Delta T)^2$
 $= -0.04 \text{ PPM} \times (20)^2$
 $= -16.0 \text{ PPM}$

PART NUMBERING GUIDE:

Manufacturer		Frequency	Load Capacitance	Package Type*	**Tolerance Spec.			
ECS	-	.327	-	12.5	-	13X	-	C

* Package type example (13X = 2x6)

** C = ± 10 ppm