

The miniature ECX-26X and the sub-miniature ECX-15X are compact, cost effective SMD tuning fork crystals. The slimline molded package requires less space than other SMD tuning fork crystals.

FEATURES

- Cost effective
- Low profile
- RoHS Compliant w/exemption for Pb in high temp solder
- Tape & Reel packaging

PART NUMBERING GUIDE "EXAMPLE"

| MANUFACTURER | FREQUENCY (32.768 MHz) | LOAD CAPACITANCE* | PACKAGE TYPE |
|--------------|------------------------|-------------------|--------------|
| ECS | - .327 | - 12.5 | - 26X |

* Package type examples (26X=ECX-26X, 27X=ECX-15X) Sample Part Number: ECS-.327-12.5-26X

OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

| PARAMETERS | CONDITIONS | ECX-26X | | | ECX-15X | | | UNITS |
|--------------------------|-----------------------|---------|--------|-------|---------|---------|-------|--------|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| FREQUENCY RANGE | F ₀ | | 32.768 | | | 32.768 | | KHz |
| FREQUENCY TOLERANCE | Δf/f ₀ | | | ±20 | | | ±20 | PPM |
| LOAD CAPACITANCE | Optional CL available | | 12.5 | | | 12.5 | | pF |
| DRIVE LEVEL | DL | | | 1.0 | | | 1.0 | μW |
| EQUIV. SERIES RESISTANCE | R ₁ | | | 50K | | | 55K | Ω |
| Q-FACTOR | Q | | 70K | | | 70K | | Q |
| TURNOVER TEMPERATURE | | +20 | +25 | +30 | +20 | +25 | +30 | °C |
| TEMPERATURE COEFFICIENT | β | | -0.35 | -0.04 | | -0.35 | -0.04 | PPM/°C |
| SHUNT CAPACITANCE | C ₀ | | 0.9 | | | 0.95 | | pF |
| CAPACITANCE RATIO | | | 360 | | | 380 | | |
| OPERATING TEMP RANGE | T _{OPR} | -20 | | +70 | -20 | | +70 | °C |
| STORAGE TEMP RANGE | T _{STG} | -40 | | +125 | -40 | | +125 | °C |
| INSULATION RESISTANCE | @ 100V DC ±15V | 500M | | | 500M | | | Ω |
| AGING (FIRST YEAR) | @ +25°C ±3°C | | | ±3 | | | ±3 | PPM |
| MOTION CAPACITANCE | C ₁ | | 0.0025 | | | +0.0025 | | PF |

PACKAGE DIMENSIONS (mm)

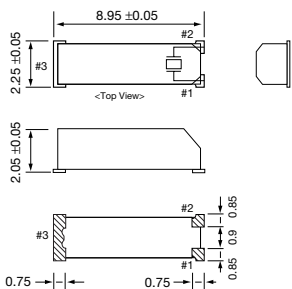


Figure 1) ECX-26X Top, Side Bottom & End views

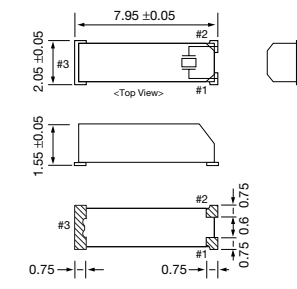


Figure 3) ECX-15X Top, Side Bottom & End views

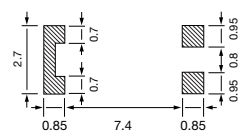


Figure 2) ECX-26X Land Pattern

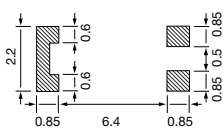
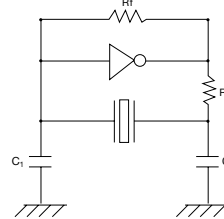


Figure 4) ECX-15X Land Pattern

RECOMMENDED OSCILLATION CIRCUIT

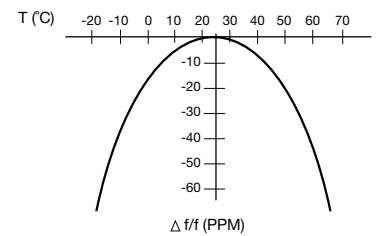


ELECTRICAL CHARACTERISTICS

IC: TC 4069P
 R_f: 10MΩ
 R_d: 330KΩ (As required)
 C₁ = 22pF, C₂ = 22pF
 V_{DD} = 3.0V

In this circuit, low drive level with a maximum of 1μW 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°C?

- 1) Change in T (°C) = 45 - 25 = 20°C
- 2) Change in frequency = -0.04 PPM x (ΔT)²
 = -0.04 PPM x (20)²
 = -16.0 PPM