

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



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

## OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS

| PARAMETERS                     |                   | ECS-.327-12.5-13X-C   | UNITS   |
|--------------------------------|-------------------|---|---------|
| Frequency                      | F <sub>0</sub>    | 32.768  | KHz     |
| Frequency Tolerance            | Δf/f <sub>0</sub> | ±10   | ppm     |
| Load Capacitance               | C <sub>L</sub>    | 12.5  | pF      |
| Drive Level (max)              | D <sub>L</sub>    | 1   | μW      |
| Resistance At Series Resonance | R <sub>1</sub>    | 35(max)   | KΩ      |
| Q-Factor                       | Q                 | 70,000(typ.)  |         |
| Turnover Temperature           | T <sub>M</sub>    | +25 ±5  | °C      |
| Temperature Coefficient        | β                 | -0.040ppm/°C <sup>2</sup> max.                                      | PPM/ΔC° |
| Shunt Capacitance              | C <sub>0</sub>    | 1.35 (typ.)   | pF      |
| Capacitance Ratio              |                   | 450 (typ.)  |         |
| Operating Temp                 | T <sub>opr</sub>  | -20 ~ +70   | °C      |
| Storage Temperature            | T <sub>stg</sub>  | -40 ~ +85   | °C      |
| Shock Resistance               |                   | Drop 3 times on hard wooden board from height of 75cm / ±5 ppm max. | PPM     |
| Insulation Resistance          | IR                | 500 MΩ min./DC100V  | MΩ      |
| Aging (First Year)             | Δf/f <sub>0</sub> | ±3 ppm max. @ +25°C ±3°C  | ppm     |
| Motional Capacitance           | C <sub>1</sub>    | 0.0030(typ.)  | pF      |

## DIMENSIONS (mm)

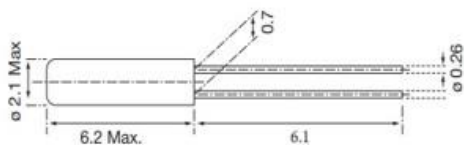
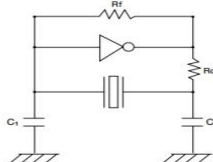


Figure 1) ECS-2X6X

### RECOMMENDED OSCILLATION CIRCUIT

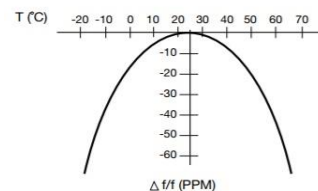


### ELECTRICAL CHARACTERISTICS

IC: TC 4069P  
 Rf: 10MΩ  
 Rd: 330KΩ (As required)  
 C<sub>1</sub> = 22pF, C<sub>2</sub> = 22pF  
 V<sub>DD</sub> = 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)<sup>2</sup> = -0.04 PPM x (20)<sup>2</sup> = -16.0 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

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