

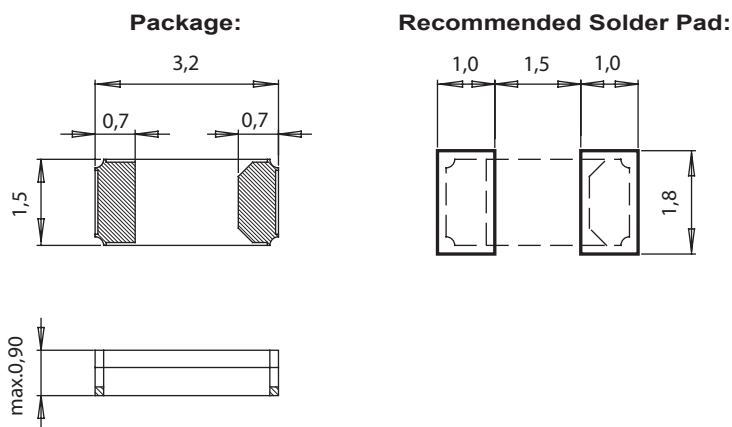
# CC7V-T1A

## Tuning Fork Crystal 32.768 kHz



**100% leadfree, RoHS - compliant**

### DIMENSIONS



All dimensions in mm typical

**Miniature SMT ceramic package**  
**Package height 0.90 mm**  
**SMD-package in Tape and Reel**  
**Ind. and Ext. temperature ranges**  
**AEC-Q200 automotive compliant**  
**High stability, Low aging**  
**Low power consumption**  
**High shock and vibration resistance**

### DESCRIPTION:

This SMD ceramic package has been specially designed for miniature industrial, telecom and portable applications. This part is available for extended operating temperature range and is compliant with the AEC-Q200 quality standards for automotive applications. A special crystal manufacturing process is used to achieve improved electrical characteristics and a miniaturized blank size.

The crystals are supplied in special trays (200 crystals per tray).  
 For pick-and-place equipment, the parts are available in 12 mm tape:  
 7" (178 mm) reel with 1'000 crystals  
 7" (178 mm) reel with 3'000 crystals  
 13" (330 mm) reel with 14'000 crystals

### ELECTRICAL CHARACTERISTICS AT 25°C:

| Nominal Frequency           | <sup>1)</sup> F <sub>L</sub> | 32.768                                                               | kHz |
|-----------------------------|------------------------------|----------------------------------------------------------------------|-----|
| Load capacitance            | <sup>2)</sup> C <sub>L</sub> | 7.0 / 9.0 / 12.5                                                     | pF  |
| Frequency tolerance         | <sup>3)</sup> ΔF/F           | +/-20                                                                | ppm |
|                             | ΔF/F                         | +/-100                                                               | ppm |
| Series resistance typ./max. | R <sub>s</sub>               | 50 / 70                                                              | kΩ  |
| Motional capacitance typ.   | C <sub>1</sub>               | 3.7                                                                  | fF  |
| Static capacitance typ.     | C <sub>0</sub>               | 1.2                                                                  | pF  |
| Drive level max.            | P                            | 1.0                                                                  | μW  |
| Insulation resistance min.  | R <sub>i</sub>               | 500                                                                  | MΩ  |
| Aging first year max.       | ΔF/F                         | +/-3                                                                 | ppm |
| Turnover temperature        | T <sub>0</sub>               | 25 +/-5                                                              | °C  |
| Frequency vs. temperature   | ΔF/F <sub>0</sub>            | -0.035 ppm/°C <sup>2</sup> (T - T <sub>0</sub> ) <sup>2</sup> +/-10% | ppm |

1) Other frequencies on request.

2) Other load capacitances on request.

3) Tighter and wider frequency tolerances on request.

**STANDARD FREQUENCIES:**

| Frequency<br>kHz             |
|------------------------------|
| 32.768                       |
| Other frequencies on request |

**ENVIRONMENTAL  
CHARACTERISTICS:**

|                                |      | Conditions             | Max. Dev. |
|--------------------------------|------|------------------------|-----------|
| Storage temp. range            |      | -55 to +125°C          |           |
| TA Operating temperature range |      | -40 to +85°C           |           |
| TB Extended oper. temp. range  |      | -40 to +125°C          |           |
| TC Extended oper. temp. range  |      | -55 to +125°C          |           |
| Shock resistance               | ΔF/F | 5000 g, 0.3 ms, ½ sine | +/-5 ppm  |
| Vibration resistance           | ΔF/F | 20 g / 10–2000 Hz      | +/-5 ppm  |

**TERMINATIONS AND  
PROCESSING:**

| Type     | Termination                        | Processing                            |
|----------|------------------------------------|---------------------------------------|
| CC7V-T1A | For SMD mounting<br>Au plated pads | Reflow soldering<br>260°C / 20 s max. |

**PRODUCT DESCRIPTION AND  
ORDERING INFORMATION:**

|                                                                             |                  |               |                 |                             |                                       |
|-----------------------------------------------------------------------------|------------------|---------------|-----------------|-----------------------------|---------------------------------------|
| <b>CC7V-T1A</b>                                                             | <b>32.768kHz</b> | <b>12.5pF</b> | <b>+/-20ppm</b> | <b>TA</b>                   | <b>QC</b>                             |
| <u>Frequency F<sub>1</sub></u>                                              |                  |               |                 |                             |                                       |
| <u>C<sub>L</sub> Load Capacitance</u>                                       |                  |               |                 |                             |                                       |
| 7.0 pF                                                                      |                  |               |                 |                             |                                       |
| 9.0 pF                                                                      |                  |               |                 |                             |                                       |
| 12.5 pF                                                                     |                  |               |                 |                             |                                       |
| <u>Frequency tolerance</u>                                                  |                  |               |                 |                             |                                       |
| +/- 20 ppm                                                                  |                  |               |                 |                             |                                       |
| +/- 100 ppm                                                                 |                  |               |                 |                             |                                       |
| <b>Optional:</b><br>if not defined,<br>'Standard' will apply                |                  |               |                 |                             |                                       |
|                                                                             |                  |               |                 | <u>Temperature Range</u>    |                                       |
|                                                                             |                  |               |                 | TA = -40 to 85°C (Standard) |                                       |
|                                                                             |                  |               |                 | TB = -40 to +125°C          |                                       |
|                                                                             |                  |               |                 | TC = -55 to +125°C          |                                       |
|                                                                             |                  |               |                 | <u>Qualification</u>        |                                       |
|                                                                             |                  |               |                 | QC = Commercial (Standard)  |                                       |
|                                                                             |                  |               |                 | QA = Automotive AEC-Q200    |                                       |
|                                                                             |                  |               |                 | QM = Medical                |                                       |
| A unique part number will be generated for each product specification, i.e: |                  |               |                 |                             |                                       |
| 20xxx-MG01                                                                  |                  |               |                 |                             | 1'000 pcs (in 12mm tape on 7" reel)   |
| 20xxx-MG03                                                                  |                  |               |                 |                             | 3'000 pcs (in 12mm tape on 7" reel)   |
| 20xxx-PG14                                                                  |                  |               |                 |                             | 14'000 pcs (in 12mm tape on 13" reel) |
| Please contact us.                                                          |                  |               |                 |                             |                                       |

All specifications subject to change without notice.



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