

# CC4V-T1A

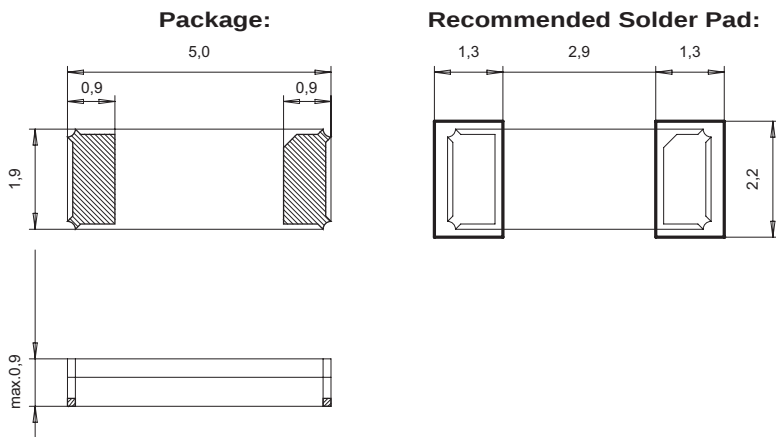
**Tuning Fork Crystal 30 kHz – 1.0 MHz**



**100% leadfree, RoHS - compliant**

**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**

## DIMENSIONS



All dimensions in mm typical

## DESCRIPTION:

This SMD ceramic package has been specially designed for miniature industrial and telecom applications. This part is available for extended operating temperature range and is compliant with the AEC-Q200 quality standards for automotive applications.

The crystals are supplied in special trays (100 crystals per tray).  
 For pick-and-place equipment, the parts are available in 12 mm tape:  
 7" (178 mm) reel with 2'000 crystals  
 13" (330 mm) reel with 10'000 crystals

## ELECTRICAL CHARACTERISTICS AT 25°C:

| Frequency Range                   | F <sub>L</sub> | 30-200             | 201-560 | 1'000  | kHz |
|-----------------------------------|----------------|--------------------|---------|--------|-----|
| Load capacitance <sup>1)</sup>    | C <sub>L</sub> | 7.0<br>9.0<br>12.5 | 4.0     | 10.0   | pF  |
| Frequency tolerance <sup>2)</sup> | ΔF/F           | +/-20              | +/-100  | +/-100 | ppm |
|                                   | ΔF/F           | +/-100             | +/-250  | +/-500 | ppm |
| Drive level max.                  | P              | 1.0                |         |        | μW  |
| Insulation resistance min.        | R <sub>i</sub> | 500                |         |        | MΩ  |
| Aging first year max.             | ΔF/F           | +/-3               |         |        | ppm |

| Frequency Example <sup>3)</sup> | F <sub>L</sub>    | 32.768                                                               | 240.000   | 1'000     | kHz |
|---------------------------------|-------------------|----------------------------------------------------------------------|-----------|-----------|-----|
| Series resistance typ./max.     | R <sub>S</sub>    | 50 / 65                                                              | 2.6 / 4.5 | 0.5 / 1.2 | kΩ  |
| Motional capacitance typ.       | C <sub>1</sub>    | 2.1                                                                  | 1.8       | 1.1       | fF  |
| Static capacitance typ.         | C <sub>0</sub>    | 1.2                                                                  | 1.3       | 1.0       | pF  |
| Turnover temperature            | T <sub>0</sub>    | 25 +/-5                                                              | 30 +/-5   | 39 +/-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 load capacitances on request.

2) Tighter and wider frequency tolerances on request.

3) Values for other frequencies consult factory.

## STANDARD FREQUENCIES:

| Frequency<br>kHz                                          |         |         |         |         | Frequency<br>MHz |
|-----------------------------------------------------------|---------|---------|---------|---------|------------------|
| 32.768                                                    | 36.409  | 38.400  | 40.000  | 76.800  | 1.000            |
| 100.000                                                   | 128.000 | 153.600 | 200.000 | 240.000 |                  |
| Other frequencies between 30 kHz and 1.008 MHz on request |         |         |         |         |                  |

## ENVIRONMENTAL CHARACTERISTICS:

|                                |              | Conditions               | Max.<br>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               | $\Delta F/F$ | 5000 g, 0.3 ms, 1/2 sine | +/-5 ppm     |
| Vibration resistance           | $\Delta F/F$ | 20 g / 10–2000 Hz        | +/-5 ppm     |

## TERMINATIONS AND PROCESSING:

| Type     | Termination                        | Processing                            |
|----------|------------------------------------|---------------------------------------|
| CC4V-T1A | For SMD mounting<br>Au plated pads | Reflow soldering<br>260°C / 20 s max. |

## PRODUCT DESCRIPTION AND ORDERING INFORMATION:

|                                                                             |                  |               |                             |           |                                       |
|-----------------------------------------------------------------------------|------------------|---------------|-----------------------------|-----------|---------------------------------------|
| <b>CC4V-T1A</b>                                                             | <b>32.768kHz</b> | <b>12.5pF</b> | <b>+/-20ppm</b>             | <b>TA</b> | <b>QC</b>                             |
| <u>Frequency <math>F_0</math></u>                                           |                  |               |                             |           |                                       |
| <u><math>C_L</math> Load Capacitance</u>                                    |                  |               |                             |           |                                       |
| 7.0 pF                                                                      |                  |               |                             |           |                                       |
| 9.0 pF                                                                      |                  |               |                             |           |                                       |
| <b>12.5 pF</b>                                                              |                  |               |                             |           |                                       |
| <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-MG02                                                                  |                  |               |                             |           | 2'000 pcs (in 12mm tape on 7" reel)   |
| 20xxx-PG10                                                                  |                  |               |                             |           | 10'000 pcs (in 12mm tape on 13" reel) |
| Please contact us.                                                          |                  |               |                             |           |                                       |

All specifications subject to change without notice.



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