

TFSM Series

Tuning Fork Crystal

Features

- 32.7680kHz Frequency Reference
- Tuning Fork Crystal Design
- Cylindrical Thru-Hole Package w/ SM Lead-Form
- Compatible to Citizen CMR200T and Micro Crystal MS1V-T1K
- Frequency Tolerance, ± 20 ppm Standard
- Parabolic Temperature Coefficient
- Tape and Reel Packaging, EIA-418



Part Dimensions:
6.2 x 2.1mm • 56.56mg

RoHS Compliant in Accordance with EU Directive 2011/65/EU

- Lead-Free Termination Finish
- Exemption 7(a), Lead [Pb] in high melting temperature type solders

Applications

- Real Time Clock Reference
- FPGAs & Microcontrollers
- Wireless Communications
- Consumer Electronics
- Computer Peripherals
- IoT Applications
- Instrumentation
- Industrial Electronics

Description

CTS TFSM Series is ideal for supporting wide range of electronic designs requiring a Real Time Clock reference. This series will support general commercial applications.

Ordering Information

| Model | Frequency Tolerance | Load Capacitance | Frequency Code [kHz] | | | | | | | | | | |
|---|---------------------------|------------------|----------------------|----|--------------|--|---------------------------|---|-------------|------|-----------|-------------------------------------|-----|
| TFSM 26 | 2 | P | 32K7680 | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Code</th> <th>Package</th> </tr> </thead> <tbody> <tr> <td>26</td> <td>6.2x2.1mm</td> </tr> </tbody> </table> | | Code | Package | 26 | 6.2x2.1mm | <table border="1"> <thead> <tr> <th>Code</th> <th>Capacitance</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>12.5pF</td> </tr> <tr> <td>T</td> <td>6pF</td> </tr> </tbody> </table> | | Code | Capacitance | P | 12.5pF | T | 6pF |
| Code | Package | | | | | | | | | | | | |
| 26 | 6.2x2.1mm | | | | | | | | | | | | |
| Code | Capacitance | | | | | | | | | | | | |
| P | 12.5pF | | | | | | | | | | | | |
| T | 6pF | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Code</th> <th>@ +25°C</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>± 20ppm</td> </tr> <tr> <td>1</td> <td>± 10ppm¹</td> </tr> </tbody> </table> | | Code | @ +25°C | 2 | ± 20 ppm | 1 | ± 10 ppm ¹ | <table border="1"> <thead> <tr> <th>Code</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td colspan="2">Product Frequency Code ²</td> </tr> </tbody> </table> | | Code | Frequency | Product Frequency Code ² | |
| Code | @ +25°C | | | | | | | | | | | | |
| 2 | ± 20 ppm | | | | | | | | | | | | |
| 1 | ± 10 ppm ¹ | | | | | | | | | | | | |
| Code | Frequency | | | | | | | | | | | | |
| Product Frequency Code ² | | | | | | | | | | | | | |

Notes:

- 1] Check factory for availability.
- 2] Frequency is recorded with two leading digits before the 'K' and 4 significant digits after the 'K' [including zeros].

Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the ranges provided in its specification.

Electrical Specifications

Operating Conditions

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------------|-----------|------------|-----|-----|-----|------|
| Operating Temperature | T_A | - | -10 | +25 | +60 | °C |
| Turnover Temperature | T_M | - | +20 | +25 | +30 | °C |
| Storage Temperature | T_{STG} | - | -40 | - | +85 | °C |

Frequency Stability

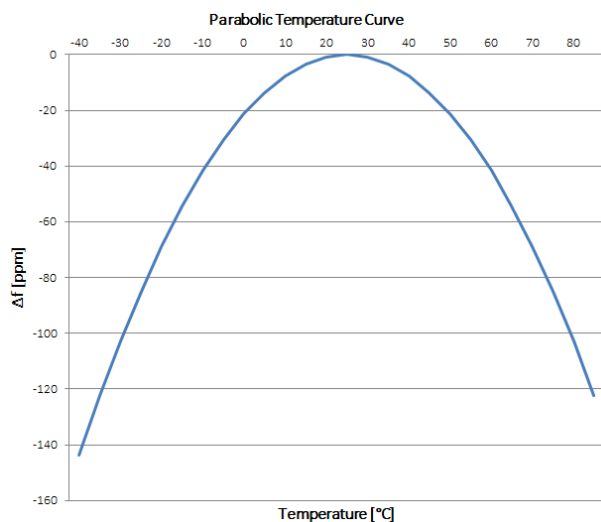
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------------|----------------|--------------------|-----|---------------|-----|---------------------|
| Frequency | f_0 | - | | 32.7680 | | kHz |
| Frequency Tolerance [Note 1] | $\Delta f/f_0$ | Standard @ +25°C | -20 | - | 20 | ppm |
| Parabolic Coefficient | β | See Figure 1 | | -0.034 ±0.006 | | ppm/°C ² |
| Aging | $\Delta f/f_0$ | First Year @ +25°C | -3 | - | 3 | ppm |

Crystal Parameters

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------------|--------|----------------|-----|-----------------------------|-----|------|
| Operating Mode | - | - | | Flexural Mode [Tuning Fork] | | - |
| Load Capacitance [Note 1] | C_L | Standard | - | 12.5 | - | pF |
| Shunt Capacitance | C_0 | - | - | 1.0 | - | pF |
| Motional Capacitance | C_1 | - | - | 3.0 | - | fF |
| Series Resistance | R_1 | - | - | - | 40 | kΩ |
| Drive Level | DL | - | - | - | 1.0 | μW |
| Insulation Resistance | R_i | +100Vdc ±15Vdc | 500 | - | - | MΩ |

1.] See Ordering Information for available options.

Figure 1



Frequency Stability [Δf] at a given temperature,

$$\Delta f = \beta [T_A - T_M]^2$$

β = Parabolic Coefficient
 T_A = Ambient Temperature
 T_M = Turnover Temperature

Ex. Find frequency stability at $T_A = +45^\circ\text{C}$

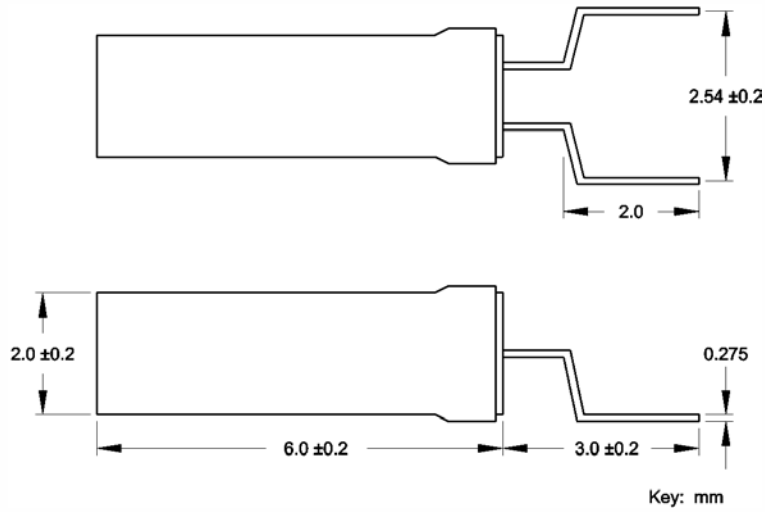
$$\Delta f = -0.034[45-25]^2$$

$$\Delta f = -0.034[20]^2$$

$$\Delta f = -13.6\text{ppm}$$

Mechanical Specifications

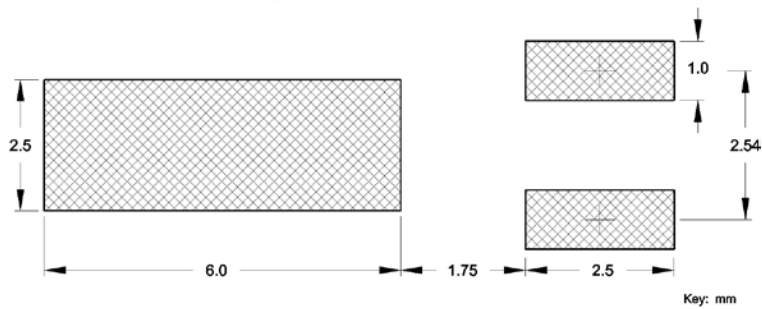
Package Drawing



Marking Information

Refer to document 016-0071-0, TF Marking Guide, for marking formats by product family.

Recommended Pad Layout

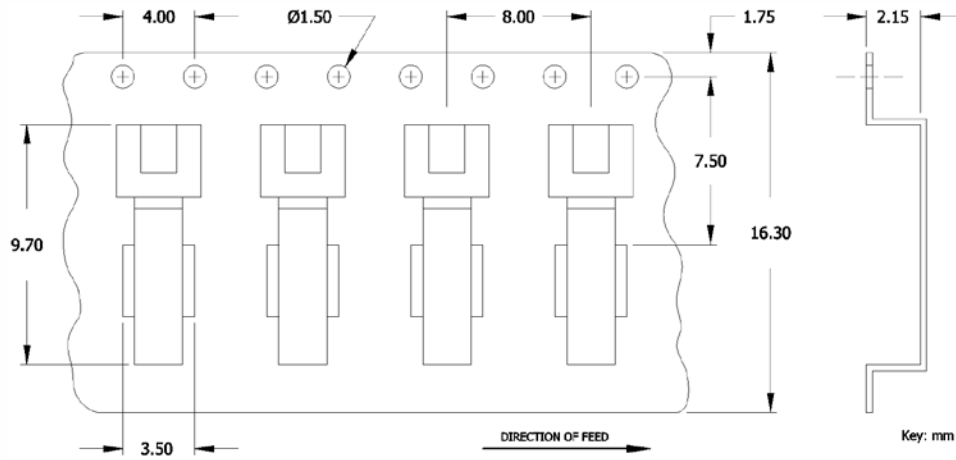


Notes

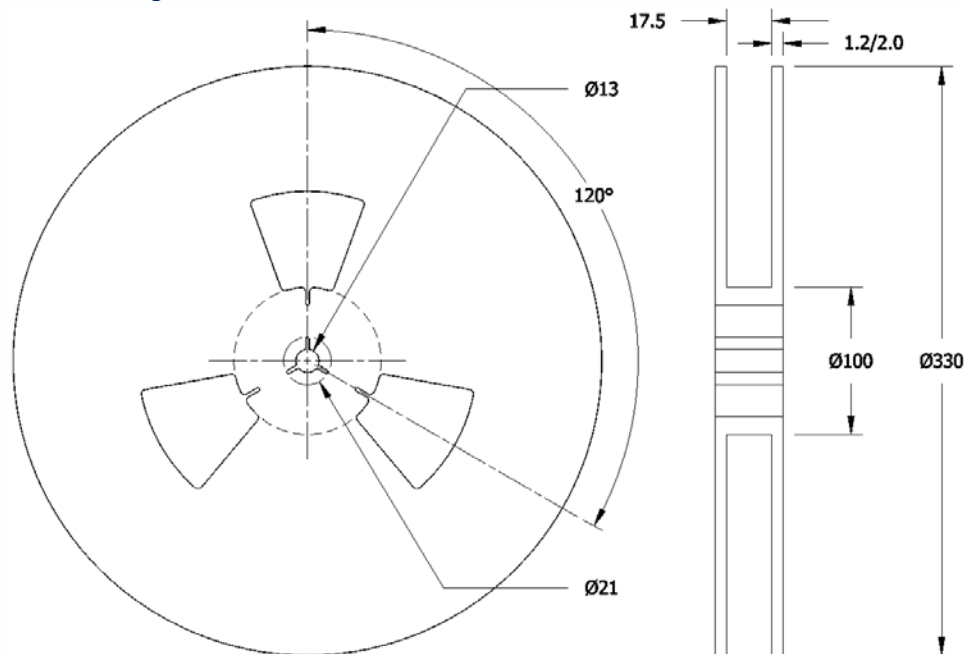
1. JEDEC termination code (e2). Barrier-plating is nickel [Ni] with tin [Sn] copper [Cu] finish.
2. Reflow conditions per JEDEC J-STD-020; $+260^{\circ}\text{C}$ maximum, 20 seconds.
3. MSL = 1.

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 3.4k pieces maximum per 330mm reel.
2. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.