TFSM Series

Tuning Fork Crystal

Part Dimensions:
6.2 × 2.1mm • 56.56mg

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, ±20ppm Standard
- Parabolic Temperature Coefficient
- Tape and Reel Packaging, EIA-481

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

Code	Package
26	6.2x2.1mm

Code	Capacitance
P	12.5pF
T	6pF

Code	@ +25°C
2	±20ppm
1	±10ppm [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.

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

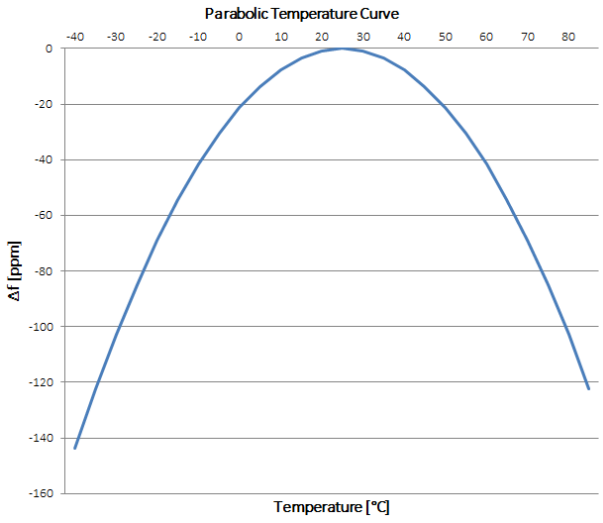
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency	f_O	-		32.7680		kHz
Frequency Tolerance [Note 1]	$\Delta f/f_O$	Standard @ +25°C	-20	-	20	ppm
Parabolic Coefficient	ß	See Figure 1		-0.034 ±0.006		ppm/°C^2
Aging	$\Delta f/f_0$	First Year @ +25°C	-3	-	3	ppm

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,

$$\Delta f = ß[T_A - T_M]^2$$

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

Ex. Find frequency stability at T_A = +45°C

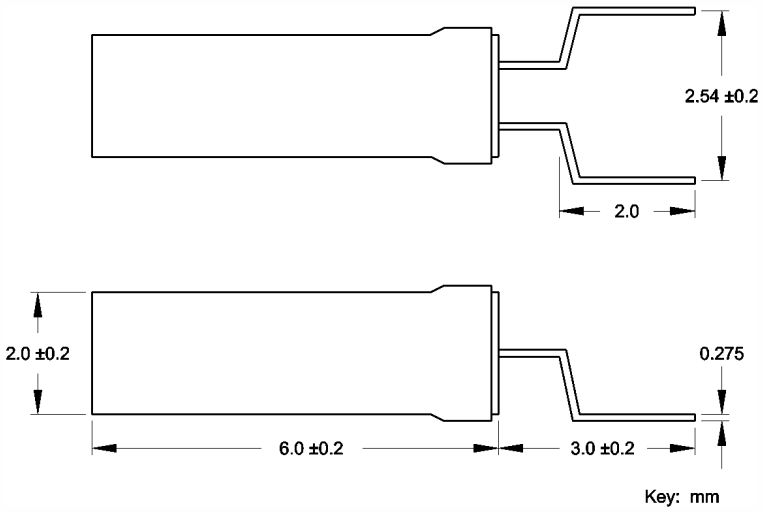
$\Delta f = -0.034[45-25]^2$

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

$\Delta f = -13.6$ppm

Mechanical Specifications

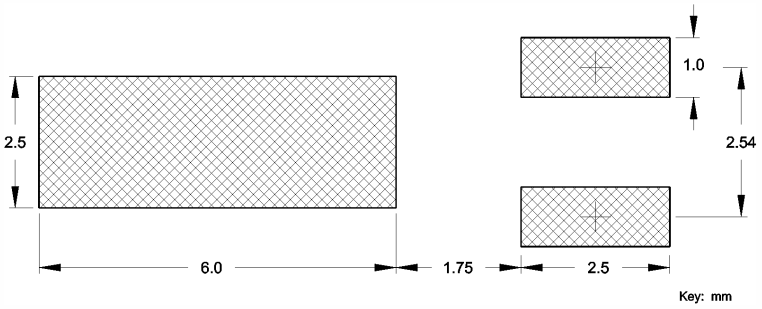
Package Drawing



Marking Information

Contact factory for marking formats that apply to this model series.

Recommended Pad Layout

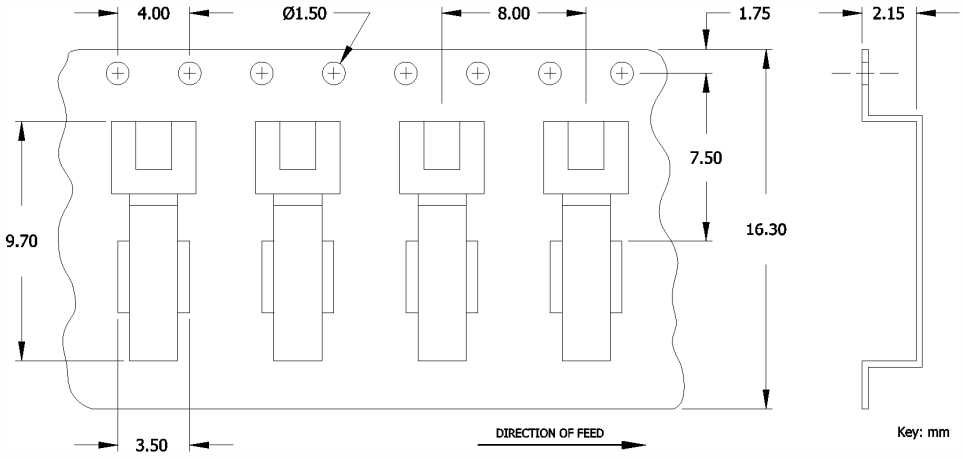


Notes

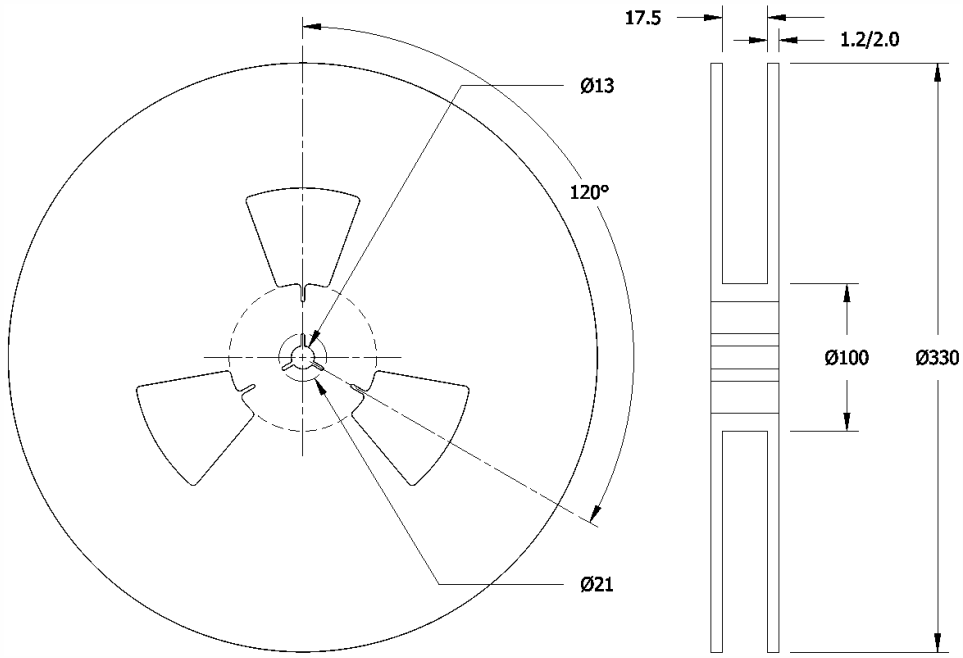
1. JEDEC termination code (e2). Barrier-plating is nickel [Ni] with tin [Sn] copper [Cu] finish.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.

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.