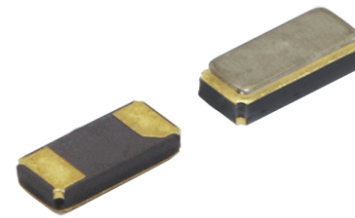


# TFA32 Series

## Automotive Grade Tuning Fork Crystal

### Features

- AEC-Q200 Compliant
- Hermetic Ceramic Surface Mount Package
- Tuning Fork Crystal Design
- 32.7680kHz Frequency Reference
- Frequency Tolerance,  $\pm 20$ ppm Standard
- Parabolic Temperature Coefficient
- Tape and Reel Packaging, EIA-418



Part Dimensions:  
3.2 x 1.5 x 0.9mm • 12.1467mg

### Applications

- Automotive Electronics
- Car Navigation Systems
- Car Infotainment Systems
- Industrial Control Equipment
- M2M Communications
- FPGAs & Microcontrollers

### Description

CTS TFA32 Series is ideal for supporting wide range of electronic designs requiring a Real Time Clock reference. This series will support general automotive and industrial applications.

### Ordering Information

Model		Frequency Tolerance	Load Capacitance	Temperature Range	Frequency Code [kHz]	Packaging																																	
TF	A32	2	P	I	327K	R																																	
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Notes:

1] Check with factory for availability.

**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 tolerances provided in its specification.

## Electrical Specifications

### Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Temperature	$T_A$	-	-40	+25	+105	°C
Turnover Temperature	$T_M$	-	+20	+25	+30	°C
Storage Temperature	$T_{STG}$	-	-55	-	+125	°C

### Frequency Stability

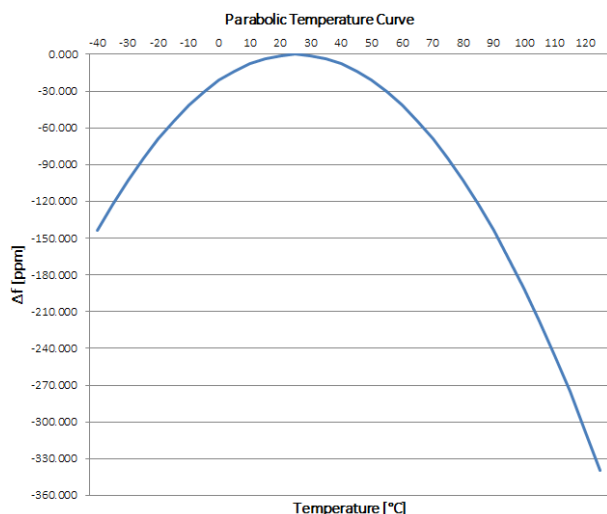
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency	$f_0$	-		32.7680		kHz
Frequency Tolerance [Note 1]	$\Delta f/f_0$	Standard @ +25°C	-20	-	20	ppm
Parabolic Coefficient	$\beta$	See Figure 1		-0.034 ±0.010		ppm/°C <sup>2</sup>
Aging	$\Delta f/f_0$	First Year @ +25°C	-3	-	3	ppm

### 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	$C_0$	-	-	1.2	-	pF
Motional Capacitance	$C_1$	-	-	3.4	-	fF
Series Resistance	$R_1$	-	-	-	70	kΩ
Drive Level	DL	-	-	0.5	1.0	μW
Insulation Resistance	$R_i$	+100Vdc ±15Vdc	500	-	-	MΩ

1.] See Ordering Information for available options.

Figure 1



Frequency Stability [ $\Delta f$ ] at a given temperature,

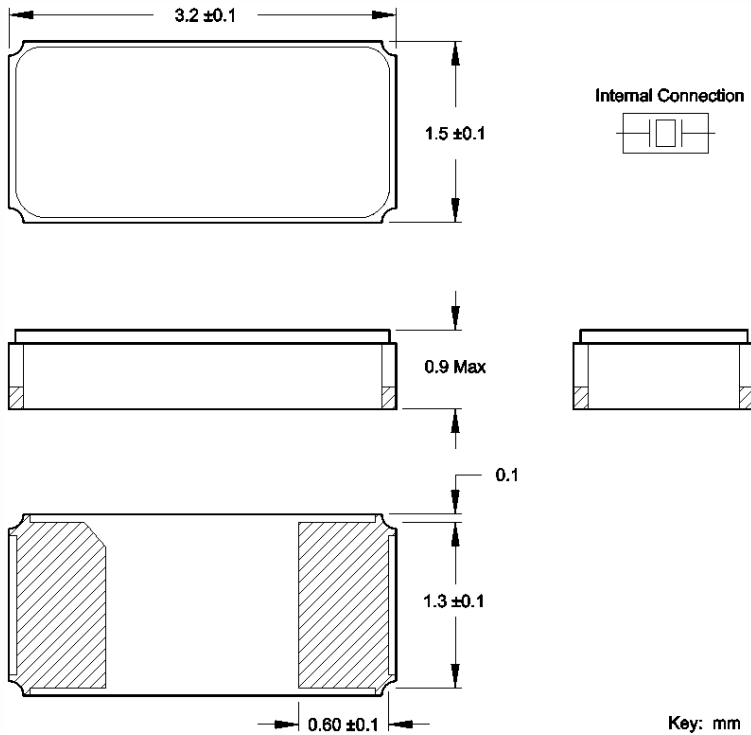
$$\Delta f = \beta [T_A - T_M]^2$$

$\beta$  = Parabolic Coefficient  
 $T_A$  = Ambient Temperature  
 $T_M$  = Turnover Temperature

Ex. Find frequency stability at  $T_A = +60^\circ\text{C}$   
 $\Delta f = -0.034[60-25]^2$   
 $\Delta f = -0.034[35]^2$   
 $\Delta f = -41.65\text{ppm}$

### Mechanical Specifications

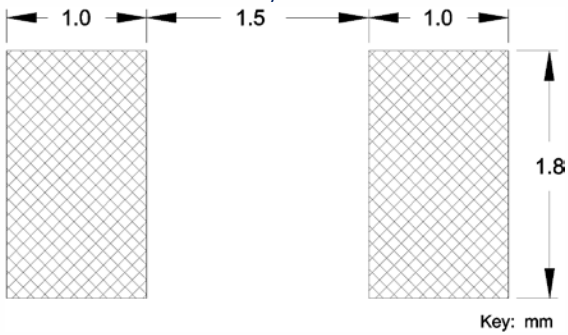
#### Package Drawing



#### 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 (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.



## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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