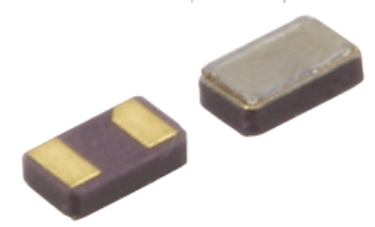
TFA20 Series

Automotive Grade Tuning Fork Crystal



Part Dimensions:
2.0 × 1.2 × 0.6mm • 4.5926mg

Features

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

Applications

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

Description

CTS TFA20 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 A20	2	P	I	327K	R

Code	Package
A	Automotive
20	2.0x1.2mm

Code	Capacitance
P	12.5pF
J	9pF
V	7pF
W	5pF

Code	Frequency
Frequency = 32.7680kHz	

Code	@ +25°C
2	±20ppm
1	±10ppm

Code	Temp. Range
I	-40°C to +85°C
G	-40°C to +105°C
H	-40°C to +125°C [1]

Code	Packing
R	3k pcs./reel

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.

Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Temperature	T_A	-	-40 -40 -40	 +25 	+85 +105 +125	℃
Turnover Temperature	T_M	-	+20	+25	+30	℃
Storage Temperature	T_{STG}	-	-55	-	+125	℃

Frequency Stability

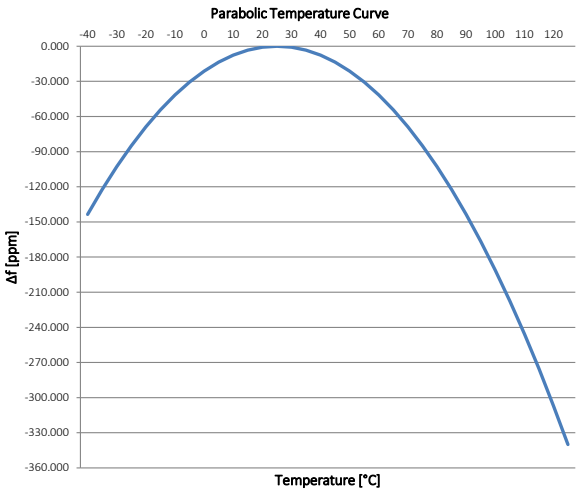
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency	f_O	-		32.7680		kHz
Frequency Tolerance [Note 1]	$\Delta f/f_O$	Standard @ +25°C	-20	-	20	ppm
Parabolic Coefficient	ß	See Figure 1		-0.034 ±0.010		ppm/°C^2
Aging	$\Delta f/f_0$	First Year @ +25°C	-3	-	3	ppm

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	-	-	1.3	-	pF
Motional Capacitance	C_1	-	-	6.5	-	fF
Series Resistance	R_1	-	-	-	90	kΩ
Drive Level	DL	-	-	0.1	0.5	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 = +60°C

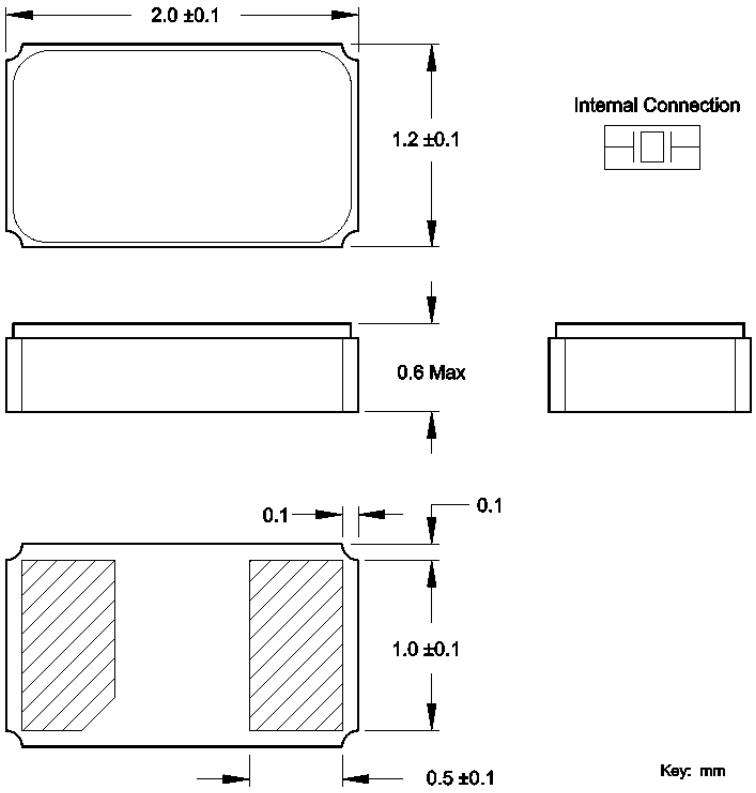
$\Delta f = -0.034[60-25]^2$

$\Delta f = -0.034[35]^2$

$\Delta f = -41.65$ppm

Mechanical Specifications

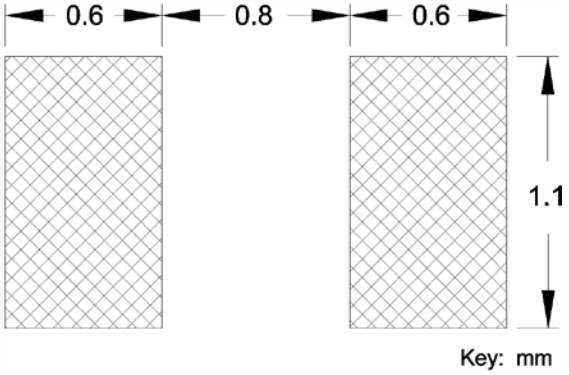
Package Drawing



Marking Information

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

Recommended Pad Layout

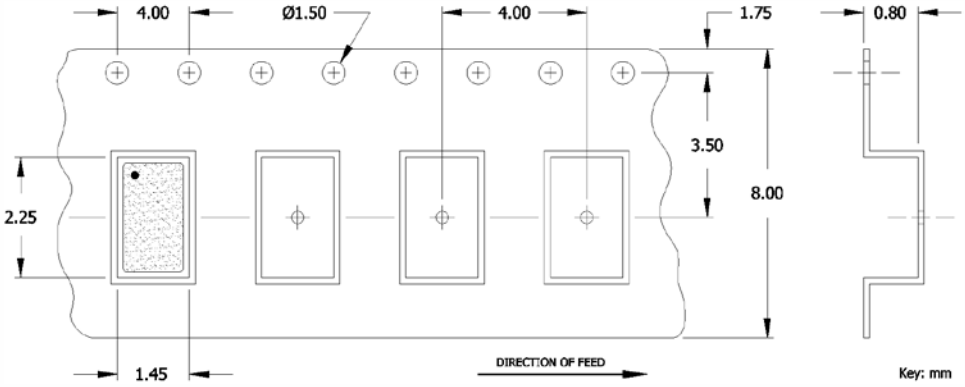


Notes

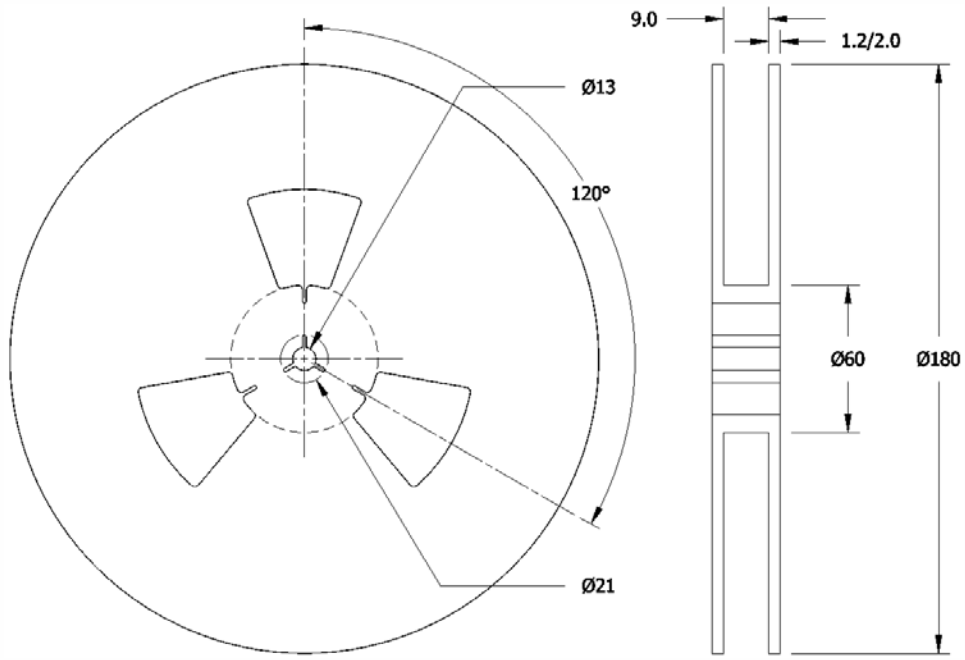
1. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 3k pieces maximum per 180mm reel.
2. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.