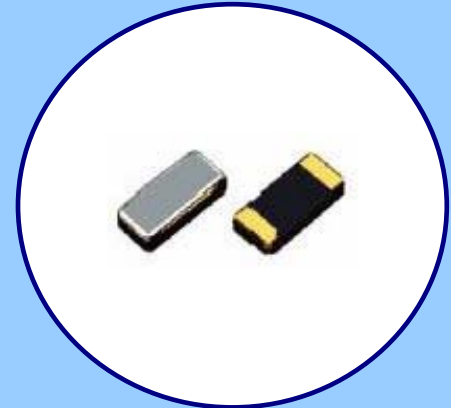




FEATURES

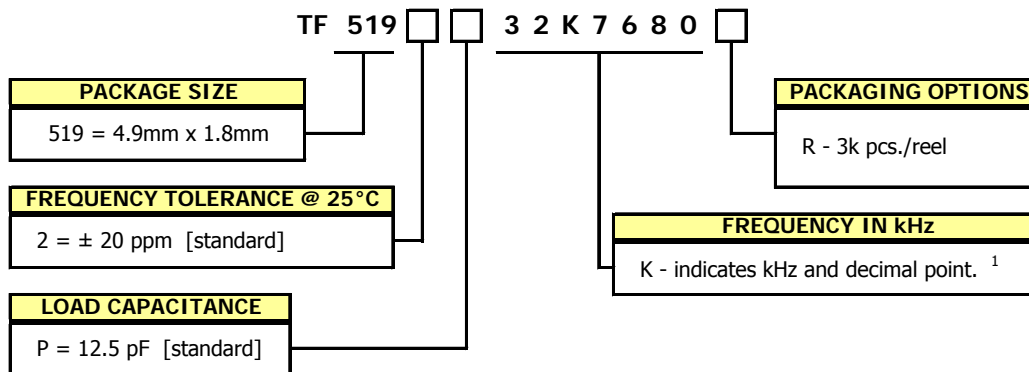
- 32.7680 kHz Frequency Reference
- Package Size 4.9mm x 1.8mm
- Tuning Fork Crystal Design
- Hermetic Ceramic Package
- Frequency Tolerance, ± 20 ppm Standard
- Frequency Temperature Coefficient, $-0.034\text{ppm}/^\circ\text{C}^2$
- Operating Temperature, -40°C to $+85^\circ\text{C}$ Standard
- Tape & Reel Packaging, EAI-481
- **RoHS/Green Compliant (6/6)**



APPLICATIONS

The TF519 crystal series is ideal for use in a wide range of communication equipment, notebooks, computer peripherals, audio visual, Bluetooth and other wireless applications, USB interfaces, PDAs and automotive electronics.

ORDERING INFORMATION

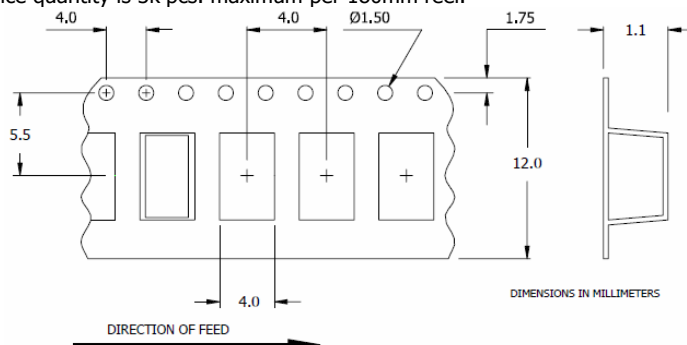


1] Frequency is recorded with two leading digits before the 'K' and 4 significant digits after the 'K' (including zeros).

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

PACKAGING INFORMATION [Reference]

Device quantity is 3k pcs. maximum per 180mm reel.

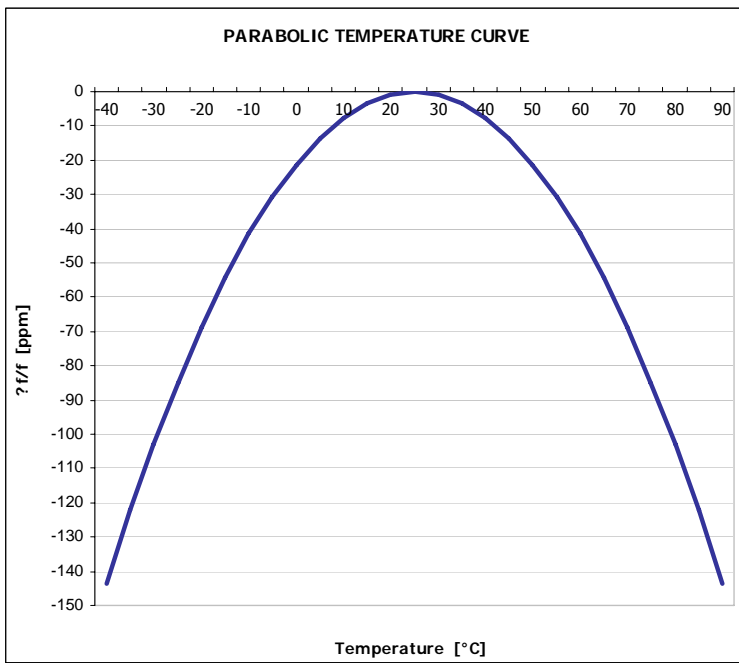


ELECTRICAL CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
ELECTRICAL PARAMETERS	Frequency	f_0			32.7680		kHz
	Operating Mode	-		Flexural Mode [Tuning Fork]			-
	Frequency Tolerance	$\Delta f/f_0$	@+25°C	-	20	-	± ppm
	Frequency Temperature Coefficient	$\Delta f/f_M$		-0.034±0.006ppm/°C ²			-
	Frequency Stability			See Figure 1			
	Operating Temperature Range	T_A		-40	-	+85	°C
	Turnover Temperature	T_M	±5°C	-	+25	-	°C
	Load Capacitance *	C_L	Standard	-	12.5	-	pF
	Aging	$\Delta f/f_0$	@+25°C, 1st year	-	-	3.0	± ppm
	Drive Level	DL		-	0.5	1.0	µW
	Shunt Capacitance	C_0		-	1.35	-	pF
	Motional Capacitance	C_1		-	2.1	-	fF
	Series Resistance	R_1		-	-	70	k Ohms
	Insulation Resistance	R_i	+100Vdc ±15Vdc	500	-	-	M Ohms
	Storage Temperature Range	T_{STR}		-40	-	+85	°C

* See Ordering Information for available options.

FIGURE 1

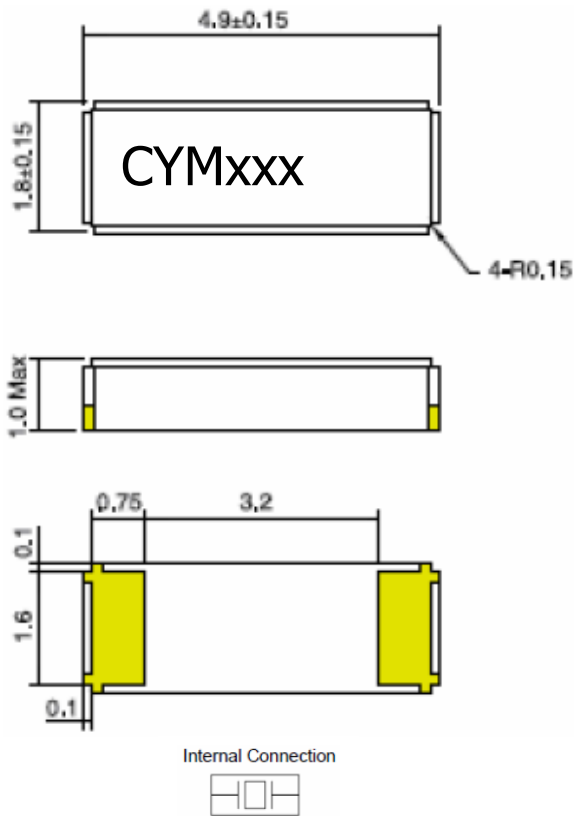


Frequency stability [ppm] is determined using parabolic curve, $\Delta f = \text{Temperature Coefficient}(T_A - T_M)^2$.

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

TF519 PACKAGE DRAWING



MARKING INFORMATION

1. YM – Date code; Y – year [last digit], M – month [See Table I for codes].
2. xxx – Lot code.

NOTES

1. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.
2. Termination pads (e4); barrier plating is nickel [Ni] with gold [Au] flash plate.
3. Reflow conditions per JEDEC J-STD-020; 260°C maximum, 20 seconds.
4. MSL = 1.

SUGGESTED SOLDER PAD GEOMETRY

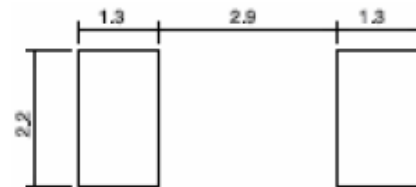


TABLE I

MONTH	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
CODE	1	2	3	4	5	6	7	8	9	X	Y	Z