









# 32.768kHz Series Tuning Fork Crystal Units

The 32.768kHz tuning fork crystal unit is the most widely used frequency control product. TAITIEN's tuning-fork-type crystals have low power consumption ideal for portable application. Their different package sizes provide the customers more choices for time management. TAITIEN's tuning-fork-type crystals are cost effective real time clock products.

Type	XA	XB		XD			XN	
Size (mm)	3 x 8	1 x 4	2 x 6	2.0 x 1.2	3.2 x 1.5	4.1 x 1.5	6.9 x 1.4	8.0 x 3.8
Package	DIP	DIP	DIP	SMD	SMD	SMD	SMD	SMD
RoHS	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes*
Outline								

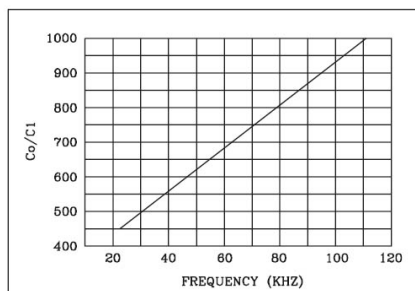
\* Pb in high temperature solder (exempt per RoHS 2002/95/EC Annex (7)) and suitable for RoHS compliant reflow

## ELECTRICAL SPECIFICATION

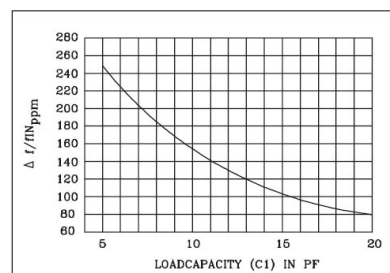
Nominal Frequency	32.768000 kHz
Mode of Vibration	Fundamental
Storage Temp. Range (T <sub>STR</sub> )	-55°C ~+125 °C
Turnover Temperature (TM)	25±5 °C
Temperature Coefficient (β)	-(0.03±0.01) ppm/°C <sup>2</sup>
Frequency vs. Temperature (Δf / fM)	β × (T-TM) <sup>2</sup> ppm
Series Resistance (R1)	65~90 KΩ Max.
Level of Drive (DL)	0.1±0.01 uW Typ, 0.5 uW Max.
Aging (first year) (Δf / f0)	±3 ppm Max.
Quality Factor (Q)	30000~60000 Typ.
Shunt Capacitance (C0)	3~7 pF Max.
Load Capacitance (CL)	6, 7, 9, 12.5 pF (Please contact us)
Frequency Tolerance(f <sub>tol</sub> )	±20 ppm @ 25±5 °C
Insulation Resistance	500 MΩ Min. @ DC 100±15 V

Specifications subject to change without notice

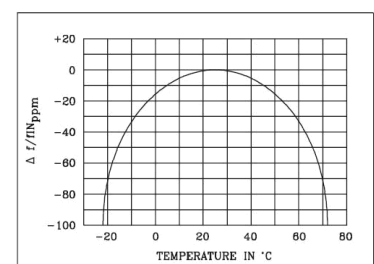
FREQ. vs. CAPACITANCE RATIO (C0/C1)



FREQ. vs. LOAD CAPACITANCE (TYP.)

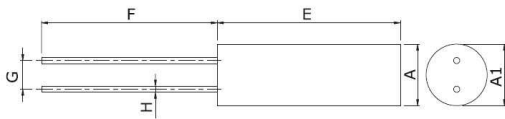


FREQ. vs. TEMPERATURE (TYP.)



Rev(3)06/2016

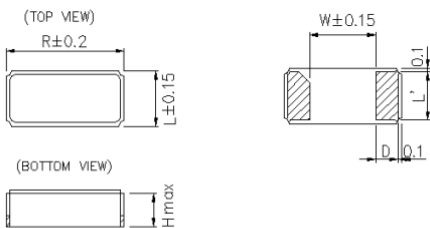
## DIMENSION (mm) – XA / XB Type



UNIT:mm

TYPE	A	A'	E	F	G	H
XA	3.0	3.1max	8.0max	10±1	0.8±0.2	∅0.32±0.07
XB-N	2.0	2.1max	6.0max	5.0min	0.7±0.2	∅0.28±0.05
XB-J	1.0	1.2max	4.6max	5.7min	0.3±0.05	∅0.18±0.03

## DIMENSION (mm) – XD Type

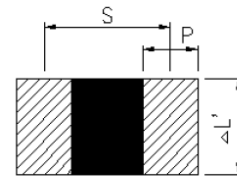


Internal connection



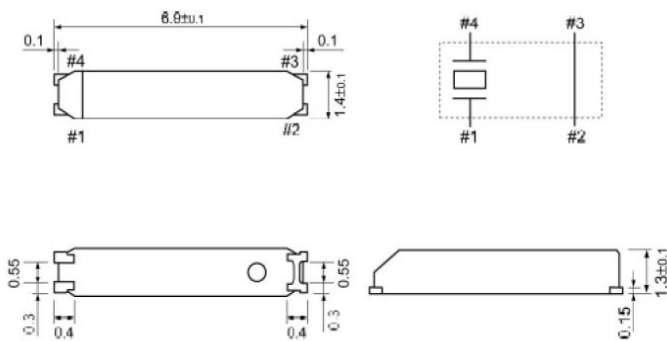
Model	R	L	H	W	L'	D	S	P	∠L'
4115	4.1	1.5	0.9	2.7	1.3	0.6	3.4	1.1	1.8
3215	3.2	1.5	0.9	1.7	1.3	0.6	2.5	1.1	1.8
2012	2.0	1.2	0.6	0.8	1.0	0.5	1.4	0.6	1.1

## SOLDER PAD LAYOUT (mm)



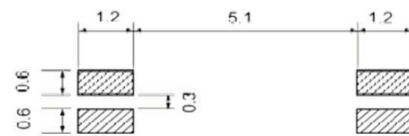
Do not design any patterns on shaded area  
 Recommended soldering pattern

## DIMENSION (mm) – XN Type

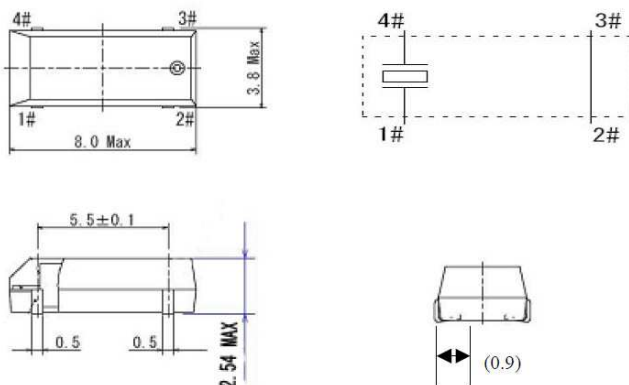


\* Do not connect to external with #2 and #3

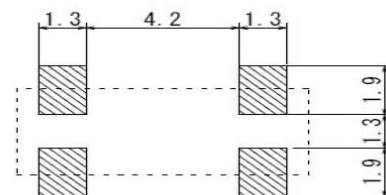
## SOLDER PAD LAYOUT (mm)



## DIMENSION (mm) – XN Type



## SOLDER PAD LAYOUT (mm)



# Model Numbering Guide – Crystal Units

## Available options

Type	package (mm)	Load Capacitance (pF)	Freq. Tol. @25°C (ppm)	Freq. Stability (ppm)	Temp. Range(°C)	Special Requirement	Oscillator Mode	Appearance	Lead Free	Dash	Freq. (MHz)
X: X'tal (MHz series)	3: 1.6x1.2 Z: 2.0x1.6 Y: 2.5x2.0 X: 3.2x2.5 V: 5.0x3.2 (4Pads) R: 6.0x3.5 2: 3.2x2.5 S: 5.0x3.2 (2Pads) Q: 8.0x4.5 I: 11.1x4.68 (U4) J: 13.0x4.85 (U4B)	L: 6 O: 7 A: 8 B: 9 C: 10 D: 12 E: 15 F: 16 G: 18 H: 20 P: 22 Q: 25 I: 30 J: 32 K: 50 N: No Standard S: Series	A: ±5 B: ±10 P: ±15 C: ±20 D: ±25 E: ±30 F: ±40 G: ±50 H: ±100 I: ±150	A: ±5 B: ±10 P: ±15 C: ±20 D: ±25 E: ±30 F: ±40 G: ±50 H: ±100 I: ±150 Z: ±150 above	A: +10~+40 B: +0~-55 E: +0~+85 I: -10~+60 C: -20~+70 D: -30~+85 L: -40~+85 M: -40~+95 J: -40~+105 H: -40~+125 G: -40~+150 F: -55~+125	A: For Automotive B: Spurious D: DLD N: No Special P: Pullability S: Several	A: AT Fundamental T: AT 3 <sup>rd</sup> Overtone	N: Normal	F: RoHS Compliant	-	XX.XXXXX
X: X'tal (32.768 kHz series)	A: 3.0x8.0 (Dip) B: 1.0x4.0 (Dip) /2.0x6.0 (Dip) D: 2.0x1.2 (2Pads) 3.2x1.5 (2Pads) /4.1x1.5 (2Pads) N: 6.9x1.4 (4Pads) /8.0x3.8 (4Pads)	L: 6 O: 7 B: 9 M: 12.5	C: ±20	H: ±100 I: ±150 Z: ±150 above	C: -20~+70 L: -40~+85	N: No Special	D: Tuning Fork	N: Normal (XA 3.0x8.0 size XB 2.0x6.0 size) J: XB 1.0x4.0 size C: XD 4.1x1.5 size D: XD 3.2x1.5 size M: XD 2.0x1.2 size E: XN 8.0x3.8 size H: XN 6.9x1.4 size	D: RoHS Compliant B: Non-RoHS Compliant	-	0.032768

**X Y C D D L N A N F – 40.000000**

\*Not all combinations of options are available.

### Example: XYCDDLNANF-40.000000

<b>Type</b>	X'tal
<b>Package</b>	2.5 x 2.0 mm
<b>Load Capacitance</b>	10 pF
<b>Freq. Tol.</b>	±25ppm
<b>Freq. Stability</b>	±25ppm
<b>Temp Range</b>	-40~+85 °C
<b>Special Requirement</b>	No Special
<b>Oscillator Mode</b>	AT Fundamental
<b>Appearance</b>	Normal Appearance
<b>Lead Free</b>	RoHS Compliant
<b>Frequency</b>	40.000000 MHz