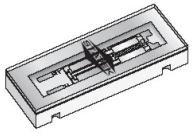
EUROQUARTZ

CX6VSM CRYSTAL

Miniature SMD Crystal for Pierce Oscillators 18kHz to 600kHz



FEATURES

- **Frequency Range 18kHz to 600kHz**
- **High shock resistance**
- **Low ageing**
- **Ultra low profile package (1mm)**
- **Full MIL testing available**

DESCRIPTION

CX6VSM crystals are leadless devices designed for surface mounting on PCBs or hybrid substrates. The crystals are intended for use in Pierce (single inverter) oscillator circuits.

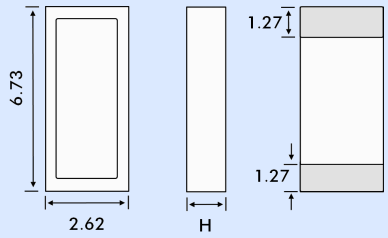
SPECIFICATION

Specifications stated are typical at 25°C unless otherwise indicated.
Specifications may change without notice.

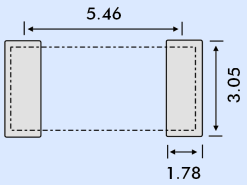
Frequency Range:	18.0kHz to 600.0kHz
Functional Mode:	Tuning Fork (Flexure)
Standard Calibration Tolerance[1]:	*see table*
Motional Resistance (R1):	*Figure 1* Max = 18~24.9kHz, 2x typical 25~600kHz, 2.5x typical
Motional Capacitance (C1):	*Figure 2*
Quality Factor (Q):	*Figure 3* Min. is 0.25x typical
Shunt Capacitance (C0):	1.4pF max.
Drive Level	
18~24.9kHz:	0.5µW max.
25~600.0kHz:	1.0µW max.
Turning Point (T_0)[2]:	*Figure 4*
Temperature Coefficient (k):	-0.035ppm/°C[2]
Ageing, first year:	5ppm max.
Shock, survival[3]:	1,500g peak, 0.3ms, ½ sine
Vibration, survival[3]:	10g rms, 20~2000Hz random
Operating Temperature Range	
Commercial:	-10° to +70°C
Industrial:	-40° to +85°C
Military:	-55 to +125°C
Storage Temperature Range:	-55° to +125°C
Maximum Process Temperature:	+260°C for 20 seconds

1. *Tighter frequency calibration is available.*
2. *Other turning point is available*
3. *Higher shock and vibration survival is available*

OUTLINE & DIMENSIONS



Suggested Solder Pattern



Dim. H	Glass Lid	Ceramic Lid
SM1	0.99	1.35
SM2	1.04	1.40
SM3	1.12	1.47
SM4	1.04	1.40
SM5	1.12	1.47

TERMINATIONS - PLATING

Designation	Termination
SM1	Gold Plated (Lead Free)
SM2	Solder Plated
SM3	Solder Dipped
SM4	Solder Plated (Lead Free)
SM5	Solder Dipped (Lead Free)

PACKAGING OPTIONS

CX6VSM crystals are available either tray packed (<250pcs) or tape and reel (>250 pieces).
16mm tape, 178mm or 330mm reels (EIA 418).

HOW TO ORDER CX6VSM CRYSTALS

CX6V - S - C - SM1 - 32.768K, 30 / M

- **S**: 'S' if special, custom design. Otherwise leave blank
- **C**: Blank = glass lid; C = ceramic lid
- **SM1**: Terminations — SM1 = Gold plated *; SM2 = Solder plated; SM3 = Solder dipped; SM4 = Solder plated *; SM5 = Solder dipped *; * = Lead free
- **32.768K**: Frequency, K = kHz
- **30**: Calibration Tolerance @25°C (in ppm)
- **M**: Temp. Range — C = -10° ~ +70°C; I = -40° ~ +85°C; M = -55° ~ +125°C; S = Customer specified

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STANDARD CALIBRATION TOLERANCE

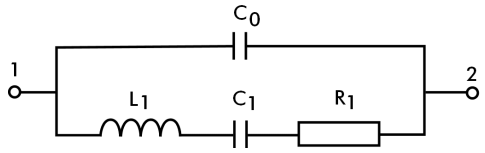
Frequency Range (kHz)			
18~74.9	75~169.9	170~249	250~600
±30ppm (0.003%)	±50ppm (0.005%)	±100ppm (0.01%)	±200ppm (0.02%)
±100ppm (0.01%)	±100ppm (0.01%)	±200ppm (0.02%)	±500ppm (0.05%)
±1000ppm (0.1%)	±1000ppm (0.1%)	±2000ppm (0.2%)	±5000ppm (0.5%)

LOAD CAPACITANCE (CL)*

Frequency Range (kHz)	Load Capacitance	Frequency Range (kHz)	Load Capacitance
18~24.9	10pF	100.1~179.9	5pF
25~54.9	9pF	180~600	4pF
55~100.0	8pF		

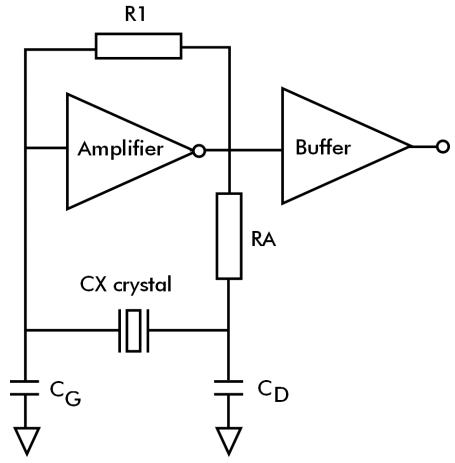
* The load capacitance we use to calibrate CX6VSM.
(Other CL is available.)

CRYSTAL EQUIVALENT CIRCUIT



R1 Motional Resistance
C1 Motional Capacitance
L1 Motional Inductance
C0 Shunt Capacitance

CONVENTIONAL CMOS PIERCE OSCILLATOR CIRCUIT



Turning Point Temperature

Note: Frequency f at temperature T is related to frequency F0 at turning point temperature To by:

$$\frac{f\text{-}fo}{fo} = k(T\text{-}To)^2$$

FIGURE 1
CX6V Typical Motional Resistance R1

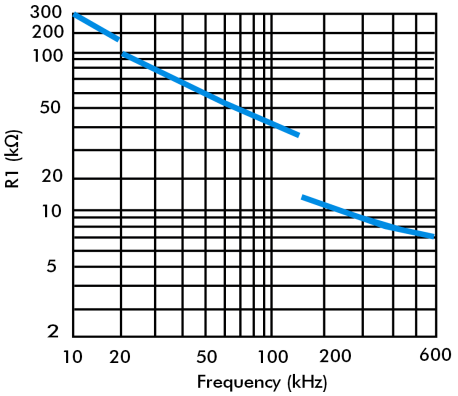


FIGURE 2
CX6V Typical Motional Capacitance C1

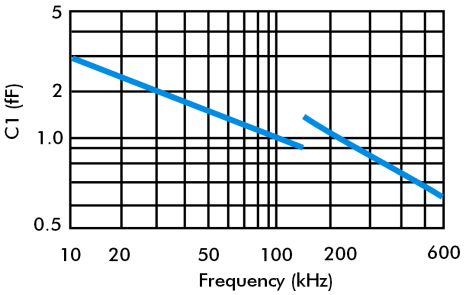


FIGURE 3
CX6V Typical Quality Factor (Q)

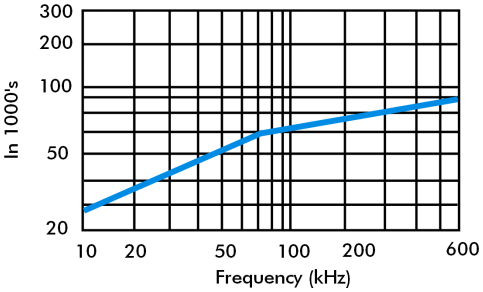
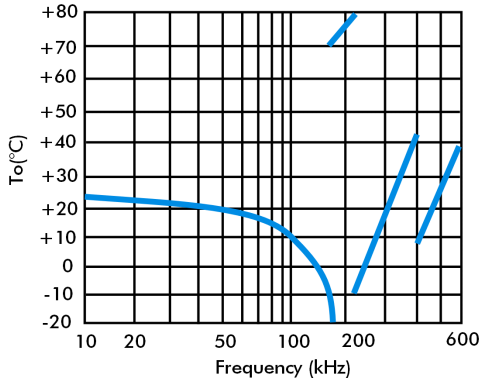


FIGURE 4
CX6V Typical Turning Point Temperature (To)



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