EUROQUARTZ

CX2HSM CRYSTAL

Miniature SMD Crystal for Series Oscillators 16kHz to 600kHz

FEATURES

- **Frequency Range 16kHz to 600kHz**
- **High shock resistance**
- **Low ageing**
- **Designed for low power applications**
- **Full MIL testing available**

DESCRIPTION

CX2HSM crystals consist of a high quality tuning fork resonator in a rugged, hermetically sealed ceramic package. CX2HSM crystals are intended for use in Series (two cascaded inverters) oscillator circuits.

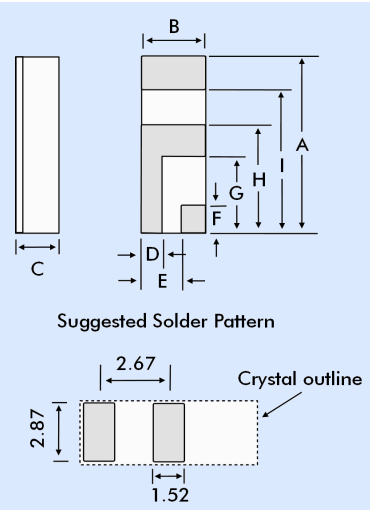
SPECIFICATION

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

Frequency Range:	16.0kHz to 600.0kHz
Standard Calibration Tolerance*:	*see table*
Motional Resistance (R_1):	*Figure 1* Max = 16~169.9kHz, 2x typical 170~600kHz, 2.5x typical
Motional Capacitance (C_1):	*Figure 2*
Quality Factor (Q):	*Figure 3* Min. is 0.25x typical
Shunt Capacitance (C_0):	2.0pF max.
Drive Level	
16~24.9kHz:	1.5µW max.
25~600.0kHz:	3.0µW max.
Turning Point (T_0)**:	*Figure 4*
Temperature Coefficient (k):	-0.035ppm/°C²
Ageing, first year:	5ppm max.
Shock, survival***:	1,500g, 0.3ms, ½ sine
Vibration, survival***:	10g rms, 20~2000Hz
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

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

OUTLINE & DIMENSIONS



Dim.	Typ.	Max.
A	6.60	6.99
B	2.39	2.74
C	see below	
D	0.89	1.14
E	1.50	1.75
F	1.27	1.52
G	2.67	2.92
H	3.94	4.19
I	5.33	5.59

Dim. C	Glass Lid	Ceramic Lid
SM1	1.65	1.91
SM2	1.70	1.96
SM3	1.78	2.03
SM4	1.70	1.96
SM5	1.78	2.03

STANDARD CALIBRATION TOLERANCE

Frequency Range (kHz)			
16~74.9	75~169.9	170~249.9	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%)

PACKAGING OPTIONS

CX2HSM crystals are available either tray packed (<250pcs) or tape and reel (>250 pieces).
16mm tape, 178mm or 330mm reels (EIA 418).

HOW TO ORDER CX2HSM CRYSTALS

CX2H - S - C - SM1 - 32.768K 30 / I

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

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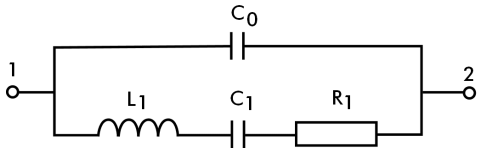
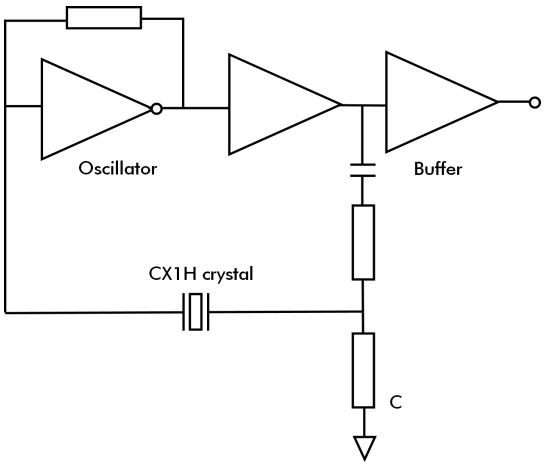
CRYSTAL EQUIVALENT CIRCUIT



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

CONVENTIONAL SERIES OSCILLATOR CIRCUIT



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)

Turning Point Temperature

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

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

FIGURE 1
CX2H Typical Motional Resistance R1

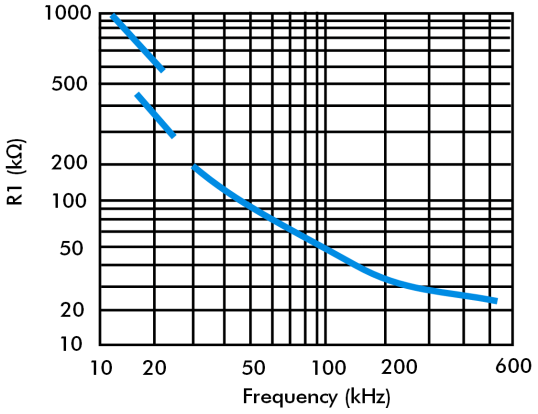


FIGURE 2
CX1H Typical Motional Capacitance C1

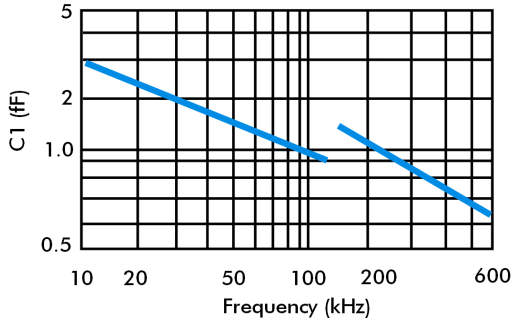


FIGURE 3
CX2H Typical Quality Factor (Q)

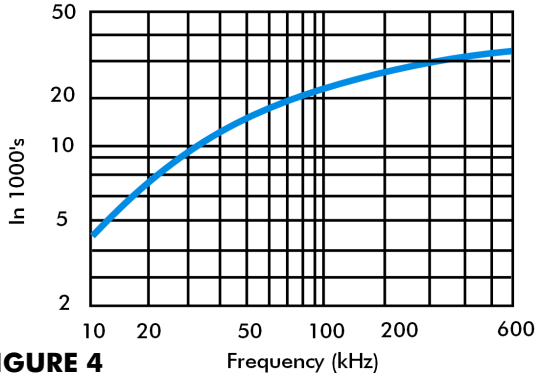
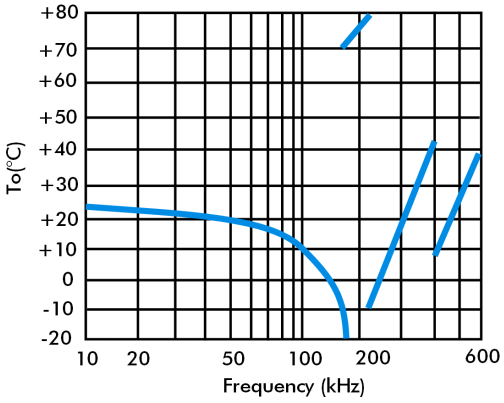


FIGURE 4
CX2H Typical Turning Point Temperature (To)



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