

Quartz Crystals

Surface Mount		Thru - Hole type		32.768 KHz	Frequency Tolerance options		
X2012	X3215	T26	T38		± 5 ppm	± 10 ppm	± 20 ppm
[2.05 * 1.2 * 0.55 mm]	[3.2 * 1.5 * 0.8 mm]	[2.0 ϕ * 6.0 mm]	[3.0 ϕ * 8.0 mm]				

Features

Specifications

Ultra compact, thin, and light weight tuning fork crystal unit

- Excellent heat resistance and environmental characteristics
- Excellent electrical performance optimum for mobile communications, OA (office automation) and AV (audiovisual) applications
- RoHS Compliant. Meets the re-flow profiling requirements using lead-free solder



General Specifications

Frequency Range	32.768 KHz			
Hold type	Surface Mount Type		Thru - Hole Type	
Item / Type	X2012	X3215	T26	T38
Package sizes	[2.05 * 1.2 * 0.55 mm]	[3.2 * 1.5 * 0.8 mm]	[2.0 ϕ * 6.0 mm]	[3.0 ϕ * 8.0 mm]
Shunt Capacitance	1.3 pF typ. / 1.5 pF max.	1.0 pF typ. / 1.6 pF max.	1.5 pF max.	0.9 pF max.
Equivalent series resistance	80 K Ω max.		40 K Ω max.	35 K Ω max.
Temperature coefficient	$-0.04 \times 10^{-6} / ^\circ\text{C}^2$ max.		$-0.035 \times 10^{-6} / ^\circ\text{C}^2$ max.	
Drive Level	0.1 μ W typical (0.5 μ W max.)		1.0 μ W typical	
Operating Temperature Range	- 40 $^\circ\text{C}$ to 85 $^\circ\text{C}$		- 10 $^\circ\text{C}$ to 60 $^\circ\text{C}$	
Storage Temperature Range	- 40 $^\circ\text{C}$ to 125 $^\circ\text{C}$		- 40 $^\circ\text{C}$ to 85 $^\circ\text{C}$	
Crystal Cut	XT - Cut			
Load Capacitance	7 pF , 9 pF or 12.5 pF			
Frequency Tolerance	± 5 ppm , ± 10 ppm , ± 20 ppm (max.) at 25 $^\circ\text{C}$			
Turning POINT	+ 25 $^\circ\text{C}$ \pm 5 $^\circ\text{C}$			
Insulation resistance	500 M Ω min.			

Outline Dimensions (Unit : mm)

X2012	X3215
T26	T38
<p style="text-align: center;">Frequency (Hz)</p>	<p style="text-align: center;">Frequency (Hz)</p>

Part Number Formats and Product Marking Rules

Quartz Crystals

Holder Type

SMD type :	X11	X21	X22	X32	X42	MJ	MF	MQ	M49	ML49	MP5	MP4	MP25	MP24	
Dip type :	H49	HUS	HUSL	U1	U5	T38	T26								
Jacket type :	H49MJ	49TMJ	U1MJ	U5MJ	T26MJ										
Gull wing :	H49SM	49TSM	U1SM	U5SM	T26SM										

Part Number Format

	[1] Holder Type	-	[2] Center Freq.	-	[3] CL	-	[4] Freq. Tolerance	/	[5] Freq. Stability	[6] Operating Temp. Range Code	/	[7] Special ESR
Example (1)	H49	-	40.000A3	-	12	-	30	/	30	X		
(2)	X32	-	26.000	-	16	-	30	/	30	X	/	20R
(3)	MJ	-	12.000	-	20	-	10	/	10	W		
(4)	M49	-	24.000	-	18	-	20	/	30	H	/	15R

Ex (1) : H49 - 40.000A3 - 12 [49/U type , 40.000MHz , AT-cut 3rd overtone , 12pF , ±30ppm (25°C) , ±30ppm (-10°C to 60°C)]

Ex (2) : X32 - 26.000 - 16 / 20R [X32 type , 26.000MHz , 16pF , ±30ppm (25°C) , ±30ppm (-10°C to 60°C) , 20 Ω]

Ex (3) : MJ - 12.000 - 20 - 10 / 10 W [MJ type , 12.000MHz , 20pF , ±10ppm (25°C) , ±10ppm (0°C to 50°C)]

Ex (4) : M49 - 24.000 - 18 - 20 / 30 Y4 [M49 type , 24.000MHz , 18pF , ±20ppm (25°C) , ±30ppm (-30°C to 85°C) , 15 Ω]

[1]	Holder Type
[2]	Center frequency . Please add " A3 , A5 or B " after the " Freq. in MHz " for the quartz cut other options . Blank : AT-cut fund. mode ; A3 : AT-cut 3rd overtone ; A5 : AT-cut 5th overtone ; B : BT-cut fund. mode
[3]	Load Capacitance (CL) : series (spec. code is " S ") or Parallel (If parallel , please specify CL value , typical CL ranges from 8 to 32 pF)
	Available Options " V " = Vinyl sleeve around holder , " K " = 3rd lead at bottom center , " R " = On reel " G " = 3rd lead at top center , " I " = Teflon insulator at bottom
[4]	Calibration tolerance value : freq. tolerance value (at 25°C) , industrial temp. range
[5]	Frequency Stability , industrial temp. range
[6]	Temp. Range
	Options
[7]	If non-standard please enter the desired ESR (Equivalent Series Resistance) after " / " , for example " 20R " : 20Ω

Production Marking Rules

General X'tal package type marking rules	MQ, MF, MJ, X42 marking rules	X22, X32 marking rules																																																												
<p>(Cutting method) : A : AT-cut (fundamental) B : BT-cut (fundamental) 3 : AT-cut (3rd overtone) 5 : AT-cut (5th overtone)</p>	<p>(Cutting method) : A : AT-cut , fundamental B : BT-cut , fundamental 3 : AT-cut , 3rd overtone 5 : AT-cut , 5rd overtone</p>	<p>X21 marking rules</p>																																																												
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