

Quartz Crystals

X11

[1.6 * 1.2 * 0.4 mm]

X21

[2.0 * 1.6 * 0.5 mm]

X22

[2.5 * 2.0 * 0.6 mm]

X32

[3.2 * 2.5 * 0.7 mm]

Surface Mount

X11, X21, X22, X32

Fundamental

X32

3rd Overtone

Features

Specifications

- The entire package can be grounded via the top metal lid and the two bottom pads
- Small footprint. Ideal for space constrained applications
- Exhibits extremely low aging with a high shock & vibration resistance



General Specifications

Item / Type	X11 (1.6 * 1.2 * 0.4 mm)	X21 (2.0 * 1.6 * 0.5 mm)	X22 (2.5 * 2.0 * 0.6 mm)	X32 (3.2 * 2.5 * 0.7 mm)
Frequency Range	24.0 ~ 48.0 MHz (Fund.)	20.0 ~ 54.0 MHz (Fund.)	12.0 ~ 60.0 MHz (Fund.)	8 ~ 54.0 MHz (Fund.) 40 ~ 200 MHz (3rd Overtone)
Crystal Cut // Load Capacitance	AT - Cut // Series or Parallel (8 to 32 pF) resonance			
Drive Level	10 μ W (typ.) 100 μ W (max.)			
Frequency Tolerance	\pm 10 ppm , \pm 20 ppm or \pm 30 ppm (max.) at 25°C			
Aging	Δ F / F : \pm 3 ppm / year (max.)			
Storage Temperature Range	- 50°C to 105°C			

ESR (Equivalent Series Resistance)

X11		X21		X22		X32		
Frequency Range	E. S. R.	Frequency Range	E. S. R.	Frequency Range	E. S. R.	Frequency Range	E. S. R.	Oscillator Mode
24.0 ~ 29.9 MHz	120 Ω max.	20.0 ~ 23.9 MHz	120 Ω max.	12.0 ~ 15.9 MHz	300 Ω max.	8.0 ~ 9.9 MHz	600 Ω max.	Fund. Mode
30.0 ~ 39.9 MHz	100 Ω max.	24.0 ~ 29.9 MHz	100 Ω max.	16.0 ~ 29.9 MHz	100 Ω max.	10.0 ~ 11.9 MHz	200 Ω max.	
40.0 ~ 48.0 MHz	80 Ω max.	30.0 ~ 37.9 MHz	80 Ω max.	30.0 ~ 60.0 MHz	70 Ω max.	12.0 ~ 29.9 MHz	100 Ω max.	
		38.0 ~ 54.0 MHz	60 Ω max.			30.0 ~ 54.0 MHz	60 Ω max.	3rd Overtone
						40.0 ~ 200.0 MHz	80 Ω max.	

Frequency stability Vs Operating temperature range

Frequency stability Vs Operating temperature range							
Stability code	Temp. (°C) \ ppm	\pm 5	\pm 10	\pm 15	\pm 20	\pm 25	\pm 30
X	-10 to 60°C	▲	○	○	○	○	○
Y	-20 to 70°C		○	○	○	○	○
I	-40 to 85°C			○	○	○	○

○ : available

▲ : contact Mercury

Outline Dimensions (Unit : mm)

X11	X21
<p>Pad Connections : Pad 1 and 3 : Crystal Chamfered pad is pad No. 4</p>	<p>Pad Connections : Pad 1 and 3 : Crystal Chamfered pad is pad No.2 or 4</p>
X22	X32
<p>Pad Connections : Pad 1 and 3 : Crystal Chamfered pad is pad No. 1 or 3</p>	<p>Pad Connections : Pad 1 and 3 : Crystal Chamfered pad is pad No. 1 or 4</p>

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Quartz Crystals

MJ

5.0 * 3.2 * 0.8 mm

MQ

7.0 * 5.0 * 1.0 mm

Surface Mount

MJ , MQ

Fundamental

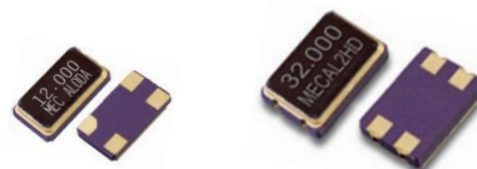
MJ , MQ

3rd Overtone

Features

Specifications

- Exhibits extremely low aging with a high shock and vibration resistance
- The entire package can be grounded via the top metal lid and the two bottom pads
- This low 0.7mm package height is ideal for height constrained applications



General Specifications

Item / Type	MJ series	MQ series
Package Dimensions	(5.0 * 3.2 * 0.8 mm)	(7.0 * 5.0 * 1.0 mm)
Frequency Range	8.0 ~ 52.0 MHz (Fund.)	6.0 ~ 50.0 MHz (Fund.)
	40.0 ~ 200.0 MHz (3rd)	40.0 ~ 200.0 MHz (3rd)
Crystal Cut	AT - Cut ; 3rd overtone	
Load Capacitance	Series or Parallel (8 to 32 pF) resonance	
Drive Level	10 μ W (typ.) 100 μ W (max.)	
Frequency Tolerance	\pm 10 ppm , \pm 20 ppm or \pm 30 ppm (max.) at 25°C	
Aging	Δ F / F : \pm 3 ppm / year (max.)	
Storage Temp. Range	- 50°C to 105°C	

ESR (Equivalent Series Resistance)

MJ			MQ		
Freq. (MHz)	E.S.R.	Mode	Freq. (MHz)	E.S.R.	Mode
8.0 ~ 9.9 MHz	150 Ω	Fund.	6.0 ~ 8.0	80 Ω	Fund.
10.0 ~ 14.9 MHz	80 Ω		8.1 ~ 11.0	60 Ω	
15.0 ~ 19.9 MHz	50 Ω		11.1 ~ 14.0	50 Ω	
20.0 ~ 52.0 MHz	40 Ω		14.1 ~ 50.0	40 Ω	
40.0 ~ 200.0 MHz	80 Ω	3rd	40.1 ~ 50.0	80 Ω	3rd
			50.1 ~ 200.0	90 Ω	

Frequency stability Vs Operating temperature range

Frequency stability vs Operating temperature range							
Stability code	Temp. (°C) \ ppm	\pm 5	\pm 10	\pm 15	\pm 20	\pm 25	\pm 30
X	-10 to 60°C	○	○	○	○	○	○
Y	-20 to 70°C	▲	○	○	○	○	○
I	-40 to 85°C			○	○	○	○

○ : available

▲ : contact Mercury

Outline Dimensions (Unit : mm)

MJ	MQ
<p>Top View </p> <p>Bottom View </p> <p>Suggested Layout </p> <p>Pad connections : Pad 1 , 3 : Crystal Chamfered pad is pad No. 1 or 4</p>	<p>Top View </p> <p>Bottom View </p> <p>Suggested Layout </p> <p>Pad connections : Pad 1 , 3 : Crystal ; Pad 2 , 4 : Ground Chamfered pad is pad No. 4</p>

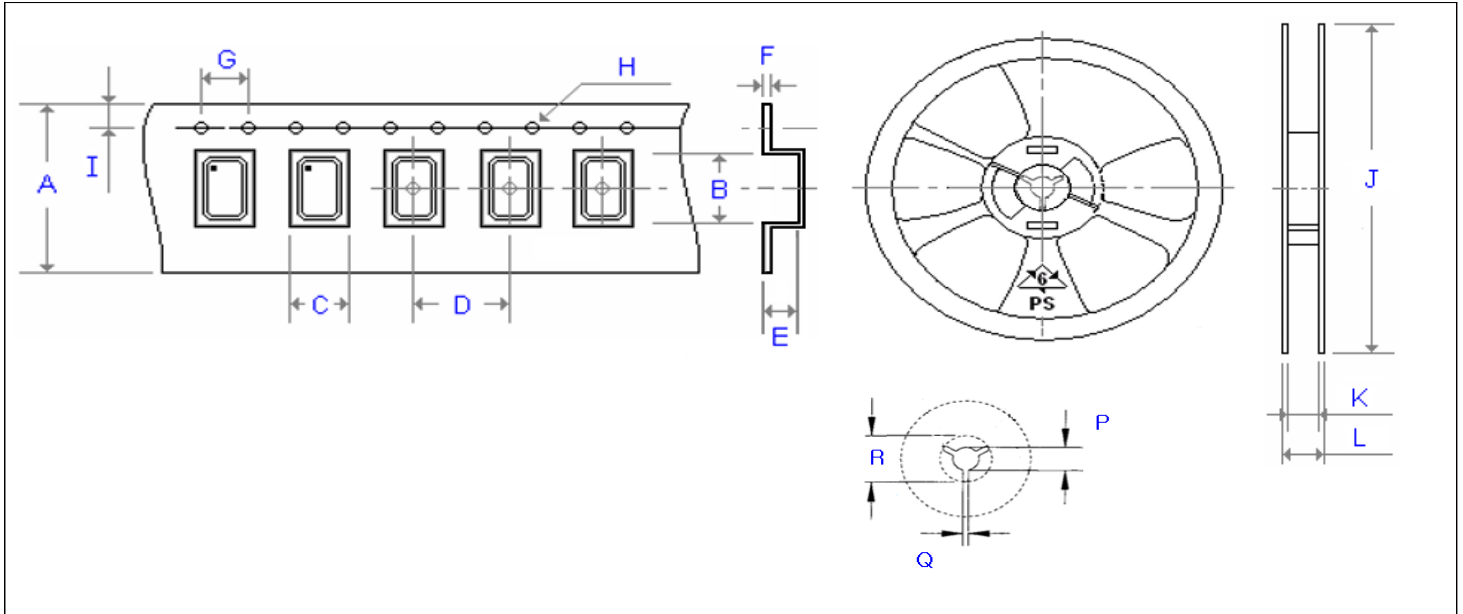
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Emboss Taping and Reel Specifications

[Crystal Units]

[M . C . F . Units]



Carrier Type Dimensions (unit : mm) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
X11	8.00	1.79	1.39	4.00	0.45	0.25	4.00	Ø 1.50	1.75	3000
X21	8.00	2.30	1.90	4.00	0.60	0.20	4.00	Ø 1.50	1.75	3000
X22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
X32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
X2012	8.00	2.25	1.45	4.00	0.75	0.25	4.00	Ø 1.50	1.75	3000
X3215	12.00	3.40	1.75	4.00	0.87	0.32	4.00	Ø 1.50	1.75	3000
MJ	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
MQ	16.00	7.20	5.40	8.00	1.80	0.30	4.00	Ø 1.50	1.75	1000
M49	24.00	15.00	5.00	12.00	4.25	0.40	4.00	Ø 1.50	1.75	1000
ML49	24.00	14.80	5.00	12.00	3.50	0.40	4.00	Ø 1.50	1.75	1000
MP4 (24)	24.00	13.30	5.10	12.00	4.20	0.40	4.00	Ø 1.50	1.75	1000
MP5 (25)	24.00	13.40	5.10	12.00	5.20	0.40	4.00	Ø 1.50	1.75	1000

Reel Dimensions (unit : mm) ±2mm

	J	K	L	P	Q	R	pcs / reel
X11	180.00	8.40	11.40	13.00	2.50	20.20	3000
X21	180.00	8.40	11.40	13.00	2.50	20.20	3000
X22	180.00	8.40	11.40	13.00	2.50	20.20	3000
X32	180.00	9.00	12.00	13.00	2.50	20.20	3000
X2012	180.00	9.00	11.40	13.00	2.50	20.20	3000
X3215	180.00	13.00	15.40	13.00	2.50	20.20	3000
MJ	180.00	13.00	16.00	13.00	2.50	20.20	1000
MQ	180.00	17.20	19.30	13.00	2.50	20.20	1000
M49	330.00	24.50	29.10	13.00	2.50	20.20	1000
ML49	330.00	24.50	29.10	13.00	2.50	20.20	1000
MP4 (24)	330.00	24.50	29.10	13.00	2.50	20.20	1000
MP5 (25)	330.00	24.50	29.10	13.00	2.50	20.20	1000

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