

# Quartz Crystals

**X42**

4.0 \* 2.5 \* 0.7 mm

**MJ**

5.0 \* 3.2 \* 0.75 mm

**MF**

6.0 \* 3.5 \* 1.0 mm

**MQ**

7.0 \* 5.0 \* 1.0 mm

Surface Mount

X42, MJ, MF, 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	X42 series	MJ series	MF series	MQ series
Package Dimensions	( 4.0 * 2.5 * 0.7 mm )	( 5.0 * 3.2 * 0.75 mm )	( 6.0 * 3.5 * 1.0 mm )	( 7.0 * 5.0 * 1.0 mm )
Frequency Range	12.0 ~ 60.0 MHz ( Fund. )	8.0 ~ 52.0 MHz ( Fund. ) 40.0 ~ 200.0 MHz ( 3rd )	7.3 ~ 60.0 MHz ( Fund. )	6.0 ~ 50.0 MHz ( Fund. ) 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 $\mu$ W typical ( 100 $\mu$ W max. )			
Frequency Tolerance	$\pm$ 10 ppm , $\pm$ 20 ppm or $\pm$ 30 ppm ( max. ) at 25°C			
Aging	$\Delta$ F / F : $\pm$ 3 ppm / year ( max. )			
Storage Temp. Range	- 50°C to 105°C			

## ESR ( Equivalent Series Resistance )

X42			MJ			MF			MQ		
Freq. ( MHz )	E.S.R.	Mode	Freq. ( MHz )	E.S.R.	Mode	Freq. ( MHz )	E.S.R.	Mode	Freq. ( MHz )	E.S.R.	Mode
12.0 ~ 14.9 MHz	80 $\Omega$	Fund.	8.0 ~ 9.9 MHz	150 $\Omega$	Fund.	7.3 ~ 11.9	80 $\Omega$	Fund.	6.0 ~ 8.0	80 $\Omega$	Fund.
15.0 ~ 29.9 MHz	50 $\Omega$		10.0 ~ 14.9 MHz	80 $\Omega$		12.0 ~ 15.9	60 $\Omega$		8.1 ~ 11.0	60 $\Omega$	
30.0 ~ 60.0 MHz	40 $\Omega$		15.0 ~ 19.9 MHz	50 $\Omega$		16.0 ~ 60.0	40 $\Omega$		11.1 ~ 14.0	50 $\Omega$	
			20.0 ~ 52.0 MHz	40 $\Omega$					14.1 ~ 50.0	40 $\Omega$	
			40.0 ~ 200.0 MHz	80 $\Omega$	3rd				40.1 ~ 50.0	80 $\Omega$	3rd
									50.1 ~ 200.0	90 $\Omega$	

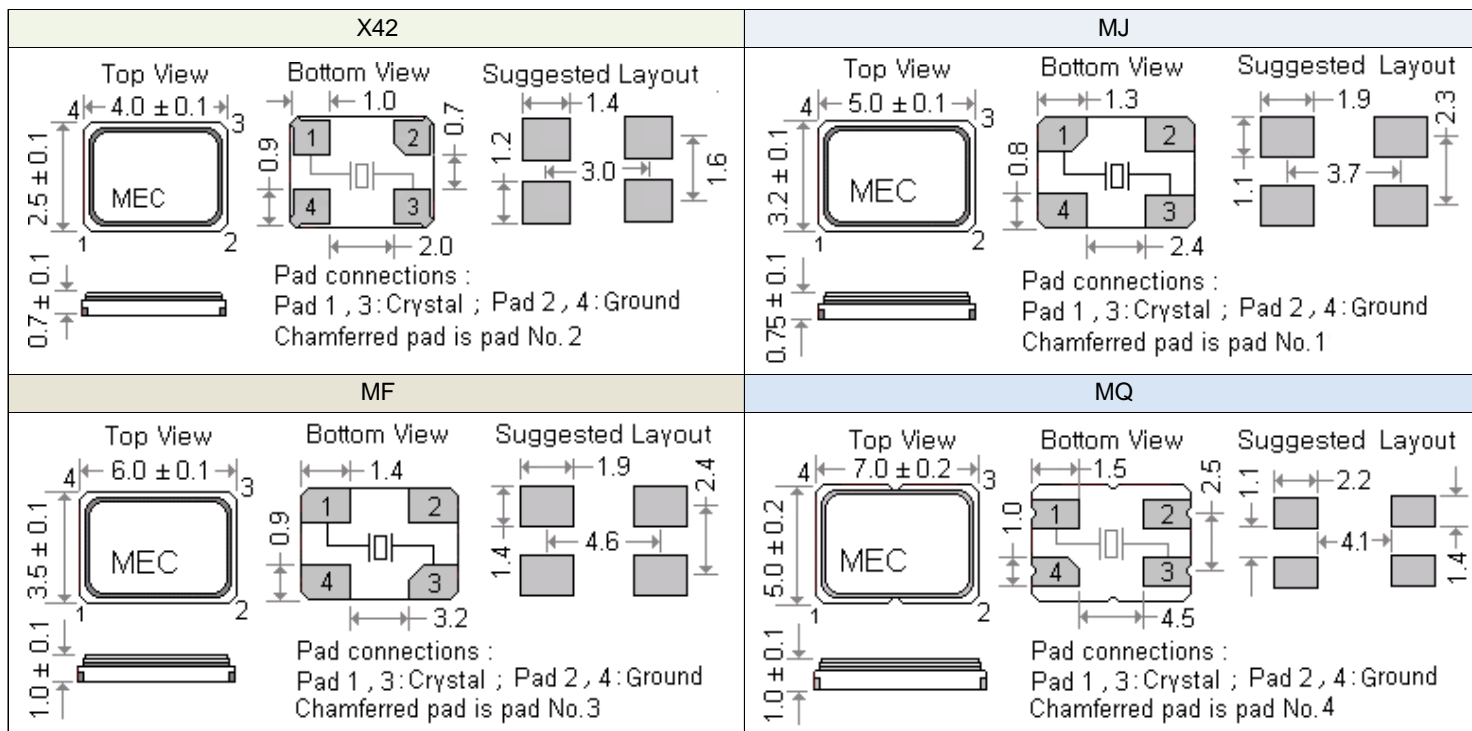
## Frequency stability Vs Operating temperature range

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 )



Mercury [www.mercury-crystal.com](http://www.mercury-crystal.com)

Taiwan : Tel: (+886)-2-2406-2779 / sales-tw@mercury-crystal.com

USA : Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com

China : Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

# 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 - 30 / 30 X [ 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 - 30 / 30 X / 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 H / 15R [ 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	W	0°C ~ +50°C	X	-10°C ~ +60°C	Y	-20°C ~ +70°C	F	-30°C ~ +70°C	G	-10°C ~ +80°C
		H	-30°C ~ +85°C	I	-40°C ~ +85°C	J	-40°C ~ +90°C	K	-40°C ~ +105°C	M	-55°C ~ +105°C
	Options	N	-55°C ~ +125°C	Z	Customized						
[ 7 ]	If non-standard please enter the desired ESR ( Equivalent Series Resistance ) after " / " , for example " 20R " : 20Ω										

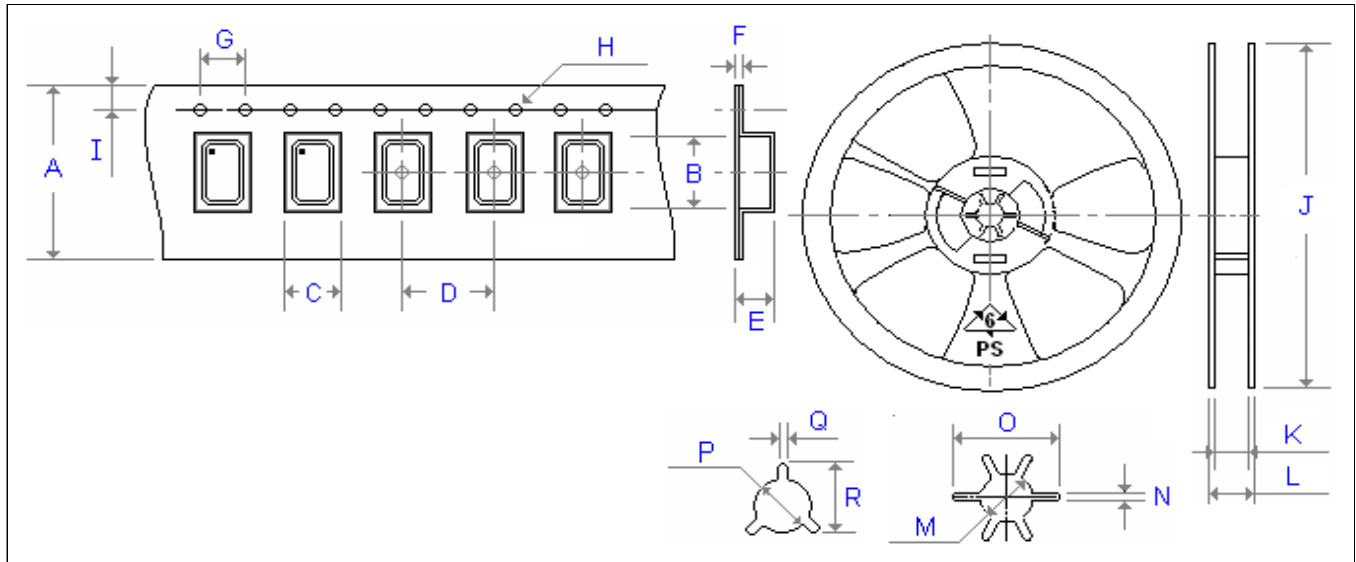
### Production Marking Rules

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>Lot code :                      ( month ) : Table 2                      ( Year ) :                      ex : 2020 --- 0                      2021 --- 1</p> <p>Load capacitance (CL) : Table 1</p>	<p>Mercury Logo</p> <p>( Cutting method ) :                      A : AT-cut , fundamental                      B : BT-cut , fundamental                      3 : AT-cut , 3rd overtone                      5 : AT-cut , 5th overtone</p> <p>Lot code :                      ( Month ) --- Table 2                      ( Year ) --- 2020 --- 0</p> <p>Load capacitance (CL) : Table 1</p>	<p>Mercury Logo</p> <p>( Month ) --- Table 2                      ( Year ) 2020 --- 0                      2021 --- 1</p> <p>Load capacitance (CL) : Table 1</p>																																																												
<h4>X21 marking rules</h4> <p>Mercury Logo</p> <p>( Month ) --- Table 2                      ( Year ) 2020 --- 0                      2021 --- 1</p> <p>Load capacitance (CL) : Table 1</p>																																																														
<table border="1" style="width: 100%;"> <tr> <th>Table 1</th> <th>CL</th> <th>&lt; 10</th> <th>10</th> <th>11</th> <th>12</th> <th>13</th> <th>14</th> <th>15</th> <th>16</th> <th>17</th> <th>18</th> <th>19</th> <th>20</th> <th>21</th> <th>22</th> <th>23</th> <th>24</th> <th>25</th> <th>26</th> <th>27</th> <th>28</th> <th>29</th> <th>30</th> <th>31</th> <th>32</th> <th>33</th> <th>34</th> <th>&gt;34</th> <th>Series</th> </tr> <tr> <td></td> <td>Code</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> <td>G</td> <td>H</td> <td>I</td> <td>J</td> <td>K</td> <td>L</td> <td>M</td> <td>N</td> <td>O</td> <td>P</td> <td>Q</td> <td>R</td> <td>S</td> <td>T</td> <td>U</td> <td>V</td> <td>W</td> <td>X</td> <td>Y</td> <td>Z</td> <td>a</td> <td>b</td> </tr> </table>	Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series		Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b		
Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series																																	
	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b																																	
<table border="1" style="width: 100%;"> <tr> <th>Table 2</th> <th>Month</th> <th>Jan.</th> <th>Feb.</th> <th>Mar.</th> <th>Apr.</th> <th>May</th> <th>Jun.</th> <th>Jul.</th> <th>Aug.</th> <th>Sep.</th> <th>Oct.</th> <th>Nov.</th> <th>Dec.</th> </tr> <tr> <td></td> <td>Code</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> <td>G</td> <td>H</td> <td>I</td> <td>J</td> <td>K</td> <td>L</td> </tr> </table>	Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.		Code	A	B	C	D	E	F	G	H	I	J	K	L																																		
Table 2	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.																																																	
	Code	A	B	C	D	E	F	G	H	I	J	K	L																																																	

## Emboss Taping and Reel Specifications

[ Crystal Units ]

[ M . C . F . Units ]



Carrier Type Dimensions ( unit : mm )

	A	B	C	D	E	F	G	H	I	pcs / reel
X11	8.0	1.8	1.4	4.0	0.5	0.3	4.0	Ø 1.55	1.75	3000
X21	8.0	2.3	1.9	4.0	0.6	0.2	4.0	Ø 1.50	1.75	3000
X22	8.0	2.7	2.3	4.0	1.2	0.3	4.0	Ø 1.50	1.75	3000
X32	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.50	1.75	3000
X42	12.0	4.3	2.8	8.0	1.0	0.3	4.0	Ø 1.55	1.75	1000
X2012	8.0	2.3	1.5	4.0	0.8	0.3	4.0	Ø 1.50	1.75	3000
X3215	12.0	3.4	1.7	4.0	1.0	0.3	4.0	Ø 1.50	1.75	3000
MJ	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
MF	16.0	6.3	3.8	8.0	1.4	0.3	4.0	Ø 1.50	1.75	1000
MQ	16.0	7.2	5.4	8.0	1.8	0.3	4.0	Ø 1.55	1.75	1000
M49	24.0	15.0	5.0	12.0	4.3	0.4	4.0	Ø 1.55	1.75	1000
ML49	24.0	14.8	5.0	12.0	3.5	0.4	4.0	Ø 1.55	1.75	1000
MP4 ( 24 )	24.0	13.3	5.1	12.0	4.2	0.4	4.0	Ø 1.55	1.75	1000
MP5 ( 25 )	24.0	13.4	5.1	12.0	5.2	0.4	4.0	Ø 1.55	1.75	1000

Reel Dimensions ( unit : mm )

	J	K	L	M	N	O	P	Q	R	pcs / reel
X11	180.0	9.0	12.0	-	-	-	13.2	2.1	-	3000
X21	180.0	9.0	12.0	-	-	-	13.2	2.1	-	3000
X22	180.0	9.0	12.0	-	-	-	13.2	2.1	-	3000
X32	180.0	9.0	12.0	-	-	-	13.2	2.1	-	3000
X42	180.0	13.0	16.0	-	-	-	13.2	2.5	-	1000
X2012	180.0	9.0	11.4	-	-	-	13.0	2.0	21.0	3000
X3215	180.0	13.0	15.4	-	-	-	13.0	-	-	3000
MJ	180.0	13.0	16.0	-	-	-	13.2	2.5	-	1000
MF	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
MQ	180.0	17.2	19.3	-	-	-	13.3	2.2	22.0	1000
M49	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000
ML49	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000
MP4 ( 24 )	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000
MP5 ( 25 )	330.0	25.0	30.0	-	-	-	13.4	2.5	19.5	1000