

Quartz Crystals

X11	X21	X22	X32	Surface Mount	X11, X21, X22, X32 Fundamental	X22, X32 3rd Overtone
1.65 * 1.25 * 0.30	2.05 * 1.65 * 0.50	2.55 * 2.05 * 0.60	3.20 * 2.50 * 0.70			

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	X21	X22	X32
Package Dimensions	(1.65 * 1.25 * 0.30 mm)	(2.05 * 1.65 * 0.50 mm)	(2.55 * 2.05 * 0.60 mm)	(3.20 * 2.50 * 0.70 mm)
Frequency Range	24.0 ~ 96.0 MHz (Fund.)	16.0 ~ 64.0 MHz (Fund.)	12.0 ~ 80.0 MHz (Fund.) 50 ~ 200 MHz (3rd Overtone)	8 ~ 96.0 MHz (Fund.) 50 ~ 200 MHz (3rd Overtone)
Crystal Cut // Load Capacitance	AT - Cut // Series or Parallel (8 to 32 pF) resonance			
Drive Level	10 μW (typ.) 100 μW (max.)			
Frequency Tolerance	± 10 ppm , ± 20 ppm or ± 30 ppm (max.) at 25°C			
Aging	ΔF / F : ± 3 ppm / year (max.)			
Storage Temperature Range	- 50°C to 125°C			

ESR (Equivalent Series Resistance)

X11		X21		X22			X32		
Frequency Range	E. S. R.	Frequency Range	E. S. R.	Frequency Range	E. S. R.	Oscillator Mode	Frequency Range	E. S. R.	Oscillator Mode
24.0 ~ 29.9 MHz	120 Ω max.	16.0 ~ 23.9 MHz	120 Ω max.	12.0 ~ 15.9 MHz	150 Ω max.	Fund. Mode	8.0 ~ 9.9 MHz	500 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	80 Ω max.		10.0 ~ 11.9 MHz	200 Ω max.	
40.0 ~ 96.0 MHz	80 Ω max.	30.0 ~ 37.9 MHz	80 Ω max.	30.0 ~ 80.0 MHz	60 Ω max.		12.0 ~ 29.9 MHz	80 Ω max.	
		38.0 ~ 64.0 MHz	60 Ω max.	50.0 ~ 200.0 MHz	80 Ω max.	3rd Overtone	30.0 ~ 96.0 MHz	40 Ω max.	
							50.0 ~ 200.0 MHz	60 Ω max.	3rd Overtone

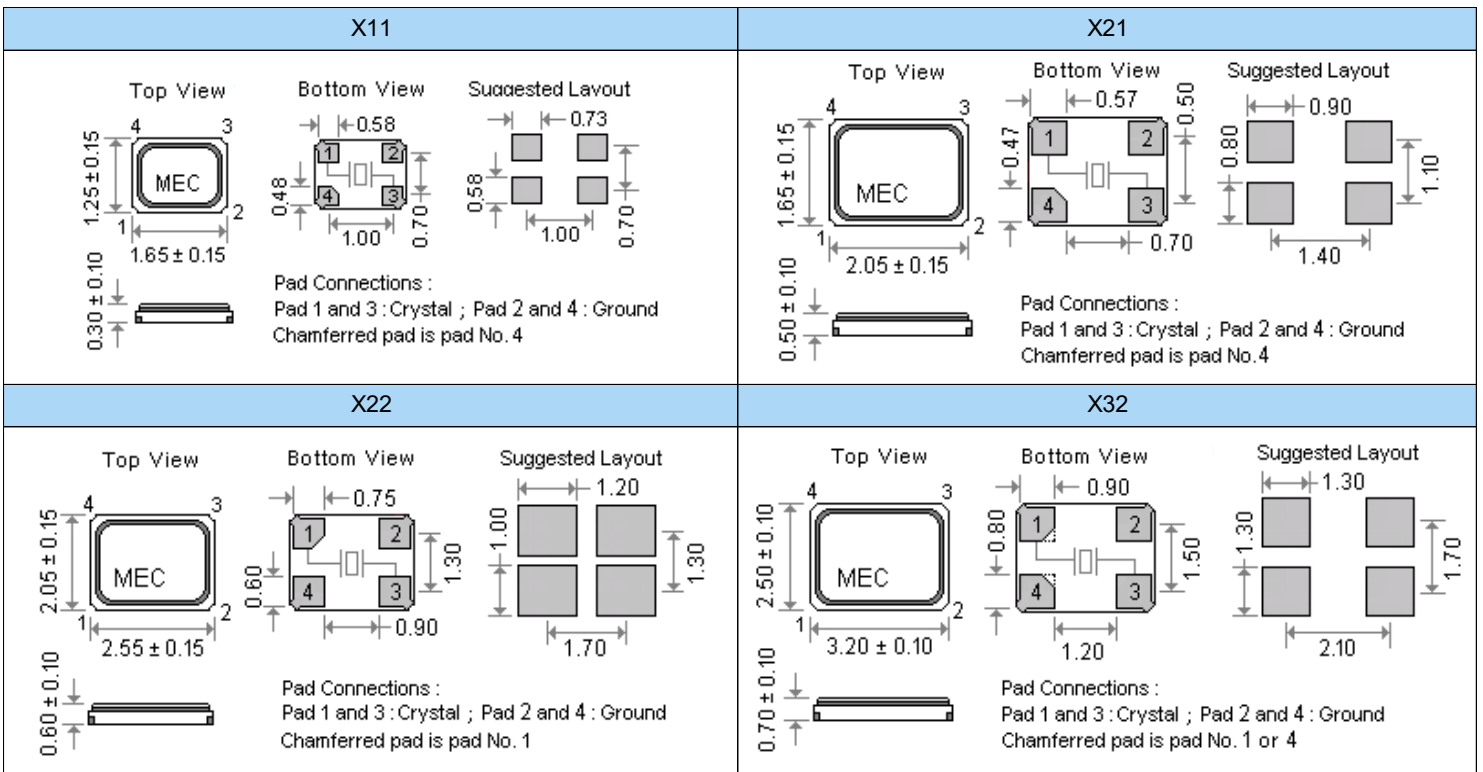
Frequency stability Vs Operating temperature range

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

○ : available

▲ : contact Mercury

Outline Dimensions (Unit : mm)



Quartz Crystals

MJ

5.0 * 3.2 * 0.9

MQ

7.0 * 5.0 * 1.0

Surface Mount

MJ , MQ

Fundamental

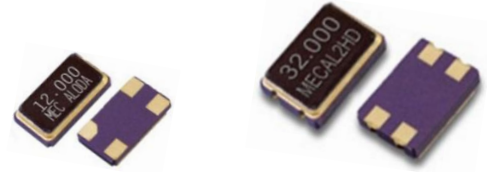
MJ , MQ

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



General Specifications

Item / Type	MJ series	MQ series
Package Dimensions	(5.0 * 3.2 * 0.9 mm)	(7.0 * 5.0 * 1.0 mm)
Frequency Range	8.0 ~ 52.0 MHz (Fund.)	6.0 ~ 50.0 MHz (Fund.)
	50.0 ~ 200.0 MHz (3rd)	45.0 ~ 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 125°C	

ESR (Equivalent Series Resistance)

MJ			MQ		
Freq. (MHz)	E.S.R.	Mode	Freq. (MHz)	E.S.R.	Mode
8.0 ~ 9.9	100 Ω	Fund.	6.0 ~ 8.0	80 Ω	Fund.
10.0 ~ 14.9	60 Ω		8.1 ~ 11.0	60 Ω	
15.0 ~ 19.9	50 Ω		11.1 ~ 14.0	50 Ω	
20.0 ~ 52.0	40 Ω		14.1 ~ 50.0	40 Ω	
50.0 ~ 200.0	80 Ω	3rd	40.1 ~ 45.0	60 Ω	3rd
			45.1 ~ 200.0	80 Ω	

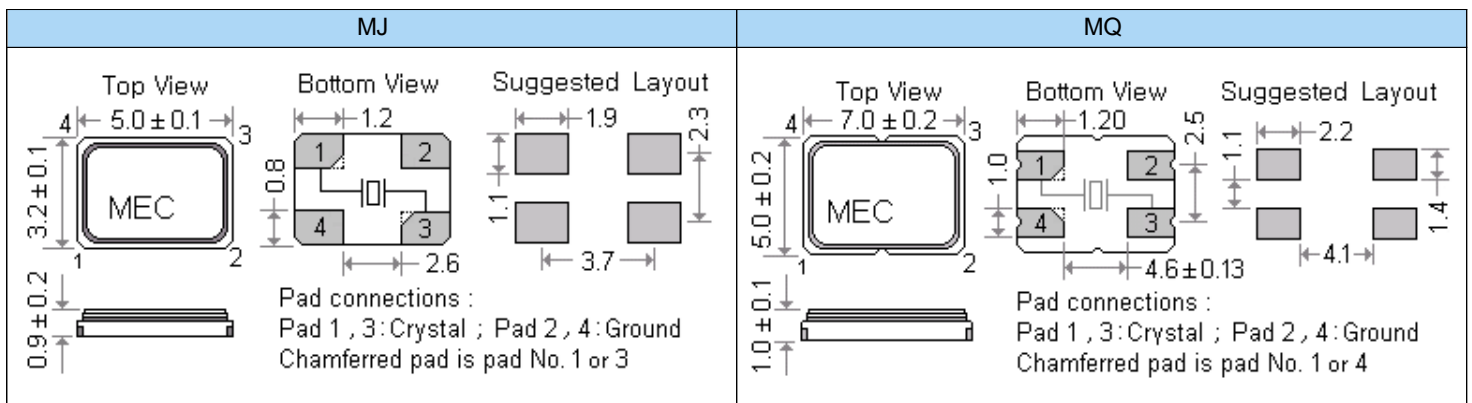
Frequency stability Vs Operating temperature range

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)



Part Number Formats and Product Marking Rules

Quartz Crystals

Holder Type

SMD type : X11 X21 X22 X32 MJ MQ M49 ML49 MP5 MP4 MP25 MP24

Dip type : H49 HUS HUSL U1 U5

Part Number Format and Example

	[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 ; SL : SL-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																														
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>W</td> <td>0°C ~ +50°C</td> <td>X</td> <td>-10°C ~ +60°C</td> <td>Y</td> <td>-20°C ~ +70°C</td> <td>F</td> <td>-30°C ~ +70°C</td> <td>G</td> <td>-10°C ~ +80°C</td> </tr> <tr> <td>H</td> <td>-30°C ~ +85°C</td> <td>I</td> <td>-40°C ~ +85°C</td> <td>J</td> <td>-40°C ~ +90°C</td> <td>K</td> <td>-40°C ~ +105°C</td> <td>L</td> <td>-40°C ~ +125°C</td> </tr> <tr> <td>M</td> <td>-55°C ~ +105°C</td> <td>N</td> <td>-55°C ~ +125°C</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	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	L	-40°C ~ +125°C	M	-55°C ~ +105°C	N	-55°C ~ +125°C						
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	L	-40°C ~ +125°C																						
M	-55°C ~ +105°C	N	-55°C ~ +125°C																												
	Temp. Range is -10°C to 60°C , for example " X "																														
[7]	If non-standard please enter the desired Temp. Range after " / " , for example " -20 + 60 " : -20°C to 60°C If non-standard please enter the desired ESR (Equivalent Series Resistance) after " / " , for example " 20R " : 20Ω																														

Production Marking Rules

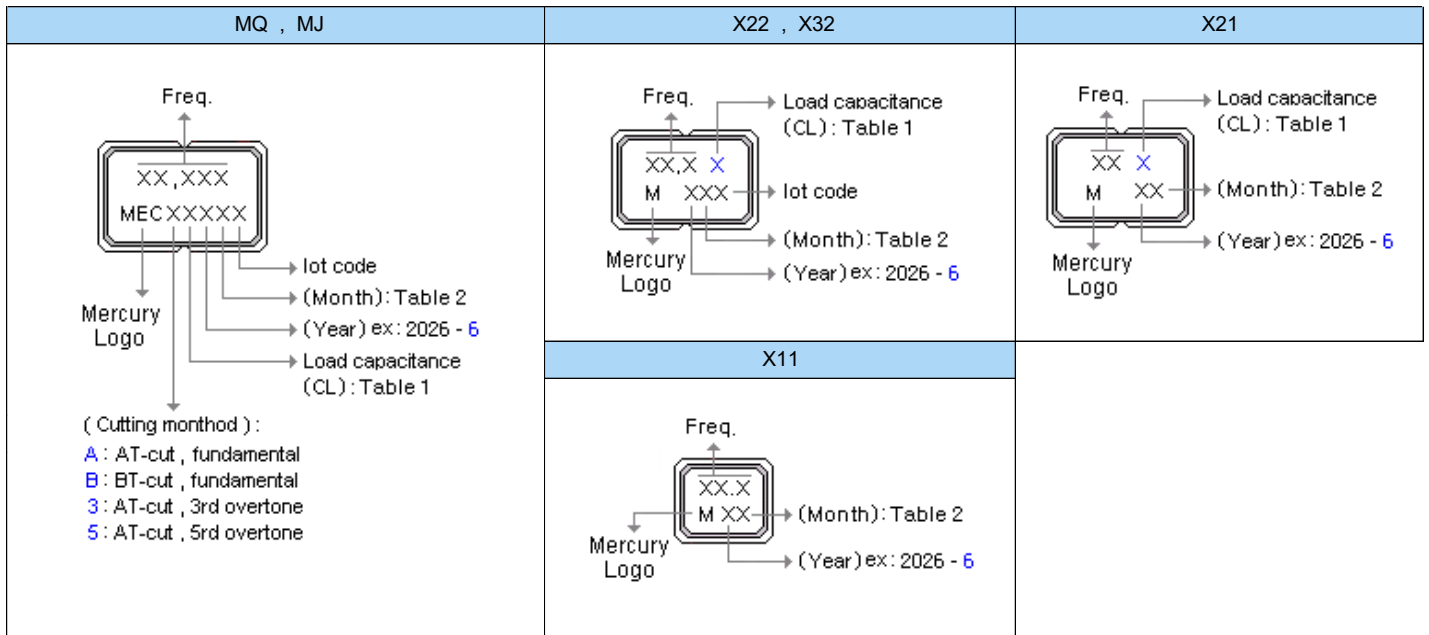


Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series
	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b

Table 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

Part Number Formats and Product Marking Rules

Quartz Crystals

Production Marking Rules

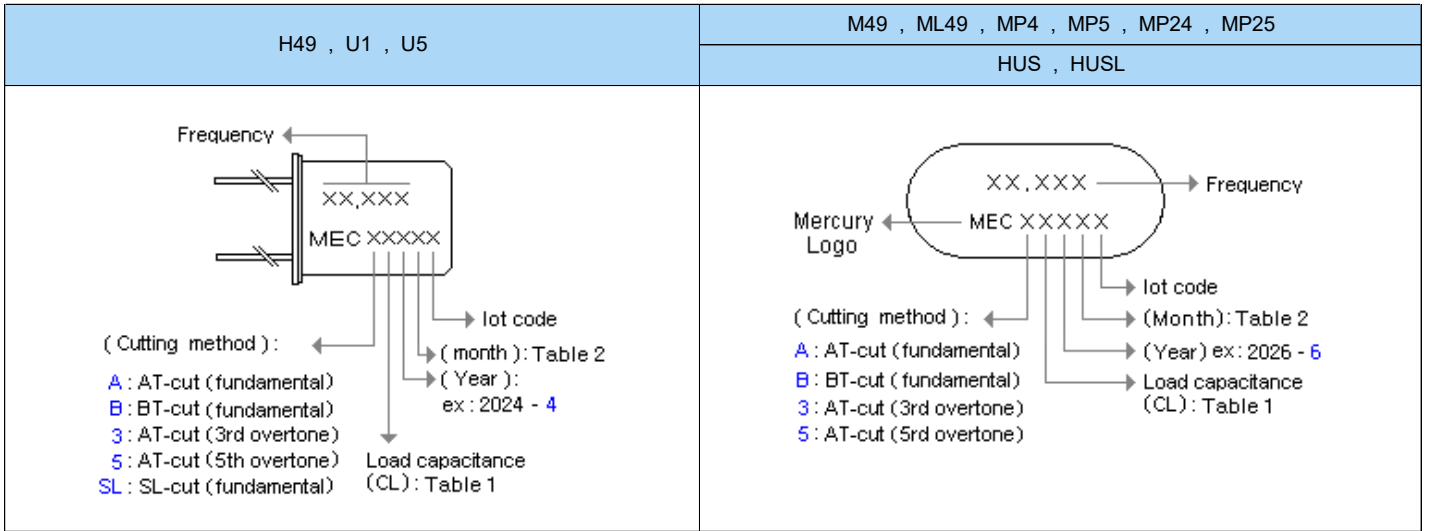


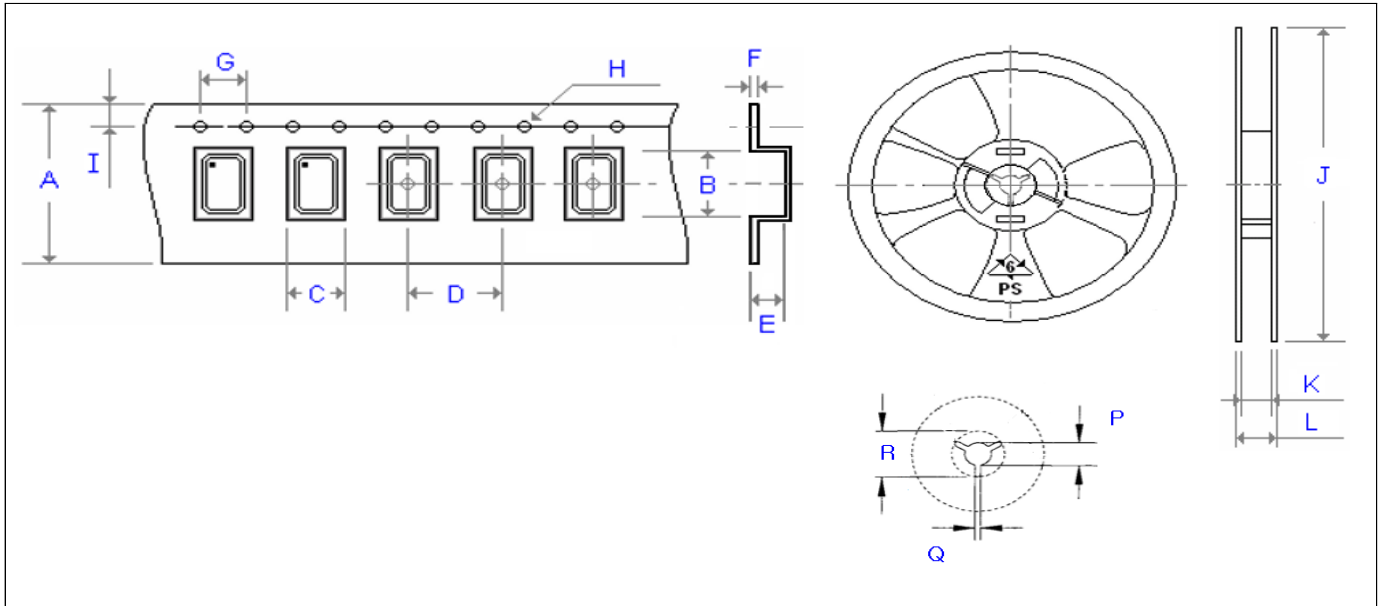
Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series
	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b

Table 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) ±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	1.70	4.00	1.00	0.30	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) +2.0 / -0.0mm

	J	K	L	P	Q	R	pcs / reel
X11	180.00	9.00	12.00	13.20	2.10	-	3000
X21	180.00	9.00	12.00	13.20	2.10	-	3000
X22	180.00	9.00	12.00	13.20	2.10	-	3000
X32	180.00	9.00	12.00	13.20	2.10	-	3000
X2012	180.00	9.00	12.00	13.20	2.10	-	3000
X3215	180.00	13.00	16.00	13.20	2.50	-	3000
MJ	180.00	13.00	16.00	13.20	2.50	-	1000
MQ	180.00	17.20	19.30	13.30	2.20	22.00	1000
M49	330.00	24.50	29.10	13.00	2.20	17.30	1000
ML49	330.00	24.50	29.10	13.00	2.20	17.30	1000
MP4 (24)	330.00	24.50	29.10	13.00	2.20	17.30	1000
MP5 (25)	330.00	24.50	29.10	13.00	2.20	17.30	1000