

Quartz Crystals

M49 , ML49

12.4 * 4.5 * 4.0 (3.0) mm

MP4 , MP5

12.9 * 4.5 * 5.0 (4.0) mm

MP24 , MP25

11.4 * 5.0 * 5.0 (4.0) mm

SMD

Fundamental

3rd Overtone

Min.

3.2 MHz

Max.

100 MHz

Features

Specifications

- Withstands solder reflow and available in EIA-481A tape and reel
- AT-strip crystal inside. Optimized for low spurious.
- Lowest cost among all Mercury SMD crystals
- Designed for top board assembly and an one time solder reflow only
- Do not mount with the metal housing downward



General Specifications

Item / Type	M49 (12.4 * 4.5 * 4.0 mm) series	MP4 (12.9 * 4.5 * 4.0 mm) series	MP5 (12.9 * 4.5 * 5.0 mm) series
	ML49 (12.4 * 4.5 * 3.0 mm) series	MP24 (11.4 * 5.0 * 4.0 mm) series	MP25 (11.4 * 5.0 * 5.0 mm) series
Frequency Range & Crystal Cut	3.200 ~ 48.000 MHz , AT-cut , Fundamental Mode (see Table 1) 30.000 ~ 100.000 MHz , AT-cut , 3rd overtone (see Table 1)		
Load Capacitance	Series or Parallel (8 to 32 pF) resonance		
Drive Level	100 μW (typ.) 500 μW (max.)		
Frequency Tolerance	± 10 ppm , ± 20 ppm or ± 30 ppm (max.) at 25°C		
Frequency Stability	See Table 2		
Aging	ΔF / F : ±3 ppm / year (max.)		
Storage Temperature Range	- 50°C to 105°C		

Table 1

ESR (Equivalent Series Resistance)					
Freq.(MHz)	E.S.R.	Osc. Mode	Freq.(MHz)	E.S.R.	Osc. Mode
3.2 ~ 3.4	300 Ω	AT , Fund.	30.1 ~ 50.0	100 Ω	AT , 3rd
3.5 ~ 6.0	120 Ω		50.1 ~ 100.0	80 Ω	
6.1 ~ 10.0	60 Ω				
10.1 ~ 48.0	40 Ω				

Table 2

Frequency stability Vs Operating temperature range						
Stability code	Temp. (°C) \ ppm	± 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)

[M49] ; [ML49]	[MP4] ; [MP5]	[MP24] ; [MP25]												
Side View Top View Bottom View Suggested Layout MEC P/N H (height) <table><tr><td>M 49</td><td>4.0 mm (max.)</td></tr><tr><td>ML 49</td><td>3.0 mm (max.)</td></tr></table> Poly Phenylene Sulfide Insulator	M 49	4.0 mm (max.)	ML 49	3.0 mm (max.)	Side View Top View Bottom View Suggested Layout MEC P/N H (height) <table><tr><td>MP 5</td><td>5.0 mm (max.)</td></tr><tr><td>MP 4</td><td>4.0 mm (max.)</td></tr></table> Plastic molded base Lead frame contacts	MP 5	5.0 mm (max.)	MP 4	4.0 mm (max.)	Side View Top View Bottom View Suggested Layout MEC P/N H (height) <table><tr><td>MP 25</td><td>5.0 mm (max.)</td></tr><tr><td>MP 24</td><td>4.0 mm (max.)</td></tr></table> Plastic molded base Lead frame contacts	MP 25	5.0 mm (max.)	MP 24	4.0 mm (max.)
M 49	4.0 mm (max.)													
ML 49	3.0 mm (max.)													
MP 5	5.0 mm (max.)													
MP 4	4.0 mm (max.)													
MP 25	5.0 mm (max.)													
MP 24	4.0 mm (max.)													

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
 X2012 X3215
 Dip type : H49 HUS HUSL U1 U5 T38 T26

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 ; 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	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
		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

General X'tal package type marking rules	MQ, MJ marking rules	X22 , X32 marking rules
 (Cutting method) : A : AT-cut (fundamental) B : BT-cut (fundamental) 3 : AT-cut (3rd overtone) 5 : AT-cut (5th overtone) SL : SL-cut (fundamental) Load capacitance (CL) : Table 1	 (Cutting method) : A : AT-cut , fundamental B : BT-cut , fundamental 3 : AT-cut , 3rd overtone 5 : AT-cut , 5th overtone	 X21 marking rules
X11 marking rules		

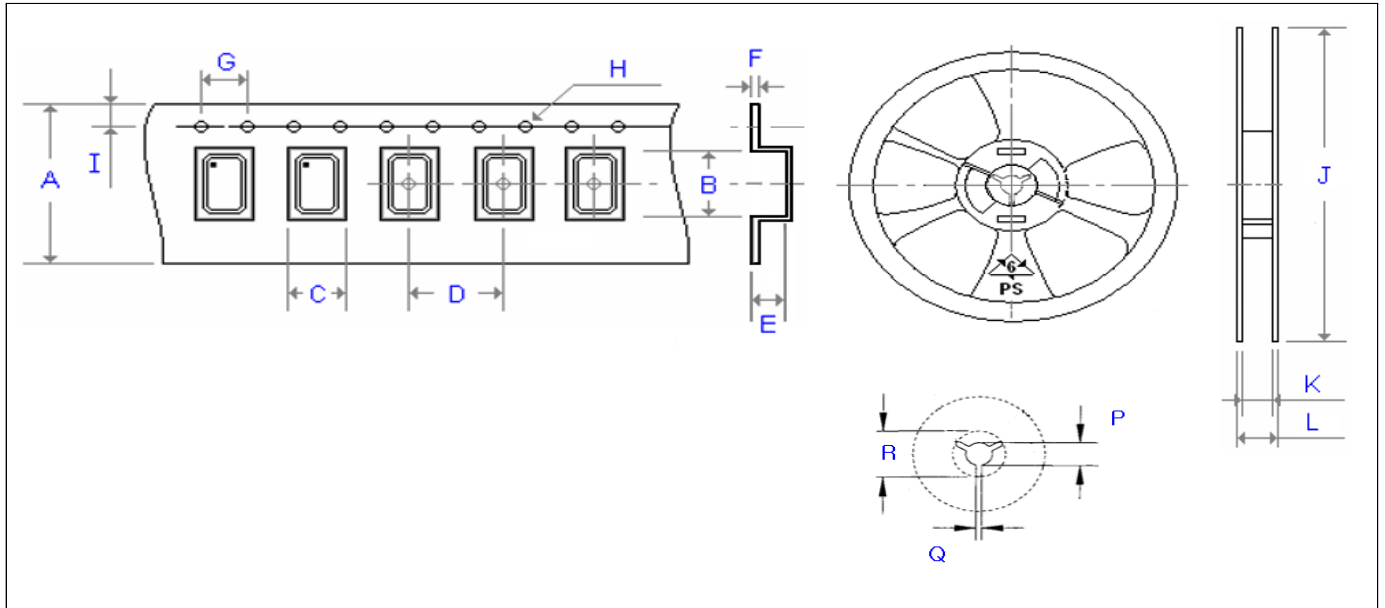
Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series
	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b

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