Quartz Crystals

M49 , ML49	MP4 , MP5	MP24 , MP25	SMD	Fundamental	3rd Overtone	Min.	Max.
12.4 * 4.5 * 4.0 (3.0) mm	12.9 * 4.5 * 5.0 (4.0) mm	11.4 * 5.0 * 5.0 (4.0) mm				3.2 MHz	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	△F / 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				

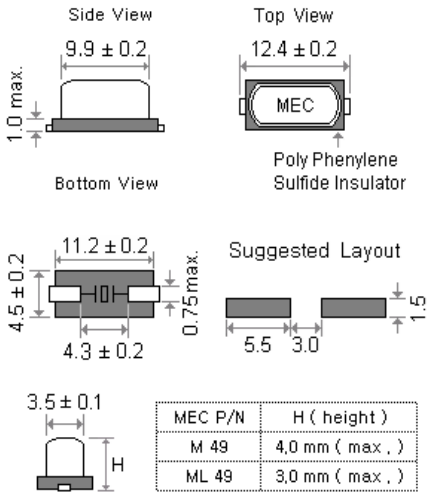
Table 2

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

○ : available ; ▲ : contact Mercury

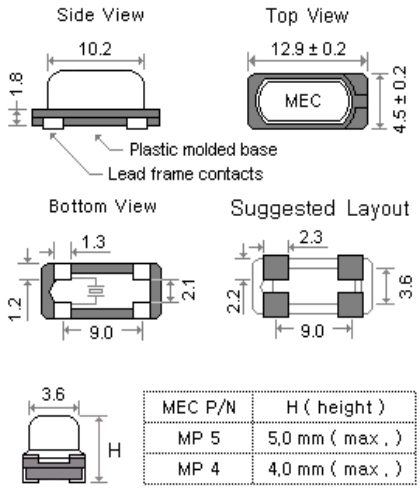
Outline Dimensions (Unit : mm)

[M49] ; [ML49]



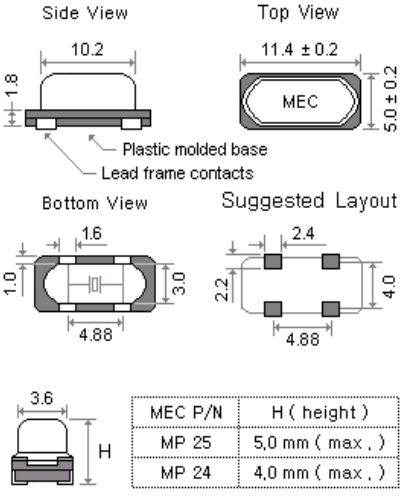
MEC P/N	H (height)
M 49	4,0 mm (max ,)
ML 49	3,0 mm (max ,)

[MP4] ; [MP5]



MEC P/N	H (height)
MP 5	5,0 mm (max ,)
MP 4	4,0 mm (max ,)

[MP24] ; [MP25]



MEC P/N	H (height)
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

Dip type : H49 | HUS | HUSL | U1 | U5

Part Number Format and Example

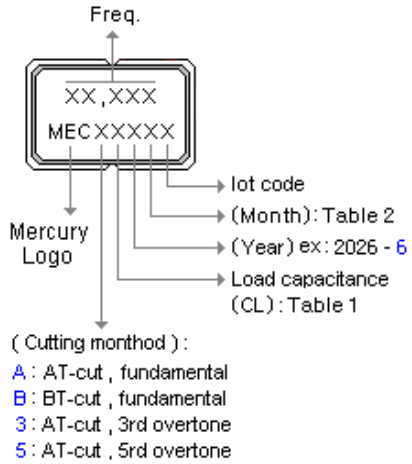
	[1] Holder Type	-	[2] Center Freq.	-	[3] CL	-	[4] Freq . Tolerance	/	[5] Freq. Stability	[6] Operating Temp. Range Code	/	[7] Special ESR
Example (1)	H49	-	40.000A3	-	12	-	30	/	30	X		
(2)	X32	-	26.000	-	16	-	30	/	30	X	/	20R
(3)	MJ	-	12.000	-	20	-	10	/	10	W		
(4)	M49	-	24.000	-	18	-	20	/	30	H	/	15R

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	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												

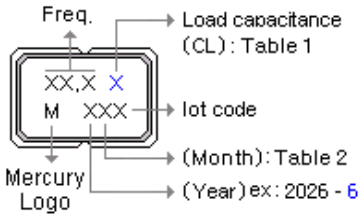
Production Marking Rules

MQ , MJ

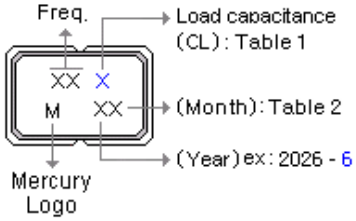


(Cutting monthod) :
A : AT-cut , fundamental
B : BT-cut , fundamental
3 : AT-cut , 3rd overtone
5 : AT-cut , 5rd overtone

X22 , X32



X21



X11

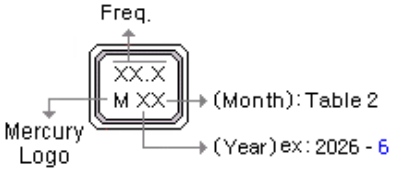


Table 1	CL	< 10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	>34	Series
	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b

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

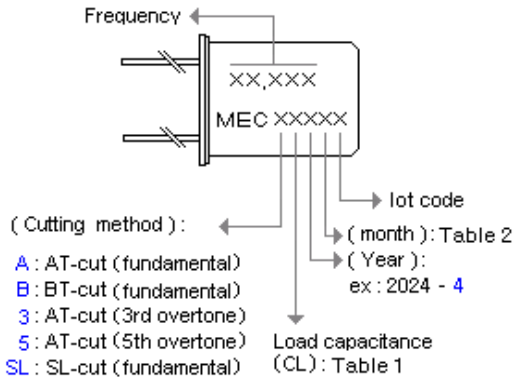
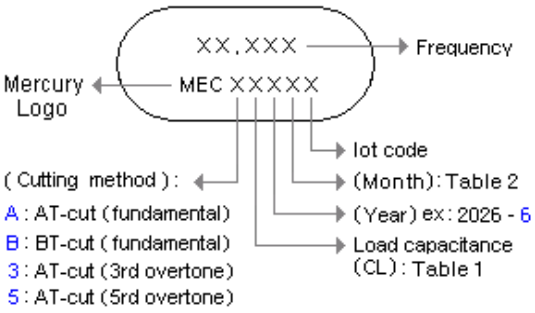
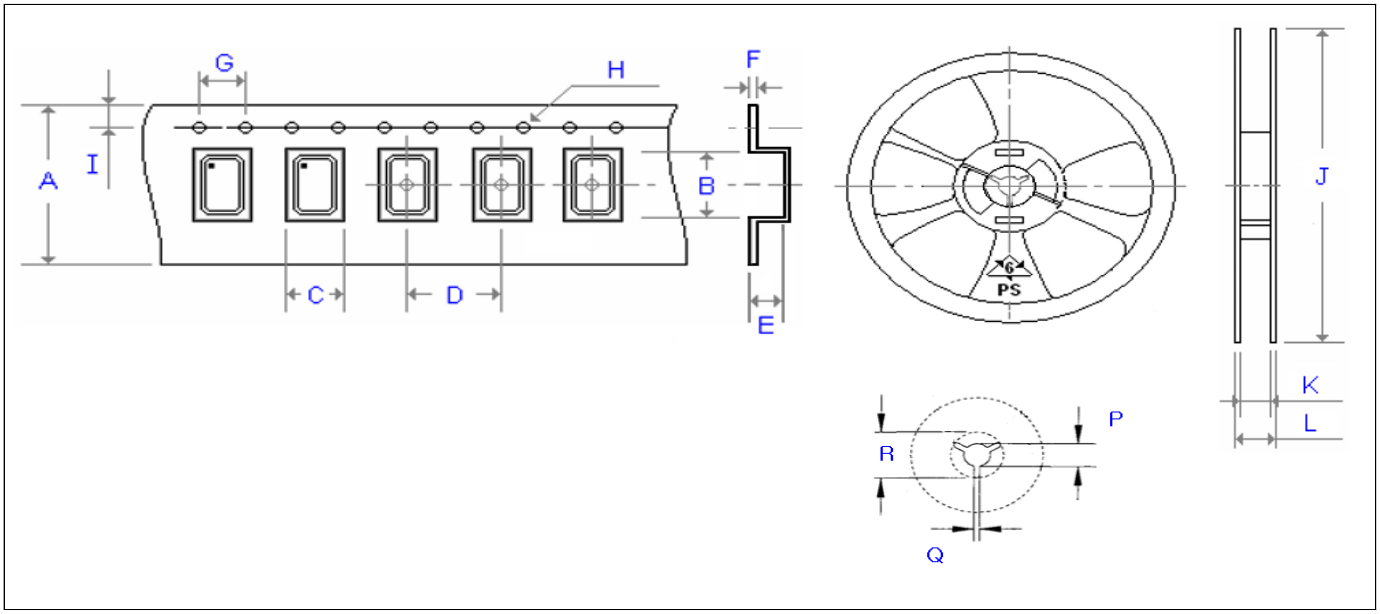
H49 , U1 , U5	M49 , ML49 , MP4 , MP5 , MP24 , MP25 HUS , HUSL
	

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