

Quartz Crystals

M49

[12.4 * 4.5 * 4.0 mm]

ML49

[12.4 * 4.5 * 3.0 mm]

Surface Mount Crystals

Fundamental

3rd Overtone

Min.

3 MHz

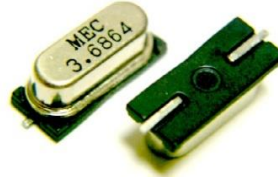
Max.

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



General Specifications

Item / Type	M49 (12.4 * 4.5 * 4.0mm) series	ML49 (12.4 * 4.5 * 3.0mm) series
Frequency Range & Crystal Cut	3.000 ~ 48.000 MHz , AT-cut , Fundamental Mode (see Table 1) 27.000 ~ 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

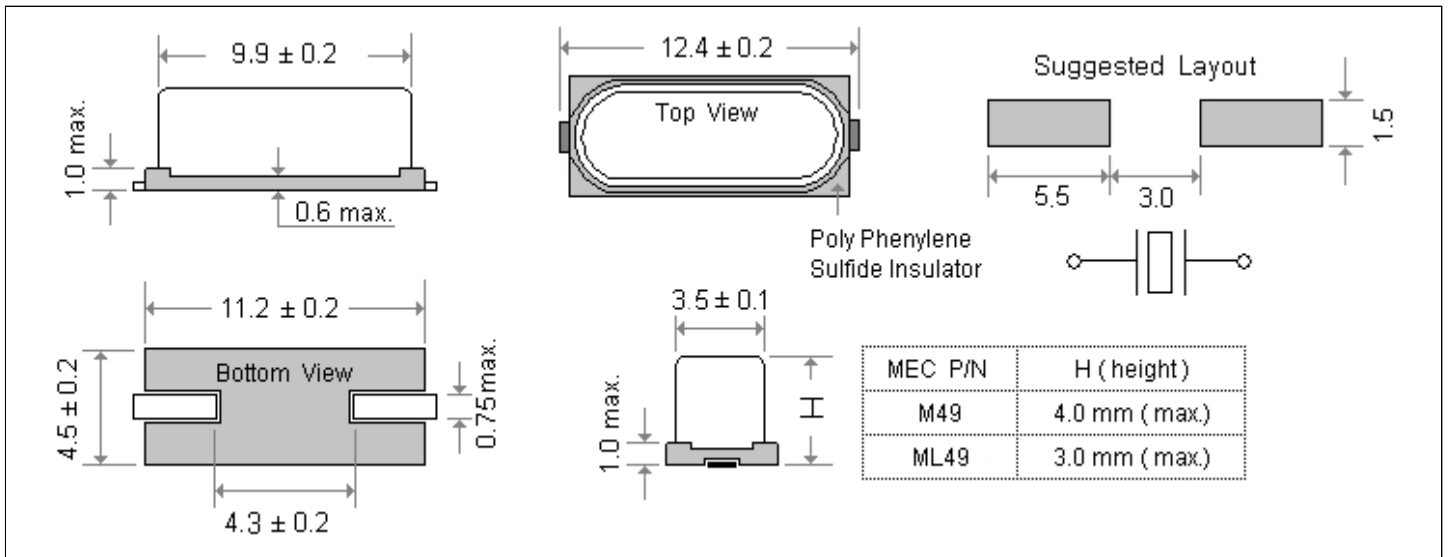
ESR (Equivalent Series Resistance)					
Freq.(MHz)	E.S.R.	Osc. Mode	Freq.(MHz)	E.S.R.	Osc. Mode
3.0 ~ 3.4	300 Ω	AT , Fund.	27.0 ~ 30.0	150 Ω	AT , 3rd
3.5 ~ 6.0	120 Ω		30.1 ~ 50.0	100 Ω	
6.1 ~ 10.0	60 Ω		50.1 ~ 100.0	80 Ω	
10.1 ~ 48.0	40 Ω				

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)



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 Options
[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>Lot code (Month) --- Table 2 (Year) --- 2020 --- 0 2021 --- 1</p> <p>Load capacitance (CL) : Table 1</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 2021 --- 1</p>
<h4 style="text-align: center;">X11 marking rules</h4> <p>(Month) --- Table 2 (Year) 2020 --- 0 2021 --- 1</p>		<h4 style="text-align: center;">X21 marking rules</h4> <p>(Month) --- Table 2 (Year) 2020 --- 0 2021 --- 1</p>

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																

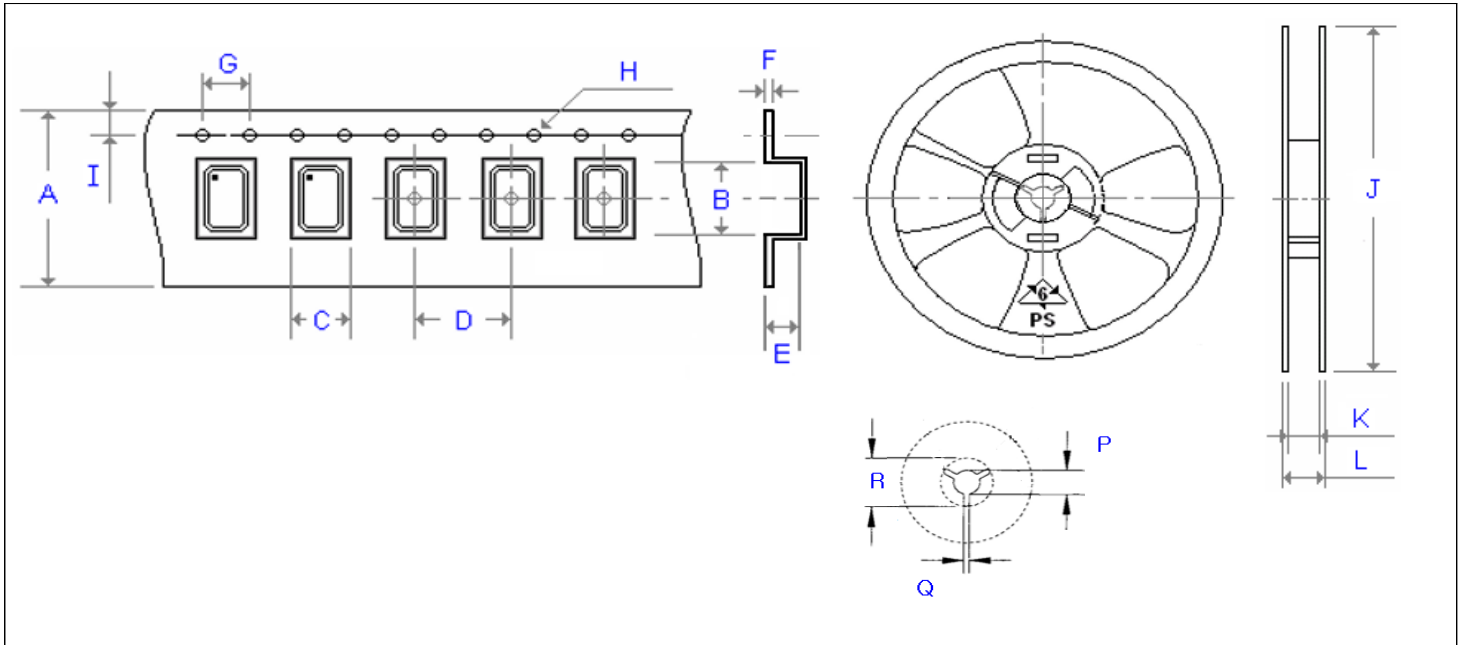
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■ USA : Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China : Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

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	∅ 1.50	1.75	3000
X21	8.00	2.30	1.90	4.00	0.60	0.20	4.00	∅ 1.50	1.75	3000
X22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
X32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
X42	12.00	4.30	2.80	8.00	1.00	0.30	4.00	∅ 1.50	1.75	1000
X2012	8.00	2.25	1.45	4.00	0.75	0.25	4.00	∅ 1.50	1.75	3000
X3215	12.00	3.40	1.75	4.00	0.87	0.32	4.00	∅ 1.50	1.75	3000
MJ	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
MF	16.00	6.30	4.00	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
MQ	16.00	7.20	5.40	8.00	1.80	0.30	4.00	∅ 1.50	1.75	1000
M49	24.00	15.00	5.00	12.00	4.25	0.40	4.00	∅ 1.50	1.75	1000
ML49	24.00	14.80	5.00	12.00	3.50	0.40	4.00	∅ 1.50	1.75	1000
MP4 (24)	24.00	13.30	5.10	12.00	4.20	0.40	4.00	∅ 1.50	1.75	1000
MP5 (25)	24.00	13.40	5.10	12.00	5.20	0.40	4.00	∅ 1.50	1.75	1000

Reel Dimensions (unit : mm) ±2mm

	J	K	L	P	Q	R	pcs / reel
X11	180.0	8.4	11.4	13.0	2.5	20.2	3000
X21	180.0	8.4	11.4	13.0	2.5	20.2	3000
X22	180.0	8.4	11.4	13.0	2.5	20.2	3000
X32	180.0	9.0	12.0	13.0	2.5	20.2	3000
X42	180.0	13.0	16.0	13.0	2.5	20.2	1000
X2012	180.0	9.0	11.4	13.0	2.5	20.2	3000
X3215	180.0	13.0	15.4	13.0	2.5	20.2	3000
MJ	180.0	13.0	16.0	13.0	2.5	20.2	1000
MF	180.0	17.2	19.3	13.0	2.5	20.2	1000
MQ	180.0	17.2	19.3	13.0	2.5	20.2	1000
M49	330.0	24.5	29.1	13.0	2.5	20.2	1000
ML49	330.0	24.5	29.1	13.0	2.5	20.2	1000
MP4 (24)	330.0	24.5	29.1	13.0	2.5	20.2	1000
MP5 (25)	330.0	24.5	29.1	13.0	2.5	20.2	1000

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