

**H49**

[ 10.7 \* 4.5 \* 13.6 mm ]

**49T**

[ 10.7 \* 4.5 \* 11.2 mm ]

Thru - Hole Crystals

Fund.

3rd O.T.

5th O.T.

Min.

1.0MHz

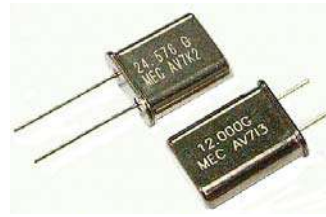
Max.

160MHz

## Features

## Specifications

- Tight tolerance and stability. Ideal for communication equipment
- Available up to 200 MHz using a 5th overtone crystal mode
- RoHS compliant versions are also available.



## General Specifications

Item / Type	H49 ; 49T ; H49MJ ; 49TMJ series	
Frequency Range	H49	1.0 ~ 1.3MHz , 1.8 ~ 200.0MHz ( see Table 1 )
	49T	3.1 ~ 200.0MHz ( see Table 1 )
Load Capacitance	Series or Parallel ( 8 to 32 pF ) resonance	
Drive Level	100μ W typical ( 500μ W max. )	
Frequency Tolerance	AT-cut: ± 5 ppm , ± 10 ppm , ± 20 ppm or ± 30 ppm at 25°C	
	SL-cut: ± 50 ppm at 25°C	
Frequency Stability	See Table 2	
Aging	ΔF / F : ±2 ppm / year ( max. )	
Storage Temperature Range	- 50°C to 105°C	

Table 1

H49 ; 49T ESR ( Equivalent Series Resistance )							
Freq. ( MHz )	Hold Type	crystal cut and osc. Mode	E.S.R.	Freq. ( MHz )	Hold Type	crystal cut and osc. Mode	E.S.R.
1.0 ~ 1.3	H49	SL , Fund.	5K Ω	7.1 ~ 10.0	H49 , 49T	AT , Fund.	35 Ω
1.8 ~ 3.0	H49	AT , Fund.	400 Ω	10.1 ~ 30.0	H49 , 49T	AT , Fund.	25 Ω
3.1 ~ 3.5	H49	AT , Fund.	150 Ω	30.1 ~ 45.0	H49 , 49T	AT , Fund.	20 Ω
3.6 ~ 5.0	H49 , 49T	AT , Fund.	100 Ω	24.0 ~ 100.0	H49 , 49T	AT , 3rd	60 Ω
5.1 ~ 7.0	H49 , 49T	AT , Fund.	50 Ω	80.0 ~ 160.0	H49 , 49T	AT , 5th	70 Ω

Table 2

Frequency stability vs Operating temperature range									
Stability code	Temp. (°C) \ ppm	± 5	± 10	± 15	± 20	± 25	± 30	± 50	± 100 (SL-cut )
X	-10 to 60°C	○	○	○	○	○	○	○	○
Y	-20 to 70°C	▲	○	○	○	○	○	○	○
I	-40 to 85°C		○	○	○	○	○	○	○

○ : available ; ▲ : contact Mercury

## Outline Dimensions ( Unit : mm )

Dip type ( H49 , 49T )				Jacket type ( H49MJ , 49TMJ )																		
<p>Spot welded 3rd lead (option only)</p> <p>glass insulator</p>																						
		<table border="1"> <thead> <tr> <th></th> <th>H</th> </tr> </thead> <tbody> <tr> <td>H49</td> <td>13.6 ± 0.2</td> </tr> <tr> <td>49T</td> <td>11.2 ± 0.2</td> </tr> </tbody> </table>			H	H49	13.6 ± 0.2	49T	11.2 ± 0.2			<table border="1"> <thead> <tr> <th></th> <th>H</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>H49MJ</td> <td>13.8 ± 0.2</td> <td>17.1 ± 0.2</td> </tr> <tr> <td>49TMJ</td> <td>11.4 ± 0.2</td> <td>14.7 ± 0.2</td> </tr> </tbody> </table>			H	W	H49MJ	13.8 ± 0.2	17.1 ± 0.2	49TMJ	11.4 ± 0.2	14.7 ± 0.2
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Mercury [www.mercury-crystal.com](http://www.mercury-crystal.com)

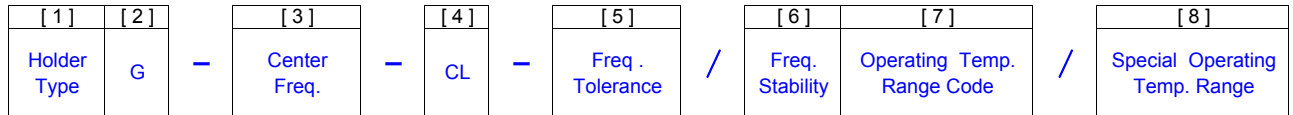
# Part Number Formats and Product Marking Rules

## Quartz Crystals

### Holder Type

SMD type :	X22	X32	X42	MJ	MF	MQ	M49	ML49	MP5	MP4
Dip type :	H49	49T	H50	H48	HUS	HUSL	U1	U5	T38	T26
Jecket type :	H49MJ	49TMJ	U1MJ	U5MJ	T38MJ	T26MJ				
Gull wing :	H49SM	49TSM	U1SM	U5SM	T38SM	T26SM				

### Part Number Format



Example	(1)	H49	G	-	40.000A3	-	12					
	(2)	MJ		-	12.000	-	20	-	10	/	10	Y
	(3)	M49	G	-	24.000	-	18	-	20	/	30	/

Ex (1): H49G - 40.000A3 - 12 [ 49/U type, RoHS, 40.000MHz, AT-cut 3rd overtone, 12pF, ±30ppm (25°C), ±30ppm (-10°C to 60°C) ]

Ex (2): MJ - 12.000 - 20 - 10 / 10 Y [ MJ type, 12.000MHz, 20pF, ±10ppm (25°C), ±10ppm (-20°C to 70°C) ]

Ex (3): M49G - 24.000 - 18 - 20 / 30 / -30+75 [ M49 type, RoHS, 24.000MHz, 18pF, ±20ppm (25°C), ±30ppm (-30°C to 75°C) ]

[ 1 ]	Holder Type
[ 2 ]	Please add " G " after the " type code " for RoHS compliant ( Does not apply to X22 , X32 , X42 , MJ , MF , MQ series )
[ 3 ]	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
[ 4 ]	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
[ 5 ]	Calibration tolerance value : freq. tolerance value ( at 25°C ) , industrial temp. range
[ 6 ]	Frequency Stability , industrial temp. range
[ 7 ]	industrial temp. range --- X : -10°C to 60°C ; Y : -20°C to 70°C ; I : -40°C to 85°C
[ 8 ]	If non-standard please enter the desired temp. range after " / " , for example " / -30+70 " : -30°C to 70°C

### Production Marking Rules

General X'tal package type marking rules	MQ, MF, MJ, X42 marking rules	X22, X32 marking rules
<p>( X22 , X32 , X42 , MJ , MF , MQ series are not included.)</p> <p>Suffix " G " for RoHS compliant .</p> <p>( Cutting method ) :                      A : AT-cut (fundamental)                      B : BT-cut (fundamental)                      3 : AT-cut (3rd overtone)                      5 : AT-cut (5th overtone)</p> <p>Date code ( month ) : Table 2                      ( Year ) :                      ex: 2010 --- 0                      2011 --- 1</p> <p>Load capacitance (CL) : Table 1</p>	<p>MQ, MF, MJ, X42 marking rules</p> <p>( Cutting method ) :                      A : AT-cut , fundamental                      B : BT-cut , fundamental                      3 : AT-cut , 3rd overtone                      5 : AT-cut , 5th overtone</p> <p>Date code (Month) --- Table 2                      (Year) --- 2010 --- 0                      Load capacitance (CL) : Table 1</p>	<p>X22, X32 marking rules</p> <p>Date code (Month) --- Table 2                      (Year) 2010 --- 0                      2011 --- 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

# Mercury Green Program

## Common points for all crystal products

### Mercury Green Program

Mercury's Green Program is implemented in accordance with the European Union's directive on "Restriction of the use of certain Hazardous Substance(RoHS)". Mercury's Lead-Free and RoHS Compliant products follow the EU directive (2002/95/EC) and include test reports issued by SGS Group on hazardous substances levels for the six substances: lead(pb), cadmium(cd), mercury (Hg), hexavalent chromium(Cr+6), polybrominated biphenyl(PBB), and polybrominated diphenyl ether (PBDE).

- Crystal Green Program-Crystals
- Crystal Oscillator Green Program-XO、VCXO、VCTCXO、TCXO、OCXO
- Crystal Filter Green Program-Filters



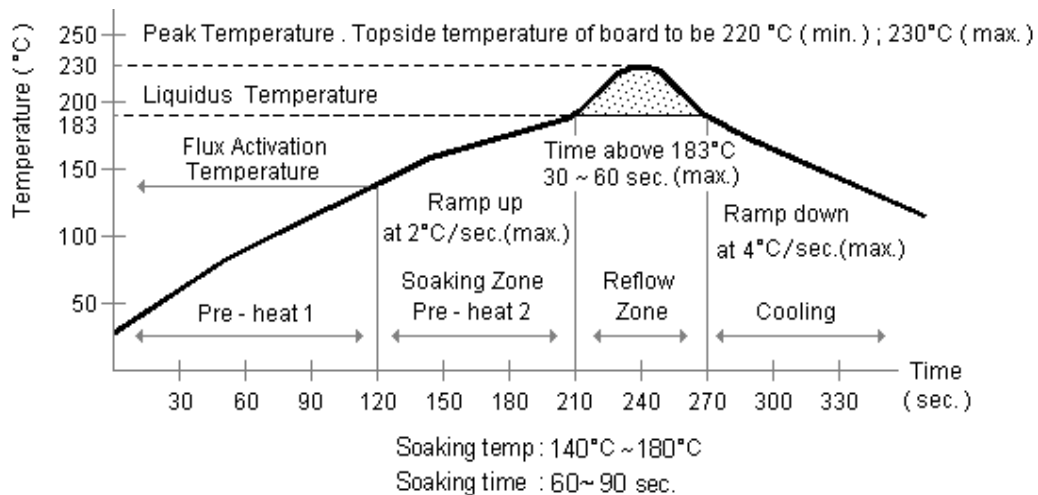
**RoHS Compliant Product  
by Mercury**

### Soldering conditions

- (1) Lead wires should be soldered within 3 seconds with the iron heated to a temperature of 380°C ( max. ).
- (2) In solder-dip mounting , it should be within 10 seconds with a temperature of 260°C ( max. ).  
Heating the whole crystal unit in the dip mounting process should be avoided .  
Upright mounting is recommended ( to prevent applying heat directly to the body of a crystal unit ) .
- (3) Heating the whole body of the crystal unit , for example , in a reflow oven may affect the performance.  
The holder is small and is sealed by solder material by press sealing , so that such a reflow process is not allowed to be applied .

### Suggested Reflow Profile [ SMD type products ]

(1) Low temperature solder reflow : For Sn62 , Pb36 , Ag2 , Sn63 , Pb37 alloy .



(2) High temperature solder reflow : For Sn96.5% , Ag3.5% , Cu0.5% alloy .

