

Quartz Crystals

H49
[10.7 * 4.5 * 13.2 mm]

HUSL
[10.7 * 4.3 * 2.5 mm]

HUS
[10.7 * 4.3 * 3.5 mm]

Thru - Hole

Fund.

3rd O.T.

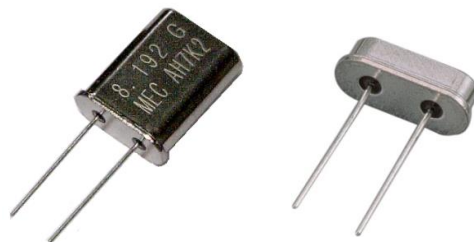
Min.
455 MHz

Max.
100 MHz

Features

Specifications

- Tight tolerance and stability. Ideal for communication equipment
- RoHS complian
- H49 (13.2mm height) & HUSL (2.5mm height) & HUS (3.5mm height)
- Low cost and light weight



General Specifications

Item / Type	H49 (10.7 * 4.5 * 13.2mm) series	HUSL (10.7 * 4.3 * 2.5mm) series	HUS (10.7 * 4.3 * 3.5mm) series
Frequency Range & Crystal Cut	455KHz ~ 1.0MHz 1.8MHz ~ 100.0MHz (see Table 1)	3.000 ~ 48.000 MHz , AT-cut , Fundamental Mode (see Table 2) 27.000 ~ 100.000 MHz , AT-cut , 3rd overtone (see Table 2)	
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 3		
Aging	ΔF / F : ±5 ppm & ±3 ppm year (max.)		
Storage Temperature Range	- 55°C to 125°C		

Table 1

H49 ESR (Equivalent Series Resistance)					
Freq.(MHz)	E.S.R.	Osc. Mode	Freq.(MHz)	E.S.R.	Osc. Mode
0.455	3000 Ω	CT , Fund.	4.0 ~ 4.9	70 Ω	AT , Fund.
0.5 ~ 1.0	3000 Ω	SL , Fund.	5.0 ~ 7.9	60 Ω	
1.8 ~ 1.9	500 Ω	AT , Fund.	8.0 ~ 9.9	30 Ω	
2.0 ~ 2.4	450 Ω		10.0 ~ 50.0	25 Ω	
2.5 ~ 2.9	350 Ω	AT , 3rd	24.0 ~ 100.0	40 Ω	
3.0 ~ 3.9	90 Ω				

Table 2

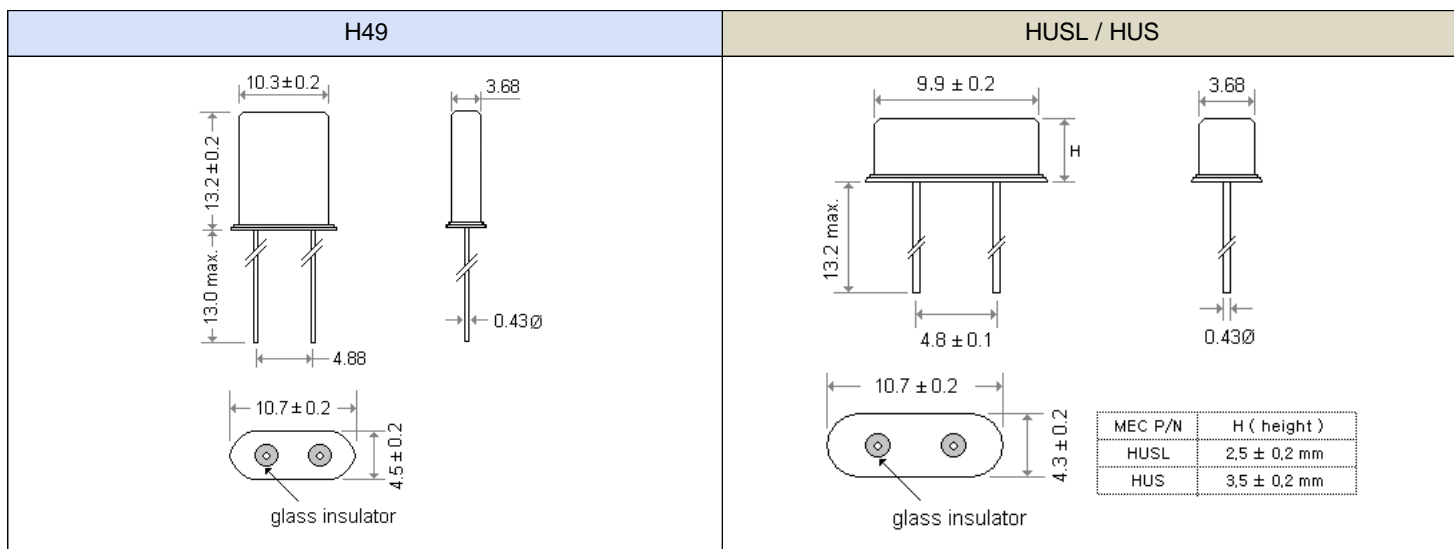
HUSL & HUS ESR (Equivalent Series Resistance)					
Freq.(MHz)	E.S.R.	Osc. Mode	Freq.(MHz)	E.S.R.	Osc. Mode
3.0 ~ 3.4	300 Ω	AT , Fund.	27.0 ~ 30.0	150 Ω	AT , 3rd
3.5 ~ 6.0	120 Ω		30.1 ~ 50.0	100 Ω	
6.1 ~ 10.0	60 Ω		50.1 ~ 100.0	80 Ω	
10.1 ~ 48.0	40 Ω				

Table 3

Frequency stability vs Operating temperature range								
Stability code	Temp. (°C) \ ppm	± 5	± 10	± 15	± 20	± 25	± 30	± 50
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
	X2012	X3215										
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																														
	<table border="1"> <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>M</td> <td>-55°C ~ +105°C</td> </tr> <tr> <td>N</td> <td>-55°C ~ +125°C</td> <td>Z</td> <td>Customized</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	M	-55°C ~ +105°C	N	-55°C ~ +125°C	Z	Customized						
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																						
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N	-55°C ~ +125°C	Z	Customized																												
[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, MJ 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) C : CT-cut (fundamental) SL : SL-cut (fundamental) SC : SC-cut (3rd overtone)</p>	<p>(Cutting method) : A : AT-cut , fundamental B : BT-cut , fundamental 3 : AT-cut , 3rd overtone 5 : AT-cut , 5rd overtone</p>	
<h4>X11 marking rules</h4>		<h4>X21 marking rules</h4>

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

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