

CRYSTAL UNITS SPECIFICATION

Product Type : HC - 49US / SMD

Model : 24.000MHz

Description : SMD/49US/24.000MHz/20pF/30ppm

SKC P/N : F49SM24000M20

SPEC No. : 1 - 220518 - F49SM24000M20



DATE : 18-May-22

Designer : *Aaron Lee*

Checked By : *Tom*

Approved By : *Sam*

REVISION HISTORY

Rev	Revise Page	Revise Contents	Date	Ref. No.	Reviser
A	N/A	Initial Release	18-May-22	N/A	Aaron Lee

ELECTRICAL CHARACTERISTICS			
1	Holder type		HC - 49US / SMD
2	Oscillation mode		<input checked="" type="checkbox"/> Fundamental <input type="checkbox"/> 3rd Overtone <input type="checkbox"/> 5th Overtone
3	Crystal cutting type		AT CUT
4	Nominal frequency	FL	24.000MHz
5	Frequency stability	Tol	± 30 ppm (ref at 25℃)
6	Operating temperature range	TOPR	-20℃ to +70℃
7	Storage temperature range		-40℃ to +85℃
8	Temperature characteristic		± 30 ppm in item 6
9	Load capacitance	CL	20 PF ± 0.2PF
10	Equivalent series resistance	ESR	35 Ohms max.
11	Drive level	DL	100 uW
12	Shunt capacitance	C0	5.0 PF max.
13	Aging rate per year		Less than ±5ppm / year
14	Insulation resistance		500M Ohms min. at DC 100V ± 10V
15	Test circuit		Measured in S&A 250B / 350B
16	Marking		SKC

DIMENSIONS

(Unit:mm)

The diagram shows a top-down view of a rectangular surface-mount device (SMD) package. The package has a central oval-shaped area containing the marking 'SKC xx. xxxxx'. The overall width of the package is dimensioned as 10.0Max. The height of the package is dimensioned as 3.6Max. The marking 'SKC' is followed by a space, then 'xx.', then a space, then 'xxxxx'. The 'x's in 'xxxxx' are circled, and arrows point from them to the 'MARKING' section. The package has two small rectangular pads on the left and right sides, representing the mounting pads.

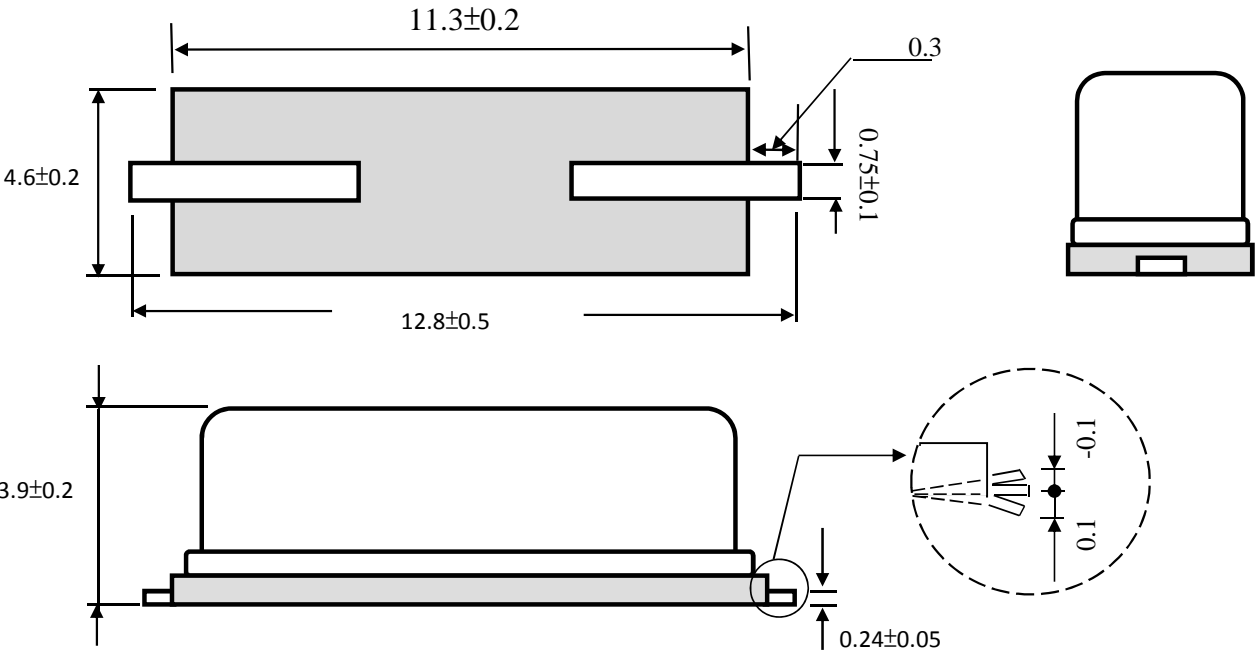
MARKING:

SKC: Marking

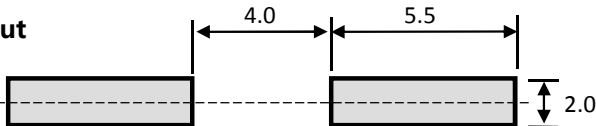
xx.xxx:Frequency

X: Year

X: Months



Suggested Layout

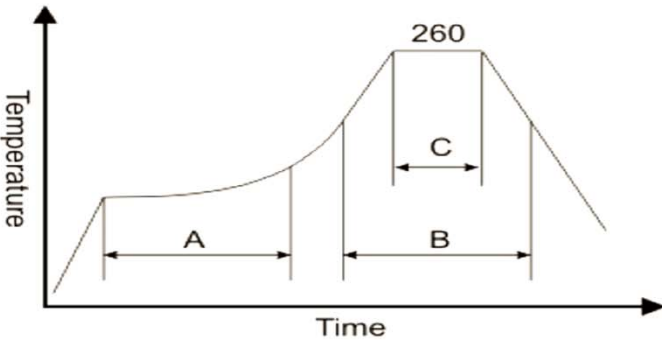


Date Code

YEAR	:	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
CODE	:	1	2	3	4	5	6	7	8	9	0		
MONTH	:	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CODE	:	A	B	C	D	E	F	G	H	K	L	M	N

*This date code will be cycled every ten years.

SUGGESTED REFLOW PROFILE

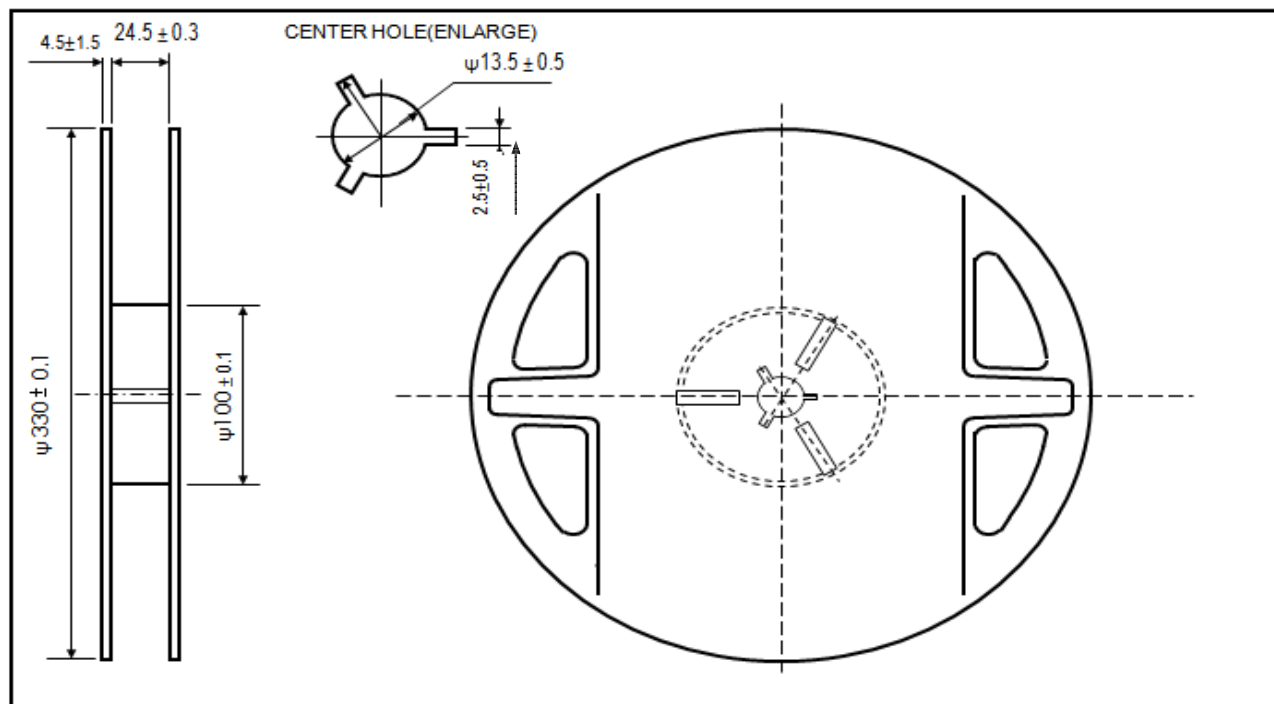
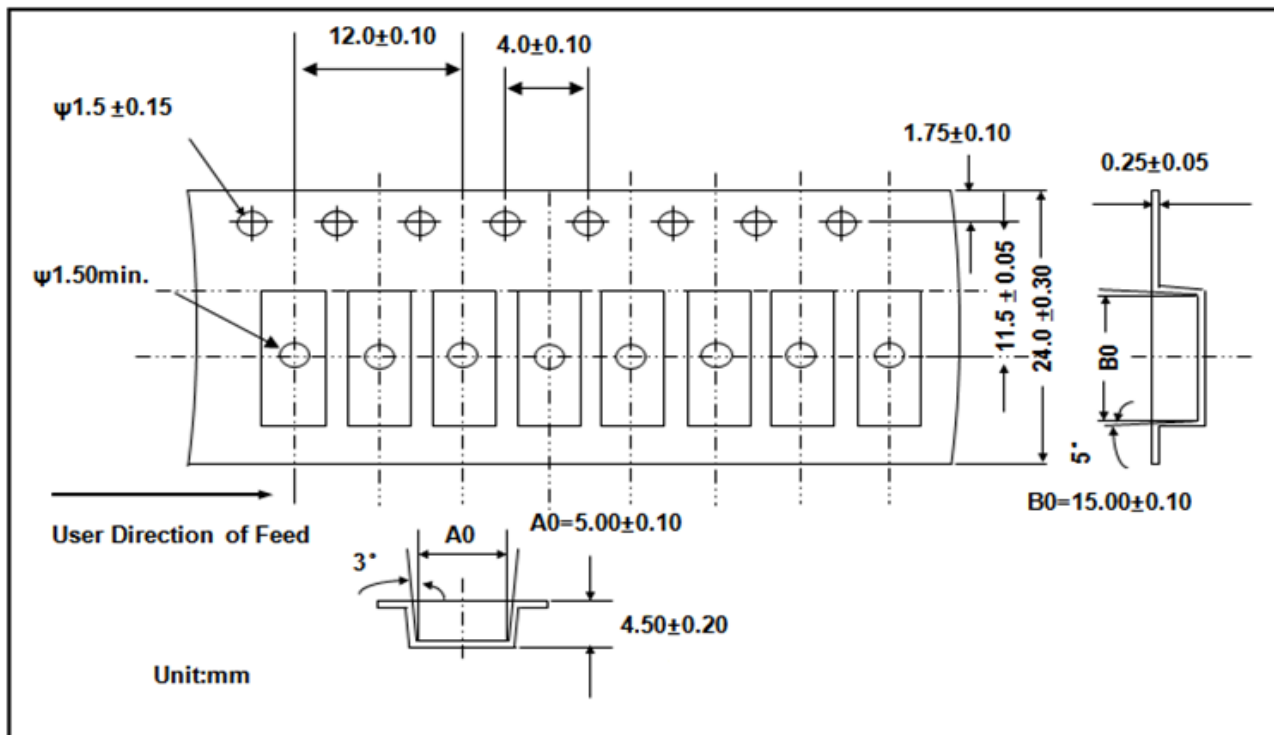


Note:

	Stage	Temperature	Time
A	Preheat	$160 \sim 180^{\circ}\text{C}$	60~120 Sec
B	Primary Heat	220°C	60 Sec
C	Peak	$260^{\circ}\text{C} \pm 5^{\circ}\text{C}$	10 Sec

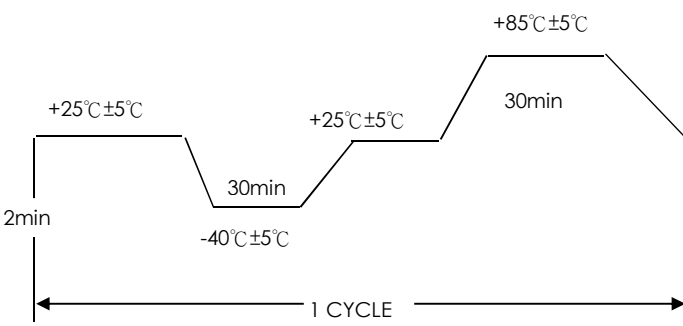
■ EMBOSS CARRIER TAPE & REEL

(1000pcs / per reel)



MECHANICAL ENDURANCE : Provide that measurement shall be carried out after letting it alone in the room temperature for 1 hour.

ENVIRONMENTAL STABILITY		SPECIFICATION
1	Shock test	Dropping from 75 cm height 3 times on firm wood variation frequency less than $\pm 5\text{ppm}$, and resistance less than $\pm 10\%$.
2	Sealing test	Less than $2.0 \times 10^{-9} \text{ Pa} \cdot \text{m}^3/\text{sec}$.
3	Soldering heat resistance	Method : Put lead wire through 260°C for 10 seconds. 95% be covered with solder. Judging : Test $\Delta F/F \leq \pm 5\text{ppm}$ $\Delta F/Rr \leq \pm 10\%$ or $\pm 2\Omega$
4	Solderability	At $235^\circ\text{C} \pm 5^\circ\text{C}$ for 5 sec. must more than 95% be covered with solder.
5	Humidity	Temperature : $40 \pm 2^\circ\text{C}$ Length of Test : 96 Hrs Relative Humidity : 83% - 88%
6	Frequency drift	Method : Place crystal in a -20°C to 70°C constant temperature trough for 5 minutes then use 250B testing instrument to its is frequency tolerance variation. Judging reference : In accordance with customer specification.
7	Air tightness test	Soak crystal in alcohol. Place it in a compression room and compress at $0.4 \sim 0.45\text{Mpa}$ for 30 minutes. Then take it out and put it at room temperature to blow dry for 5 minutes. Judging : Insulation resistance $> 500\text{M}\Omega$
8	Mechanical test	a. Lead pull Method : Fix the crystal. Add 1KG heavy weight on the lead-in axle for 10 ± 1 seconds. Judging : There should be on loosening 、 break 、 and poor contact of lead-in axle.

ENVIRONMENTAL STABILITY		SPECIFICATION
9	Mechanical test	<p>b. Lead bend</p> <p>Method : Fix the crystal. Add 1KG weight at $2.5 \pm 0.5\text{mm}$ from the crystal and bend the lead wire to 90°.</p> <p>Repeat this method 3 times.</p> <p>Judging : There should be on loosening 、 break 、 and poor contact of lead-in axle.</p>
10	Insulation resistance	<p>Method : Use a megavar (Dc $100 \pm 15\text{V}$) to measure insulation resistance between lead wire and metal case for 1 minute ± 5 seconds.</p> <p>Judging : Insulation resistance $> 500\text{M}\Omega$</p>
11	Aging	<p>Method : Place crystal at $85^\circ\text{C} \pm 2^\circ\text{C}$ for 1000 hours.</p> <p>Conduct the test twice a week, 2 days $< \text{interval} < 4$ days.</p> <p>Conduct the first test after the first 24 hours.</p> <p>Conduct final measuring (measure under testing temperature) when the test is concluded.</p> <p>Judging : Test $\Delta f/f < \pm 5\text{ppm}$</p>
12	Temperature & Humidity cycling	<p>Cycle : 5 cycles</p> <p>Temp : High Temp. $+85^\circ\text{C}$ Low Temp. -40°C</p> <p>HUM : $93\% \pm 3\%$</p> <p>Judging : Test $\Delta F/F < \pm 5\text{ppm}$</p> <p>Freq. Drift $\pm 5\text{ppm Max.}$</p> <p>Resistance Drift $\pm 10\% \text{ Max. or } \pm 2\Omega$</p>  <p>The diagram illustrates a temperature and humidity cycling profile for one cycle. It consists of four segments: a 2-minute dwell at $+25^\circ\text{C} \pm 5^\circ\text{C}$, a 30-minute dwell at $-40^\circ\text{C} \pm 5^\circ\text{C}$, a 30-minute dwell at $+25^\circ\text{C} \pm 5^\circ\text{C}$, and a 30-minute dwell at $+85^\circ\text{C} \pm 5^\circ\text{C}$. The segments are connected by ramps. A horizontal double-headed arrow at the bottom indicates the duration of one cycle.</p>