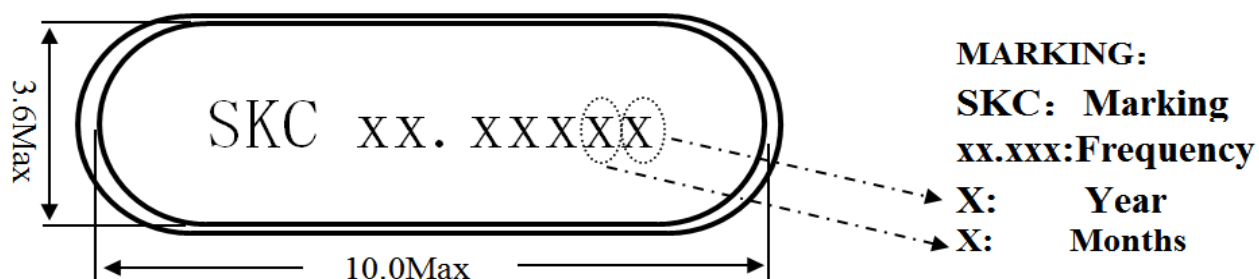


# CRYSTAL UNITS SPECIFICATION

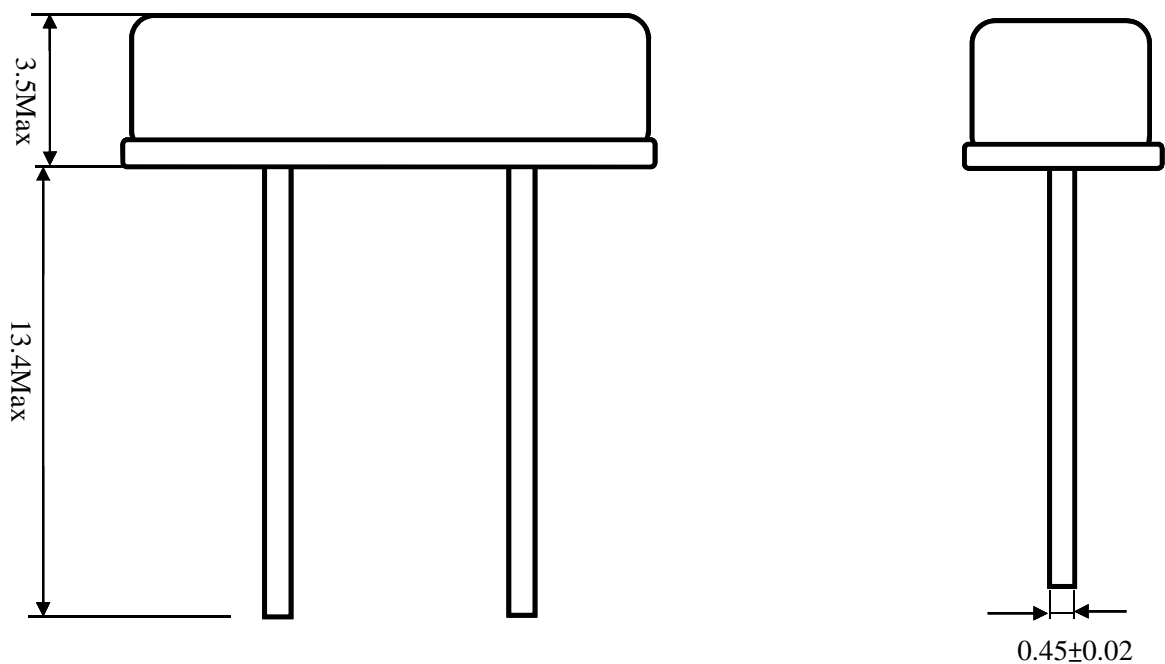
■ ELECTRICAL CHARACTERISTICS			
1	Holder type		HC - 49US
2	Oscillation mode		■ Fundamental <input type="checkbox"/> 3rd Overtone <input type="checkbox"/> 5th Overtone
3	Crystal cutting type		AT CUT
4	Nominal frequency	FL	16.000MHz
5	Frequency stability	Tol	± 10 ppm ( ref at 25°C )
6	Operating temperature range	TOPR	-20°C to +70°C
7	Storage temperature range		-40°C to +85°C
8	Temperature characteristic		± 30 ppm in item 6
9	Load capacitance	CL	22 PF ± 0.2PF
10	Equivalent series resistance	ESR	35 Ohms max.
11	Drive level	DL	300 uW MAX
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)



# CRYSTAL UNITS SPECIFICATION



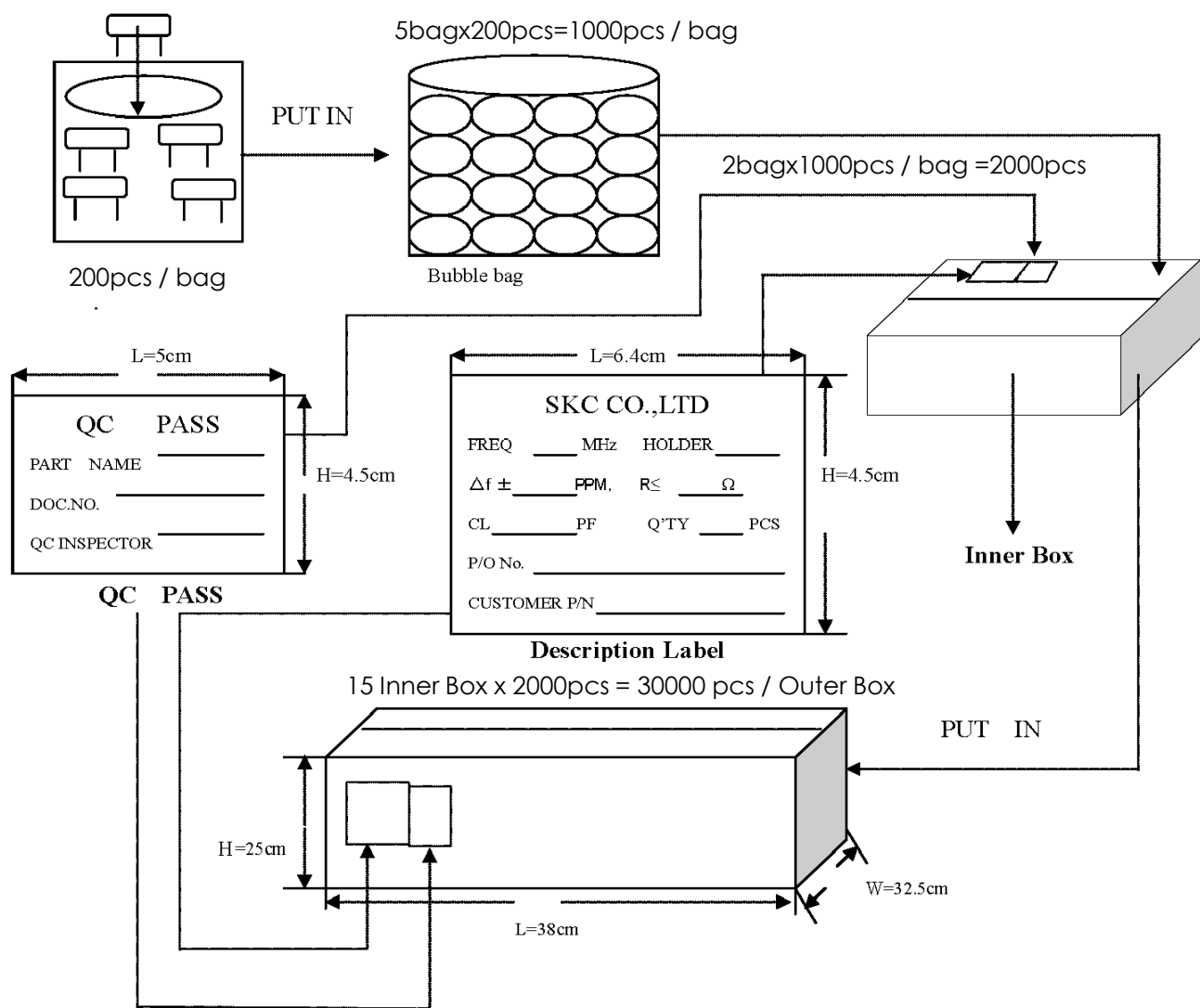
■ **Date Code:**

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.

# CRYSTAL UNITS SPECIFICATION

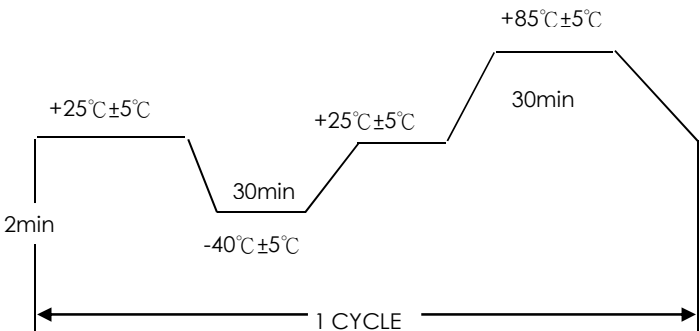
## ■ PACKAGE



# CRYSTAL UNITS SPECIFICATION

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 $260^\circ\text{C}$ for 10 seconds. 95% be covered with solder. Judging : Test $\Delta F/F \leq \pm 5\text{ppm}$ $\Delta F/R_r \leq \pm 10\%$ 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 $-20^\circ\text{C}$ to $70^\circ\text{C}$ 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 no the lead-in axle for $10 \pm 1$ seconds. Judging : There should be on loosening , break , and poor contact of lead-in axle.

# CRYSTAL UNITS SPECIFICATION

ENVIRONMENTAL STABILITY		SPECIFICATION
9	Mechanical test	<p>b. Lead bend</p> <p>Method : Fix the crystal. Add 1KG weight at <math>2.5 \pm 0.5\text{mm}</math> from the crystal and bend the lead wire to <math>90^\circ</math>. 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 <math>100 \pm 15\text{V}</math>) to measure insulation resistance between lead wire and metal case for 1 minute <math>\pm</math> 5 seconds.</p> <p>Judging : Insulation resistance <math>&gt; 500\text{M}\Omega</math></p>
11	Aging	<p>Method : Place crystal at <math>85^\circ\text{C} \pm 2^\circ\text{C}</math> for 1000 hours.</p> <p>Conduct the test twice a week, 2 days <math>&lt;</math> interval <math>&lt;</math> 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 <math>\Delta f/f &lt; \pm 5\text{ppm}</math></p>
12	Temperature & Humidity cycling	<p>Cycle : 5 cycles</p> <p>Temp : High Temp. <math>+85^\circ\text{C}</math> Low Temp. <math>-40^\circ\text{C}</math></p> <p>HUM : <math>93\% \pm 3\%</math></p> <p>Judging : Test <math>\Delta F/F &lt; \pm 5\text{ppm}</math></p> <p>Freq. Drift <math>\pm 5\text{ppm Max.}</math></p> <p>Resistance Drift <math>\pm 10\% \text{ Max. or } \pm 2\Omega</math></p>  <p>The diagram illustrates the temperature and humidity cycling profile for one cycle. It consists of four segments: a 2-minute hold at <math>+25^\circ\text{C} \pm 5^\circ\text{C}</math>, a 30-minute ramp down to <math>-40^\circ\text{C} \pm 5^\circ\text{C}</math>, a 30-minute ramp up to <math>+25^\circ\text{C} \pm 5^\circ\text{C}</math>, and a 30-minute hold at <math>+85^\circ\text{C} \pm 5^\circ\text{C}</math>. The entire sequence is labeled as '1 CYCLE'.</p>