



APPROVAL SHEET

Customer: Orion Technology Co., Ltd.
Part Name: HC-49SMD 24.0-18(24MHZ 18pF)
JYEG Part No.: JYSD1A1G3D8-18-24.000
Holder: HC-49US/SMD
Frequency: 24.0000MHZ
Manufacturer: Jingyuan Electronics
Date: 2016-11-03

RoHS COMPLIANT

Drawn	Checked	Approved
Gu Junhong	XingXianghua	Zhang Yong

(For Customer Use)

Acceptable	Non-Acceptable

1.This specification applies to quartz crystal unit with a frequency of 24.0000MHZ.

2.Electrical characteristics:

	Item	Conditions	Specifications
2.1	Holder type	H:4.2mm	HC-49SMD
2.2	Norminal frequency		24.0000MHz
2.3	Order of vibration		Fundamental
2.4	Adjustment tolerance	Reference temperature shall be 25+/-2°C	+/-30ppm
2.5	Frequency tolerance over temperature Range	-40°C~+85°C	+/-50ppm
2.6	Operating temperature range		-40°C~+85°C
2.7	Storage temperature range		-40°C~+85°C
2.8	Resonance resistance		<40ohm
2.9	Load capacitance		18 pF
2.10	DLD	0.01-100uW/20 steps	<12ohm
2.11	RLD	0.01-100uW/20 steps	<40ohm
2.12	Shunt capacitance	C0	5 pF
2.13	Motional capacitance	C1	NA
2.14	Pulling Sensitivity	S	NA
2.15	Drive level		100 uW
2.16	Insulation resistance	DC/100V shall be applied for 1min ,then measurement shall be made between terminal and case.	>500M ohm
2.17	Aging		+/-5 ppm max/year

3.Measurement Circuit:

3.1 Frequency measurement:

Measurement circuit: 250B(Saunders)

Load capacitance:18pF Drive level :100 uW

3.2 Resistance measurement

Measurement circuit:250B(Saunders)

Load capacitance :Series Drive level :100 uW

4. Construction

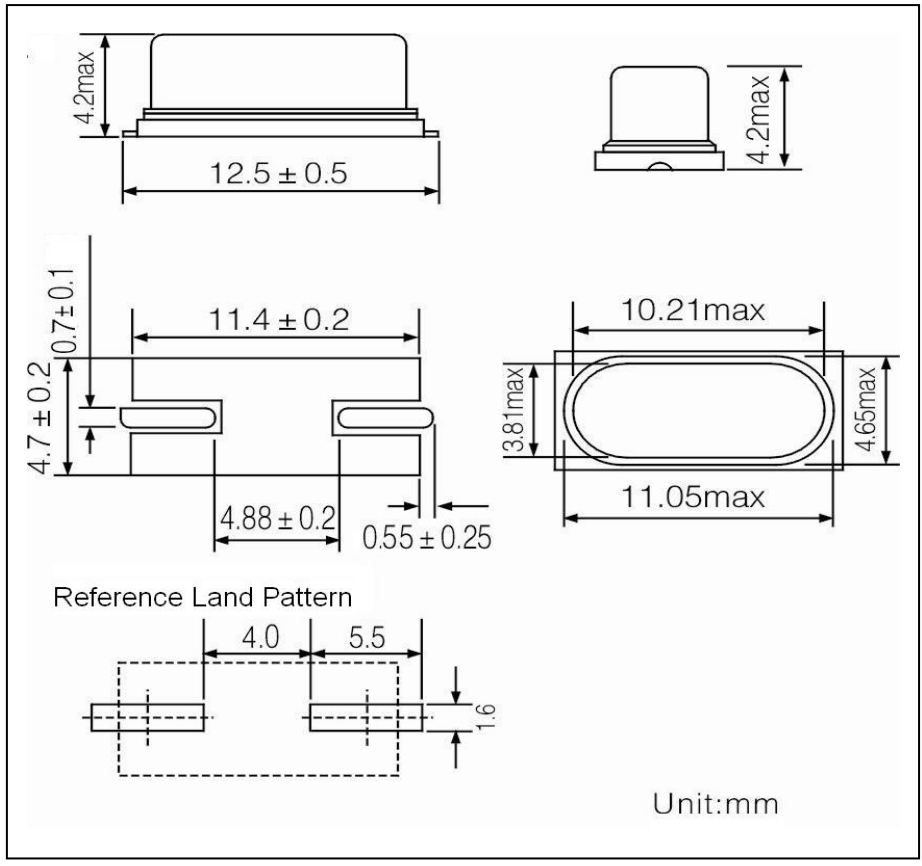
4.1 Crystal enclosure seal:

Solder seal resistance weld cold weld

4.2 crystal enclosure medium

nitrogen vacuum dry air

5.Dimension:



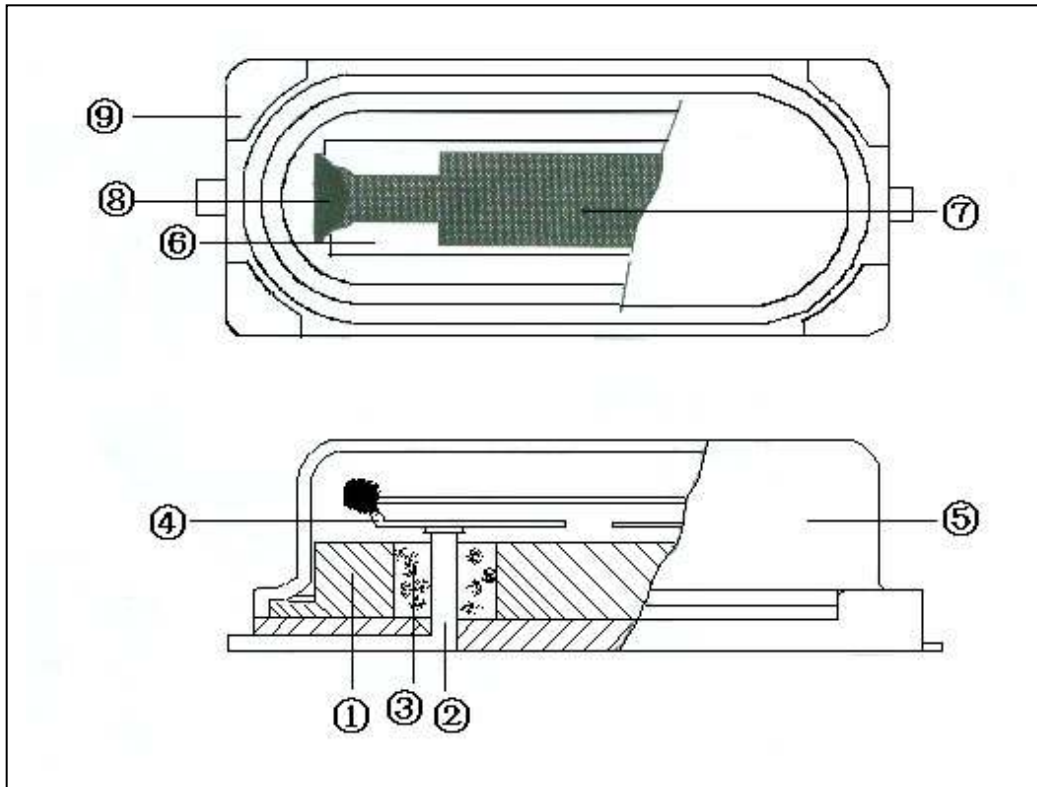
6. Marking

- Laser Marking
- Ink Marking

JY24.000

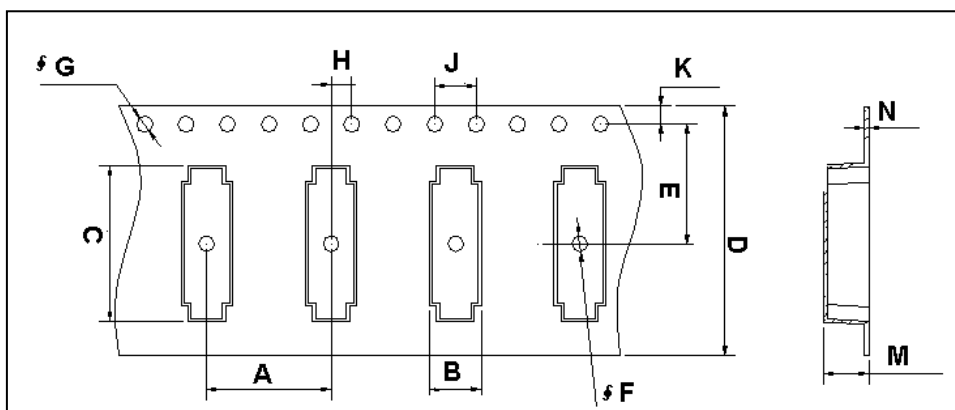
24.000-----Frequency

7. Inside Structure

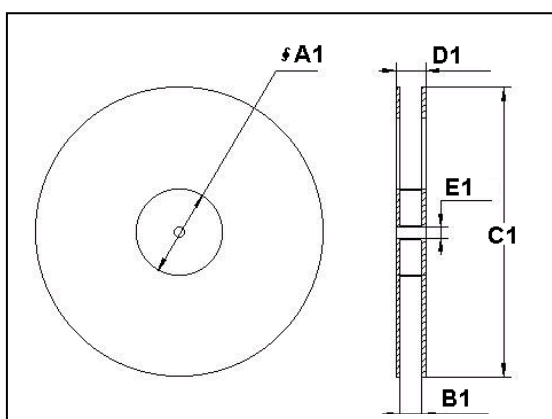


No.	Name	Material
①	Base	Fe Alloy
②	Lead	Kovar
③	Glass	Glass
④	Support	Cu
⑤	Can	Cu-Ni
⑥	Blank	SiO ₂
⑦	Electrode	Ag
⑧	Epoxy	Silver Resin
⑨	Insulator	PPS

8. Taping Dimension



Reel:



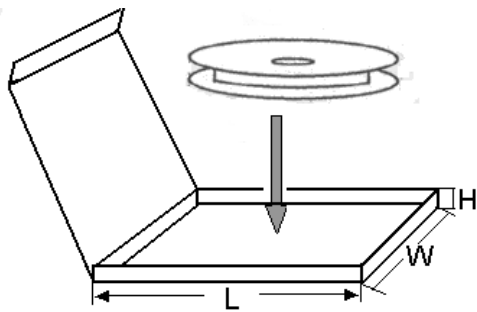
Symbol	Size	Symbol	Size	Symbol	Size
A	12 ± 0.1	G	1.55 ± 0.05	A1	100 ± 1.0
B	5 ± 0.1	H	2 ± 0.2	B1	24.4 ± 2.0
C	15 ± 0.1	J	4 ± 0.2	C1	330 max
D	24 ± 0.3	K	1.75 ± 0.1	D1	30.4max
E	11.5 ± 0.1	M	4.35	E1	$13.0^{+0.5}_{-0.2}$
F	1.5	N	0.4 ± 0.05		

9.Packing Instruction

1. **1 reel/box** (the reel with crystals packed by plastic bag).

1 reel=1000pcs

1.1 box dimension

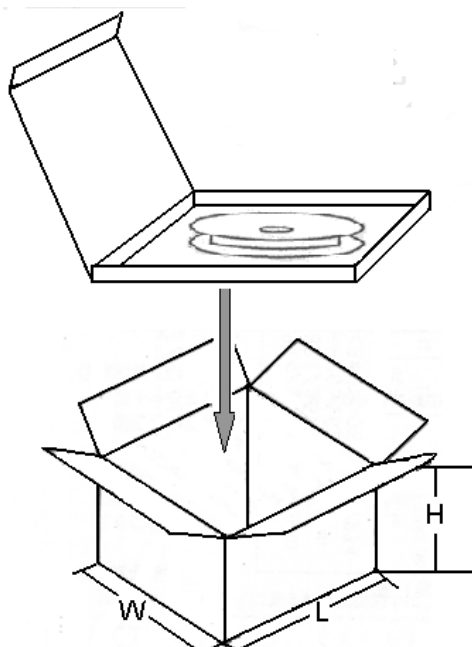


L	350mm
W	350mm
H	35mm

2. **10 boxes/ carton**(the carton with bubble pad four sides)

10 boxes=10000pcs

2.1 carton dimension

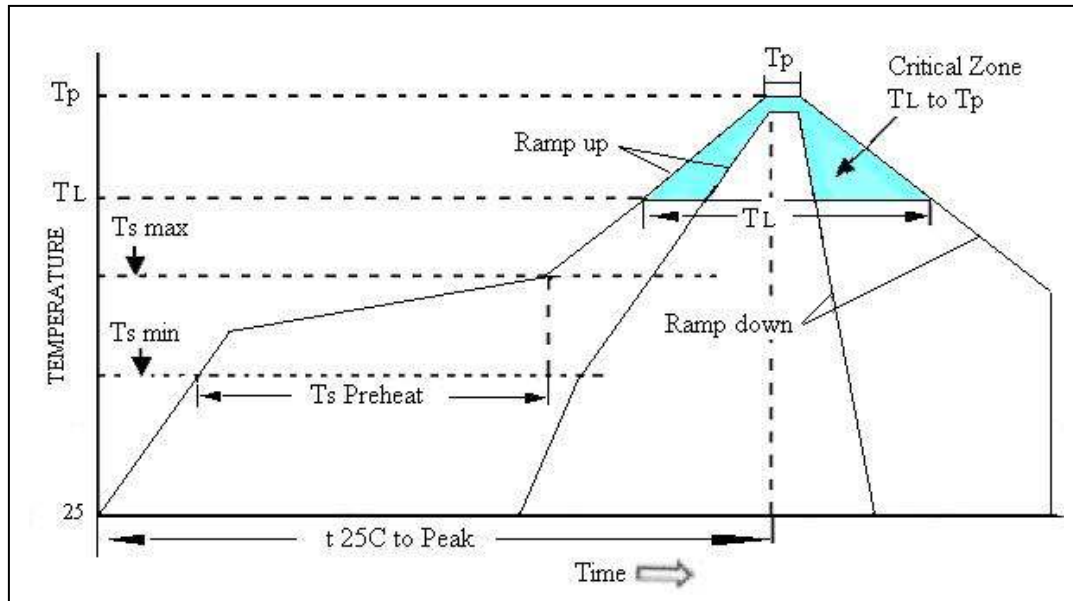


L	385mm
W	385mm
H	445mm

10. Reliability characteristic:

	Item	Condition	Specifications		
10.1	Solderability	Solder bath temperature: 260°C, dwell time: 5 seconds, Solder: 100% tin	A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed.		
10.2	Resistance to soldering heat	Solder temperature 260±3°C, Immersion time: 10 S Solder bath composition: 100% tin	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
10.3	Vibration	The entire frequency range: 10Hz to 55Hz, Amplitude: 1.5mm This motion shall be applied for a period of 2 h in each of 3 mutually perpendicular axes (a total of 6h)	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
10.4	Drop test	Drop from 75cm height on 3cm hard wooden board for 3 times	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
10.5	Cold Storage	The quartz crystal unit shall be stored at a temperature of -40±3°C for 1000 h, then it shall be subjected to standard atmospheric conditions for 1h after which measurement shall be made.	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
10.6	High temperature high humidity storage (steady state)	The quartz crystal unit shall be stored at a temperature of 40±2°C with relative humidity of 95% for 1000h, then it shall be subjected to standard atmospheric conditions for 2h after which measurement shall be made.	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
10.7	Thermal shock	The quartz crystal unit shall be subjected to 50 successive Change of temperature cycles. Each as shown in table below, then it shall be subjected to standard atmospheric conditions for 1h after which measurement shall be made.	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
		1		Temperature -40±3°C	Duration 15minutes
		2.		100±2°C	15minutes
3.	Transition time	Within 10 seconds			
10.8	Sealing	Helium leakage detector shall be used to measure the leakage rate of gas through any faulty seal. Pressure: 500Kpa, duration: 120 minutes	Leakage rate ≤ 1*10 ⁻⁹ Pa.m ³ /S		
10.9	High temperature Life test	The quartz crystal unit shall be stored at a temperature of 85±3°C for 720h, then it shall be subjected to standard atmospheric condition for 1h after which measurement shall be made.	Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		
10.10	Salt Mist	Salt solution concentration: 200g/L, duration: 1 hours, 24 cycles.	No rust. Δ F ≤ ±5ppm Δ R ≤ ±15%+3 ohm		

11Reflow Profile:



High Temperature Infrared /Convection

Note: Temperature shown are applied to body of device

Ts max to T_L (Ramp-up Rate)	3°C/second max
Preheat	
Temperature Min(T_s Min)	150°C
Temperature Typical(T_s Typ)	175°C
Temperature Max.(T_s Max)	200°C
Time(t_s)	60-180 seconds
Ramp-up Rate(T_L to T_p)	3°C/second Max
Time Maintained Above:	
--Temperature(T_L)	217°C
--Time(T_L)	60-150seconds
Peak Temperature (T_p)	260 °C Max for 10 seconds
Time within 5°C of actual peak(t_p)	20-40 seconds
Ramp-down Rate	6°C/seconds Max
Time 25°C to Peak Temperature(t)	8 minutes Max
Moisture Sensitivity Level	Level 1

High Temperature Manual Soldering

Note: Temperature shown are applied to body of device

260°C Max for 5 seconds Max, 2 times Max