



Issue	November 22, 2011
Rev.	1.0
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Customer	Future
Customer P/N	
Product	49SMB Crystal
Nominal Frequency	12.000000MHz
HOSONIC P/N	ESD12.0000F20B33F

Drawn	Checked	Approved
KEN	JOHN	ROCK



HANGZHOU HOSONIC ELECTRONIC CO., LTD.

CRYSTAL UNIT SPECIFICATIONS



Revised Record

Rev.	Rev. Date	Item	Content	Remark
1.0	2011-11-22		Initial released	

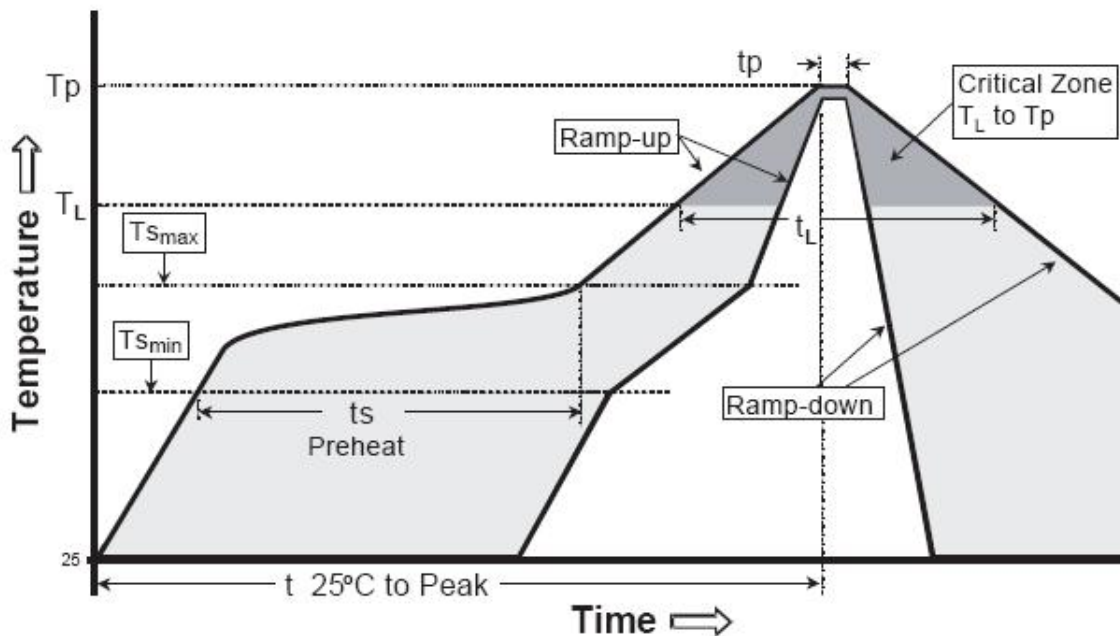
**I ELECTRICAL PARAMETERS**

No.	Item	Symb.	Electrical Specification				Remark
			Min.	Type	Max.	Units	
1	Nominal Frequency	F0	12.000000			MHz	
2	Mode of Vibration		Fundamental				
3	Frequency Tolerance	$\Delta F/F0$	-30	-	30	ppm	at 25°C±3°C
4	Operating Temperature Range	T _{OPR}	0	-	70	°C	
5	Frequency Stability	TC	-30	-	30	ppm	
6	Storage Temperature	T _{STG}	-55	-	125	°C	
7	Load capacitance	CL		20	-	pF	
8	Equivalent Series Resistance	ESR	-	-	50	Ω	
9	Drive Level	DL	-	100	200	μW	
10	Insulation Resistance	IR	500	-	-	MΩ	At 100V _{DC}
11	Shunt Capacitance	C0	-	-	7	pF	
12	Aging Per Year	Fa	-5	-	5	ppm	First Year
13	Package type	HC-49SMB					



I REFLOW PROFILES

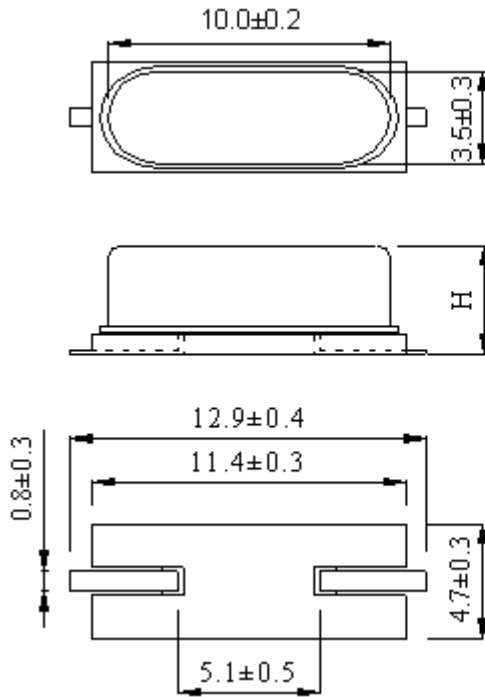
Profiles Feature	Pb-Free Assembly
Average Ramp-up Rate (Ts max to Tp)	3°C/second max.
Preheat <ul style="list-style-type: none">■ Temperature Min (Ts min)■ Temperature Max (Ts max)■ Time (ts min to ts max)	125°C 200°C 60~180 seconds
Time maintained above <ul style="list-style-type: none">■ Temperature (TL)■ Time (tL)	217°C 60~150 seconds
Peak/Classification Temperature (Tp)	260°C
Time within 5°C of actual Peak Temperature (tp)	20~40 seconds
Ramp-down rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.
Suggest reflow times	3 Times max



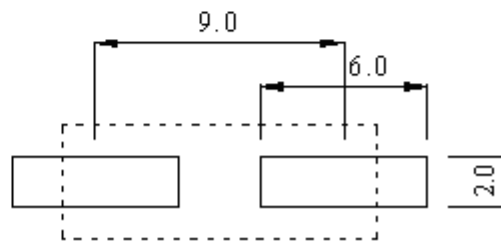
Remark: To reference JEDEC J-STD-020C



I Outline Dimensions (unit: mm)

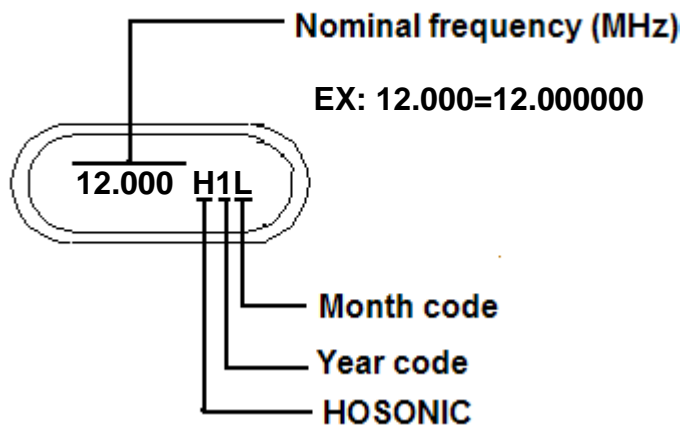


Solder Pattern



$H = 3.2 \text{ MAX}$

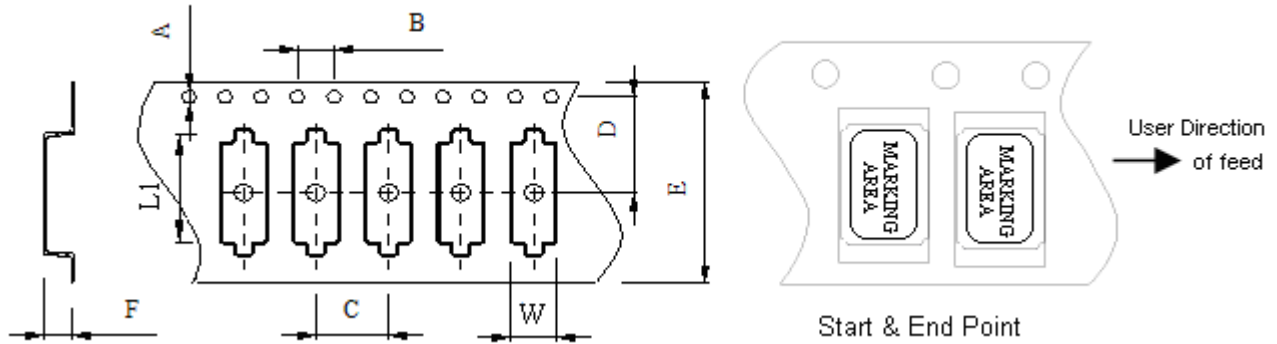
I MARKING



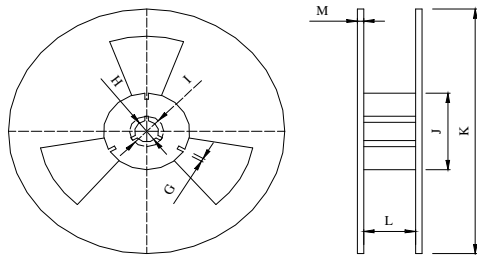
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	B	C	D	E	F	G	H	J	K	L	M



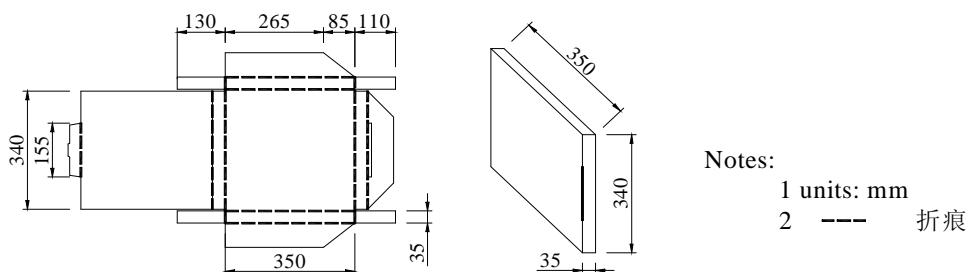
Package (units : mm)



Model	A	B	C	D	E	F	L1	W
HC-49SMA	Φ 1.50	4.0	12	11.5	24±0.3	4.35	15.0	5.0
HC-49SMB	Φ 1.50	4.0	12	11.5	24±0.3	3.5	15.0	5.0



Model	G	H	I	J	K	L	M
HC-49SMA	2.4±0.1	Φ 13.5	20±0.1	100±0.1	330±0.1	25.5±0.1	2.1±0.1
HC-49SMB	2.4±0.1	Φ 13.5	20±0.1	100±0.1	330±0.1	25.5±0.1	2.1±0.1



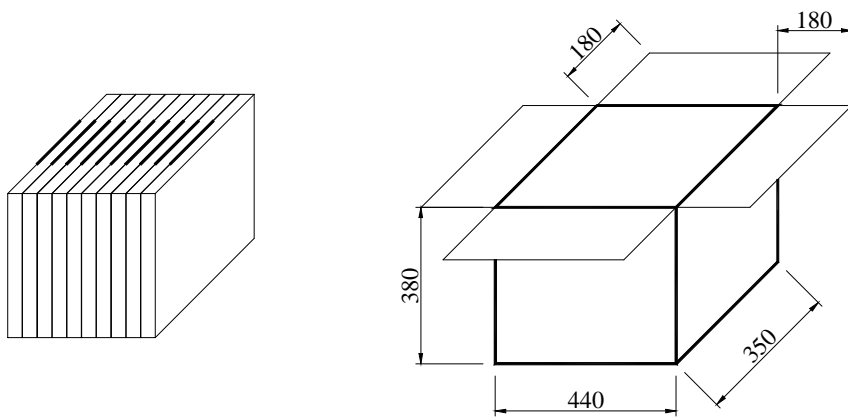
Notes:
 1 units: mm
 2 --- 折痕

1 REEL = 1 INNER BOX



Package (units : mm)

(Continued)



10 INNER BOX = 1 OUTER BOX

I 10,000 pcs = 1 OUTER BOX



I RELIABILITY SPECIFICATIONS

No.	Test Item	Test Conditions	Reference
1	High Temperature Storage	Temperature: 125°C ±5°C Time: 1000±24 Hours	MIL-STD-883E-1016
2	Temperature Cycle	Temperature 1: -55°C ±5°C Temperature 2: 125°C ±5°C Temperature change between T1 and T2 at soonest Run 10 cycles, maintain T1 and T2 15minutes each in one cycle	MIL-STD-883E-1011.9B
3	Solder Heat Resistance	Pre-heat: 125°C 60~120 Seconds Solder Temperature: 260°C ±5°C Time: 30 Seconds	MIL-STD-202F 210 E
4	Drop Test	3 Times Free Fall from 75cm height table to 3cm thickness hard wood board	MIL-STD-202F-203B
5	High Temperature, High Humidity Storage	Temperature: 85°C ±5°C Relative Humidity: 80%--85% Time: 250Hours±24 Hours	MIL-STD-202 F-103B
6	Steam Aging	Temperature: 97°C ±5°C Time: 8 Hours 260°C solder pot to check solderability	MIL-STD-883 C-1008.2B
7	Solderability	Dip in flux 5~10 seconds Temperature: 245°C ±5°C Time: 10 Seconds	MIL-STD-883E 2003
8	Aging	Temperature: 85°C ±5°C Time: 250±12Hours	MIL-STD-202 F-108A B
9	Thermal Shock	Temperature 1: -55°C ±5°C Temperature 2: 125°C ±5°C Temperature change between T1 and T2: 5 seconds 10 cycles, maintain T1 and T2 for 30 minutes each in one cycle	MIL-STD-883E-1011.9B
10	Vibration	Frequency Range: 10Hz~2000Hz Amplitude: 1.5mm or 20G 4Hours in each direction, total 12Hours	MIL-STD-202F