Hosonic

HOSONIC TECHNOLOGY (GROUP) CO., LTD.

RoHS COMPLIANT

SMD CRYSTAL UNIT SPECIFICATIONS

Automotive Application: AEC-Q200
Application uses refer to page 10

Customer	满度科技
Customer P/N	
Product	1612 Seam Sealing Crystal
Nominal Frequency	38.400000MHz
HOSONIC P/N	ETSB38E0X0002A
Version	10C0
Issue Date	2026/8/10

HOSONIC		
Drawn	**Checked**	**Approved**
LUCY	**ZOE**	**JOHN**

Approved By Customer : _____

✓ **MSL: Level 1**

✓ **Halogen Free**

深圳市满度科技有限公司
Web:www.manduic.com
Tel:150-1290-5940
Email:sales@manduic.com

微信扫码咨询客服

Revised Record				
Rev.	Rev. Date	Item	Content	Remark
1.0	2026-08-10		Initial released	

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I ELECTRICAL PARAMETERS

Electrical characteristics measured by S&A250B or equivalent.

No.	Item	Symb.	Electrical Specification				Remark
			Min.	Typ.	Max.	Units	
1	Nominal Frequency	F0		38.400000		MHz	
2	Mode of Vibration			Fundamental			
3	Frequency Tolerance	ΔF/F0	-10	-	10	ppm	At 25℃±3℃
4	Operating Temperature Range	T_{OPR}	-40	-	125	℃	
5	Frequency Stability (over operating temperature)	TC	-50	-	50	ppm	Ref. to 25℃
6	Storage Temperature	T_{STG}	-55	-	125	℃	
7	Load capacitance	CL	-	12	-	pF	
8	Equivalent Series Resistance	ESR	-	-	100	Ω	
9	Drive Level	DL	-	50	100	μW	
10	Insulation Resistance	IR	500	-	-	MΩ	At 100V_{DC}
11	Shunt Capacitance	C0	-	-	2	pF	
12	Aging Per Year	Fa	-2	-	2	ppm	First Year
13	Package type	ETSB					

NOTE: Storage Temperature is only for the product itself,the temperature for the packing material is -4~40℃.

I STORAGE REQUIREMENT

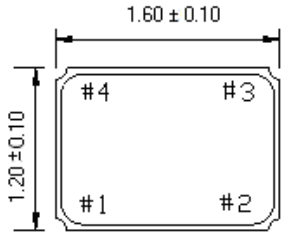
Storage environmental conditions: -4~40℃, 70%RH max.

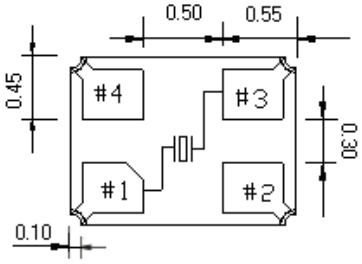
Maximum storage time: 24 Months from date of manufacture.

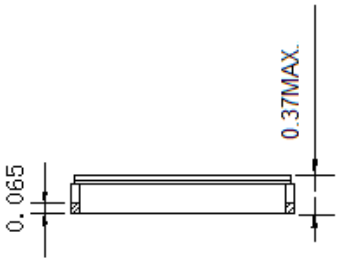
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I OUTLINE DIMENSIONS (UNIT: mm)

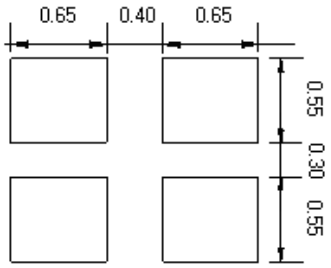
Top View







Recommended Solder Pattern

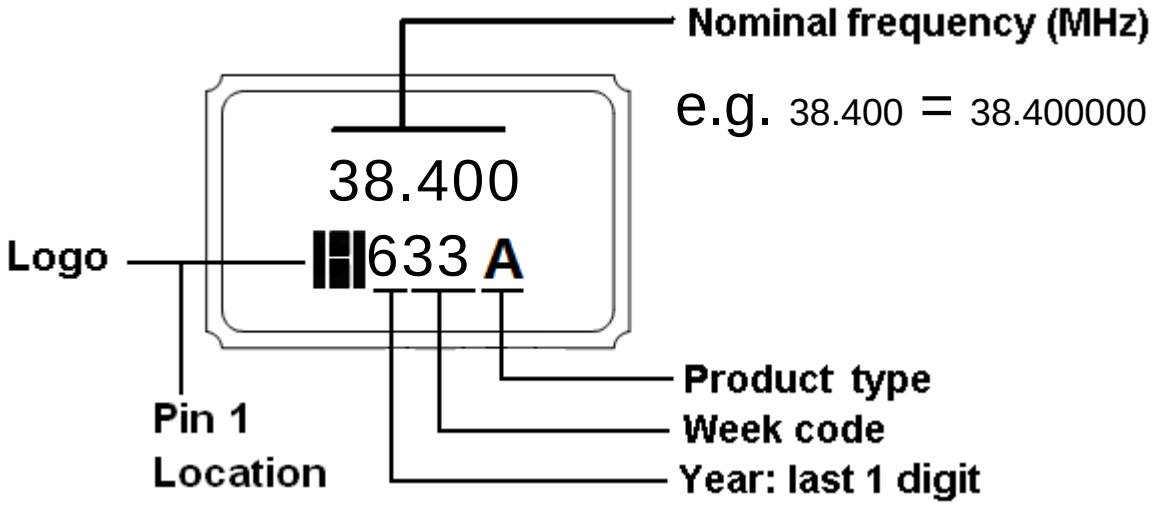


Pin	Connection
#1、#3	IN/OUT
#2	GND
#4	GND/NC

【NOTE】#2 is connected with a metal cover

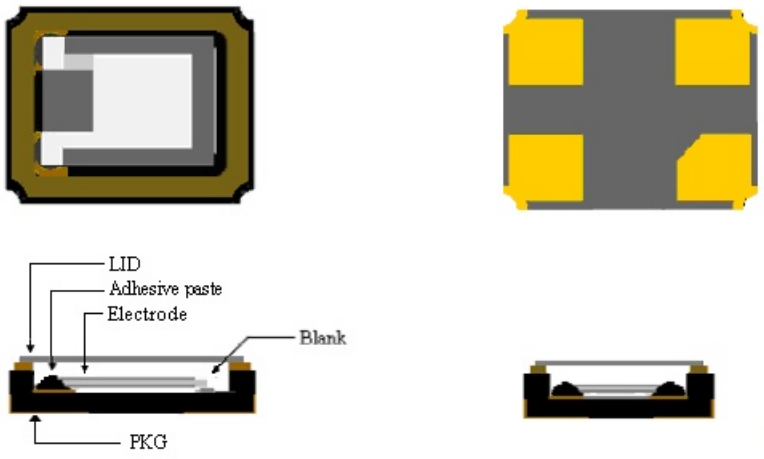
*unlabeled tolerance：± 0.1mm

I MARKING



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I PRODUCT LAYOUT

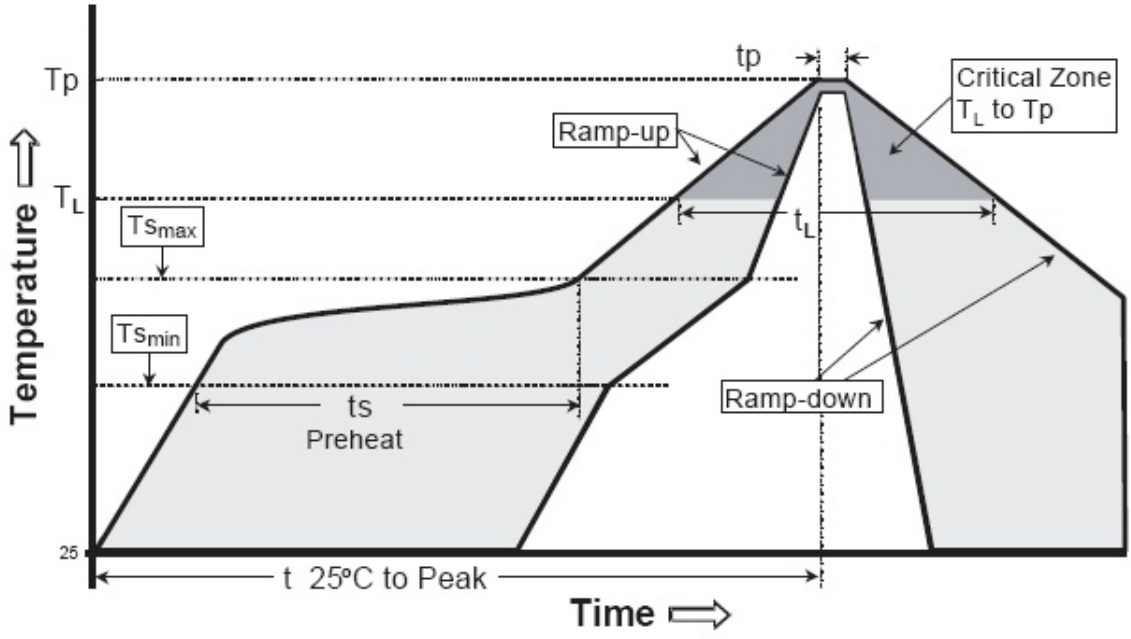


NO.	Part	Material	Remark
1	LID	KOVAR	
2	PKG	Al_2O_3	Base
3	Blank	SiO_2	Quartz
4	Adhesive paste	Ag/Silicon	Support
5	Electrode	Noble metal	

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I REFLOW PROFILES

Profiles Feature	Pb-Free Assembly
Average Ramp-up Rate (Ts max to Tp)	3℃/second max.
Preheat ■ Temperature Min (Ts min) ■ Temperature Max (Ts max) ■ Time (ts min to ts max)	 125℃ 200℃ 60~180 seconds
Time maintained above ■ Temperature (T_L) ■ Time (t_L)	 217℃ 60~150 seconds
Peak/Classification Temperature (Tp)	260℃
Time within 5℃ of actual Peak Temperature (t_p)	20~40 seconds
Ramp-down rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max.
Suggest reflow times	**3 Times max**

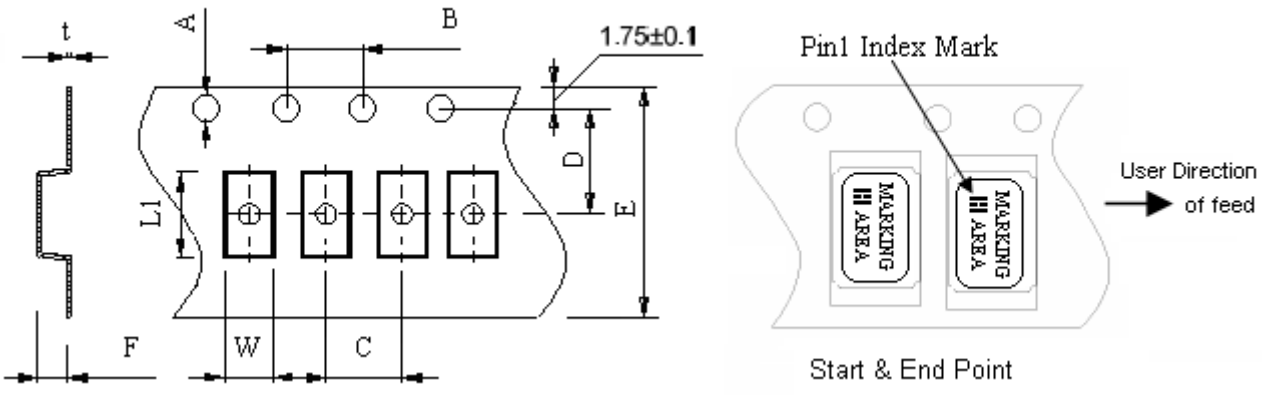


Remark：To reference JEDEC J-STD-020

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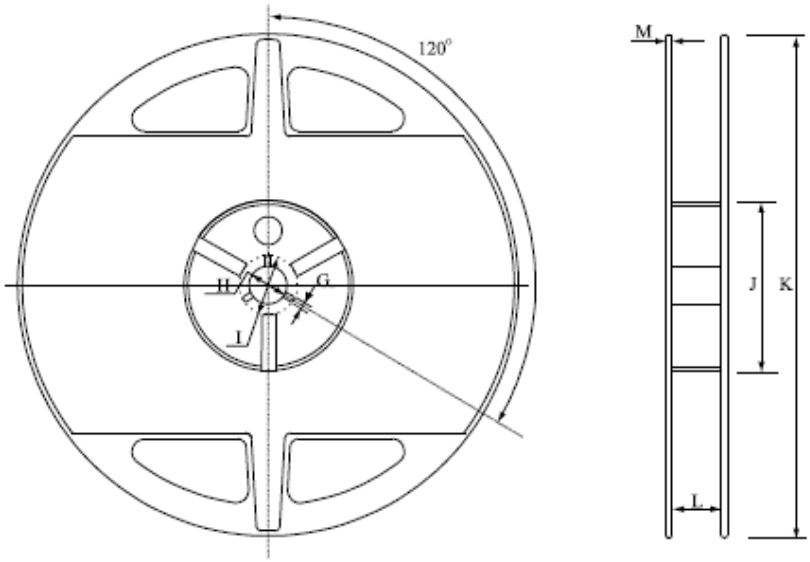
I PACKAGE(reference to EIA-481)

Tape Dimensions(unit : mm)



A	B	C	D	E	F	L1	W	t
1.5±0.1	4.0±0.1	4.0±0.1	3.5±0.1	8.0±0.1	0.6±0.1	1.8±0.1	1.4±0.1	0.25±0.05

Reel Dimensions(unit: mm)

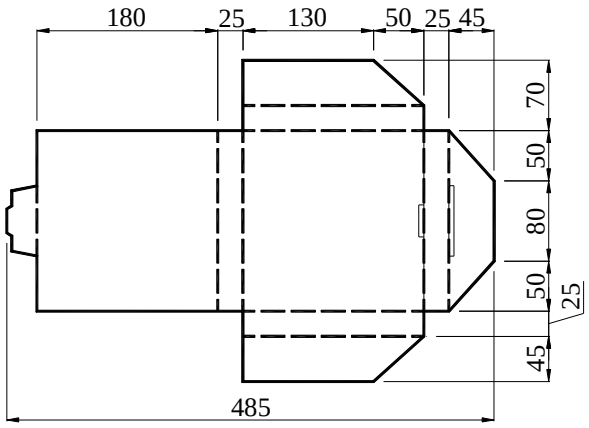


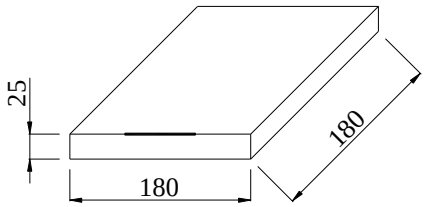
G	H	I	J	K	L	M
2.2±0.5	13.5±0.5	18.2±0.5	60.0±1.0	178.0±1.0	9.5±1.0	1.6±0.2

*5000pcs/Reel

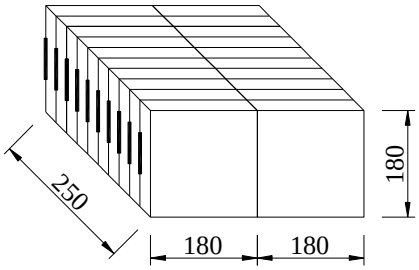
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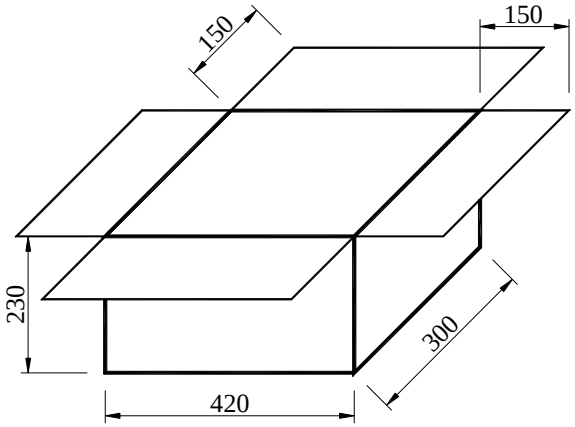
Carton Dimension (unit : mm)





1 reel = 1 Inner box





20 Inner boxes = 1 Carton

100kpcs = 1 Carton

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I RELIABILITY SPECIFICATIONS（REFER TO AEC-Q200）

No.	Test Item	Test Conditions	Reference	
1	High Temperature Storage	Temperature: 125℃±5℃ Time: 1000±12 Hours	AEC-Q200	MIL-STD-202 Method 108
2	Temperature Cycle	Temperature 1: -55℃±5℃ Temperature 2: 125℃±5℃ Temperature change between T1 and T2 at soonest; Run 1000 cycles, maintain T1 and T2 15minutes each in one cycle	AEC-Q200	JESD22 Method JA-104
3	Resistance to Soldering Heat	Pre-heat: 125℃ 60~120 Seconds Solder Temperature: 260℃±5℃ Time: 30 Seconds	AEC-Q200	MIL-STD-202 Method 210
4	Drop Test	3 Times Free Fall from 75cm height table to 3cm thickness hard wood board	IEC68-2-32	IEC68-2-32
5	Biased Humidity	Temperature: 85℃±5℃ Relative Humidity: 80%--85% Time: 1000Hours±12 Hours	AEC-Q200	MIL-STD-202 Method 103
6	Solderability	Dip in flux 5~10 seconds Temperature: 245℃±5℃ Time: 10 Seconds	AEC-Q200	J-STD-002
7	Operational Life	Temperature: 125℃±5℃ Time: 1000±12Hours	AEC-Q200	MIL-STD-202 Method 108
8	Terminal Strength	Leaded: force of 3±0.5Kg for 5~10 sec. in each terminal SMD: force of 3±0.5Kg for 60sec. in each side	AEC-Q200	MIL-STD-202 Method211 AEC Q200-006
9	Vibration	Frequency Range: 10Hz~2000Hz Amplitude: 1.5mm or 20G 4Hours in each direction, total 12Hours	AEC-Q200	MIL-STD-202 Method 204
10	Mechanical Shock	Peak value:100(g's) Normal duration: 6mS Waveform : Half-sine； Velocity change:12.3ft/s	AEC-Q200	MIL-STD-202 Method 213

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Notice

When the product is used for safety equipment related to human life and property, the customer has the responsibility to confirm the impact of the product on the equipment in advance. In the meantime, the safety design (redundancy design, fault prevention design, etc.) should be carried out to ensure sufficient safety of the equipment.

Safety-related equipment includes but not limited to:

1. Automotive, trains, ships, and equipment directly involved in the operation

2. Medical, military, space related

3. Disaster prevention and relief equipment and crime prevention equipment

4. Traffic lights

5. Other similar equipment with the same functionality as the above equipment

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I 应用注意事项 APPLICATION NOTES：

1. 焊接 soldering

石英晶体产品如果焊接温度过高过长，则可能导致频率发生较大的变化，请使用标准温度曲线来焊接，参考第 6 页 reflow 曲线。Please adhere to the standard temperature curve for soldering. The soldering temperature for quartz crystal products must be carefully controlled, as excessive temperature or prolonged exposure can result in significant frequency drift. For guidance, please refer to the reflow curve provided on page 6.

2. 清洗/涂层 Cleaning/Coating

2.1 对于一般清洗液（PH 中性）的使用以及超声波清洗没有问题，但这仅是对单个晶体产品进行试验所得的结果，因此请根据实际使用状态进行确认。The use of a general cleaning solution (pH neutral) and ultrasonic cleaning is acceptable; however, this applies only to single crystal products. The results obtained from testing should be verified in accordance with the actual usage conditions.

2.2 当在晶体周边或本体上使用保护涂层时请谨慎評估，不能使用有腐蚀性的材料，如聚氨酯胶，它可能会破坏晶体的密封性。 Please evaluate before apply a protective coating on or around the crystal unit. Do not use corrosive materials, such as polyurethane glue, which may destroy the seal of the crystal unit.

3. PCB 组装 PCB Assembly

3.1 分板工序中请注意分板过程中板子的弯曲度，弯曲度过大会可能导致晶体失效或焊接不良,请事先试验确认。尤其是使用玻璃胶封装的 GLASS 产品。During the de-boarding process, care must be taken to prevent excessive bending of the board, as this may lead to crystal failure or poor soldering quality. It is advisable to conduct tests and confirm results beforehand, particularly for GLASS products encapsulated with glass adhesive.

3.2 超声波封装的制程，会对晶体内部线路（振动过大）产生破坏，进而影响晶体的老化特性或导致晶体失效，故晶体 PCB 组装不推荐采用超声波封装制程。The ultrasonic packaging process can inflict damage on the internal circuits of the crystal unit due to excessive vibration, potentially affecting its aging characteristics or leading to failure. Therefore, we do not recommend using ultrasonic packaging for crystal PCB assembly.

3.3 注塑封装的制程，会因压力原因使晶体表面受压过大，进而影响晶体的外形变化，导致晶体失效或破裂，故晶体在 PCB 组装过程中采用注塑封装时，请和供应商说明，并先试样。The injection molding packaging process exerts significant pressure on the surface of the crystal unit, which may alter its shape and result in failure or breakage. Consequently, when utilizing injection molding during PCB assembly involving crystals, please communicate this requirement clearly with your supplier and conduct preliminary sample testing first.

4. 其他 Others

4.1 如果激励电功率过大，有可能导致晶体特性老化或损坏，请您注意规格书内的规定的范围。Excessive drive Level may lead to aging or degradation of crystal characteristics; therefore, adherence to specified ranges outlined in product specifications is essential.

4.2 为确保晶体振荡电路的稳定性。我司推荐电路的负性阻抗为晶体负载阻抗规格值的 3 倍以上，若是车载和安全设备，则推荐 10 倍以上。To maintain stability within crystal oscillation circuits, We recommends that negative impedance values for the circuits should be at least three times greater than those specified for load impedance associated with crystals; for automotive applications and safety equipment specifically, we advise maintaining a minimum factor of ten times.

4.3 未尽事宜，请联系我们。For any matters not covered, please contact us.

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