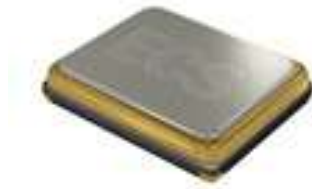




PRODUCT SPECIFICATION SHEET



Customer	-		
Customer P/N	-		
Product Type	Quartz Crystal Resonator		
Part Number	ECS-320-CDX-2662	Version	S0
Part Description	SMD X'tal 1.6 x 1.2		
Nominal Frequency	32.000000MHz		

Prepared	I.L.
Reviewed	A.A.
Approved	D.K.
Date	06/05/2026

Customer's Approval & Date :

ECS Inc. International

15351 W. 109th Street, Lenexa, Kansas 66219
www.ecsxtal.com

MSL1
Moisture
Sensitivity
Level



AEC-Q200 Qualified

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ATTENTION

- [1] If you intend to use products on the controlling equipment that relate to medical, aeronautical, aerospace, military science, space and etc., please make sure to let us know your intentions in advance.
- [2] Ultrasonic related process may cause damage to crystal blank by resonance itself. If ultrasonic related process is used, we strongly recommend assessing the damage risk under related ultrasonic conditions before use in production.

1. History of Specification Revision

[illegible]

2. Electrical Specifications

2.1 General specification

#	Parameter	Value/Description	Unit	Remark
1	Nominal frequency	32.000000	MHz	-
2	Cutting type	AT-cut	-	-
3	Oscillation mode	Fundamental	-	-
4	Moisture sensitivity level (MSL)	Level 1	-	J-STD-020
5	ESD	HBM $\geq$ 2000V	-	ANSI/ESDA/JEDEC JS-001

2.2 Operation conditions

#	Parameter	Min.	Typ	Max.	Unit	Remark
1	Operating temperature	-40	-	+125	°C	-
2	Storage temperature	-40	-	+125	°C	-
3	Load capacitance (C _L)	-	6	-	pF	-
4	Drive level	-	10	200	μW	-

2.3 Frequency stability & electrical parameters

#	Parameter	Min.	Typ.	Max.	Unit	Remark
1	Frequency tolerance (Overall)	-33	-	0	ppm	Within -40~+105°C, Include 2,3 and 4
		-33	-	+62		Within +105~+120°C, Include 2,3 and 4
		33	-	+72		Within +120~+125°C, Include 2,3 and 4
2	Initial frequency tolerance	-9	-	+11	ppm	At 25±3°C and specific load, refer to nominal frequency
3	Frequency versus temp. characteristics (Reference)	-18	-	+18	ppm	Within -40~+105°C, refer to frequency at 25°C
		-18	-	+50		Within +105~+120°C, refer to frequency at 25°C
		-18	-	+60		Within +120~+125°C, refer to frequency at 25°C
4	Frequency aging	-2	-	+1	ppm	At 25±3°C (First year)
		-4	-	+1		At 25±3°C (5 years)
		-6	-	+1		At 25±3°C (10 years)

2.3 Frequency stability & electrical parameters (Cont.)

#	Parameter	Min.	Typ	Max.	Unit	Remark
5	Equivalent series resistance (ESR)	-	40	60	ohms	-
6	Shunt capacitance (C0)	-30%	0.54	+30%	pF	Not grounded
7	Motional capacitance (C1)	-30%	1.17	+30%	fF	Not grounded
8	Motional inductance (L)	-30%	21.10	+30%	mH	Not grounded
9	Pulling sensitivity (TS)	-30%	14.20	+30%	ppm/pF	Not grounded
10	Insulation resistance	500	-	-	M-ohms	At DC 100V
11	Air-tightness	-	-	$1.1 \cdot 10^{-9}$	Pa m ³ /s	-

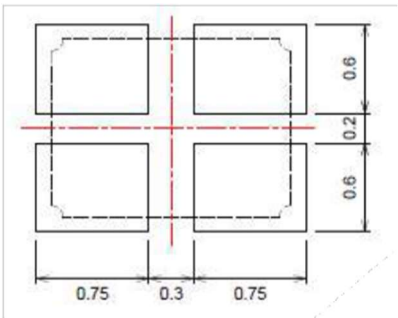
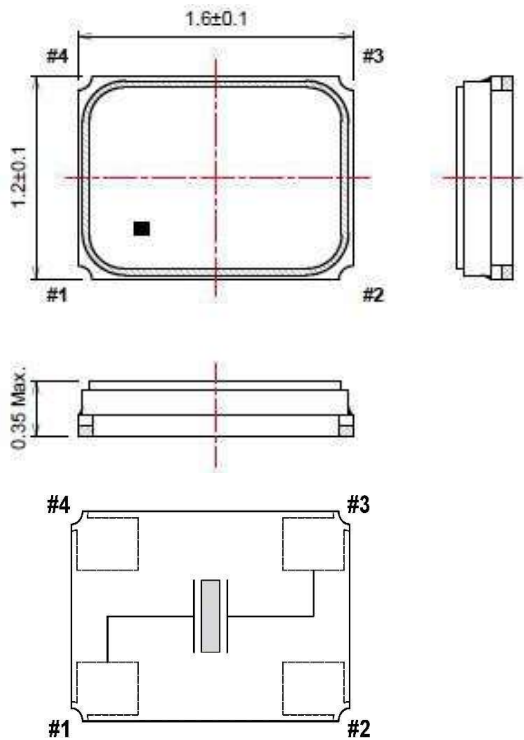
Measure equipment: Electrical characteristics is measured by S&A 250B or equivalent.

Standard atmospheric conditions:

Unless otherwise specified, the standard environmental conditions for performance measurement and tests are under ambient temperature at (25±3)°C and relative humidity: 40% to 70%.

3. Product Design

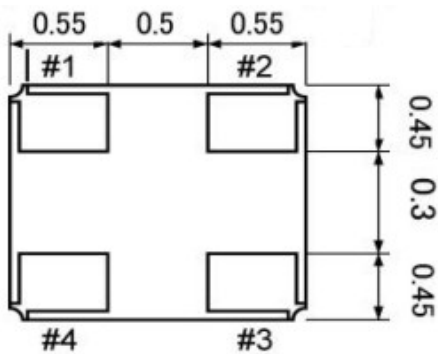
3.1 Package dimensions and pad functions



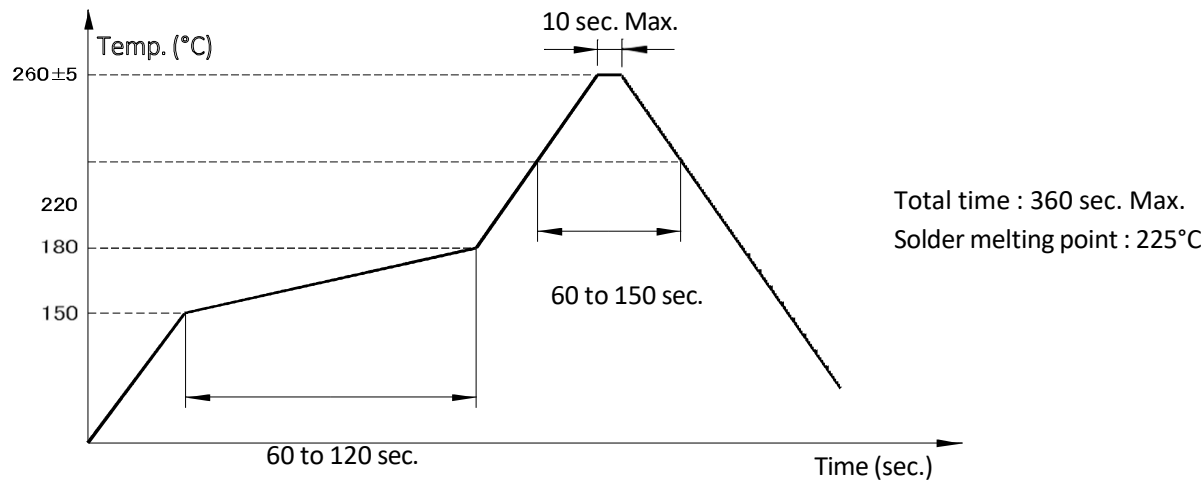
Unit : mm
Tolerance unless otherwise specified: ± 0.1 mm.

Pad	Function
#1	X'tal terminal (Input/output)
#2	GND terminal
#3	X'tal terminal (Input/output)
#4	GND terminal

3.2 Recommended land pattern

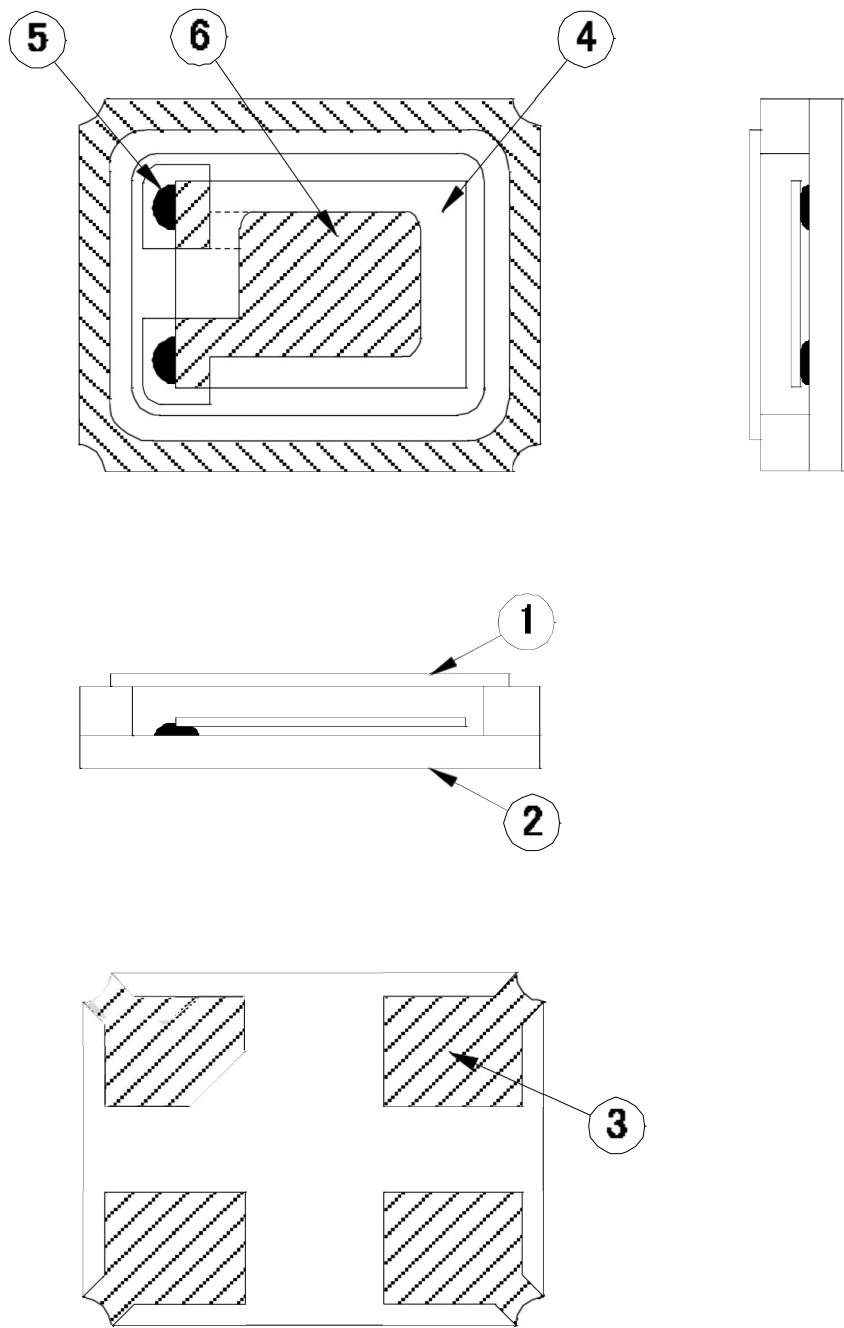


3.3 Recommended reflow profile



3. Product Design (Cont.)

3.4 Illustration to product structure



#	Components	Materials	Finish
1	Cap (Lid)	Kovar (Fe-Co-Ni)	Ni plating
2	Base (Package)	Almina ceramics (Al ₂ O ₃)	-
3	Pad (Package)	Ni + Au	Ni + Au plating
4	Crystal blank	SiO ₂	-
5	Conductive adhesive	Ag	Silicone resin
6	Electrode	Noble metal	-

4. Reliability

Test items and conditions

#	Item	Test Condition	Reference
1	High temperature exposure (storage)	1000 hours, unpowered. Tested at maximum specified operating temperature or maximum specified storage temperature (whichever is higher).	AEC-Q200 Test 3 MIL-STD-202 Method 108
2	Temperature cycling	1000 cycles, unpowered. Lower temperature of the chamber: -55°C. Upper temperature of the chamber: maximum specified operating temperature and shall not exceed 85°C. Dwell time (soak time): 30 minutes. Transition time: 1 minute maximum.	AEC-Q200 Test 4 JESD22-A104
3	Humidity bias	1000 hours. 85°C/85%RH with V _{DD} applied.	AEC-Q200 Test 7 MIL-STD-202 Method 103
4	High temperature operating life	1000 hours, with V _{DD} applied. Temperature of the chamber: maximum specified operating temperature up to 150°C.	AEC-Q200 Test 8 MIL-STD-202 Method 108
5	External visual	Inspect device construction, marking and workmanship. Pre and post electrical test not required.	AEC-Q200 Test 9 MIL-STD-883 Method 2009
6	Physical dimensions	Verify physical dimensions to the applicable component specification. Pre and post electrical test not required.	AEC-Q200 Test 10 JESD22-B100
7	Mechanical shock	Condition C, 100g's, 6 msec., half-sine, three shocks in each direction along the three mutually perpendicular axes.	AEC-Q200 Test 13 MIL-STD-202 Method 213
8	Vibration	Test from 10 Hz to 2000 Hz. 5g's for 20 minutes. 12 cycles each of 3 orientations.	AEC-Q200 Test 14 MIL-STD-202 Method 204
9	Resistance to soldering heat	Condition K, time above 217 °C , 60 sec. to 150 sec., reflow 3 cycles.	AEC-Q200 Test 15 MIL-STD-202 Method 210

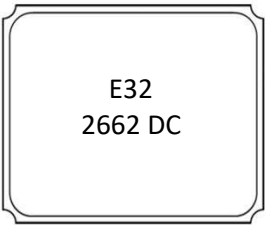
4. Reliability (Cont.)

Test items and conditions (Cont.)

#	Item	Test Condition	Reference
10	Solderability	Method B1, Coating Durability Category 2. Method D, Coating Durability Category 2. Pre and post electrical test not required.	AEC-Q200 Test 18 J-STD-002
11	Electrical characterization	Summary to show minimum, maximum, mean and standard deviation at room, minimum and maximum operating temperatures. Pre and post electrical test not required.	AEC-Q200 Test 19 Product specification sheet
12	Board flex (SMD)	Board bending displacement: 2.5 mm, holding time: 60 sec.	AEC-Q200 Test 21 AEC-Q200-005
13	Terminal strength (SMD)	Force: 1.8 kg, holding time: 60 sec.	AEC-Q200 Test 22 AEC-Q200-006

5. Marking and Packing

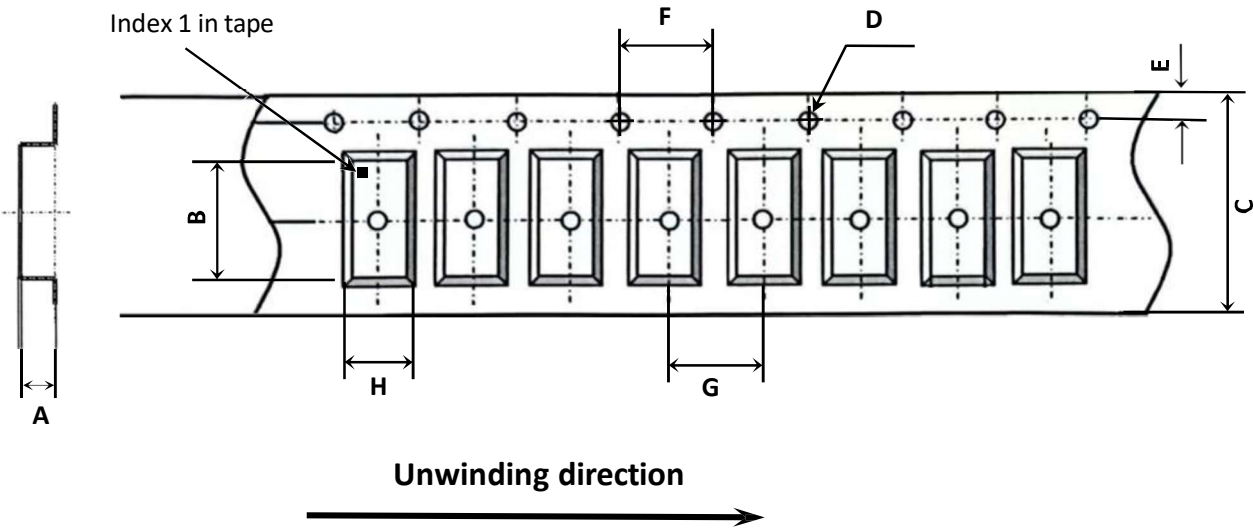
5.1 Marking definition



E = ECS Inc. International
32 = 32.000 MHz
2662 = Control Drawing Number
DC = Date Code (ex. A6, January 2026)

5.2 Packing (EIA-481-2)

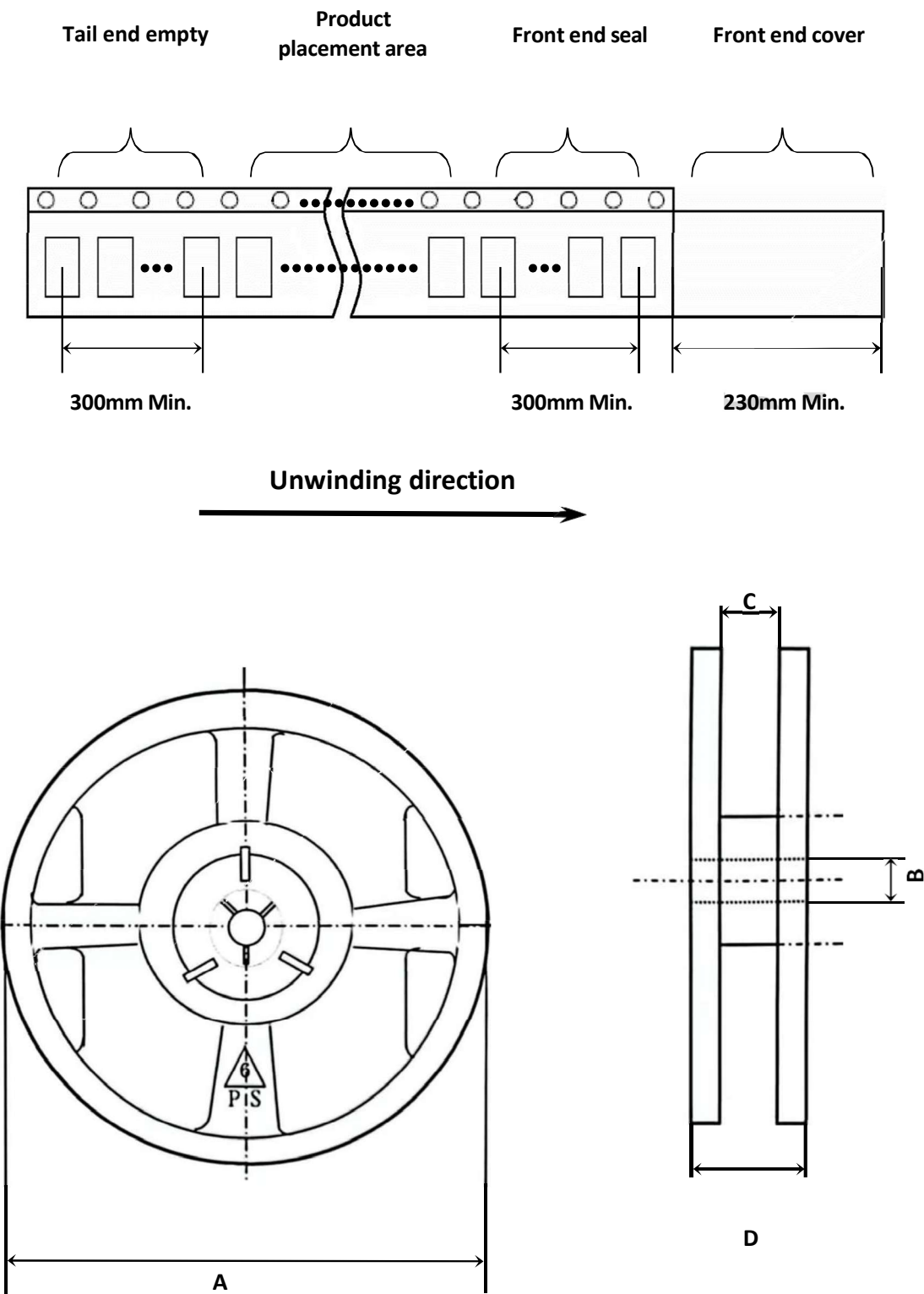
8mm-4mm 3000pcs / reel



Tape dimension (Unit : mm)							
A	B	C	D	E	F	G	H
0.45±0.1	1.79±0.1	8.0±0.2	1.55±0.05	1.75±0.1	4.00±0.2	4.00±0.1	1.39±0.1

5. Marking and Packing (Cont.)

5.2 Packing (EIA-481-2) (Cont.)



3,000 pcs/reel

Reel dimension (Unit : mm)			
A	B	C	D
178±2.0	13.2±0.5	9.0±0.5	11.5±1.4

5. Marking and Packing (Cont.)

5.3 SMD product packing standard

Reel packing		
	Name: reel	
	Standard: diameter 18cm	
	Material: plastics	

Remark:

Product storage conditions:

- [1] Temperature: 15 to 35°C.
- [2] Humidity: 30 to 70% RH.
- [3] Time: within 18 months after delivery.
- [4] Please store the products in a dry, clean, well-ventilated area and avoid direct sunlight exposure, heat, and vibration.