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SPECIFICATION FOR APPROVAL

CUSTOMER : _____

PRODUCT TYPE : SMD SEAM SEALING X'TAL 3.2*2.5

NOMINAL FREQ. : 32.768MHz

STARWAVE P/N : SWXCCABVE0-32.768000

REVISION : A1

CUSTOMER P/N : _____

PM / SALES : _____

DATE : _____

CUSTOMER SIGNATURE & Date

- (1) STAR requires one copy returned with signature and title of authorized individual that signifies acceptance of the attached specifications.
- (2) Orders received and accepted by STAR after return of signed copy of specification will be produced per these specifications.
- (3) Any changes to these specifications must be agreed upon by both parties and new revision of the Product Specification Sheet will be issued.
- (4) Any issuance of purchase order prior to consigning back the Approval page of "Specification Sheets" from customers will be regarded as the agreement on the contents of these specifications.

RoHS Compliant

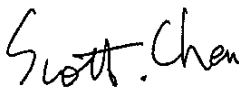
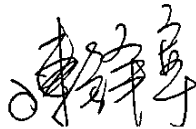
PRODUCT SPECIFICATION SHEET

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NOMINAL FREQ. : 32.768MHz

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REVISION : A1

PE/RD	QA	MFG
		
23-Apr-25	23-Apr-25	23-Apr-25

NOTE:

- (1)Lead Free Products are "Directive 2002/95/EC of The European Parliament of 27 January 2003 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment" Compliant (Attachment: SGS Test Report).
- (2)Revision "Sx" is for engineering samples only. PE/RD's approval required.
- (3)Revision "Ax" is production ready. PE, QA and MFG's approval required.

RoHS Compliant

■ ELECTRICAL SPECIFICATIONS

Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:

Ambient temperature : $25 \pm 5^{\circ}\text{C}$
Relative humidity : 40%~70%

If there is any doubt about the results, measurement shall be made within the following limits:

Ambient temperature : $25 \pm 3^{\circ}\text{C}$
Relative humidity : 40%~70%

Measure equipment

Electrical characteristics measured by HP E5100A or equivalent.

Crystal cutting type

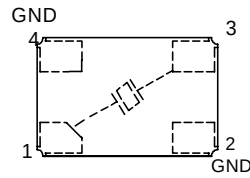
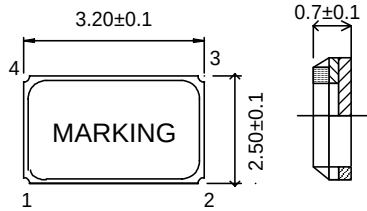
The crystal is using AT CUT (thickness shear mode).

Unit Weight:

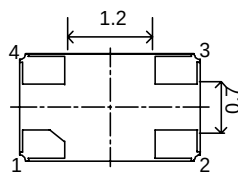
0.018 ± 0.001 g/pcs

	Parameters	SYM.	Electrical Spec.				Notes
			MIN	TYPE	MAX	UNITS	
1	Nominal Frequency	FL	32.768000			MHz	-
2	Oscillation Mode	-	Fundamental			-	-
3	Load Capacitance	CL	12.5			pF	-
4	Frequency Tolerance	-	± 10			ppm	shift to -5ppm at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
5	Frequency Tolerance	-	± 20			ppm	Over Operating Temp. Range (Reference 25°C)
6	Operating Temperature	-	-40	~	85	$^{\circ}\text{C}$	-
7	Aging	-	± 3			ppm	1st Year
8	Drive Level	DL	-	100	-	μW	-
9	Effective Resistance Rr	Rr	-	-	50	Ω	-
10	Shunt Capacitance C0	C0	-	1.3	-	pF	-
11	Motional Capacitance C1	C1	-	3.0	-	fF	-
12	Insulation Resistance	-	500	-	-	M Ω	at DC 100V
13	Storage Temperature Range	-	-40	~	125	$^{\circ}\text{C}$	-
14	Pulling Sensitivity	-	15	~	19	ppm/pF	-

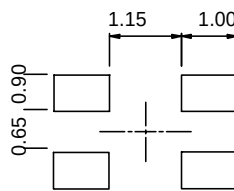
DIMENSIONS



Internal View Connection



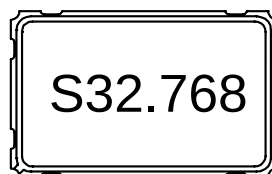
Top View



Suggest Layout

Units:mm

MARKING



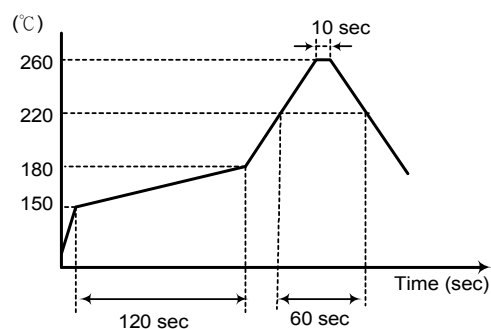
Frequency(MHz)
ex:32.768000MHz=32.768

This date code will be cycled every four years

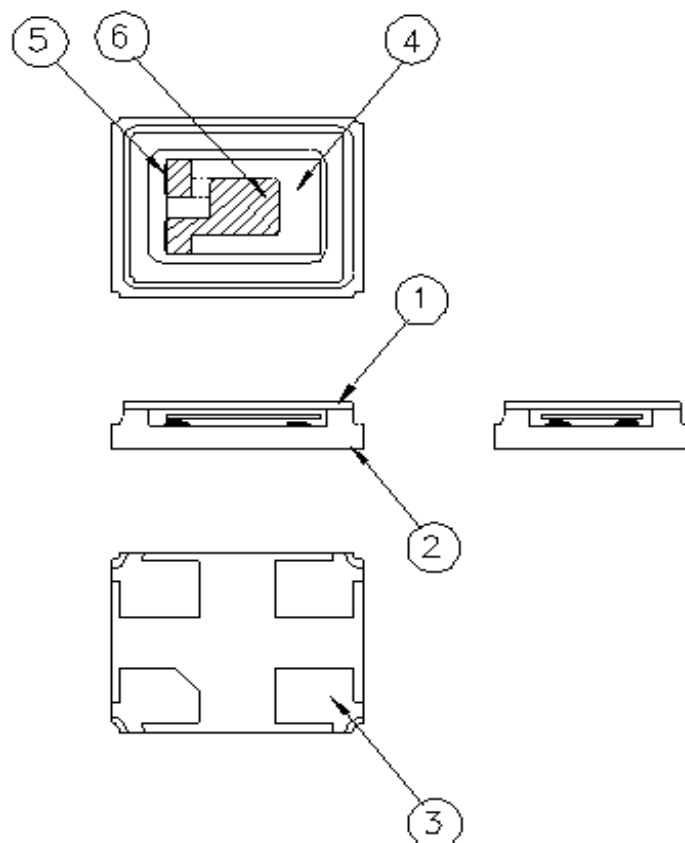
SUGGESTED REFLOW PROFILE

Total time : 200 sec. Max.

Solder melting point :220 °C

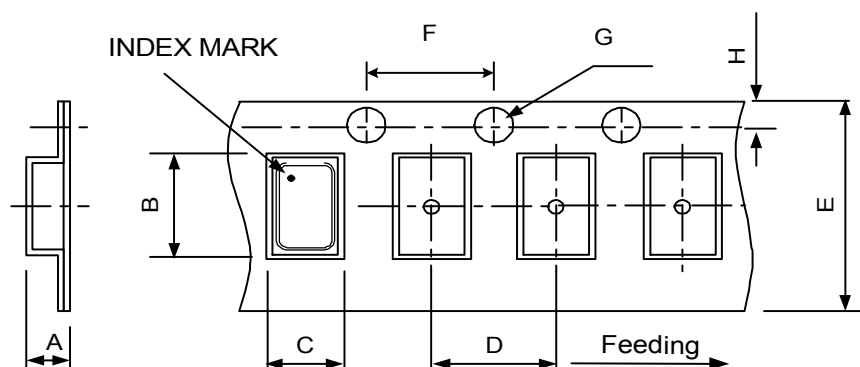


■ STRUCTURE ILLUSTRATION



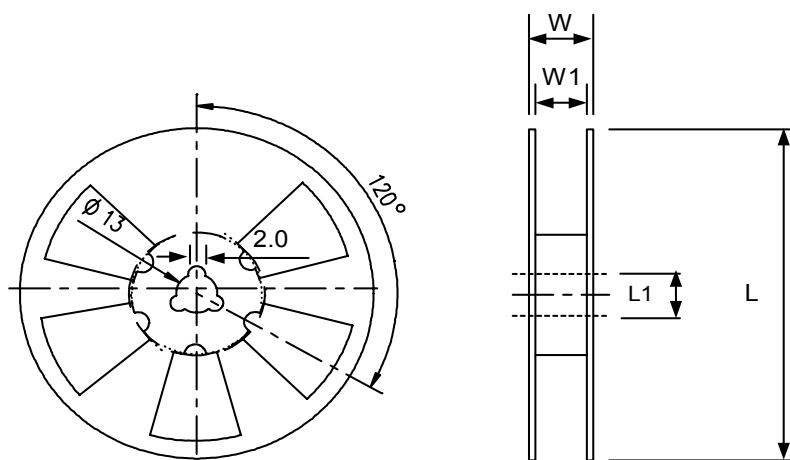
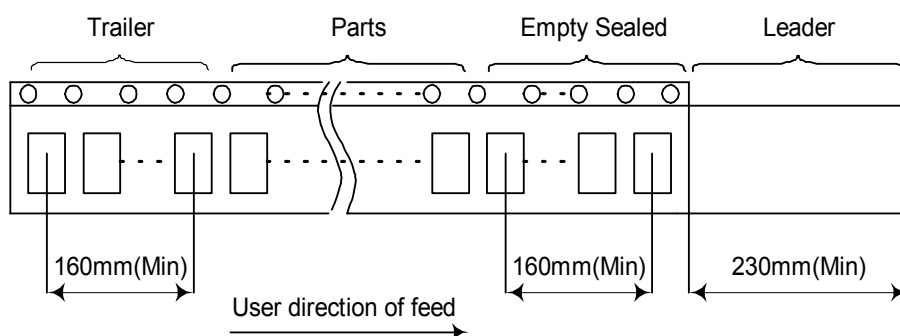
NO	COMPONENTS	MATERIALS	QTY	FINISH/SPECIFICATIONS
1	Lid	Kovar (Fe/Co/Ni)	1	-
2	Base(Package)	Ceramic (Al ₂ O ₃) + Kovar (Fe/Co/Ni)+ Ag/Cu	1	Color black
3	PAD	Au	4	Tungsten metalize + Ni plating + Au plating
4	Crystal blank	SiO ₂	1	-
5	Conductive adhesive	Ag	4	Silicon resin
6	Electrode	Au + Cr	2	-

■ PACKING : (EIA-481-2)



DIMENSIONS	A	B	C	D	E	F	G	H	
	1.40	3.40	2.70	4.00	8.00	4.00	1.50	1.75	(UNIT : mm)

REMARK :



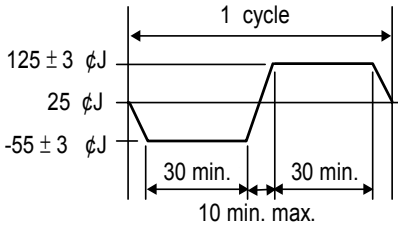
DIMENSIONS	L	L1	W	W1	pcs / Reel (UNIT : mm)
	178	13	11.5	8	Standard Reel Quantity is 3,000 pcs per reel

■ RELIABILITY SPECIFICATIONS

1. Mechanical Endurance

No.	Test Item	Test Methods	REF.DOC
1.1	Drop Test	150 cm height, 3 times on concrete floor.	JIS C6701
1.2	Mechanical Shock	Device are shocked to half sine wave (1000 G) three mutually perpendicular axes each 3 times. 0.5m sec. duration time	MIL-STD-202F
1.3	Vibration	Frequency range 10 ~ 2000 Hz Amplitude 1.52 mm/20G Sweep time 20 minute Perpendicular axes each test time 4 hours (Total test time 12 hours)	MIL-STD-883E
1.4	Gross Leak	Standard Sample For Automatic Gross Leak Detector, Test Pressure: 2Kg / cm ²	MIL-STD-883E
1.5	Fine Leak	Helium Bombing 4.5 Kg/ cm ² for 2 hr	
1.6	Solder ability	Temperature 260 °C ± 5°C Immersing depth 0.5 mm minimum Immersion time 5 ± 1 seconds Flux Rosin resin methyl alcohol solvent (1 : 4)	MIL-STD-883E

2. Environmental Endurance

No.	Test Item	Test Methods	REF. DOC
2.1	Resistance To Soldering Heat	Pre-heat temperature 125 °C Pre-heat time 60 ~ 120 sec. Test temperature 260 ± 5 °C Test time 10 ± 1 sec.	MIL-STD-202F
2.2	High Temp. Storage	+ 125 °C ± 3 °C for 500 ± 12 hours	MIL-STD-883E
2.3	Low Temp. Storage	- 40 °C ± 3 °C for 500 ± 12 hours	
2.4	Thermal Shock	Total 100 cycles of the following temperature cycle  The diagram shows a temperature cycle with three levels: 125 ± 3 °C, 25 °C, and -55 ± 3 °C. The cycle consists of a 30 min. dwell at the high temperature, a 10 min. max. ramp down to the low temperature, a 30 min. dwell at the low temperature, and a 10 min. max. ramp up to the high temperature. The total duration of one cycle is indicated as 1 cycle.	MIL-STD-883E
2.5	High Temp & Humidity	85°C ± 3°C, RH 85% , 500Hrs	JIS C5023
2.6	Pressure Cooker Storage	121 ± 3°C , RH100% , 2 bar , 240Hrs	JIS C6701