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SPECIFICATION FOR APPROVAL

CUSTOMER : _____

PRODUCT TYPE : SMD CXO 7.0*5.0

NOMINAL FREQ. : 12.288MHz

STARWAVE P/N : SWOACV33EF-12.288000

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.

RoHS Compliant

PRODUCT SPECIFICATION SHEET

PRODUCT TYPE : SMD CXO 7.0*5.0

NOMINAL FREQ. : 12.288MHz

STARWAVE P/N : SWOACV33EF-12.288000

REVISION : A1

PE/RD	QA	MFG
Zhang fen qi	Xu wen tao	Luo jun jie
05-Feb-26	05-Feb-26	05-Feb-26

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 : $22\pm 5^{\circ}\text{C}$
 Relative temperature : 40%~70%

If there is no doubt about the results, measurement shall be made within the following limits:

Ambient temperature : $22\pm 1^{\circ}\text{C}$
 Relative temperature : 40%~70%

Measure equipment

Electrical characteristics measured by MD 37WX-05M or equivalent.

Crystal cutting type

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

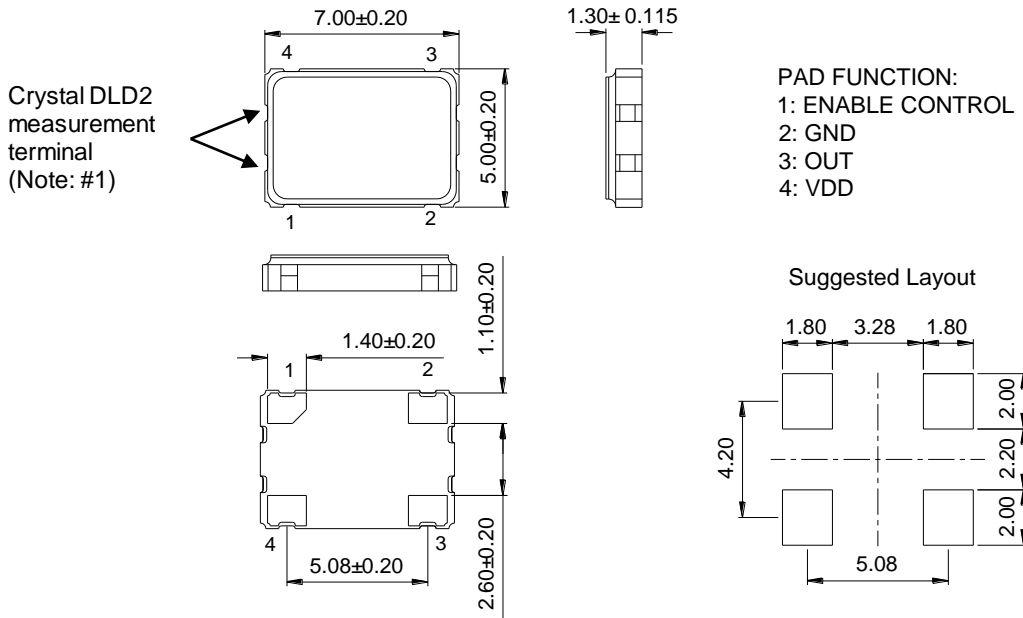
Unit Weight:

0.051±0.001 g/pcs

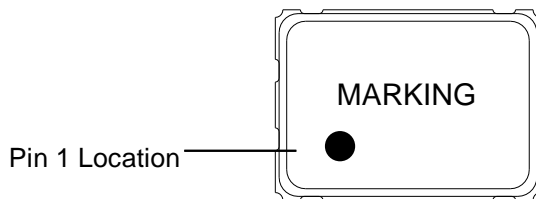
	Parameters	SYM.	Electrical Spec.				Notes
			MIN	TYPE	MAX	UNITS	
1	Nominal Frequency	-	12.288000			MHz	-
2	Frequency Stability	-	±30			ppm	-
3	Operating Temperature	Topr	-40	25	85	°C	-
4	Storage Temperature	Tstg	-55	~	125	°C	-
5	Supply Voltage	VDD	3.3 ±10%			V	-
6	Input Current	Icc	-	-	20	mA	-
7	Enable Control	-	Yes			-	Pad 1
8	Output Load : CMOS	CL	15			pF	-
9	Output Voltage High	VoH	2.97	-	-	V	-
10	Output Voltage Low	VoL	-	-	0.33	V	-
11	Rise Time	Tr	-	-	5	ns	10%→90%VDD Level
12	Fall Time	Tr	-	-	5	ns	90%→10%VDD Level
13	Symmetry (Duty ratio)	TH/T	45	~	55	%	-
14	Start-up Time	Tosc	-	-	10	ms	-
15	Enable Voltage High	Vhi	70%Vdd	-	-	V	-
16	Disable Voltage Low	Vlo	-	-	30%Vdd	V	-
17	Aging	-	±3			ppm/yr.	1st. Year at 25°C
18	Output Disable Delay Time	T off	-	-	100	nS	-
19	Output Enable Delay Time	T on	-	-	100	nS	-

■ DIMENSIONS

(Unit:mm)



■ MARKING



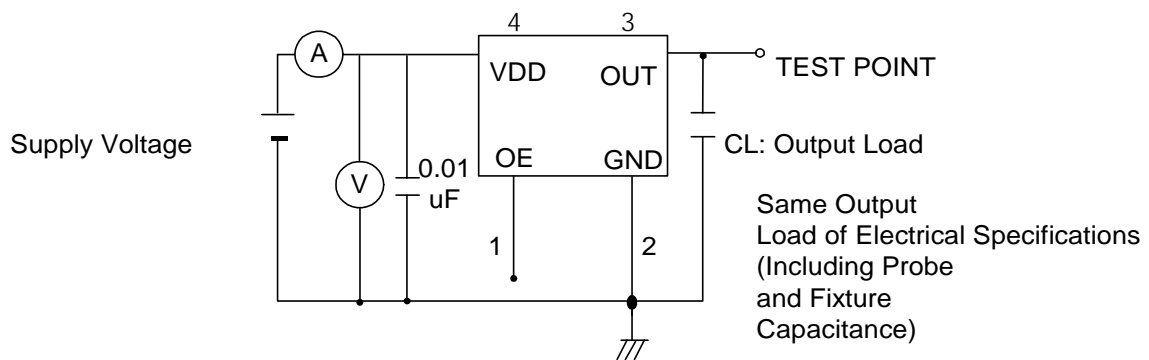
TEST DIAGRAM

Pad 1 options:

- a. N/C
- b. Control input (output enable/disable)

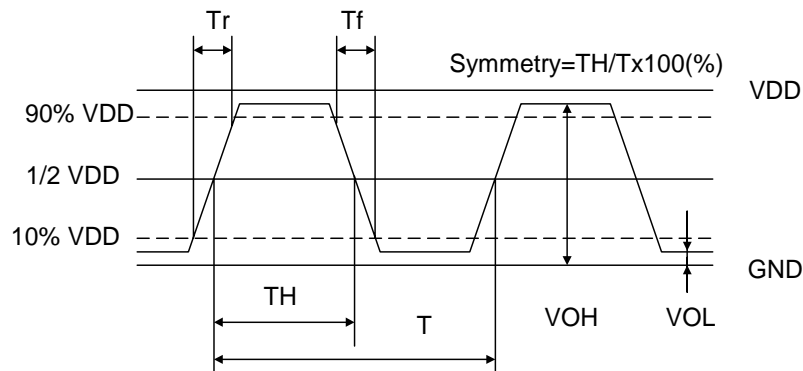
Logic 1 or open on pad 1: Oscillator output

Logic 0 on pad 1 : Disable output to high impedance



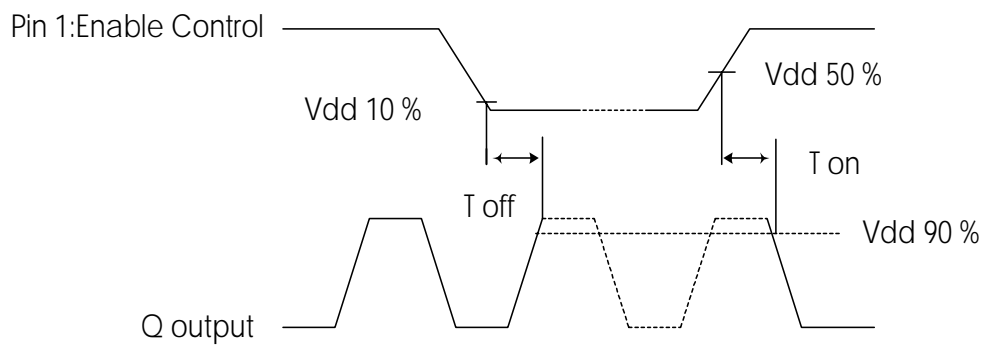
WAVEFORM CONDITIONS

Waveform measurement system should have a min. bandwidth of 5 times the frequency being tested.



■ OUTPUT ENABLE / DISABLE DELAY

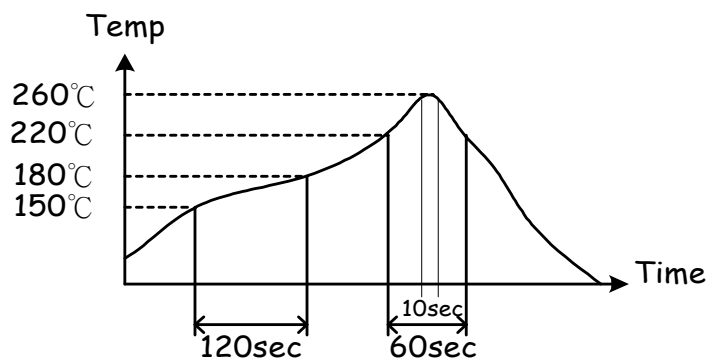
The following figure shows the oscillator timing during normal operation . Note that when the device is in standby, the oscillator stops. When standby is released, the oscillator starts and stable oscillator output occurs after a short delay.



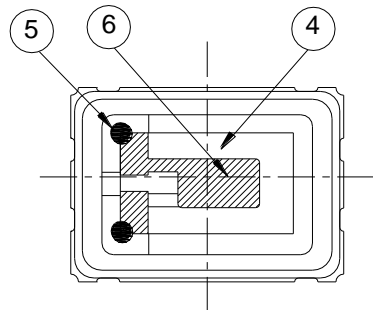
■ SUGGESTED REFLOW PROFILE

Total time : 200 sec. Max.

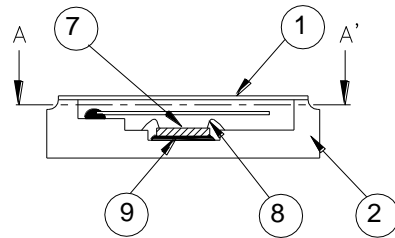
Solder melting point :220 °C



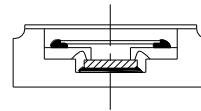
■ STRUCTURE ILLUSTRATION



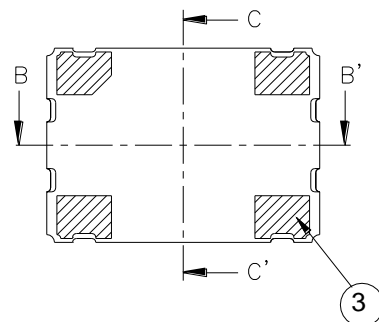
A-A' sectional drawing



B-B' sectional drawing

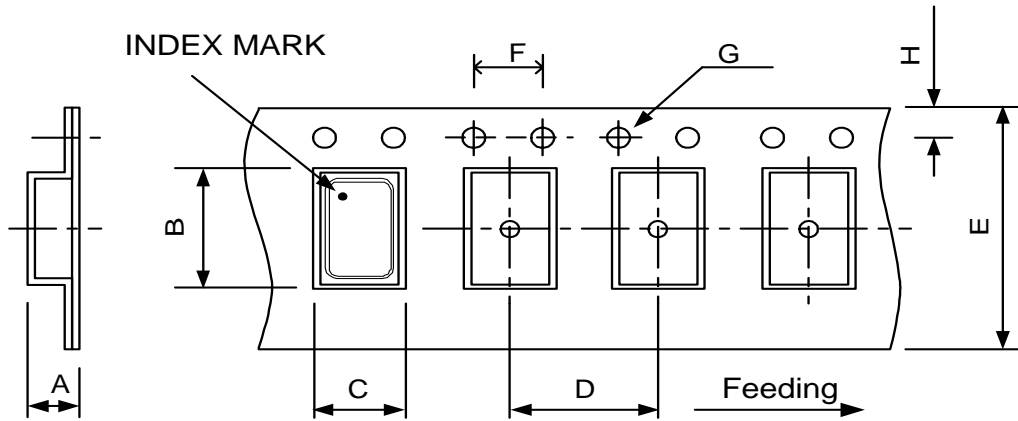


C-C' sectional drawing



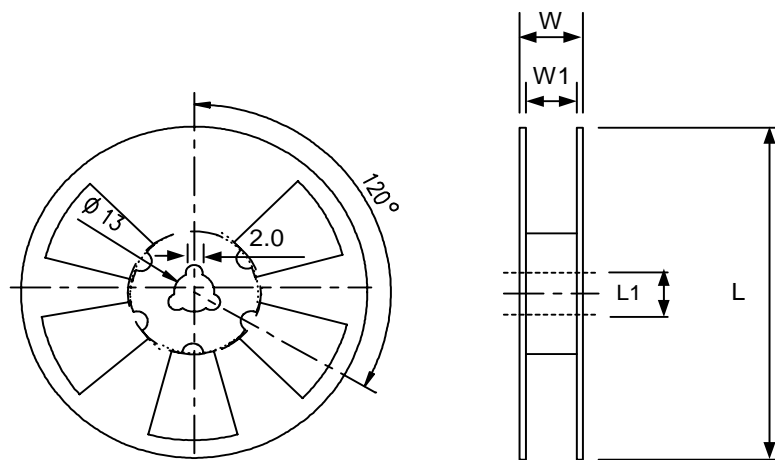
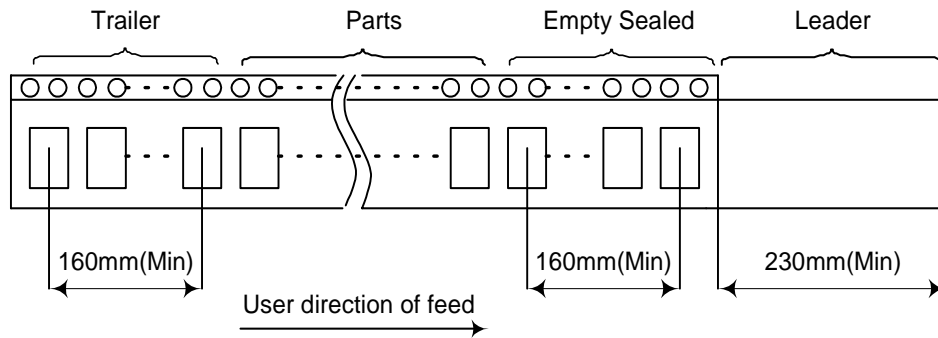
NO	COMPONENTS	MATERIALS	FINISH/SPECIFICATIONS
1	LID	Kovar (Fe/Co/Ni)	-
2	Base(Package)	Ceramic (Al ₂ O ₃) + Kovar (Fe/Co/Ni)+ Ag/Cu	Color black
3	PAD	Au	Tungsten metalize + Ni plating + Au plating
4	Crystal blank	SiO ₂	-
5	Conductive adhesive	Ag	Silicon resin
6	Electrode	Noble Metal	-
7	IC chip	-	-
8	Bonding wire	Au	Pad 1 options : NC is 5 wires , EN is 6 wires.
9	Die attached	Conductive (Ag)	Epoxy resin

PACKING : (EIA-481-2)



DIMENSIONS	A	B	C	D	E	F	G	H	(UNIT : mm)
	2.00	7.90	5.45	8.00	16.00	4.00	1.50	1.75	

REMARK :



DIMENSIONS	L	L1	W	W1	pcs / Reel (UNIT : mm)
	180	13	20.5	16	Standard Reel Quantity is 1,000 pcs per reel

■ RELIABILITY SPECIFICATIONS

No.	Test Item	Test Methods	REF. DOC
1	Drop Test	75 cm height, fall freely onto stainless plate 3 times.	JIS C6701
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
3	Vibration	Frequency range 10 ~ 2000 Hz Amplitude 1.52 mm Sweep time 20 minute Perpendicular axes each test time 4 hours (Total test time 12 hours)	MIL-STD-883E
4	Solderability	Temperature 255 °C ± 5°C Immersing depth 0.5 mm minimum Immersion time 10 ± 0.5 seconds Flux Rosin resin methyl alcohol solvent (1 : 4)	MIL-STD-883E
5	Resistance To Soldering Heat	Pre-heat temperature 125 °C Pre-heat time 60 ~ 120 sec. Test temperature 260 ± 5 °C Test time 5 ± 1 sec.	MIL-STD-202F
6	High Temp. Storage	+ 125 °C ± 2 °C for 1000 ± 12 hours	MIL-STD-883E
7	Low Temp. Storage	- 40 °C ± 2 °C for 1000 ± 12 hours	
8	Thermal Cycles	Total 100 cycles of the following temperature cycle 	MIL-STD-883E
9	High Temp. Operation	+ 85°C, VDD, for 1000 hours	MIL-STD-883E
10	Pressure Cooker Storage	120 ± 3°C, RH100%, 2 bar, for 240 hours	