Temperature Compensated Crystal Oscillator (TCXO)

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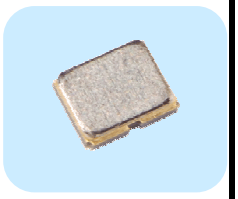


Data Sheet

MODEL : TG2016SLN 32.000000MHz ACGNNM

SPEC. No. : ISD-19-1317 Rev.01

DATE : Oct.24, 2019

SEIKO EPSON CORPORATION

Pb free	Pb free.
RoHS Compliant	Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)

INTRODUCTION

1. Any part of this material may not be reproduced or duplicated in any form or any means without the written permission of Seiko Epson.
2. This sheet is not intended to guarantee or provide an approval of implementation of industrial patents.

Data Sheet

[1] Characteristics

· Package size (2.0 mm×1.6 mm×0.61 mm)

· High stability TCXO

· Output waveform : Clipped sine wave

[2] Absolute maximum ratings

Parameter	Symbol	Specifications			Unit	Conditions
		Min.	Typ.	Max.		
Supply voltage	Vcc-GND	-0.3	-	+4.0	V	
Storage temperature range	T_stg	-40	-	+105	°C	Storage as single product

[3] Recommended operating conditions

Parameter	Symbol	Specifications			Unit	Conditions
		Min.	Typ.	Max.		
Supply voltage	Vcc	2.9	3.0	3.1	V	Vcc=3.0V +/-0.1V
Supply voltage	GND	0	-	0	V	
Operating temperature range	T_use	-40	+25	+85	°C	
Output load	Load_R	9	10	11	kΩ	
Output load	Load_C	9	10	11	pF	
Output load	Cc	0.01	-	-	µF	DC-cut capacitor *

* DC-cut capacitor is not included in this TCXO. Please attach an external DC-cut capacitor to the out pin.

[4] Frequency characteristics

(Vcc =3.0 V, GND=0.0 V, Load=10 kΩ // 10 pF, T_use=+25°C)

Parameter	Symbol	Specifications			Unit	Conditions
		Min.	Typ.	Max.		
Output Frequency	fo	-	32	-	MHz	
Frequency tolerance *1	f_tol	-2.0	-	+2.0	$x10^{-6}$	T_use=+25°C+/-2°C After 2 reflows *2
Frequency / temperature characteristics (Reference to +25°C)	fo-Tc	-0.5	-	+0.5	$x10^{-6}$	T_use=-40°C to +85°C
Frequency / load coefficient	fo-Load	-0.1	-	+0.1	$x10^{-6}$	Load +/-10%
Frequency / voltage coefficient	fo-Vcc	-0.2	-	+0.2	$x10^{-6}$	Vcc +/-5% *3
Frequency aging	f_age	-1.0	-	+1.0	$x10^{-6}$	T_use=+25 °C, 1year

*1 Include initial frequency tolerance and frequency deviation after reflow cycles.

*2 Measured in the elapse of 24 hours after reflow soldering.

*3 Vcc +/- 0.1V must be in operating supply voltage range (2.9 V to 3.1 V)

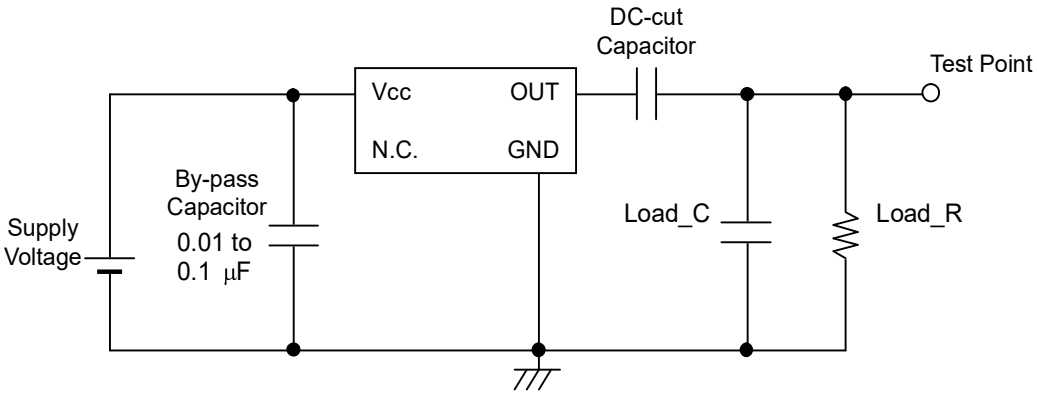
[5] Electrical characteristics

(Vcc =3.0 V, GND=0.0 V, Load=10 kΩ // 10 pF, T_use=+25°C)

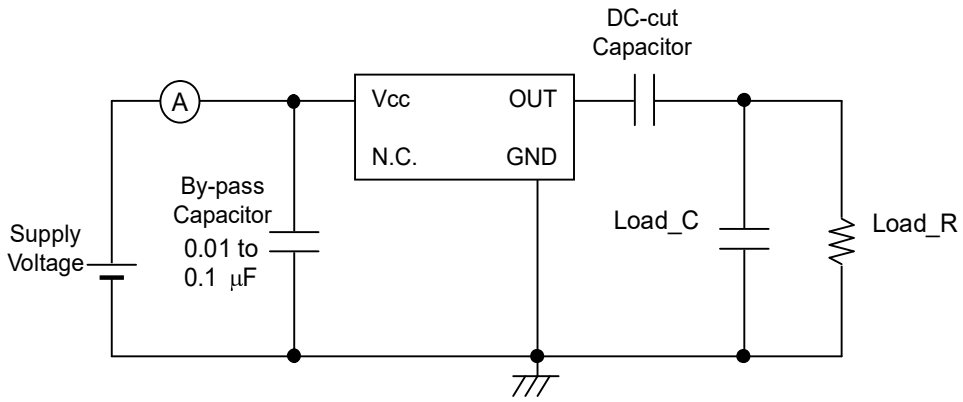
Parameter	Symbol	Specifications			Unit	Conditions
		Min.	Typ.	Max.		
Current consumption	Icc	-	-	2.0	mA	
Output level	Vp-p	0.8	-	1.5	V	Peak to peak voltage
Start up time	t_sta	-	-	1.0	ms	Until output signal has been reached min 90% of final amp.
Start up time	t_sta	-	-	2.0	ms	Until frequency has been reached within +/-0.5x10^{-6} of final frequency.
Symmetry	SYM	45	50	55	%	GND level (DC-cut)
Harmonics	-	-	-	-10.0	dBc	

[6] Test circuit

1) Output Load : Load_R // Load_C = 10 kΩ // 10 pF



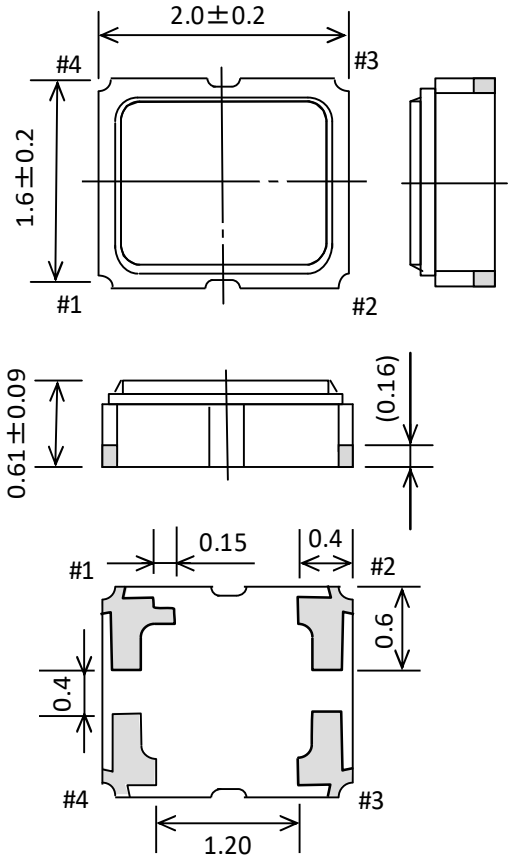
2) Current consumption



3) Conditions

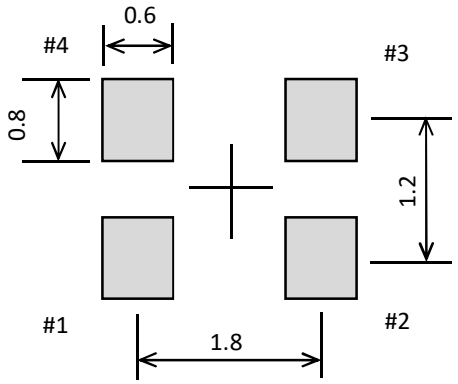
1. Oscilloscope: Impedance Min. 1MΩ
   Input capacitance Max. 10 pF
   Band width Min. 300 MHz
   Impossible to measure both frequency and wave form at the same time.
   (In case of using oscilloscope's amplifier output, possible to measure both at the same time.)
2. Load_C includes probe capacitance.
3. A capacitor (By-pass:0.01 to 0.1 μF) is placed between Vcc and GND,and closely to TCXO.
4. Use the current meter whose internal impedance value is small.
5. Power Supply
   Impedance of power supply should be as low as possible.
6. GND pin should be connected to low impedance GND.

[7] Outline drawing unit:mm



Material
Ceramics(Cavity)
Au plated nickel(Electric terminal)
Fe-Ni-Co(Lid)

[8] Recommended foot print unit:mm



Pin #	Connection
1	N.C. (*1)
2	GND
3	OUT
4	Vcc

*1) Please keep “N.C.” pin OPEN condition
or GND connection.
"N.C." pin doesn’t work as a ground pin.

For stable operation, please add a bypass capacitor(0.01uF to 0.1uF) between Vcc and GND. Please place it as close to TCXO as possible.

Please do not place any pattern between footprint pads.

[9] Handling precautions

Prior to using this product, please carefully read the section entitled “Precautions” on our Web site (https://www5.epsondevice.com/en/information/#precaution) for instructions on how to handle and use the product properly to ensure optimal performance of the product in your equipment.
Before using the product under any conditions other than those specified therein, please consult with us to verify and confirm that the performance of the product will not be negatively affected by use under such conditions.
In addition to the foregoing precautions, in order to avoid the deteriorating performance of the product, we strongly recommend that you DO NOT use the product under ANY of the following conditions:

(1) When mounting the product on a board using water-soluble sold remove the residue of the flux from the board. Especially the residues that contains active halogens, will negatively affect the performance and product.
(2) Do not excessively give mechanical or vibration shock on the product since it contains a crystal unit inside .
(3) Do not use the product being exposed to chemical substances that are corrosive to metal or plastic materials (Ex. Salt water, organic solvent, chemichal gas, etc)
Do not use the product being exposed to sunlight, dust, corrosive gasses, or other materials for a long time.
(4) Since this product contains a semiconductor inside, do not use it beging exposed to static electricity or electromagnetic waves.
(5) Ultrasonic cleaning might damage a X'tal unit inside. Please carefully check before applying ultrasonic cleaning.
(6) As well as other semiconductors or precision components, do not use the product under circumstances that may negatively affect the performance and/or reliability of the product.
(7) Power supply with ripple may cause unexpected operation or degradation of phase noise characteristics, so please evaluate carefully before use.
(8) Supply voltage should be increased monotonically. In addidion,please do not power on at midpoint potential since that may cause malfunction or no output.
(9) Aging stability is estimated from environmental reliability tests; expected amount of the frequency variation. This does not intend to guarantee the product-life cycle.
(10)Do not place signal lines ,supply voltage lines, or GND lines on the area where the oscillators are soldered, their internal layer, and their reverse side. This may affect the performances of the product.
(11)A metal part of the surface (metal cap) is connected to GND #2 terminal. Please take necessary precautions to prevent from a short circuit to GND by contacting with the metal cap.
(12)Product failures covered by warranty period only appliy to cases when the product is used under recommended environment described in the specifications.Products that have been opened/damaged for analysis will not be covered with warranty.

Should any customer use the product in any manner contrary to the precautions and/or advice herein, such use shall be done at the customer’s own risk.

[Notice]

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No. ISD-19-1317 Rev.01 (Oct.24, 2019)