



# TCXO / VC-TCXO HIGH STABILITY, CMOS OUTPUT



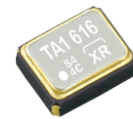
Product Number  
**TG3225CEN : X1G005101xxxxxx**  
**TG2520CEN : X1G005161xxxxxx**

## TG3225CEN / TG2520CEN

- Output frequency : 12 MHz to 52 MHz
- Supply voltage : 2.8 V Typ. / 3.0 V Typ. / 3.3 V Typ.
- Frequency / temperature characteristics :  $\pm 2.0 \times 10^{-6}$  Max.
- External dimensions: 3.2 x 2.5 x 0.9 mm / 2.5 x 2.0 x 0.8 mm
- Applications : Reference clock for measurement machine  
Wireless communication devices  
(Smart meter, Telemeter, other)
- Features : High stability, CMOS output



TG3225CEN  
(3.2 x 2.5 x 0.9 mm)



TG2520CEN  
(2.5 x 2.0 x 0.8 mm)

### Specifications (characteristics)

Item	Symbol	TCXO	VC-TCXO	Conditions / Remarks
		12 MHz to 52 MHz		
Output frequency range	fo	12 MHz, 20 MHz, 24 MHz, 25 MHz, 26 MHz, 27 MHz, 32 MHz, 36 MHz, 38.4 MHz, 39 MHz and 40 MHz		Standard frequency
Supply voltage	V <sub>CC</sub>	2.8 V $\pm$ 5 % / 3.0 V $\pm$ 5 % / 3.3 V $\pm$ 5 %		Supply voltage range: 2.375 V to 3.63 V
Storage temperature range	T <sub>stg</sub>	-40 °C to +90 °C		Storage as single product.
Operating temperature range	T <sub>use</sub>	G: -40 °C to +85 °C		
Frequency tolerance	f <sub>tol</sub>	$\pm 2.0 \times 10^{-6}$ Max.		After reflow, +25 °C
Frequency/temperature characteristics	fo-Tc	F: $\pm 2.0 \times 10^{-6}$ Max. / -40 °C to +85 °C		Standard stability version
Frequency/load coefficient	fo-Load	$\pm 0.2 \times 10^{-6}$ Max.		15 pF $\pm$ 10 %
Frequency/voltage coefficient	fo-V <sub>CC</sub>	$\pm 0.3 \times 10^{-6}$ Max.		V <sub>CC</sub> $\pm$ 5 %
Frequency aging	f <sub>age</sub>	$\pm 1.0 \times 10^{-6}$ Max.		+25 °C, First year, 12 MHz $\leq$ fo $\leq$ 20 MHz, 24 MHz $\leq$ fo $\leq$ 40 MHz
		$\pm 1.5 \times 10^{-6}$ Max.		+25 °C, First year, 20 MHz < fo < 24 MHz, 40 MHz < fo $\leq$ 52 MHz
Current consumption	I <sub>CC</sub>	4.0 mA Max.		12 MHz $\leq$ fo $\leq$ 26 MHz
		6.0 mA Max.		26 MHz < fo $\leq$ 39 MHz
		6.5 mA Max.		39 MHz < fo $\leq$ 52 MHz
Input impedance	Z <sub>in</sub>	-	500 k $\Omega$ Min.	V <sub>c</sub> - GND (DC)
Frequency control range	f <sub>cont</sub>	-	$\pm 5.0 \times 10^{-6}$ Min.	C: V <sub>c</sub> = 1.4 V $\pm$ 1.0 V (V <sub>CC</sub> = 2.8 V) or D: V <sub>c</sub> = 1.5 V $\pm$ 1.0 V (V <sub>CC</sub> = 3.0 V) or E: V <sub>c</sub> = 1.65 V $\pm$ 1.0 V (V <sub>CC</sub> = 3.3 V)
Frequency change polarity	f <sub>cp</sub>	-	Positive polarity	
Symmetry	SYM	45 % to 55 %		50 % V <sub>CC</sub> level, L <sub>CMOS</sub> $\leq$ 15 pF
Output voltage	V <sub>OH</sub>	90 % V <sub>CC</sub> Min.		
	V <sub>OL</sub>	10 % V <sub>CC</sub> Max.		
Start-up time	t <sub>str</sub>	2.0 ms Max.		t = 0 at 90 % V <sub>CC</sub>
Rise time / Fall time	tr/tf	8.0 ns Max.		10 % V <sub>CC</sub> to 90 % V <sub>CC</sub> level, Load: 15 pF
CMOS load condition	L <sub>CMOS</sub>	15 pF		15 pF $\pm$ 10 %

\* Note : Please contact us for requirements not listed in this specification.

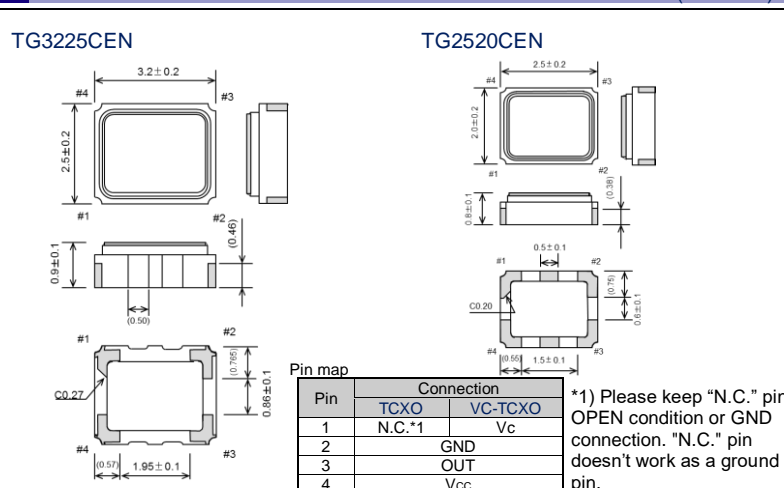
Product Name **TG3225CEN 39.000000MHz K F G N M**  
 (Standard form) ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① Model ② Output (C: CMOS)  
 ③ Frequency ④ Supply voltage (Refer to symbol table)  
 ⑤ Frequency / temperature characteristics (F:  $\pm 2.0 \times 10^{-6}$  Max.)  
 ⑥ Operating temperature (G: -40 °C to +85 °C)  
 ⑦ OE function (N: Non) ⑧ V<sub>c</sub> function (Refer to symbol table, A: V<sub>c</sub> = any)  
 ⑨ Internal identification code ("M" is default)

Voltage [V]	④ V <sub>CC</sub> function [V <sub>c</sub> ] (Symbol table)			
	TCXO	VC-TCXO		
④ V <sub>CC</sub> (Typ.)	K: 2.5 to 3.3	K: 2.5 to 3.3	P: 2.6 to 3.3	M: 2.8 to 3.3
⑧ V <sub>c</sub> (Typ.)	N: Non	C: 1.4	D: 1.5	E: 1.65

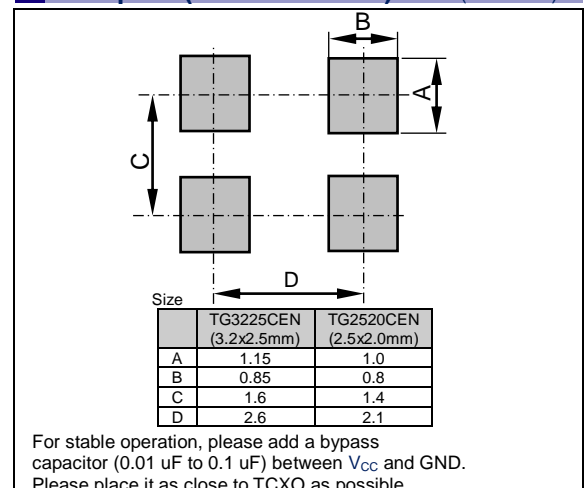
### External dimensions

(Unit: mm)



### Footprint (Recommended)

(Unit: mm)



## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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In order provide high quality and reliable products and services than meet customer needs, Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

IATF 16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

### ► Explanation of the mark that are using it for the catalog

	► Pb free.
	► 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.)
	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc ).

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