TCXO / VC-TCXO
HIGH STABILITY, CMOS OUTPUT

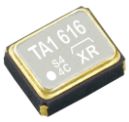
Pb Free RoHS Compliant

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 : ±2.0 × 10⁻⁶ Max.
- External dimensions : 3.2 × 2.5 × 0.9 mm / 2.5 × 2.0 × 0.8 mm
- Applications : Reference clock for measurement machine
  Wireless communication devices
  (Smart meter, Telemeter, other)
- Features : High stability, CMOS output

TG3225CEN
(3.2 × 2.5 × 0.9 mm)



TG2520CEN
(2.5 × 2.0 × 0.8 mm)

Specifications (characteristics)

Item	Symbol	TCXO	VC-TCXO	Conditions / Remarks
Output frequency range	fo	12 MHz to 52 MHz		
		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_{CC}	2.8 V ± 5 % / 3.0 V ± 5 % / 3.3 V ± 5 %		Supply voltage range: 2.375 V to 3.63 V
Storage temperature range	T_stg	-40 °C to +90 °C		Storage as single product.
Operating temperature range	T_use	G: -40 °C to +85 °C		
Frequency tolerance	f_tol	±2.0 × 10⁻⁶ Max.		After reflow, +25 °C
Frequency/temperature characteristics	fo-Tc	F: ±2.0 × 10⁻⁶ Max. / -40 °C to +85 °C		Standard stability version
Frequency/load coefficient	fo-Load	±0.2 × 10⁻⁶ Max.		15 pF ± 10 %
Frequency/voltage coefficient	fo-V_{CC}	±0.3 × 10⁻⁶ Max.		V_{CC} ± 5 %
Frequency aging	f_age	±1.0 × 10⁻⁶ Max.		+25 °C, First year, 12 MHz ≤ fo ≤ 20 MHz, 24 MHz ≤ fo ≤ 40 MHz
		±1.5 × 10⁻⁶ Max.		+25 °C ,First year, 20 MHz < fo < 24 MHz, 40 MHz < fo ≤ 52 MHz
Current consumption	I_{CC}	4.0 mA Max.		12 MHz ≤ fo ≤ 26 MHz
		6.0 mA Max.		26 MHz < fo ≤ 39 MHz
		6.5 mA Max.		39 MHz < fo ≤ 52 MHz
Input impedance	Zin	-	500 kΩ Min.	Vc - GND (DC)
Frequency control range	f_cont	-	±5.0 × 10⁻⁶ Min.	C: Vc = 1.4 V ± 1.0 V (V_{CC} = 2.8 V) or D: Vc = 1.5 V ± 1.0 V (V_{CC} = 3.0 V) or E: Vc = 1.65 V ± 1.0 V (V_{CC} = 3.3 V)
Frequency change polarity	f_cp	-	Positive polarity	
Symmetry	SYM	45 % to 55 %		50 % V_{CC} level, L_CMOS ≤ 15 pF
Output voltage	V_{OH}	90 % V_{CC} Min.		
	V_{OL}	10 % V_{CC} Max.		
Start-up time	t_str	2.0 ms Max.		t = 0 at 90 % V_{CC}
Rise time / Fall time	tr/tf	8.0 ns Max.		10 % V_{CC} to 90 % V_{CC} level, Load: 15 pF
CMOS load condition	L_CMOS	15 pF		15 pF ± 10 %

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

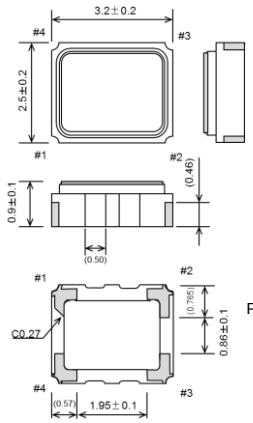
Product Name (Standard form): TG3225 CEN 39.000000MHz K F G N N M
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①Model ②Output (C: CMOS)
③Frequency ④Supply voltage (Refer to symbol table)
⑤Frequency / temperature characteristics (F: ±2.0 × 10⁻⁶ Max.)
⑥Operating temperature (G: -40 °C to +85 °C)
⑦OE function (N: Non) ⑧Vc function (Refer to symbol table , A: Vc = any) ⑨Internal identification code (“M” is default)

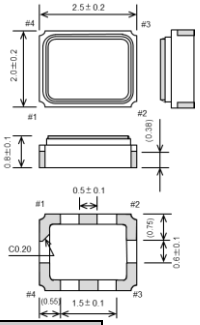
④Supply voltage [V_{CC}] ,⑧Vc function [Vc] (Symbol table)				
Voltage [V]	TCXO	VC-TCXO		
④V_{CC} (Typ.)	K: 2.5 to 3.3	K: 2.5 to 3.3	P: 2.6 to 3.3	M: 2.8 to 3.3
⑧Vc (Typ.)	N: Non	C: 1.4	D: 1.5	E: 1.65

External dimensions (Unit: mm)

TG3225CEN



TG2520CEN

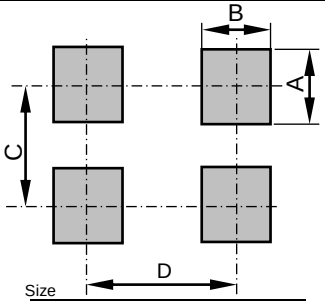


Pin map

Pin	Connection	
	TCXO	VC-TCXO
1	N.C.*1	Vc
2	GND	
3	OUT	
4	V_{CC}	

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

Footprint (Recommended) (Unit: mm)



Size

	TG3225CEN (3.2x2.5mm)	TG2520CEN (2.5x2.0mm)
A	1.15	1.0
B	0.85	0.8
C	1.6	1.4
D	2.6	2.1

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

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.

WORKING FOR HIGH QUALITY

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