

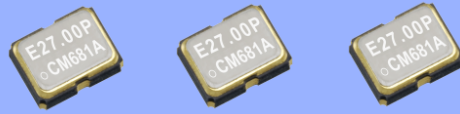
**VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR (VCXO)**  
**OUTPUT : CMOS**

**VG-4231CE**

- Frequency range : 3 MHz to 60 MHz
- Supply voltage : 3.3 V (PSCM / CSCM)  
 : 2.8 V (PSBM / CSBM)  
 : 1.8 V (PQEM / CQEM)
- Frequency control range :  $\pm 140 \times 10^{-6}$  (\*SCM / \*SBM)  
 :  $\pm 120 \times 10^{-6}$  (\*QEM)
- Low current consumption : 1.0 mA Typ. (27 MHz , 3.3 V)
- External dimensions : 3.2 x 2.5 x 1.05 mm



Product Number (please contact us)  
**Q3614CE00xxxx00**



Actual size

**Specifications (characteristics)**

Item	Symbol	Specifications			Conditions / Remarks
		PSCM / CSCM	PSBM / CSBM	PQEM / CQEM	
Output frequency range	f <sub>o</sub>	3 MHz to 60 MHz			Please contact us about available frequencies.
Supply voltage	V <sub>cc</sub>	3.3 V $\pm 0.3$ V	2.8 V $\pm 0.2$ V	1.8 V $\pm 0.2$ V	
Storage temperature	T <sub>stg</sub>	-40 °C to +125 °C			Storage as single product.
Operating temperature	T <sub>use</sub>	As per below table			
Frequency tolerance	f <sub>tol</sub>	As per below table			C : V <sub>c</sub> =1.65 V / B : V <sub>c</sub> =1.40 V / E : V <sub>c</sub> =0.90 V
Current consumption	I <sub>cc</sub>	7 mA Max.	6.8 mA Max.	1.2 mA Max.	No load condition
Frequency control range	f <sub>cont</sub>	S: $\pm 140 \times 10^{-6}$ Min.			V <sub>c</sub> = 1/2 V <sub>cc</sub> $\pm$ 1/2 V <sub>cc</sub>
Modulation characteristics	BW	15 kHz Min.			$\pm 3$ dB (at 1 kHz)
Input resistance	R <sub>in</sub>	M : 5 M $\Omega$ Min.			DC level
Frequency change polarity	—	Positive polarity			V <sub>c</sub> =0 V to V <sub>cc</sub>
Symmetry	SYM	40 % to 60 %			CMOS load:50 % V <sub>cc</sub> level
Output voltage	V <sub>OH</sub>	V <sub>cc</sub> -0.4 V Min.			I <sub>OH</sub> =-3.0 mA
	V <sub>OL</sub>	0.4 V Max.			I <sub>OL</sub> = 3.0 mA
Output load condition (CMOS)	L <sub>CMOS</sub>	15 pF Max.			CMOS load
Rise time and Fall time	t <sub>r</sub> / t <sub>f</sub>	4 ns Max.	6 ns Max.		CMOS load: 20 % V <sub>cc</sub> to 80 % V <sub>cc</sub> level
Start-up time	t <sub>str</sub>	5 ms Max.			Time at 90 % V <sub>cc</sub> to be 0 s
Frequency aging	f <sub>aging</sub>	$\pm 5 \times 10^{-6}$ Max.			+25 °C, 5 years

Please keep V<sub>c</sub> pin open or ground while powering up V<sub>cc</sub>.

Product Name **VG-4231 CE 27.000000MHz C S C - M** (⑥⑥:SE,QC,QB are not available)  
 (Standard form) ① ② ③ ④⑤⑥ ⑦

①Model ②Package type ③Frequency ④Frequency tolerance / Operating temperature  
 ⑤Frequency control range ⑥Supply voltage ⑦Input resistance (M: 5 M $\Omega$  Min.)

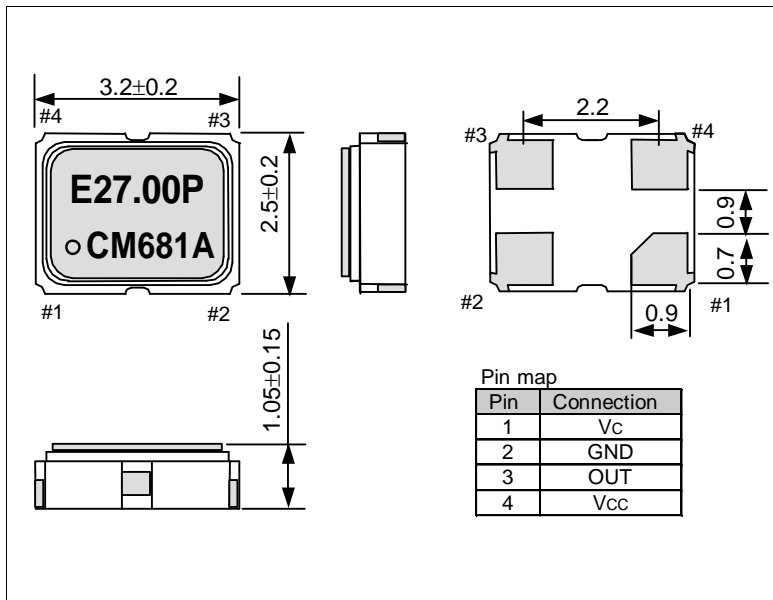
④⑤	④Frequency tolerance / Operating temperature	⑤Frequency control range (Absolute pull range*)
CS	C $\pm 30 \times 10^{-6}$ / -20 to +70 °C	S $\pm 140 \times 10^{-6}$ Min. ( $\pm 100 \times 10^{-6}$ Min.)
PS	P $\pm 37 \times 10^{-6}$ / -40 to +85 °C	S $\pm 140 \times 10^{-6}$ Min. ( $\pm 95 \times 10^{-6}$ Min.)
CQ	C $\pm 30 \times 10^{-6}$ / -20 to +70 °C	Q $\pm 120 \times 10^{-6}$ Min. ( $\pm 80 \times 10^{-6}$ Min.)
PQ	P $\pm 37 \times 10^{-6}$ / -40 to +85 °C	Q $\pm 120 \times 10^{-6}$ Min. ( $\pm 75 \times 10^{-6}$ Min.)

⑥Supply voltage	
E	1.8 V Typ.
B	2.8 V Typ.
C	3.3 V Typ.

\* Absolute pull range = Frequency control range- (Frequency tolerance + 5 years Aging + Free fall + Vibration)

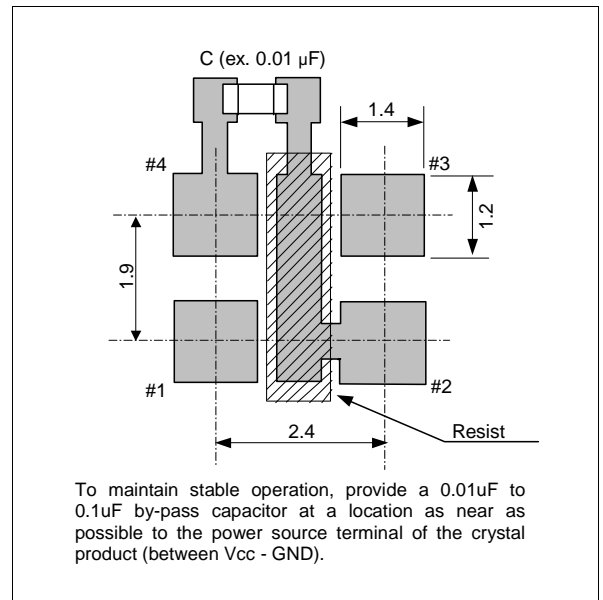
**External dimensions**

(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.

## 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 ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 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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