



## VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR (VCXO)

OUTPUT : CMOS

Product Number  
Q3614CE00xxxx00

## 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 :  $3.2 \times 2.5 \times 1.05$  mm



## Specifications (characteristics)

Item	Symbol	Specifications			Conditions / Remarks
		PSCM / CSCM	PSBM / CSBM	PQEM / CQEM	
Output frequency range	Fo	3 MHz to 60 MHz		24 MHz to 30 MHz	Please contact us about available frequencies.
Supply voltage	Vcc	3.3 V $\pm$ 0.3 V	2.8 V $\pm$ 0.2 V	1.8 V $\pm$ 0.2 V	
Storage temperature	T_stg	-40 C to +125 C			Storage as single product.
Operating temperature	T_use	As per below table			
Frequency tolerance	f_tol	As per below table			C : Vc=1.65 V / B : Vc=1.40 V / E : Vc=0.90 V
Current consumption	Icc	7 mA Max.	6.8 mA Max.	1.2 mA Max.	No load condition
Frequency control range	f_cont	S: $\pm 140 \times 10^{-6}$ Min.		Q: $\pm 120 \times 10^{-6}$ Min.	Vc = 1/2 Vcc $\pm$ 1/2 Vcc
Modulation characteristics	BW	15 kHz Min.			$\pm 3$ dB (at 1 kHz)
Input resistance	Rin	M : 5 M $\Omega$ Min.			DC level
Frequency change polarity	—	Positive polarity			Vc=0 V to Vcc
Symmetry	SYM	40 % to 60 %			CMOS load: 50 % Vcc level
Output voltage	VoH	Vcc-0.4 V Min.			IoH= -3.0 mA
	VoL	0.4 V Max.			IoL= 3.0 mA
Output load condition (CMOS)	L_CMOS	15 pF Max.			CMOS load
Rise time and Fall time	tr / tf	4 ns Max.		6 ns Max.	CMOS load: 20 % Vcc to 80 % Vcc level
Start-up time	t_str	5 ms Max.			Time at 90 % Vcc to be 0 s
Frequency aging	f_age	$\pm 5 \times 10^{-6}$ Max.			+25 C, 5 years

Please keep Vc pin open or ground while powering up Vcc.

Product Name VG-4231 CE 27.000000MHz C S C - M (⑤⑥:SE, QC, QB are not available)  
(Standard form) ① ② ③ ④⑤⑥ ⑦① Model ② Package type ③ Frequency ④ Frequency tolerance / Operating temperature  
⑤ Frequency control range ⑥ Supply voltage ⑦ Input resistance (M: 5 M $\Omega$  Min.)

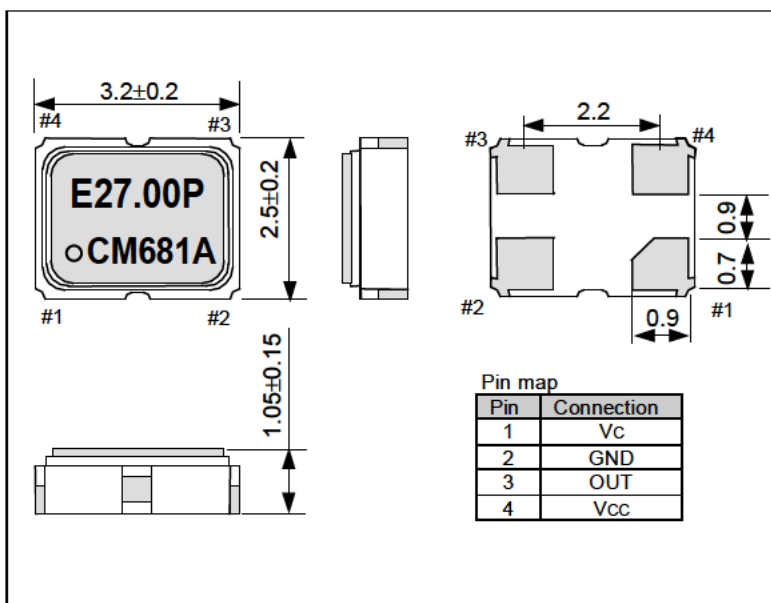
④⑤	④ Frequency tolerance / Operating temperature	⑤ Frequency control range (Absolute pull range*)
CS	C $\pm 30 \times 10^{-6}$ / -20 to +70 °C	S $\pm 140 \times 10^{-6}$ Min. ( $\pm 100 \times 10^{-6}$ Min.)
PS	P $\pm 37 \times 10^{-6}$ / -40 to +85 °C	S $\pm 140 \times 10^{-6}$ Min. ( $\pm 95 \times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

⑥ Supply 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)

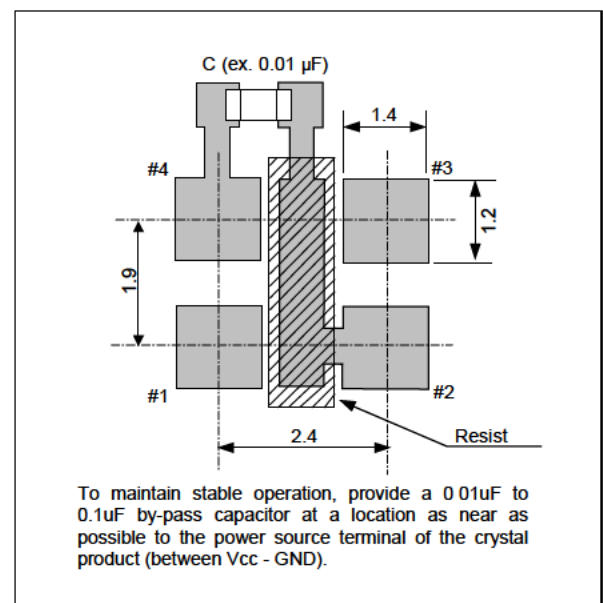
## External dimensions

(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.

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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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