



## VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR (VCXO) MINIATURE SIZE LOW PROFILE, WIDE PULL RANGE

# 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	$f_o$	3 MHz to 60 MHz		24 MHz to 30 MHz	Please contact us for inquiries regarding other frequencies.
Supply voltage	$V_{cc}$	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			Store as bare product.
Operating temperature	$T_{use}$	As per below table			
Frequency tolerance	$f_{tol}$	As per below table			C : $V_c=1.65$ V / B : $V_c=1.40$ V / E : $V_c=0.90$ V
Current consumption	$I_{cc}$	7 mA Max.	6.2 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.	$V_c = 1/2 V_{cc} \pm 1/2 V_{cc}$
Modulation characteristics	BW	15 kHz Min.			$\pm 3$ dB (at 1 kHz)
Input resistance	$R_{in}$	M : 5 M $\Omega$ Min.			DC level
Frequency change polarity	—	Positive polarity			$V_c=0$ V to $V_{cc}$
Symmetry	SYM	40 % to 60 %			CMOS load: 50 % $V_{cc}$ level
Output voltage	$V_{OH}$	$V_{cc}-0.4$ V Min.			$I_{OH}=3.0$ mA
	$V_{OL}$	0.4 V Max.			$I_{OL}=3.0$ mA
Output load condition (CMOS)	L_CMOS	15 pF Max.			CMOS load
Rise time and Fall time	$t_r / t_f$	4 ns Max.		6 ns Max.	CMOS load: 20 % $V_{cc}$ to 80 % $V_{cc}$ level
Start-up time	$t_{str}$	5 ms Max.			Time at 90 % $V_{cc}$ to be 0 s
Frequency aging	$f_{aging}$	$\pm 5 \times 10^{-6}$ Max.			+25 °C, 5 years

\* Please keep  $V_c$  pin open or ground while powering up  $V_{cc}$ .

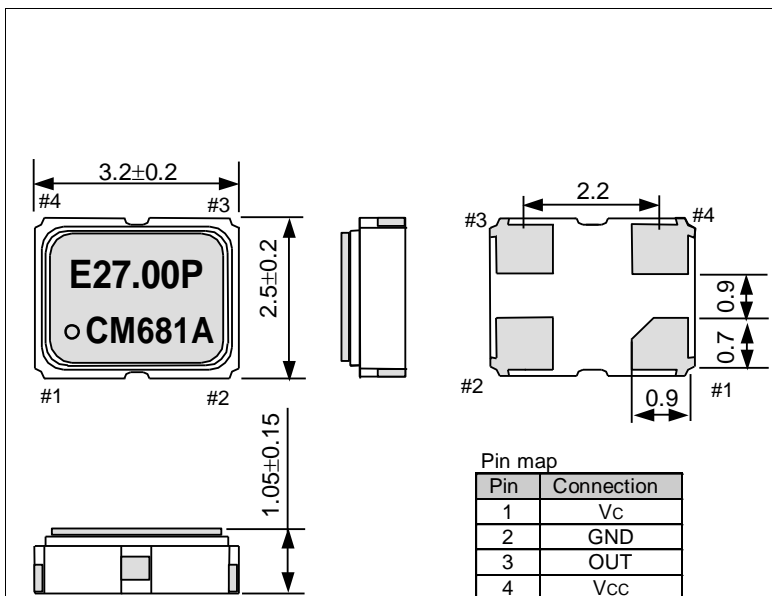
### Frequency tolerance / Temperature range / Absolute pull range

	Frequency tolerance	Temperature range	Absolute pull range
CSCM / CSBM / CQEM	C : $\pm 30 \times 10^{-6}$	-20 °C to +70 °C	S : $\pm 100 \times 10^{-6}$ / Q : $\pm 80 \times 10^{-6}$
PSCM / PSBM / PQEM	P : $\pm 37 \times 10^{-6}$	-40 °C to +85 °C	S : $\pm 95 \times 10^{-6}$ / Q : $\pm 75 \times 10^{-6}$

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

### External dimensions

(Unit:mm)

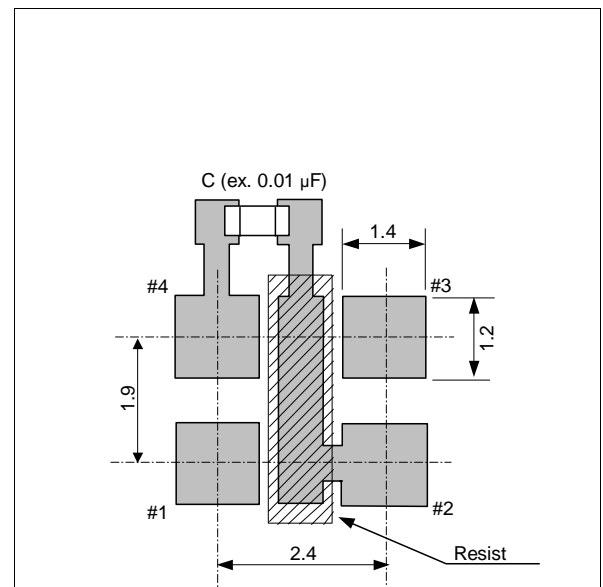


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### Footprint (Recommended)

(Unit:mm)



To maintain stable operation, provide a 0.01µF to 0.1µF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between  $V_{cc}$  - GND).