

**VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR (VCXO)  
WIDE PULL RANGE**

**VG-4231CA**

- Frequency range : 1 MHz to 60 MHz
- Supply voltage : 3.3 V (DRC,GRC)  
5.0 V (DRH,GRH)
- Frequency control range:  $\pm 130 \times 10^{-6}$
- Thickness : 1.4 mm Typ.



Actual size



**Specifications (characteristics)**

Item	Symbol	Specifications		Remarks
		DRH / GRH	DRC / GRC	
Output frequency range	$f_0$	1.000 MHz to 60.000 MHz	1.000 MHz to 60.000 MHz	Please contact us for inquiries regarding available frequencies.
Supply voltage	Vcc	H:5.0 V $\pm 0.5$ V	C:3.3 V $\pm 0.3$ V	
Temperature range	Storage temperature	-40 °C to +125 °C		Store as bare product after unpacking
	Operating temperature	As per below table		
Frequency tolerance	F_tol(osc)	As per below table		Vc=2.5 V(DRH,GRH)/ Vc=1.65 V(DRC,GRC)
Current consumption	Icc	20 mA Max.	10 mA Max.	No load condition
Output disable current	I_dis	15 mA Max.	7 mA Max.	OE=GND
Frequency control range	Fcont	R: $\pm 130 \times 10^{-6}$ (1 MHz < $f_0$ $\leq$ 42 MHz) Q: $\pm 120 \times 10^{-6}$ (42 MHz < $f_0$ $\leq$ 60 MHz)		Vc=2.5 V $\pm 2.0$ V(DRH,GRH) Vc=1.65 V $\pm 1.5$ V(DRC,GRC)
Absolute pull range *1	APR	DR: $\pm 80 \times 10^{-6}$ Min., GR: $\pm 65 \times 10^{-6}$ Min.		Frequency control range: $\pm 130 \times 10^{-6}$
Modulation characteristics	BW	15 kHz Min.		$\pm 3$ dB (at 1kHz)
Input resistance	Rin	50 k $\Omega$ Min.		DC level
Frequency change polarity	—	Positive polarity		Vc=0.5 V to 4.5 V(**H) , 0.15 V to 3.15 V(**C)
Symmetry	SYM	40 % to 60 %		CMOS load:50 % Vcc level
High output voltage	VoH	Vcc-0.4 V Min.		IoH= -0.8 mA(DRC,GRC),IoH=-4 mA(DRH,GRH)
Low output voltage	VoL	0.4 V Max.		IoL= 3.2 mA(DRC,GRC),IoL= 4 mA(DRH,GRH)
Output load condition (CMOS)	L_CMOS	15 pF Max.		CMOS load
Output enable / disable input voltage	ViH	70 % Vcc Min.		OE Terminal
	ViL	30 % Vcc Max.		
Output rise and fall time	tr / trf	4 ns Max.		CMOS load: 20 % Vcc to 80 % Vcc level
Oscillation start up time	tosc	10 ms Max.		Time at 90 %Vcc to be 0 s
Frequency aging	F_aging	$\pm 10 \times 10^{-6}$ Max. *2		+25 °C, 10 years

\*1 Absolute pull range = Frequency control range- (Frequency tolerance + 10 years Aging + Free fall + Vibration)

\*2 50 MHz <  $f_0$   $\leq$  60 MHz :  $\pm 15 \times 10^{-6}$  Max.

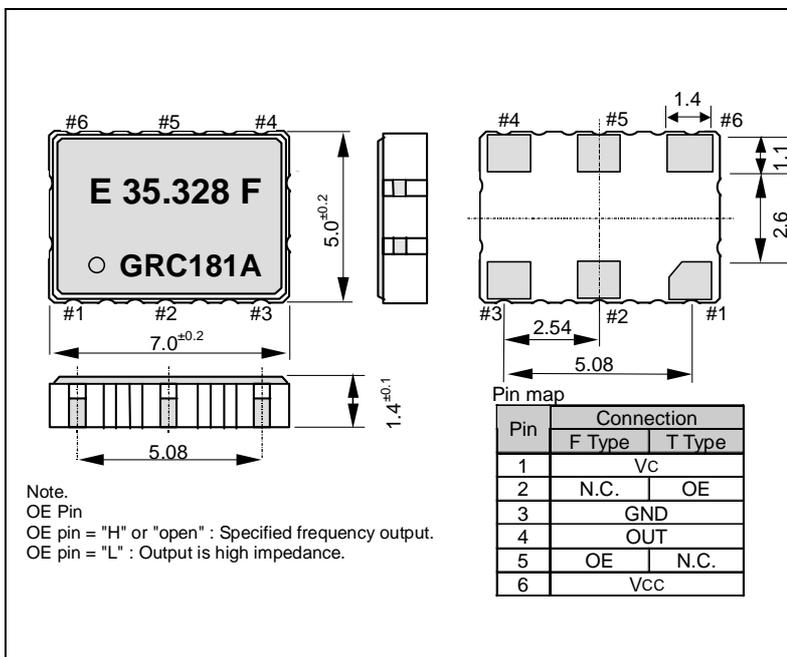
\* Please keep Vc pin open or ground while powering up Vcc.

**Frequency tolerance / Temperature range**

	Frequency tolerance	Temperature range
DRC / DRH / DQC	$\pm 35 \times 10^{-6}$	-20 °C to +70 °C
GRC / GRH / GQC	$\pm 50 \times 10^{-6}$	-40 °C to +85 °C

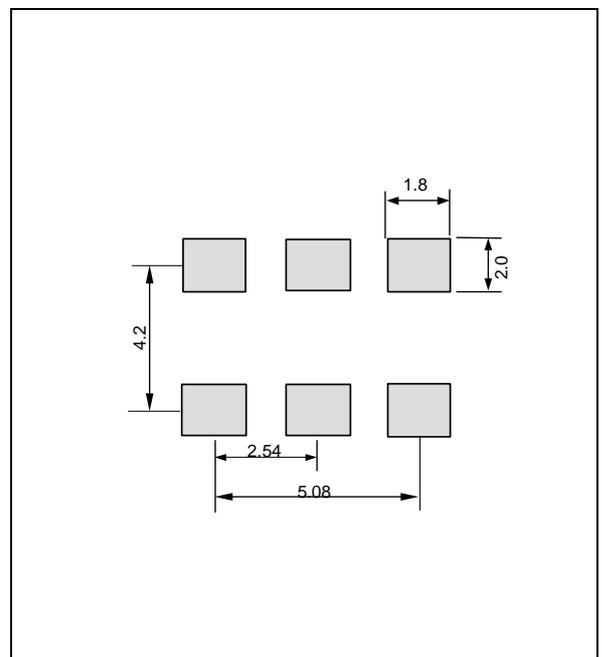
**External dimensions**

(Unit:mm)



**Footprint (Recommended)**

(Unit:mm)



# “3D STRATEGY” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, “Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, 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. In the future, new group companies will be expected to acquire the certification around the third year of operations.

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

Epson Toyocom quickly began working to acquire company-wide ISO 9000 series certification, and has acquired ISO 9001 or ISO 9002 certification for all targeted products manufactured in Japanese and overseas plants.

Epson Toyocom has acquired QS-9000 certification, which is of a higher level. Also, TS 16949 certification, which is also of a higher level, has been acquired.

QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.

ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.

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/ Medical instruments to sustain life / Submarine transmitters / Power stations and related / Fire work equipment and security equipment  
/ traffic control equipment / and others requiring equivalent reliability.
- In this new crystal master for Epson Toyocom, product codes and markings will remain as previously identified prior to the merger. Due to the on-going strategy of gradual unification of part numbers, please review product codes and markings, as they will change during the course of the coming months.  
We apologize for the inconvenience, but we will eventually have a unified part numbering system for Epson Toyocom that will be user friendly.