

**VOLTAGE-CONTROLLED CRYSTAL OSCILLATOR (VCXO)**

**OUTPUT : LV-PECL**



Product Number (Please contact us)

**VG-4513CB: X1G004151xxxxxx**

**VG-4513CA: X1G004141xxxxxx**

**VG-4513CB**  
**VG-4513CA**

- Frequency range : 100 MHz to 250 MHz
- Supply voltage : 3.3 V
- Absolute pull range :  $\pm 30 \times 10^{-6}$  Min,  $\pm 50 \times 10^{-6}$  Min,  $\pm 100 \times 10^{-6}$  Min
- Function : Output Enable(OE)  
Active High or Low
- Output : LV-PECL



VG-4513CB  
(5.0 × 3.2 × 1.3 mm)



VG-4513CA  
(7.0 × 5.0 × 1.6 mm)

Actual size

VG-4513CB

VG-4513CA

**Specifications (characteristics)**

| Item                        | Symbol                         | Specifications                                                                                                                                                                                                                                                  | Conditions / Remarks                                                                     |
|-----------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Output frequency range      | f <sub>o</sub>                 | 100.000 MHz to 250.000 MHz                                                                                                                                                                                                                                      | Please contact us about available frequencies.                                           |
| Supply voltage              | V <sub>cc</sub>                | 3.3 V ± 0.165 V                                                                                                                                                                                                                                                 |                                                                                          |
| Storage temperature range   | T <sub>stg</sub>               | -55 °C to +125 °C                                                                                                                                                                                                                                               |                                                                                          |
| Operating temperature range | T <sub>use</sub>               | -40 °C to +85 °C                                                                                                                                                                                                                                                |                                                                                          |
| Current consumption         | I <sub>cc</sub>                | 65 mA Max.                                                                                                                                                                                                                                                      |                                                                                          |
| Frequency tolerance         | f <sub>tol</sub>               | 100 MHz ≤ f <sub>o</sub> ≤ 200 MHz : ±50 × 10 <sup>-6</sup> Max.<br>200 MHz < f <sub>o</sub> ≤ 250 MHz : ±70 × 10 <sup>-6</sup> Max.                                                                                                                            | Includes initial tolerance, temperature change, V <sub>cc</sub> change and 10years aging |
| Absolute pull range         | APR                            | 120 MHz ≤ f <sub>o</sub> ≤ 200 MHz<br>±30 × 10 <sup>-6</sup> Min. ±50 × 10 <sup>-6</sup> Min. ±100 × 10 <sup>-6</sup> Min.<br>100 MHz ≤ f <sub>o</sub> < 120 MHz, 200 MHz < f <sub>o</sub> ≤ 250 MHz<br>±30 × 10 <sup>-6</sup> Min. ±50 × 10 <sup>-6</sup> Min. | V <sub>c</sub> = 1.65 V ± 1.65 V                                                         |
| Input resistance            | R <sub>in</sub>                | 100 kΩ Min.                                                                                                                                                                                                                                                     | DC level                                                                                 |
| Output load condition       | L <sub>ECL</sub>               | 50Ω at V <sub>cc</sub> -2.0V                                                                                                                                                                                                                                    |                                                                                          |
| High output voltage         | V <sub>OH</sub>                | V <sub>cc</sub> -1.1 V Min.                                                                                                                                                                                                                                     |                                                                                          |
| Low output voltage          | V <sub>OL</sub>                | V <sub>cc</sub> -1.5 V Max.                                                                                                                                                                                                                                     |                                                                                          |
| Symmetry                    | SYM                            | 40 % to 60 %                                                                                                                                                                                                                                                    | at V <sub>cc</sub> -1.30 V, V <sub>c</sub> =1/2V <sub>cc</sub>                           |
| Rise/Fall times             | t <sub>r</sub> /t <sub>f</sub> | 0.5 ns Max.                                                                                                                                                                                                                                                     | at 20 % to 80 % output swing                                                             |
| High input voltage          | V <sub>IH</sub>                | 70% V <sub>cc</sub> Min.                                                                                                                                                                                                                                        |                                                                                          |
| Low input voltage           | V <sub>IL</sub>                | 30% V <sub>cc</sub> Max.                                                                                                                                                                                                                                        |                                                                                          |
| Oscillation start up time   | t <sub>str</sub>               | 10ms Max.                                                                                                                                                                                                                                                       |                                                                                          |

| Item                                                              | Offset frequency | 122.88 MHz  | 153.6 MHz   | 245.76 MHz  |
|-------------------------------------------------------------------|------------------|-------------|-------------|-------------|
| Phase noise<br>(Typical value)<br>APR ±50 × 10 <sup>-6</sup> Min. | 10 Hz            | -75 dBc/Hz  | -70 dBc/Hz  | -64 dBc/Hz  |
|                                                                   | 100 Hz           | -105 dBc/Hz | -100 dBc/Hz | -94 dBc/Hz  |
|                                                                   | 1 kHz            | -129 dBc/Hz | -124 dBc/Hz | -118 dBc/Hz |
|                                                                   | 10 kHz           | -147 dBc/Hz | -143 dBc/Hz | -138 dBc/Hz |
|                                                                   | 100 kHz          | -151 dBc/Hz | -152 dBc/Hz | -149 dBc/Hz |

Product Name **VG-4513CA - 122.880000 - G F C T**

(Standard form) ① ② ③ ④⑤⑥⑦

①Model ②Package type ③Frequency(MHz) ④Operating temperature range ⑤Absolute pull range

⑥Supply voltage (C: 3.3V Typ.) ⑦OE function

| ④Operating temperature |              |
|------------------------|--------------|
| G                      | -40 to +85°C |
| J                      | -20 to +70°C |
| K                      | 0 to +70°C   |

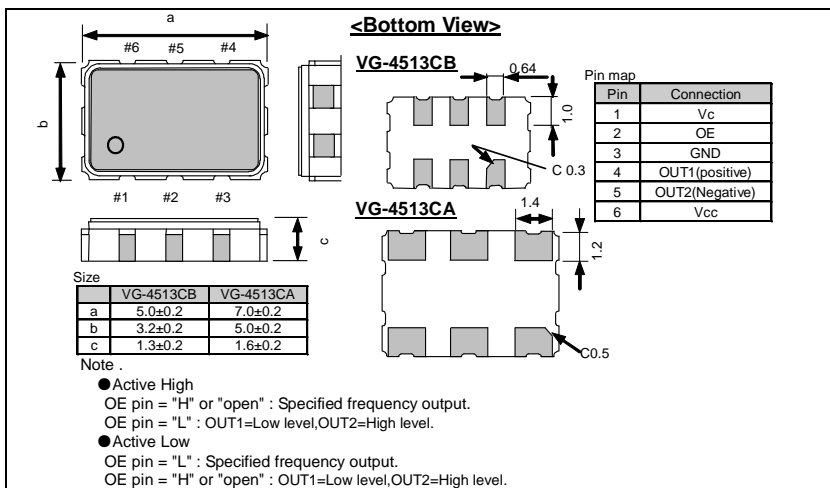
| ⑤Absolute pull range |                              |
|----------------------|------------------------------|
| H*                   | ±100 × 10 <sup>-6</sup> Min. |
| G                    | ±50 × 10 <sup>-6</sup> Min.  |
| F                    | ±30 × 10 <sup>-6</sup> Min.  |

| ⑦OE function |             |
|--------------|-------------|
| T            | Active High |
| L            | Active Low  |

\*Only 120 MHz ≤ f<sub>o</sub> ≤ 200 MHz are available.

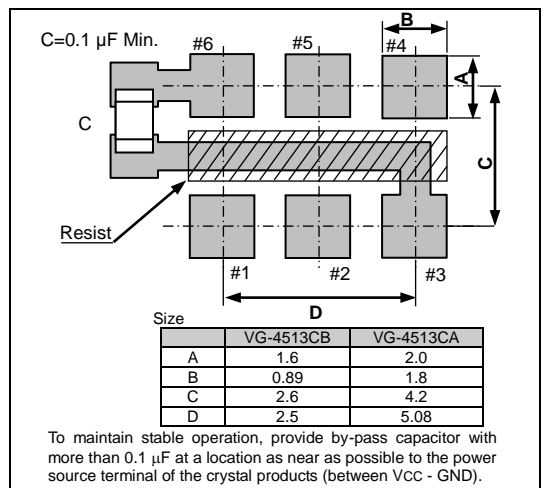
**External dimensions**

(Unit : mm)



**Footprint (Recommended)**

(Unit : mm)



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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.

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|                                                                                     |                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | ► Pb free.                                                                                                                                                                                                                      |
|  | ► Complies with EU RoHS directive.<br>*About the products without the Pb-free mark.<br>Contains Pb in products exempted by EU RoHS directive.<br>(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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