

**VC-TCXO / TCXO / TCXO-Standby**  
**For Automotive**  
**105 °C High temperature range**



Product Number (Please contact us)  
**TG2016SKA : X1G005371xxxx16**

**TG2016SKA**

- Output frequency : 13 MHz to 55 MHz
- Supply voltage : 1.8 V Typ. / 3.3 V Typ.
- Frequency / temperature characteristics :  $\pm 0.5 \times 10^{-6}$  Max. (-40 °C to +105 °C)
- External dimensions: 2.0 × 1.6 × 0.7 mm Max.
- Applications : GNSS for Automotive, V2X (TCU, DSRC)\*
- Features : Low noise, 105 °C High temp, Stand-by function ( $\overline{ST}$ )
- Conforms to AEC-Q100



\* GNSS: Global Navigation Satellite System V2X: Vehicle to Everything TCU: Telematics control unit DSRC: Dedicated Short Range Communication

**Specifications (characteristics)**

| Item                                  | Symbol             | VC-TCXO                                                | TCXO                      | TCXO-Standby | Conditions / Remarks                                                                                                         |
|---------------------------------------|--------------------|--------------------------------------------------------|---------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------|
| Output frequency range                | fo                 | 13 MHz to 55 MHz<br>26 MHz, 38.4 MHz, 49.58 MHz        |                           |              | Standard frequency                                                                                                           |
| Supply voltage                        | V <sub>CC</sub>    | 1.8 V ±0.1 V / 3.3 V ±5 %                              |                           |              | Supply voltage range :1.7 V to 3.63 V                                                                                        |
| Storage temperature range             | T <sub>stg</sub>   | -55 °C to +125 °C                                      |                           |              | Storage as single product.                                                                                                   |
| Operating temperature range           | T <sub>use</sub>   | H: -40 °C to +105 °C                                   |                           |              | Standard                                                                                                                     |
| Frequency tolerance                   | f <sub>tol</sub>   | ±2.0 × 10 <sup>-6</sup> Max.                           |                           |              | After 3 times reflow, +25 °C                                                                                                 |
| Frequency/temperature Characteristics | fo-T <sub>C</sub>  | C: ±0.5 × 10 <sup>-6</sup> Max. / H: -40 °C to +105 °C |                           |              | Standard stability version                                                                                                   |
| Frequency/load coefficient            | fo-Load            | ±0.2 × 10 <sup>-6</sup> Max.                           |                           |              | 10 kΩ // 10 pF ±10 %                                                                                                         |
| Frequency/voltage coefficient         | fo-V <sub>CC</sub> | ±0.2 × 10 <sup>-6</sup> Max.                           |                           |              | V <sub>CC</sub> ± 5 %                                                                                                        |
| Frequency aging                       | f <sub>age</sub>   | ±1.0 × 10 <sup>-6</sup> Max.                           |                           |              | +25 °C, First year, 13 MHz ≤ fo ≤ 20 MHz,<br>26 MHz ≤ fo ≤ 40 MHz                                                            |
|                                       |                    | ±1.5 × 10 <sup>-6</sup> Max.                           |                           |              | +25 °C, First year, 20 MHz < fo < 26 MHz<br>40 MHz < fo ≤ 55 MHz                                                             |
| Current consumption                   | I <sub>CC</sub>    | 2.0 mA Max.<br>2.5 mA Max.                             |                           |              | 13 MHz ≤ fo ≤ 40 MHz<br>40 MHz < fo ≤ 55 MHz                                                                                 |
| Input resistance                      | F <sub>cp</sub>    | 500 kΩ Min.                                            | -                         |              | V <sub>C</sub> - GND (DC)                                                                                                    |
| Frequency control range               | f <sub>cont</sub>  | ±8.0 × 10 <sup>-6</sup><br>to ±15.0 × 10 <sup>-6</sup> | -                         |              | B: V <sub>C</sub> = 0.9 V ±0.6 V (V <sub>CC</sub> = 1.8 V) or<br>E: V <sub>C</sub> = 1.65 V ±1.0 V (V <sub>CC</sub> = 3.3 V) |
| Frequency change polarity             | -                  | Positive polarity                                      | -                         |              |                                                                                                                              |
| Stand-by current                      | I <sub>std</sub>   | -                                                      | 10 μA Max.                |              | $\overline{ST}$ = GND                                                                                                        |
| Input voltage                         | V <sub>IH</sub>    | -                                                      | 80 % V <sub>CC</sub> Min. |              | $\overline{ST}$ terminal                                                                                                     |
|                                       | V <sub>IL</sub>    | -                                                      | 20 % V <sub>CC</sub> Max. |              |                                                                                                                              |
| Symmetry                              | SYM                | 40 % to 60 %                                           |                           |              | GND level (DC cut)                                                                                                           |
| Output voltage                        | V <sub>pp</sub>    | 0.8 V Min.                                             |                           |              | Peak to Peak                                                                                                                 |
| Start-up time                         | t <sub>str</sub>   | 2.0 ms Max.                                            |                           |              | T = 0 at 90 % V <sub>CC</sub>                                                                                                |
| Output load condition                 | Load <sub>R</sub>  | 10 kΩ                                                  |                           |              | DC cut capacitor = 0.01 μF                                                                                                   |
|                                       | Load <sub>C</sub>  | 10 pF                                                  |                           |              |                                                                                                                              |
| G-sensitivity                         | S <sub>g</sub>     | 1.5 × 10 <sup>-9</sup> /G Max.                         |                           |              | 30 Hz to 3 kHz, sinewave, 3axes                                                                                              |

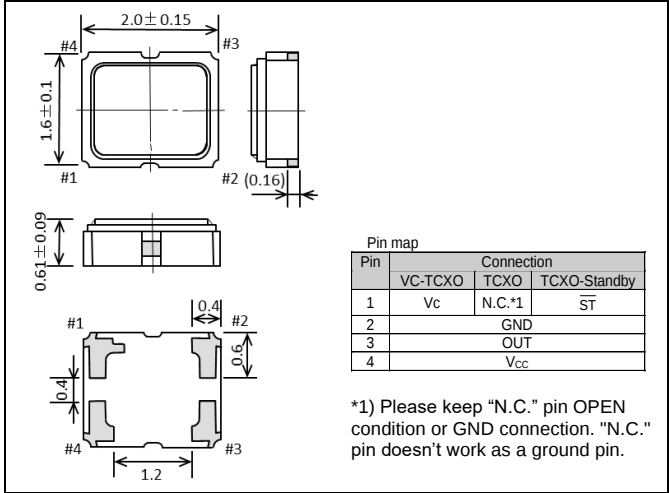
\* Note : Please contact us for requirements not listed in this specification.

- Product Name **TG2016 SKA 26.000000MHz** **E C H N N M**  
 (Standard form) ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
- ①Model(TG2016) ②Output (S: Clipped sine wave)  
 ③Frequency ④Supply voltage (Refer to symbol table)  
 ⑤Frequency / temperature characteristics (C: ±0.5 × 10<sup>-6</sup> Max.)  
 ⑥Operating temperature (H: -40 °C to +105 °C) ⑦ST function (N: Non, S: Standby)  
 ⑧V<sub>C</sub> function(Refer to symbol table) ⑨Internal identification code

| ④Supply voltage[V <sub>CC</sub> ], ⑧V <sub>C</sub> function[V <sub>C</sub> ] (Symbol table) |                  |         |         |
|---------------------------------------------------------------------------------------------|------------------|---------|---------|
| Voltage [V]                                                                                 | TCXO             | VC-TCXO |         |
| ④V <sub>CC</sub> (Typ.)                                                                     | E: 1.8<br>C: 3.3 | E: 1.8  | C: 3.3  |
| ⑧V <sub>C</sub> (Typ.)                                                                      | N: Non           | B: 0.9  | E: 1.65 |

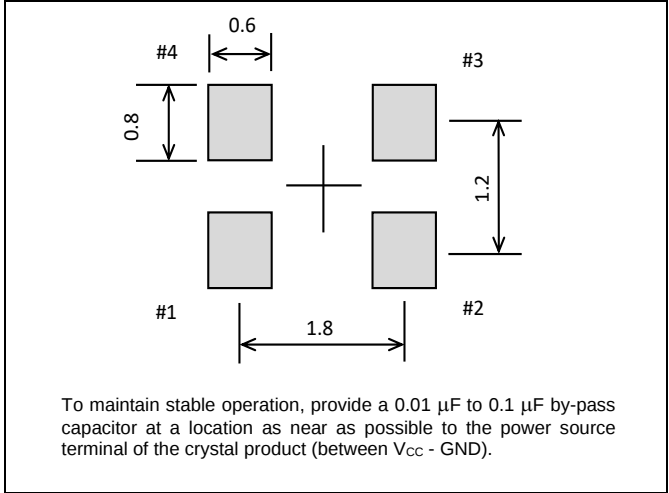
**External dimensions**

(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.<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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