

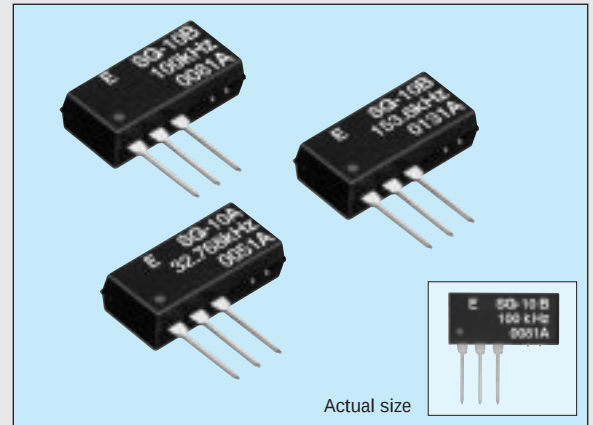
## SIP LOW/MEDIUM-FREQUENCY CRYSTAL OSCILLATOR

## SG-10

Products number

Q3110000xx xx00

- Low current consumption.
- Small suited to high-density mounting.
- Mountable on a standard printed circuit board.
- Cylindrical low/medium-frequency crystal unit builtin, thus assuring high reliability.



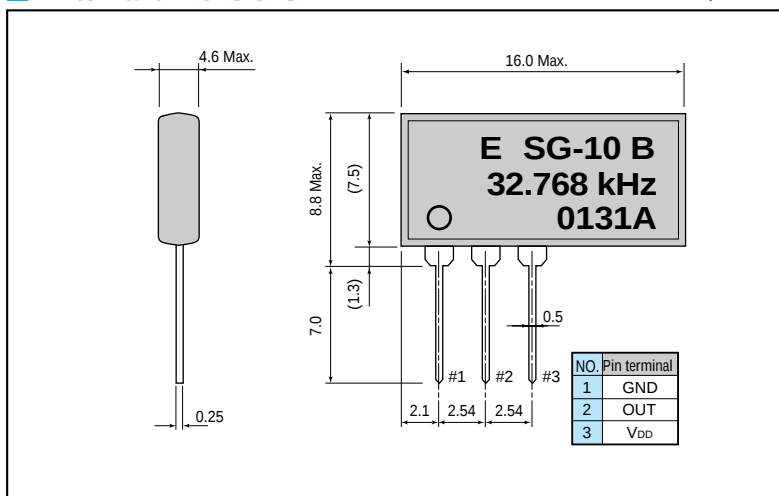
## ■ Specifications (characteristics)

| Item                                  | Symbol                | Specifications                                                       | Remarks                                                                                                                                        |
|---------------------------------------|-----------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Output frequency range                | $f_0$                 | 10.0000 Hz to 153.6000 kHz                                           | For output frequency, see the table below                                                                                                      |
| Power source voltage                  | Max. supply voltage   | $V_{DD-GND}$                                                         | -0.3 V to +7.0 V                                                                                                                               |
|                                       | Operating voltage     | $V_{DD}$                                                             | 4.5 V to 5.5 V                                                                                                                                 |
| Temperature range                     | Storage temperature   | $T_{STG}$                                                            | -55 °C to +125 °C                                                                                                                              |
|                                       | Operating temperature | $T_{OPR}$                                                            | -10 °C to +70 °C                                                                                                                               |
| Frequency tolerance                   | $\Delta f/f_0$        | A: $\pm 10 \times 10^{-6}$ B: $\pm 50 \times 10^{-6}$                | $V_{DD}=5\text{ V}$ $T_a=+25\text{ °C}$                                                                                                        |
| Frequency temperature characteristics |                       | $+10 \times 10^{-6}$ / $-120 \times 10^{-6}$                         | -10 °C to +70 °C, taking $T_a=+25\text{ °C}$ as the reference                                                                                  |
| Frequency voltage characteristics     |                       | $\pm 10 \times 10^{-6}$ Max.                                         |                                                                                                                                                |
| Current consumption                   | $I_{OP}$              | 0.5 mA Max..                                                         | No load condition                                                                                                                              |
| Duty                                  | $tw/t$                | 40 % to 60 %<br>(except for cases of 1/3 and 1/5 divided frequency.) | $1/2 V_{DD}$ or 1.4 V level                                                                                                                    |
| Output voltage                        | $V_{OH}$              | $V_{DD}-1.0\text{ V}$ Min.                                           | $I_{OH}=-40\text{ }\mu\text{A}$                                                                                                                |
|                                       | $V_{OL}$              | 0.4 V Max.                                                           | $I_{OL}=1.6\text{ mA}$                                                                                                                         |
| Output load condition (fan out)       | N/CL                  | 1 TTL Max./15 pF Max.                                                | TTL load/C-MOS load                                                                                                                            |
| Output rise time                      | $t_{TLH}$             | 60 ns Max.                                                           |                                                                                                                                                |
| Output fall time                      | $t_{THL}$             | 50 ns Max.                                                           |                                                                                                                                                |
| Oscillation start up time             | $t_{OSC}$             | 1 s Max.                                                             | For more than 1 ms until $V_{DD}=0\text{ V} \rightarrow 4.5\text{ V}$ .<br>Time at 4.5 V to be 0 s                                             |
| Aging                                 | $f_a$                 | $\pm 5 \times 10^{-6}$ /year Max.                                    | $T_a=+25\text{ °C} \pm 3\text{ °C}$ , $V_{DD}=5\text{ V}$ , first year                                                                         |
| Shock resistance                      | S.R.                  | $\pm 5 \times 10^{-6}$ Max.                                          | Three drops on a hard board from 750 mm or excitation test with $29400\text{ m/s}^2 \times 0.3\text{ ms} \times 1/2$ sine wave in 3 directions |

Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.

## ■ External dimensions

(Unit: mm)



## ■ Output frequency table

|                                               |                                                                                                                                                                               |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oscillation source                            | 32.768 kHz, 60.000 kHz, 96.000 kHz, 100.000 kHz, 153.600 kHz                                                                                                                  |
| Divided frequency output (calculation method) | Oscillation source frequency $\times$ (any arbitrary one of 1/1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/12) $\times$ (any arbitrary one of 1/1, 1/10, 1/100, 1/1000). Over 10.0 Hz range. |

For frequencies other than the above, please consult us. (Min. order lot 10000 pcs.)

## ■ Output frequency example

|                    |                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------|
| Oscillation source | 32.768 kHz, 60.000 kHz, 96.000 kHz, 100.000 kHz, 153.600 kHz                                                      |
| Divided frequency  | 10.000 Hz, 50.000 Hz, 100.000 Hz, 1.000 kHz, 4.800 kHz, 9.600 kHz, 19.200 kHz, 38.400 kHz, 50.000 kHz, 76.800 kHz |