

KHz RANGE CRYSTAL UNIT CYLINDER

C-TYPE

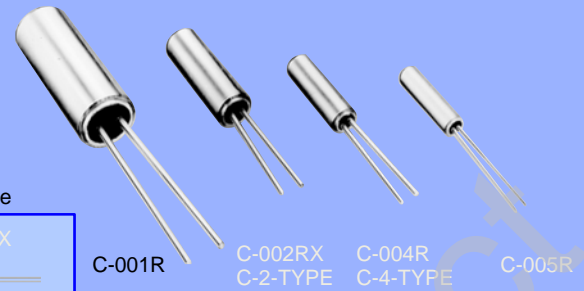
C-2-TYPE/C-4-TYPE

- Frequency range : 32.768 kHz (20 kHz to 192 kHz)
- Thickness : $\phi 1.2$ mm to $\phi 3.1$ mm
- Overtone order : Fundamental / Overtone (192 kHz)
- Applications : Clock and Microcomputer



Product Number (please contact us)

C-001R : Q11C001R1xxxx00
 C-002RX : Q11C02RX1xxxx00
 C-004R : Q11C004R1xxxx00
 C-005R : Q11C005R1xxxx00
 C-2-TYPE : Q12C20001xxxx00
 C-4-TYPE : Q12C40001xxxx00



Actual size

C-002RX

C-001R

C-002RX
C-2-TYPE

C-004R
C-4-TYPE

C-005R

Specifications for C-TYPE (characteristics)

| Item | Symbol | C-001R | C-002RX | C-004R | C-005R | Remarks |
|--------------------------------|-----------------------|--|--|--|--|---------------------------------------|
| Nominal frequency range | f_nom | 32.768 kHz | | | | |
| Temperature range | Storage temperature | -20 °C to +70 °C | | | | Store as bare product after unpacking |
| | Operating temperature | -10 °C to +60 °C | | | | |
| Level of drive | DL | 1.0 μ W Max. | | | | |
| Frequency tolerance (standard) | f_tol | $\pm 20 \times 10^{-6}$ | | | | +25 °C, DL=0.1 μ W |
| Turnover temperature | Ti | +25 °C ± 5 °C | | | | |
| Parabolic coefficient | B | $-0.04 \times 10^{-6} / ^\circ\text{C}$ Max. | | | | |
| Load capacitance | CL | 6 pF to ∞ | | | | Please specify |
| Motional resistance (ESR) | R ₁ | 35 k Ω Max. (18 k Ω Typ.) | 50 or 60 k Ω Max. (30 k Ω Typ.) | 50 k Ω Max. (30 k Ω Typ.) | 5 k Ω Max. (3 k Ω Typ.) | |
| Motional capacitance | C ₁ | 2.0 fF | | | | |
| Shunt capacitance | C ₀ | 0.9 pF Typ. | | | | |
| Frequency aging | f_age | $\pm 3 \times 10^{-6} / \text{year}$ Max. | | | | +25 °C, First year |

Specifications for C-2-TYPE C-4-TYPE (characteristics)

| Item | Symbol | Specifications | | Remarks |
|--------------------------------|-----------------------|--|--|---------------------------------------|
| | | C-2-TYPE | C-4-TYPE | |
| Nominal frequency range | f_nom | 20 kHz to 165 kHz | 20 kHz to 120 kHz, 192 kHz | |
| Temperature range | Storage temperature | -20 °C to +70 °C | | Store as bare product after unpacking |
| | Operating temperature | -10 °C to +60 °C | | |
| Level of drive | DL | 1.0 μ W Max. | | |
| Frequency tolerance (standard) | f_tol | $\pm 20 \times 10^{-6}$, $\pm 50 \times 10^{-6}$, $\pm 100 \times 10^{-6}$ | $\pm 50 \times 10^{-6}$, $\pm 100 \times 10^{-6}$ | +25 °C, DL=0.1 μ W |
| Turnover temperature | Ti | +25 °C ± 5 °C | | |
| Parabolic coefficient | B | $-0.04 \times 10^{-6} / ^\circ\text{C}$ Max. | | |
| Load capacitance | CL | 6 pF to ∞ | | Please specify |
| Motional resistance (ESR) | R ₁ | As per below table | | |
| Motional capacitance | C ₁ | 4.0 fF to 0.6 fF | | |
| Shunt capacitance | C ₀ | 2.0 pF to 0.6 pF | | |
| Frequency aging | f_age | $\pm 5 \times 10^{-6} / \text{year}$ Max. | | +25 °C, First year |

Motional resistance C-2-TYPE

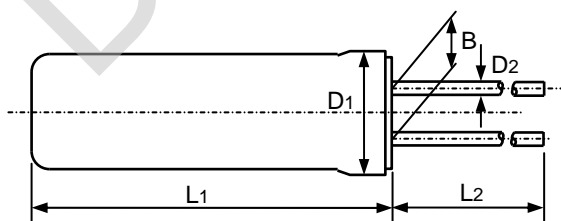
| Frequency | 20 kHz \leq f_nom < 31.2 kHz | 31.2 kHz \leq f_nom < 40 kHz | 40 kHz \leq f_nom < 90 kHz | 90 kHz \leq f_nom < 130 kHz | 130 kHz \leq f_nom \leq 165 kHz |
|---------------------|--------------------------------|--------------------------------|------------------------------|-------------------------------|-------------------------------------|
| Motional resistance | 55 k Ω Max. | 35 k Ω Max. | 20 k Ω Max. | 12 k Ω Max. | 10 k Ω Max. |

Motional resistance C-4-TYPE

| Frequency | 32 kHz \leq f_nom \leq 36 kHz | 38 kHz \leq f_nom \leq 50 kHz | 60 kHz \leq f_nom \leq 74 kHz | 74 kHz \leq f_nom \leq 100 kHz | 100 kHz < f_nom \leq 120 kHz | 192 kHz |
|---------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------|--------------------|
| Motional resistance | 55 k Ω Max. | 30 k Ω Max. | 25 k Ω Max. | 22 k Ω Max. | 15 k Ω Max. | 10 k Ω Max. |

External dimensions

(Unit:mm)



| Model | L ₁ | L ₂ | D ₁ | D ₂ | B |
|---------------------|----------------|----------------|-----------------|----------------|-----|
| C-001R | 8.0 Max. | 9.0 Min. | ϕ 3.1 Max. | ϕ 0.3 | 1.1 |
| C-002RX C-2-TYPE | 6.0 Max. | 4.0 Min. | ϕ 2.0 Max. | ϕ 0.2 | 0.7 |
| C-004R C-4-TYPE | 5.0 Max. | 4.0 Min. | ϕ 1.5 Max. | ϕ 0.18 | 0.5 |
| C-005R | 4.6 Max. | 4.0 Min. | ϕ 1.2 Max. | ϕ 0.15 | 0.3 |

100 kHz to 165 kHz: D₁ = ϕ 2.2 Max. (C-2-TYPE)