



## KHz RANGE CRYSTAL UNIT CYLINDER

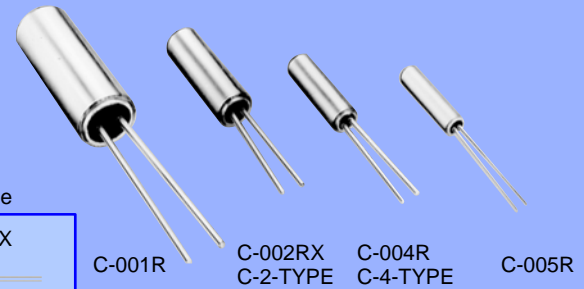
# C-TYPE C-2-TYPE / C-4-TYPE

- Frequency range : 32.768 kHz (20 kHz to 307.2 kHz)
- Thickness :  $\phi 1.2$  mm to  $\phi 3.1$  mm
- Overtone order : Fundamental / Overtone (192 kHz, 307.2 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



### 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 $\mu$ W Max.				
Frequency tolerance (standard)	f_tol	$\pm 20 \times 10^{-6}$				+25 °C, DL=0.1 $\mu$ W
Turnover temperature	Ti	+25 °C $\pm 5$ °C				
Parabolic coefficient	B	$-0.04 \times 10^{-6} / ^\circ\text{C}^2$ Max.				
Load capacitance	CL	6 pF to $\infty$				Please specify
Motional resistance (ESR)	R <sub>1</sub>	35 k $\Omega$ Max. (18 k $\Omega$ Typ.)	50 or 60 k $\Omega$ Max. (30 k $\Omega$ Typ.)	50 k $\Omega$ Max. (30 k $\Omega$ Typ.)	50 k $\Omega$ Max. (37 k $\Omega$ Typ.)	
Motional capacitance	C <sub>1</sub>	2.1 fF Typ.	2.0 fF	2.0 fF	1.9 fF Typ.	
Shunt capacitance	C <sub>0</sub>	0.9 pF Typ.	0.85 pF	0.85 pF	0.75 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, 307.2 kHz	32 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 $\mu$ W Max.		
Frequency tolerance (standard)	f_tol	$\pm 20 \times 10^{-6}, \pm 50 \times 10^{-6}, \pm 100 \times 10^{-6}$ (307.2 kHz: $\pm 100 \times 10^{-6}$ )	$\pm 50 \times 10^{-6}, \pm 100 \times 10^{-6}$	+25 °C, DL=0.1 $\mu$ W
Turnover temperature	Ti	+25 °C $\pm 5$ °C		
Parabolic coefficient	B	$-0.04 \times 10^{-6} / ^\circ\text{C}^2$ Max.		
Load capacitance	CL	6 pF to $\infty$		Please specify
Motional resistance (ESR)	R <sub>1</sub>	55 k $\Omega$ to 6 k $\Omega$	55 k $\Omega$ to 10 k $\Omega$	As per below table
Motional capacitance	C <sub>1</sub>	4.0 fF to 0.6 fF		
Shunt capacitance	C <sub>0</sub>	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

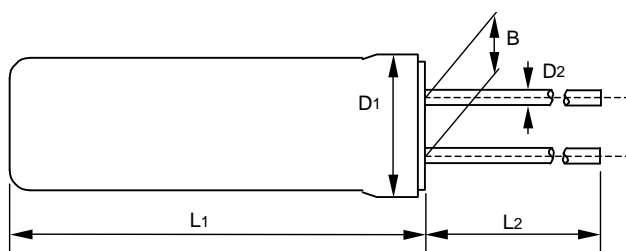
Frequency	20 kHz $\leq$ f_nom < 31.2 kHz	31.2 kHz $\leq$ f_nom < 40 kHz	40 kHz $\leq$ f_nom < 90 kHz	90 kHz $\leq$ f_nom < 130 kHz	130 kHz $\leq$ f_nom $\leq$ 165 kHz	307.2 kHz
Motional resistance	55 k $\Omega$ Max.	35 k $\Omega$ Max.	20 k $\Omega$ Max.	12 k $\Omega$ Max.	10 k $\Omega$ Max.	6 k $\Omega$ Max.

### Motional resistance C-4-TYPE

Frequency	32 kHz $\leq$ f_nom < 38 kHz	38 kHz $\leq$ f_nom < 60 kHz	60 kHz $\leq$ f_nom < 74 kHz	74 kHz $\leq$ f_nom $\leq$ 100 kHz	100 kHz < f_nom $\leq$ 120 kHz	192 kHz
Motional resistance	55 k $\Omega$ Max.	30 k $\Omega$ Max.	25 k $\Omega$ Max.	22 k $\Omega$ Max.	15 k $\Omega$ Max.	10 k $\Omega$ Max.

### External dimensions

(Unit:mm)



Model	L1	L2	D1	D2	B
C-001R	8.0 Max.	9.0 Min.	$\phi 3.1$ Max.	$\phi 0.3$	1.1
C-002RX C-2-TYPE	6.0 Max.	4.0 Min.	$\phi 2.0$ Max.	$\phi 0.2$	0.7
C-004R C-4-TYPE	5.0 Max.	4.0 Min.	$\phi 1.5$ Max.	$\phi 0.18$	0.5
C-005R	4.6 Max.	4.0 Min.	$\phi 1.2$ Max.	$\phi 0.15$	0.3

160 kHz to 165 kHz, 307.2 kHz: D1 =  $\phi 2.2$  Max. (C-2-TYPE)