



## kHz RANGE CRYSTAL UNIT

Product Number  
MC-146 : Q1xMC1462xxxx0X

## MC-146 / MC-146 TYPE

- Frequency range : MC-146---32.768 kHz  
: MC-146 TYPE---32 kHz to 100 kHz
- External dimension : 7.0 × 1.5 × 1.4 mm
- Overtone order : Fundamental
- Applications : Small communications devices



## Specifications (characteristics)

Item	Symbol	Specifications		Conditions / Remarks
		MC-146	MC-146 TYPE	
Nominal frequency range	f <sub>nom</sub>	32.768 kHz	32 kHz to 100 kHz	Please contact us about available frequencies.
Storage temperature	T <sub>stg</sub>	-55 C to +125 C		Storage as single product.
Operating temperature	T <sub>use</sub>	-40 C to +85 C		
Level of drive	DL	1.0 μW Max.		Operating Drive level 0.5 μW Max.
Frequency tolerance (standard)	f <sub>tol</sub>	± 20 × 10 <sup>-6</sup> , ± 50 × 10 <sup>-6</sup>	± 50 × 10 <sup>-6</sup> , ± 100 × 10 <sup>-6</sup>	+25 C, DL=0.1 μW
Turnover temperature	T <sub>i</sub>	+25 C ± 5 C		
Parabolic coefficient	B	-0.04 × 10 <sup>-6</sup> / C <sup>2</sup> Max.		
Load capacitance	CL	7 pF, 9 pF, 12.5 pF		Please specify
Motional resistance (ESR)	R <sub>1</sub>	65 kΩ Max.	65 kΩ to 25 kΩ	
Motional capacitance	C <sub>1</sub>	1.9 fF Typ.	2.5 fF to 0.6 fF	
Shunt capacitance	C <sub>0</sub>	0.8 pF Typ.	1.2 pF to 0.5 pF	
Frequency aging	f <sub>age</sub>	± 3 × 10 <sup>-6</sup> / year Max.	± 5 × 10 <sup>-6</sup> / year Max.	+25 C, First year

Product name MC-146 32.768000kHz 12.5 +20.0-20.0

(Standard form)

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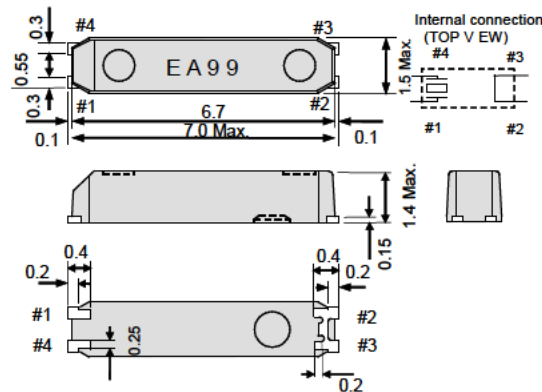
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①Model ②Frequency ③Load capacitance(pF) ④Frequency tolerance(× 10<sup>-6</sup>, +25 C)

## External dimensions

(Unit:mm)



Do not connect #2 and #3 to external device.  
The metal case inside of the molding compound may be exposed on the top or bottom of this product.  
This purely cosmetic and does not have any effect on quality, reliability or electrical specs.

## Footprint (Recommended)

(Unit:mm)

