



kHz RANGE CRYSTAL UNIT

MC-146

Product Number
MC-146: Q13MC1462xxx0X

- Frequency range : 32.768 kHz
- External dimension : 7.0 × 1.5 × 1.4 mm
- Overtone order : Fundamental
- Applications : Small communications devices



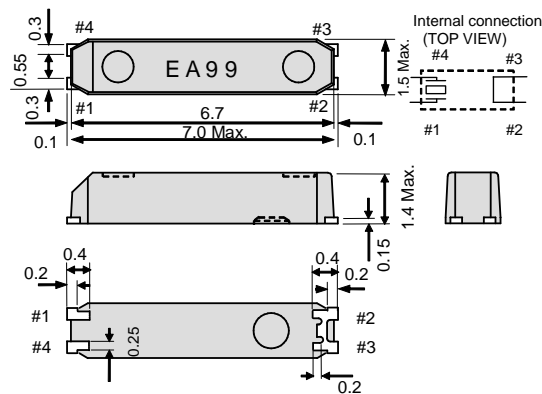
Specifications (characteristics)

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

Product name MC-146 32.768000kHz 12.5 +20.0-20.0
(Standard form) ① ② ③ ④①Model ②Frequency ③Load capacitance(pF) ④Frequency tolerance(× 10⁻⁶, +25 °C)

External dimensions

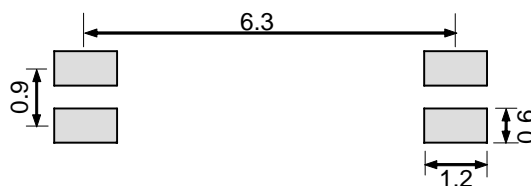
(Unit:mm)



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)



► Explanation of the mark that are using it for the catalog

	<p>► Pb free.</p>
	<p>► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)</p>
	<p>► Designed for automotive general equipment.</p>
	<p>► Designed for automotive applications related to driving and safety.</p>

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