



# kHz RANGE CRYSTAL UNIT SMD

## MC - 306 MC - 405 / MC - 406

- Frequency range : 32.768 kHz (20 kHz to 165 kHz)
- Thickness : 8.0 × 3.8 × 2.54 mm ...MC-306  
10.41 × 4.06 × 3.6 mm ...MC-405 / 406
- Overtone order : Fundamental
- Applications : Clock and Microcomputer



Product Number (please contact us)

MC-306 : Q1xMC3061xxxx00

MC-405 : Q1xMC4051xxxx00

MC-406 : Q1xMC4061xxxx00



Actual size

MC-306

MC-405 / 406



### Specifications (characteristics)

Item	Symbol	Specifications		Conditions / Remarks
Nominal frequency range	f <sub>nom</sub>	32.768 kHz	20 kHz to 165 kHz	Please contact us regarding available frequencies
Storage temperature	T <sub>stg</sub>	-55 °C to +125 °C		Store as bare product.
Operating temperature	T <sub>use</sub>	-40 °C to +85 °C		
Level of drive	DL	1.0 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	6 pF to ∞ (standard :12.5 pF)		Please specify
Motional resistance (ESR)	R <sub>1</sub>	50 kΩ Max.	As per below table	
Motional capacitance	C <sub>1</sub>	1.8 fF Typ.	4.0 fF to 0.6 fF	MC-306
		2.0 fF Typ.		MC-405 / 406
Shunt capacitance	C <sub>0</sub>	0.9 pF Typ.	2.0 pF to 0.6 pF	MC-306
		0.85 pF Typ.		MC-405 / 406
Frequency aging	f <sub>age</sub>	±3 × 10 <sup>-6</sup> / year Max.	±5 × 10 <sup>-6</sup> / year Max.	+25 °C, First year

### Motional resistance (ESR)

Frequency	20 kHz ≤ f <sub>nom</sub> < 31.2 kHz	31.2 kHz ≤ f <sub>nom</sub> < 40 kHz	40 kHz ≤ f <sub>nom</sub> < 90 kHz	90 kHz ≤ f <sub>nom</sub> < 130 kHz	130 kHz ≤ f <sub>nom</sub> ≤ 165 kHz
Motional resistance	55 kΩ Max.	35 kΩ Max.	20 kΩ Max.	12 kΩ Max.	10 kΩ Max.

### External dimensions

(Unit:mm)

**MC-306**

8.0 Max. (width), 3.2 (height), 3.8 Max. (total height), 2.38 (height), 2.54 Max. (height), 0.5 (width), 5.5 (width), 1.9 (width), 0.9 (width)

Internal connection (TOP VIEW) showing pins #1, #2, #3, #4.

Do not connect #2 and #3 to external device.  
Metal may be exposed on the top or bottom of this product.  
This will not affect any quality, reliability or electrical spec.

**MC-405 / 406**

9.60 (width), 10.41 Max. (width), 4.06 Max. (height), 3.15 (height), 3.6 Max. (height), 0.2 Min. (height), 2.54 (width), 2.54 (width), 0.51 (width), 2.29 (width)

Internal connection in MC-405 (TOP VIEW) showing pins #1, #2, #3, #4.

Internal connection in MC-406 (TOP VIEW) showing pins #1, #2, #3, #4.

Do not connect #2 and #3 of MC-406 to external device.

The first digit of No. means: 5xxxx MC-405, 6xxxx MC-406

### Footprint (Recommended)

(Unit:mm)

**MC-306**

1.3 (width), 4.2 (width), 1.3 (width), 1.9 (height), 1.3 (height), 1.9 (height)

**MC-405**

4.1 (width), 3.9 (width), 4.1 (width), 4.1 (height)

**MC-406**

4.1 (width), 3.9 (width), 4.1 (width), 1.52 (height), 1.52 (height), 0.8 (height)