Crystal unit

SEIKO EPSON CORPORATION

(Unit:mm)

(Unit:mm)

kHz RANGE CRYSTAL UNIT MC-306 / MC-306 TYPE MC-405 / MC-405 TYPE MC-406 / MC-406 TYPE

| Frequency range | | MC-306 / 405 / 406… 32.768 kHz |
|-------------------------------------|---|---|
| | : | MC-306 / 405 /406TYPE ··· 20 kHz to 120 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 |
| | | |



Specifications (characteristics)

| | | Specifications | | | |
|--------------------------------|------------|---|---|--|--|
| Item | Symbol | MC-306 / 405 / 406 | MC-306 / 405 /406 TYPE | Conditions / Remarks | |
| Nominal frequency range | f_nom | 32.768 kHz | 20 kHz to 120 kHz | Please contact us about available frequencies. | |
| 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. | | | |
| Frequency tolerance (standard) | f_tol | $\pm 20 	imes 10^{-6}, \pm 50 	imes 10^{-6}$ | $\pm 50 	imes 10^{-6}, \pm 100 	imes 10^{-6}$ | +25 °C, DL=0.1 μW | |
| Turnover temperature | Ti | +25 °C ±5 °C | | | |
| Parabolic coefficient | В | -0.04 × 10 ⁻⁶ / °C ² Max. | | | |
| Load capacitance | CL | 6 pF to ∞ (standard :12.5 pF) | | Please specify | |
| Motional resistance (ESR) | R1 | 50 kΩ Max. | As per table below | | |
| Motional capacitance | C1 | 1.8 fF Typ. | 4.0 fF to 0.6 fF | MC-306 | |
| | U 1 | 2.0 fF Typ. | | MC-405 / 406 | |
| Shunt capacitance | Co | 0.9 pF Typ. | 2.0 pF to 0.6 pF | MC-306 | |
| | C 0 | 0.85 pF Typ. | | MC-405 / 406 | |
| Frequency aging | f_age | $\pm 3 \times 10^{-6}$ / year Max. | $\pm 5 \times 10^{-6}$ / year Max. | +25 °C, First year | |

MC-306 /405 /406 TYPE Motional resistance (ESR)

| Frequency | 20 kHz≤f_nom< 31.2 kHz | 31.2 kHz≤f_nom< 40 kHz | 40 kHz≤f_nom< 90 kHz | 90 kHz≤f_nom≤120 kHz |
|-----------------------|------------------------|------------------------|----------------------|----------------------|
| Motional resistance | 55 kΩ Max. | 35 kΩ Max. | 20 kΩ Max. | 12 kΩ Max. |
| Developed as a second | | | | |

Product name (Standard form)

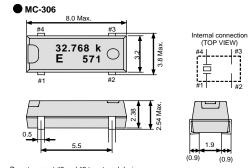
<u>32.768000kHz</u> <u>12.5</u> <u>+20.0-20.0</u> <u>MC-306</u> 1 2

3 4

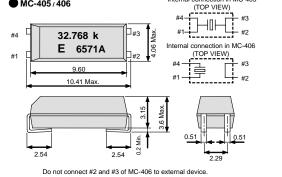
④Frequency tolerance(× 10⁻⁶, +25 °C) ③Load capacitance(pF) Model ②Frequency

MC-405 / 406

External dimensions

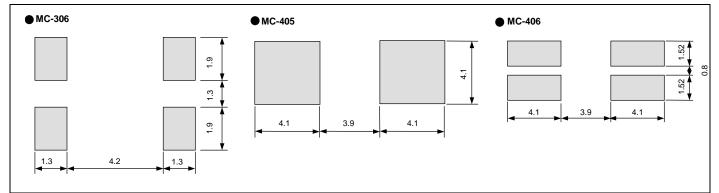


Do not connect #2 and #3 to external device. The metal case inside of the molding compound may be exposed on the top or bottom of this product. This purely cosmetic and does not have any effect on quality, reliability or electrical specs.



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

Footprint (Recommended)



PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

WORKING FOR HIGH QUALITY

In order provide high quality and reliable products and services than meet customer needs,

Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

Explanation of the mark that are using it for the catalog

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

ISO/TS16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

| Pb Free | ► Pb free. |
|-------------------|---|
| RoHS | 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.) |
| For Automotive | ► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc. |
| Automotive Safety | ► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc). |

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Epson:

 MC-405 32.7680K-A:ROHS
 MC-405 32.7680K-A0: PURE SN
 MC-405 32.7680K-A3:ROHS
 MC-405 32.7680K-AC3:

 ROHS
 MC-405 32.7680K-AG3: ROHS
 MC-405 32.7680KB-A0: ROHS
 MC-405 32.7680K-E0: PURE
 MC-405

 32.7680K-E0:ROHS
 MC-405 32.7680K-E3:ROHS
 MC-405 32.7680K-G3: ROHS
 MC-406 32.7680K-A0: ROHS
 MC-405

 406 32.7680K-A3:ROHS
 MC-406 32.7680K-E0:ROHS
 MC-406 32.7680K-E3: ROHS
 MC-405 32.7680K-E1: RO