Crystal unit

### SEIKO EPSON CORPORATION

(Unit:mm)

(Unit:mm)

Internal connection in MC-405 (TOP VIEW) #4 #1 #1 #2

Internal connection in MC-406 (TOP VIEW)

2.29

‴<u></u>∔==

#3

#2

0.51

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]#2

0.2 Min

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

2 54

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

Max

00

8.6 Max

#4



| Item                           | Symbol | Speci  | fications   | 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 1                                       | to +125 °C  | Storage as single product.                     |  |
| Operating temperature          | T_use  | -40 °C   | to +85 °C   |  |  |
| Level of drive                 | DL     | 1.0 µ  | W Max.  |  |  |
| Frequency tolerance (standard) | f_tol  | $\pm 20 \times 10^{-6}, \pm 50 \times 10^{-6}$ | $^{-6}, \pm 50 \times 10^{-6}$ $\pm 50 \times 10^{-6}, \pm 100 \times 10^{-6}$ +25 °C, DL=0.1 $\mu$ W |  |  |
| Turnover temperature           | Ti     | +25 °  | °C ±5 °C  |  |  |
| Parabolic coefficient          | В      | -0.04 × 10                                     | 0 <sup>-6</sup> / °C² Max.  |  |  |
| Load capacitance               | CL     | 6 pF to ∞ (sta                                 | andard :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   |  |
|                                | C1     | 2.0 fF Typ.                                    | 4.0 IF 10 0.6 IF  | MC-405 / 406                                   |  |
| Shunt capacitance              | Co     | 0.9 pF Typ.                                    |   | MC-306   |  |
|                                | C0     | 0.85 pF Typ.                                   | 2.0 pF to 0.6 pF  | MC-405 / 406                                   |  |
| Frequency aging                | f_age  | $\pm 3 \times 10^{-6}$ / year Max.             | $\pm$ 5 × 10 <sup>-6</sup> / year Max.  | +25 °C, First year                             |  |

### 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 kH | z |
|---------------------|------------------------|--------------|------------------------|------------|----------------------|--|---------------------|---|
| Motional resistance | 55 kΩ Max.             |              | 35 kΩ Max.             |            | 20 kΩ Max.           |  | 12 kΩ Max.          |   |
| Product name        | MC-306                 | 32.768000kHz | 12.5                   | +20.0-20.0 |                      |  |                     |   |
| (Standard form)     | 1                      | 2            | 3                      | 4          |                      |  |                     |   |

① ② ③ ①Model ②Frequency ③Load o

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

MC-405 / 406

2.54

#4

#1

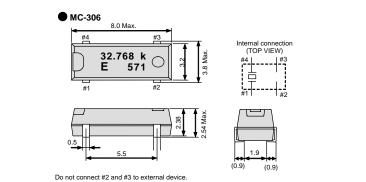
32.768 k

9.60

10.41 Max

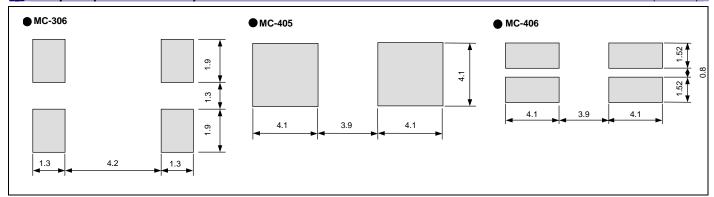
E 6571A

#### External dimensions



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)



# 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.

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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

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

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|-------------------|---|
| RoHS              | <ul> <li>Complies with EU RoHS directive.</li> <li>*About the products without the Pb-free mark.</li> <li>Contains Pb in products exempted by EU RoHS directive.</li> <li>(Contains Pb in sealing glass, high melting temperature type solder or other.)</li> </ul> |
| 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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# **Mouser Electronics**

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Epson:

 MC-306 32.7680K-A:ROHS
 MC-306 32.7680K-A0: PURE SN
 MC-306 32.7680K-A3:ROHS
 MC-306 32.7680K-AC3:

 ROHS
 MC-306 32.7680K-AE0: ROHS
 MC-306 32.7680K-E0: PURE SN
 MC-306 32.7680K-E0: ROHS
 MC-306

 32.7680K-E3: PURE SN
 MC-306 32.7680K-E3: ROHS
 MC-306 32.7680K-A0: ROHS
 MC-306
 32.7680K-E3: ROHS