

MHz RANGE CRYSTAL UNIT



Product Number  
 MA-406 : Q22MA4062xxxx00  
 MA-505 : Q22MA5052xxxx00  
 MA-506 : Q22MA5062xxxx00

**MA-406**  
**MA-505**  
**MA-506**



- Frequency range : 4 MHz to 64 MHz
- Thickness : 11.7 × 4.8 × 3.7 mm ---MA-406  
 13.46 × 5.08 × 4.6 mm ---MA-505/506
- Overtone order : Fundamental  
 3rd overtone (30 MHz to 64 MHz)
- Applications : For Clock of integrated circuit

**Specifications (characteristics)**

Item	Symbol	Specifications	Conditions / Remarks
Nominal frequency range	f <sub>nom</sub>	4.000 MHz to 29.999 MHz	Fundamental *1
		30.000 MHz to 64.000 MHz	3rd overtone *2
Storage temperature	T <sub>stg</sub>	-55 C to +125 C	Storage as single product.
Operating temperature	T <sub>use</sub>	-20 C to +70 C	Please contact us on availability of -40 C to +85 C
Level of drive	DL	10 μW to 100 μW	
Frequency tolerance (standard)	f <sub>tol</sub>	±50 × 10 <sup>-6</sup>	+25 C
Frequency versus temperature characteristics (standard)	f <sub>tem</sub>	Under 5.5 MHz : ±50 × 10 <sup>-6</sup> Over 5.5 MHz : ±30 × 10 <sup>-6</sup>	-20 C to +70 C Please contact us for requirements not listed in this specifications.
Load capacitance	CL	Fundamental: 10 pF to ∞ Overtone: 5 pF to ∞	Please specify
Motional resistance (ESR)	R1	As per table below	-20 C to +70 C, DL=100 μW
Shunt capacitance	C0	5 pF Max.	
Frequency aging	f <sub>age</sub>	±5 × 10 <sup>-6</sup> / year Max.	+25 C, First year

\*1 4.0 MHz ≤ f<sub>nom</sub> < 5.5 MHz : See "Available frequencies from 4.0 MHz to less than 5.5 MHz". 8.0 MHz < f<sub>nom</sub> < 8.2 MHz: Unavailable.

\*2 26.000 MHz ≤ f<sub>nom</sub> < 30.000 MHz : please contact us for inquiries for 3rd overtone mode.

**Available frequencies from 4.0 MHz to less than 5.5 MHz (MHz)**

4.000	4.032	4.096	4.190	4.194304	4.433619	4.500	4.800	4.9152
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**Motional resistance (ESR)**

Frequency (MHz)	4 ≤ f <sub>nom</sub> < 5.5	5.5 ≤ f <sub>nom</sub> < 6	6 ≤ f <sub>nom</sub> < 10	10 ≤ f <sub>nom</sub> < 12	12 ≤ f <sub>nom</sub> < 16	16 ≤ f <sub>nom</sub> < 30	30 ≤ f <sub>nom</sub> ≤ 36	36 < f <sub>nom</sub> ≤ 64
Motional resistance	150 Ω Max.	100 Ω Max.	80 Ω Max.	60 Ω Max.	50 Ω Max.	40 Ω Max.	100 Ω Max.	80 Ω Max.
Overtone order	Fundamental						3rd overtone	

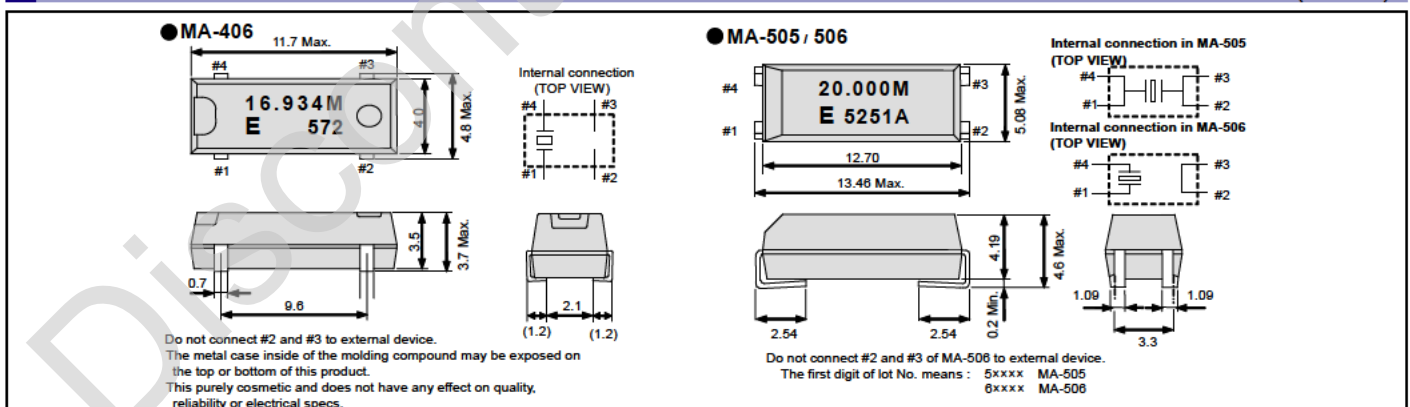
Product name      MA-406    24.000000MHz    12.0    +10.0-10.0  
 (Standard form)    ①                    ②                    ③                    ④

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

In addition to the above mentioned specification item, please specify frequency temperature characteristics and operating temperature range in case of inquiry.

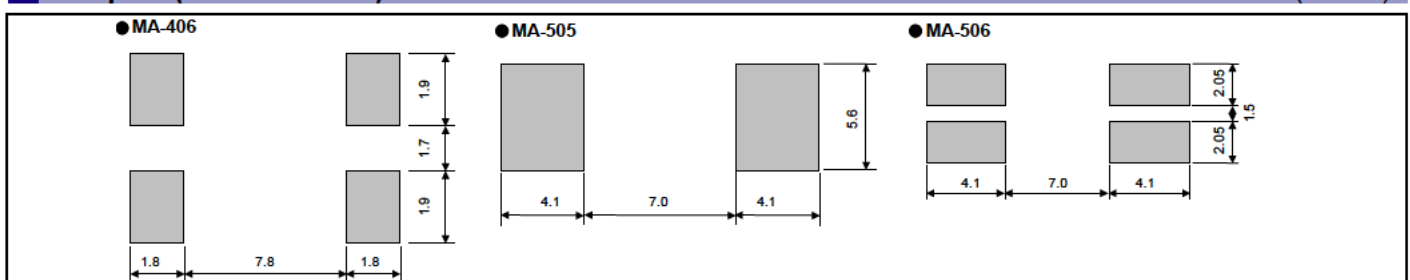
**External dimensions**

(Unit:mm)



**Footprint (Recommended)**

(Unit:mm)



## 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.





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.

## 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 IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

IATF 16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

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

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

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