



MHz RANGE CRYSTAL UNIT

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



Product Number (please contact us)

MA-406 : Q22MA4062xxxx00

MA-505 : Q22MA5052xxxx00

MA-506 : Q22MA5062xxxx00



Actual size

MA-406



MA-505 / 506



Specifications (characteristics)

Item	Symbol	Specifications	Conditions / Remarks
Nominal frequency range	f _{nom}	4.000 MHz to 29.999 MHz	Fundamental *1
		30.000 MHz to 64.000 MHz	3rd overtone *2
Storage temperature	T _{stg}	-55 °C to +125 °C	Storage as single product.
Operating temperature	T _{use}	-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 _{tol}	±50 × 10 ⁻⁶	+25 °C
Frequency versus temperature characteristics (standard)	f _{tem}	Under 5.5 MHz : ±50 × 10 ⁻⁶ Over 5.5 MHz : ±30 × 10 ⁻⁶	-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)	R ₁	As per table below	-20 °C to +70 °C, DL=100 µW
Shunt capacitance	C ₀	5 pF Max.	
Frequency aging	f _{age}	±5 × 10 ⁻⁶ / year Max.	+25 °C, First year

*1 4.0 MHz ≤ f_{nom} < 5.5 MHz : See "Available frequencies from 4.0 MHz to less than 5.5 MHz". 8.0 MHz < f_{nom} < 8.2 MHz: Unavailable.*2 26.000 MHz ≤ f_{nom} < 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 _{nom} < 5.5	5.5 ≤ f _{nom} < 6	6 ≤ f _{nom} < 10	10 ≤ f _{nom} < 12	12 ≤ f _{nom} < 16	16 ≤ f _{nom} < 30	30 ≤ f _{nom} ≤ 36	36 < f _{nom} ≤ 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

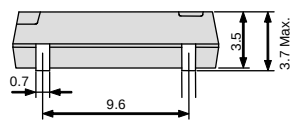
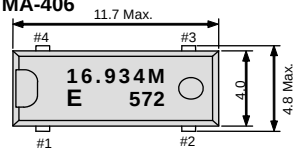
①Model ②Frequency ③Load capacitance(pF) ④Frequency tolerance(× 10⁻⁶, +25 °C)

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

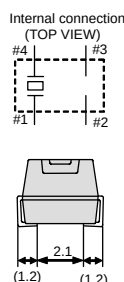
External dimensions

(Unit:mm)

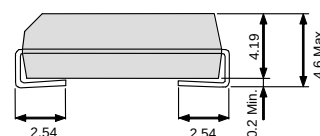
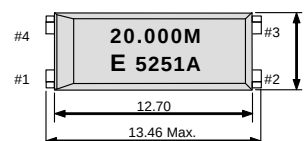
● MA-406



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.

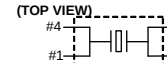


● MA-505 / 506

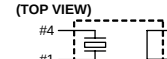


Do not connect #2 and #3 of MA-506 to external device.
The first digit of lot No. means : 5xxxx MA-505
6xxxx MA-506

Internal connection in MA-505



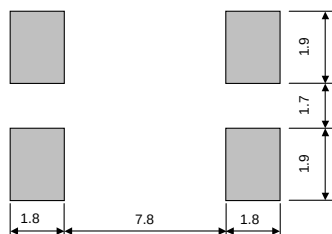
Internal connection in MA-506



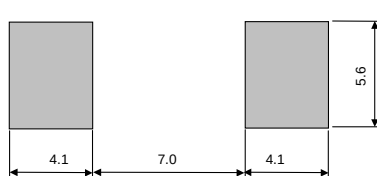
Footprint (Recommended)

(Unit:mm)

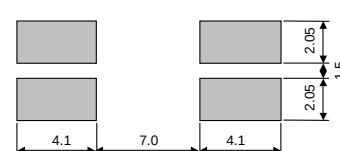
● MA-406



● MA-505



● MA-506



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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.

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	► 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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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9