

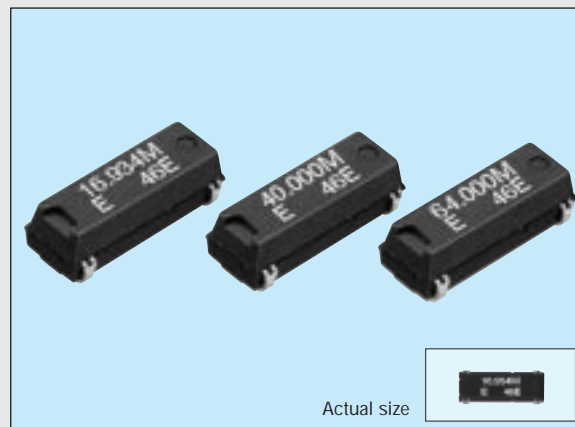
SMD HIGH-FREQUENCY CRYSTAL UNIT

MA-406

Products number

Q22MA406xxxxx00

- High-density mounting-type SMD.
- Excellent heat-resistance and environment capability.
- Cover a wide frequency range, from 4 MHz to 64 MHz.



Specifications (characteristics)

Item	Symbol	Specifications	Remarks	
Nominal frequency	f	4.000 MHz to 29.999 MHz *1	Fundamental mode	
		30.000 MHz to 64.000 MHz *2	3rd overtone mode	
Temperature range	Storage temperature	T _{STG}	-55 °C to +125 °C	Stored as bare product after unpacking
	Operating temperature	T _{OPR}	-20 °C to +70 °C	Please contact us on availability of -40 °C to +85 °C
Drive level	Maximum drive level	GL	2 mW	Only crystal oscillation is guaranteed
	Recommended drive level	DL	10 μW to 100 μW	
Frequency tolerance (standard)	Δf/f	±50 x 10 ⁻⁶	T _a =+25 °C±3 °C	
Frequency temperature characteristics (standard)		Under 5.5 MHz: ±50 x 10 ⁻⁶	-20 °C to +70 °C	
		Over 5.5 MHz: ±30 x 10 ⁻⁶		
Load capacitance	C _L	Fundamental: 10 pF to ∞	Please specify	
		Over tone: 5 pF to ∞		
Series resistance	R ₁	As per table below	-20 °C to +70 °C , DL=100 μW	
Shunt capacitance	C ₀	5 pF Max.		
Insulation resistance	IR	500 MΩ Min.		
Aging	f _a	±5 x 10 ⁻⁶ / year	T _a =+25 °C ±3 °C , first year	
Shock resistance	S.R.	±10 x 10 ⁻⁶ Max.	Three drops on a hard board from 750 mm or excitation test with 29400 m/s ² x 0.3 ms x 1/2 sine wave x 3 directions	

*1 8.0 MHz < f < 8.2 MHz: Unavailable.

4.0 MHz ≤ f < 5.5 MHz : See "Available frequencies form 4.0 MHz to less than 5.5 MHz" on page 22.

*2 26.000 MHz ≤ f < 30.000 MHz :please contact us for inquiries for 3rd overtone mode.

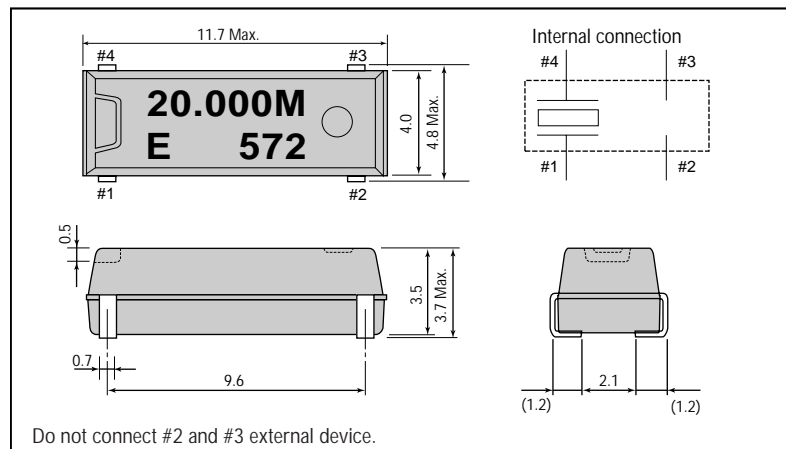
Metal may be exposed on the top of this product. This won't affect any quality, reliability or electrical spec.

Series resistance

Frequency (MHz)	4.0 ≤ f < 5.5	5.5 ≤ f < 6.0	6.0 ≤ f < 10.0	10.0 ≤ f < 12.0	12.0 ≤ f < 16.0	16.0 ≤ f < 30.0	26.0 ≤ f ≤ 36.0	36.0 < f ≤ 64.0
Series resistance (Ω)	150 Ω Max.	100 Ω Max.	80 Ω Max.	60 Ω Max.	50 Ω Max.	40 Ω Max.	100 Ω Max.	80 Ω Max.
Oscillation mode	Fundamental mode						3rd overtone mode	

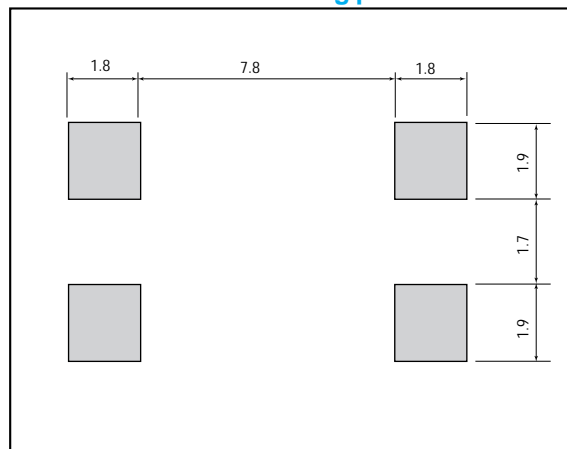
External dimensions

(Unit: mm)



Recommended soldering pattern

(Unit: mm)



Part Numbering System

Standard Crystals (AT Strip Crystal)

MA-506

30.0000M

-

A

0

Crystal Package Type:

CA-301: 3mm diameter metal can
 MA-505: 4pin "J" lead SMD, 4.57mm Height
 MA-506: 4pin "J" Lead SMD, 4.57mm Height
 MA-406: 4pin "J" Lead SMD, 3.65mm Height
 MA-306: Miniature 4pin "J" lead SMD, 2.54mm Height
 FA-238: Ceramic SMD, 0.7 Height
 FA-365: Ceramic SMD, 1.4mm Height

Freq. Tolerance@25C All Models Except CA-301

B or Blank: +/-50ppm(Std)
 C: +/-100PPM

CA-301 Only

Frequencies: 4.0000M~5.5000M
 B or Blank: +/-50 ppm (Standard)
 C: +/-100ppm
 Frequencies: 5.5001M ~ 64.0000M
 Blank: +/-30ppm (Standard)

Load Capacitance:

A: 12.5pf	AA: 27.0pf
B: 16.0pf	AB: 30.0pf
C: 18.0pf	AC: 9.0pf
D: 22.0pf	AD: 50.0pf
E: 6.0pf	AE: 22.9pf
F: Series	AF: 35.0pf
G: 20.0pf	AG: 7.0pf
H: 32.0pf	AH: 40.0pf
I: 33.0pf	AI: 25.0pf
J: 18.5pf	AJ: 8.0pf
K: 10.0pf	AK: 10.5pf
L: 18.3pf	AL: 9.5pf
M: 100.0pf	AM: 9.2pf
N: 13.5pf	AN: 7.8pf
P: 11.0pf	AP: 10.7pf
Q: 28.0pf	AQ: 5.2pf
R: 15.0pf	AR: 7.1pf
S: 9.6pf	AS: 8.5pf
T: 13.0pf	
U: 47.0pf	
V: 24.0pf	
W: 12.0pf	
X: 5.0pf	
Y: 14.0pf	
Z: 26.0pf	

Tape & Reel Qty

(For MA,FA type only)
 0: 1000pcs per reel
 3: 250pcs per reel

Frequency Range:

M: In MHz to 4 Decimal Places

CA-301 and
 MA-505/506/406: 4~64MHz
 (8.0<f<8.2MHz are not possible and only specific frequencies between 4.0~5.5MHz, 27<f<30MHz should specify fund or 3rd O/T)

MA-306: 17.734~41MHz
 FA-238: 20~50MHz
 FA-365: 10~60MHz