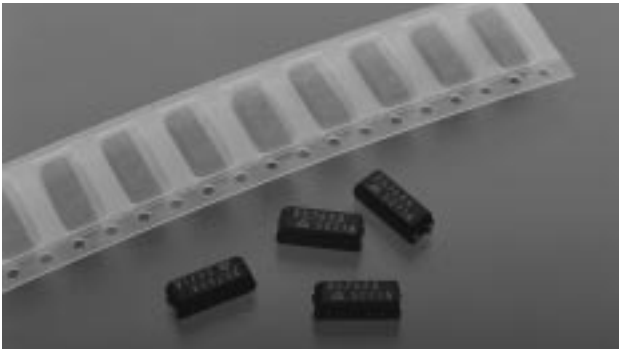


Surface Mount Quartz Crystals - Seiko Epson

Low Frequency MC405/406 Series



Features

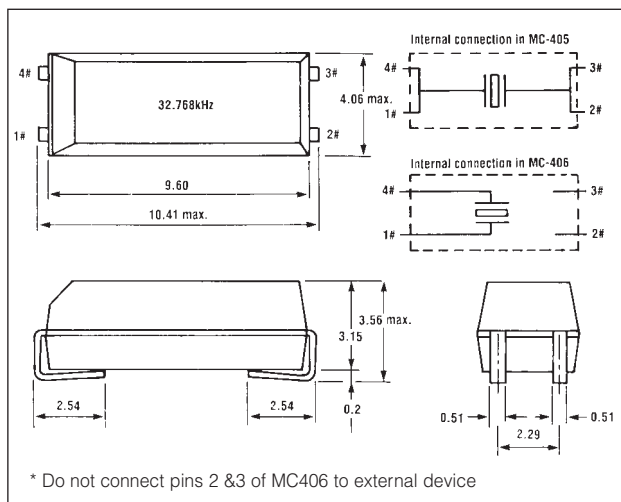
- Frequency range 20.00kHz - 165.00kHz
- High density mounting type SMD
- Photolithography finish allows uniform & stable performance
- Excellent shock resistance & environmental capability
- 32.768kHz ex-stock
- Suitable for timekeeping of clocks and microcomputers

Standard Frequencies

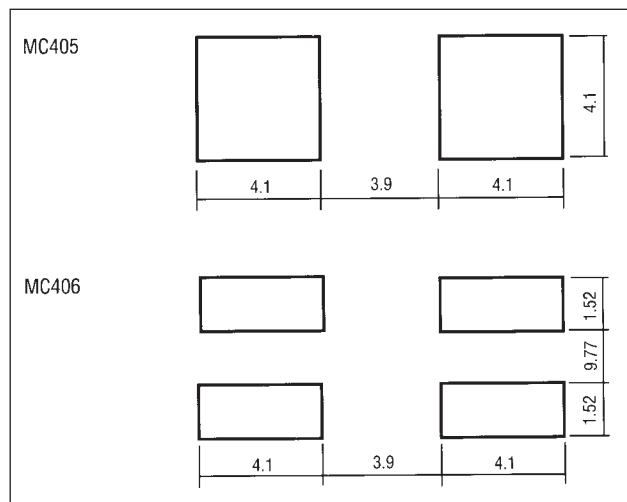
Item	Symbol	Specification		Remarks
Nominal frequency range	f	32.768kHz	20.000kHz to 165.000kHz	CSO* for frequencies
Temperature range:				
Storage temperature	T _{STG}	-55°C to +125°C		
Operating temperature	T _{OPR}	-40°C to +85°C		
Maximum drive level	GL	1.0µW MAX.		
Soldering condition (lead part only)	T _{SOL}	Two times at under 260°C within 10 sec. or under 230°C within 3 min.		
Frequency tolerance (standard)	Δf/f	±20ppm or ±50ppm	±100ppm	Ta=25°C, DL = 1.0µW
Turnover temperature (frequency)	∅T	25°C±5°C	25°C TYP.	
Temperature coefficient	a	-0.04ppm/°C² MAX.		
Load capacitance	CL	3pF to ∞		Please specify
Series resistance	R ₁	50KΩmax.	35KΩ to 8KΩ	
Motional capacitance	C ₁	2.0fF TYP.	2.1fF ~ 0.6fF	
Shunt capacitance	C ₀	0.85pF TYP.	1.0pF ~ 0.6pF	
Insulation resistance	IR	100MΩ MIN.		
Aging	fa	±3ppm/year MAX.	±5ppm/year MAX.	Ta=25°C ±3°C
Shock resistance	S.R.	±5ppm MAX		Drop test of 3 times on a hard board from 75cm height or excitation test with 3000G x 3mS x 1/2 sinewave x 3 directions

*CSO = Contact Sales Office

Dimensions(mm)



Recommended Soldering Pattern



MC405 batch numbers commence with 5
MC406 batch numbers commence with 6



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Surface Mount Quartz Crystals - Seiko Epson

The Benefits of the MC405/406 32.768kHz

- The most cost-effective SMD 32.768kHz product in the market.
- Industrial temperature range of -40°C +85°C is standard.
- The excellent heat characteristics of Seiko Epson built-in tuning fork resonator make them suitable for all surface mount soldering techniques.
- Automatic insertion is possible. The conventional mount mini-cylinder cannot be mounted by most equipment, meaning in general it is hand-soldered. The production cost saving of the MC405/406 is estimated at £0.10 per unit in volume.
- Steps such as lead forming and cropping are not required. The devices are packaged in tapes already and can be loaded in the mounting equipment as is.
- MC406 is second sourced by the ACT 90SMX package.



Standard Frequencies Ex-Stock (kHz) (-40°C +85°C)

MC405 Frequency	ACT Stock Number	MC406 Frequency	ACT Stock Number
32.768 ±20ppm 12.5pF	CQ00003DZ	32.768 ± 20ppm 12.5pF	CI00003EP
32.768 ±50ppm 12.5pF	CQ00003HL	32.768 ±50ppm 12.5pF	CI00003HL
38.40 ±20ppm 12.5pF	CQ000038DZ	307.2 ±100ppm 11pF	CI0030EF



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