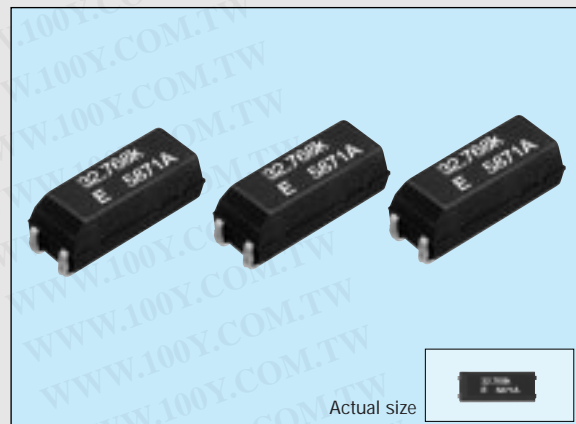


SMD LOW/MEDIUM-FREQUENCY CRYSTAL UNIT

MC-405/MC-406

- High-density mounting-type SMD.
- Photolithography finished allows uniform, stable performance.
- Excellent shock resistance and environmental capability.
- Capable of covering low-frequency range from 20 kHz to 165 kHz.
- Suitable for time keeping of clock and microcomputer.



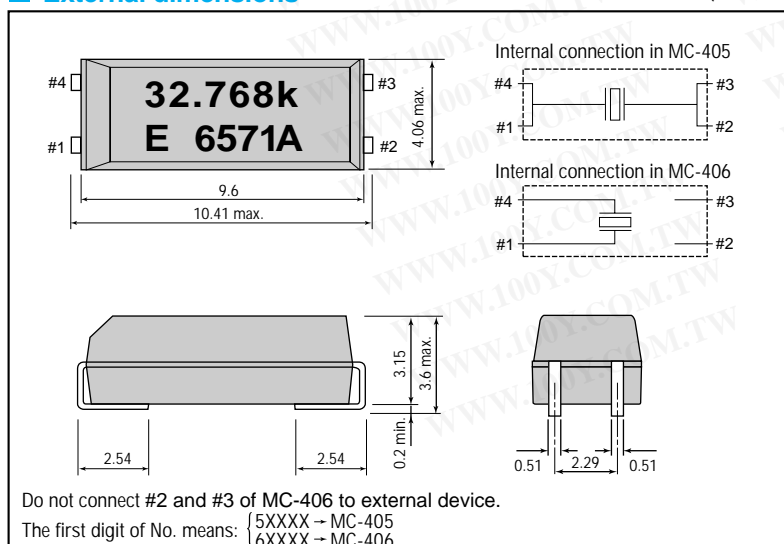
Actual size

■ Specifications (characteristics)

Item	Symbol	Specifications		Remarks
Nominal frequency range	f	32.768 kHz	20.000 kHz to 165.000 kHz 307.2 kHz	
Temperature range	Storage temperature	T _{STG} -55°C to +125°C		Stored as bare product after unpacking
	Operating temperature	T _{OPR} -40°C to +85°C		
Maximum drive level	GL	1.0μW max.		
Soldering condition	T _{SOL}	Twice at under 260°C within 10 sec. or under 230°C within 3 min.		
Frequency tolerance (standard)	Δf/f	±20ppm, ±50ppm	±50ppm, ±100ppm (307.2 kHz: ±100ppm)	T _a =25°C, DL=0.1μW
Turnover temperature (frequency)	θ _T	25°C ±5°C		
Temperature coefficient (frequency)	a	-0.04ppm/°C ² max.		
Load capacitance	C _L	6pF to ∞		Please specify
Series resistance	R ₁	50 kΩ max.	55 kΩ to 6 kΩ	For details, refer to 15
Motion capacitance	C ₁	2.0fF typ.	4.0fF to 0.6fF	
Shunt capacitance	C ₀	0.85pF typ.	2.0pF to 0.6pF	
Insulation resistance	IR	500 MΩ min.		
Aging	f _a	±3ppm/year max.	±5ppm/year max.	T _a =25°C±3°C, first year
Shock resistance	S.R.	±5ppm max.		Three drops on a hard board from 75 cm or excitation test with 3000G x 0.3ms x 1/2 sine wave x 3 directions

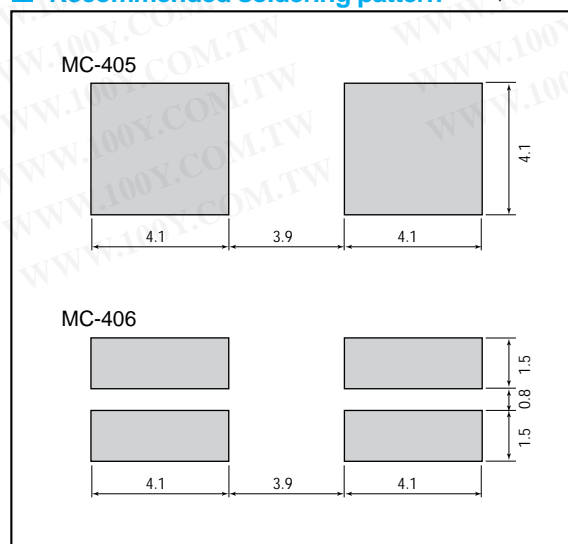
■ External dimensions

(Unit: mm)



■ Recommended soldering pattern

(Unit: mm)



勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

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THE CRYSTALMASTER



ENERGY SAVING EPSON

EPSON offers effective savings to its customers through a wide range of electronic devices, such as semiconductors, liquid crystal display (LCD) modules, and crystal devices. These savings are achieved through a sophisticated melding of three different efficiency technologies.

Power saving technology provides low power consumption at low voltages.

Space saving technology provides further reductions in product size and weight through super-precise processing and high-density assembly technology.

Time saving technology shortens the time required for design and development on the customer side and shortens delivery times.



Our concept of Energy Saving technology conserves resources by blending the essence of these three efficiency technologies. The essence of these technologies is represented in each of the products that we provide to our customers.

In the industrial sector, leading priorities include measures to counter the greenhouse effect by reducing CO₂, measures to preserve the global environment, and the development of energy-efficient products. Environmental problems are of global concern, and although the contribution of energy-saving technology developed by EPSON may appear insignificant, we seek to contribute to the development of energy-saving products by our customers through the utilization of our electronic devices. EPSON is committed to the conservation of energy, both for the sake of people and of the planet on which we live.

Resource Saving



SEIKO EPSON CORP. QUARTZ DEVICE DIVISION acquired ISO9001 and ISO14001 certification by B.V.Q.I. (Bureau Veritas Quality International) .

ISO9001 in October, 1992.

ISO14001 in November, 1997.

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