kHz RANGE CRYSTAL UNIT
LOW PROFILE SMD

FC - 13F / FC - 135 / FC - 255

- Frequency range : 32.768 kHz (32 kHz to 100 kHz)
- External dimensions : 3.2 × 1.5 × 0.55 mm ···FC-13F
  : 3.2 × 1.5 × 0.80 mm ···FC-135
  : 4.9 × 1.8 × 0.80 mm ···FC-255
- Overtone order : Fundamental
- Applications : Small communications devices

RoHS Compliant

Product Number (please contact us)
FC-13F : Q13FC13F0xxxx00
FC-135 : Q1xFC1350xxxx00
FC-255 : Q1xFC2550xxxx00

Actual size

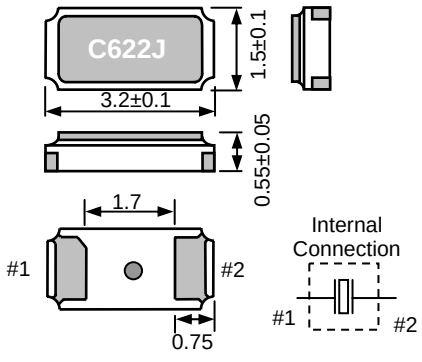
FC-13F/ 135	FC-255
	

Specifications (characteristics)

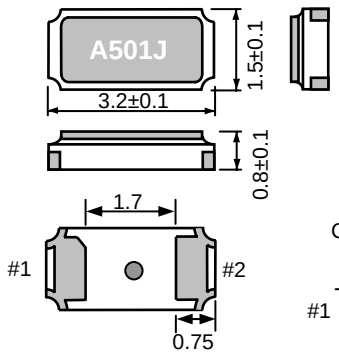
Item	Symbol	Specifications					Conditions / Remarks
		FC-13F	FC-135	FC-135	FC-255	FC-255	
Nominal frequency range	f_nom	32.768 kHz		32 kHz to 77.5 kHz	32.768 kHz	32 kHz to 100 kHz	Please contact us for inquiries regarding available frequencies.
Storage temperature	T_stg	-55 °C to +125 °C					Store as bare product.
Operating temperature	T_use	-40 °C to +85 °C					
Level of drive	DL	0.5 μW Max.					
Frequency tolerance (standard)	f_tol	$\pm 20 \times 10^{-6}$					+25 °C, DL=0.1 μW Please ask for tighter tolerance
Turnover temperature	Ti	+25 °C ±5 °C					
Parabolic coefficient	B	-0.04×10^{-6} / °C^2 Max.					
Load capacitance	CL	7 pF, 9 pF, 12.5 pF			7 pF, 12.5 pF		Please specify
Motional resistance (ESR)	R1	80 kΩ Max.	70 kΩ Max.	70 kΩ to 45 kΩ	65 kΩ Max.	70 kΩ to 30 kΩ	
Motional capacitance	C1	3.3 fF Typ.	3.4 fF Typ.	3.7 fF to 1.6 fF	2.0 fF Typ.	2.3 fF to 0.6 fF	
Shunt capacitance	C0	1.0 pF Typ.	1.0 pF Typ.	1.3 pF to 0.5 pF	1.3 pF Typ.	1.7 pF to 0.9 pF	
Frequency aging	f_age	±3 × 10^{-6} / year Max.					+25 °C, First year

External dimensions (Unit:mm)

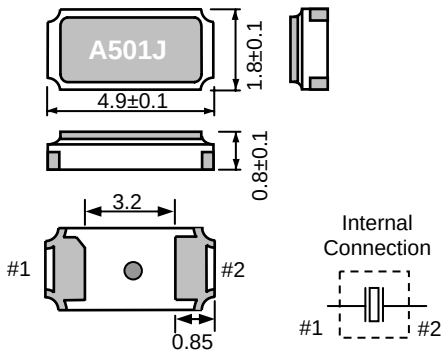
FC-13F



FC-135

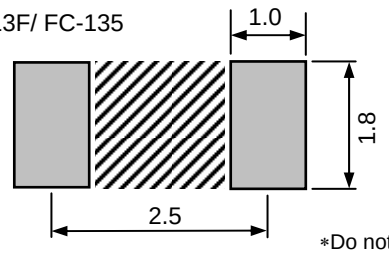


FC-255

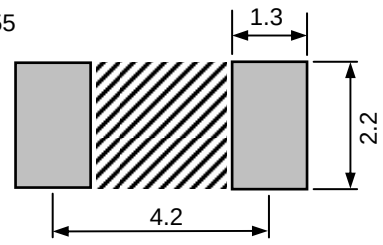


Footprint (Recommended) (Unit:mm)

FC-13F/ FC-135



FC-255



∗Do not design any patterns on shaded area.

“QMEMS” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, ”Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, 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,

Epson Toyocom made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 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	►Pb free.
RoHS Compliant	►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.)
For Automotive	►The products have been designed for high reliability applications such as Automotive.

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