



## kHz RANGE CRYSTAL UNIT



Product Number

FC-135R : X1A000141xxxx00

FC-135 : Q13FC1350xxxx00

FC-135 TYPE : Q14FC1350xxxx00

# FC-135R

## FC-135 / FC-135 TYPE

- Frequency range : FC-135R / FC-135...32.768 kHz  
: FC-135 TYPE...32 kHz to 77.5 kHz
- External dimensions : 3.2 × 1.5 × 0.80 mm
- Overtone order : Fundamental
- Applications : Small communications devices



## Specifications (characteristics)

| Item                           | Symbol           | Specifications                                  |             |                    | Conditions / Remarks                                  |
|--------------------------------|------------------|-------------------------------------------------|-------------|--------------------|-------------------------------------------------------|
|                                |                  | FC-135R                                         | FC-135      | FC-135 TYPE        |                                                       |
| Nominal frequency range        | f <sub>nom</sub> | 32.768 kHz                                      | 32.768 kHz  | 32 kHz to 77.5 kHz | Please contact us about available frequencies.        |
| Storage temperature range      | T <sub>stg</sub> | -55 °C to +125 °C                               |             |                    | Storage as single product.                            |
| Operating temperature range    | T <sub>use</sub> | -40 °C to +85 °C (+105 °C)                      |             |                    | Please contact us about +85 °C < T <sub>use</sub>     |
| Level of drive                 | DL               | 0.5 μW (1.0 μW Max.)                            |             |                    | Please contact us if you require 1.0 μW Max.          |
| Frequency tolerance (standard) | f <sub>tol</sub> | ±20 × 10 <sup>-6</sup>                          |             |                    | +25 °C, DL=0.1 μW<br>Please ask for tighter tolerance |
| Turnover temperature           | T <sub>i</sub>   | +25 °C ±5 °C                                    |             |                    |                                                       |
| Parabolic coefficient          | B                | -0.04 × 10 <sup>-6</sup> / °C <sup>2</sup> Max. |             |                    |                                                       |
| Load capacitance               | CL               | 7 pF, 9 pF, 12.5 pF                             |             |                    | Please specify                                        |
| Motional resistance (ESR)      | R <sub>1</sub>   | 50 kΩ Max.                                      | 70 kΩ Max.  | 70 kΩ to 45 kΩ     |                                                       |
| Motional capacitance           | C <sub>1</sub>   | 3.4 fF Typ.                                     | 3.4 fF Typ. | 3.7 fF to 1.6 fF   |                                                       |
| Shunt capacitance              | C <sub>0</sub>   | 1.0 pF Typ.                                     | 1.0 pF Typ. | 1.3 pF to 0.5 pF   |                                                       |
| Frequency aging                | f <sub>age</sub> | ±3 × 10 <sup>-6</sup> / year Max.               |             |                    | +25 °C, First year                                    |

Product name FC-135R 32.768000kHz 12.5 +20.0-20.0

(Standard form)

①

②

③

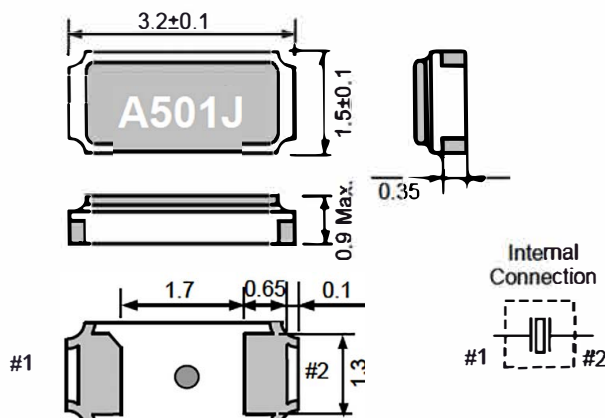
④

①Model ②Frequency ③Load capacitance (pF) ④Frequency tolerance (× 10<sup>-6</sup>, +25 °C)

## External dimensions

(Unit:mm)

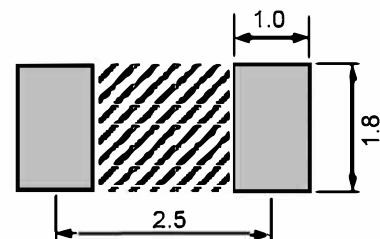
FC-135R / FC-135



## Footprint (Recommended)

(Unit:mm)

FC-135R / FC-135



\*Do not design any circuit patterns in the shaded area.

## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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.

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

IATF 16949 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.                                                                                                                                                                                                                      |
|  | ► Complies with EU RoHS directive.<br>*About the products without the Pb-free mark.<br>Contains Pb in products exempted by EU RoHS directive.<br>(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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