

## *Resonator*

# Piezoelectric Resonator (4 to 23.9 MHz)

## FAR Family (C4 series N type)

### ■ DESCRIPTION

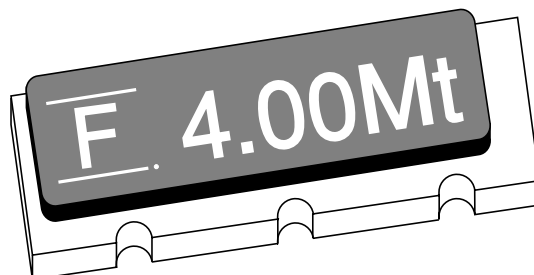
Fujitsu resonators C4 series (N type) feature originally developed single crystals with a high electro-mechanical coefficient (LiNbO<sub>3</sub>: lithium niobate), the result is very compact packaging.

C4 series (N type) with built-in capacitors for exclusive use in microcomputer clocks, and this series is ultra low profile CHIP type device for surface-mount (SMT).

### ■ FEATURES

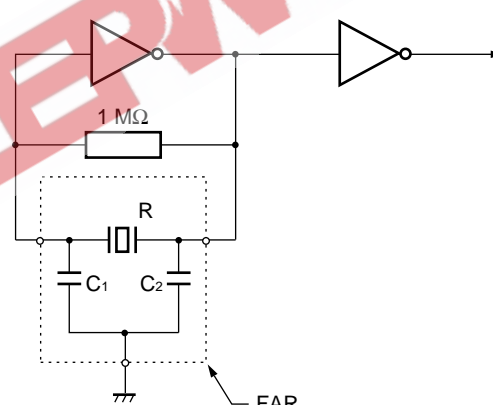
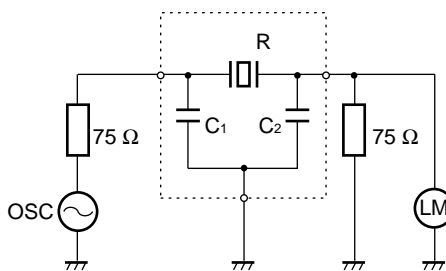
- Ultra low profile H = 1.6 mm
- Direct oscillation in 4 to 23.9 MHz frequency.
- Suitable for the source of microcomputer clock
- Emboss-typed pack for automatic mounting
- Superior shock and vibration resistance, preventing damage during automatic mounting

### ■ PACKAGE



# FAR Family (C4 series N type)

## STANDARD CHARACTERISTICS

| Parameter                                   | Series | C4 series (N type)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Remarks                                                                                                                                  |
|---------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Material                                    |        | Lithium Niobate (LiNbO <sub>3</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                          |
| Frequency                                   |        | 4 to 17 MHz      17.1 to 23.9 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                          |
| Standard frequency                          |        | See "Standard Frequency."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                          |
| Initial frequency deviation                 |        | ±0.3% (K)<br>±0.5% (M)<br>±1.0% (L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ±1.0% (L)                                                                                                                                |
| Temperature characteristic (-20°C to +60°C) |        | ±0.5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                          |
| Capacity of built-in capacitor              |        | 20±8 pF (standard)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10±4 pF, 30±8 pF are also available. Capacity is specified by Fujitsu, considering matching data with applied IC (mainly microcomputer). |
| Aging stability                             |        | Within ±0.1%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                          |
| Operating temperature                       |        | -30°C to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                          |
| Storage temperature                         |        | -40°C to +100°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                          |
| Standard measuring circuit                  |        | <ul style="list-style-type: none"> <li>Resonant frequency</li> </ul>  <ul style="list-style-type: none"> <li>Less than 4 MHz to 10 MHz<br/>IC: 1/6MB84069B×2</li> <li>10 MHz to 20.0 MHz<br/>IC: 1/6MC74HC04×2</li> <li>20.1 MHz to 23.9 MHz<br/>IC: 1/6MC74HCU04×2</li> <li>V<sub>CC</sub>: 5 V DC</li> <li>R: Resonator</li> <li>C<sub>1</sub>, C<sub>2</sub>: Loading capacitors (built-in)</li> </ul> <ul style="list-style-type: none"> <li>Serial resonant resistance</li> </ul>  <ul style="list-style-type: none"> <li>R: Resonator</li> <li>Measuring instrument: Network analyzer</li> </ul> |                                                                                                                                          |

# FAR Family (C4 series N type)

## ■ STANDARD FREQUENCY

| Standard frequency (kHz)                                                                                                                     | Package size | Resonant resistance       |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------|
| 4,000<br>4,194<br>4,915                                                                                                                      | N            | 300 Ω max.<br>(Symbol: 0) |
| 6,000<br>6,144<br>7,373<br>8,000<br>8,388<br>9,830<br>10,000<br>11,059<br>12,000<br>12,288<br>14,746<br>16,000<br>16,934<br>19,661<br>20,000 | N            | 75 Ω max.<br>(Symbol: 2)  |

- Notes:**
- Fujitsu can also develop applicable device in addition to standard devices if it's oscillation frequency is from 4 to 23.9 MHz.
  - Resonant resistance of the part other than standard, Fujitsu should specify its resonant resistance according to applied frequency. (See “• Frequency and standard resonant resistance.”)
  - Frequency and standard resonant resistance

| Frequency         | Standard resonant resistance |
|-------------------|------------------------------|
| 4.00 to 5.99 MHz  | 300 Ω max. (Symbol: 0)       |
| 6.00 to 23.99 MHz | 75 Ω max. (Symbol: 2)        |

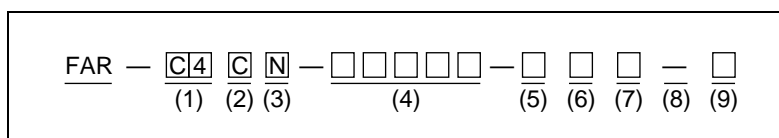
**Note:** Resonant resistance of custom designed part should be specified considering matching condition with applicable IC by Fujitsu.

## ■ NOTES ON USE

- Handle carefully
- Solder under the following conditions.  
5 seconds max. at 230°C (PCB)  
Recommended preheating is 150°C for one minute in order not to apply extreme heat to the resonator.
- Avoid extreme fluctuations in temperature.
- There is no specific direction in resonator mounting.
- Oscillation data should be examined when used in oscillation circuit with micon or other ICs.
- This is for reflow solder, not for flow solder.

# FAR Family (C4 series N type)

## ■ PART NUMBERING SYSTEM



### (1) Series

| Series | Single crystal     | Capacitor               |
|--------|--------------------|-------------------------|
| C4     | LiNbO <sub>3</sub> | With built-in capacitor |

### (2) Package Type

| Specification | Type |
|---------------|------|
| C             | CHIP |

### (3) Package Type

| Specification | Size            |
|---------------|-----------------|
| N             | 8.0 × 3.2 × 1.6 |

### (4) Frequency

(Example) Unit: kHz (Specify in five digits.)

| Frequency | Specification |
|-----------|---------------|
| 7.373 MHz | 07373         |

See “■ Standard Frequency”.

### (5) Initial Frequency Deviation

| Specification | Deviation |
|---------------|-----------|
| K             | ±0.3%     |
| M             | ±0.5%     |
| L             | ±1.0%     |

### (6) Built-in Capacitor

| Specification | Capacitance |
|---------------|-------------|
| 0             | 20±8 pF     |
| 1             | 10±4 pF     |
| 2             | 30±8 pF     |

### (7) Resonant Resistance

| Specification | Resonant resistance |
|---------------|---------------------|
| 0             | 300 Ω max.          |
| 2             | 75 Ω max.           |

# FAR Family (C4 series N type)

## (8) User-specific Special Symbols

| Specification | Description                                  |
|---------------|----------------------------------------------|
| Name          | No specifications, no taping specification   |
| —             | No specifications, with taping specification |
| A to Z        | Serial number for custom design              |

## (9) Resonant Resistance

| Specification | Description                               |
|---------------|-------------------------------------------|
| R             | 16 mm wide emboss tape coiled 3,000 times |

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# FAR Family (C4 series N type)

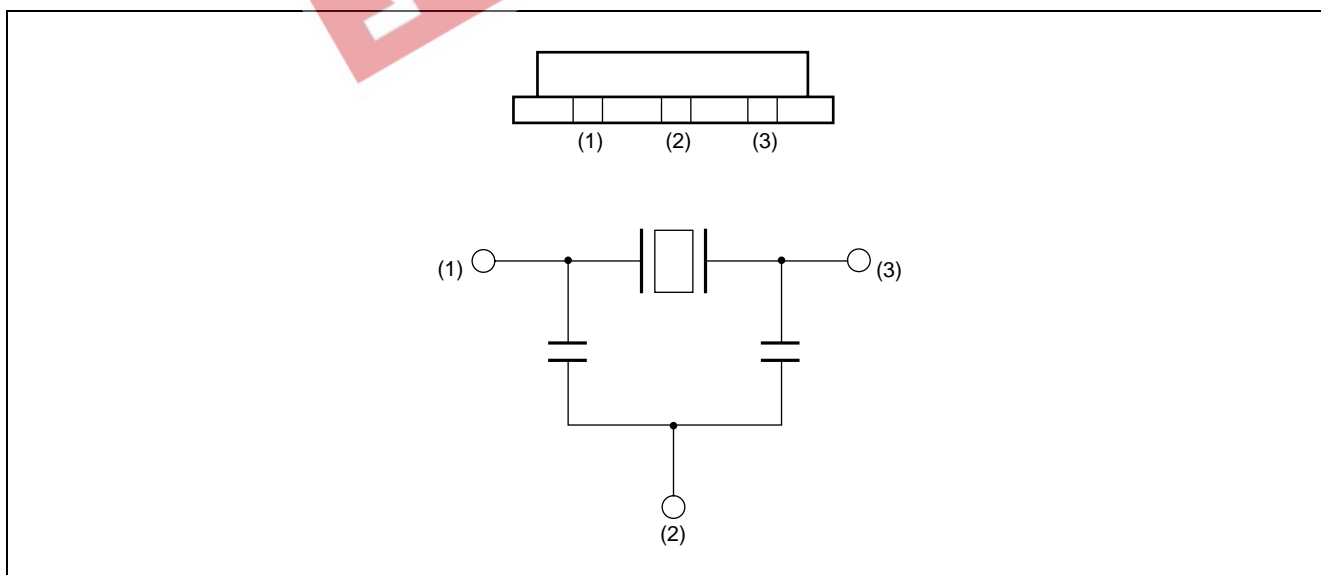
## MARKING

The diagram shows a rectangular marking area containing the text "F 12.0 MV". Arrows point from labels to specific parts of the marking: "Fujitsu logo" points to the "F", "Frequency (MHz)" points to "12.0", "Lot No. (Date of manufacture, conforms to EIAJ)" points to "MV", and "Initial frequency deviation" points to the space between "12.0" and "MV".

**Note:** The marking color varies with the capacitance of the built-in capacitor.

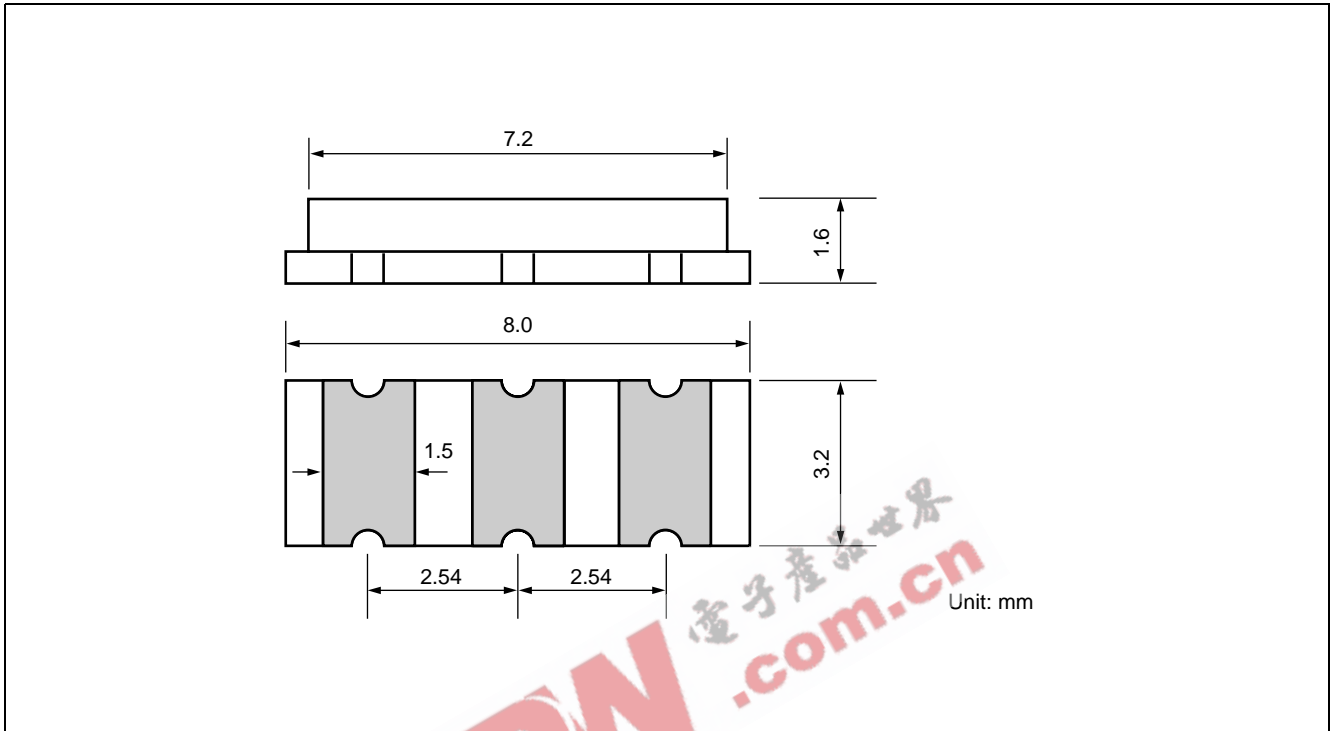
| Capacitance | Marking color |
|-------------|---------------|
| 10 pF       | Yellow        |
| 20 pF       | White         |
| 30 pF       | Gray          |

## PIN ASSIGNMENT



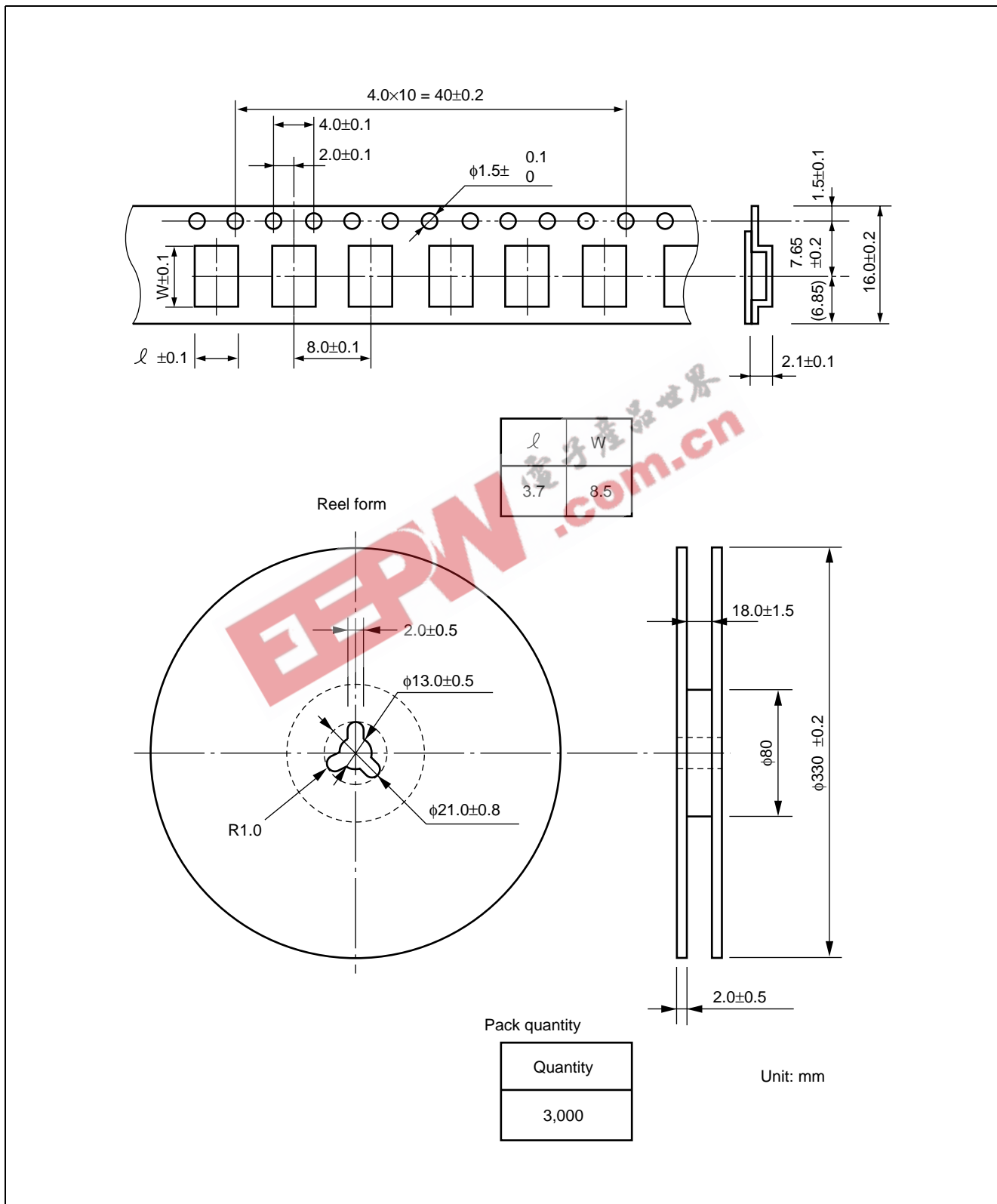
# FAR Family (C4 series N type)

## ■ DIMENSIONS



# FAR Family (C4 series N type)

## ■ TAPING FORM AND DIMENSIONS





# FAR Family (C4 series N type)

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