

## Resonator

# Piezoelectric Resonator (4 to 16 MHz)

## FAR Family (C4 series P/Q type) For Motor Application

### ■ DESCRIPTION

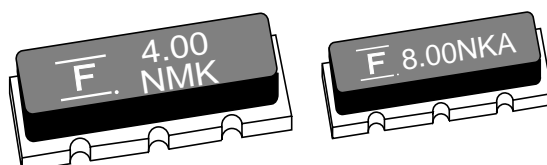
Fujitsu resonators C4 series (P/Q type) feature single crystals with a high electro-mechanical coefficient (LiNbO<sub>3</sub>: lithium niobate), the result is very compact packaging.

C4 series (P/Q type) with built-in capacitors for exclusive use in microcomputer clocks, and this series is chip type device for surface-mount and suitable for motor application due to its high reliability package.

### ■ FEATURES

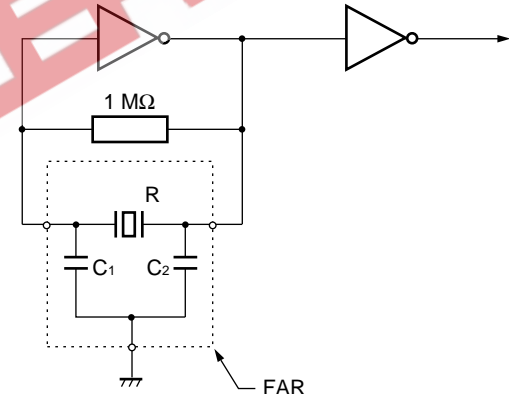
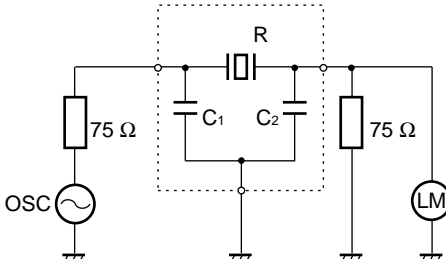
- Wide frequency range in 4 to 16 MHz
- Suitable for microcomputer clock
- PCT (121 °C, 2 atms, 96 hours) is guaranteed for Motor application.
- Emboss-typed pack for automatic mounting
- Superior shock and vibration resistance, preventing damage during automatic mounting

### ■ PACKAGE



# FAR Family (C4 series P/Q type)

## ■ STANDARD CHARACTERISTICS

Parameter	Series	C4 series (P/Q type)	Remarks
Material		Lithium Niobate (LiNbO <sub>3</sub> )	
Frequency		4 to 16 MHz	
Standard frequency		See "■ Standard Frequency."	
Initial frequency deviation		±0.5% (M)	The ±0.3% (K) version can also be produced.
Temperature characteristic (-40°C to +105°C)		± <sup>0.9</sup> / <sub>1.0</sub> % (M)	Reference temperature: +25°C
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%	For ten years at room temperature
PCT		96 hours guaranteed	Unstaturated PCT: 121°C 2 atmospheric pressures
Operating temperature		-40°C to +105°C	
Storage temperature		-55°C to +105°C	
Standard measuring circuit		<ul style="list-style-type: none"> <li>• Resonant frequency</li> </ul>  <ul style="list-style-type: none"> <li>• Serial resonant resistance</li> </ul> 	<p>4 MHz to 10 MHz IC: MB84069B×2</p> <p>10 MHz to 16.0 MHz IC: MC74HC04×2</p> <ul style="list-style-type: none"> <li>• Vcc: 5 V DC</li> <li>• R: Resonator</li> <li>• C1, C2: Loading capacitors (built-in)</li> </ul> <p>R: Resonator Measuring instrument: Network analyzer</p>

# FAR Family (C4 series P/Q type)

## ■ STANDARD FREQUENCY

Standard frequency (kHz)	Package size	Resonant resistance
4,000	P	150 Ω max. (Symbol: 01)
8,000 10,000 12,000 16,000	Q	75 Ω max. (Symbol: 02)

- Notes:**
- Fujitsu can also develop applicable device in addition to standard devices if it's oscillation frequency is from 4 to 16 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

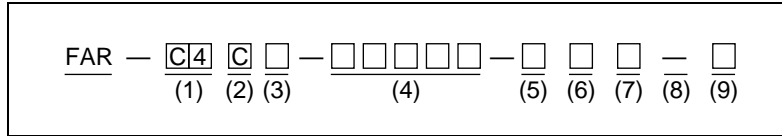
Frequency	Standard resonant resistance
4.00 to 5.99 MHz	150 Ω max. (Symbol: 1)
6.00 to 16.00 MHz	75 Ω max. (Symbol: 2)

## ■ 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 microcomputer or other ICs.
- This is for reflow solder, not for flow solder.

# FAR Family (C4 series P/Q 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 Size

Specification	Size
P	Large (4.0 to 5.9 MHz)
Q	Small (6.0 to 16.0 MHz)

### (4) Frequency

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

Frequency	Specification
8.000 MHz	08000

See “■ Standard Frequency”.

### (5) Initial Frequency Deviation

Specification	Deviation
K	±0.3%
M	±0.5%

### (6) Built-in Capacitor

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

## FAR Family (C4 series P/Q type)

### (7) Resonant Resistance

Specification	Resonant resistance
1	150 $\Omega$
2	75 $\Omega$

### (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) Taping Specification

Specification	Description
R	16 mm wide emboss tape (3,000 pcs)

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# FAR Family (C4 series P/Q type)

## MARKING

The diagram shows a rectangular marking area containing the text "F 8.00 NMK".

- Fujitsu logo:** Points to the letter "F".
- Frequency (MHz):** Points to the number "8.00".
- Material symbol:** Points to the letter "N". Below it, it says "N: LiNbO<sub>3</sub>".
- Lot No. (Date of manufacture, conforms to EIAJ):** Points to the letters "MK".
- Initial frequency deviation:** Points to the number "00" in "8.00".

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

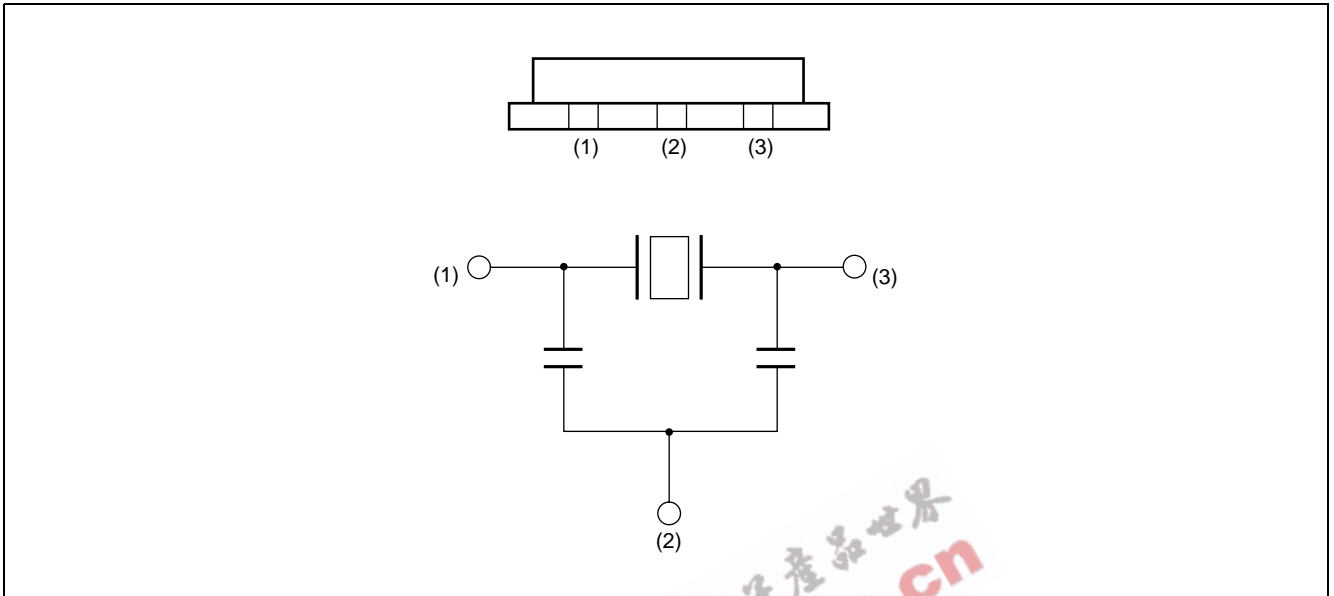
Capacitance	Marking color
10 pF	Yellow
20 pF	White
30 pF	Gray

Data code (EIAJ standard) is specified as follows in four-year cycle.

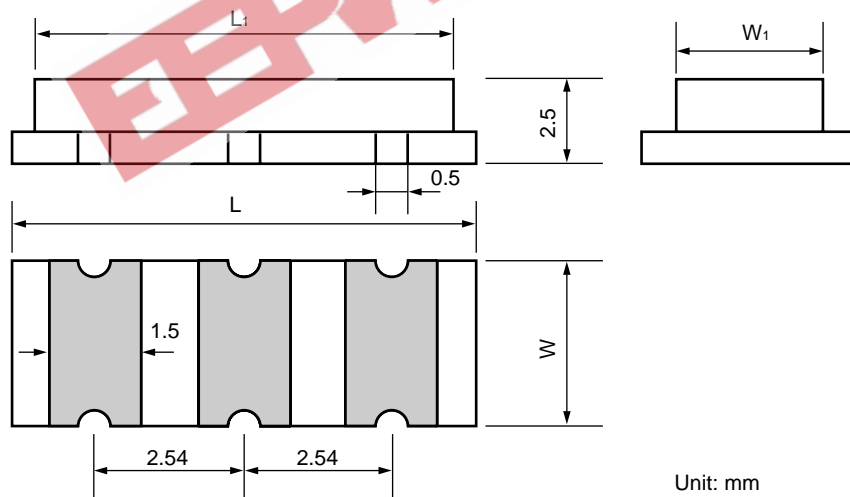
Year	Month	Symbol	Year	Month	Symbol	Year	Month	Symbol	Year	Month	Symbol
1997 2001	1	A	1998 2002	1	N	1999 2003	1	a	2000 2004	1	n
	2	B		2	P		2	b		2	o
	3	C		3	Q		3	c		3	q
	4	D		4	R		4	d		4	r
	5	F		5	S		5	e		5	s
	6	G		6	T		6	f		6	t
	7	H		7	U		7	g		7	u
	8	I		8	V		8	h		8	v
	9	J		9	W		9	j		9	w
	10	K		10	X		10	k		10	x
	11	L		11	Y		11	l		11	y
	12	M		12	Z		12	m		12	z

# FAR Family (C4 series P/Q type)

## PIN ASSIGNMENT



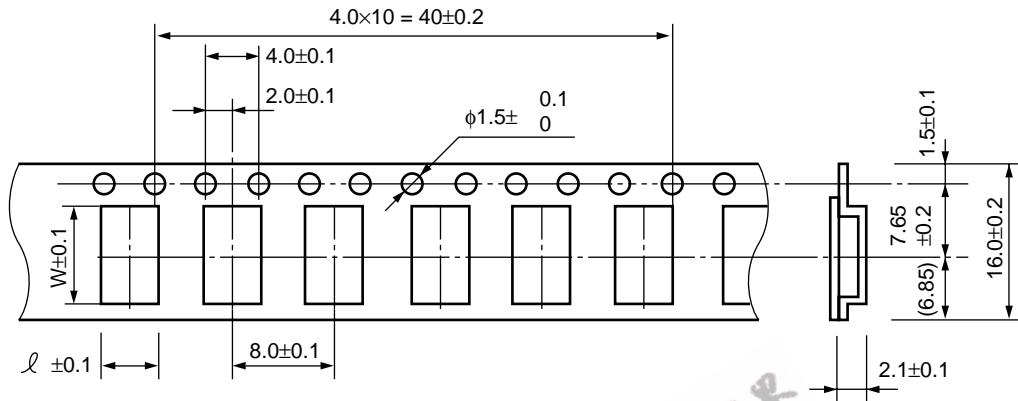
## DIMENSIONS



Size	L	L <sub>1</sub>	W	W <sub>1</sub>
P	10.0	9.4	4.5	3.3
Q	8.0	7.4	3.2	2.6

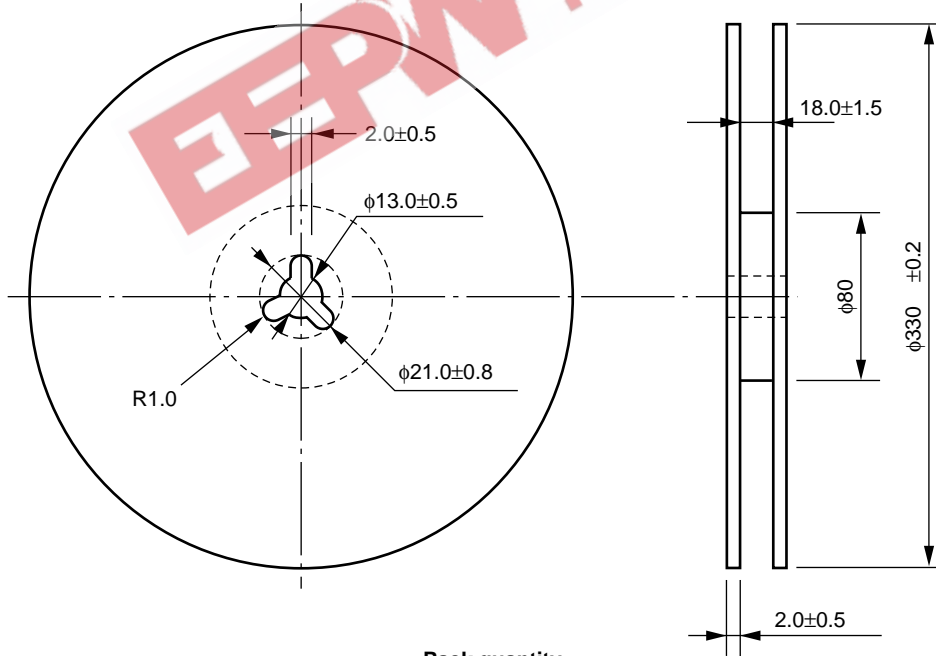
# FAR Family (C4 series P/Q type)

## ■ TAPING FORM AND DIMENSIONS



Package size	$l$	$W$	$t$
P	5.0	10.5	3.0
Q	3.7	8.5	2.8

Reel form



• Pack quantity

Package size	Quantity
P, Q	3,000

Unit: mm



# FAR Family (C4 series P/Q type)

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