

High-Frequency Resonator

Piezoelectric Resonator (24 to 40 MHz)

FAR Family (C4 Series L Type)

■ DESCRIPTION

The C4 series (L Type) resonators apply to the frequency range 24 to 60 MHz.

They are fabricated on a lithium niobate (LiNaO_3) substrate, producing resonators with ultra compact and superior stability due to the high electromechanical coupling coefficient of the material.

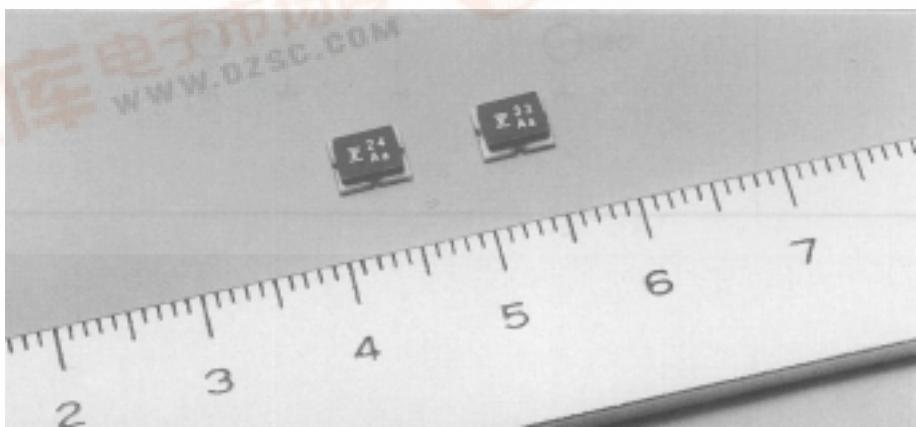
They use the third overtone resonance, so that they can oscillate at high frequency.

They include two loading capacitors inside and their package are chip type for surface mount. It contributes saving space and reducing mount cost.

■ FEATURES

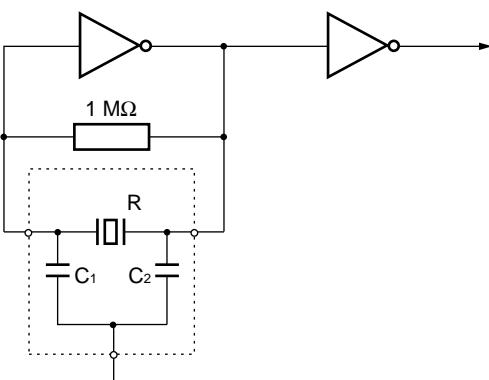
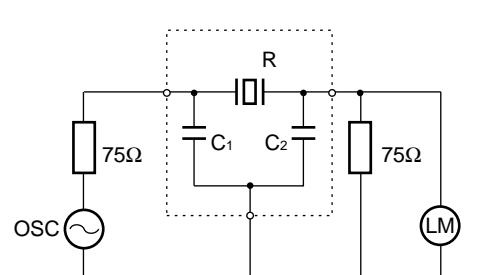
- High frequency (24 to 60 MHz)
- Surface mount package (SMT)
- Suitable for the source of microcomputer clock
- Emboss-typed pack for automatic mounting
- Superior shock and vibration resistance, preventing damage during automatic mounting

■ PACKAGE



FAR Family (C4 series L type)

■ STANDARD CHARACTERISTICS

Parameter	Series C4 Series	Remarks
Material	Lithium Niobate (LiNbO ₃)	
Frequency	24 to 40 MHz	
Standard frequency	See "■ Standard Frequency"	
Initial frequency deviation	Within $\pm 0.5\%$ (M)	The $\pm 0.3\%$ (K) version can also be produced.
Temperature characteristic (-30°C to +85°C)	Within 0.5%	Reference temperature: +25°C
Capacity of built-in capacitor	20 \pm 8 pF (standard)	10 \pm 4 pF are also available. Capacity is specified by Fujitsu, considering matching data with applied IC (mainly microcomputer)
Aging stability	Within $\pm 0.1\%$	
Operating temperature	-30°C to +85°C	
Storage temperature	-40°C to +100°C	
Standard measuring circuit	<ul style="list-style-type: none"> • Resonant frequency  <p>24 MHz to 40 MHz IC: MC74HCU04N × 2 • $V_{cc} = 5$ V DC • R: Resonator • C₁, C₂: Loading capacitors (built-in)</p>	
	<ul style="list-style-type: none"> • Serial resonant resistance  <p>Measuring instrument: Network analyzer</p>	

FAR Family (C4 series L type)

■ STANDARD FREQUENCY

Standard frequency (kHz)	Package size	Resonant resistance
24,000 kHz 33,869 kHz 40,000 kHz	L	75 Ω max. (Symbol: 2)

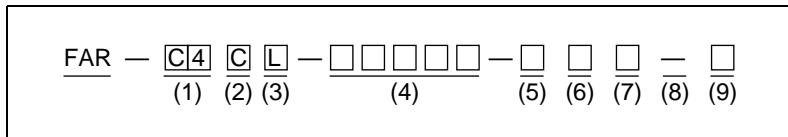
Note: Fujitsu can also develop applicable device in addition to standard devices if it's oscillation frequency is from 24 to 60 MHz.

■ 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 L type)

■ PART NUMBERING SYSTEM



(1) Series

Series	Single crystal	Capacitator
C4	LiNbO ₃	With built-in capacitor

(2) Package Type

Specification	Type
C	CHIP

(3) Package Type

Specification	Size
L	5.0 × 4.0 × 1.6

(4) Frequency

See "■ Standard Frequency."

(Example)

Unit: kHz (Specify in five digits.)

24.0 MHz → 24000

(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

(7) Resonant Resistance

Specification	Resonant resistance
2	75Ω max.

FAR Family (C4 series L type)

(8) User-specific Special Symbols

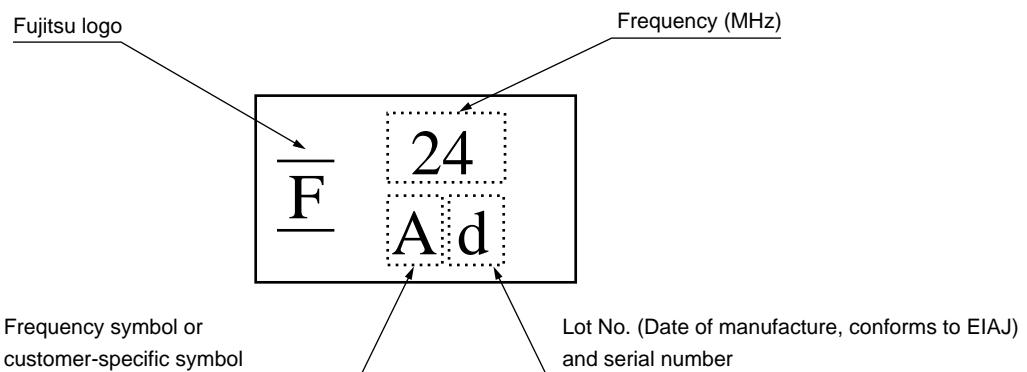
Specification	Description
Name	No specifications, no taping specification
—	No specifications, with taping specification
A to Z	Serial number for custom design

(9) Resonant Resistance

Specification	Description
R	12 mm wide tape and reel

FAR Family (C4 series L type)

■ MARKING



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

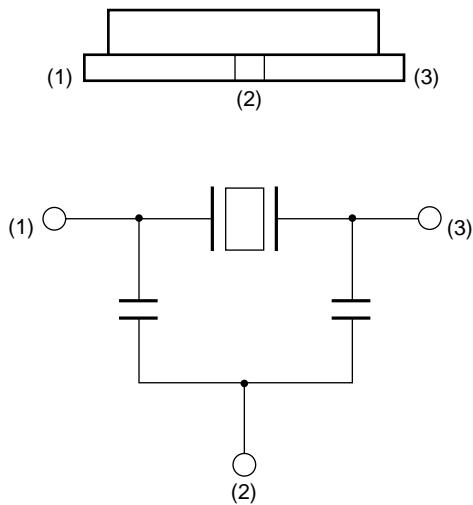
Capacitance	Making color
10 pF	Yellow
20 pF	White

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	1995 1999 2003	1	a	1996 2000 2004	1	n
	2	B		2	P		2	b		2	p
	3	C		3	Q		3	̄c		3	q
	4	D		4	R		4	d		4	r
	5	E		5	S		5	e		5	s
	6	F		6	T		6	f		6	t
	7	G		7	U		7	q		7	u
	8	H		8	V		8	h		8	v
	9	J		9	W		9	j		9	w
	10	K		10	X		10	h		10	x
	11	L		11	Y		11	l		11	y
	12	M		12	Z		12	m		12	z

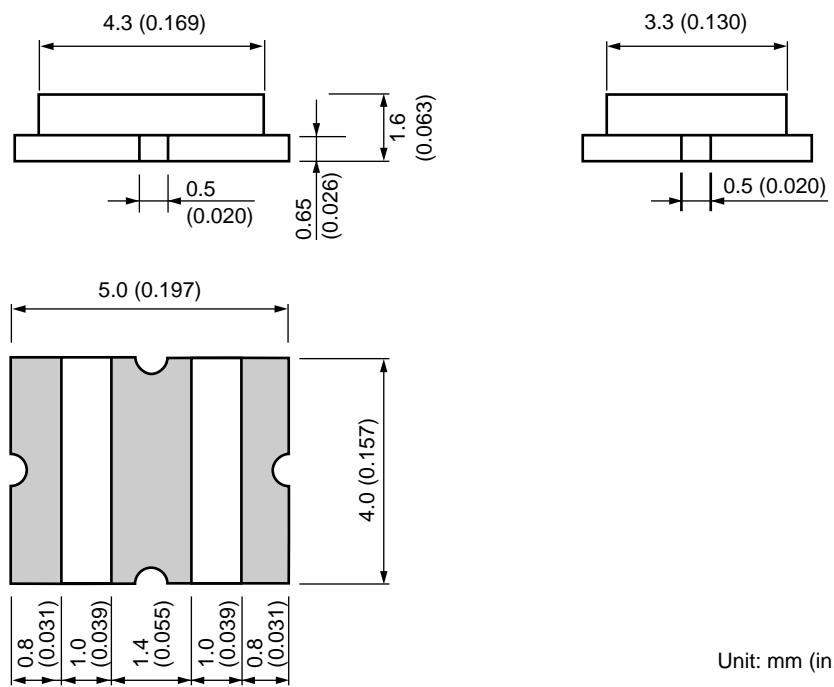
FAR Family (C4 series L type)

■ PIN ASSIGNMENT



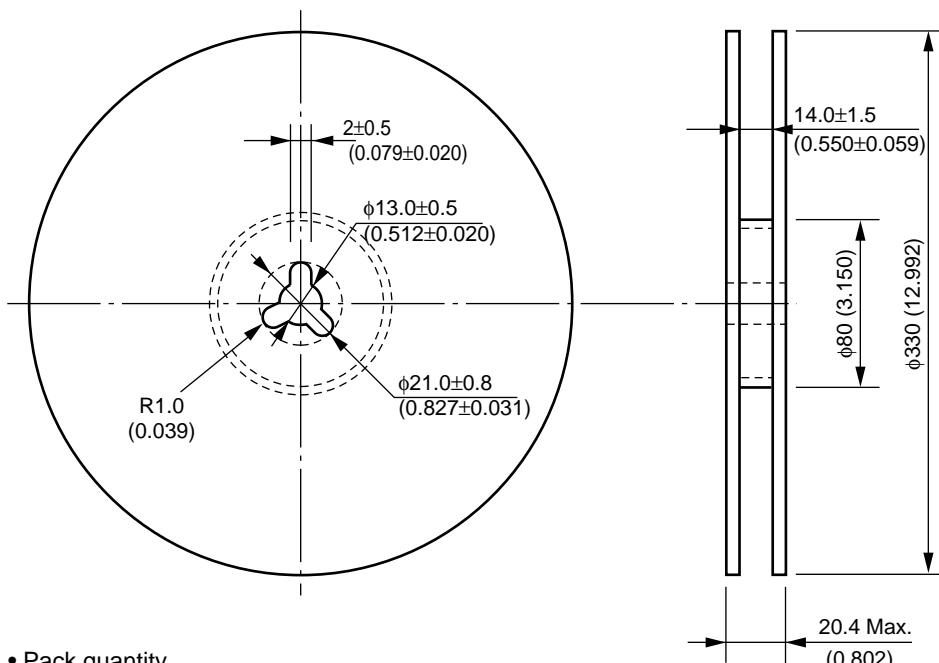
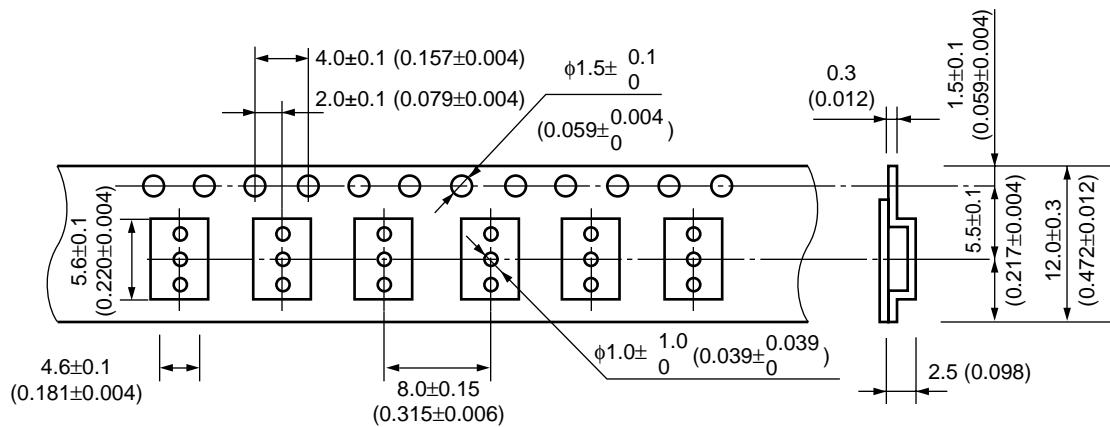
FAR Family (C4 series L type)

■ DIMENSIONS



FAR Family (C4 series L type)

■ TAPING FORM AND DIMENSIONS



Specification	Quantity
R	3,000

Unit: mm (in.)

FUJITSU LIMITED

For further information please contact:

Japan

FUJITSU LIMITED
Corporate Global Business Support Division
Electronic Devices
KAWASAKI PLANT, 4-1-1, Kamikodanaka
Nakahara-ku, Kawasaki-shi
Kanagawa 211-88, Japan
Tel: (044) 754-3763
Fax: (044) 754-3329

North and South America

FUJITSU MICROELECTRONICS, INC.
Semiconductor Division
3545 North First Street
San Jose, CA 95134-1804, U.S.A.
Tel: (408) 922-9000
Fax: (408) 432-9044/9045

Europe

FUJITSU MIKROELEKTRONIK GmbH
Am Siebenstein 6-10
63303 Dreieich-Buchschlag
Germany
Tel: (06103) 690-0
Fax: (06103) 690-122

Asia Pacific

FUJITSU MICROELECTRONICS ASIA PTE. LIMITED
#05-08, 151 Lorong Chuan
New Tech Park
Singapore 556741
Tel: (65) 281-0770
Fax: (65) 281-0220

All Rights Reserved.

The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU sales representatives before ordering.

The information and circuit diagrams in this document presented as examples of semiconductor device applications, and are not intended to be incorporated in devices for actual use. Also, FUJITSU is unable to assume responsibility for infringement of any patent rights or other rights of third parties arising from the use of this information or circuit diagrams.

FUJITSU semiconductor devices are intended for use in standard applications (computers, office automation and other office equipment, industrial, communications, and measurement equipment, personal or household devices, etc.).

CAUTION:

Customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with FUJITSU sales representatives before such use. The company will not be responsible for damages arising from such use without prior approval.

Any semiconductor devices have inherently a certain rate of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Control Law of Japan, the prior authorization by Japanese government should be required for export of those products from Japan.