FUJITSU SEMICONDUCTOR
DATA SHEET

DS07-10205-1E

Resonator

Piezoelectric Resonator (4 to 20 MHz)

FAR Family (C3 series M/N type)

■ DESCRIPTION

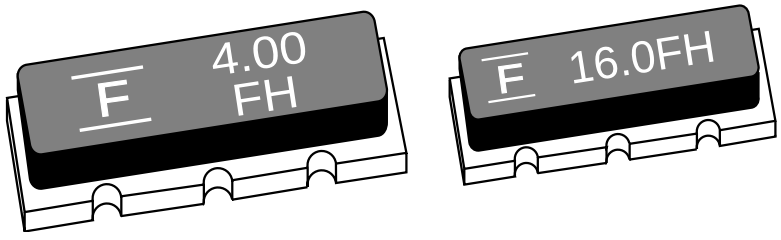
The features of the C3 series (M,N Type) resonators are compact and high stability. They are fabricated on a lithium tantalate ($LitaO_3$) substrate, producing resonators with ultra compact and superior stability due to the high electromechanical coupling coefficient of the material.

They include two loading capacitors inside and are housed in chip type of package for surface mount. These contribute saving mount space and reducing cost.

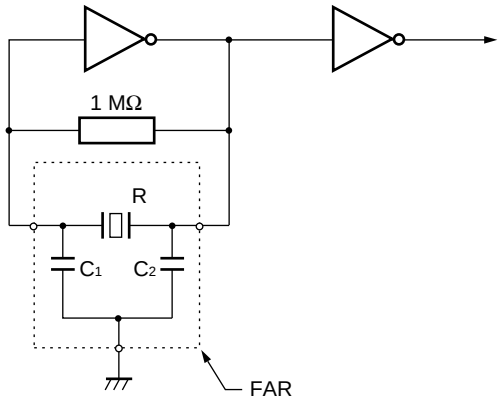
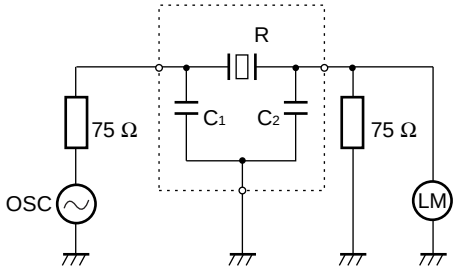
■ FEATURES

- High stability (Overall frequency deviation; 0.10% max)
- Ultra small package
- Wide frequency range in 4 MHz to 20 MHz
- Suitable for microcomputer clock
- Emboss-typed pack for automatic mounting
- Superior shock and vibration resistance, preventing damage during automatic mounting

■ PACKAGE



■ STANDARD CHARACTERISTICS

Item \ Series	C3 series	Remarks
Material	Lithium Tantalate ($LiTaO_3$)	
Frequency	4 MHz to 20 MHz	
Standard frequency	See "■ Standard Frequency."	
Initial frequency deviation	+0.025% / –0.035% (F), ±0.05% (G)	±0.1% (J) and ± 0.3% (K) are also available upon request.
Temperature characteristics	+0.035% / –0.025% (Within –10°C to +60°C)	Reference temperature: +25°C
Capacity of built-in capacitor	20 ±8 pF (Standard)	10 ±4 pF are also available. Capacity is specified by Fujitsu, considering matching data with applied IC (mainly microcomputer).
Operating temperature	–30°C to +85°C	
Storage temperature	–40°C to +100°C	
Standard measuring circuit	• Oscillation frequency  Microcomputer 1/6MC74ACO4 × 2 (4 MHz to 8 MHz) 1/6TC74ACO4 × 2 (8 MHz to 20 MHz) • V_{CC} = 5.0 V DC • R: Resonator • C_1, C_2: Loading capacitors (built-in) • Serial resonant resistance  R: Resonator Measuring equipment: Spectrum analyzer	

■ STANDARD FREQUENCY

Standard frequency (kHz)	Package size	Resonant resistance
4,000 4,194	M	300 Ω max. (Symbol: 0)
6,000 8,000 10,000 12,000 16,000 16,934 20,000	N	150 Ω max. (Symbol: 1)

Notes: • Fujitsu can also develop another frequency device besides standard devices within 4 MHz to 20 MHz.
• Regarding resonant resistance, maximum standard values are specified depending on frequency.

■ NOTES ON USE

- Handle carefully.
- Solder heat resistance.
  5 seconds max. at +230°C (on PCB)
  Recommended preheating is +150°C for one minute for avoiding giving extreme heat fluctuation to resonator.
- Avoid using resonator under condition of extreme temperature fluctuation.
- There is no specific direction in resonator mounting.
- Oscillation data must be considered in case that this resonator is used as microcomputer clock.
- Resonator is designed for reflow solder, not for flow solder.

■ PART NUMBERING SYSTEM

FAR — C3 C □ — □□□□□ — □ □ □ — □
(1) (2) (3) (4) (5) (6) (7) (8) (9)

(1) Series

Series	Material	Capacitators
C3	$LiTaO_3$	Built-in type

(2) Package type

Symbol	Type
C	Chip

(3) Package size

Symbol	Size
M	4.5 × 10.0 × 2.0 mm (4.0 MHz to 5.9 MHz)
N	3.2 × 8.0 × 1.6 mm (6.0 MHz to 20.0 MHz)

(4) Oscillation frequency

Frequency is specified with 5-digit in kHz of unit.

Frequency	Symbol
[Example] 8.000 MHz	08000

See "■ Standard Frequency."

(5) Initial frequency deviation

Symbol	Deviation
F	+0.025% –0.035%
G	±0.05%
J	±0.1%
K	±0.3%

(6) Built-in capacitors

Symbol	Capacitor
0	20 ±8 pF
1	10 ±4 pF

(7) Resonant resistance

Symbol	Resistance
0	300 Ω max.
1	150 Ω max.

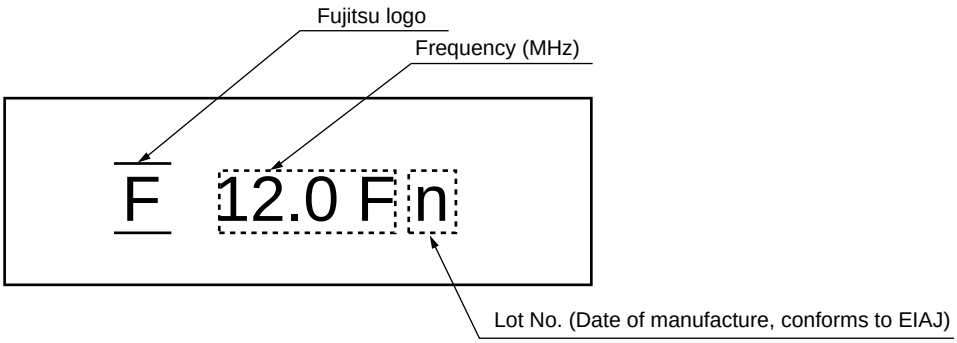
(8) Special mark

Symbol	Content
Space	Standard device, no taping specification
—	Standard device, with Tape & Reel
H to Z	Serial number for custom design

(9) Taping specification

Symbol	Content
R	16 mm width emboss tape (3,000 pcs/reel)

■ MARKING



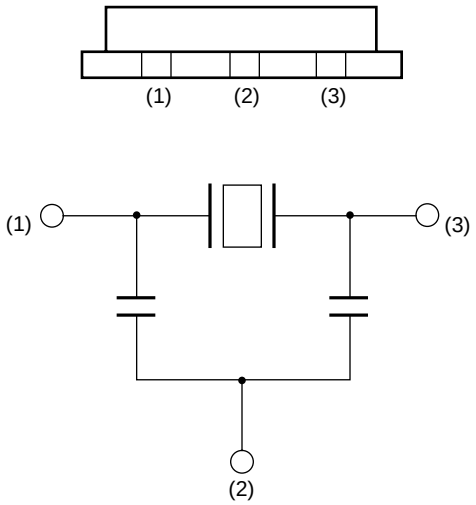
Note: The stamp varies in color according to the built-in capacitator.

Capacitor	Marking color
10 pF	Yellow
20 pF	White

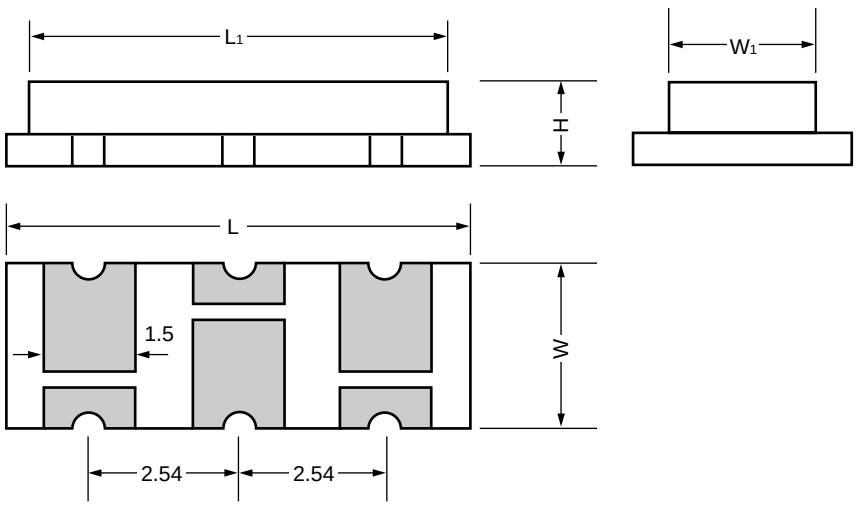
Data code (EIAJ standard) is specified as follows in four-year cycle.

Year	Month	Mark	Year	Month	Mark	Year	Month	Mark	Year	Month	Mark
1997 2001	1	A	1998 2002	1	N	1999 2003	1	a	2000 2004	1	n
	2	B		2	P		2	b		2	p
	3	C		3	Q		3	$\overline{c}$		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

■ PIN ASSIGNMENT



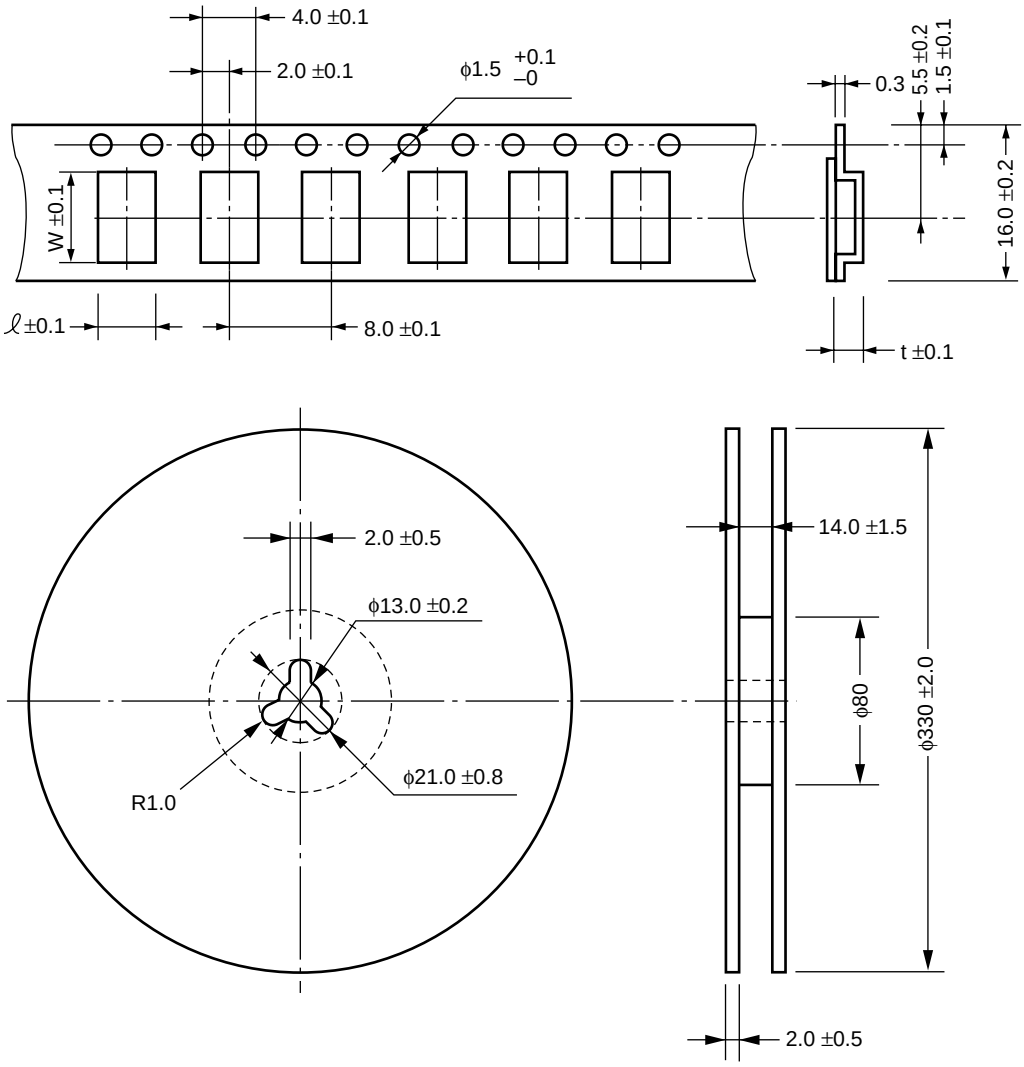
■ DIMENSIONS



Package size	L	L_1	W	W_1	H
M	10.0	9.4	4.5	3.3	2.0
N	8.0	7.4	3.2	2.6	1.6

Dimmensions in mm

■ TAPING FORM AND DIMENSIONS



Package size	ℓ	W	t
M	5.0	10.5	3.0
N	3.7	8.5	2.1

• **Pack quantity**

Package size	Quantity
M , N	3,000

Dimmensions in mm

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