Ceramic Resonators, Chip Type (3 Array Type)

Type: **EFOS**
Type: **EFOB**
Type: **EFOSS**
Type: **EFOSM**
Type: **EFOBM**
Type: **EFOJM**



■ Features

- Encased in a ceramic package
- High reliability against soldering heat and mechanical stress
- Moisture-proof sealing
- 1.2 mm maximum (SS/SM/BM/JM),
- Designed for reflow soldering
- Flat-bottom plate for better mountings
- Simplifies oscillation circuits by reducing the number of circuit parts
- RoHS compliant

■ Recommended Applications

- Clock generator for microprocessors
- Carrier circuit between telecommunication equipment (Telephone to telephone, personal computer to printer)

■ Handling Precautions (See Page 175 to 176)

■ Packaging Specifications

See Page 169 to 177

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	F	O	□	3	5	8	4	□	□	□	□

Design No.

Product Code	
EFO	Ceramic Resonators

Type	
Built-In Capacitors Type with 3-terminals	
S	2 to 13 MHz
B	13.1 to 20 MHz

Nominal Oscillation Frequency	
3584	3.58 MHz
1695	16.93 MHz

(Example)

Packaging Style	
B	Bulk Pack
E	Embossed Taping

Frequency Tolerance	
0	±1.0 %
3	±0.3 %
5	±0.5 %

1	2	3	4	5	6	7	8	9	10	11	12
E	F	O	□	□	4	0	0	4	□	□	□

Design No.

Product Code	
EFO	Ceramic Resonators

Type	
Built-In Capacitors Type with 3-terminals	
SS	4 to 13 MHz
SM	4 to 13 MHz
BM	12 to 20 MHz
JM	16 to 20 MHz
	30 to 50 MHz

Nominal Oscillation Frequency	
4004	4.00 MHz
1695	16.93 MHz
2005	20.00 MHz
4005	40.00 MHz

(Example)

Packaging Style	
B	Bulk Pack
E	Embossed Taping

Frequency Tolerance	
0	±1.0 %
3	±0.3 %
5	±0.5 %

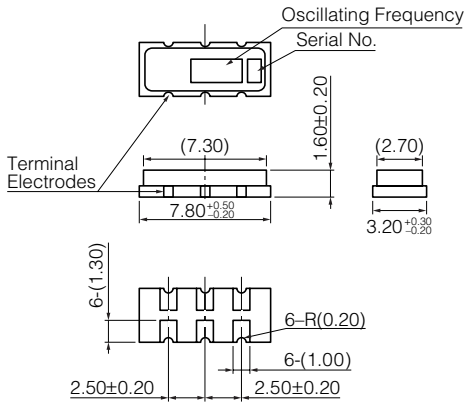
Part Number	Frequency range (MHz)	Frequency Temperature Characteristics (–20 to +80 °C)	Built-in Capacitors (Reference)
EFOS	2.00 to 8.39	±0.2 %	33 pF
	8.40 to 13.0	±1.0 %	
EFOB	13.1 to 20.0	±0.5 %	33 pF
EFOSS	4.00 to 8.39	±0.2 %	21 pF
	8.40 to 13.0	±0.3 %	
EFOSM	4.00 to 8.39	±0.2 %	33 pF
	8.40 to 13.0	±1.0 %	
EFOBM	12.0 to 20.0	±0.3 %	18 pF
EFOJM	16.0 to 20.0	±0.5 %	10 pF
	30.0 to 50.0	±0.2 %	

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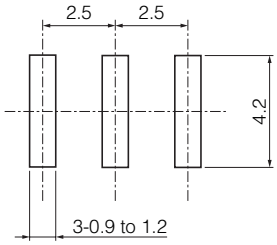
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■ Dimensions in mm (not to scale)
Recommended Land Dimensions

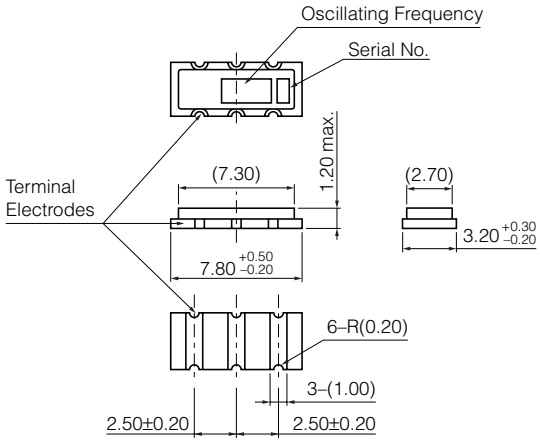
[Type EFOS]·····2.0 to 13.0 MHz



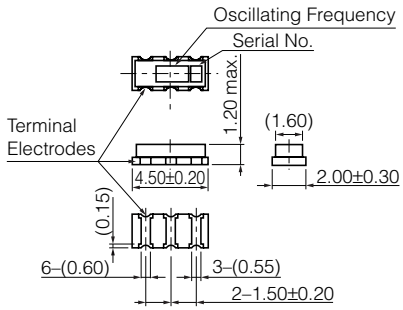
[Type EFOS, EFOSM]



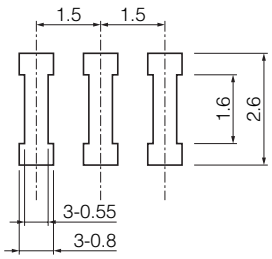
[Type EFOSM]·····4.0 to 13.0 MHz



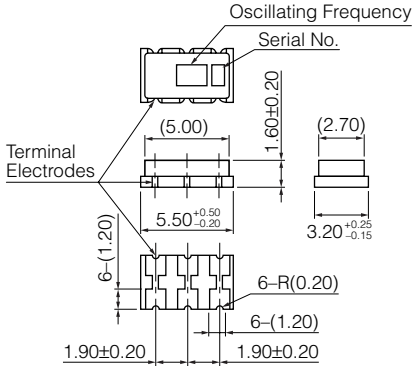
[Type EFOSS]·····4.0 to 13.0 MHz



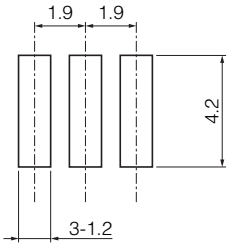
[Type EFOSS]



[Type EFOB]·····13.1 to 20.0 MHz



[Type EFOB]

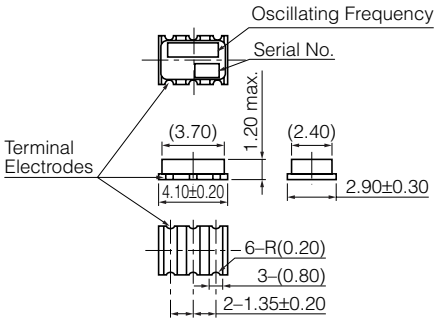


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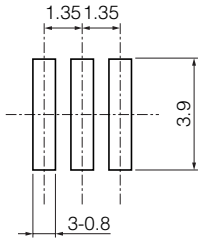
■ Dimensions in mm (not to scale)

Recommended Land Dimensions

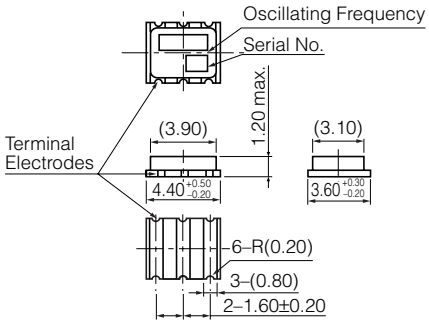
[Type EFOBM]·····12.0 to 20.0 MHz



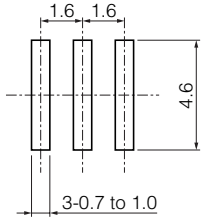
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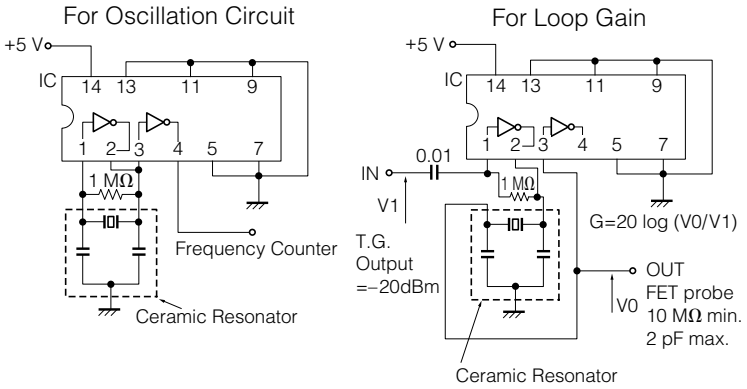
[Type EFOJM]·····16.0 to 20.0, 30.0 to 50.0 MHz



[Type EFOJM]



■ Test Circuits Diagram

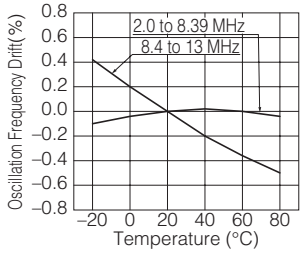


Frequency	IC
2.00 to 8.39 MHz	µPD4069UBC, TC4069UBP or similar
8.40 to 50.0 MHz	µPD74HCU, TC74 HCU04AP or similar

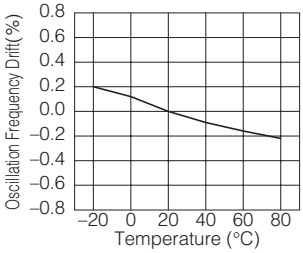
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■ Typical Characteristics ····· Temperature Characteristics

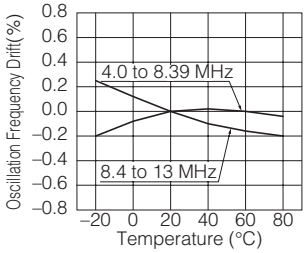
Type EFOS



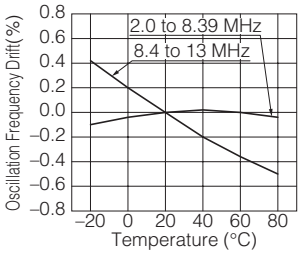
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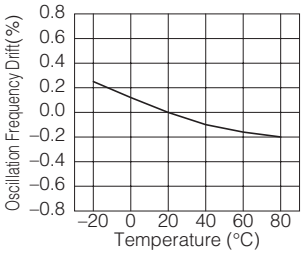
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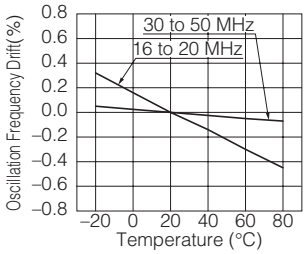
Type EFOSM



Type EFOBM



Type EFOJM

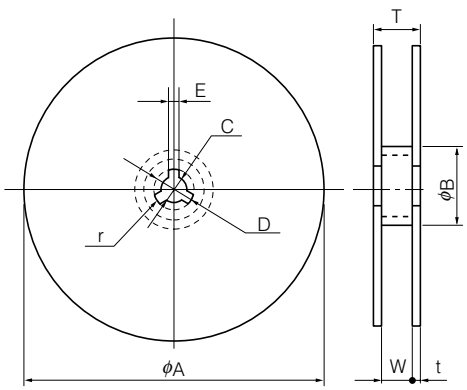


■ Packaging Specifications

● Standard Packing Quantity

Type	Embossed Taping	Bulk
EFOS, EFOSM	2500 pcs./reel	500 pcs./bag
EFOSS	2000 pcs./reel	
EFOB , EFOBM, EFOJM	1000 pcs./reel	

● Dimensions for Reel in mm (not to scale)



[Type EFOS, EFOSM]

Dim. (mm)	ϕA	ϕB	C	D	E
	330±5	80 min.	13.0±0.5	21.0±0.8	2.0±0.5

Dim. (mm)	W	T	t	r
	$16.4^{+2.0}_{0}$	22.4 max.	3 max.	1.0

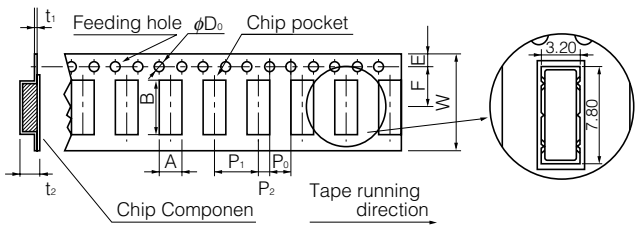
[Type EFOSS, EFOB, EFOBM, EFOJM]

Dim. (mm)	ϕA	ϕB	C	D	E
	180±5	60 min.	13.0±0.5	21.0±0.8	2.0±0.5

Dim. (mm)	W	T	t	r
	$12.4^{+2.0}_{0}$	18.4 max.	3 max.	1.0

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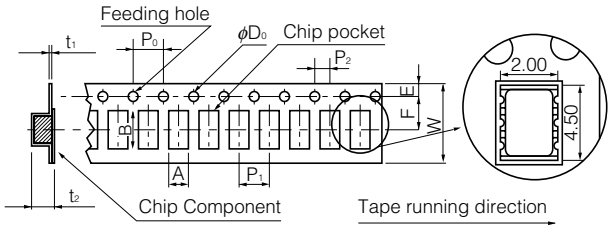
[Type EFOS, EFOSM]



Dim. (mm)	A	B	W	F	E	P_1
	3.7±0.2	8.3±0.2	16.0±0.3	7.5±0.1	1.75±0.10	8.0±0.1

Dim. (mm)	P_2	P_0	ϕD_0	t_1	t_2
	2.0±0.1	4.0±0.1	$1.5^{+0.1}_{0}$	0.3	3.5 max.

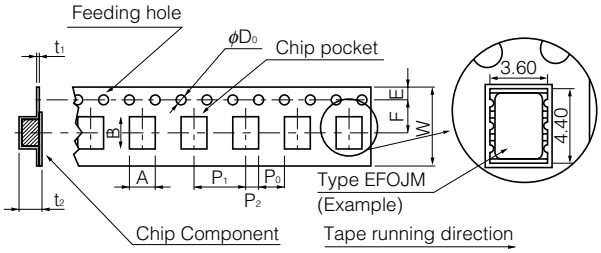
[Type EFOSS]



Dim. (mm)	A	B	W	F	E	P_1
	2.6±0.2	5.1±0.2	12.0±0.3	5.5±0.1	1.75±0.10	4.0±0.1

Dim. (mm)	P_2	P_0	ϕD_0	t_1	t_2
	2.0±0.1	4.0±0.1	$1.5^{+0.1}_{0}$	0.6 max.	3.0 max.

[Type EFOB, EFOBM, EFOJM]



Dim. (mm)	A	B	W	F	E	P_1
	①	②	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

Dim. (mm)	P_2	P_0	ϕD_0	t_1	t_2
	2.0±0.1	4.0±0.1	$1.5^{+0.1}_{0}$	0.6 max.	3.0 max.

Dim. (mm)	A	B
	①	②
Type EFOB	3.7±0.2	6.0±0.2
Type EFOBM	3.4±0.2	4.6±0.2
Type EFOJM	4.1±0.2	4.9±0.2

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