

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

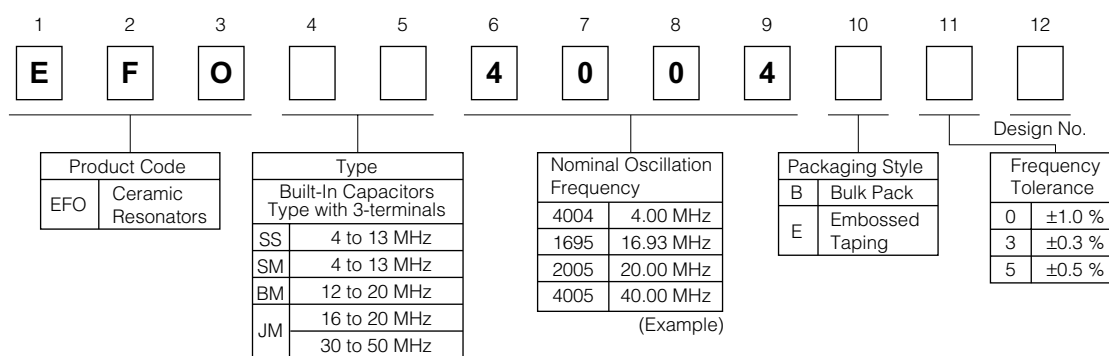
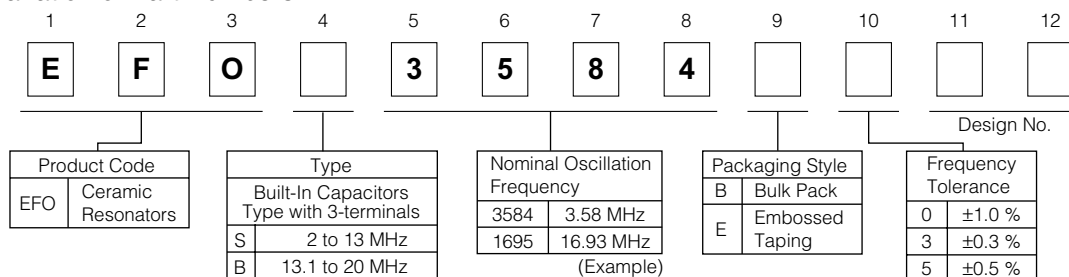
- Clock generator for microprocessors
- Carrier circuit between telecommunication equipment (Telephone to telephone, personal computer to printer)

■ Handling Precautions (See Page 175 to 176)

■ Packaging Specifications

See Page 169 to 177

■ Explanation of Part Numbers

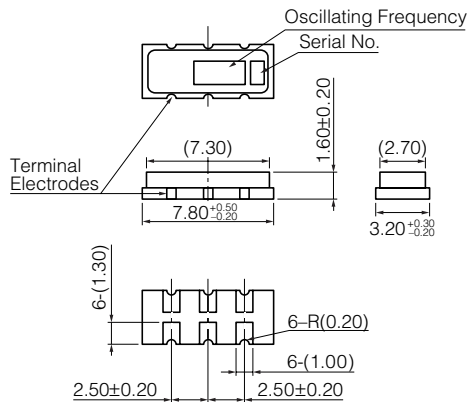


Part Number	Frequency range (MHz)	Frequency Temperature Characteristics (-20 to +80 °C)	Built-in Capacitors (Reference)
EFOS	2.00 to 8.39	±0.2 %	33 pF
	8.40 to 13.0	±1.0 %	
EFOB	13.1 to 20.0	±0.5 %	33 pF
	4.00 to 8.39	±0.2 %	
EFOSS	8.40 to 13.0	±0.3 %	21 pF
	4.00 to 8.39	±0.2 %	
EFOSM	8.40 to 13.0	±1.0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

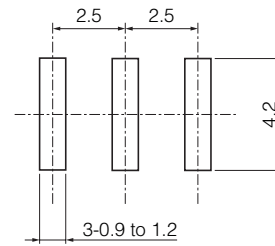
Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Feb. 2009

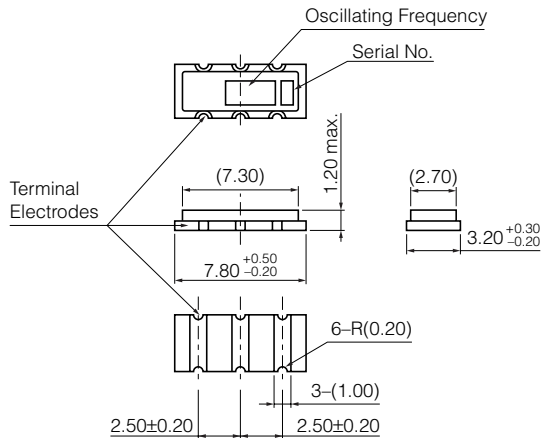
■ Dimensions in mm (not to scale)
 Recommended Land Dimensions
 [Type EFOS].....2.0 to 13.0 MHz



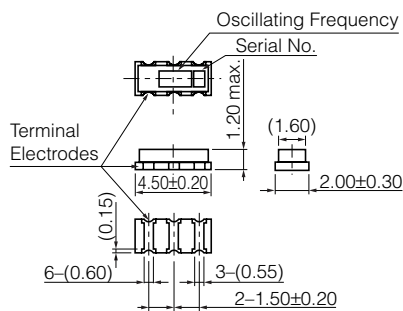
[Type EFOS, EFOSM]



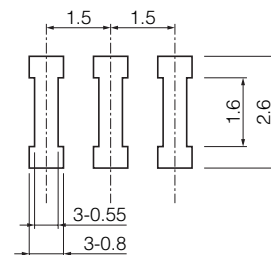
[Type EFOSM].....4.0 to 13.0 MHz



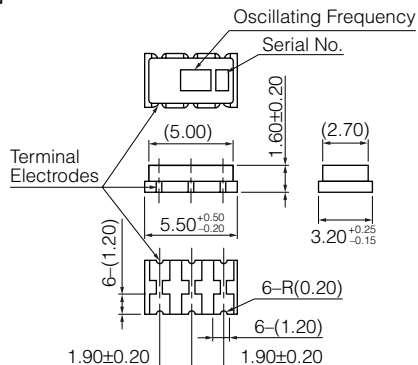
[Type EFOSS].....4.0 to 13.0 MHz



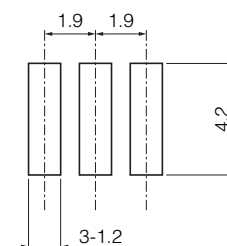
[Type EFOSS]



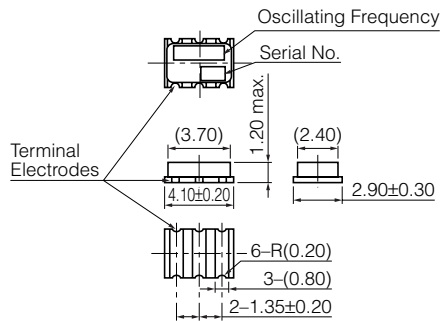
[Type EFOB].....13.1 to 20.0 MHz



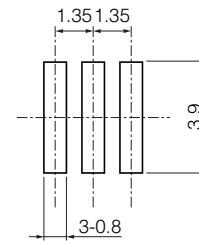
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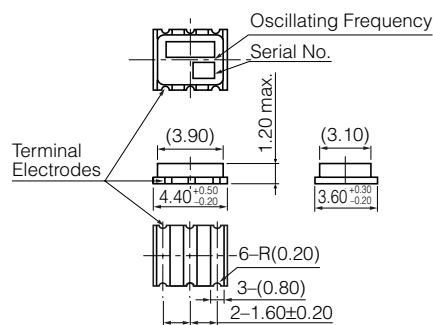
■ Dimensions in mm (not to scale)
 Recommended Land Dimensions
 [Type EFOB].....12.0 to 20.0 MHz



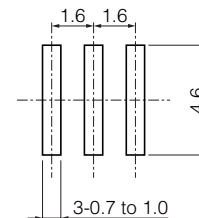
[Type EFOB]



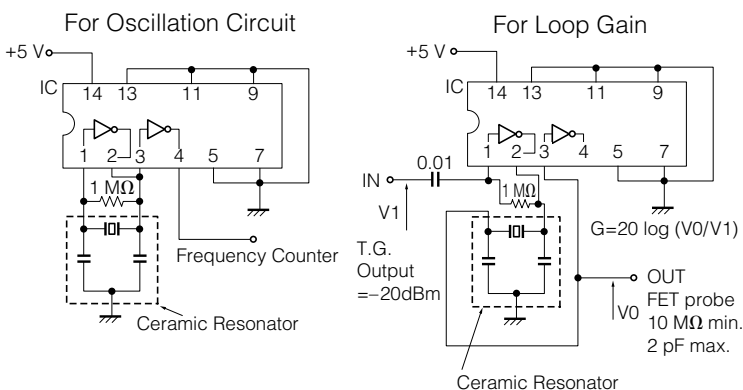
[Type EFOJM].....16.0 to 20.0, 30.0 to 50.0 MHz



[Type EFOJM]



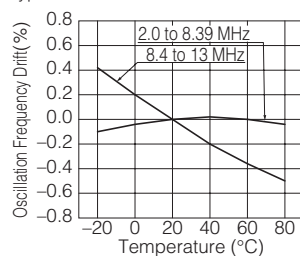
■ Test Circuits Diagram



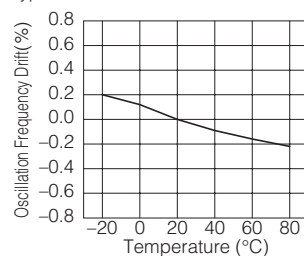
Frequency	IC
2.00 to 8.39 MHz	μPD4069UBC, TC4069UBP or similar
8.40 to 50.0 MHz	μPD74HCU, TC74 HCU04AP or similar

Typical Characteristics Temperature Characteristics

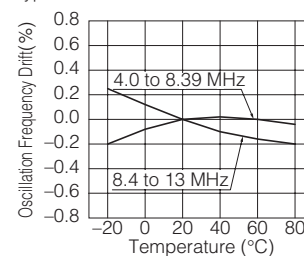
Type EFOS



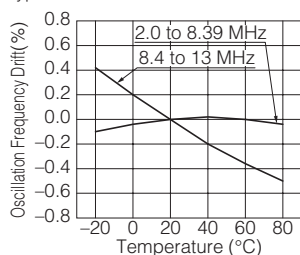
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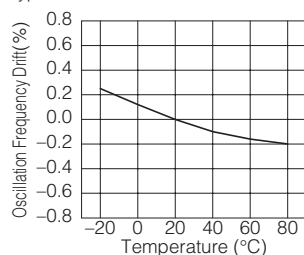
Type EFOSS



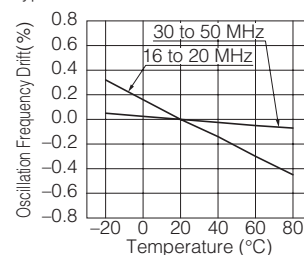
Type EFOSM



Type EFOBM



Type EFOJM

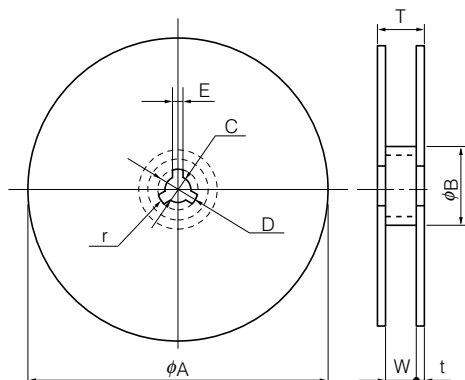


Packaging Specifications

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

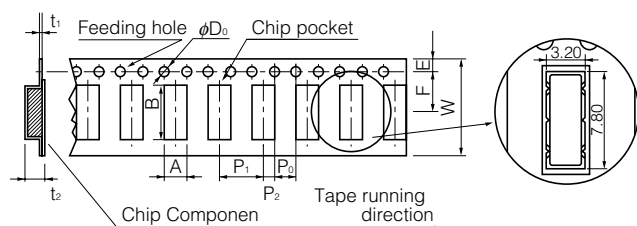
Dim. (mm)	W	T	t	r
	16.4 ^{+2.0} ₀	22.4 max.	3 max.	1.0

[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

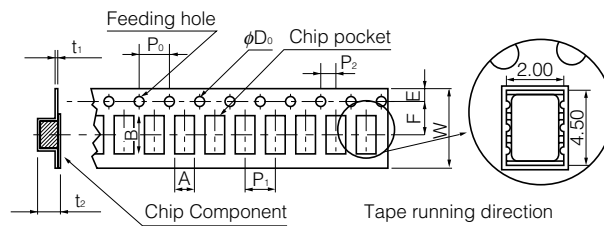
Dim. (mm)	W	T	t	r
	12.4 ^{+2.0} ₀	18.4 max.	3 max.	1.0

[Type EFOS, EFOSM]



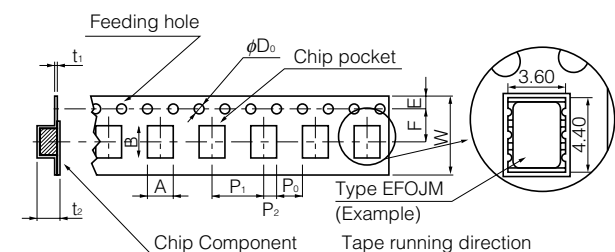
Dim. (mm)	A	B	W	F	E	P ₁
	3.7±0.2	8.3±0.2	16.0±0.3	7.5±0.1	1.75±0.10	8.0±0.1
Dim. (mm)	P ₂	P ₀	φD ₀	t ₁	t ₂	
	2.0±0.1	4.0±0.1	1.5 ^{+0.1} ₀	0.3	3.5 max.	

[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