

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 in thickness (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

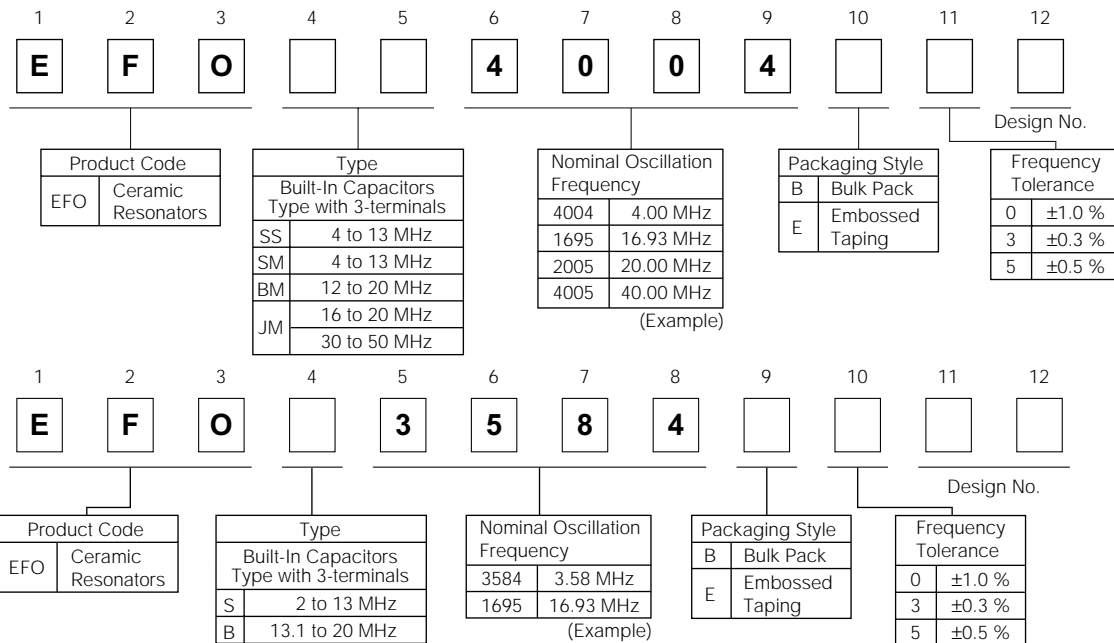
- Clock generator for microprocessors
- Carrier circuit between telecommunication equipment (Telephone to telephone, personal computer to printer)

■ Handling Precautions (See Page 201 to 202)

■ Packaging Specifications

See Page 192, 208

■ Explanation of Part Numbers

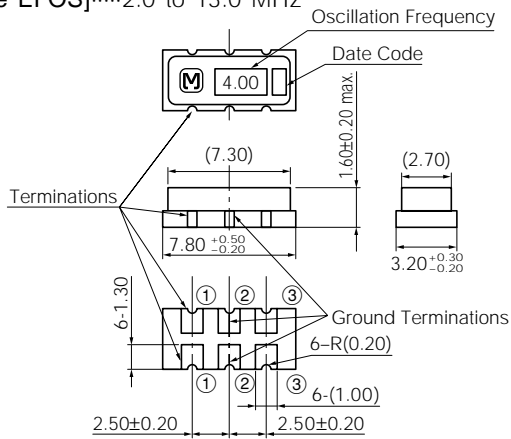


Part Number	Frequency range (MHz)	Frequency Temperature Characteristics (-20 to +80 °C)	Built-in Capacitors (Reference)
EFOS	2.00 to 8.39	±0.2 %	33 pF
	8.40 to 13.0	±1.0 %	
EFOB	13.1 to 20.0	±0.5 %	33 pF
EFOSS	4.00 to 8.39	±0.2 %	21 pF
	8.40 to 13.0	±0.3 %	
EFOSM	4.00 to 8.39	±0.2 %	33 pF
	8.40 to 13.0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

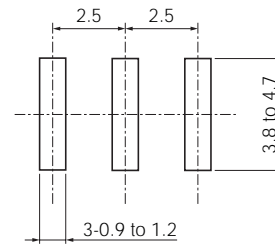
■ Dimensions in mm (not to scale)

Recommended Land Dimensions

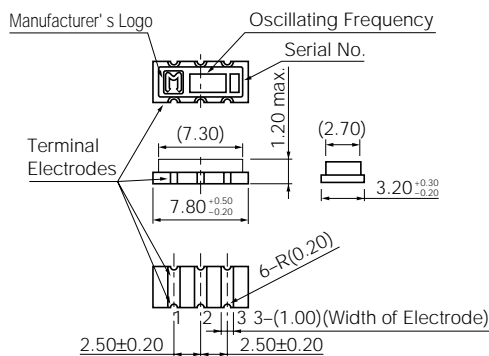
[Type EFOS].....2.0 to 13.0 MHz



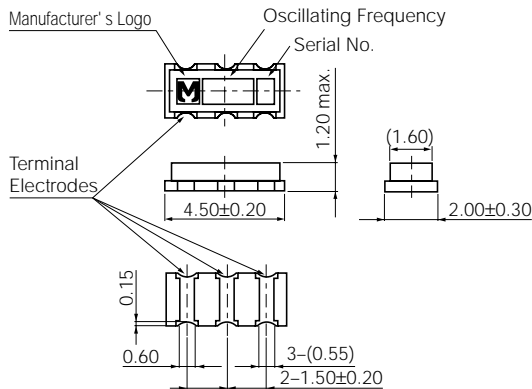
[Type EFOS, EFOSM]



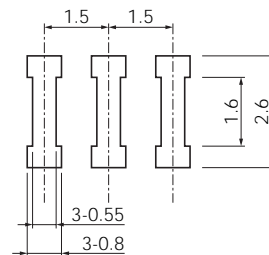
[Type EFOSM].....4.0 to 13.0 MHz



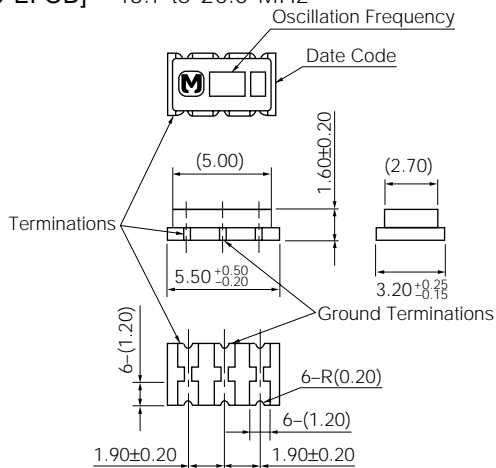
[Type EFOSS].....4.0 to 13.0 MHz



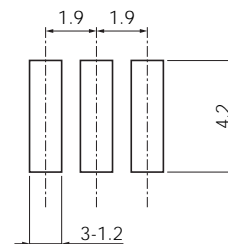
[Type EFOSS]



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

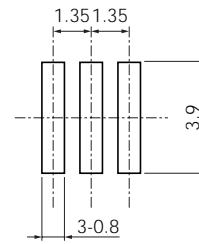
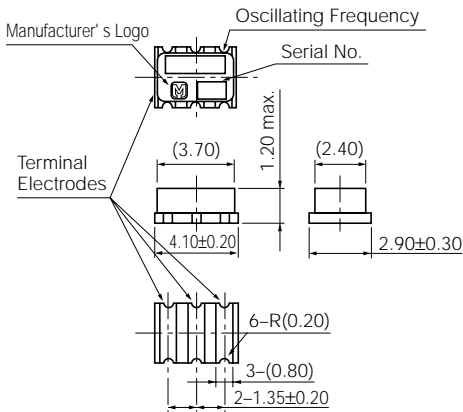


[Type EFOB]



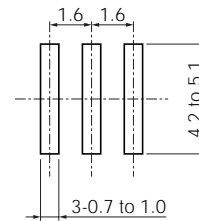
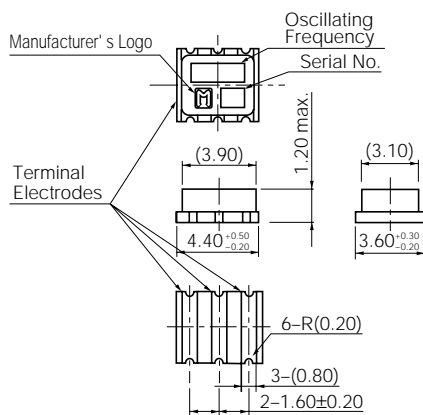
■ Dimensions in mm (not to scale)
 Recommended Land Dimensions
 [Type EFOBM].....12.0 to 20.0 MHz

[Type EFOBM]

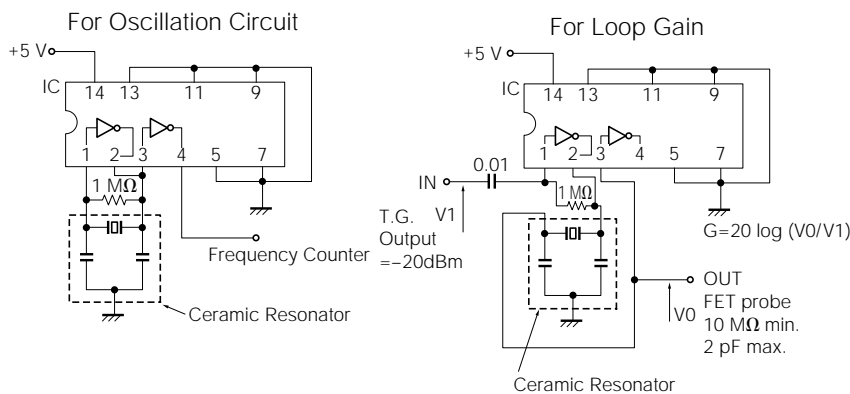


[Type EFOJM].....16.0 to 20.0, 30.0 to 50.0 MHz

[Type EFOJM]



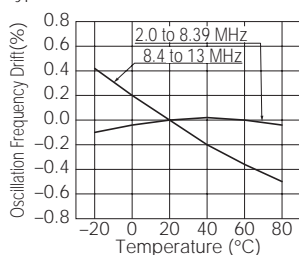
■ Test Circuits Diagram



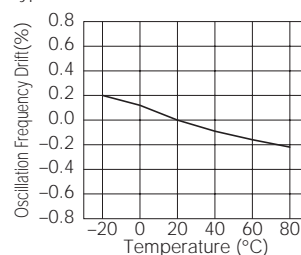
Frequency	IC
2.00 to 8.39 MHz	μPD 4069UBC or similar
8.40 to 50.0 MHz	μPD 74HCU04 or similar

■ Typical Characteristics Temperature Characteristics

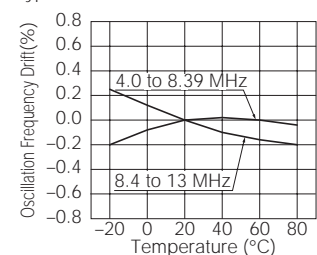
Type EFOB



Type EFOB

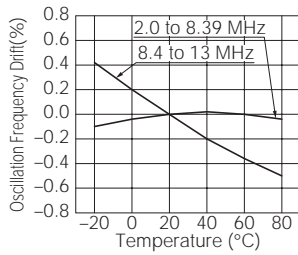


Type EFOSS

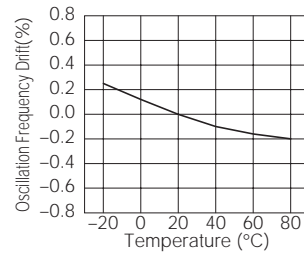


Typical Characteristics Temperature Characteristics

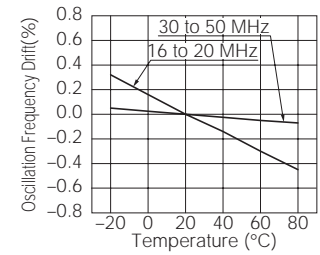
Type EFOSM



Type EFOBM



Type EFOJM

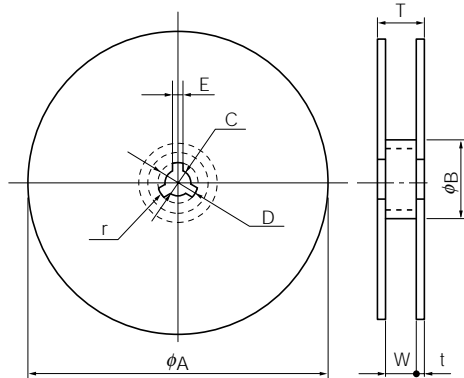


Packaging Specifications

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)



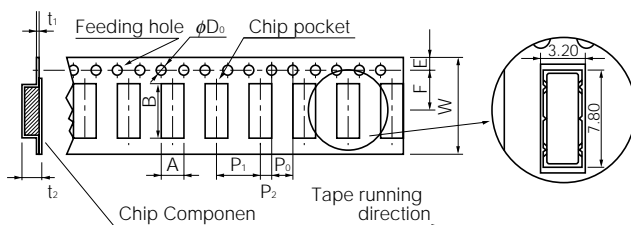
[Type EFOS, EFOSM]

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]

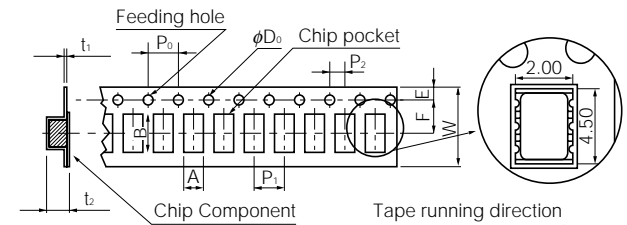
Dim. (mm)	ϕA	ϕB	C	D	E
	180 ± 5	60 min.	13.0 ± 0.5	21.0 ± 0.8	2.0 ± 0.5
Dim. (mm)	W	T	t	r	
	$12.4^{+2.0}_0$	18.4 max.	3 max.	1.0	

[Type EFOS, EFOSM]



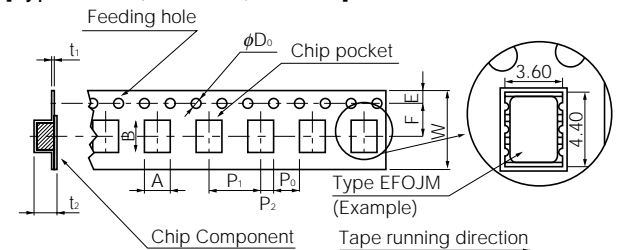
Dim. (mm)	A	B	W	F	E	P ₁
	3.7 ± 0.2	8.3 ± 0.2	16.0 ± 0.3	7.5 ± 0.1	1.75 ± 0.10	8.0 ± 0.1
Dim. (mm)	P ₂	P ₀	ϕD_0	t ₁	t ₂	
	2.0 ± 0.1	4.0 ± 0.1	$1.5^{+0.1}_0$	0.3	3.5 max.	

[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

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.