

Ceramic Resonators, Chip Type (3 Array Type)

Type: **EFOS**

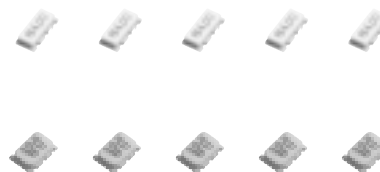
Type: **EFOB**

Type: **EFOSS**

Type: **EFOSM**

Type: **EFOBM**

Type: **EFOJM**



■ Features

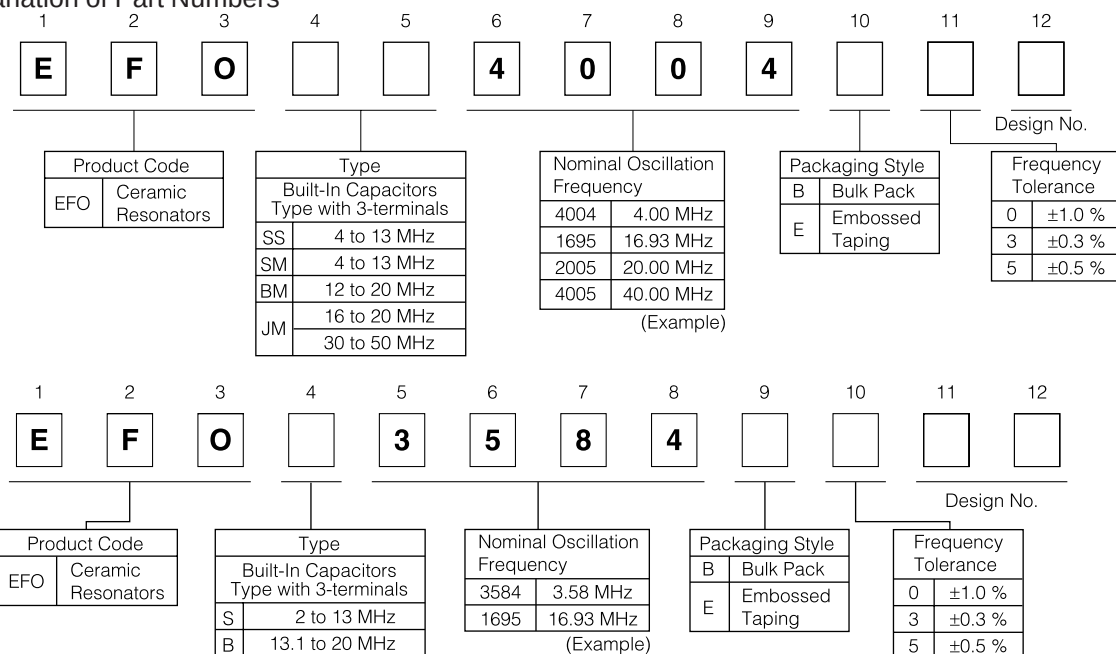
- Encased in ceramic package
- High reliability against soldering heat and mechanical stress
- Moisture-proof sealing
- 1.2 mm maximum in thickness (SS/SM/BM/JM)
- Designed for reflow soldering
- Flat-bottom plate for better mountings
- Contributes simplification of oscillation circuits and reduces the numbers of circuit parts

■ Recommended Applications

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

■ Precautions for Safety (See Page 237 to 238)

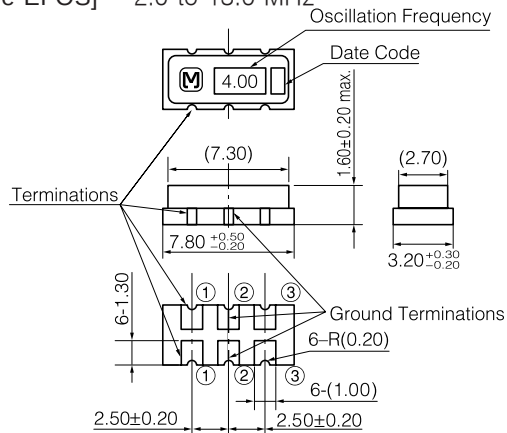
■ Explanation of Part Numbers



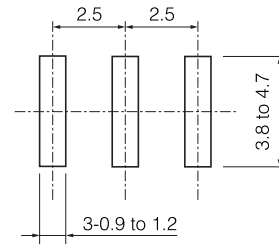
Part Number	Frequency range (MHz)	Frequency Temperature Characteristics (-20 to +80 °C)	Built-in Capacitors (Reference)	Note
EFOS	2.00 to 8.39	±0.2 %	33 pF	Product weight 0.110 g/pcs.
	8.40 to 13.0	±1.0 %		
EFOB	13.1 to 20.0	±0.5 %	33 pF	Product weight 0.072 g/pcs.
EFOSS	4.00 to 8.39	±0.2 %	21 pF	Product weight 0.028 g/pcs.
	8.40 to 13.0	±0.3 %		
EFOSM	4.00 to 8.39	±0.2 %	33 pF	Product weight 0.077 g/pcs.
	8.40 to 13.0	±1.0 %		
EFOBM	12.0 to 20.0	±0.3 %	18 pF	Product weight 0.035 g/pcs.
EFOJM	16.0 to 20.0	±0.5 %	10 pF	Product weight 0.050 g/pcs.
	30.0 to 50.0	±0.2 %		

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

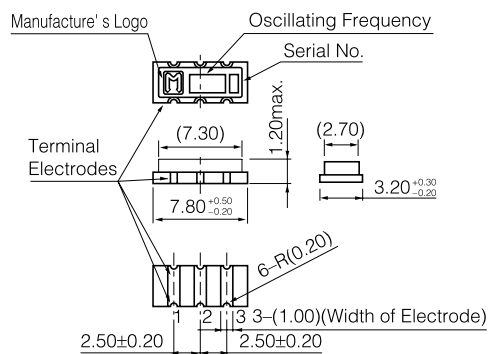
[Type EFOS].....2.0 to 13.0 MHz



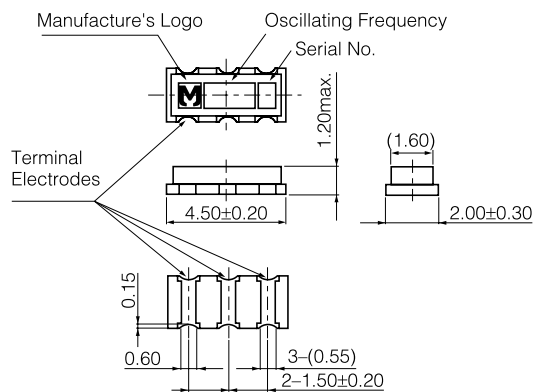
[Type EFOS, EFOSM]



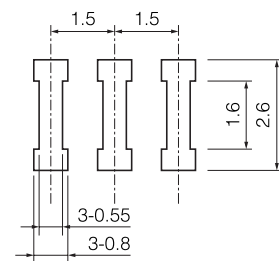
[Type EFOSM].....4.0 to 13.0 MHz



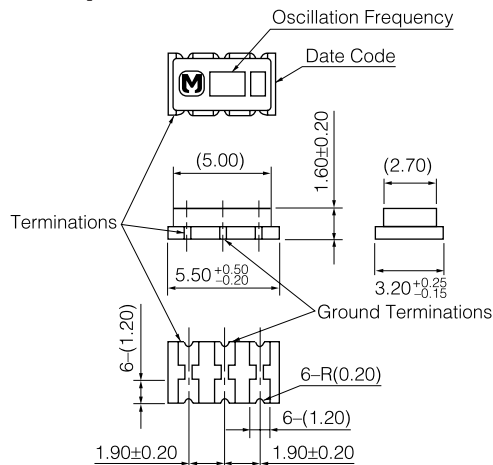
[Type EFOSS].....4.0 to 13.0 MHz



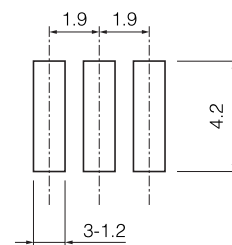
[Type EFOSS]



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

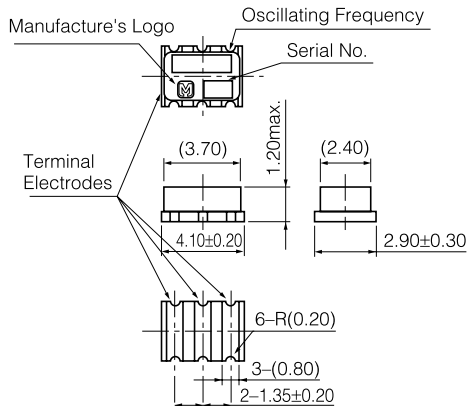


[Type EFOB]

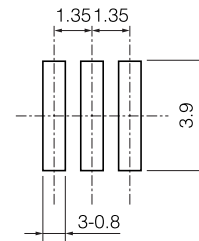


(Unit:mm)

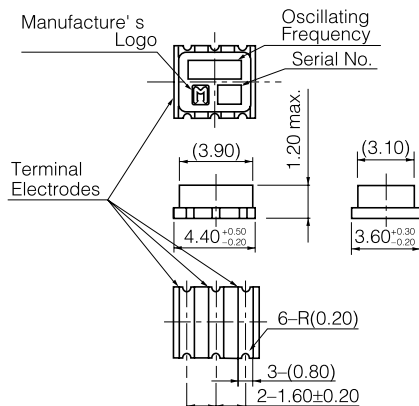
■ Dimensions in mm (not to scale)
Recommended Land Dimensions
[Type EFOB].....12.0 to 20.0 MHz



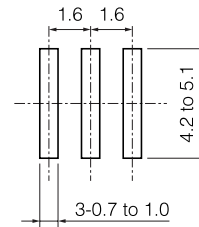
[Type EFOB]



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

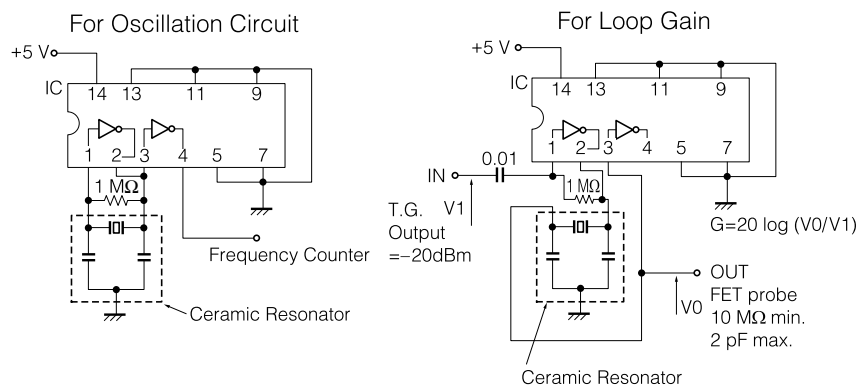


[Type EFOJM]



(Unit:mm)

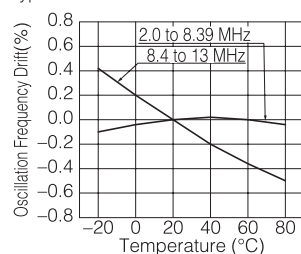
■ Test Circuits Diagram



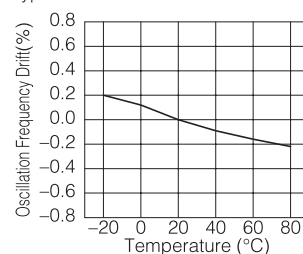
Frequency	IC
2.00 to 8.39 MHz	μPD 4069UBC or equivalent
8.40 to 50.0 MHz	μPD 74HCU04 or equivalent

■ Typical Characteristics Temperature Characteristics

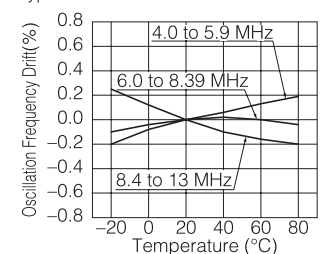
Type EFOS



Type EFOB

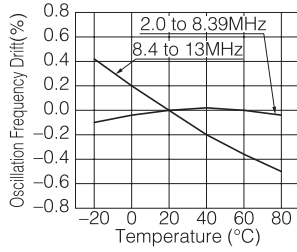


Type EFOSS

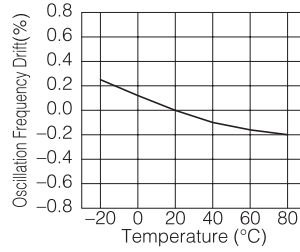


■ Typical Characteristics Temperature Characteristics

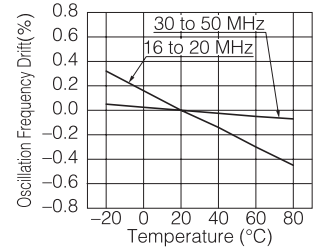
Type EFOSM



Type EFOBM



Type EFOJM

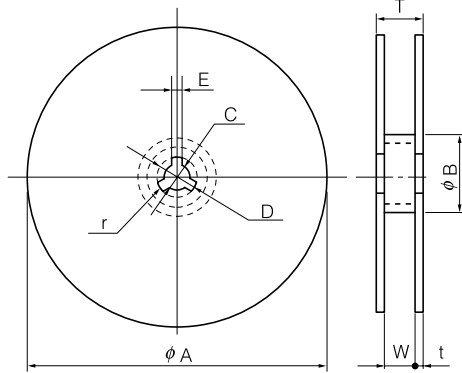


■ Packaging Specifications

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

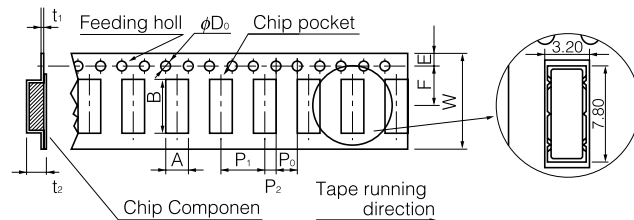
Dim.	W	T	t	r
(mm)	16.4 ^{+2.0} ₀	22.4 max.	3 max.	1.0

[Type EFOSS, EFOB, EFOBM, EFOJM]

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

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

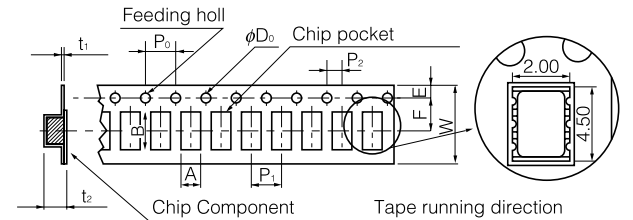
[Type EFOS, EFOSM]



Dim.	A	B	W	F	E	P ₁
(mm)	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.	P ₂	P ₀	φD ₀	t ₁	t ₂
(mm)	2.0±0.1	4.0±0.1	1.5 ^{+0.1} ₀	0.3	3.5 max.

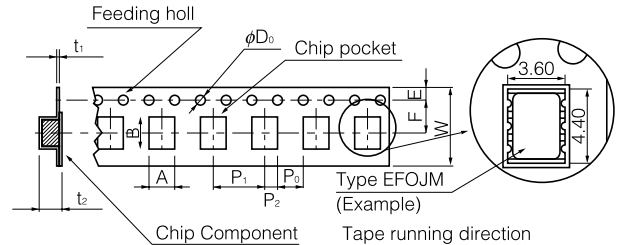
[Type EFOSS]



Dim.	A	B	W	F	E	P ₁
(mm)	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.	P ₂	P ₀	φD ₀	t ₁	t ₂
(mm)	2.0±0.1	4.0±0.1	1.5 ^{+0.1} ₀	0.6 max.	3.0 max.

[Type EFOB, EFOBM, EFOJM]



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

Dim.	P ₂	P ₀	φD ₀	t ₁	t ₂
(mm)	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