

### Ceramic Resonators, Chip Type (Thin / Built-In Capacitors Type)



- Type: **SS** (4 to 8 MHz)
- Type: **SM** (4 to 13 MHz)
- Type: **BM** (12 to 20 MHz)
- Type: **JM** (16.0 to 20.0 MHz  
30.1 to 50.0 MHz)

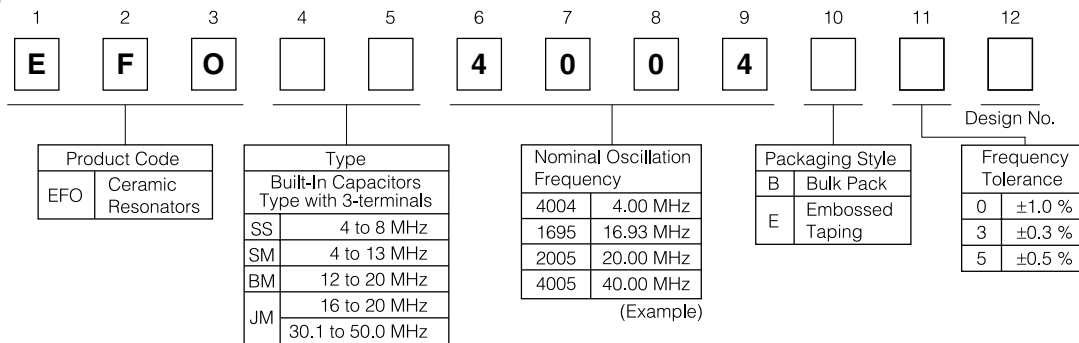
#### ■ Features

- Encased in ceramic package
- High reliability against soldering heat and mechanical stress
- Moisture-proof sealing
- Low Profile Type (1.2 mm maximum thickness)
- Designed for reflow soldering
- Flat-bottom plate for better mounting
- Simplifies oscillation circuits by reducing the total number of circuit parts

#### ■ Recommended Applications

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

#### ■ Explanation of Part Numbers



#### ■ Ratings and Characteristics

Part Number		Oscillation Frequency (fo)	Loop Gain (G)	Temperature Characteristics	Built-in Capacitors (Reference)
Bulk Pack	Embossed Taping				
EFOSS4004B5	EFOSS4004E5	4.00 MHz ±0.5 %	10 dB min.	Maximum frequency drift: ±0.2 %, -20 to 80 °C	21 pF
EFOSS8004B5	EFOSS8004E5	8.00 MHz ±0.5 %			
EFOSM4004B5	EFOSM4004E5	4.00 MHz ±0.5 %	10 dB min.	Maximum frequency drift: ±0.2 %, -20 to 80 °C	33 pF
EFOSM8004B5	EFOSM8004E5	8.00 MHz ±0.5 %			
EFOSM1005B5	EFOSM1005E5	10.00 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±1.0 %, -20 to 80 °C	33 pF
EFOSM1205B5	EFOSM1205E5	12.00 MHz ±0.5 %			
EFOBM1205B5	EFOBM1205E5	12.00 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±0.3 %, -20 to 80 °C	18 pF
EFOBM2005B5	EFOBM2005E5	20.00 MHz ±0.5 %			
EFOJM1605B5	EFOJM1605E5	16.00 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±0.5 %, -20 to 80 °C	10 pF
EFOJM1695B5	EFOJM1695E5	16.93 MHz ±0.5 %			
EFOJM2005B5	EFOJM2005E5	20.00 MHz ±0.5 %	6 dB min.	Maximum frequency drift: ±0.2 %, -20 to 80 °C	10 pF
EFOJM3205B5	EFOJM3205E5	32.00 MHz ±0.5 %			
EFOJM3385B5	EFOJM3385E5	33.868 MHz ±0.5 %			
EFOJM4005B5	EFOJM4005E5	40.00 MHz ±0.5 %			

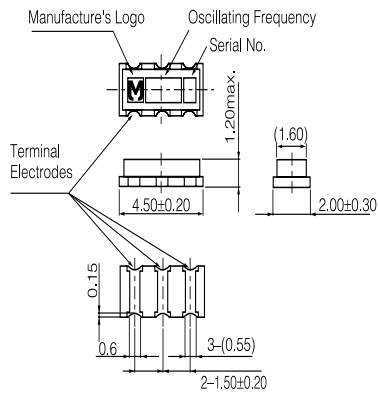
- Operating Temperature Range: -20 to 80 °C

Note:  
Also available are types other than above standard products in the frequency range of 3 to 50 MHz.  
Please contact us for more information.

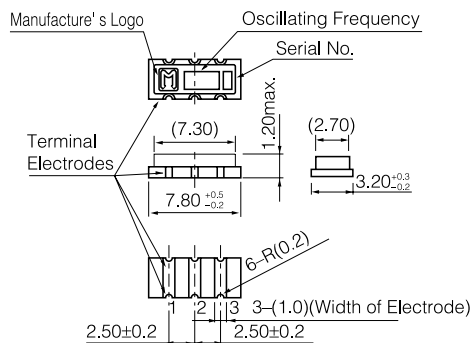
■ Dimensions in mm (not to scale)

● Bulk

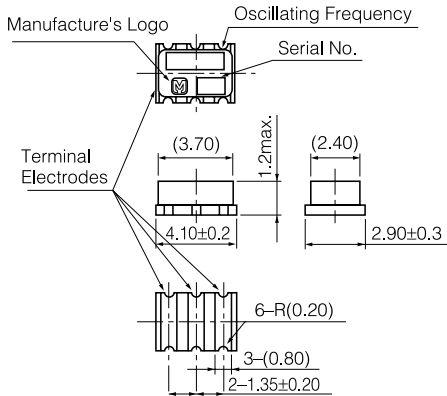
[Type SS] EFOSS□□□□B□



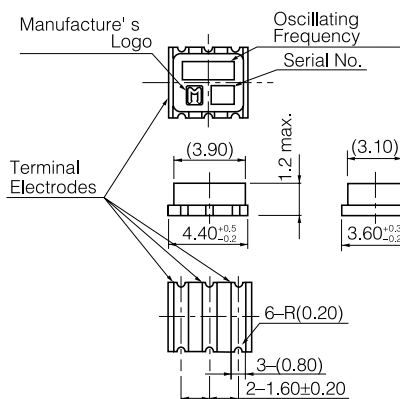
[Type SM] EFOSM□□□□B□



[Type BM] EFOBM□□□□B□

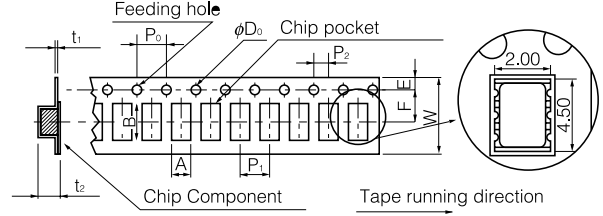


[Type JM] EFOJM□□□□B□



● Embossed Taping

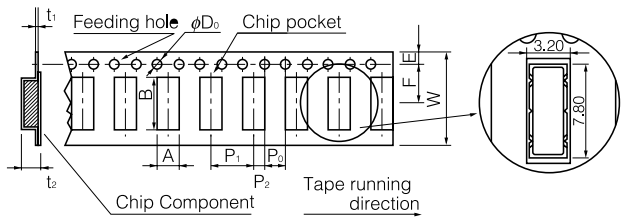
EFOSS□□□□E□



Dim.	A	B	W	F	E	P <sub>1</sub>
(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 <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>
(mm)	2.0±0.1	4.0±0.1	1.5 <sup>+0.1</sup> <sub>0</sub>	0.6 max.	3.0 max.

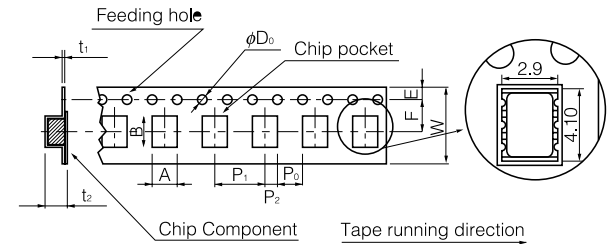
EFOSM□□□□E□



Dim.	A	B	W	F	E	P <sub>1</sub>
(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 <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>
(mm)	2.0±0.1	4.0±0.1	1.5 <sup>+0.1</sup> <sub>0</sub>	0.3	3.5 max.

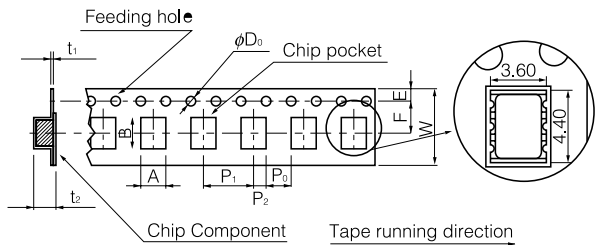
EFOBM□□□□E□



Dim.	A	B	W	F	E	P <sub>1</sub>
(mm)	3.4±0.2	4.6±0.2	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

Dim.	P <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>
(mm)	2.0±0.1	4.0±0.1	1.5 <sup>+0.1</sup> <sub>0</sub>	0.6 max.	3.0 max.

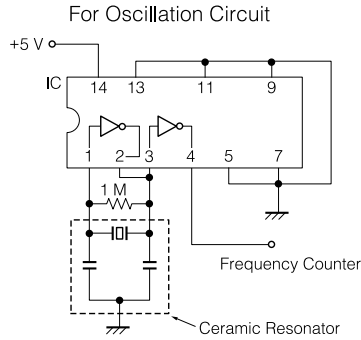
EFOJM□□□□E□



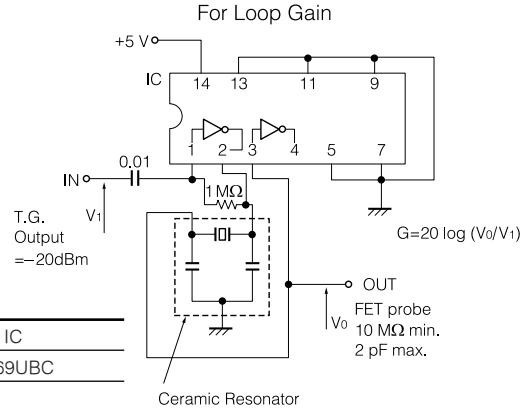
Dim.	A	B	W	F	E	P <sub>1</sub>
(mm)	4.1±0.2	4.9±0.2	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

Dim.	P <sub>2</sub>	P <sub>0</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>
(mm)	2.0±0.1	4.0±0.1	1.5 <sup>+0.1</sup> <sub>0</sub>	0.6 max.	3.0 max.

### Test Circuits Diagram

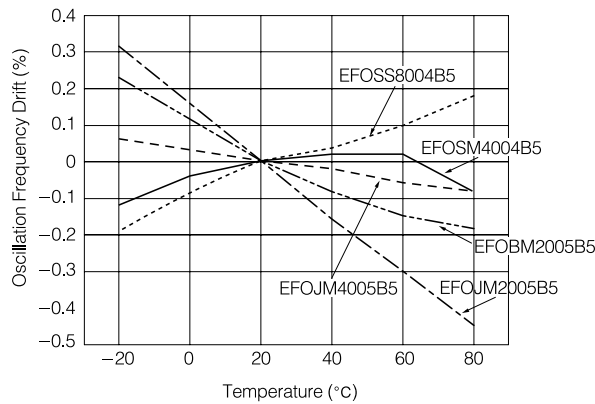


Frequency	IC
3.00 to 8.38 MHz	μPD 4069UBC
8.4 to 13.0 MHz	μPD 74HCU04
16.0 to 20.0 MHz	
30.1 to 50.0 MHz	

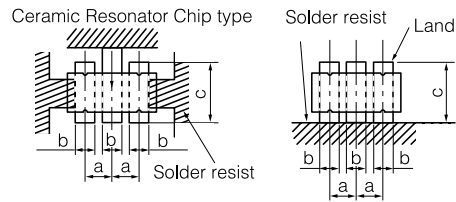


### Typical Characteristics

#### Temperature Characteristics



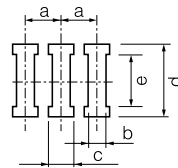
### Recommended Land Dimensions (Type SM, JM)



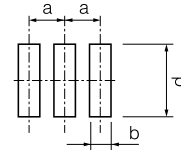
	Type SM	Type JM
a	2.5	1.6
b	0.9 to 1.2	0.7 to 1.0
c	3.8 to 4.7	4.2 to 5.1

(mm)

#### ● Type SS



#### ● Type BM



	Type SS	Type BM
a	1.5	1.35
b	0.55	0.8
c	0.8	—
d	2.6	3.9
e	1.6	—

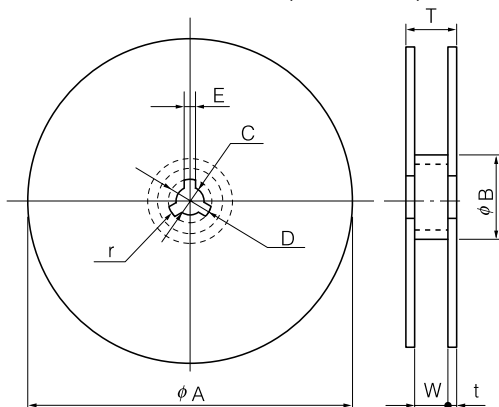
### Packaging Specifications

Supplied in bulk or taped & reel packing style

#### ● Standard Packing Quantity

Type	Embossed Taping	Bulk
SM	2500 pcs./reel	500 pcs./bag
SS	2500 pcs./reel	500 pcs./bag
JM, BM	1000 pcs./reel	500 pcs./bag

#### ● Dimensions for Reel in mm (not to scale)



#### [Type SM]

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 <sup>+2.0</sup> <sub>0</sub>	22.4 max.	3 max.	1.0	

#### [Type JM, SS, BM]

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 <sup>+2.0</sup> <sub>0</sub>	18.4 max.	3 max.	1.0	