



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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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

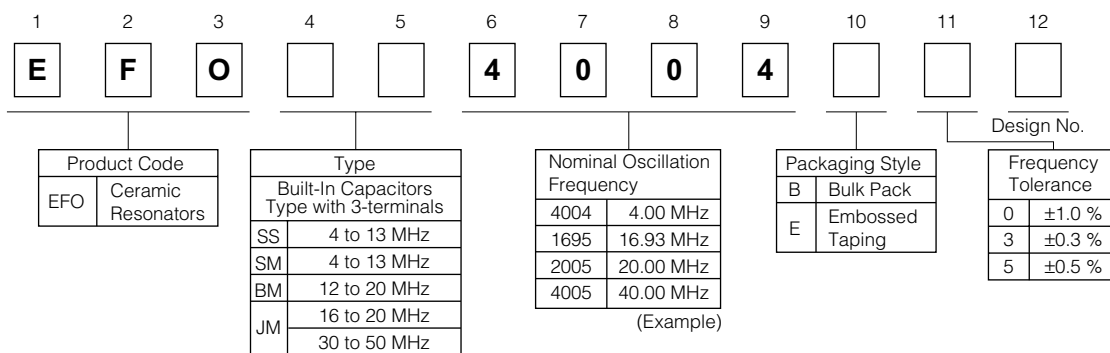
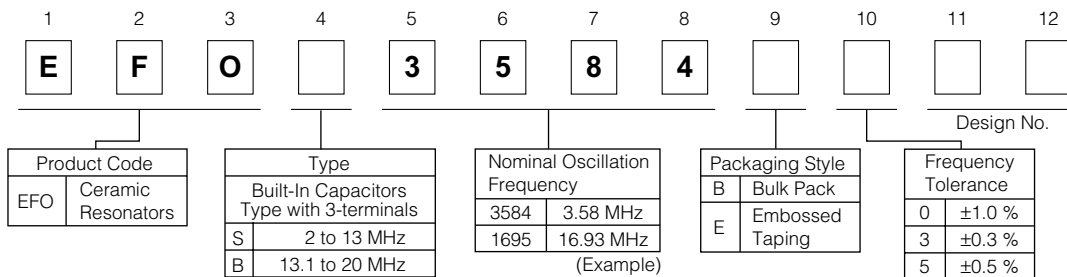
- Clock generator for microprocessors
- Carrier circuit between telecommunication equipment (Telephone to telephone, personal computer to printer)

■ Handling Precautions (See Page 175 to 176)

■ Packaging Specifications

See Page 169 to 177

■ Explanation of Part Numbers



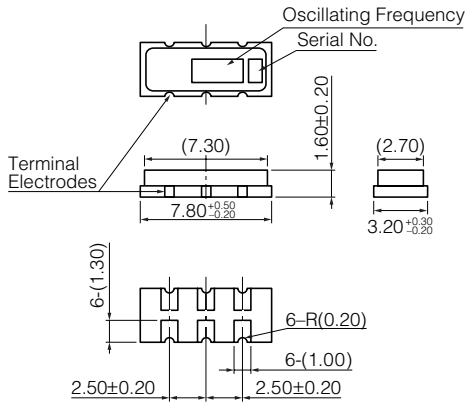
| Part Number | Frequency range (MHz) | Frequency Temperature Characteristics (-20 to +80 °C) | Built-in Capacitors (Reference) |
|-------------|-----------------------|---|---------------------------------|
| EFOS | 2.00 to 8.39 | ±0.2 % | 33 pF |
| | 8.40 to 13.0 | ±1.0 % | |
| EFOB | 13.1 to 20.0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

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.

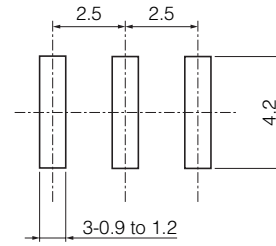
■ Dimensions in mm (not to scale)

Recommended Land Dimensions

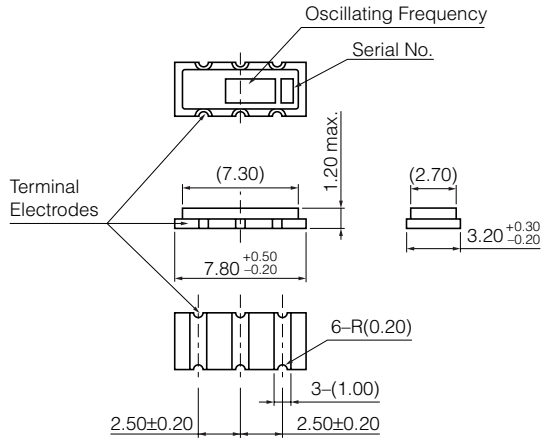
[Type EFOS].....2.0 to 13.0 MHz



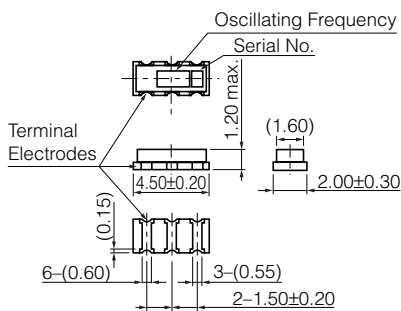
[Type EFOS, EFOSM]



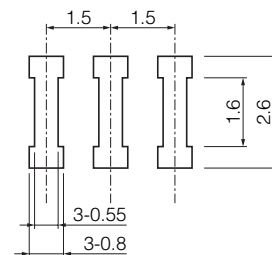
[Type EFOSM].....4.0 to 13.0 MHz



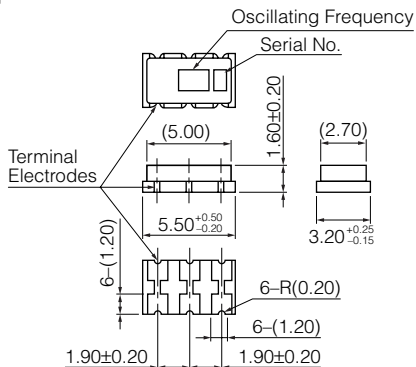
[Type EFOSS].....4.0 to 13.0 MHz



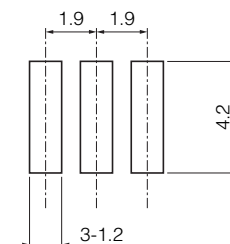
[Type EFOSS]



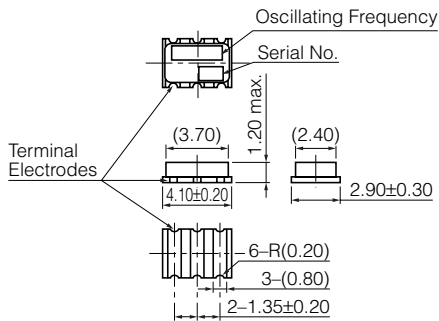
[Type EFOB].....13.1 to 20.0 MHz



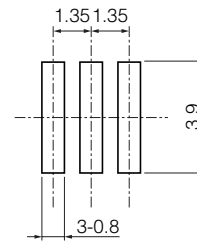
[Type EFOB]



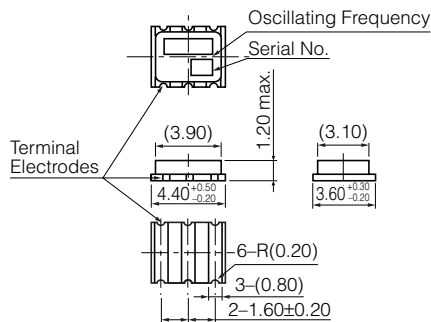
■ Dimensions in mm (not to scale)
 Recommended Land Dimensions
 [Type EFOB].....12.0 to 20.0 MHz



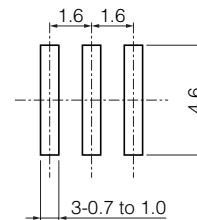
[Type EFOB]



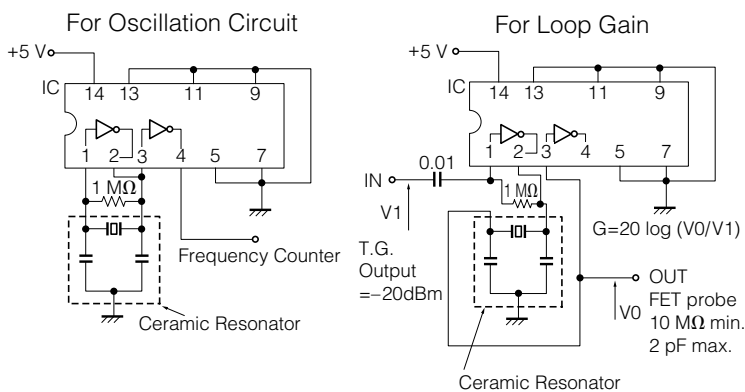
[Type EFOJM].....16.0 to 20.0, 30.0 to 50.0 MHz



[Type EFOJM]



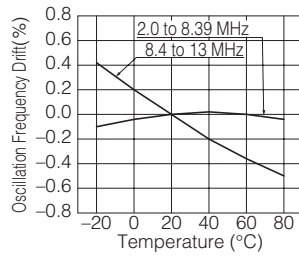
■ Test Circuits Diagram



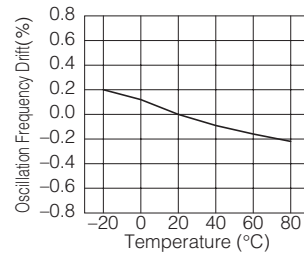
| Frequency | IC |
|------------------|---|
| 2.00 to 8.39 MHz | μPD4069UBC, TC4069UBP or similar |
| 8.40 to 50.0 MHz | μPD74HCU, TC74 HCU04AP or similar |

Typical Characteristics Temperature Characteristics

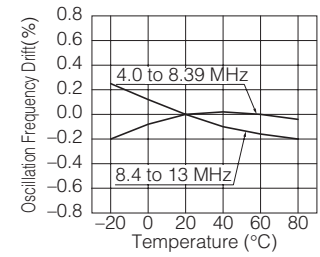
Type EFOS



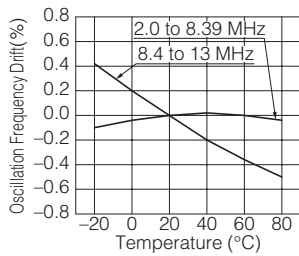
Type EFOB



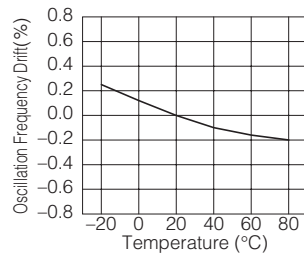
Type EFOSS



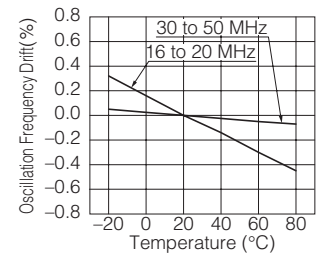
Type EFOSM



Type EFOBM



Type EFOJM

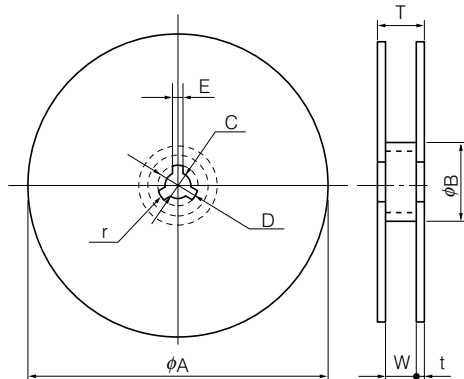


Packaging Specifications

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 |

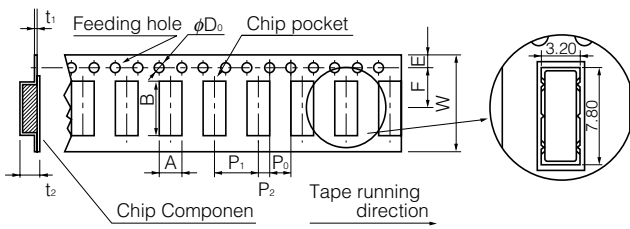
| Dim. (mm) | W | T | t | r |
|-----------|-----------------|-----------|--------|-----|
| | $16.4^{+2.0}_0$ | 22.4 max. | 3 max. | 1.0 |

[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 |

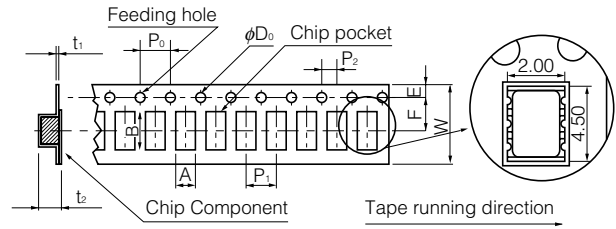
| Dim. (mm) | W | T | t | r |
|-----------|-----------------|-----------|--------|-----|
| | $12.4^{+2.0}_0$ | 18.4 max. | 3 max. | 1.0 |

[Type EFOS, EFOSM]



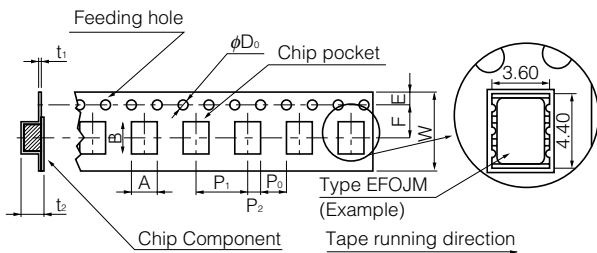
| | | | | | | |
|-----------|----------------|----------------|----------------------------------|----------------|----------------|----------------|
| Dim. (mm) | A | B | W | F | E | P ₁ |
| | 3.7±0.2 | 8.3±0.2 | 16.0±0.3 | 7.5±0.1 | 1.75±0.10 | 8.0±0.1 |
| Dim. (mm) | P ₂ | P ₀ | φD ₀ | t ₁ | t ₂ | |
| | 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 |