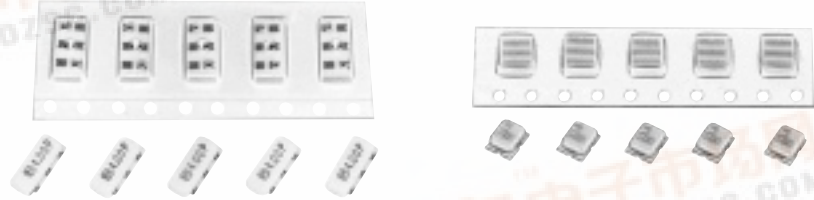


# Panasonic

## Ceramic Resonators (Chip Type)

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

Type: **S** ( 2 to 13 MHz)Type: **B** (13.1 to 20 MHz)Type: **J** (30.1 to 50 MHz)

#### ■ Features

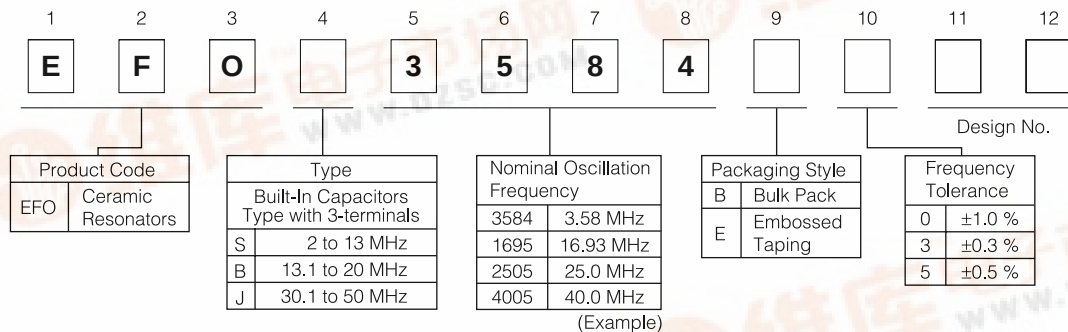
- Encased in ceramic package
- High reliability against soldering heat and mechanical stress
- Moisture-proof sealing
- Low Profile Type (1.8 mm maximum in thickness)
- Designed for reflow soldering
- Flat-bottom plate for better mountings
- Contributes simplification of oscillation circuits and reduces 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 218 to 219)

#### ■ 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 |                            |               |                                               |                                 |
| EFO3584B5   | EFO3584E5       | 3.58 MHz ±0.5 %            | 10 dB min.    | Maximum frequency drift: ±0.2 %, -20 to 80 °C | 33 pF                           |
| EFO4004B5   | EFO4004E5       | 4.00 MHz ±0.5 %            |               |                                               |                                 |
| EFO8004B5   | EFO8004E5       | 8.00 MHz ±0.5 %            |               |                                               |                                 |
| EFO1005B5   | EFO1005E5       | 10.00 MHz ±0.5 %           | 15 dB min.    | Maximum frequency drift: ±1.0 %, -20 to 80 °C | 33 pF                           |
| EFO1205B5   | EFO1205E5       | 12.00 MHz ±0.5 %           |               |                                               |                                 |
| EFO1605B5   | EFO1605E5       | 16.00 MHz ±0.5 %           |               |                                               |                                 |
| EFO1695B5   | EFO1695E5       | 16.93 MHz ±0.5 %           | 15 dB min.    | Maximum frequency drift: ±0.5 %, -20 to 80 °C | 33 pF                           |
| EFOB2005B5  | EFOB2005E5      | 20.00 MHz ±0.5 %           |               |                                               |                                 |
| EFOJ3205B5  | EFOJ3205E5      | 32.00 MHz ±0.5 %           |               |                                               |                                 |
| EFOJ3385B5  | EFOJ3385E5      | 33.868 MHz ±0.5 %          | 6 dB min.     | Maximum frequency drift: ±0.2 %, -20 to 80 °C | 10 pF                           |
| EFOJ4005B5  | EFOJ4005E5      | 40.00 MHz ±0.5 %           |               |                                               |                                 |

- Operating Temperature Range: -20 to 80 °C

Note:

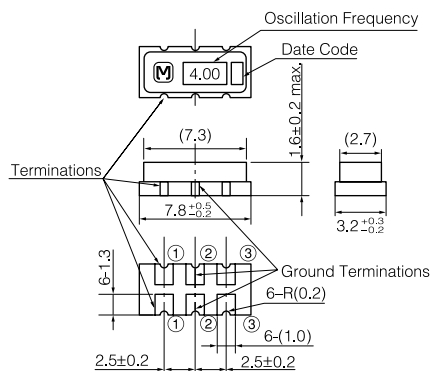
Also available are types other than above standard products in the frequency range of 3 to 50 MHz.  
Please contact us for more information.



■ Dimensions in mm (not to scale)

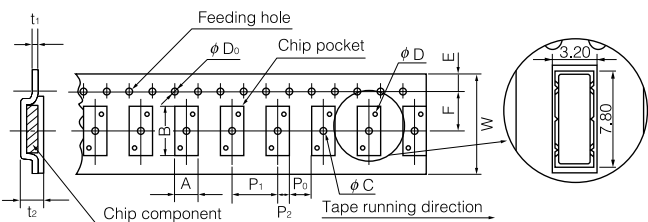
● Bulk

[Type S] EFOS□□□□B□



● Embossed Taping

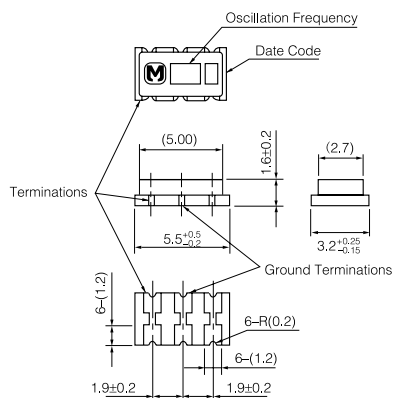
EFOS□□□□E□



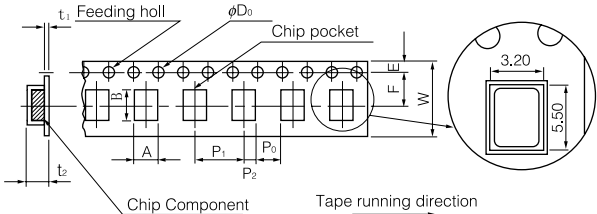
| Dim. | A   | B   | W        | F       | E         | P <sub>1</sub> |
|------|-----|-----|----------|---------|-----------|----------------|
| (mm) | 3.7 | 8.3 | 16.0±0.3 | 7.5±0.1 | 1.75±0.10 | 8.0±0.1        |

| Dim. | P <sub>2</sub> | P <sub>0</sub> | φD <sub>0</sub>                  | t <sub>1</sub> | t <sub>2</sub> | φC   | φD  |
|------|----------------|----------------|----------------------------------|----------------|----------------|------|-----|
| (mm) | 2.0±0.1        | 4.0±0.1        | 1.5 <sup>+0.1</sup> <sub>0</sub> | 0.6 max.       | 3.0 max.       | 1.55 | 1.0 |

[Type B] EFOB□□□□B□



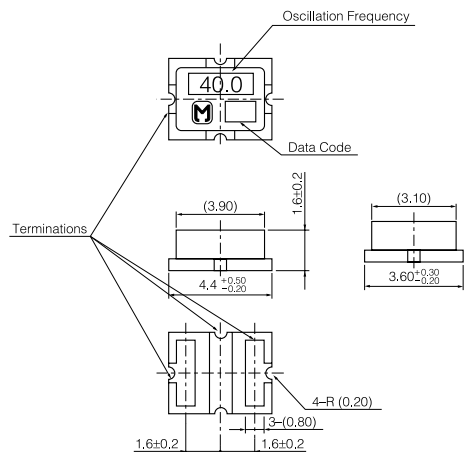
EFOB□□□□E□



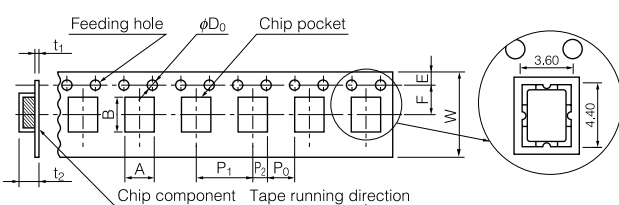
| Dim. | A   | B   | W        | F       | E         | P <sub>1</sub> |
|------|-----|-----|----------|---------|-----------|----------------|
| (mm) | 3.7 | 6.0 | 12.0±0.3 | 5.5±0.1 | 1.75±0.10 | 8.0±0.1        |

| 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.       |

[Type J] EFOJ□□□□B□



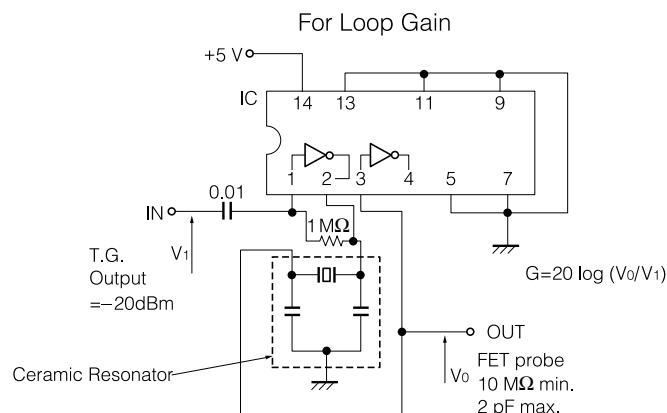
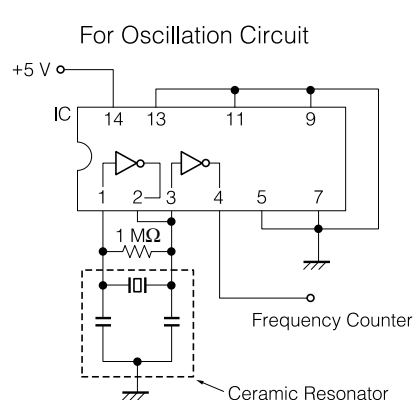
EFOJ□□□□E□



| Dim. | A   | B   | W        | F       | E         | P <sub>1</sub> |
|------|-----|-----|----------|---------|-----------|----------------|
| (mm) | 4.1 | 4.9 | 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.       |

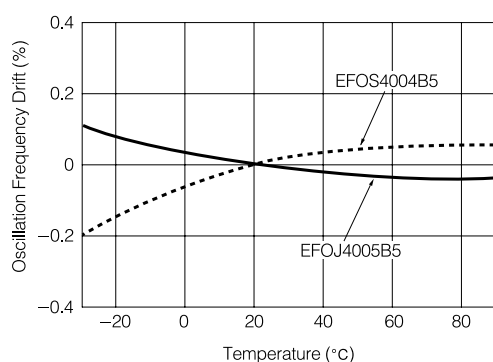
### Test Circuits Diagram



| Frequency        | IC          |
|------------------|-------------|
| 2.00 to 8.38 MHz | μPD 4069UBC |
| 8.4 to 50 MHz    | μPD 74HCU04 |

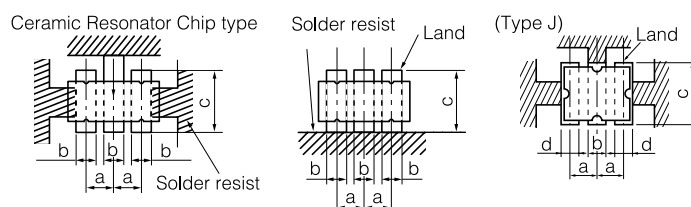
### Typical Characteristics

Temperature Characteristics



### Recommended Land Dimensions

(Type S,B,J)



|   | Type S     | Type B | Type J     |
|---|------------|--------|------------|
| a | 2.5        | 1.9    | 1.7        |
| b | 0.9 to 1.2 | 1.2    | 0.8 to 1.0 |
| c | 3.8 to 4.7 | 4.2    | 4.2 to 5.1 |
| d | —          | —      | 1.0 to 1.2 |

(mm)

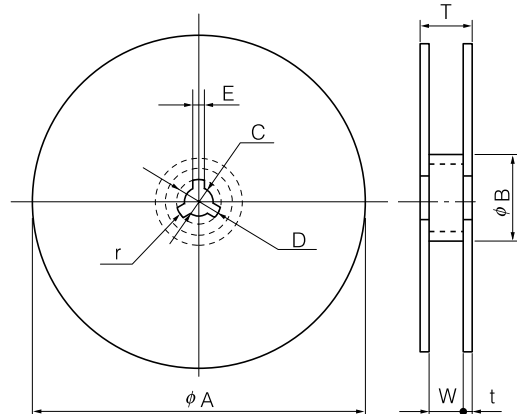
### Packaging Specifications

Supplied in bulk or taped & reel packing style

#### Standard Packing Quantity

| Type | Embossed Taping | Bulk         |
|------|-----------------|--------------|
| S    | 2500 pcs./reel  | 500 pcs./bag |
| B,J  | 1000 pcs./reel  | 500 pcs./bag |

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



#### [Type S]

| 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 B,J]

| 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      |         |