

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

Type: **S** ( 2 to 13 MHz)

Type: **B** (13.1 to 20 MHz)

Type: **J** (30.1 to 50 MHz)



#### ■ Features

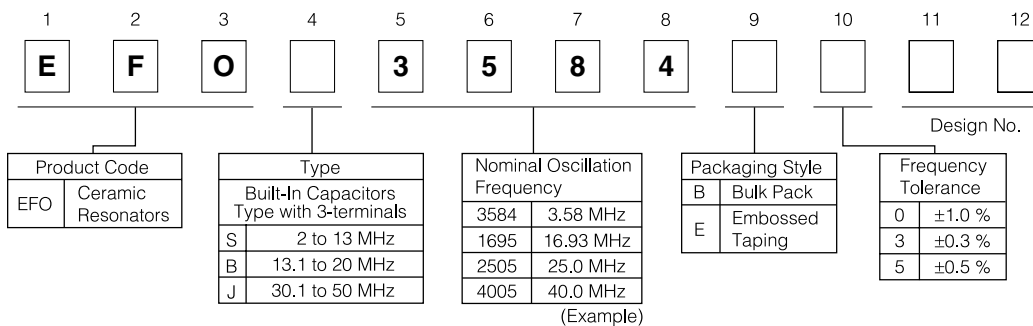
- Encased in ceramic package
- High reliability against soldering heat and mechanical stress
- Moisture-proof sealing
- Low Profile Type (1.8 mm maximum in thickness)
- Designed for reflow soldering
- Flat-bottom plate for better mounting
- Simplifies oscillation circuits

#### ■ Recommended Applications

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

#### ■ Safety Precautions (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				
EFOS3584B5	EFOS3584E5	3.58 MHz ±0.5 %	10 dB min.	Maximum frequency drift: ±0.2 %, -20 to 80 °C	33 pF
EFOS4004B5	EFOS4004E5	4.00 MHz ±0.5 %			
EFOS8004B5	EFOS8004E5	8.00 MHz ±0.5 %			
EFOS1005B5	EFOS1005E5	10.00 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±1.0 %, -20 to 80 °C	33 pF
EFOS1205B5	EFOS1205E5	12.00 MHz ±0.5 %			
EFOB1605B5	EFOB1605E5	16.00 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±0.5 %, -20 to 80 °C	33 pF
EFOB1695B5	EFOB1695E5	16.93 MHz ±0.5 %			
EFOB2005B5	EFOB2005E5	20.00 MHz ±0.5 %			
EFOJ3205B5	EFOJ3205E5	32.00 MHz ±0.5 %	6 dB min.	Maximum frequency drift: ±0.2 %, -20 to 80 °C	10 pF
EFOJ3385B5	EFOJ3385E5	33.868 MHz ±0.5 %			
EFOJ4005B5	EFOJ4005E5	40.00 MHz ±0.5 %			

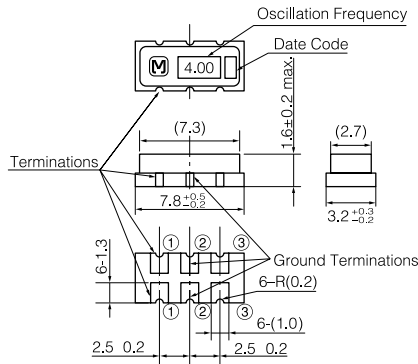
- Operating Temperature Range: -20 to 80 °C

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

■ Dimensions in mm (not to scale)

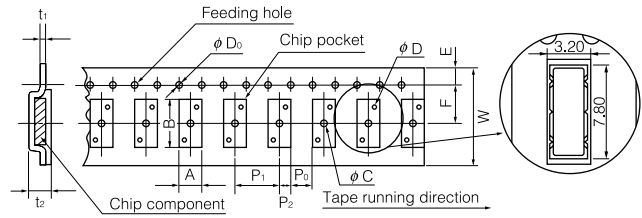
● Bulk

[Type S] EFOS□□□□B□



● Embossed Taping

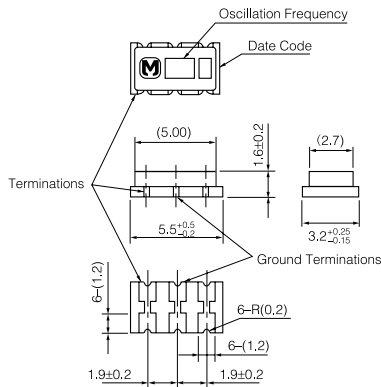
EFOS□□□□E□



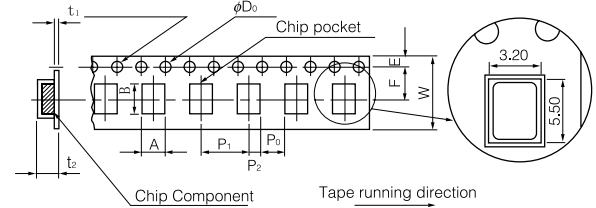
Dim.	A	B	W	F	E	P <sub>1</sub>
(mm)	3.7	8.3	16.0±0.3	7.5±0.1	1.75±0.10	8.0±0.1

Dim.	P <sub>2</sub>	P <sub>0</sub>	$\phi D_0$	t <sub>1</sub>	t <sub>2</sub>	$\phi C$	$\phi D$
(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□



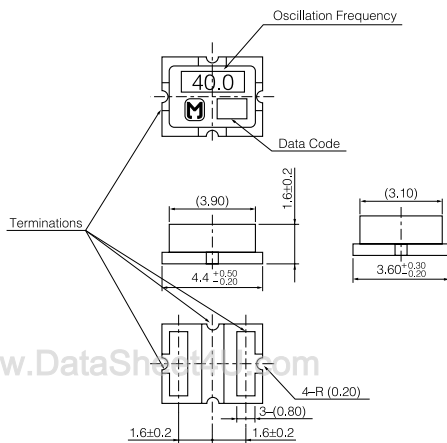
EFOB□□□□E□



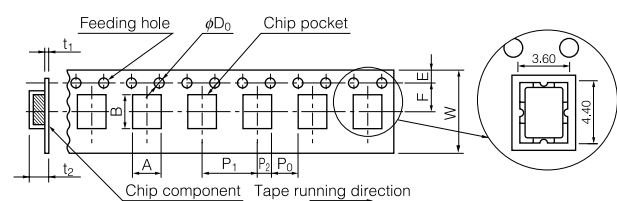
Dim.	A	B	W	F	E	P <sub>1</sub>
(mm)	3.7	6.0	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

Dim.	P <sub>2</sub>	P <sub>0</sub>	$\phi D_0$	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□

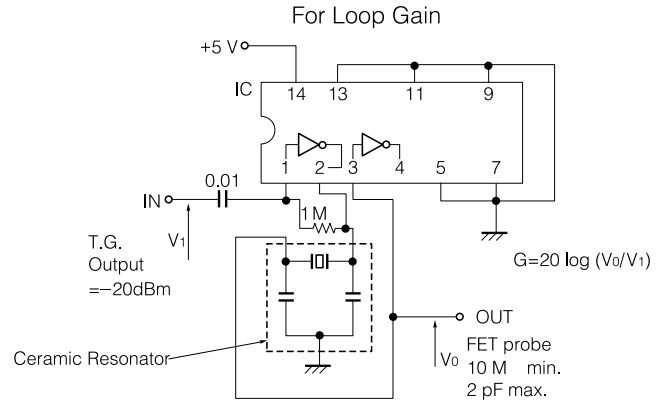
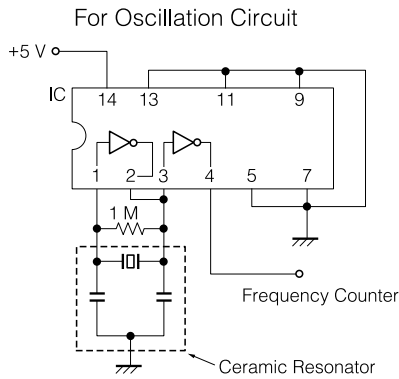


Dim.	A	B	W	F	E	P <sub>1</sub>
(mm)	4.1	4.9	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

Dim.	P <sub>2</sub>	P <sub>0</sub>	$\phi D_0$	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.

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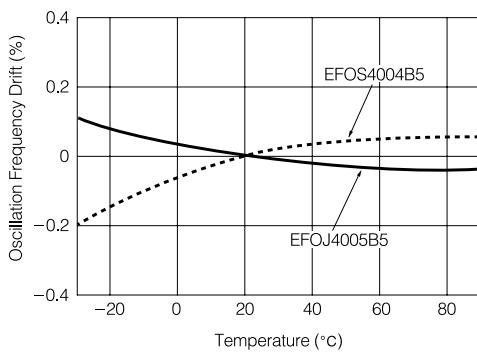
### Test Circuits Diagram



Frequency	IC
2.00 to 8.38 MHz	$\mu$ PD 4069UBC
8.4 to 50 MHz	$\mu$ PD 74HCU04

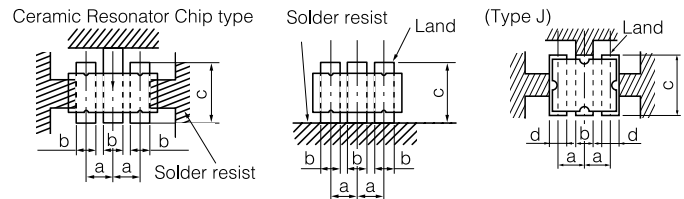
### Typical Characteristics

#### 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)

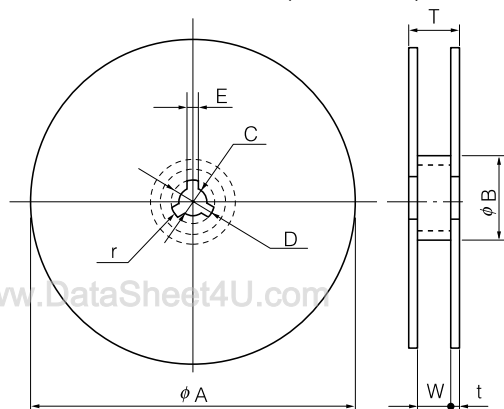
### Packaging Specifications

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.	$\phi A$	$\phi B$	C	D	E
(mm)	$330 \pm 5$	80 min.	$13.0 \pm 0.5$	$21.0 \pm 0.8$	$2.0 \pm 0.5$
Dim.	W	T	t	r	
(mm)	$16.4^{+2.0}_0$	22.4 max.	3 max.	1.0	

#### [Type B,J]

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