

Ceramic Resonators, Chip Type (For General Purpose)

Type: **P** (2 to 13 MHz)
 Type: **D** (13.1 to 20 MHz)
 Type: **L** (30.1 to 50 MHz)

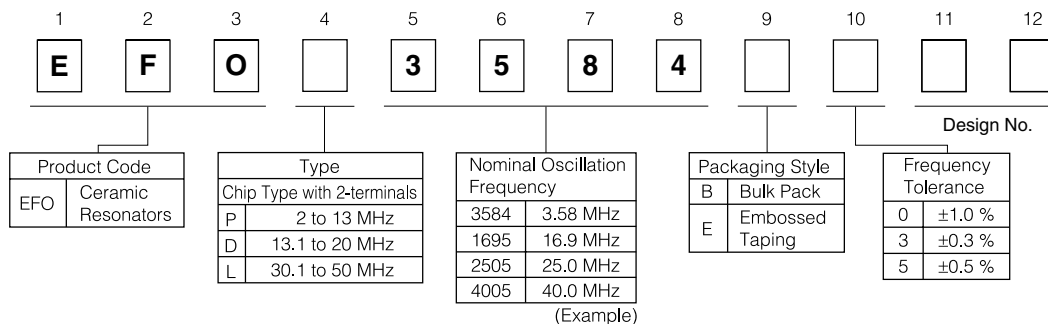


■ Features

- 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

■ Safety Precautions (See Page 218 to 219)

■ Explanation of Part Numbers



■ Recommended Applications

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

■ Application Notes

● Soldering Conditions

Reflow soldering should be done at 220 °C for less than 10 seconds, and peak temperature of 240 °C. (Remark) Flow soldering method and dip soldering method should not be applied.

■ Ratings and Characteristics

Part Number		Oscillation Frequency (fo)	Loop Gain (G)	Temperature Characteristics
Bulk Pack	Embossed Taping			
EFOP3584B5	EFOP3584E5	3.58 MHz ±0.5 %	10 dB min.	Maximum frequency drift: ±0.3 %, -20 to 80 °C
EFOP4004B5	EFOP4004E5	4.00 MHz ±0.5 %		
EFOP8004B5	EFOP8004E5	8.00 MHz ±0.5 %		
EFOP1005B5	EFOP1005E5	10.00 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±1.0 %, -20 to 80 °C
EFOP1205B5	EFOP1205E5	12.00 MHz ±0.5 %		
EFOD1605B5	EFOD1605E5	16.00 MHz ±0.5 %		
EFOD1695B5	EFOD1695E5	16.93 MHz ±0.5 %	15 dB min.	Maximum frequency drift: ±1.0 %, -20 to 80 °C
EFOD2005B5	EFOD2005E5	20.00 MHz ±0.5 %		
EFOL3205B5	EFOL3205E5	32.00 MHz ±0.5 %		
EFOL3385B5	EFOL3385E5	33.868 MHz ±0.5 %	6 dB min.	Maximum frequency drift: ±0.3 %, -20 to 80 °C
EFOL4005B5	EFOL4005E5	40.00 MHz ±0.5 %		

- Operating Temperature Range: -20 to 80 °C

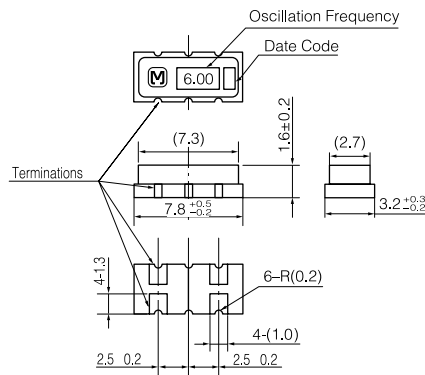
Note:

Also available other types than the above standard products in the frequency range of 3 to 50.0 MHz. Please contact us for more information.

■ Dimensions in mm (not to scale)

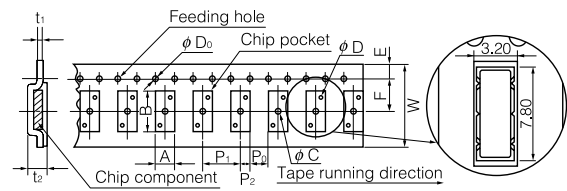
● Bulk

[Type P] EFOP□□□□B□



● Embossed Taping

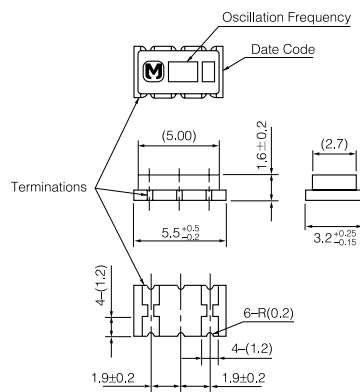
EFOP□□□□E□



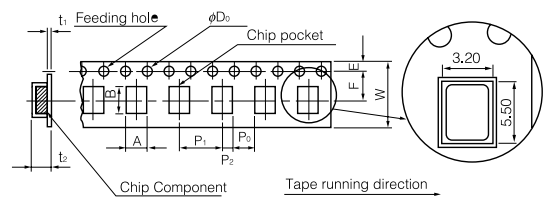
Dim.	A	B	W	F	E	P ₁
(mm)	3.7	8.3	16.0±0.3	7.5±0.1	1.75±0.10	8.0±0.1

Dim.	P ₂	P ₀	ϕD_0	t ₁	t ₂	ϕC	ϕD
(mm)	2.0±0.1	4.0±0.1	1.5 ^{+0.1} ₀	0.6 max.	3.0 max.	1.55	1.0

[Type D] EFOD□□□□B□



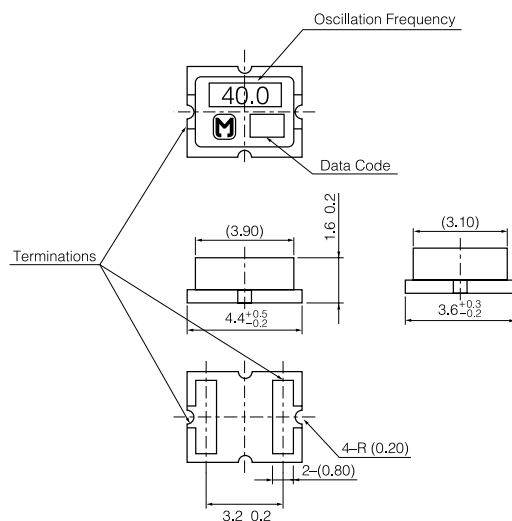
EFOD□□□□E□



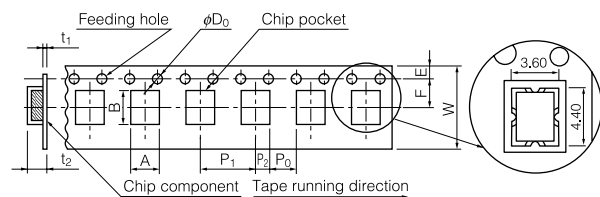
Dim.	A	B	W	F	E	P ₁
(mm)	3.7	6.0	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

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.

[Type L] EFOL□□□□B□



EFOL□□□□E□

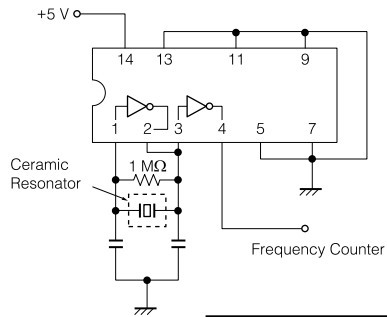


Dim.	A	B	W	F	E	P ₁
(mm)	4.1	4.9	12.0±0.3	5.5±0.1	1.75±0.10	8.0±0.1

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.

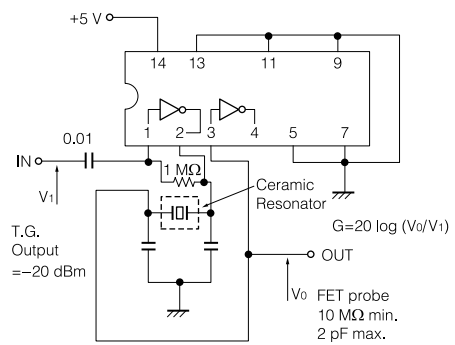
Test Circuits Diagram

For Oscillation Circuit



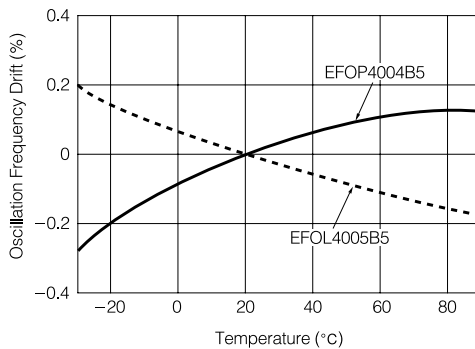
Frequency	IC
2.00 to 8.38 MHz	μPD 4069UBC
8.4 to 50 MHz	μPD 74HCU04

For Loop Gain



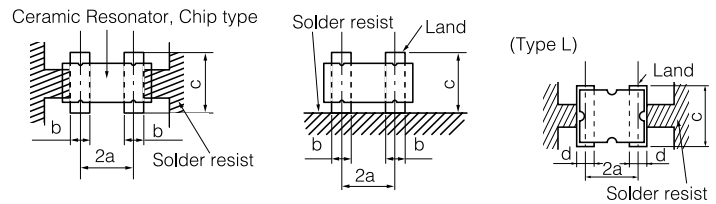
Typical Characteristics

Temperature Characteristics



Recommended Land Dimensions

(Type P/D/L)



	Type P	Type D	Type L
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)

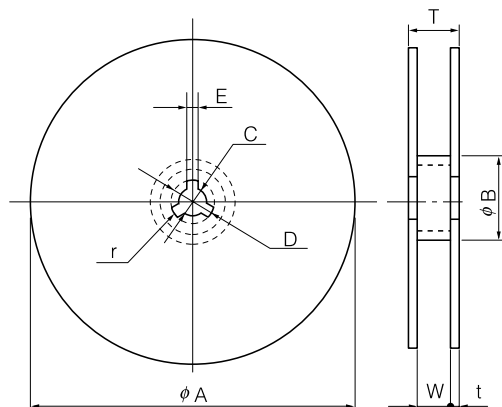
Packaging Specifications

Supplied in bulk or taped & reel packing style

Standard Packing Quantity

Type	Embossed Taping	Bulk
P	2500 pcs./reel	500 pcs./bag
D, L	1000 pcs./reel	500 pcs./bag

Dimensions for Reel in mm (not to scale)



[Type P]

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 D/L]

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