

Surface Mount Type

Series : **FC** Type : **V**

Low impedance



Features

- Endurance : 105 °C 1000 h
- Low impedance (1/2 for HA series)
- Vibration-proof product is available upon request. ($\phi 8$ mm and larger)
- RoHS compliant

Specifications

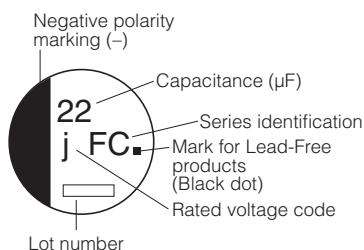
Category temperature range	-40 °C to +105 °C							
Rated voltage range	6.3 V.DC to 50 V.DC							
Capacitance range	1 μ F to 1500 μ F							
Capacitance tolerance	± 20 % (120 Hz/+20 °C)							
Leakage current	$I \leq 0.01$ CV or 3 (μ A) After 2 minutes (Whichever is greater)							
Dissipation factor (tan δ)	Please see the attached characteristics list							
Characteristics at low temperature	V.DC	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C) / Z(+20 °C)	2	2	2	2	2	2	
	Z(-40 °C) / Z(+20 °C)	3	3	3	3	3	3	
Endurance	After applying rated working voltage for 1000 hours at +105 °C ± 2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.							
	Capacitance change	Within ± 20 % of the initial value						
	tan δ	≤ 200 % of the initial limit						
Shelf life	After storage for 1000 hours at +105 °C ± 2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)							
	After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits.							
Resistance to soldering heat	Capacitance change	Within ± 10 % of the initial value						
	tan δ	Within the initial limit						
	DC leakage current	Within the initial limit						
AEC-Q200	AEC-Q200 compliant							

Frequency correction factor for ripple current

Frequency (Hz)	50, 60	120	1 k	10 k	100 k to
Correction factor	0.70	0.75	0.90	0.95	1.00

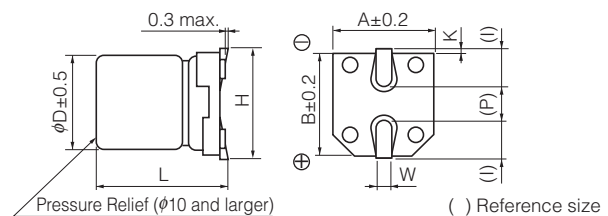
Marking

Example : 6.3 V.DC 22 μ F
Marking color : BLACK



R. Voltage (V.DC)	6.3	10	16	25	35	50
Code	j	A	C	E	V	H

Dimensions



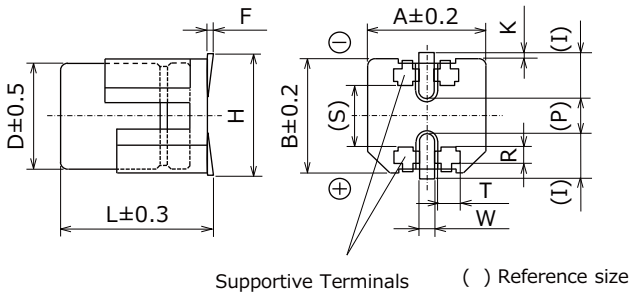
(Unit : mm)

Size code	ϕD	L	A, B	H	I	W	P	K
B	4.0	$5.4^{+0.1}_{-0.2}$	4.3	5.5 max.	1.8	0.65 ± 0.1	1.0	$0.35^{+0.15}_{-0.20}$
C	5.0	$5.4^{+0.1}_{-0.2}$	5.3	6.5 max.	2.2	0.65 ± 0.1	1.5	$0.35^{+0.15}_{-0.20}$
D	6.3	$5.4^{+0.1}_{-0.2}$	6.6	7.8 max.	2.6	0.65 ± 0.1	1.8	$0.35^{+0.15}_{-0.20}$
E	8.0	6.2 ± 0.3	8.3	9.5 max.	3.4	0.65 ± 0.1	2.2	$0.35^{+0.15}_{-0.20}$
F	8.0	10.2 ± 0.3	8.3	10.0 max.	3.4	0.90 ± 0.2	3.1	0.70 ± 0.2
G	10.0	10.2 ± 0.3	10.3	12.0 max.	3.5	0.90 ± 0.2	4.6	0.70 ± 0.2

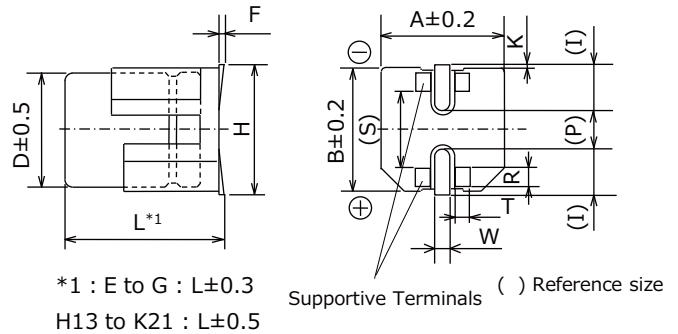
Dimensions (Vibration-proof products)

* The size and shape are different from standard products. Please inquire details of our company.

< Size code : D, D8 >



< Size code : E, F, G, H13, J16, K16, K21 >



*1 : E to G : L±0.3
H13 to K21 : L±0.5

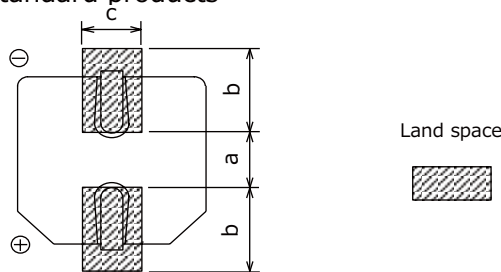
Unit : mm

Size code	φD	L	A, B	H max.	F	I	W	P	K	R	S	T
D	6.3	6.1	6.6	7.8	0 to +0.15	2.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}	1.1±0.2	3.3±0.2	1.05±0.2
D8	6.3	8.0	6.6	7.8	0 to +0.15	2.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}	1.1±0.2	3.3±0.2	1.05±0.2
E	8.0	6.5	8.3	9.5	0 to +0.15	3.4	0.7±0.1	2.2	0.35 ^{+0.15} _{-0.20}	0.70±0.2	5.3±0.2	1.7±0.2
F	8.0	10.5	8.3	10.0	0 to +0.15	3.4	1.2±0.2	3.1	0.70±0.2	0.70±0.2	5.3±0.2	1.3±0.2
G	10.0	10.5	10.3	12.0	0 to +0.15	3.5	1.2±0.2	4.6	0.70±0.2	0.70±0.2	6.9±0.2	1.3±0.2
H13	12.5	13.8	13.5	15.0	-0.1 to +0.15	4.7	1.2±0.2	4.4	0.70±0.3	2.2±0.2	7.1±0.2	2.4±0.2
J16	16.0	16.8	17.0	19.0	-0.1 to +0.15	5.5	1.4±0.2	6.7	0.70±0.3	3.0±0.2	9.0±0.2	1.9±0.2
K16	18.0	16.8	19.0	21.0	-0.1 to +0.15	6.7	1.4±0.2	6.7	0.70±0.3	3.0±0.2	11.0±0.2	1.9±0.2
K21	18.0	21.8	19.0	21.0	-0.1 to +0.15	6.7	1.4±0.2	6.7	0.70±0.3	3.0±0.2	11.0±0.2	1.9±0.2

Land / Pad pattern

The circuit board land/pad pattern size for chip capacitors is specified in the following table. The land pitch influences installation strength and consider it.

● Standard products



(Table of board land size vs. capacitor size)

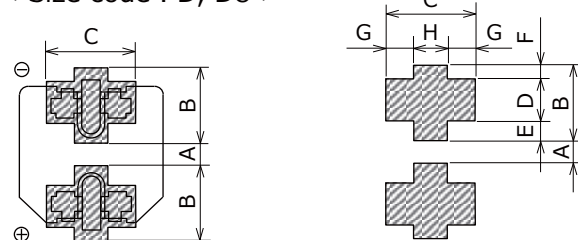
Size code	a	b	c
B (φ4)	1.0	2.5	1.6
C (φ5)	1.5	2.8	1.6
D (φ6.3)	1.8	3.2	1.6
D8 (φ6.3x7.7L)	1.8	3.2	1.6
E (φ8x6.2L)	2.2	4.0	1.6
F (φ8x10.2L)	3.1	4.0	2.0
G (φ10x10.2L)	4.6	4.1	2.0
H (φ12.5)	4.0	5.7	2.0
J (φ16)	6.0	6.5	2.5
K (φ18)	6.0	7.5	2.5

Unit : mm

When size "a" is wide, back fillet can be made, decreasing fitting strength.

● Vibration-proof products

< Size code : D, D8 >



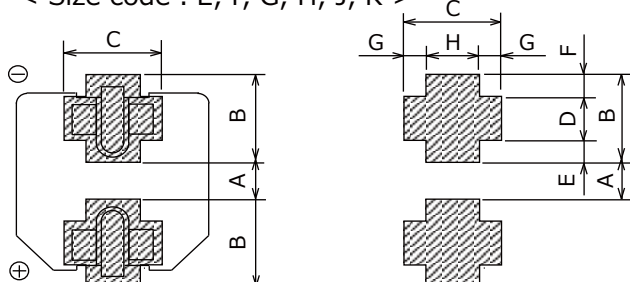
(Table of board land size vs. capacitor size)

Size code	A	B	C	D	E	F	G	H
D (φ6.3xL6.1)	1.2	3.6	3.2	2.0	0.95	0.65	1.0	1.2
D8 (φ6.3xL8.0)	1.2	3.6	3.2	2.0	0.95	0.65	1.0	1.2
E (φ8x6.5L)	1.8	4.2	5.0	1.3	1.5	1.4	1.5	2.0
F (φ8x10.5L)	2.7	4.0	4.7	1.3	1.0	1.7	1.1	2.5
G (φ10)	3.9	4.4	4.7	1.3	1.2	1.9	1.1	2.5
H (φ12.5)	3.9	6.0	6.9	2.8	1.3	1.9	2.2	2.5
J (φ16)	5.8	6.8	6.2	3.6	1.3	1.9	1.7	2.8
K (φ18)	5.8	7.3	6.2	3.6	1.8	1.9	1.7	2.8

Unit : mm

When size "A" is wide, back fillet can be made, decreasing fitting strength.

< Size code : E, F, G, H, J, K >



* Take mounting conditions, solderability and fitting strength into consideration when selecting parts for your company's design.

* The vibration-proof capacitors of size φ6.3 has support terminals extending from the bottom side to the lead edge. Then, make sure to find appropriate soldering conditions to form fillet on the support terminals if required for appearance inspection.

Characteristics list

Endurance : 105 °C 1000 h

Rated voltage (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Size code	Specification			Part No.	Reflow	Min. Packaging Qty	
		φD	L		Ripple current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping (pcs)	
6.3	22	4	5.4	B	60	3.00	0.26	EEEF0J220R	(1)	2000	
	47	5	5.4	C	95	1.80	0.26	EEEF0J470R	(1)	1000	
	68	6.3	5.4	D	140	1.00	0.26	EEEF0J680P	(1)	1000	
	100	6.3	5.4	D	140	1.00	0.26	EEEF0J101P	(1)	1000	
	220	8	6.2	E	230	0.40	0.26	EEEF0J221P	(2)	1000	
	330	8	10.2	F	450	0.30	0.26	EEEF0J331P	(2)	500	
	1000	10	10.2	G	670	0.15	0.26	EEEF0J102P	(2)	500	
	1500	10	10.2	G	670	0.15	0.26	EEEF0J152P	(2)	500	
10	33	5	5.4	C	95	1.80	0.19	EEEF1A330R	(1)	1000	
	100	8	6.2	E	230	0.40	0.19	EEEF1A101P	(2)	1000	
	150	8	6.2	E	230	0.40	0.19	EEEF1A151P	(2)	1000	
	220	8	10.2	F	450	0.30	0.19	EEEF1A221P	(2)	500	
	470	10	10.2	G	670	0.15	0.19	EEEF1A471P	(2)	500	
	1000	10	10.2	G	670	0.15	0.19	EEEF1A102P	(2)	500	
16	10	4	5.4	B	60	3.00	0.16	EEEF1C100R	(1)	2000	
	22	5	5.4	C	95	1.80	0.16	EEEF1C220R	(1)	1000	
	47	6.3	5.4	D	140	1.00	0.16	EEEF1C470P	(1)	1000	
	68	8	6.2	E	230	0.40	0.16	EEEF1C680P	(2)	1000	
	100	8	6.2	E	230	0.40	0.16	EEEF1C101P	(2)	1000	
	220	10	10.2	G	670	0.15	0.16	EEEF1C221P	(2)	500	
	330	10	10.2	G	670	0.15	0.16	EEEF1C331P	(2)	500	
	470	10	10.2	G	670	0.15	0.16	EEEF1C471P	(2)	500	
	680	10	10.2	G	670	0.15	0.16	EEEF1C681P	(2)	500	
25	6.8	4	5.4	B	60	3.00	0.14	EEEF1E68R	(1)	2000	
	22	6.3	5.4	D	140	1.00	0.14	EEEF1E220P	(1)	1000	
	33	6.3	5.4	D	140	1.00	0.14	EEEF1E330P	(1)	1000	
	47	8	6.2	E	230	0.40	0.14	EEEF1E470P	(2)	1000	
	68	8	10.2	F	450	0.30	0.14	EEEF1E680P	(2)	500	
	100	8	10.2	F	450	0.30	0.14	EEEF1E101P	(2)	500	
	220	10	10.2	G	670	0.15	0.14	EEEF1E221P	(2)	500	
	330	10	10.2	G	670	0.15	0.14	EEEF1E331P	(2)	500	
	470	10	10.2	G	670	0.15	0.14	EEEF1E471P	(2)	500	
35	1	4	5.4	B	60	3.00	0.12	EEEF1V1R0R	(1)	2000	
	2.2	4	5.4	B	60	3.00	0.12	EEEF1V2R2R	(1)	2000	
	3.3	4	5.4	B	60	3.00	0.12	EEEF1V3R3R	(1)	2000	
	4.7	4	5.4	B	60	3.00	0.12	EEEF1V4R7R	(1)	2000	
	6.8	5	5.4	C	95	1.80	0.12	EEEF1V6R8R	(1)	1000	
	10	5	5.4	C	95	1.80	0.12	EEEF1V100R	(1)	1000	
	22	6.3	5.4	D	140	1.00	0.12	EEEF1V220P	(1)	1000	
	33	8	6.2	E	230	0.40	0.12	EEEF1V330P	(2)	1000	
	47	8	6.2	E	230	0.40	0.12	EEEF1V470P	(2)	1000	
	100	10	10.2	G	670	0.15	0.12	EEEF1V101P	(2)	500	
	220	10	10.2	G	670	0.15	0.12	EEEF1V221P	(2)	500	
	330	10	10.2	G	670	0.15	0.12	EEEF1V331P	(2)	500	
50	1	4	5.4	B	30	5.00	0.12	EEEF1H1R0R	(1)	2000	
	2.2	4	5.4	B	30	5.00	0.12	EEEF1H2R2R	(1)	2000	
	3.3	4	5.4	B	30	5.00	0.12	EEEF1H3R3R	(1)	2000	
	4.7	5	5.4	C	50	3.00	0.12	EEEF1H4R7R	(1)	1000	
	10	6.3	5.4	D	70	2.00	0.12	EEEF1H100P	(1)	1000	
	22	8	6.2	E	120	0.70	0.12	EEEF1H220P	(2)	1000	
	33	8	10.2	F	300	0.60	0.12	EEEF1H330P	(2)	500	
	47	10	10.2	G	500	0.30	0.12	EEEF1H470P	(2)	500	
	100	10	10.2	G	500	0.30	0.12	EEEF1H101P	(2)	500	
	220	10	10.2	G	500	0.30	0.12	EEEF1H221P	(2)	500	

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

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