

Surface Mount Type

Series: **HA** Type: **V**

High-temperature assurance
size



Features

- Endurance : 105 °C 1000 h
- Vibration-proof product (30G guaranteed) is available upon request ($\phi 8 \leq$)
- RoHS compliant

Specifications

Category temp. range	-40 °C to +105 °C									
Rated voltage range	6.3 V.DC to 100 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	Rated voltage (V.DC)	6.3	10	16	25	35	50	63	100	(Impedance ratio at 120 Hz)
	Z (-25 °C) / Z (+20 °C)	4	3	2	2	2	2	3	3	
	Z (-40 °C) / Z (+20 °C)	8	6	4	4	3	3	4	4	
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 (6.3 V.DC of miniature : ± 30 %)								
	Dissipation factor (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, capacitors shall meet the following limits.									
Resistance to soldering heat	Capacitance change	Within ± 10 % of the initial value								
	Dissipation factor (tan δ)	Within the initial limit								
	DC leakage current	Within the initial limit								

Frequency correction factor for ripple current

Frequency (Hz)	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

Marking

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

R.voltage code

A	10	H	50
C	16	J	63
E	25	K	80
V	35	2A	100

Unit : V.DC

Dimensions

() Reference size

Unit : mm

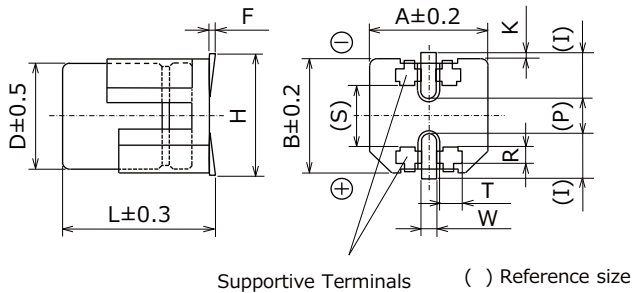
Size code	ϕD	L	A, B	H	I	W	P	K
B	4.0	5.4 $^{+0.1}_{-0.2}$	4.3	5.5 max.	1.8	0.65 \pm 0.1	1.0	0.35 $^{+0.15}_{-0.20}$
C	5.0	5.4 $^{+0.1}_{-0.2}$	5.3	6.5 max.	2.2	0.65 \pm 0.1	1.5	0.35 $^{+0.15}_{-0.20}$
D	6.3	5.4 $^{+0.1}_{-0.2}$	6.6	7.8 max.	2.6	0.65 \pm 0.1	1.8	0.35 $^{+0.15}_{-0.20}$
D8	6.3	7.7 \pm 0.3	6.6	7.8 max.	2.6	0.65 \pm 0.1	1.8	0.35 $^{+0.15}_{-0.20}$
E	8.0	6.2 \pm 0.3	8.3	9.5 max.	3.4	0.65 \pm 0.1	2.2	0.35 $^{+0.15}_{-0.20}$
F	8.0	10.2 \pm 0.3	8.3	10.0 max.	3.4	0.90 \pm 0.2	3.1	0.70 \pm 0.2
G	10.0	10.2 \pm 0.3	10	12.0 max.	3.5	0.90 \pm 0.2	4.6	0.70 \pm 0.2

*The dimensions of the vibration-proof products, please refer to the page of the mounting specification.

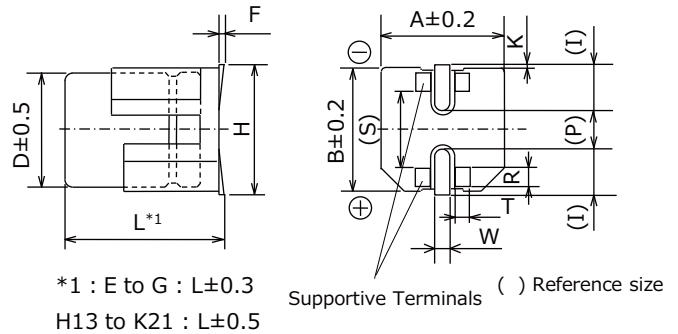
Dimensions (Vibration-proof products)

* 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

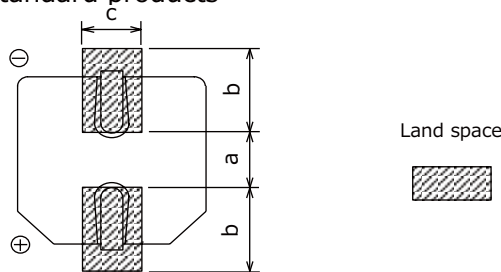
Unit : mm

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

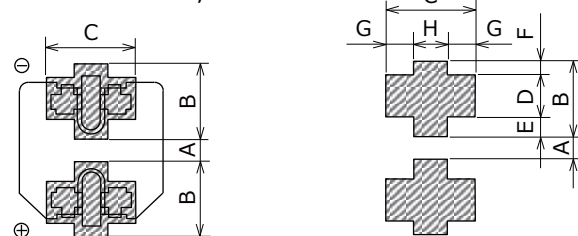
The circuit board land/pad pattern size for chip capacitors is specified in the following table. The land pitch influences installation strength and consider it.

● Standard products

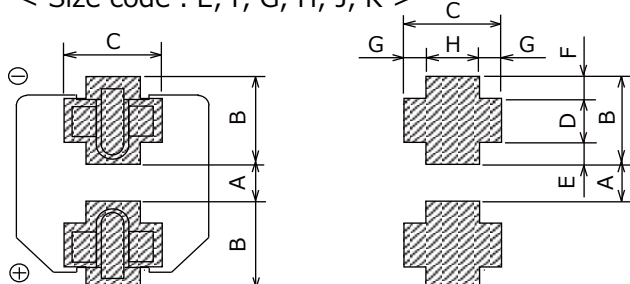


● Vibration-proof products

< Size code : D, D8 >



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



(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

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

(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

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

* 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)	Capacitance (±20 %) (μF)	Case size (mm)		Size code* ¹	Specification		Part number	Reflow	Min. Packaging Q'ty
		φD	L		Ripple current* ² (mA r.m.s.)	tan δ* ³			Taping (pcs)
6.3	22	4	5.4	B	29	0.30	EEEHA0J220R	(1)	2000
	33	4	5.4	(B)	29	0.35	EEEHA0J330WR	(1)	2000
	47	4	5.4	(B)	36	0.35	EEEHA0J470WR	(1)	2000
		5	5.4	C	46	0.30	EEEHA0J470R	(1)	1000
	100	5	5.4	(C)	47	0.35	EEEHA0J101WR	(1)	1000
		6.3	5.4	D	71	0.30	EEEHA0J101P	(1)	1000
	220	6.3	5.4	(D)	74	0.35	EEEHA0J221WP	(1)	1000
	330	6.3	7.7	D8	105	0.30	EEEHA0J331XP	(1)	900
		8	10.2	F	230	0.35	EEEHA0J331P	(2)	500
	470	8	10.2	(F)	300	0.35	EEEHA0J471UP	(2)	500
1000	8	10.2	(F)	300	0.35	EEEHA0J102UP	(2)	500	
	10	10.2	G	400	0.35	EEEHA0J102P	(2)	500	
1500	10	10.2	G	480	0.35	EEEHA0J152P	(2)	500	
10	22	4	5.4	(B)	28	0.30	EEEHA1A220WR	(1)	2000
	33	4	5.4	(B)	29	0.30	EEEHA1A330WR	(1)	2000
		5	5.4	C	43	0.22	EEEHA1A330R	(1)	1000
	47	5	5.4	(C)	43	0.30	EEEHA1A470WR	(1)	1000
	100	6.3	5.4	(D)	71	0.30	EEEHA1A101WP	(1)	1000
		8	6.2	E	110	0.26	EEEHA1A101P	(2)	1000
	220	6.3	7.7	D8	105	0.22	EEEHA1A221XP	(1)	900
		8	10.2	F	160	0.26	EEEHA1A221P	(2)	500
	470	8	10.2	(F)	200	0.26	EEEHA1A471UP	(2)	500
		10	10.2	G	270	0.26	EEEHA1A471P	(2)	500
1000	10	10.2	G	400	0.26	EEEHA1A102P	(2)	500	
16	10	4	5.4	B	28	0.16	EEEHA1C100R	(1)	2000
	22	4	5.4	(B)	28	0.26	EEEHA1C220WR	(1)	2000
		5	5.4	C	39	0.16	EEEHA1C220R	(1)	1000
	33	5	5.4	(C)	35	0.26	EEEHA1C330WR	(1)	1000
	47	5	5.4	(C)	39	0.26	EEEHA1C470WR	(1)	1000
		6.3	5.4	D	70	0.16	EEEHA1C470P	(1)	1000
	100	6.3	5.4	(D)	70	0.26	EEEHA1C101WP	(1)	1000
		8.0	6.2	E	91	0.20	EEEHA1C101UP	(2)	1000
	220	6.3	7.7	D8	105	0.16	EEEHA1C221XP	(1)	900
		8	10.2	(F)	150	0.20	EEEHA1C221UP	(2)	500
		10	10.2	G	210	0.20	EEEHA1C221P	(2)	500
	330	8	10.2	(F)	170	0.20	EEEHA1C331UP	(2)	500
		10	10.2	G	230	0.20	EEEHA1C331P	(2)	500
	470	8	10.2	(F)	340	0.20	EEEHA1C471UP	(2)	500
		10	10.2	G	340	0.20	EEEHA1C471P	(2)	500
	680	10	10.2	G	380	0.20	EEEHA1C681P	(2)	500

*1: Size code() : Miniaturization product

*2: Ripple current (120 Hz / +105 °C)

*3: tanδ (120 Hz / +20 °C)

- 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"

Characteristics list

Endurance : 105 °C 1000 h

Rated voltage (V.DC)	Capacitance (±20 %) (μF)	Case size (mm)		Size code* ¹	Specification		Part number	Reflow	Min. Packaging Q'ty
		φD	L		Ripple current* ² (mA r.m.s.)	tan δ* ³			Taping (pcs)
25	4.7	4	5.4	B	22	0.14	EEEHA1E4R7R	(1)	2000
	10	4	5.4	(B)	22	0.20	EEEHA1E100WR	(1)	2000
		5	5.4	C	28	0.14	EEEHA1E100R	(1)	1000
	22	5	5.4	(C)	35	0.20	EEEHA1E220WR	(1)	1000
		6.3	5.4	D	55	0.14	EEEHA1E220P	(1)	1000
	33	5	5.4	(C)	45	0.20	EEEHA1E330WR	(1)	1000
		6.3	5.4	D	65	0.14	EEEHA1E330P	(1)	1000
	47	6.3	5.4	(D)	70	0.20	EEEHA1E470WP	(1)	1000
		8	6.2	E	91	0.16	EEEHA1E470P	(2)	1000
	100	6.3	7.7	D8	91	0.14	EEEHA1E101XP	(1)	900
		8	6.2	(E)	91	0.16	EEEHA1E101UP	(2)	1000
		8	10.2	F	130	0.16	EEEHA1E101P	(2)	500
	220	8	10.2	(F)	160	0.16	EEEHA1E221UP	(2)	500
		10	10.2	G	190	0.16	EEEHA1E221P	(2)	500
330	8	10.2	(F)	180	0.16	EEEHA1E331UP	(2)	500	
	10	10.2	G	340	0.16	EEEHA1E331P	(2)	500	
470	10	10.2	G	360	0.16	EEEHA1E471P	(2)	500	
35	4.7	4	5.4	B	22	0.12	EEEHA1V4R7R	(1)	2000
	10	4	5.4	(B)	22	0.16	EEEHA1V100WR	(1)	2000
		5	5.4	C	30	0.12	EEEHA1V100R	(1)	1000
	22	5	5.4	(C)	35	0.16	EEEHA1V220WR	(1)	1000
		6.3	5.4	D	60	0.12	EEEHA1V220P	(1)	1000
	33	6.3	5.4	(D)	42	0.16	EEEHA1V330WP	(1)	1000
		8	6.2	E	84	0.14	EEEHA1V330P	(2)	1000
	47	8	6.2	(E)	84	0.14	EEEHA1V470UP	(2)	1000
		8	10.2	F	98	0.14	EEEHA1V470P	(2)	500
	100	6.3	7.7	D8	84	0.12	EEEHA1V101XP	(1)	900
		8	10.2	(F)	120	0.14	EEEHA1V101UP	(2)	500
		10	10.2	G	160	0.14	EEEHA1V101P	(2)	500
	220	8	10.2	(F)	170	0.14	EEEHA1V221UP	(2)	500
		10	10.2	G	210	0.14	EEEHA1V221P	(2)	500
330	10	10.2	G	250	0.14	EEEHA1V331P	(2)	500	
50	1	4	5.4	B	10	0.12	EEEHA1H1R0R	(1)	2000
	2.2	4	5.4	B	16	0.12	EEEHA1H2R2R	(1)	2000
	3.3	4	5.4	B	16	0.12	EEEHA1H3R3R	(1)	2000
	4.7	5	5.4	C	23	0.12	EEEHA1H4R7R	(1)	1000
	10	6.3	5.4	D	35	0.12	EEEHA1H100P	(1)	1000
	22	8	6.2	E	70	0.12	EEEHA1H220P	(2)	1000
		6.3	7.7	D8	70	0.12	EEEHA1H330XP	(1)	900
	33	8	6.2	(E)	70	0.12	EEEHA1H330UP	(2)	1000
		8	10.2	F	91	0.12	EEEHA1H330P	(2)	500
		6.3	7.7	D8	63	0.12	EEEHA1H470XP	(1)	900
	47	8	10.2	(F)	95	0.12	EEEHA1H470UP	(2)	500
		10	10.2	G	100	0.12	EEEHA1H470P	(2)	500
		8	10.2	(F)	110	0.12	EEEHA1H101UP	(2)	500
	100	10	10.2	G	120	0.12	EEEHA1H101P	(2)	500
220		10	10.2	G	150	0.12	EEEHA1H221P	(2)	500

*1: Size code () : Miniaturization product

*2: Ripple current (120 Hz / +105 °C)

*3: tanδ (120 Hz / +20 °C)

• 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"

Characteristics list

Endurance : 105 °C 1000 h

Rated voltage (V.DC)	Capacitance (±20 %) (μF)	Case size (mm)		Size code ^{*1}	Specification		Part number	Reflow	Min. Packaging Q'ty
		φD	L		Ripple current ^{*2} (mA r.m.s.)	tan δ ^{*3}			Taping (pcs)
63	10	8	6.2	E	25	0.18	EEEHA1J100P	(2)	1000
	22	8	6.2	(E)	25	0.18	EEEHA1J220UP	(2)	1000
		8	10.2	F	30	0.18	EEEHA1J220P	(2)	500
	33	10	10.2	G	45	0.18	EEEHA1J330P	(2)	500
	47	8	10.2	(F)	45	0.18	EEEHA1J470UP	(2)	500
		10	10.2	G	50	0.18	EEEHA1J470P	(2)	500
100	4.7	8	6.2	(E)	30	0.18	EEEHA2A4R7UP	(2)	1000
	10	8	10.2	F	55	0.18	EEEHA2A100P	(2)	500
	22	8	10.2	(F)	55	0.18	EEEHA2A220UP	(2)	500
		10	10.2	G	60	0.18	EEEHA2A220P	(2)	500
	33	10	10.2	G	65	0.18	EEEHA2A330P	(2)	500
	47	10	10.2	(G)	65	0.18	EEEHA2A470UP	(2)	500

*1: Size code() : Miniaturization product

*2: Ripple current (120 Hz / +105 °C)

*3: tanδ (120 Hz / +20 °C)

- 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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