

### Surface Mount Type

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

High-temperature assurance



### Features

- Endurance : 105 °C 1000 h
- Vibration-proof product is available upon request. (φ8 mm and larger)
- 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 μF to 1500 μF									
Capacitance tolerance	±20 % (120 Hz/+20°C)									
Leakage current	$I \leq 0.01 CV$ or 3 (μA) 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	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 %)								
	tan δ	≤ 200 % of the initial limit								
Shelf life	After storage for 1000 hours at +85 °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.									
	DC leakage current	Within the initial limit								
Resistance to soldering heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	Within ±10 % of the initial value								
	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 μF  
Marking color : BLACK

Negative polarity marking (-)

Capacitance (μF)

Series identification

Mark for Lead-Free products (Black dot)

Lot number

Rated voltage mark

Rated voltage mark				Unit : V.DC
j	6.3	V	35	
A	10	H	50	
C	16	J	63	
E	25	2A	100	

### Dimensions

( ) Reference size

	Unit : mm								
Size code	D	L	A,B	H	I	W	P	K	
B	4.0	5.4 <sup>+0.1</sup> <sub>-0.2</sub>	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	
C	5.0	5.4 <sup>+0.1</sup> <sub>-0.2</sub>	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	
D	6.3	5.4 <sup>+0.1</sup> <sub>-0.2</sub>	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 <sup>+0.15</sup> <sub>-0.20</sub>	
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	

### Characteristics list

Endurance : 105 °C 1000 h

Rated voltage (V.DC)	Capacitance (±20 %) (μF)	Case size(mm)		Size code *1	Specification		Part number	Reflow	Packaging Qty Taping (pcs)
		φD	L		Ripple current *2 (mA r.m.s.)	tan δ *3			
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	C	46	0.30	EEEHA0J470R	(1)	1000
	100	5	5.4	(C)	47	0.35	EEEHA0J101WR	(1)	1000
			6.3	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	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	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	E	110	0.26	EEEHA1A101P	(2)	1000
	220	6.3	7.7	D8	105	0.22	EEEHA1A221XP	(1)	900
			8	F	160	0.26	EEEHA1A221P	(2)	500
	470	8	10.2	(F)	200	0.26	EEEHA1A471UP	(2)	500
			10	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
			5.4	(C)	39	0.26	EEEHA1C470WR	(1)	1000
	47	6.3	5.4	D	70	0.16	EEEHA1C470P	(1)	1000
			5.4	(D)	70	0.26	EEEHA1C101WP	(1)	1000
	100	8.0	6.2	E	91	0.20	EEEHA1C101UP	(2)	1000
			7.7	D8	105	0.16	EEEHA1C221XP	(1)	900
	220	8	10.2	(F)	150	0.20	EEEHA1C221UP	(2)	500
			10	G	210	0.20	EEEHA1C221P	(2)	500
	330	8	10.2	(F)	170	0.20	EEEHA1C331UP	(2)	500
			10	G	230	0.20	EEEHA1C331P	(2)	500
	470	8	10.2	(F)	340	0.20	EEEHA1C471UP	(2)	500
			10	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: tan δ (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	Taping (pcs)
		φD	L		Ripple current *2 (mA r.m.s.)	tan δ *3			
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	1.0	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
	47	6.3	7.7	D8	63	0.12	EEEHA1H470XP	(1)	900
		8	10.2	(F)	95	0.12	EEEHA1H470UP	(2)	500
		10	10.2	G	100	0.12	EEEHA1H470P	(2)	500
100	8	10.2	(F)	110	0.12	EEEHA1H101UP	(2)	500	
	10	10.2	G	120	0.12	EEEHA1H101P	(2)	500	
220	10	10.2	G	150	0.12	EEEHA1H221P	(2)	500	

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### Characteristics list

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Rated voltage (V.DC)	Capacitance (±20 %) (μF)	Case size(mm)		Size code *1	Specification		Part number	Reflow	Packaging Qty Taping (pcs)
		φD	L		Ripple current *2 (mA r.m.s.)	tan δ *3			
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

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