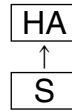


### Surface Mount Type

Series: **HA** Type: **V**  
 HA High temperature Lead-Free reflow (suffix:A\*)

High-temperature assurance size



### Features

- Endurance: 105 °C 1000 h
- Vibration-proof product is available upon request. (ø8 mm and larger)
- RoHS directive compliant

### Specifications

Category Temp. Range	-40 °C to +105 °C							
Rated W.V. Range	6.3 V.DC to 50 V.DC							
Nominal Cap. Range	0.1 µF to 1500 µF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.01 CV or 3 (µA) After 2 minutes (Whichever is greater)							
tan δ	Please see the attached High temperature lead-free reflow products list.							
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	4	3	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	8	6	4	4	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	±30 % of initial measured value						
	tan δ	≤ 200 % of initial specified value						
	DC leakage current	≤ initial specified value						
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)							
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.							
	Capacitance change	±10 % of initial measured value						
	tan δ	≤ initial specified value						
	DC leakage current	≤ initial specified value						

### Frequency correction factor for ripple current

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

### Marking

**Example: 6.3 V 22 µF**  
 Marking color: **BLACK**

Rated Voltage Mark

j	6.3 V
A	10 V
C	16 V
E	25 V
V	35 V
H	50 V

### Dimensions in mm(not to scale)

( ) reference size

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±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

(mm)

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ High temperature Lead-Free reflow products

Endurance : 105 °C 1000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty	
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping (pcs)	
6.3	22	4	5.4	B	29	0.30	EEEHA0J220AR	(5)	2000	
	33	4	5.4	(B)	29	0.35	EEEHAJ330WAR	(5)	2000	
	47	5	5.4	C	46	0.30	EEEHA0J470AR	(5)	1000	
		5	5.4	(C)	47	0.40	EEEHAJ101WAR	(5)	1000	
	100	6.3	5.4	D	71	0.30	EEEHA0J101AP	(5)	1000	
		6.3	7.7	D8	105	0.30	EEEHAJ331XAP	(5)	900	
	330	8	6.2	(E)	180	0.35	EEEHAJ331UAP	(7)	500	
		8	10.2	F	230	0.35	EEEHA0J331AP	(7)	500	
	470	8	10.2	(F)	300	0.35	EEEHAJ471UAP	(7)	500	
	1000	10	10.2	G	400	0.35	EEEHA0J102AP	(7)	500	
1500	10	10.2	(G)	480	0.50	EEEHAJ152UAP	(7)	500		
10	22	4	5.4	(B)	28	0.30	EEEHAA220WAR	(5)	2000	
	33	4	5.4	(B)	29	0.30	EEEHAA330WAR	(5)	2000	
		5	5.4	C	43	0.22	EEEHA1A330AR	(5)	1000	
	47	5	5.4	(C)	43	0.30	EEEHAA470WAR	(5)	1000	
	100	6.3	5.4	(D)	71	0.30	EEEHAA101WAP	(5)	1000	
		8	6.2	E	110	0.26	EEEHA1A101AP	(7)	1000	
	220	6.3	7.7	D8	105	0.22	EEEHAA221XAP	(5)	900	
		8	10.2	F	160	0.26	EEEHA1A221AP	(7)	500	
	470	8	10.2	(F)	200	0.26	EEEHAA471UAP	(7)	500	
		10	10.2	G	270	0.26	EEEHA1A471AP	(7)	500	
1000	10	10.2	(G)	400	0.35	EEEHAA102UAP	(7)	500		
16	10	4	5.4	B	28	0.16	EEEHA1C100AR	(5)	2000	
	22	4	5.4	(B)	28	0.26	EEEHAC220WAR	(5)	2000	
		5	5.4	C	39	0.16	EEEHA1C220AR	(5)	1000	
	33	5	5.4	(C)	35	0.26	EEEHAC330WAR	(5)	1000	
	47	5	5.4	(C)	39	0.26	EEEHAC470WAR	(5)	1000	
		6.3	5.4	D	70	0.16	EEEHA1C470AP	(5)	1000	
	100	6.3	5.4	(D)	70	0.26	EEEHAC101WAP	(5)	1000	
	220	6.3	7.7	D8	105	0.20	EEEHAC221XAP	(5)	900	
		8	10.2	(F)	150	0.20	EEEHAC221UAP	(7)	500	
		10	10.2	G	210	0.20	EEEHA1C221AP	(7)	500	
	330	8	10.2	(F)	170	0.20	EEEHAC331UAP	(7)	500	
		10	10.2	G	230	0.20	EEEHA1C331AP	(7)	500	
	470	8	10.2	(F)	340	0.26	EEEHAC471UAP	(7)	500	
		10	10.2	G	340	0.20	EEEHA1C471AP	(7)	500	
680	10	10.2	(G)	380	0.26	EEEHAC681UAP	(7)	500		

\* Size code( ):Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V, 1H→H

The taping dimensions are explained on EE188 of our Catalog. Please use it as a reference guide.

Reflow Profile(Fig-1 to Fig-11) listed on EE186 of our Catalog.

■ High temperature Lead-Free reflow products

Endurance : 105 °C 1000 h

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty	
		Dia.	Length	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping	
(V)	(μF)	(mm)	(mm)					(pcs)		
25	4.7	4	5.4	B	22	0.14	EEEHA1E4R7AR	(5)	2000	
	10	4	5.4	(B)	22	0.20	EEEHAE100WAR	(5)	2000	
			5	C	28	0.14	EEEHA1E100AR	(5)	1000	
	22	5	5.4	(C)	35	0.20	EEEHAE220WAR	(5)	1000	
			6.3	D	55	0.14	EEEHA1E220AP	(5)	1000	
	33	5	5.4	(C)	45	0.20	EEEHAE330WAR	(5)	1000	
			6.3	D	65	0.14	EEEHA1E330AP	(5)	1000	
	47	6.3	5.4	(D)	70	0.20	EEEHAE470WAP	(5)	1000	
			8	E	91	0.16	EEEHA1E470AP	(7)	1000	
	100	8	6.2	(E)	91	0.16	EEEHAE101UAP	(7)	1000	
			6.3	D8	91	0.16	EEEHAE101XAP	(5)	900	
			8	10.2	F	130	0.16	EEEHA1E101AP	(7)	500
	220	8	10.2	(F)	160	0.20	EEEHAE221UAP	(7)	500	
			10	G	190	0.16	EEEHA1E221AP	(7)	500	
	330	8	10.2	(F)	180	0.20	EEEHAE331UAP	(7)	500	
10			G	340	0.16	EEEHA1E331AP	(7)	500		
470	10	10.2	(G)	360	0.25	EEEHAE471UAP	(7)	500		
35	4.7	4	5.4	B	22	0.12	EEEHA1V4R7AR	(5)	2000	
	10	4	5.4	(B)	22	0.16	EEEHAV100WAR	(5)	2000	
			5	C	30	0.12	EEEHA1V100AR	(5)	1000	
	22	5	5.4	(C)	35	0.16	EEEHAV220WAR	(5)	1000	
			6.3	D	60	0.12	EEEHA1V220AP	(5)	1000	
	33	6.3	5.4	(D)	42	0.16	EEEHAV330WAP	(5)	1000	
			8	E	84	0.14	EEEHA1V330AP	(7)	1000	
	47	8	6.2	(E)	84	0.14	EEEHAV470UAP	(7)	1000	
			8	F	98	0.14	EEEHA1V470AP	(7)	500	
	100	6.3	7.7	D8	84	0.14	EEEHAV101XAP	(5)	900	
			8	10.2	(F)	120	0.14	EEEHAV101UAP	(7)	500
			10	10.2	G	160	0.14	EEEHA1V101AP	(7)	500
	220	8	10.2	(F)	170	0.14	EEEHAV221UAP	(7)	500	
			10	G	210	0.14	EEEHA1V221AP	(7)	500	
	330	10	10.2	(G)	250	0.30	EEEHAV331UAP	(7)	500	
50	0.1	4	5.4	B	1	0.12	EEEHA1HR10AR	(5)	2000	
	0.22	4	5.4	B	2	0.12	EEEHA1HR22AR	(5)	2000	
	0.33	4	5.4	B	3	0.12	EEEHA1HR33AR	(5)	2000	
	0.47	4	5.4	B	5	0.12	EEEHA1HR47AR	(5)	2000	
	1	4	5.4	B	10	0.12	EEEHA1H1R0AR	(5)	2000	
	2.2	4	5.4	B	16	0.12	EEEHA1H2R2AR	(5)	2000	
	3.3	4	5.4	B	16	0.12	EEEHA1H3R3AR	(5)	2000	
	4.7	5	5.4	C	23	0.12	EEEHA1H4R7AR	(5)	1000	
	10	6.3	5.4	D	35	0.12	EEEHA1H100AP	(5)	1000	
	22	8	6.2	E	70	0.12	EEEHA1H220AP	(7)	1000	
	33	6.3	7.7	D8	70	0.14	EEEHAH330XAP	(5)	900	
			8	6.2	(E)	70	0.12	EEEHAH330UAP	(7)	1000
			8	10.2	F	91	0.12	EEEHA1H330AP	(7)	500
	47	6.3	7.7	D8	63	0.14	EEEHAH470XAP	(5)	900	
			8	10.2	(F)	95	0.12	EEEHAH470UAP	(7)	500
10			10.2	G	100	0.12	EEEHA1H470AP	(7)	500	
100	8	10.2	(F)	110	0.18	EEEHAH101UAP	(7)	500		
		10	10.2	G	120	0.12	EEEHA1H101AP	(7)	500	
220	10	10.2	(G)	150	0.18	EEEHAH221UAP	(7)	500		

\* Size code( ):Miniaturization product

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