

Surface Mount Type

Series: **S** Type : **V**

■ Features Endurance: 85°C 2000 h
5.4 mm (≤φ6.3) height, RoHS directive compliant

Country of Origin

Japan

Malaysia

(φ4, φ5, φ6.3, φ8, φ10)



■ Specifications

Category temp. range	-40 to +85°C												
Rated W.V. Range	4 to 100 V .DC												
Nominal Cap. Range	0.1 to 1500 μF												
Capacitance Tolerance	±20 % (120Hz/+20°C)												
DC Leakage Current	I ≤ 0.01 CV or 3(μA) (Bi-Polar I ≤ 0.02 CV or 6 (μA) after 2 minutes (Whichever is greater)												
tan δ	Please see the attached standard products list												
Characteristics at Low Temperature	W.V. (V)	4	6.3	10	16	25	35	50	63	100	(Impedance ratio at 120 Hz)		
	-25 / +20 °C	7	4	3	2	2	2	2	3	3			
	-40 / +20 °C	15	8	6	4	4	3	3	4	4			
Endurance	After applying rated working voltage for 2000 hours at +85±2°C and then being stabilized at +20°C, capacitors shall meet the following limits.												
	Capacitance change : ±20% of initial measured value										tan δ	≤ 200% of initial specified value	
	Size code	Rated W.V.	Cap. change									DC leakage current	≤ initial specified value
	A(φ3)	4 to 50W.V.	±30%	Initial measured value for 1000 hours									
A(φ3) to D8(φ6.3)	4 W.V.												
≤ D(φ6.3) Miniature	6.3 W.V.	±20%											
	≥ 10 W.V.												
Shelf Life	After storage for 1000 hours at +85±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, capacitor shall meet the following limits.												
	Capacitance change	±10% of initial measured value											
	tan δ	≤ initial specified value											
	DC leakage current	≤ initial specified value											

■ Marking

Example: 50V 1 μF (Polarized)

Negative polarity marking (No marking for the bi-polarity)

■ Dimensions in mm (not to scale)

Size code	D	L	A, B	H	I	W	P	K
A	3.0	5.4	3.3	4.5MAX	1.5	0.55±0.1	0.6	0.35-0.20 to +0.15
B	4.0	5.4	4.3	5.5MAX	1.8	0.65±0.1	1.0	0.35-0.20 to +0.15
C	5.0	5.4	5.3	6.5MAX	2.2	0.65±0.1	1.5	0.35-0.20 to +0.15
D	6.3	5.4	6.6	7.8MAX	2.6	0.65±0.1	1.8	0.35-0.20 to +0.15
D8	6.3	7.7	6.6	7.8MAX	2.6	0.65±0.1	1.8	0.35-0.20 to +0.15
E	8.0	6.2	8.3	9.5MAX	3.4	0.65±0.1	2.2	0.35-0.20 to +0.15
F	8.0	10.2	8.3	10.0MAX	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2	10.3	12.0MAX	3.5	0.90±0.2	4.6	0.70±0.2

■ Case size

W.V.(V)	4 (0G)		6.3 (0J)		10 (1A)		16 (1C)		25 (1E)		35 (1V)		50 (1H)		63 (1J)		100 (2A)	
Cap.(μF)	Polar-ized	Polar-ized	Bi-polar	Polar-ized	Bi-polar	Polar-ized	Bi-polar	Polar-ized	Bi-polar	Polar-ized	Bi-polar	Polar-ized	Bi-polar	Polar-ized	Bi-polar	Polar-ized	Bi-polar	
0.1													A, B					
0.22													A, B	B				
0.33													A, B	B				
0.47													A, B	B				
1.0													A, B	B				
2.2												A	B	A, B	C			
3.3														B	C			E
4.7																		F(E)
10					B	A, B	C	C(B)	D	C(B)	D	C(B)	D	D(C)				F(E)
22	A	B(A)	C	(B)	D	C(B)	D	D(C)		D(C)		E(D)		E(D)			F(E)	G(F)
33	B	(B)		C(B)		(C)		D(C)		E(D)		F(E), D8		G(F), D8			F	G
47	B	C(B)	D	(C)		D(C)		(D)		E(D)		G(F), D8		G(F)			G(F)	
100	C	D(C)		D(C)		E(D)		F(E), D8		G(F), D8		G(F)		G			G	
220	D	(D)		E, D8		F, D8		G(F)		G(F)		G						
330	(D)	E, D8		F		G(F)		G(F)		G								
470	D8	F		G(F)		G(F)		G										
1000		G(F)		G														
1500		G																

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■ Standard Products

W.V. (V)	Cap. (±20%) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Min. Packaging Q'ty	
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (120Hz) (+85°C) (mA)	tan δ (120Hz) (+20°C)	Endur- ance (hours)			Reflow Taping (pcs)
4	22	3	5.4	A	19	0.37	1000	EEE0GS220SR	(1)	2000
	33	4	5.4	B	26	0.35	1000	EEE0GA330SR	(1)	2000
	47	4	5.4	B	34	0.35	1000	EEE0GA470SR	(1)	2000
	100	5	5.4	C	61	0.35	1000	EEE0GA101SR	(1)	1000
	220	6.3	5.4	D	82	0.35	1000	EEE0GA221SP	(1)	1000
	330	6.3	5.4	D	80	0.50	1000	EEE0GA331WP	(1)	1000
	470	6.3	7.7	D8	200	0.35	1000	EEE0GA471XP	(1)	900
6.3	22	3	5.4	A	20	0.35	1000	EEE0JS220WR	(1)	2000
		4	5.4	B	29	0.26	2000	EEE0JA220SR	(1)	2000
	33	4	5.4	B	22	0.35	1000	EEE0JA330WR	(1)	2000
		4	5.4	B	36	0.35	1000	EEE0JA470WR	(1)	2000
	47	5	5.4	C	46	0.26	2000	EEE0JA470SR	(1)	1000
		5	5.4	C	47	0.35	1000	EEE0JA101WR	(1)	1000
	100	6.3	5.4	D	71	0.26	2000	EEE0JA101SP	(1)	1000
		6.3	5.4	D	74	0.35	1000	EEE0JA221WP	(1)	1000
	330	6.3	7.7	D8	188	0.26	2000	EEE0JA331XP	(1)	900
		8	6.2	E	300	0.35	2000	EEE0JA331P	(2)	1000
	470	8	10.2	F	380	0.35	2000	EEE0JA471P	(2)	500
8		10.2	F	500	0.35	2000	EEE0JA102UP	(2)	500	
1000	10	10.2	G	700	0.35	2000	EEE0JA102P	(2)	500	
	1500	10	10.2	G	750	0.35	2000	EEE0JA152P	(2)	500
10	22	4	5.4	B	28	0.30	1000	EEE1AA220WR	(1)	2000
		4	5.4	B	29	0.30	1000	EEE1AA330WR	(1)	2000
	33	5	5.4	C	43	0.20	2000	EEE1AA330SR	(1)	1000
		5	5.4	C	47	0.30	1000	EEE1AA470WR	(1)	1000
	100	5	5.4	C	50	0.30	1000	EEE1AA101WR	(1)	1000
		6.3	5.4	D	70	0.26	2000	EEE1AA101SP	(1)	1000
	220	6.3	7.7	D8	173	0.20	2000	EEE1AA221XP	(1)	900
		8	6.2	E	250	0.26	2000	EEE1AA221P	(2)	1000
	330	8	10.2	F	390	0.26	2000	EEE1AA331P	(2)	500
		8	10.2	F	390	0.26	2000	EEE1AA471UP	(2)	500
470	10	10.2	G	400	0.26	2000	EEE1AA471P	(2)	500	
	10	10.2	G	580	0.26	2000	EEE1AA102P	(2)	500	
16	10	3	5.4	A	20	0.18	1000	EEE1CS100SR	(1)	2000
		4	5.4	B	28	0.16	2000	EEE1CA100SR	(1)	2000
	22	4	5.4	B	28	0.26	1000	EEE1CA220WR	(1)	2000
		5	5.4	C	39	0.16	2000	EEE1CA220SR	(1)	1000
	33	5	5.4	C	35	0.26	1000	EEE1CA330WR	(1)	1000
		5	5.4	C	39	0.26	1000	EEE1CA470WR	(1)	1000
	47	6.3	5.4	D	70	0.16	2000	EEE1CA470SP	(1)	1000
		6.3	5.4	D	70	0.26	1000	EEE1CA101WP	(1)	1000
	100	8	6.2	E	200	0.20	2000	EEE1CA101P	(2)	1000
		6.3	7.7	D8	162	0.16	2000	EEE1CA221XP	(1)	900
220	8	10.2	F	280	0.20	2000	EEE1CA221P	(2)	500	

The taping dimensions are explained on p.195 of our Catalog. Please use it as a reference guide.
 Reflow Profile(Fig-1 to Fig-6) listed on p.193 of our Catalog.

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■ Standard Products

W.V. (V)	Cap. (±20%) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Min. Packaging Q'ty	
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (120Hz (+85°C) (mA)	tan δ (120Hz) (+20°C)	Endurance (hours)		Reflow	Taping (pcs)
16	330	8	10.2	F	320	0.20	2000	EEE1CA331UP	(2)	500
		10	10.2	G	380	0.20	2000	EEE1CA331P	(2)	500
	470	8	10.2	F	350	0.20	2000	EEE1CA471UP	(2)	500
		10	10.2	G	420	0.20	2000	EEE1CA471P	(2)	500
25	4.7	3	5.4	A	12	0.16	1000	EEE1ES4R7SR	(1)	2000
		4	5.4	B	22	0.14	2000	EEE1EA4R7SR	(1)	2000
	10	4	5.4	B	22	0.20	1000	EEE1EA100WR	(1)	2000
		5	5.4	C	28	0.14	2000	EEE1EA100SR	(1)	1000
	22	5	5.4	C	35	0.20	1000	EEE1EA220WR	(1)	1000
		6.3	5.4	D	55	0.14	2000	EEE1EA220SP	(1)	1000
	33	5	5.4	C	42	0.20	1000	EEE1EA330WR	(1)	1000
		6.3	5.4	D	65	0.14	2000	EEE1EA330SP	(1)	1000
	47	6.3	5.4	D	70	0.20	1000	EEE1EA470WP	(1)	1000
	100	6.3	7.7	D8	143	0.14	2000	EEE1EA101XP	(1)	900
		8	6.2	E	91	0.16	2000	EEE1EA101UP	(2)	1000
		8	10.2	F	180	0.16	2000	EEE1EA101P	(2)	500
	220	8	10.2	F	230	0.16	2000	EEE1EA221UP	(2)	500
		10	10.2	G	310	0.16	2000	EEE1EA221P	(2)	500
	330	8	10.2	F	270	0.16	2000	EEE1EA331UP	(2)	500
		10	10.2	G	340	0.16	2000	EEE1EA331P	(2)	500
470	10	10.2	G	380	0.16	2000	EEE1EA471P	(2)	500	
35	2.2	3	5.4	A	8	0.14	1000	EEE1VS2R2SR	(1)	2000
	3.3	3	5.4	A	10	0.14	1000	EEE1VS3R3SR	(1)	2000
	4.7	4	5.4	B	22	0.12	2000	EEE1VA4R7SR	(1)	2000
	10	4	5.4	B	22	0.16	1000	EEE1VA100WR	(1)	2000
		5	5.4	C	30	0.12	2000	EEE1VA100SR	(1)	1000
	22	5	5.4	C	36	0.16	1000	EEE1VA220WR	(1)	1000
		6.3	5.4	D	60	0.12	2000	EEE1VA220SP	(1)	1000
	33	6.3	5.4	D	60	0.16	1000	EEE1VA330WP	(1)	1000
		8	6.2	E	130	0.14	2000	EEE1VA330P	(2)	1000
	47	6.3	5.4	D	70	0.16	1000	EEE1VA470WP	(1)	1000
		8	6.2	E	165	0.14	2000	EEE1VA470P	(2)	1000
	100	6.3	7.7	D8	132	0.12	2000	EEE1VA101XP	(1)	900
		8	10.2	F	140	0.14	2000	EEE1VA101UP	(2)	500
		10	10.2	G	210	0.14	2000	EEE1VA101P	(2)	500
	220	8	10.2	F	200	0.14	2000	EEE1VA221UP	(2)	500
		10	10.2	G	310	0.14	2000	EEE1VA221P	(2)	500
330	10	10.2	G	350	0.14	2000	EEE1VA331P	(2)	500	
50	0.1	3	5.4	A	1	0.14	1000	EEE1HS0R1SR	(1)	2000
		4	5.4	B	1	0.12	2000	EEE1HA0R1SR	(1)	2000
	0.22	3	5.4	A	2	0.14	1000	EEE1HSR22SR	(1)	2000
		4	5.4	B	2	0.12	2000	EEE1HAR22SR	(1)	2000
	0.33	3	5.4	A	3	0.14	1000	EEE1HSR33SR	(1)	2000
		4	5.4	B	3	0.12	2000	EEE1HAR33SR	(1)	2000

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■ Standard Products

W.V. (V)	Cap. (±20%) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Min. Packaging Q'ty	
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (120Hz) (+85°C) (mA)	tan δ (120Hz) (+20°C)	Endurance (hours)		Reflow	Taping (pcs)
50	0.47	3	5.4	A	5	0.14	1000	EEE1HSR47SR	(1)	2000
		4	5.4	B	5	0.12	2000	EEE1HAR47SR	(1)	2000
	1	3	5.4	A	8	0.14	1000	EEE1HS010SR	(1)	2000
		4	5.4	B	10	0.12	2000	EEE1HA010SR	(1)	2000
	2.2	3	5.4	A	8	0.14	1000	EEE1HS2R2SR	(1)	2000
		4	5.4	B	16	0.12	2000	EEE1HA2R2SR	(1)	2000
	3.3	4	5.4	B	16	0.12	2000	EEE1HA3R3SR	(1)	2000
	4.7	4	5.4	B	18	0.14	1000	EEE1HA4R7WR	(1)	2000
		5	5.4	C	23	0.12	2000	EEE1HA4R7SR	(1)	1000
	10	5	5.4	C	27	0.14	1000	EEE1HA100WR	(1)	1000
		6.3	5.4	D	35	0.12	2000	EEE1HA100SP	(1)	1000
	22	6.3	5.4	D	40	0.14	1000	EEE1HA220WP	(1)	1000
		8	6.2	E	120	0.12	2000	EEE1HA220P	(2)	1000
	33	6.3	7.7	D8	85	0.12	2000	EEE1HA330XP	(1)	900
		8	6.2	E	65	0.12	2000	EEE1HA330UP	(2)	1000
		8	10.2	F	110	0.12	2000	EEE1HA330P	(2)	500
	47	6.3	7.7	D8	105	0.12	2000	EEE1HA470XP	(1)	900
		8	10.2	F	110	0.12	2000	EEE1HA470UP	(2)	500
		10	10.2	G	130	0.12	2000	EEE1HA470P	(2)	500
	100	8	10.2	F	200	0.12	2000	EEE1HA101UP	(2)	500
10		10.2	G	250	0.12	2000	EEE1HA101P	(2)	500	
220	10	10.2	G	300	0.12	2000	EEE1HA221P	(2)	500	
63	22	8	6.2	E	40	0.18	2000	EEE1JA220UP	(2)	1000
		8	10.2	F	40	0.18	2000	EEE1JA220P	(2)	500
	33	8	10.2	F	45	0.18	2000	EEE1JA330P	(2)	500
	47	8	10.2	F	45	0.18	2000	EEE1JA470UP	(2)	500
		10	10.2	G	45	0.18	2000	EEE1JA470P	(2)	500
100	10	10.2	G	60	0.18	2000	EEE1JA101P	(2)	500	
100	3.3	8	6.2	E	50	0.18	2000	EEE2AA3R3P	(2)	1000
		8	10.2	F	80	0.18	2000	EEE2AA4R7P	(2)	500
	4.7	8	6.2	E	50	0.18	2000	EEE2AA4R7UP	(2)	1000
		8	10.2	F	85	0.18	2000	EEE2AA100P	(2)	500
	10	8	6.2	E	50	0.18	2000	EEE2AA100UP	(2)	1000
		8	10.2	F	85	0.18	2000	EEE2AA100P	(2)	500
	22	8	10.2	F	55	0.18	2000	EEE2AA220UP	(2)	500
		10	10.2	G	85	0.18	2000	EEE2AA220P	(2)	500
33	10	10.2	G	90	0.18	2000	EEE2AA330P	(2)	500	

The taping dimensions are explained on p.195 of our Catalog.

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Reflow Profile(Fig-1 to Fig-6) listed on p.193 of our Catalog.

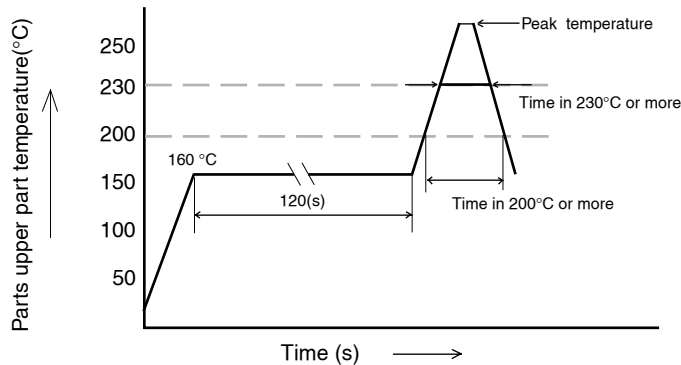
■ Standard Products(Bi-polar)

W.V. (V)	Cap. (±20%) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Min. Packaging Q'ty	
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (120Hz) (+85°C) (mA)	tan δ (120Hz) (+20°C)	Endurance (hours)		Reflow	Taping (pcs)
6.3	22	5	5.4	C	29	0.52	2000	EEE0JA220NR	(1)	1000
	47	6.3	5.4	D	46	0.52	2000	EEE0JA470NP	(1)	1000
10	10	4	5.4	B	25	0.40	2000	EEE1AA100NR	(1)	2000
	33	6.3	5.4	D	43	0.40	2000	EEE1AA330NP	(1)	1000
16	4.7	4	5.4	B	20	0.32	2000	EEE1CA4R7NR	(1)	2000
	10	5	5.4	C	25	0.32	2000	EEE1CA100NR	(1)	1000
	22	6.3	5.4	D	39	0.32	2000	EEE1CA220NP	(1)	1000
25	3.3	4	5.4	B	12	0.28	2000	EEE1EA3R3NR	(1)	2000
	4.7	5	5.4	C	21	0.28	2000	EEE1EA4R7NR	(1)	1000
	10	6.3	5.4	D	28	0.28	2000	EEE1EA100NP	(1)	1000
35	2.2	4	5.4	B	12	0.24	2000	EEE1VA2R2NR	(1)	2000
	4.7	5	5.4	C	22	0.24	2000	EEE1VA4R7NR	(1)	1000
	10	6.3	5.4	D	30	0.24	2000	EEE1VA100NP	(1)	1000
50	0.22	4	5.4	B	2	0.24	2000	EEE1HAR22NR	(1)	2000
	0.33	4	5.4	B	3	0.24	2000	EEE1HAR33NR	(1)	2000
	0.47	4	5.4	B	5	0.24	2000	EEE1HAR47NR	(1)	2000
	1	4	5.4	B	10	0.24	2000	EEE1HA010NR	(1)	2000
	2.2	5	5.4	C	16	0.24	2000	EEE1HA2R2NR	(1)	1000
	3.3	5	5.4	C	21	0.24	2000	EEENZ1H3R3R	(1)	1000
	4.7	6.3	5.4	D	31	0.24	2000	EEE1HA4R7NP	(1)	1000

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Reflow Profile(Fig-1 to Fig-6) listed on p.193 of our Catalog.

■ Reflow guaranteed condition

● RoHS compliant



Lead-Free reflow

Reflow No	Fig.(1)	Fig.(2)	Fig.(3)	Fig.(4)
Category	φ 3 to φ 6.3	φ 8 to φ 10	φ 12.5 to φ 18	EB series only (φ 10 to φ 18)
Peak temperature	250°C	235°C	230°C (220°C)	230°C
Time in peak temperature	5s	5s	5s (s)	5s
Time in 200°C or more	60s	60s	20s (30s)	20s
Time of reflow	1 time	1 time	1 time	1 time

High temperature Lead-Free reflow

Reflow No	Fig.(5)	Fig.(6)
Category	φ 4 to φ 6.3	φ 8 to φ 10
Peak temperature	260°C (255°C)	245°C
Time around peak temperature	5s in (10s) in 250°C or more	10s in 240°C or more
Time in 230°C or more	30s	30s
Time in 200°C or more	70s	70s
Time of reflow	2 times	2 times

● RoHS not compliant

Category	Dia. φ3 to φ 6.3 EEV-, ECEV- Part No.	Dia. φ8 to φ 10 EEV-, ECEV- Part No.
Reflow condition	<p>Peak temperature/ Time in 200°C or more</p> <p>Peak temperature(°C)</p> <p>Time in 200°C or more</p>	<p>Peak temperature/ Time in 200°C or more</p> <p>Peak temperature(°C)</p> <p>Time in 200°C or more</p>

* For reflow, use athermal condition system such as infrared radiation(IR) or hot blast.

* Vapor heat transfer systems(VPS) are not recommended.

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