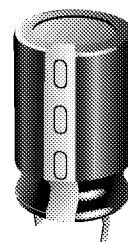


Aluminum Electrolytic Capacitors (Type Snap-In Series UP)

Series: UP

Type: TS (Snap-In)

STANDARD	85 °C
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■ Features

- Lifetime: 85 °C 2000 h
- Snap-in terminals
- 20 to 40% smaller than series TS-U

■ Recommended Applications

- Smoothing circuits, AC adapters, inverter lighting systems

■ Explanation of Part Numbers

Product Code: 1 E, 2 C, 3 O

Style: 4 S

Rated Working Voltage Code: 5, 6

Series Code: 7 P

N. Capacitance Code: 8, 9, 10

Diameter: 11

Option: 12 B

ECOS*	Standard terminal type
ECEC	Short terminal type

W.V. Code	1C	1E	1V	1H	1J	1K	2A	2C	2P	2D	2E	2F	2V	2G	2W
W.V. (V)	16	25	35	50	63	80	100	160	180	200	250	315	350	400	450

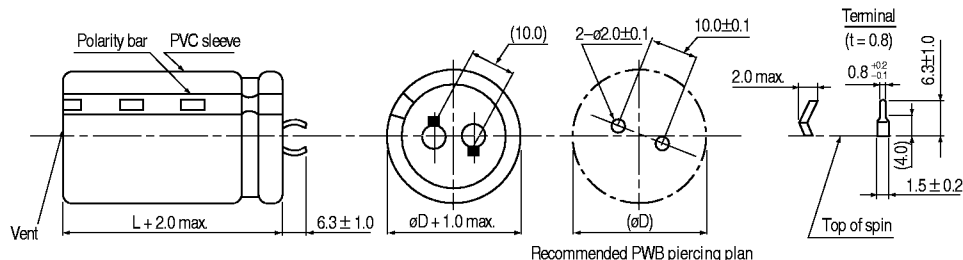
* Our product code will be changed from ECO to ECE during April 1996 to March 1998. We will inform the revision date before our change.

■ Specifications

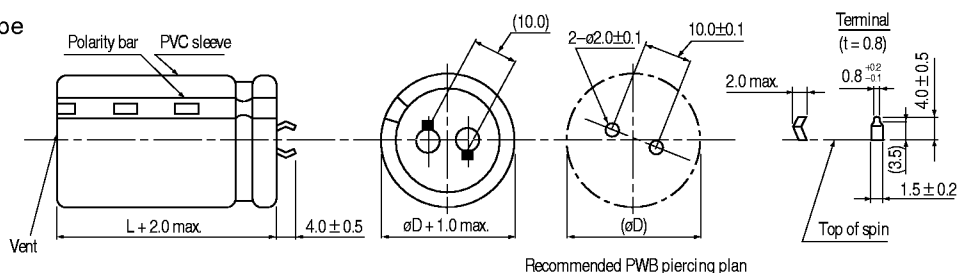
Operating temperature range	-40 to +85°C				-25 to +85°C					
Rated working voltage	16 to 250 V DC				310 to 450 V DC					
Nominal capacitance range	180 to 68000 μF				56 to 820 μF					
Capacitance tolerance	±20% (120 Hz/+20°C)									
DC leakage current	3 √CV (μA) max. after 5 minutes application of rated working voltage at +20°C. C: Capacitance (μF) V: Working Voltage (V DC)									
tan δ	(120 Hz/+20°C)									
	Working Voltage (V)		16	25	35	50	63	80	100	160 to 450
	tan δ		0.50	0.40	0.35	0.30	0.25	0.20	0.20	0.15
	For capacitance value > 33000 μF, add the following calculated value: $\frac{(\text{Rated capacitance}) - 33000 \mu\text{F}}{10000 \mu\text{F}} \times 0.1$									
Frequency correction factor for ripple current	Frequency (Hz)		50	60	100	120	500	1 k	10 k ~	
	C.F.	16 to 100 V	0.93	0.95	0.99	1.00	1.05	1.08	1.15	
		160 to 450 V	0.75	0.80	0.95	1.00	1.20	1.25	1.40	
Endurance	After 2,000 hours application of DC voltage with specified ripple current (≤ rated DC working voltage) at +85°C, the capacitor shall meet the following limits.									
	Capacitance change		±20% of initial measured value (±3.5 ±25%)							
	tan δ		≤ 200% of initial specified value							
	DC leakage current		≤ initial specified value							
Shelf life	After storage for 1,000 hours at +85°C with no voltage applied, capacitor shall meet the limits specified in “Endurance.”									

■ Dimensions in mm (not to scale)

Standard terminal type



Short terminal type



■ Case Size/Ripple Current

(A) rms (120 Hz/+85°C)

Working Voltage (code)		16V (1C) – (SV) 20V			
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)			
		B	C	D	E
10,000 (103)	3.78	22x30	25x25		
12,000 (123)	4.52	22x30	25x25		
15,000 (153)	5.26	22x35	25x30		
18,000 (183)	5.57	22x40	25x30		
22,000 (223)	6.10	22x45	25x35	30x30	
27,000 (273)	6.31		25x45	30x35	
33,000 (333)	6.84		25x50	30x40	35x30
39,000 (393)	6.94			30x45	35x35
47,000 (473)	7.47			30x50	35x40
56,000 (563)	8.73				35x45 *
68,000 (683)	9.05				35x50 *

Working Voltage (code)		25V (1E) – (SV) 32V			
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)			
		B	C	D	E
6,800 (682)	3.47	22x30	25x25		
8,200 (822)	3.57	22x30	25x25		
10,000 (103)	3.78	22x35	25x30	30x25	
12,000 (123)	4.10	22x40	25x35	30x30	
15,000 (153)	4.63	22x50	25x40	30x30	
18,000 (183)	6.47		25x45	30x35	
22,000 (223)	6.10	25x50	30x40		
27,000 (273)	6.21			30x45	35x35
33,000 (333)	6.84			30x50	35x40
39,000 (393)	7.36				35x45 *
47,000 (473)	8.00				35x50 *

Working Voltage (code)		35V (1V) – (SV) 44V			
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)			
		B	C	D	E
4,700 (472)	3.26	22x30	25x25		
5,600 (562)	3.36	22x30	25x25		
6,800 (682)	3.68	22x35	25x30		
8,200 (820)	4.00	22x40	25x35		
10,000 (103)	4.42	22x45	25x40	30x30	35x25
12,000 (123)	5.05		25x45	30x35	35x30
15,000 (153)	5.57		25x50	30x40	35x30
18,000 (183)	5.68			30x45	35x35
22,000 (223)	6.10			30x50	35x40
27,000 (273)	6.84				35x45 *
33,000 (333)	7.15				35x50 *

Working Voltage (code)		50V (1H) – (SV) 63V			
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)			
		B	C	D	E
3,300 (332)	2.73	22x30	25x25		
3,900 (392)	2.75	22x30	25x25		
4,700 (472)	3.03	22x35	25x30	30x25	
5,600 (562)	3.42	22x40	25x35	30x30	
6,800 (682)	3.85	22x50	25x40	30x30	
8,200 (822)	4.41		25x45	30x35	
10,000 (103)	4.97		25x50	30x40	35x30
12,000 (123)	5.58			30x45	35x35
15,000 (153)	6.44			30x50	35x40
18,000 (183)	6.94				35x45 *
22,000 (223)	7.57				35x50 *

* When capacitors of ø35x45L and ø35x50L are mounted on PWB, reinforce them with mounting clamp or adhesives. (Avoid using adhesives including halogenated compositions.)

■ Case Size/Ripple Current (cont'd)

(A) rms (120 Hz/+85°C)

Working Voltage (code)		63V (1J) – (SV) 79V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
2,200 (222)	2.52	22x30	25x25			
2,700 (272)	3.73	22x35	25x30			
3,300 (332)	4.10	22x40	25x30	30x25		
3,900 (392)	4.44	22x45	25x35	30x30		
4,700 (472)	4.86	22x50	25x40	30x30	35x25	
5,600 (562)	5.36		25x45	30x35	35x30	
6,800 (682)	5.84		25x50	30x40	35x30	
8,200 (822)	6.00			30x45	35x35	
10,000 (103)	6.52				35x40	
12,000 (123)	7.15				35x50 *	

Working Voltage (code)		90V (1K) – (SV) 100V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
1,500 (152)	2.26	22x30	25x25			
1,800 (182)	2.52	22x35	25x30			
2,200 (222)	2.73	22x40	25x30	30x25		
2,700 (272)	2.78	22x45	25x35	30x30		
3,300 (332)	3.21	22x50	25x40	30x30		
3,900 (392)	3.59		25x45	30x35		
4,700 (472)	4.09		25x50	30x40		
5,600 (562)	4.55			30x45	35x35	
6,800 (682)	5.16			30x50	35x40	
8,200 (822)	5.83				35x50 *	

Working Voltage (code)		100V (2A) – (SV) 125V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
1,000 (102)	1.96	22x30	25x25			
1,200 (122)	2.31	22x35	25x30			
1,500 (152)	2.57	22x40	25x30	30x25		
1,800 (182)	2.84	22x45	25x35	30x30		
2,200 (222)	3.14	22x50	25x40	30x30		
2,700 (272)	3.71		25x45	30x35		
3,300 (332)	4.06		25x50	30x40		
3,900 (392)	4.54			30x45	35x35	
4,700 (472)	5.13			30x50	35x40	
5,600 (562)	5.75				35x45 *	
6,800 (682)	6.60				35x50 *	

Working Voltage (code)		25V (1E) – (SV) 32V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
330 (331)	1.45	22x25				
390 (301)	1.62	22x30	25x25			
470 (471)	2.11	22x30	25x25			
560 (561)	2.25	22x35	25x30	30x25		
680 (681)	2.50	22x40	25x35	30x25		
820 (821)	2.75	22x45	25x35	30x30		
1,000 (102)	3.00		25x45	30x35	35x30	
1,200 (122)	3.25		25x50	30x35	35x30	
1,500 (152)	3.73			30x45	35x35	
1,800 (182)	4.20			30x50	35x40	
2,200 (222)	4.78				35x45 *	
2,700 (272)	5.45				35x50 *	

Working Voltage (code)		180V (2P) – (SV) 225V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
330 (331)	1.77	22x25				
390 (391)	1.91	22x30	25x25			
470 (471)	2.08	22x35	25x25			
560 (561)	2.25	25x35	25x30			
680 (681)	2.50	22x40	25x35	30x30		
820 (821)	2.75	22x45	25x40	30x30		
1,000 (102)	3.00		25x45	30x35		
1,200 (122)	3.31		25x50	30x40	35x35	
1,500 (152)	3.83			30x45	35x40	
2,200 (222)	4.92				35x50 *	

Working Voltage (code)		200V (2D) – (SV) 250V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
270 (271)	1.41	22x25				
330 (331)	1.56	22x30	25x25			
390 (391)	1.68	22x30	25x25			
470 (471)	1.85	22x35	25x30	30x25		
560 (561)	2.43	22x40	25x35	30x25		
680 (681)	2.68	22x45	25x35	30x30		
820 (821)	2.93		25x45	30x35	35x25	
1,000 (102)	3.25		25x50	30x40	35x30	
1,200 (122)	3.50			30x45	35x35	
1,500 (152)	3.87			30x50	35x40 *	
1,800 (182)	4.32				35x45 *	
2,200 (222)	4.92				35x50	

* When capacitors of ø35x45L and ø35x50L are mounted on PWB, reinforce them with mounting clamp or adhesives. (Avoid using adhesives including halogenated compositions.)

■ Case Size/Ripple Current (cont'd)

(A) rms (120 Hz/+85°C)

Working Voltage (code)		250V (2E) – (SV) 300V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
180 (181)	1.07	22x25				
220 (221)	1.17	22x30	25x25			
270 (271)	1.31	22x30	25x25			
330 (331)	1.75	22x35	25x30	30x25		
390 (391)	1.91	22x40	25x35	30x25		
470 (471)	2.11	22x45	25x40	30x30		
560 (561)	2.25		25x45	30x35	35x25	
680 (681)	2.50		25x50	30x40	35x30	
820 (821)	2.77			30x45	35x40	
1,000 (102)	3.32			30x50	35x40	
1,200 (122)	3.53				35x45 *	
1,500 (152)	4.04				35x50 *	

Working Voltage (code)		315V (2F) – (SV) 365V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
100 (101)	0.92	22x25				
120 (121)	1.01	22x30	25x25			
150 (151)	1.11	22x30	25x25			
180 (181)	1.21	22x35	25x30	30x25		
220 (221)	1.41	22x40	25x35	30x25		
270 (271)	1.60	22x45	25x40	30x30		
330 (331)	1.82		25x45	30x35	35x25	
390 (391)	2.01		25x50	30x35	35x30	
470 (471)	2.27			30x40	35x35	
560 (561)	2.56			30x45	35x35	
680 (681)	2.87				35x45 *	
820 (821)	3.25				35x50 *	

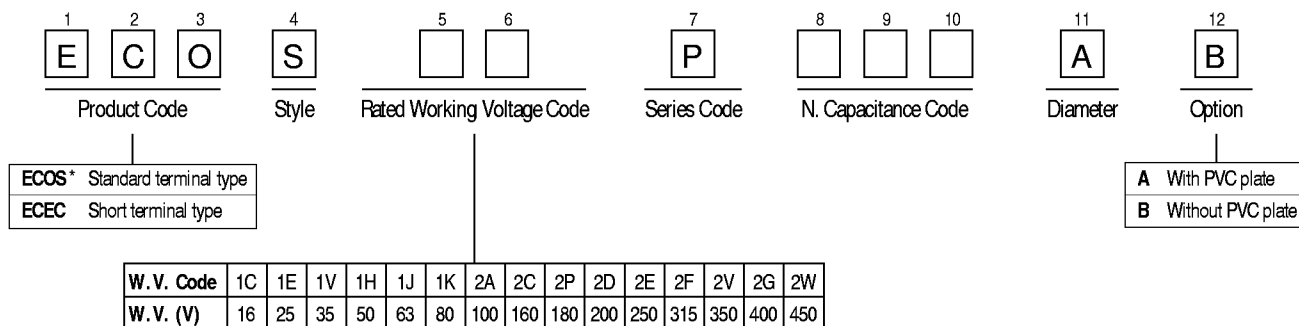
Working Voltage (code)		350V (2V) – (SV) 400V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
82 (820)	0.83	22x25				
100 (101)	0.91	22x30				
120 (121)	1.00	22x30	25x25			
150 (151)	1.12	22x35	25x30	30x25		
180 (181)	1.22	22x40	25x35	30x25		
220 (221)	1.44	22x45	25x40	30x30	35x25	
270 (271)	1.66		25x45	30x35	35x30	
330 (331)	1.88		25x50	30x40	35x30	
390 (391)	2.06			30x45	35x35	
470 (471)	2.40			30x50	35x40	
560 (561)	2.60				35x45 *	
680 (681)	2.96				35x50 *	

Working Voltage (code)		400V (2G) – (SV) 450V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
68 (680)	0.76	22x25				
82 (820)	0.83	22x25				
100 (101)	0.92	22x30	25x25			
120 (121)	1.02	22x35	25x30			
150 (151)	1.16	22x40	25x30	30x25		
180 (181)	1.44	22x45	25x35	30x30		
220 (221)	1.49	22x50	25x40	30x30		
270 (271)	1.67		25x45	30x35	35x30	
330 (331)	1.90			30x40	35x35	
390 (391)	2.13			30x45	35x40	
470 (471)	2.39				35x45 *	
560 (561)	2.69				35x50 *	

Working Voltage (code)		450V (2W) – (SV) 500V				
Cap. (μF) (code)	Ripple Current	Case size øD x L (mm)				
		B	C	D	E	
56 (560)	0.70	22x25				
68 (680)	0.76	22x30				
82 (820)	0.83	22x30	25x25			
100 (101)	0.93	22x35	25x30	30x25		
120 (121)	1.04	22x40	25x30	30x25		
150 (151)	1.19	22x50	25x40	30x30		
180 (181)	1.35		25x45	30x35	35x25	
220 (221)	1.55		25x50	30x40	35x30	
270 (271)	1.78			30x45	35x35	
330 (331)	2.01			30x50	35x40	
390 (391)	2.24				35x45 *	
470 (471)	2.53				35x50 *	

* When capacitors of ø35x45L and ø35x50L are mounted on PWB, reinforce them with mounting clamp or adhesives. (Avoid using adhesives including halogenated compositions.)

■ Explanation of Part Numbers



* Our product code will be changed from ECO to ECE during April 1996 to March 1998. We will inform the revision date before our change.

■ Case Size/Ripple Current

(A) rms (120 Hz/+85°C)

Case Size øD x L (mm)	Rated Working Voltage									
	16V (1C) – (SV) 20V		25V (1E) – (SV) 32V		35V (1V) – (SV) 44V		50V (1H) – (SV) 63V		63V (1J) – (SV) 79V	
	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current
20 x 25	6,800	3.15	4,700	3.05	3,300	2.75	2,200	2.26		
20 x 30	8,200	3.47	5,600	3.36	3,900	2.94	2,700	2.52		
20 x 35	10,000	3.78	6,800	3.47	4,700	3.26	3,300	2.73	2,200	2.52
	12,000	4.52								
20 x 40	15,000	5.26	8,200	3.57	5,600	3.36	3,900	2.75	2,700	3.73

Case Size øD x L (mm)	Rated Working Voltage									
	80V (1K) – (SV) 100V		100V (2A) – (SV) 125V		160V (2C) – (SV) 200V		180V (2P) – (SV) 225V		200V (2D) – (SV) 250V	
	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current
20 x 32					330	1.45	330	1.77	270	1.41
20 x 35	1,500	2.26	1,000	1.96	390	1.62	390	1.91	330	1.56
20 x 40	1,800	2.52	1,200	2.31			470	2.08		

Case Size øD x L (mm)	Rated Working Voltage									
	250V (2E) – (SV) 300V		315V (2F) – (SV) 365V		350V (2V) – (SV) 400V		400V (2G) – (SV) 450V		450V (2W) – (SV) 500V	
	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current
20 x 30	180	1.07	100	0.92	82	0.83	68	0.76	56	0.70
							82	0.83		
20 x 35	220	1.17			100	0.91	100	0.92	68	0.76
									82	0.83
20 x 40			120	1.01			120	1.02		

■ Explanation of Part Numbers

1 E	2 C	3 O	4 S	5 	6 	7 P	8 	9 	10 	11 	12 G
Product Code			Style	Rated Working Voltage Code		Series Code	N. Capacitance Code			Diameter	Option
ECOS* Standard terminal type										B 22mm	A With PVC plate
ECEC Short terminal type										C 25mm	
										D 30mm	
										E 35mm	

W.V. Code	1C	1E	1V	1H	1J	1K	2A	2C	2P	2D	2E	2F	2V	2G	2W
W.V. (V)	16	25	35	50	63	80	100	160	180	200	250	315	350	400	450

* Our product code will be changed from ECO to ECE during April 1996 to March 1998. We will inform the revision date before our change.

■ Case Size/Ripple Current

(A) rms (120 Hz/+85°C)

Case Size øD x L (mm)	Rated Working Voltage									
	16V (1C) – (SV) 20V		25V (1E) – (SV) 32V		35V (1V) – (SV) 44V		50V (1H) – (SV) 63V		63V (1J) – (SV) 79V	
	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current
22 x 20	4,700	1.60	3,300	1.60	2,200	1.40	1,500	1.20	1,000	1.20
25 x 20	6,800	1.80	4,700	1.80	3,300	1.70	2,200	1.40	1,500	1.30
30 x 20	10,000	2.40	6,800	2.30	4,700	2.00	3,300	1.70	2,200	1.50
35 x 20	15,000	3.20	10,000	2.70	6,800	2.40	4,700	2.10	2,700	1.70

Case Size øD x L (mm)	Rated Working Voltage									
	80V (1K) – (SV) 100V		100V (2A) – (SV) 125V		160V (2C) – (SV) 200V		200V (2D) – (SV) 250V		250V (2E) – (SV) 300V	
	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current
22 x 20	680	1.00	470	1.00	220	0.75	150	0.65	120	0.45
25 x 20	1,000	1.20	680	1.10	270	0.87	220	0.87	150	0.65
30 x 20	1,500	1.40	1,000	1.20	390	1.10	330	1.10	220	0.87
35 x 20	2,200	1.70	1,500	1.50	560	1.30	470	1.30	330	1.10

Case Size øD x L (mm)	Rated Working Voltage			
	400 (2G) – (SV) 450V		450V (2W) – (SV) 500V	
	Cap. (μF)	Ripple Current	Cap. (μF)	Ripple Current
22 x 20	47	0.25	33	0.20
25 x 20	68	0.35	47	0.29
30 x 20	100	0.47	68	0.38
35 x 20	150	0.60	100	0.52