

TS-UP Series 85°C, 3000 hours*

- Compact size for general purpose and industrial applications
- 2 and 3 pin versions available
- 20mm lengths for low profile applications



Rated Working Voltage:	16 ~ 250 VDC	350 ~ 500 VDC								
Operating Temperature:	-40 ~ +85°C	-25 ~ +85°C								
Nominal Capacitance:	120 ~ 82000µF (±20% tolerance)	33 ~ 1000µF (±20% tolerance)								
Dissipation Factor: (120 Hz, +20°C)	Working Voltage [V]:	16	25	35	50	63	80	100	160 ~ 500	
	Max. D.F. (%):	50	40	35	30	25	20	20	15	
For capacitance values > 33000µF, add the value of: $\frac{\text{rated cap. } [\mu\text{F}] - 33000}{1000}$										
Leakage Current:	$3\sqrt{CV}$ (µA) max. after 5 minutes; C = Capacitance in µF, V = WV									
Ripple Current Multipliers:	Frequency(Hz):	50	60	100-120	500	1k	10k~	Ripple Current Ambient Temperature Factors**		
	Temperature (°C):	85°C	70°C	60°C	Multiplier:			1.0	1.3	1.4
Endurance:	3000 hours at +85°C with maximum specified ripple current (see page 6) *2000 hours for 20mm length sizes									

**Use of temperature ripple current multipliers may limit life to the hours specified for the maximum operating temperature.

Part Number System

E	C	P	Voltage Code	Series	Capacitance Code	Case Diameter	Insulation Options	
Common Code / Terminal Type							25 ~ 50mm lengths	
ECOS	2 pin, 6.3mm Length Terminal (Standard)						A	PVC with top plate
ECEC	2 pin, 4.0mm Length "Short" Terminal						B	PVC without top plate
ECE3	3 Pin, 4.0mm Length Terminal						20mm length	
(Please see page 10 for details)							L	PVC with top plate
							G	PVC without top plate
							Extended Capacitance Ratings	
							X	PVC with top plate

TS-UP Standard Ratings (part numbers shown with 2 pins, 6.3mm length terminal, and top vinyl plate)

Cap. (µF)	Size (mm) D x L	Max 85°C R.C. (A _{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10kHz~	120Hz	20kHz	
16 VDC Working, 20 VDC Surge						
4700	22 x 20	1.60	1.84	0.159	0.135	ECOS1CP472BL
	22 x 25	1.77	2.04	0.159	0.135	ECOS1CP472BA
6800	22 x 25	2.57	2.96	0.110	0.093	ECOS1CP682BA
	25 x 20	1.80	2.07	0.110	0.093	ECOS1CP682CL
8200	22 x 25	3.10	3.57	0.091	0.077	ECOS1CP822BA
10000	22 x 30	3.78	4.35	0.075	0.063	ECOS1CP103BA
	25 x 25	3.78	4.35	0.075	0.063	ECOS1CP103CA
	30 x 20	2.40	2.76	0.083	0.070	ECOS1CP103DL
12000	22 x 30	4.52	5.20	0.062	0.053	ECOS1CP123BA
	25 x 25	4.52	5.20	0.062	0.053	ECOS1CP123CA
15000	22 x 35	5.26	6.05	0.053	0.045	ECOS1CP153BA
	25 x 30	5.26	6.05	0.053	0.045	ECOS1CP153CA
	35 x 20	3.20	3.68	0.055	0.047	ECOS1CP153EL
18000	22 x 40	5.57	6.41	0.046	0.039	ECOS1CP183BA
	25 x 30	5.57	6.41	0.046	0.039	ECOS1CP183CA
22000	22 x 45	6.10	7.02	0.038	0.032	ECOS1CP223BA
	25 x 35	6.10	7.02	0.038	0.032	ECOS1CP223CA
	30 x 30	6.10	7.02	0.038	0.032	ECOS1CP223DA
27000	25 x 45	6.31	7.26	0.031	0.026	ECOS1CP273CA
	30 x 35	6.31	7.26	0.031	0.026	ECOS1CP273DA
33000	25 x 50	6.84	7.87	0.025	0.021	ECOS1CP333CA
	30 x 40	6.84	7.87	0.025	0.021	ECOS1CP333DA
	35 x 30	6.84	7.87	0.025	0.021	ECOS1CP333EA
39000	30 x 45	6.94	7.98	0.021	0.018	ECOS1CP393DA
	35 x 35	6.94	7.98	0.021	0.018	ECOS1CP393EA
47000	30 x 50	7.47	8.59	0.019	0.017	ECOS1CP473DA
	35 x 40	7.47	8.59	0.021	0.019	ECOS1CP473EA
56000	35 x 45	8.73	10.04	0.019	0.018	ECOS1CP563EA
68000	35 x 50	9.05	10.41	0.018	0.017	ECOS1CP683EA
25 VDC Working, 32 VDC Surge						
3300	22 x 20	1.60	1.84	0.176	0.141	ECOS1EP332BL
	22 x 25	1.68	1.93	0.161	0.129	ECOS1EP332BA
4700	22 x 25	2.39	2.75	0.113	0.090	ECOS1EP472BA
	25 x 20	1.80	2.07	0.123	0.099	ECOS1EP472CL
5600	22 x 25	2.86	3.29	0.095	0.076	ECOS1EP562BA
25 VDC Working, 32 VDC Surge (continued)						
6800	22 x 30	3.47	3.99	0.078	0.062	ECOS1EP682BA
	25 x 25	3.47	3.99	0.078	0.062	ECOS1EP682CA
	30 x 20	2.30	2.65	0.078	0.062	ECOS1EP682DL
8200	22 x 30	3.57	4.11	0.065	0.052	ECOS1EP822BA
	25 x 25	3.57	4.11	0.065	0.052	ECOS1EP822CA
10000	22 x 35	3.78	4.35	0.058	0.046	ECOS1EP103BA
	25 x 30	3.78	4.35	0.058	0.046	ECOS1EP103CA
	30 x 25	3.78	4.35	0.058	0.046	ECOS1EP103DA
	35 x 20	2.70	3.11	0.061	0.049	ECOS1EP103EL
12000	22 x 40	4.10	4.72	0.048	0.039	ECOS1EP123BA
	25 x 35	4.10	4.72	0.048	0.039	ECOS1EP123CA
	30 x 30	4.10	4.72	0.048	0.039	ECOS1EP123DA
15000	22 x 50	4.63	5.32	0.039	0.031	ECOS1EP153BA
	25 x 40	4.63	5.32	0.039	0.031	ECOS1EP153CA
	30 x 30	4.63	5.32	0.039	0.031	ECOS1EP153DA
18000	25 x 45	5.47	6.29	0.035	0.028	ECOS1EP183CA
	30 x 35	5.47	6.29	0.035	0.028	ECOS1EP183DA
	35 x 20	6.10	7.02	0.029	0.023	ECOS1EP223CA
22000	30 x 40	6.10	7.02	0.029	0.023	ECOS1EP223DA
	30 x 45	6.21	7.14	0.023	0.019	ECOS1EP273DA
27000	35 x 35	6.21	7.14	0.025	0.020	ECOS1EP273EA
	30 x 50	6.84	7.87	0.020	0.017	ECOS1EP333DA
33000	35 x 40	6.84	7.87	0.020	0.017	ECOS1EP333EA
	35 x 45	7.36	8.46	0.019	0.017	ECOS1EP393EA
47000	35 x 50	8.00	9.20	0.017	0.015	ECOS1EP473EA
35 VDC Working, 44 VDC Surge						
2200	22 x 20	1.40	1.61	0.181	0.136	ECOS1VP222BL
	22 x 25	1.52	1.75	0.166	0.124	ECOS1VP222BA
3300	22 x 25	2.29	2.63	0.111	0.083	ECOS1VP332BA
	25 x 20	1.70	1.96	0.121	0.090	ECOS1VP332CL
3900	22 x 25	2.71	3.12	0.094	0.070	ECOS1VP392BA
	22 x 30	3.26	3.75	0.078	0.058	ECOS1VP472BA
4700	25 x 25	3.26	3.75	0.078	0.058	ECOS1VP472CA
	30 x 20	2.00	2.30	0.088	0.066	ECOS1VP472DL
5600	22 x 30	3.36	3.86	0.080	0.060	ECOS1VP562BA

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A_{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10kHz~	120Hz	20kHz	
160 VDC Working, 200 VDC Surge						
220	22 x 20	0.75	1.05	0.980	0.490	ECOS2CP221BL
	22 x 25	0.91	1.27	0.829	0.414	ECOS2CP221BA
270	22 x 25	1.19	1.67	0.675	0.338	ECOS2CP271BA
	25 x 20	0.87	1.22	0.798	0.399	ECOS2CP271CL
330	22 x 25	1.45	2.03	0.553	0.276	ECOS2CP331BA
390	22 x 25	1.62	2.27	0.468	0.234	ECOS2CP391BX
	25 x 25	1.62	2.27	0.468	0.234	ECOS2CP391CA
	30 x 20	1.10	1.54	0.595	0.298	ECOS2CP391DL
470	22 x 30	2.11	2.95	0.423	0.212	ECOS2CP471BA
	25 x 25	2.11	2.95	0.423	0.212	ECOS2CP471CA
560	22 x 30	2.25	3.15	0.355	0.178	ECOS2CP561BX
	22 x 35	2.25	3.15	0.355	0.178	ECOS2CP561BA
	25 x 25	2.25	3.15	0.355	0.178	ECOS2CP561CX
	25 x 30	2.25	3.15	0.355	0.178	ECOS2CP561CA
	35 x 20	1.30	1.82	0.414	0.207	ECOS2CP561EL
680	22 x 35	2.50	3.50	0.293	0.146	ECOS2CP681BX
	22 x 40	2.50	3.50	0.293	0.146	ECOS2CP681BA
	25 x 30	2.50	3.50	0.293	0.146	ECOS2CP681CX
820	30 x 25	2.50	3.50	0.293	0.146	ECOS2CP681DA
	22 x 40	2.50	3.50	0.243	0.121	ECOS2CP821BX
	22 x 45	2.75	3.85	0.263	0.131	ECOS2CP821BA
1000	25 x 35	2.75	3.85	0.263	0.131	ECOS2CP821CA
	30 x 25	2.75	3.85	0.263	0.131	ECOS2CP821DX
	30 x 30	2.75	3.85	0.263	0.131	ECOS2CP821DA
1200	22 x 45	3.00	4.20	0.216	0.108	ECOS2CP102BX
	25 x 40	3.00	4.20	0.216	0.108	ECOS2CP102CX
	25 x 45	3.00	4.20	0.232	0.128	ECOS2CP102CA
	30 x 30	3.00	4.20	0.232	0.128	ECOS2CP102DX
	30 x 35	3.00	4.20	0.232	0.128	ECOS2CP102DA
1500	35 x 30	3.00	4.20	0.232	0.128	ECOS2CP102EA
	25 x 50	3.25	4.55	0.207	0.114	ECOS2CP122CA
	30 x 35	3.25	4.55	0.207	0.114	ECOS2CP122DA
1800	35 x 30	3.25	4.55	0.207	0.114	ECOS2CP122EA
	25 x 50	3.73	5.22	0.166	0.091	ECOS2CP152CX
	30 x 45	3.73	5.22	0.166	0.091	ECOS2CP152DA
2200	35 x 30	3.73	5.22	0.166	0.091	ECOS2CP152EA
	35 x 35	3.73	5.22	0.166	0.091	ECOS2CP152EX
	30 x 50	4.20	5.88	0.138	0.083	ECOS2CP182DA
2700	35 x 35	4.20	5.88	0.138	0.083	ECOS2CP182EX
	30 x 50	4.78	6.69	0.105	0.053	ECOS2CP222DX
	35 x 40	4.78	6.69	0.113	0.073	ECOS2CP222EX
2700	35 x 45	4.78	6.69	0.113	0.073	ECOS2CP222EA
	35 x 50	5.45	7.63	0.092	0.060	ECOS2CP272EA
	200 VDC Working, 250 VDC Surge					
150	22 x 20	0.65	0.91	1.326	0.597	ECOS2DP151BL
	22 x 25	0.71	0.99	1.216	0.547	ECOS2DP151BA
220	22 x 25	1.04	1.46	0.829	0.373	ECOS2DP221BA
	25 x 20	0.87	1.22	0.904	0.407	ECOS2DP221CL
270	22 x 25	1.41	1.97	0.614	0.276	ECOS2DP271BA
	22 x 25	1.56	2.18	0.553	0.249	ECOS2DP331BX
330	30 x 20	1.00	1.40	0.603	0.271	ECOS2DP331DL
	22 x 30	1.68	2.35	0.468	0.210	ECOS2DP391BA
390	25 x 25	1.68	2.35	0.468	0.210	ECOS2DP391CA
	22 x 35	1.85	2.59	0.388	0.175	ECOS2DP471BA
	25 x 30	1.85	2.59	0.388	0.175	ECOS2DP471CA
470	35 x 20	1.30	1.82	0.459	0.206	ECOS2DP471EL
	22 x 40	2.43	3.40	0.326	0.147	ECOS2DP561BA
	25 x 30	2.43	3.40	0.326	0.147	ECOS2DP561CX
560	30 x 25	2.43	3.40	0.326	0.147	ECOS2DP561DA
	22 x 45	2.68	3.75	0.268	0.121	ECOS2DP681BA
	25 x 35	2.68	3.75	0.268	0.121	ECOS2DP681CA
680	30 x 30	2.68	3.75	0.268	0.121	ECOS2DP681DA
	25 x 45	2.93	4.10	0.222	0.100	ECOS2DP821CA
	30 x 30	2.93	4.10	0.222	0.100	ECOS2DP821DX
820	30 x 35	2.93	4.10	0.222	0.100	ECOS2DP821EA
	35 x 25	2.93	4.10	0.222	0.100	ECOS2DP821EX
	25 x 45	3.25	4.55	0.199	0.090	ECOS2DP102CX
1000	25 x 50	3.25	4.55	0.199	0.090	ECOS2DP102CA
	30 x 35	3.25	4.55	0.199	0.090	ECOS2DP102DX
	30 x 40	3.25	4.55	0.199	0.090	ECOS2DP102DA
	35 x 30	3.25	4.55	0.199	0.090	ECOS2DP102EA
	35 x 35	3.50	4.90	0.166	0.075	ECOS2DP122DX
1200	30 x 45	3.50	4.90	0.166	0.075	ECOS2DP122DA
	35 x 30	3.50	4.90	0.166	0.075	ECOS2DP122EX
	35 x 35	3.50	4.90	0.166	0.075	ECOS2DP122EA

Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A_{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10kHz~	120Hz	20kHz	
200 VDC Working, 250 VDC Surge (continued)						
1500	30 x 45	3.87	5.42	0.144	0.072	ECOS2DP152DX
	30 x 50	3.87	5.42	0.144	0.072	ECOS2DP152DA
	35 x 35	3.87	5.42	0.144	0.072	ECOS2DP152EX
1800	35 x 40	3.87	5.42	0.144	0.072	ECOS2DP152EA
	30 x 50	4.32	6.05	0.120	0.060	ECOS2DP182DX
	35 x 40	4.32	6.05	0.120	0.060	ECOS2DP182EX
2200	35 x 45	4.32	6.05	0.120	0.060	ECOS2DP182EA
	35 x 45	4.92	6.89	0.098	0.054	ECOS2DP222EX
	35 x 50	4.92	6.89	0.098	0.054	ECOS2DP222EA
250 VDC Working, 300 VDC Surge						
120	22 x 20	0.45	0.63	1.658	0.663	ECOS2EP121BL
	22 x 25	0.71	0.99	1.520	0.608	ECOS2EP121BA
150	22 x 25	0.89	1.25	1.216	0.486	ECOS2EP151BA
	25 x 20	0.65	0.91	1.326	0.531	ECOS2EP151CL
180	22 x 25	1.07	1.50	0.921	0.368	ECOS2EP181BA
220	22 x 25	1.17	1.64	0.754	0.301	ECOS2EP221BX
	30 x 20	0.87	1.22	0.829	0.332	ECOS2EP221DL
270	22 x 30	1.31	1.83	0.614	0.246	ECOS2EP271BA
	25 x 25	1.31	1.83	0.614	0.246	ECOS2EP271CA
330	22 x 35	1.75	2.45	0.553	0.221	ECOS2EP331BA
	25 x 30	1.75	2.45	0.502	0.201	ECOS2EP331CA
	35 x 20	1.10	1.54	0.553	0.221	ECOS2EP331EL
390	22 x 40	1.91	2.67	0.468	0.187	ECOS2EP391BA
	25 x 30	1.91	2.67	0.468	0.187	ECOS2EP391CX
	25 x 35	1.91	2.67	0.468	0.187	ECOS2EP391CA
470	30 x 25	1.91	2.67	0.425	0.170	ECOS2EP391DA
	22 x 45	2.11	2.95	0.388	0.155	ECOS2EP471BA
	25 x 35	2.11	2.95	0.388	0.155	ECOS2EP471CX
	25 x 40	2.11	2.95	0.388	0.155	ECOS2EP471CA
	30 x 25	2.11	2.95	0.353	0.141	ECOS2EP471DX
560	30 x 30	2.11	2.95	0.388	0.155	ECOS2EP471DA
	25 x 40	2.25	3.15	0.326	0.130	ECOS2EP561CX
	25 x 45	2.25	3.15	0.326	0.130	ECOS2EP561CA
680	30 x 30	2.25	3.15	0.326	0.130	ECOS2EP561DX
	30 x 35	2.25	3.15	0.326	0.130	ECOS2EP561DA
	35 x 25	2.25	3.15	0.326	0.130	ECOS2EP561EA
820	25 x 45	2.50	3.50	0.268	0.107	ECOS2EP681CX
	25 x 50	2.50	3.50	0.268	0.107	ECOS2EP681CA
	30 x 35	2.50	3.50	0.268	0.107	ECOS2EP681DX
1000	30 x 40	2.50	3.50	0.268	0.107	ECOS2EP681DA
	35 x 30	2.50	3.50	0.268	0.107	ECOS2EP681EA
	30 x 40	2.50	3.50	0.222	0.089	ECOS2EP821DX
1200	30 x 45	2.77	3.88	0.222	0.089	ECOS2EP821DA
	35 x 30	2.77	3.88	0.222	0.089	ECOS2EP821EX
	35 x 35	2.77	3.88	0.243	0.109	ECOS2EP821EA
1500	30 x 45	3.32	4.65	0.182	0.073	ECOS2EP102DX
	30 x 50	3.32	4.65	0.199	0.090	ECOS2EP102DA
	35 x 35	3.32	4.65	0.199	0.090	ECOS2EP102EX
	35 x 40	3.32	4.65	0.199	0.090	ECOS2EP102EA
	35 x 40	3.53	4.94	0.166	0.083	ECOS2EP122EX
1800	35 x 45	3.53	4.94	0.166	0.083	ECOS2EP122EA
	35 x 50	4.04	5.66	0.133	0.066	ECOS2EP152EA
	350 VDC Working, 400 VDC Surge					
82	22 x 25	0.83	1.16	2.022	0.708	ECOS2VP820BA
100	22 x 30	0.91	1.27	1.658	0.580	ECOS2VP101BA
120	22 x 30	1.00	1.40	1.382	0.484	ECOS2VP121BA
	25 x 25	1.00	1.40	1.382	0.484	ECOS2VP121CA
150	22 x 35	1.12	1.57	1.105	0.387	ECOS2VP151BA
	25 x 25	1.12	1.57	1.105	0.387	ECOS2VP151CX
	25 x 30	1.12	1.57	1.105	0.387	ECOS2VP151CA
180	30 x 25	1.12	1.57	1.105	0.387	ECOS2VP151DA
	22 x 40	1.22	1.71	0.921	0.322	ECOS2VP181BA
	25 x 30	1.22	1.71	0.921	0.322	ECOS2VP181CX
220	25 x 35	1.22	1.71	0.921	0.322	ECOS2VP181CA
	30 x 25	1.22	1.71	0.921	0.322	ECOS2VP181DA
	22 x 45	1.44	2.02	0.754	0.264	ECOS2VP221BA
270	25 x 35	1.44	2.02	0.754	0.264	ECOS2VP221CX
	25 x 40	1.44	2.02	0.754	0.264	ECOS2VP221CA
	30 x 25	1.44	2.02	0.754	0.264	ECOS2VP221DX
	30 x 30	1.44	2.02	0.754	0.264	ECOS2VP221DA
	35 x 25	1.44	2.02	0.754	0.264	ECOS2VP221EA
330	25 x 40	1.66	2.32	0.614	0.215	ECOS2VP271CX
	30 x 30	1.66	2.32	0.614	0.215	ECOS2VP271DX
	30 x 35	1.66	2.32	0.614	0.215	ECOS2VP271DA
	35 x 25	1.66	2.32	0.614	0.215	ECOS2VP271EX

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A_{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10kHz~	120Hz	20kHz	
450 VDC Working, 500 VDC Surge (continued)						
270	35 x 35	1.78	2.49	0.675	0.270	ECOS2WP271EA
330	30 x 50	2.01	2.81	0.553	0.249	ECOS2WP331DA
	35 x 35	2.01	2.81	0.553	0.221	ECOS2WP331EX
	35 x 40	2.01	2.81	0.553	0.249	ECOS2WP331EA
390	35 x 45	2.24	3.14	0.510	0.255	ECOS2WP391EA
470	35 x 45	2.53	3.54	0.423	0.233	ECOS2WP471EX
	35 x 50	2.53	3.54	0.423	0.233	ECOS2WP471EA
500 VDC Working, 550 VDC Surge (continued)						
47	22 x 25	0.63	0.88	3.527	1.411	ECOS2HP470BA
56	22 x 30	0.70	0.98	2.960	1.184	ECOS2HP560BA
68	22 x 35	0.78	1.09	2.438	0.975	ECOS2HP680BA
	25 x 25	0.78	1.09	2.438	0.975	ECOS2HP680CA
82	22 x 40	0.88	1.23	2.022	0.809	ECOS2HP820BA
	25 x 30	0.88	1.23	2.022	0.809	ECOS2HP820CA
100	22 x 45	0.99	1.39	1.658	0.663	ECOS2HP101BA
	25 x 35	0.99	1.39	1.658	0.663	ECOS2HP101CA
120	22 x 50	1.13	1.58	1.382	0.553	ECOS2HP121BA
	25 x 40	1.13	1.58	1.382	0.553	ECOS2HP121CA
	30 x 30	1.13	1.58	1.382	0.553	ECOS2HP121DA
150	25 x 45	1.29	1.80	1.105	0.442	ECOS2HP151CA
	30 x 35	1.29	1.80	1.105	0.442	ECOS2HP151DA
	35 x 25	1.20	1.68	1.105	0.442	ECOS2HP151EA
180	25 x 50	1.38	1.93	0.921	0.368	ECOS2HP181CA
	30 x 40	1.38	1.93	0.921	0.368	ECOS2HP181DA
	35 x 30	1.36	1.90	0.921	0.368	ECOS2HP181EA
220	30 x 45	1.50	2.10	0.754	0.339	ECOS2HP221DA
	35 x 35	1.54	2.16	0.754	0.301	ECOS2HP221EA
270	35 x 40	1.76	2.46	0.614	0.276	ECOS2HP271EA
330	35 x 45	1.99	2.79	0.502	0.251	ECOS2HP331EA
390	35 x 50	2.22	3.11	0.425	0.234	ECOS2HP391EA