

TS-HA Series 105°C, 3000 hours*

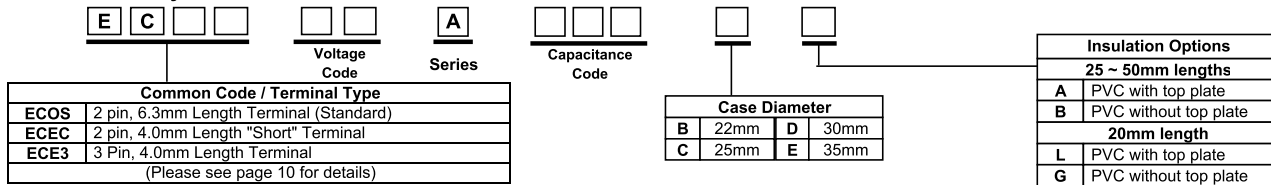
- High ripple current capability
- 20mm lengths for low profile applications
- 2 and 3 pin versions available



Rated Working Voltage:	10 ~ 250 VDC	385 ~ 450 VDC
Operating Temperature:	-40 ~ +105°C	-25 ~ +105°C
Nominal Capacitance:	68 ~ 82000µF (±20% tolerance)	33 ~ 470µF (±20% tolerance)
Dissipation Factor: (120 Hz, +20°C)	Working Voltage [V]:	10 16 25 35 50 63 80 100 - 450
	Max. D.F. (%):	55 45 35 30 25 20 17 15
For capacitance values > 33000µF, add the value of: $\frac{\text{rated cap. } [\mu\text{F}] - 33000}{1000}$		
Leakage Current:	3√CV (µA) max. after 5 minutes; C = Capacitance in µF, V = WV	
Ripple Current Multipliers:	Frequency(Hz):	50 60 100-120 500 1k 10k~
		10-100WV: 0.93 0.95 1.0 1.05 1.08 1.15 160-450WV: 0.75 0.8 1.0 1.2 1.25 1.4
Ripple Current Ambient Temperature Factors**		
Ambient Temperature: 105°C 85°C 70°C 60°C ≤45°C		
Multiplier: 1.0 1.7 2.0 2.2 2.35		
Endurance:	3000 hours at +105°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



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

Cap. (µF)	Size (mm) D x L	Max 105°C R.C. (A _{rms})		20°C ESR (Ω, max.)		Panasonic Part Number	Cap. (µF)	Size (mm) D x L	Max 105°C R.C. (A _{rms})		20°C ESR (Ω, max.)		Panasonic Part Number
		120Hz	10kHz~	120Hz	20kHz				120Hz	20kHz	120Hz	20kHz	
10 VDC Working, 13 VDC Surge							16 VDC Working, 20 VDC Surge (continued)						
4700	22 x 25	0.85	0.98	0.159	0.135	ECOS1AA472BA	10000	35 x 20	2.40	2.76	0.071	0.057	ECOS1CA103EL
6800	22 x 25	1.30	1.50	0.110	0.093	ECOS1AA682BA	12000	22 x 35	2.90	3.34	0.055	0.044	ECOS1CA123BA
10000	22 x 25	1.80	2.07	0.075	0.063	ECOS1AA103BA		25 x 30	2.90	3.34	0.055	0.044	ECOS1CA123CA
12000	22 x 30	2.20	2.53	0.062	0.053	ECOS1AA123BA		30 x 25	2.90	3.34	0.055	0.044	ECOS1CA123DA
15000	22 x 35	2.30	2.65	0.053	0.045	ECOS1AA153BA	15000	22 x 40	3.20	3.68	0.046	0.037	ECOS1CA153BA
	25 x 25	2.30	2.65	0.053	0.045	ECOS1AA153CA		25 x 35	3.20	3.68	0.046	0.037	ECOS1CA153CA
18000	22 x 40	2.40	2.76	0.044	0.038	ECOS1AA183BA	30 x 30	3.20	3.68	0.046	0.037	ECOS1CA153DA	
	25 x 30	2.40	2.76	0.044	0.038	ECOS1AA183CA	18000	22 x 45	3.50	4.03	0.040	0.034	ECOS1CA183BA
22000	22 x 45	2.60	2.99	0.038	0.032	ECOS1AA223BA		25 x 40	3.50	4.03	0.040	0.034	ECOS1CA183CA
	25 x 35	2.60	2.99	0.038	0.032	ECOS1AA223CA	30 x 30	3.50	4.03	0.040	0.034	ECOS1CA183DA	
	30 x 25	2.60	2.99	0.038	0.032	ECOS1AA223DA	35 x 25	3.50	4.03	0.040	0.034	ECOS1CA183EA	
27000	22 x 50	3.10	3.57	0.033	0.028	ECOS1AA273BA	22000	25 x 45	3.80	4.37	0.033	0.028	ECOS1CA223CA
	25 x 40	3.10	3.57	0.033	0.028	ECOS1AA273CA		30 x 35	3.80	4.37	0.033	0.028	ECOS1CA223DA
	30 x 30	3.10	3.57	0.033	0.028	ECOS1AA273DA		35 x 30	3.80	4.37	0.033	0.028	ECOS1CA223EA
	35 x 25	3.10	3.57	0.033	0.028	ECOS1AA273EA		27000	25 x 50	4.20	4.83	0.028	0.025
33000	25 x 45	3.40	3.91	0.027	0.023	ECOS1AA333BA	30 x 40		4.20	4.83	0.028	0.025	ECOS1CA273DA
	30 x 35	3.40	3.91	0.027	0.023	ECOS1AA333CA	35 x 30		4.20	4.83	0.028	0.025	ECOS1CA273EA
	35 x 30	3.40	3.91	0.027	0.023	ECOS1AA333EA	33000	30 x 45	4.70	5.41	0.023	0.020	ECOS1CA333DA
39000	25 x 50	3.70	4.26	0.025	0.021	ECOS1AA393BA		35 x 35	4.70	5.41	0.023	0.020	ECOS1CA333EA
	30 x 40	3.70	4.26	0.025	0.021	ECOS1AA393CA	39000	30 x 50	5.10	5.87	0.022	0.020	ECOS1CA393DA
	35 x 30	3.70	4.26	0.025	0.021	ECOS1AA393EA		35 x 40	5.10	5.87	0.022	0.020	ECOS1CA393EA
47000	30 x 45	4.20	4.83	0.023	0.020	ECOS1AA473DA	47000	35 x 45	5.50	6.33	0.020	0.018	ECOS1CA473EA
	35 x 35	4.20	4.83	0.023	0.020	ECOS1AA473EA	56000	35 x 50	6.00	6.90	0.019	0.017	ECOS1CA563EA
56000	30 x 50	5.00	5.75	0.022	0.019	ECOS1AA563DA	25 VDC Working, 32 VDC Surge						
68000	35 x 40	5.00	5.75	0.022	0.021	ECOS1AA563EA	2200	22 x 20	1.30	1.50	0.241	0.181	ECOS1EA222BL
68000	35 x 50	5.50	6.33	0.021	0.020	ECOS1AA683EA		22 x 25	1.30	1.50	0.241	0.181	ECOS1EA222BA
3300	22 x 20	1.30	1.50	0.216	0.173	ECOS1CA332BL	3300	22 x 25	1.62	1.86	0.161	0.121	ECOS1EA332BA
	22 x 25	1.30	1.50	0.176	0.141	ECOS1CA332BA		25 x 20	1.60	1.84	0.161	0.121	ECOS1EA332CL
4700	22 x 25	1.52	1.75	0.123	0.099	ECOS1CA472BA	4700	22 x 25	2.00	2.30	0.106	0.079	ECOS1EA472BA
	25 x 20	1.60	1.84	0.152	0.121	ECOS1CA472CL		30 x 20	1.80	2.07	0.113	0.085	ECOS1EA472DL
6800	22 x 25	2.20	2.53	0.085	0.068	ECOS1CA682BA	5600	22 x 30	2.20	2.53	0.089	0.067	ECOS1EA562BA
	30 x 20	1.80	2.07	0.105	0.084	ECOS1CA682DL		6800	22 x 30	2.40	2.76	0.073	0.055
8200	22 x 30	2.40	2.76	0.071	0.057	ECOS1CA822BA	25 x 25		2.40	2.76	0.073	0.055	ECOS1EA682CA
	10000	22 x 30	2.60	2.99	0.066	0.053	ECOS1CA103BA	35 x 20	2.30	2.65	0.080	0.060	ECOS1EA682EL
25 x 25		2.60	2.99	0.066	0.053	ECOS1CA103CA	8200	22 x 35	2.70	3.11	0.061	0.045	ECOS1EA822BA
							25 x 30	2.70	3.11	0.061	0.045	ECOS1EA822CA	

