

Panasonic®

Large Can

Aluminum Electrolytic Capacitors

Year 2000 issue



Matsushita Electronic Components Corporation of America (ACOM) has been manufacturing aluminum electrolytic capacitors since 1982.

ACOM initially produced the popular 2 pin, snap-in capacitor. Manufacturing has expanded with the introduction of multi-pin snap-in and computer grade capacitors.

New and expanded range products in this catalog include:

- ***Expanded capacitance ratings (TS-UP series)***
- ***Expanded case sizes***
 - ***40mm diameters (TS-UP, TS-HA, TS-HB series)***
 - ***50mm diameters, lengths to 105mm (T-UP, T-HA series)***
- ***Screw terminal products (G-AA, G-BA series)***
- ***500WV products (TS-UP, T-UP, G-AA series)***

This catalog contains general information and standard product listings for aluminum electrolytic capacitors produced by Matsushita Electronic Components Corporation of America (ACOM).

Special designs and more comprehensive technical information are available upon request. Contact your Panasonic sales representative for details.

The information contained herein is believed to be accurate at the time of publication. Design and specifications are subject to change without notice.

No ozone depleting substances (ODS) under the Montreal Protocol are used in the manufacturing process for these products.

The ACOM capacitor plant is ISO 9001 registered.

Capacitor Quick Guide

Series	Features	Endurance (Load Life)	Voltage Range (WV)	Cap. Range (μ F)	Size Range D x L (mm)	Comments	Page
<i>2 terminal snap-in style (TS Type)</i>							7
TS-UP	High CV	85°C 2000 ~ 3000h	16 ~ 500	33 ~ 68,000	20 x 25 ~ 40 x 50	Extended CV ratings, 40mm diameters, 500WV available	8
TS-HA	High CV High Ripple Long Life	105°C 2000 ~ 3000h	10 ~ 450	33 ~ 68,000	20 x 25 ~ 40 x 50	20mm low profile lengths available	13
TS-HB	Very High CV High Ripple Long Life	105°C 3000h	160 ~ 450	82 ~ 2,700	22 x 30 ~ 40 x 50	40mm diameters available	17
TS-XB	Premium Industrial Grade	105°C 7000h	160 ~ 450	39 ~ 2,200	22 x 25 ~ 35 x 50	Longest life TS type	19
TS-EX	VDE-0806 Specification	105°C 2000h	250	100 ~ 1,200	22 x 25 ~ 35 x 50	VDE-0806 over- voltage capability	22
<i>4 / 5 terminal snap-in style (T Type)</i>							23
T-UP	High CV High Ripple	85°C 3000h	16 ~ 500	470 ~ 120,000	35 x 40 ~ 50 x 105	50mm diameters, 500WV ratings available	24
T-HA	Long Life High Ripple	105°C 3000h	16 ~ 450	390 ~ 120,000	35 x 40 ~ 50 x 105	50mm diameter sizes available	27
<i>Screw terminal "computer grade" style (G Type)</i>							29
G-AA	High CV Industrial Grade	85°C 3000h	16 ~ 500	150 ~ 1,200,000	35 x 40 ~ 77 x 220	English and metric terminals available	30
G-BA	Long Life Industrial Grade	105°C 2000h	10 ~ 450	220 ~ 1,200,000	35 x 40 ~ 77 x 220	English and metric terminals available	34

1 General Specifications

Capacitance

Nominal capacitance is specified at 120Hz frequency and 20°C temperature. Unless specified otherwise, standard capacitance tolerance is $\pm 20\%$ of the nominal value.

Working Voltage

The maximum allowable sum of continuous DC voltage plus peak ripple voltage which can be applied to the capacitor.

Surge Voltage

The maximum transient voltage level allowed for short periods of time without sustaining permanent damage to the capacitor. Values are listed in the standard product ratings.

Leakage Current

$I = 3\sqrt{CV}$ (μA) maximum after 5 minutes of applying rated voltage. Capacitance is the nominal value in μF , voltage in VDC.

Ripple Current

The standard product tables list ripple current allowable limits at specified maximum operating temperatures.

Correction factors for other temperatures and frequencies are listed in the general sections for the general product type.

Endurance (Life) Test

Duration:	Specified hours of life
Ambient Temp.:	Maximum specified operating temperature
Applied Voltage:	DC voltage with maximum specified ripple current applied (the sum of the applied DC voltage plus the peak ripple voltage should not exceed rated working voltage)

Post test requirements at +20°C:

Leakage Current:	\leq Initial specified value
Cap. change:	$\leq \pm 20\%$ of initial measured value
D. F. / E.S.R.:	$\leq 200\%$ of initial specified value

Shelf Life

Duration:	1000 hours
Ambient Temp.:	Maximum specified operating temperature
Applied Voltage:	None

Post test requirements at +20°C:

Same as Endurance Test requirements above.

Measurements are to be performed after applying DC working voltage for 30 minutes.

2 Life Expectancy

Panasonic capacitors have a specified life at a maximum temperature and ripple current. Typical life can be considerably longer based on actual life test results performed by the factory. This data can be provided to help the designer estimate expected life. This information is given with a 60% confidence level.

Capacitor life at lower temperatures follows "The Doubling 10°C Rule" where life is doubled for each 10°C reduction in operating temperature. The following equation is useful for determining the life of a capacitor in the application;

$$L_2 = L_1 \times 2^{\frac{T_1 - (T_2 + \Delta T)}{10}}$$

where:

L_1 = Specified life (hours) at maximum operating temperature. Typical life may be substituted (at a 60% confidence level).

L_2 = Expected life (hours) at actual operating temperature.

T_1 = Maximum operating temperature.

T_2 = Ambient temperature (°C).

ΔT = Ripple current temperature rise (°C).

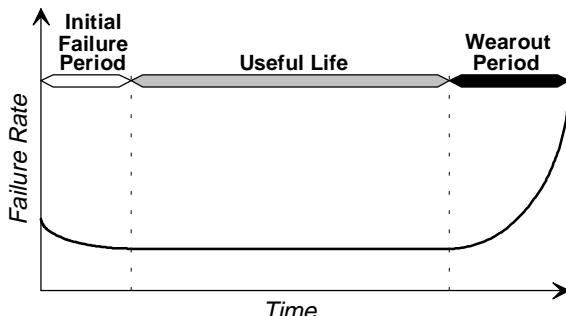
It is recommended that the ripple current heat rise be limited to 15°C at lower ambient temperatures as higher temperature rises may reduce operating life.

End of life is defined by the occurrence of one of the following when stabilized at 20°C;

- ◆ Capacitance change exceeds $\pm 20\%$ of the initial measured value.
- ◆ Dissipation Factor exceeds 200% of the initial specified value.

2 Life Expectancy (continued)

- ◆ Leakage Current exceeds the initial specified value.



Life Cycle of an Aluminum Electrolytic Capacitor

3 Circuit Design Considerations

Operating Temperature and Frequency

Aluminum electrolytic capacitor electrical characteristics are normally specified at a temperature of 20°C and a frequency of 120Hz. Electrical parameters are temperature and frequency dependent as follows;

(1) Effects of operating temperature

At higher temperatures, capacitance and leakage current increase while ESR decreases.

At lower temperatures, capacitance and leakage current will decrease while ESR increases.

(2) Effects of frequency

Capacitance, impedance, and ESR will decrease as frequency increases.

At lower frequencies, ripple current generated temperature will rise due to increasing ESR.

Reverse Voltage

DC capacitors have polarity which must be verified before insertion.

Avoid use in circuits with changing or uncertain polarity.

Ensure that allowable ripple currents superimposed on low DC bias voltages do not cause reverse voltage conditions.

Charge / Discharge Applications

Standard capacitors are not suitable for use in repeating charge / discharge applications.

Capacitors Connected in Parallel

Circuit resistance can approximate the series resistance of the capacitor, resulting in ripple current load imbalances. Careful design of wiring methods can minimize excessive ripple currents applied to a capacitor.

Capacitors Connected in Series

Normal DC leakage current variations among capacitors can cause voltage differences. The use of voltage dividing sharing resistors with consideration to leakage currents can compensate for voltage imbalances.

Electrical Precautions

Transient recovery voltage may be generated in the capacitor due to dielectric absorption. Typical voltage levels are less than 10% of the rated capacitor voltage. If required, this voltage can be discharged with a resistor.

The aluminum case of the capacitor has an indeterminate resistance to the cathode terminal. The vinyl sleeve on the capacitor is for marking and identification purposes and is not meant to electrically isolate the capacitor.

When designing circuits, consider worst case capacitor failure modes such as open or short circuits.

The effects of hot, electrically conductive, combustible, electrolyte liquid or vapor escaping from the safety vent should also be considered.

4 Capacitor Mounting Considerations

Circuit Board Design

Avoid wiring pattern runs which pass between the mounted capacitor and the circuit board. When dipping into a solder bath, excessive solder may collect under the capacitor by capillary action and short circuit the anode and cathode terminals.

4 Mounting Considerations (continued)

The vinyl sleeve of the capacitor can be damaged if solder passes through a lead hole for subsequently processed parts.

Electrically isolate the extra terminal(s) on T type products from the anode terminal, cathode terminal, and other circuit paths.

Clearance Requirements

Case mounted pressure relief vents require sufficient clearance to operate properly. The minimum clearance is diameter dependent as follows: 20~ 35mm diameters, 3mm minimum. 40mm diameters or greater, 5mm minimum.

Circuit Board Cleaning

Aluminum electrolytic capacitors can withstand immersion or ultrasonic cleaning with "safe" cleaning solvents for up to 5 minutes and 60°C maximum temperatures.

Most aqueous based cleaning solvents and detergents are acceptable. Some solvent groups could damage capacitors as follows:

- Halogenated cleaning solvents may permeate the capacitor seal, causing internal corrosion and failure.
- Alkali solvents may attack and dissolve the aluminum case.
- Petroleum based solvents may deteriorate the rubber seal.
- Xylene may deteriorate the rubber seal.
- Acetone may remove vinyl sleeve ink printing.

A thorough rinsing and drying process will prevent entrapment of residual solvents between the capacitor and the circuit board. Excessive drying temperatures and / or radiant heat drying sources may result in splitting or excessive shrinkage of the vinyl sleeve.

Mounting Adhesives and Coating Agents

When using mounting adhesives or coating agents, avoid materials with halogenated cleaning solvents including chloroprene based polymers.

A thorough drying process after application is required to prevent solvent entrapment between the capacitor and the circuit board.

Mounting adhesives or reinforcement clamps are recommended on 2 terminal, TS types with case sizes of ϕ 35 x 45mm or larger. Additional mounting support is also recommended for 4 or 5 terminal, T types with lengths exceeding 63mm.

5 Storage

Leakage current will increase with long storage times.

Storage times in ambient temperatures of 40°C or less can be four years or more before leakage current should be checked for conformance to the specified limit.

Longer storage times may require reforming of the capacitor to reduce leakage current below the specified limit. This can be accomplished by applying rated voltage in series with a 1000Ω resistor for a time period of 30 ~ 60 minutes.

Under normal conditions, shelf life can exceed 10 years, providing that leakage current is checked before use.

Long term storage in high humidity conditions could cause oxidation of the terminal plating which could adversely affect solderability.

6 Safety Precautions

If the pressure relief vent of the capacitor should operate, immediately turn off the equipment and disconnect from the power source. This will minimize additional damage caused by the vaporizing electrolyte.

Avoid contact with the escaping electrolyte which can exceed 100°C temperatures.

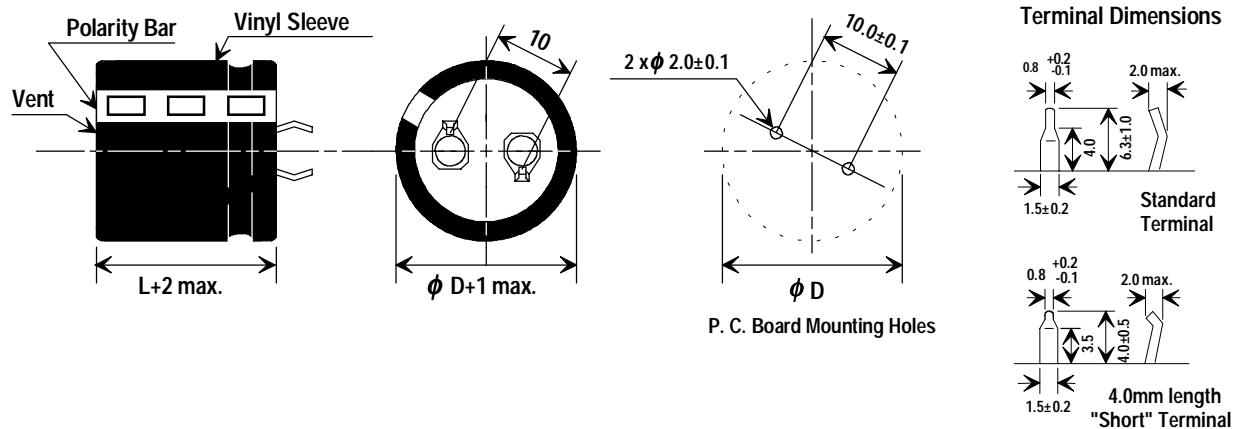
If electrolyte or vapors enter the eye, immediately flush the eye with large amounts of water and seek medical attention.

If electrolytes or vapors are ingested by mouth, gargle with water.

If electrolyte contacts the skin, wash with soap and water.

TS Type General Information

Dimensions



Ripple Current Multipliers

Ripple Current Frequency Correction Factors						
Frequency (Hz):	50	60	100~120	500	1k~50k	
16~100WV:	0.93	0.95	1.0	1.05	1.08	1.15
160~500WV:	0.75	0.8	1.0	1.2	1.25	1.4

Ripple Current Temperature Correction Factors					
Max. Temperature	105°C	85°C	70°C	60°C	≤45°C
TS-UP	---	1.0	1.3	1.4	1.5
TS-HA, HB, XB, EX		1.0	1.7	2.0	2.2
					2.35

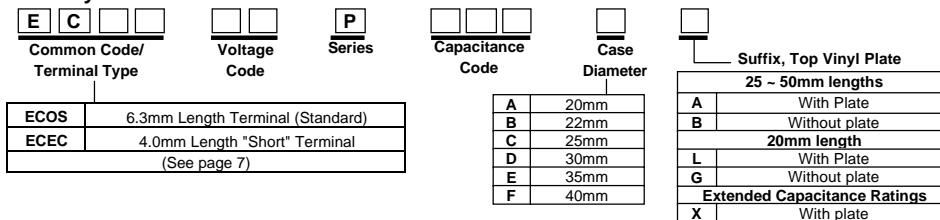
Note: Use of temperature correction factors can limit load life to the hours specified for the maximum operating temperature of the series.

TS-UP Series two terminal snap-in

- Compact size for general purpose and industrial applications
- **NEW:** 500 WV ratings, 40mm diameter sizes, extended capacitance ratings
- Wide range of case sizes including 20mm lengths for low profile applications
- Can vent construction



Rated Working Voltage:	16 ~ 250 VDC								350 ~ 500 VDC													
Operating Temperature:	-40 ~ +85°C								-25 ~ +85°C													
Nominal Capacitance:	120 ~ 68000µF ($\pm 20\%$ tolerance)								33 ~ 680µF ($\pm 20\%$ 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: $(\text{rated cap. } [\mu\text{F}] - 33000) / 1000$																					
Endurance:	3000 hours* at +85°C with maximum specified ripple current (see page 4) *2000 hours for 20mm diameter or 20mm length sizes																					

Part Number System**TS-UP Standard Ratings**

Cap. (µF)	Size (mm) D x L	Max 85°C R.C. (A _{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
16 VDC Working, 20 VDC Surge						
6800	20 x 25	3.15	3.62	0.098	0.083	ECOS1CP682AA
8200	20 x 30	3.47	3.99	0.081	0.069	ECOS1CP822AA
10000	20 x 35	3.78	4.35	0.066	0.056	ECOS1CP103AA
12000	20 x 35	4.52	5.20	0.062	0.053	ECOS1CP123AA
15000	20 x 40	5.26	6.05	0.053	0.045	ECOS1CP153AA
4700	22 x 20	1.60	1.84	0.159	0.135	ECOS1CP472BL
10000	22 x 30	3.78	4.35	0.075	0.063	ECOS1CP103BA
12000	22 x 30	4.52	5.20	0.062	0.053	ECOS1CP123BA
15000	22 x 35	5.26	6.05	0.053	0.045	ECOS1CP153BA
18000	22 x 40	5.57	6.41	0.046	0.039	ECOS1CP183BA
22000	22 x 45	6.10	7.02	0.038	0.032	ECOS1CP223BA
6800	25 x 20	1.80	2.07	0.110	0.093	ECOS1CP682CL
10000	25 x 25	3.78	4.35	0.075	0.063	ECOS1CP103CA
12000	25 x 25	4.52	5.20	0.062	0.053	ECOS1CP123CA
15000	25 x 30	5.26	6.05	0.053	0.045	ECOS1CP153CA
18000	25 x 30	5.57	6.41	0.046	0.039	ECOS1CP183CA
22000	25 x 35	6.10	7.02	0.038	0.032	ECOS1CP223CA
27000	25 x 45	6.31	7.26	0.031	0.026	ECOS1CP273CA
33000	25 x 50	6.84	7.87	0.025	0.021	ECOS1CP333CA
10000	30 x 20	2.40	2.76	0.083	0.070	ECOS1CP103DL
22000	30 x 30	6.10	7.02	0.038	0.032	ECOS1CP223DA
27000	30 x 35	6.31	7.26	0.031	0.026	ECOS1CP273DA
33000	30 x 40	6.84	7.87	0.025	0.021	ECOS1CP333DA
39000	30 x 45	6.94	7.98	0.021	0.018	ECOS1CP393DA
47000	30 x 50	7.47	8.59	0.019	0.017	ECOS1CP473DA
15000	35 x 20	3.20	3.68	0.055	0.047	ECOS1CP153EL
33000	35 x 30	6.84	7.87	0.025	0.021	ECOS1CP333EA
39000	35 x 35	6.94	7.98	0.021	0.018	ECOS1CP393EA
47000	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
68000	40 x 40	9.05	10.41	0.018	0.017	ECOS1CP683FA
82000	40 x 50	10.29	11.83	0.016	0.015	ECOS1CP823FA
25 VDC Working, 32 VDC Surge						
4700	20 x 25	3.05	3.51	0.113	0.090	ECOS1EP472AA
5600	20 x 30	3.36	3.86	0.095	0.076	ECOS1EP562AA
6800	20 x 35	3.47	3.99	0.078	0.062	ECOS1EP682AA
8200	20 x 40	3.57	4.11	0.065	0.052	ECOS1EP822AA
3300	22 x 20	1.60	1.84	0.176	0.141	ECOS1EP332BL
6800	22 x 30	3.47	3.99	0.078	0.062	ECOS1EP682BA
8200	22 x 30	3.57	4.11	0.065	0.052	ECOS1EP822BA
10000	22 x 35	3.78	4.35	0.058	0.046	ECOS1EP103BA
12000	22 x 40	4.10	4.72	0.048	0.039	ECOS1EP123BA
15000	22 x 50	4.63	5.32	0.039	0.031	ECOS1EP153BA
4700	25 x 20	1.80	2.07	0.123	0.099	ECOS1EP472CL
6800	25 x 25	3.47	3.99	0.078	0.062	ECOS1EP682CA
8200	25 x 25	3.57	4.11	0.065	0.052	ECOS1EP822CA
10000	25 x 30	3.78	4.35	0.058	0.046	ECOS1EP103CA
12000	25 x 35	4.10	4.72	0.048	0.039	ECOS1EP123CA
15000	25 x 40	4.63	5.32	0.039	0.031	ECOS1EP153CA
18000	25 x 45	5.47	6.29	0.035	0.028	ECOS1EP183CA
22000	25 x 50	6.10	7.02	0.029	0.023	ECOS1EP223CA
6800	30 x 20	2.30	2.65	0.078	0.062	ECOS1EP682DL
10000	30 x 25	3.78	4.35	0.058	0.046	ECOS1EP103DA
12000	30 x 30	4.10	4.72	0.048	0.039	ECOS1EP123DA
15000	30 x 30	4.63	5.32	0.039	0.031	ECOS1EP153DA
18000	30 x 35	5.47	6.29	0.035	0.028	ECOS1EP183DA
22000	30 x 40	6.10	7.02	0.029	0.023	ECOS1EP223DA
27000	30 x 45	6.21	7.14	0.023	0.019	ECOS1EP273DA
33000	30 x 50	6.84	7.87	0.020	0.017	ECOS1EP333DA
10000	35 x 20	2.70	3.11	0.061	0.049	ECOS1EP103EL
27000	35 x 35	6.21	7.14	0.025	0.020	ECOS1EP273EA
33000	35 x 40	6.84	7.87	0.020	0.017	ECOS1EP333EA
39000	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
47000	40 x 40	8.00	9.20	0.017	0.015	ECOS1EP473FA
56000	40 x 50	8.96	10.30	0.016	0.015	ECOS1EP563FA

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120Hz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number	Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120Hz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number	
35 VDC Working, 44 VDC Surge												
3300	20 x 25	2.73	3.14	0.111	0.083	ECOS1VP332AA	2200	20 x 25	2.26	2.60	0.151	0.113
3900	20 x 30	2.94	3.38	0.094	0.070	ECOS1VP392AA	2700	20 x 30	2.52	2.90	0.123	0.092
4700	20 x 35	3.26	3.75	0.078	0.058	ECOS1VP472AA	3300	20 x 35	2.73	3.14	0.100	0.075
5600	20 x 40	3.36	3.86	0.080	0.060	ECOS1VP562AA	3900	20 x 40	2.75	3.16	0.085	0.064
2200	22 x 20	1.40	1.61	0.181	0.136	ECOS1VP222BL	1500	22 x 20	1.20	1.38	0.254	0.191
4700	22 x 30	3.26	3.75	0.078	0.058	ECOS1VP472BA	3300	22 x 30	2.73	3.14	0.100	0.075
5600	22 x 30	3.36	3.86	0.080	0.060	ECOS1VP562BA	3900	22 x 30	2.75	3.16	0.085	0.064
6800	22 x 35	3.68	4.23	0.066	0.049	ECOS1VP682BA	4700	22 x 35	3.03	3.48	0.071	0.053
8200	22 x 40	4.00	4.60	0.057	0.042	ECOS1VP822BA	5600	22 x 40	3.42	3.93	0.059	0.044
10000	22 x 45	4.42	5.08	0.050	0.037	ECOS1VP103BA	6800	22 x 50	3.85	4.43	0.049	0.037
3300	25 x 20	1.70	1.96	0.121	0.090	ECOS1VP332CL	2200	25 x 20	1.40	1.61	0.173	0.130
4700	25 x 25	3.26	3.75	0.078	0.058	ECOS1VP472CA	3300	25 x 25	2.73	3.14	0.100	0.075
5600	25 x 25	3.36	3.86	0.080	0.060	ECOS1VP562CA	3900	25 x 25	2.75	3.16	0.085	0.064
6800	25 x 30	3.68	4.23	0.066	0.049	ECOS1VP682CA	4700	25 x 30	3.03	3.48	0.071	0.053
8200	25 x 35	4.00	4.60	0.057	0.042	ECOS1VP822CA	5600	25 x 35	3.42	3.93	0.059	0.044
10000	25 x 40	4.42	5.08	0.050	0.037	ECOS1VP103CA	6800	25 x 40	3.85	4.43	0.049	0.037
12000	25 x 45	5.05	5.81	0.044	0.033	ECOS1VP123CA	8200	25 x 45	4.41	5.07	0.040	0.030
15000	25 x 50	5.57	6.41	0.036	0.027	ECOS1VP153CA	10000	25 x 50	4.97	5.72	0.036	0.027
4700	30 x 20	2.00	2.30	0.088	0.066	ECOS1VP472DL	3300	30 x 20	1.70	1.96	0.116	0.087
10000	30 x 30	4.42	5.08	0.050	0.037	ECOS1VP103DA	4700	30 x 25	3.03	3.48	0.071	0.053
12000	30 x 35	5.05	5.81	0.044	0.033	ECOS1VP123DA	5600	30 x 30	3.42	3.93	0.059	0.044
15000	30 x 40	5.57	6.41	0.036	0.027	ECOS1VP153DA	6800	30 x 30	3.85	4.43	0.049	0.037
18000	30 x 45	5.68	6.53	0.030	0.023	ECOS1VP183DA	8200	30 x 35	4.41	5.07	0.040	0.030
22000	30 x 50	6.10	7.02	0.026	0.020	ECOS1VP223DA	10000	30 x 40	4.97	5.72	0.036	0.027
6800	35 x 20	2.40	2.76	0.071	0.053	ECOS1VP682EL	12000	30 x 45	5.58	6.42	0.032	0.024
10000	35 x 25	4.42	5.08	0.050	0.037	ECOS1VP103EA	15000	30 x 50	6.44	7.41	0.028	0.021
12000	35 x 30	5.05	5.81	0.044	0.033	ECOS1VP123EA	4700	35 x 20	2.10	2.42	0.081	0.061
15000	35 x 30	5.57	6.41	0.036	0.027	ECOS1VP153EA	10000	35 x 30	4.97	5.72	0.036	0.027
18000	35 x 35	5.68	6.53	0.030	0.023	ECOS1VP183EA	12000	35 x 35	5.58	6.42	0.032	0.024
22000	35 x 40	6.10	7.02	0.026	0.020	ECOS1VP223EA	15000	35 x 40	6.44	7.41	0.028	0.021
27000	35 x 45	6.84	7.87	0.021	0.017	ECOS1VP273EA	18000	35 x 45	6.94	7.98	0.023	0.018
33000	35 x 50	7.15	8.22	0.018	0.014	ECOS1VP333EA	22000	35 x 50	7.57	8.71	0.021	0.017
27000	40 x 40	6.84	7.87	0.021	0.017	ECOS1VP273FA	18000	40 x 40	6.94	7.98	0.023	0.017
39000	40 x 50	7.98	9.18	0.017	0.014	ECOS1VP393FA	27000	40 x 50	8.80	10.12	0.018	0.015
63 VDC Working, 79 VDC Surge												
2200	20 x 35	2.52	2.90	0.151	0.113	ECOS1JP222AA	1200	20 x 30	2.08	2.39	0.221	0.166
2700	20 x 40	3.73	4.29	0.123	0.092	ECOS1JP272AA	1500	20 x 35	2.26	2.60	0.177	0.133
1000	22 x 20	1.20	1.38	0.381	0.286	ECOS1JP102BL	1800	20 x 40	2.52	2.90	0.147	0.111
2200	22 x 30	2.52	2.90	0.151	0.113	ECOS1JP222BA	2200	20 x 50	2.73	3.14	0.136	0.102
2700	22 x 35	3.73	4.29	0.123	0.092	ECOS1JP272BA	680	22 x 20	1.00	1.15	0.439	0.329
3300	22 x 40	4.10	4.72	0.105	0.079	ECOS1JP332BA	1500	22 x 30	2.26	2.60	0.177	0.133
3900	22 x 45	4.44	5.11	0.098	0.073	ECOS1JP392BA	1800	22 x 35	2.52	2.90	0.147	0.111
4700	22 x 50	4.86	5.59	0.081	0.061	ECOS1JP472BA	2200	22 x 40	2.73	3.14	0.121	0.090
1500	25 x 20	1.30	1.50	0.254	0.191	ECOS1JP152CL	2700	22 x 45	2.78	3.20	0.098	0.074
2200	25 x 25	2.52	2.90	0.151	0.113	ECOS1JP222CA	3300	22 x 50	3.21	3.69	0.085	0.064
2700	25 x 30	3.73	4.29	0.123	0.092	ECOS1JP272CA	1000	25 x 20	1.20	1.38	0.298	0.224
3300	25 x 30	4.10	4.72	0.105	0.079	ECOS1JP332CA	1500	25 x 25	2.26	2.60	0.177	0.133
3900	25 x 35	4.44	5.11	0.098	0.073	ECOS1JP392CA	1800	25 x 30	2.52	2.90	0.147	0.111
4700	25 x 40	4.86	5.59	0.081	0.061	ECOS1JP472CA	2200	25 x 30	2.73	3.14	0.121	0.090
5600	25 x 45	5.36	6.16	0.068	0.051	ECOS1JP562CA	2700	25 x 35	2.78	3.20	0.098	0.074
6800	25 x 50	5.84	6.72	0.061	0.046	ECOS1JP682CA	3300	25 x 40	3.21	3.69	0.085	0.064
2200	30 x 20	1.50	1.73	0.173	0.130	ECOS1JP222DL	3900	25 x 45	3.59	4.13	0.077	0.057
3300	30 x 25	4.10	4.72	0.105	0.079	ECOS1JP332DA	4700	25 x 50	4.09	4.70	0.063	0.048
3900	30 x 30	4.44	5.11	0.098	0.073	ECOS1JP392DA	1500	30 x 20	1.40	1.61	0.199	0.149
4700	30 x 30	4.86	5.59	0.081	0.061	ECOS1JP472DA	2200	30 x 25	2.73	3.14	0.121	0.090
5600	30 x 35	5.36	6.16	0.068	0.051	ECOS1JP562DA	2700	30 x 30	2.78	3.20	0.098	0.074
6800	30 x 40	5.84	6.72	0.061	0.046	ECOS1JP682DA	3300	30 x 30	3.21	3.69	0.085	0.064
8200	30 x 45	6.00	6.90	0.051	0.038	ECOS1JP822DA	3900	30 x 35	3.59	4.13	0.077	0.057
3300	35 x 20	1.70	1.96	0.126	0.094	ECOS1JP332EL	4700	30 x 40	4.09	4.70	0.063	0.048
4700	35 x 25	4.86	5.59	0.081	0.061	ECOS1JP472EA	5600	30 x 45	4.55	5.23	0.056	0.042
5600	35 x 30	5.36	6.16	0.068	0.051	ECOS1JP562EA	6800	30 x 50	5.16	5.93	0.046	0.035
6800	35 x 30	5.84	6.72	0.061	0.046	ECOS1JP682EA	2200	35 x 20	1.70	1.96	0.136	0.102
8200	35 x 35	6.00	6.90	0.051	0.038	ECOS1JP822EA	5600	35 x 35	4.55	5.23	0.056	0.042
10000	35 x 40	6.52	7.50	0.041	0.033	ECOS1JP103EA	6800	35 x 40	5.16	5.93	0.046	0.035
12000	35 x 50	7.15	8.22	0.035	0.028	ECOS1JP123EA	8200	35 x 50	5.83	6.70	0.038	0.029
12000	40 x 40	7.15	8.22	0.035	0.028	ECOS1JP123FA	2200	40 x 40	5.83	6.70	0.038	0.029
15000	40 x 50	7.53	8.66	0.033	0.027	ECOS1JP153FA	10000	40 x 50	6.56	7.54	0.033	0.025
80 VDC Working, 100 VDC Surge												
1200	20 x 30	2.08	2.39	0.221	0.166	ECOS1KP122AA	1200	20 x 30	2.08	2.39	0.221	0.166
1500	20 x 35	2.26	2.60	0.177	0.133	ECOS1KP152AA	1500	20 x 40	2.52	2.90	0.147	0.111
1800	20 x 40	2.52	2.90	0.147	0.111	ECOS1KP182AA	1800	20 x 50	2.73	3.14	0.121	0.090
2200	20 x 50	2.73	3.14	0.136	0.102	ECOS1KP222AA	2200	22 x 20	1.00	1.15	0.439	0.329
680	22 x 20	1.00	1.15	0.439	0.329	ECOS1KP681BL	680	22 x 20	1.00	1.15	0.439	0.329
1500	22 x 30	2.26	2.60	0.177	0.133	ECOS1KP152BA	1500	22 x 30	2.26	2.60	0.177	0.133
1800	22 x 35	2.52	2.90	0.147	0.111	ECOS1KP182BA	1800	22 x 40	2.73	3.14	0.121	0.090
2200	22 x 40	2.73	3.14	0.121	0.090	ECOS1KP222BA	2200	25 x 30	2.73	3.14	0.121	0.090
2700	22 x 45	2.78	3.20	0.098	0.074	ECOS1KP272BA	2700	25 x 35	2.78	3.20	0.098	0.074
3300	22 x 50	3.21	3.69	0.085	0.064	ECOS1KP332BA	3300	25 x 40	3.21	3.69	0.085	0.064
3												

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120Hz	Max. 20°C ESR (Ω) 10k-50kHz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number	Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120Hz	Max. 20°C ESR (Ω) 10k-50kHz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number
100 VDC Working, 125 VDC Surge													
560	20 x 25	1.35	1.55	0.385	0.250	ECOS2AP561AA	330	20 x 30	1.45	2.03	0.553	0.276	ECOS2CP331AA
820	20 x 30	1.59	1.83	0.263	0.171	ECOS2AP821AA	390	20 x 35	1.62	2.27	0.468	0.234	ECOS2CP391AA
1000	20 x 35	1.96	2.25	0.216	0.140	ECOS2AP102AA	220	22 x 20	0.75	1.05	0.980	0.490	ECOS2CP221BL
1200	20 x 40	2.31	2.66	0.180	0.117	ECOS2AP122AA	330	22 x 25	1.45	2.03	0.553	0.276	ECOS2CP331BA
1500	20 x 50	2.57	2.96	0.144	0.093	ECOS2AP152AA	390	22 x 30	1.62	2.27	0.468	0.234	ECOS2CP391BX
470	22 x 20	1.00	1.15	0.459	0.298	ECOS2AP471BL	470	22 x 30	2.11	2.95	0.423	0.212	ECOS2CP471BA
680	22 x 25	1.61	1.85	0.317	0.206	ECOS2AP681BA	560	22 x 30	2.25	3.15	0.355	0.178	ECOS2CP561BX
1000	22 x 30	1.96	2.25	0.216	0.140	ECOS2AP102BA	560	22 x 35	2.25	3.15	0.355	0.178	ECOS2CP561BA
1200	22 x 35	2.31	2.66	0.193	0.126	ECOS2AP122BA	680	22 x 35	2.50	3.50	0.293	0.146	ECOS2CP681BX
1500	22 x 40	2.57	2.96	0.155	0.101	ECOS2AP152BA	680	22 x 40	2.50	3.50	0.293	0.146	ECOS2CP681BA
1800	22 x 45	2.84	3.27	0.129	0.084	ECOS2AP182BA	820	22 x 40	2.50	3.50	0.243	0.121	ECOS2CP821BX
2200	22 x 50	3.14	3.61	0.121	0.078	ECOS2AP222BA	820	22 x 45	2.75	3.85	0.263	0.131	ECOS2CP821BA
680	25 x 20	1.10	1.27	0.366	0.238	ECOS2AP681CL	1000	22 x 45	3.00	4.20	0.216	0.108	ECOS2CP102BX
1000	25 x 25	1.96	2.25	0.216	0.140	ECOS2AP102CA	270	25 x 20	0.87	1.22	0.798	0.399	ECOS2CP271CL
1200	25 x 30	2.31	2.66	0.180	0.117	ECOS2AP122CA	390	25 x 25	1.62	2.27	0.468	0.234	ECOS2CP391CA
1500	25 x 30	2.57	2.96	0.155	0.101	ECOS2AP152CA	470	25 x 25	2.11	2.95	0.423	0.212	ECOS2CP471CA
1800	25 x 35	2.84	3.27	0.138	0.090	ECOS2AP182CA	560	25 x 25	2.25	3.15	0.355	0.178	ECOS2CP561CX
2200	25 x 40	3.14	3.61	0.121	0.078	ECOS2AP222CA	560	25 x 30	2.25	3.15	0.355	0.178	ECOS2CP561CA
2700	25 x 45	3.71	4.27	0.104	0.068	ECOS2AP272CA	680	25 x 30	2.50	3.50	0.293	0.146	ECOS2CP681CX
3300	25 x 50	4.06	4.67	0.090	0.059	ECOS2AP332CA	820	25 x 35	2.75	3.85	0.263	0.131	ECOS2CP821CA
1000	30 x 20	1.20	1.38	0.249	0.162	ECOS2AP102DL	1000	25 x 40	3.00	4.20	0.216	0.108	ECOS2CP102CX
1500	30 x 25	2.57	2.96	0.155	0.101	ECOS2AP152DA	1000	25 x 45	3.00	4.20	0.232	0.128	ECOS2CP102CA
1800	30 x 30	2.84	3.27	0.138	0.090	ECOS2AP182DA	1200	25 x 50	3.25	4.55	0.207	0.114	ECOS2CP122CA
2200	30 x 30	3.14	3.61	0.121	0.078	ECOS2AP222DA	1500	25 x 50	3.73	5.22	0.166	0.091	ECOS2CP152CX
2700	30 x 35	3.71	4.27	0.104	0.068	ECOS2AP272DA	390	30 x 20	1.10	1.54	0.595	0.298	ECOS2CP391DL
3300	30 x 40	4.06	4.67	0.090	0.059	ECOS2AP332DA	680	30 x 25	2.50	3.50	0.293	0.146	ECOS2CP681DA
3900	30 x 45	4.54	5.22	0.077	0.050	ECOS2AP392DA	820	30 x 25	2.75	3.85	0.263	0.131	ECOS2CP821DX
4700	30 x 50	5.13	5.90	0.071	0.049	ECOS2AP472DA	820	30 x 30	2.75	3.85	0.263	0.131	ECOS2CP821DA
1500	35 x 20	1.50	1.73	0.177	0.115	ECOS2AP152EL	1000	30 x 30	3.00	4.20	0.232	0.128	ECOS2CP102DX
2200	35 x 25	3.14	3.61	0.121	0.078	ECOS2AP222EA	1000	30 x 35	3.00	4.20	0.232	0.128	ECOS2CP102DA
2700	35 x 30	3.71	4.27	0.104	0.068	ECOS2AP272EA	1200	30 x 35	3.25	4.55	0.207	0.114	ECOS2CP122DA
3900	35 x 35	4.54	5.22	0.081	0.052	ECOS2AP392EA	1500	30 x 45	3.73	5.22	0.166	0.091	ECOS2CP152DA
4700	35 x 40	5.13	5.90	0.071	0.049	ECOS2AP472EA	1800	30 x 50	4.20	5.88	0.138	0.083	ECOS2CP182DA
5600	35 x 45	5.75	6.61	0.059	0.041	ECOS2AP562EA	2200	30 x 50	4.78	6.69	0.105	0.053	ECOS2CP222DX
6800	35 x 50	6.60	7.59	0.049	0.037	ECOS2AP682EA	560	35 x 20	1.30	1.82	0.414	0.207	ECOS2CP561EL
5600	40 x 40	5.75	6.61	0.059	0.044	ECOS2AP562FA	1000	35 x 30	3.00	4.20	0.232	0.128	ECOS2CP102EA
8200	40 x 50	7.28	8.37	0.040	0.030	ECOS2AP822FA	1200	35 x 30	3.25	4.55	0.207	0.114	ECOS2CP122EA
200 VDC Working, 250 VDC Surge													
270	20 x 30	1.41	1.97	0.614	0.276	ECOS2DP271AA	180	20 x 30	1.07	1.50	0.921	0.368	ECOS2EP181AA
330	20 x 35	1.56	2.18	0.553	0.249	ECOS2DP331AA	220	20 x 35	1.17	1.64	0.754	0.301	ECOS2EP221AA
470	20 x 40	1.85	2.59	0.388	0.175	ECOS2DP471AX	120	22 x 20	0.45	0.63	1.658	0.663	ECOS2EP121BL
680	20 x 50	2.52	3.53	0.268	0.121	ECOS2DP681AX	180	22 x 25	1.07	1.50	0.921	0.368	ECOS2EP181BA
150	22 x 20	0.65	0.91	1.326	0.597	ECOS2DP151BL	220	22 x 25	1.17	1.64	0.754	0.301	ECOS2EP221BX
270	22 x 25	1.41	1.97	0.614	0.276	ECOS2DP271BA	270	22 x 30	1.31	1.83	0.614	0.246	ECOS2EP271BA
330	22 x 25	1.56	2.18	0.553	0.249	ECOS2DP331BX	330	22 x 35	1.75	2.45	0.553	0.221	ECOS2EP331BA
390	22 x 30	1.68	2.35	0.468	0.210	ECOS2DP391BA	390	22 x 40	1.91	2.67	0.468	0.187	ECOS2EP391BA
470	22 x 35	1.85	2.59	0.388	0.175	ECOS2DP471BA	470	22 x 45	2.11	2.95	0.388	0.155	ECOS2EP471BA
560	22 x 40	2.43	3.40	0.326	0.147	ECOS2DP561BA	150	25 x 20	0.65	0.91	1.326	0.531	ECOS2EP151CL
680	22 x 45	2.68	3.75	0.268	0.121	ECOS2DP681BA	270	25 x 25	1.31	1.83	0.614	0.246	ECOS2EP271CA
220	25 x 20	0.87	1.22	0.904	0.407	ECOS2DP221CL	330	25 x 30	1.75	2.45	0.502	0.201	ECOS2EP331CA
390	25 x 25	1.68	2.35	0.468	0.210	ECOS2DP391CA	390	25 x 30	1.91	2.67	0.468	0.187	ECOS2EP391CX
470	25 x 30	1.85	2.59	0.388	0.175	ECOS2DP471CA	470	25 x 35	2.11	2.95	0.388	0.155	ECOS2EP471CX
560	25 x 30	2.43	3.40	0.326	0.147	ECOS2DP561CX	470	25 x 40	2.11	2.95	0.388	0.155	ECOS2EP471CA
680	25 x 35	2.68	3.75	0.268	0.121	ECOS2DP681CA	560	25 x 40	2.25	3.15	0.326	0.130	ECOS2EP561CX
820	25 x 45	2.93	4.10	0.222	0.100	ECOS2DP821CA	560	25 x 45	2.25	3.15	0.326	0.130	ECOS2EP561CA
1000	25 x 45	3.25	4.55	0.199	0.090	ECOS2DP102CX	680	25 x 45	2.50	3.50	0.268	0.107	ECOS2EP681CX
330	30 x 20	1.00	1.40	0.603	0.271	ECOS2DP331DL	680	25 x 50	2.50	3.50	0.268	0.107	ECOS2EP681CA
560	30 x 25	2.43	3.40	0.326	0.147	ECOS2DP561DA	220	30 x 20	0.87	1.22	0.829	0.332	ECOS2EP221DL
680	30 x 30	2.68	3.75	0.268	0.121	ECOS2DP681DA	390	30 x 25	1.91	2.67	0.425	0.170	ECOS2EP391DA
820	30 x 30	2.93	4.10	0.222	0.100	ECOS2DP821DX	470	30 x 25	2.11	2.95	0.353	0.141	ECOS2EP471DX
1000	30 x 35	3.25	4.55	0.199	0.090	ECOS2DP102DX	470	30 x 30	2.11	2.95	0.388	0.155	ECOS2EP471DA
							560	30 x 30	2.25	3.15	0.326	0.130	ECOS2EP561DX

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A _{rms}) 120Hz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number	Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A _{rms}) 120Hz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number		
200 VDC Working, 250 VDC Surge (continued)													
1000	30 x 40	3.25	4.55	0.199	0.090	ECOS2DP102DA	560	30 x 35	2.25	3.15	0.326	0.130	ECOS2EP561DA
1200	30 x 40	3.50	4.90	0.166	0.075	ECOS2DP122DX	680	30 x 35	2.25	3.15	0.268	0.107	ECOS2EP681DX
1200	30 x 45	3.50	4.90	0.166	0.075	ECOS2DP122DA	680	30 x 40	2.50	3.50	0.268	0.107	ECOS2EP681DA
1500	30 x 45	3.87	5.42	0.144	0.072	ECOS2DP152DX	820	30 x 40	2.50	3.50	0.222	0.089	ECOS2EP821DX
1500	30 x 50	3.87	5.42	0.144	0.072	ECOS2DP152DA	820	30 x 45	2.77	3.88	0.222	0.089	ECOS2EP821DA
1800	30 x 50	4.32	6.05	0.120	0.060	ECOS2DP182DX	1000	30 x 45	3.32	4.65	0.182	0.073	ECOS2EP102DX
470	35 x 20	1.30	1.82	0.459	0.206	ECOS2DP471EL	1000	30 x 50	3.32	4.65	0.199	0.090	ECOS2EP102DA
820	35 x 25	2.93	4.10	0.243	0.109	ECOS2DP821EA	330	35 x 20	1.10	1.54	0.553	0.221	ECOS2EP331EL
1000	35 x 30	3.25	4.55	0.199	0.090	ECOS2DP102EA	560	35 x 25	2.25	3.15	0.326	0.130	ECOS2EP561EA
1200	35 x 30	3.50	4.90	0.166	0.075	ECOS2DP122EX	680	35 x 30	2.50	3.50	0.268	0.107	ECOS2EP681EA
1200	35 x 35	3.50	4.90	0.166	0.075	ECOS2DP122EA	820	35 x 30	2.77	3.88	0.222	0.089	ECOS2EP821EX
1500	35 x 35	3.87	5.42	0.144	0.072	ECOS2DP152EX	820	35 x 35	2.77	3.88	0.243	0.109	ECOS2EP821EA
1500	35 x 40	3.87	5.42	0.144	0.072	ECOS2DP152EA	1000	35 x 35	3.32	4.65	0.199	0.090	ECOS2EP102EX
1800	35 x 40	4.32	6.05	0.120	0.060	ECOS2DP182EX	1000	35 x 40	3.32	4.65	0.199	0.099	ECOS2EP102EA
1800	35 x 45	4.32	6.05	0.120	0.060	ECOS2DP182EA	1200	35 x 40	3.53	4.94	0.166	0.083	ECOS2EP122EX
2200	35 x 45	4.92	6.89	0.098	0.054	ECOS2DP222EX	1200	35 x 45	3.53	4.94	0.166	0.083	ECOS2EP122EA
2200	35 x 50	4.92	6.89	0.098	0.054	ECOS2DP222FA	1500	35 x 50	4.04	5.66	0.133	0.066	ECOS2EP152EA
2700	40 x 40	4.92	6.89	0.098	0.054	ECOS2DP222FA	1500	40 x 40	4.04	5.66	0.133	0.066	ECOS2EP152FA
2700	40 x 50	5.41	7.57	0.080	0.044	ECOS2DP272FA	1800	40 x 50	4.49	6.29	0.111	0.055	ECOS2EP182FA
350 VDC Working, 400 VDC Surge													
82	20 x 30	0.83	1.16	2.022	0.708	ECOS2VP820AA	68	20 x 30	0.76	1.06	2.438	0.853	ECOS2TP680AA
100	20 x 35	0.91	1.27	1.658	0.580	ECOS2VP101AA	82	20 x 30	0.83	1.16	2.022	0.708	ECOS2TP820AA
82	22 x 25	0.83	1.16	2.022	0.708	ECOS2VP820BA	100	20 x 35	0.92	1.29	1.658	0.580	ECOS2TP101AA
100	22 x 30	0.91	1.27	1.658	0.580	ECOS2VP101BA	120	20 x 40	1.02	1.43	1.382	0.553	ECOS2TP121AA
120	22 x 30	1.00	1.40	1.382	0.484	ECOS2VP121BA	47	22 x 20	0.25	0.35	4.233	1.481	ECOS2TP470BL
150	22 x 35	1.12	1.57	1.105	0.387	ECOS2VP151BA	68	22 x 25	0.76	1.06	2.438	0.853	ECOS2TP680BA
180	22 x 40	1.22	1.71	0.921	0.322	ECOS2VP181BA	82	22 x 25	0.83	1.16	2.022	0.708	ECOS2TP820BA
220	22 x 45	1.44	2.02	0.754	0.264	ECOS2VP221BA	100	22 x 30	0.92	1.29	1.658	0.580	ECOS2TP101BA
120	25 x 25	1.00	1.40	1.382	0.484	ECOS2VP121CA	120	22 x 35	1.02	1.43	1.382	0.553	ECOS2TP121BA
150	25 x 25	1.12	1.57	1.105	0.387	ECOS2VP151CX	150	22 x 35	1.16	1.62	1.105	0.442	ECOS2TP151BX
150	25 x 30	1.12	1.57	1.105	0.387	ECOS2VP151CA	150	22 x 40	1.16	1.62	1.105	0.442	ECOS2TP151BA
180	25 x 30	1.22	1.71	0.921	0.322	ECOS2VP181CX	180	22 x 40	1.44	2.02	0.921	0.368	ECOS2TP181BX
180	25 x 35	1.22	1.71	0.921	0.322	ECOS2VP181CA	180	22 x 45	1.44	2.02	0.921	0.368	ECOS2TP181BA
220	25 x 35	1.44	2.02	0.754	0.264	ECOS2VP221CX	220	22 x 45	1.49	2.09	0.829	0.373	ECOS2TP221BX
220	25 x 40	1.44	2.02	0.754	0.264	ECOS2VP221CA	220	22 x 50	1.49	2.09	0.829	0.373	ECOS2TP221BA
270	25 x 40	1.66	2.32	0.614	0.215	ECOS2VP271CX	68	25 x 20	0.35	0.49	2.926	1.024	ECOS2TP680CL
330	25 x 50	1.88	2.63	0.502	0.176	ECOS2VP331CA	100	25 x 25	0.92	1.29	1.658	0.580	ECOS2TP101CA
390	25 x 50	2.06	2.88	0.425	0.149	ECOS2VP391CX	120	25 x 25	1.02	1.43	1.382	0.553	ECOS2TP121CX
150	30 x 25	1.12	1.57	1.105	0.387	ECOS2VP151DA	120	25 x 30	1.02	1.43	1.382	0.553	ECOS2TP121CA
180	30 x 25	1.22	1.71	0.921	0.322	ECOS2VP181DA	150	25 x 30	1.16	1.62	1.105	0.442	ECOS2TP151CA
220	30 x 25	1.44	2.02	0.754	0.264	ECOS2VP221DX	180	25 x 30	1.44	2.02	0.921	0.368	ECOS2TP181CX
220	30 x 30	1.44	2.02	0.754	0.264	ECOS2VP221DA	180	25 x 35	1.44	2.02	0.921	0.368	ECOS2TP181CA
270	30 x 30	1.66	2.32	0.614	0.215	ECOS2VP271DX	220	25 x 40	1.49	2.09	0.829	0.373	ECOS2TP221CA
270	30 x 35	1.66	2.32	0.614	0.215	ECOS2VP271DA	270	25 x 45	1.67	2.34	0.675	0.304	ECOS2TP271CA
330	30 x 35	1.88	2.63	0.502	0.176	ECOS2VP331DX	330	25 x 50	1.90	2.66	0.553	0.249	ECOS2TP331CX
330	30 x 40	1.88	2.63	0.502	0.176	ECOS2VP331DA	100	30 x 20	0.47	0.66	1.989	0.696	ECOS2TP101DL
390	30 x 40	2.06	2.88	0.425	0.149	ECOS2VP391DX	150	30 x 25	1.16	1.62	1.105	0.442	ECOS2TP151DA
390	30 x 45	2.06	2.88	0.426	0.149	ECOS2VP391DA	180	30 x 25	1.44	2.02	0.921	0.368	ECOS2TP181DX
470	30 x 50	2.40	3.36	0.388	0.136	ECOS2VP471DA	180	30 x 30	1.44	2.02	0.921	0.368	ECOS2TP181DA
560	30 x 50	2.60	3.64	0.326	0.114	ECOS2VP561DX	220	30 x 30	1.49	2.09	0.829	0.373	ECOS2TP221DA
220	35 x 25	1.44	2.02	0.754	0.264	ECOS2VP221EA	270	30 x 35	1.67	2.34	0.675	0.304	ECOS2TP271DA
270	35 x 25	1.66	2.32	0.614	0.215	ECOS2VP271EX	330	30 x 40	1.90	2.66	0.553	0.249	ECOS2TP331DA
270	35 x 30	1.66	2.32	0.614	0.215	ECOS2VP271EA	390	30 x 45	2.13	2.98	0.468	0.210	ECOS2TP391DA
330	35 x 30	1.88	2.63	0.502	0.176	ECOS2VP331EA	470	30 x 50	2.39	3.35	0.388	0.175	ECOS2TP471DA
390	35 x 30	2.06	2.88	0.425	0.149	ECOS2VP391EX	150	35 x 20	0.60	0.84	1.326	0.531	ECOS2TP151EL
390	35 x 35	2.06	2.88	0.425	0.149	ECOS2VP391EA	270	35 x 25	1.67	2.34	0.675	0.304	ECOS2TP271EX
470	35 x 35	2.40	3.36	0.353	0.123	ECOS2VP471EX	270	35 x 30	1.67	2.34	0.675	0.304	ECOS2TP271EA
470	35 x 40	2.40	3.36	0.353	0.123	ECOS2VP471EA	330	35 x 30	1.90	2.66	0.553	0.249	ECOS2TP331EX
560	35 x 40	2.60	3.64	0.296	0.104	ECOS2VP561EX	330	35 x 35	1.90	2.66	0.553	0.249	ECOS2TP331EA
470	35 x 45	2.40	3.36	0.353	0.123	ECOS2VP471EA	390	35 x 35	2.13	2.98	0.468	0.210	ECOS2TP391EX
560	35 x 45	2.60	3.64	0.355	0.142	ECOS2VP561EA	390	35 x 40	2.13	2.98	0.468	0.210	ECOS2TP391EA
680	35 x 45	2.96	4.14	0.293	0.117	ECOS2VP681EX	470	35 x 40	2.39	3.35	0.388	0.175	ECOS2TP471EX
680	35 x 50	2.96	4.14	0.293	0.117	ECOS2VP681EA	470	35 x 45	2.39	3.35	0.388	0.175	ECOS2TP471EA
820	35 x 50	3.55	4.97	0.243	0.097	ECOS2VP821EX	560	35 x 45	2.69	3.77	0.326	0.147	ECOS2TP561EX
680	40 x 40	2.96	4.14	0.293	0.117	ECOS2VP681FA	560	35 x 50	2.69	3.77	0.326	0.147	ECOS2TP561EA
1000	40 x 50	3.80	5.32	0.199	0.080	ECOS2VP102FA	680	35 x 50	3.00	4.20	0.268	0.121	ECOS2TP681EX

TS-UP Standard Ratings (continued)

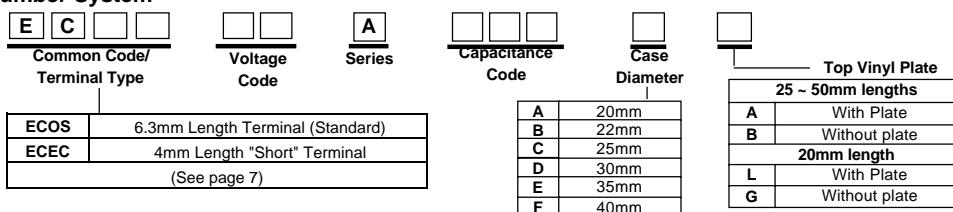
Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A _{rms}) 120Hz 10k-50kHz	Max. 20°C ESR (Ω) 120Hz 20kHz	Panasonic Part Number	Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A _{rms}) 120Hz 10k-50kHz	Max. 20°C ESR (Ω) 120Hz 20kHz	Panasonic Part Number				
400 VDC Working, 450 VDC Surge													
82	20 x 30	0.83	1.16	2.022	0.708	ECOS2GP820AA	56	20 x 30	0.70	0.98	2.960	1.184	ECOS2WP560AA
100	20 x 35	0.92	1.29	1.658	0.580	ECOS2GP101AA	82	20 x 35	0.83	1.16	2.022	0.809	ECOS2WP820AA
120	20 x 40	1.02	1.43	1.382	0.484	ECOS2GP121AA	33	22 x 20	0.20	0.28	6.028	2.411	ECOS2WP330BL
47	22 x 20	0.25	0.35	3.527	1.235	ECOS2GP470BL	56	22 x 25	0.70	0.98	2.960	1.184	ECOS2WP560BA
82	22 x 25	0.83	1.16	2.022	0.708	ECOS2GP820BA	82	22 x 30	0.83	1.16	2.022	0.809	ECOS2WP820BA
100	22 x 30	0.92	1.29	1.658	0.580	ECOS2GP101BA	100	22 x 35	0.93	1.30	1.658	0.663	ECOS2WP101BA
120	22 x 35	1.02	1.43	1.382	0.484	ECOS2GP121BA	120	22 x 40	1.04	1.46	1.382	0.553	ECOS2WP121BA
150	22 x 40	1.16	1.62	1.105	0.387	ECOS2GP151BA	150	22 x 50	1.19	1.67	1.105	0.442	ECOS2WP151BA
180	22 x 45	1.44	2.02	0.921	0.322	ECOS2GP181BA	47	25 x 20	0.29	0.41	4.233	1.693	ECOS2WP470CL
220	22 x 50	1.49	2.09	0.754	0.264	ECOS2GP221BA	82	25 x 25	0.83	1.16	2.022	0.809	ECOS2WP820CA
68	25 x 20	0.35	0.49	2.926	1.024	ECOS2GP680CL	120	25 x 30	1.04	1.46	1.382	0.553	ECOS2WP121CA
100	25 x 25	0.92	1.29	1.658	0.580	ECOS2GP101CA	150	25 x 40	1.19	1.67	1.105	0.442	ECOS2WP151CA
120	25 x 25	1.02	1.43	1.382	0.484	ECOS2GP121CX	180	25 x 40	1.35	1.89	0.921	0.368	ECOS2WP181CX
150	25 x 30	1.16	1.62	1.105	0.387	ECOS2GP151CA	180	25 x 45	1.35	1.89	0.921	0.368	ECOS2WP181CA
180	25 x 30	1.44	2.02	0.921	0.322	ECOS2GP181CX	220	25 x 45	1.55	2.17	0.754	0.301	ECOS2WP221CX
180	25 x 35	1.44	2.02	0.921	0.322	ECOS2GP181CA	220	25 x 50	1.55	2.17	0.754	0.301	ECOS2WP221CA
220	25 x 40	1.49	2.09	0.754	0.264	ECOS2GP221CA	68	30 x 20	0.38	0.53	2.926	1.170	ECOS2WP680DL
270	25 x 45	1.67	2.34	0.675	0.236	ECOS2GP271CA	120	30 x 25	1.04	1.46	1.382	0.553	ECOS2WP121DA
100	30 x 20	0.47	0.66	1.989	0.696	ECOS2GP101DL	150	30 x 30	1.19	1.67	1.105	0.442	ECOS2WP151DA
150	30 x 25	1.16	1.62	1.105	0.387	ECOS2GP151DA	180	30 x 30	1.35	1.89	0.921	0.368	ECOS2WP181DX
220	30 x 30	1.49	2.09	0.754	0.264	ECOS2GP221DA	180	30 x 35	1.35	1.89	0.921	0.368	ECOS2WP181DA
270	30 x 35	1.67	2.34	0.675	0.236	ECOS2GP271DA	220	30 x 35	1.55	2.17	0.754	0.301	ECOS2WP221DX
330	30 x 40	1.90	2.66	0.553	0.193	ECOS2GP331DA	220	30 x 40	1.55	2.17	0.754	0.301	ECOS2WP221DA
390	30 x 45	2.13	2.98	0.468	0.164	ECOS2GP391DA	270	30 x 45	1.78	2.49	0.675	0.270	ECOS2WP271DA
150	35 x 20	0.60	0.84	1.326	0.464	ECOS2GP151EL	330	30 x 50	2.01	2.81	0.553	0.249	ECOS2WP331DA
270	35 x 30	1.67	2.34	0.675	0.236	ECOS2GP271EA	100	35 x 20	0.52	0.73	1.989	0.796	ECOS2WP101EL
330	35 x 30	1.90	2.66	0.553	0.193	ECOS2GP331EX	180	35 x 25	1.35	1.89	0.921	0.368	ECOS2WP181EA
330	35 x 35	1.90	2.66	0.553	0.193	ECOS2GP331EA	220	35 x 30	1.55	2.17	0.754	0.301	ECOS2WP221EA
390	35 x 35	2.13	2.98	0.468	0.164	ECOS2GP391EX	270	35 x 30	1.78	2.49	0.614	0.246	ECOS2WP271EX
390	35 x 40	2.13	2.98	0.468	0.164	ECOS2GP391EA	270	35 x 35	1.78	2.49	0.675	0.270	ECOS2WP271EA
470	35 x 40	2.39	3.35	0.388	0.136	ECOS2GP471EX	330	35 x 35	2.01	2.81	0.553	0.221	ECOS2WP331EX
470	35 x 45	2.39	3.35	0.388	0.136	ECOS2GP471EA	330	35 x 40	2.01	2.81	0.553	0.249	ECOS2WP331EA
560	35 x 45	2.69	3.77	0.326	0.114	ECOS2GP561EX	390	35 x 45	2.24	3.14	0.510	0.255	ECOS2WP391EA
560	35 x 50	2.69	3.77	0.326	0.114	ECOS2GP561EA	470	35 x 45	2.53	3.54	0.423	0.233	ECOS2WP471EX
680	35 x 50	3.00	4.20	0.268	0.094	ECOS2GP681EX	470	35 x 50	2.53	3.54	0.423	0.233	ECOS2WP471EA
560	40 x 40	2.69	3.77	0.326	0.114	ECOS2GP561FA	470	40 x 40	2.53	3.54	0.423	0.233	ECOS2WP471FA
820	40 x 50	3.38	4.73	0.222	0.078	ECOS2GP821FA	680	40 x 50	3.15	4.41	0.293	0.161	ECOS2WP681FA
500 VDC Working, 550 VDC Surge													
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							
82	22 x 40	0.88	1.23	2.022	0.809	ECOS2HP820BA							
100	22 x 45	0.99	1.39	1.658	0.663	ECOS2HP101BA							
120	22 x 50	1.13	1.58	1.382	0.553	ECOS2HP121BA							
68	25 x 25	0.78	1.09	2.438	0.975	ECOS2HP680CA							
82	25 x 30	0.88	1.23	2.022	0.809	ECOS2HP820CA							
100	25 x 35	0.99	1.39	1.658	0.663	ECOS2HP101CA							
120	25 x 40	1.13	1.58	1.382	0.553	ECOS2HP121CA							
150	25 x 45	1.29	1.80	1.105	0.442	ECOS2HP151CA							
180	25 x 50	1.38	1.93	0.921	0.368	ECOS2HP181CA							
120	30 x 30	1.13	1.58	1.382	0.553	ECOS2HP121DA							
150	30 x 35	1.29	1.80	1.105	0.442	ECOS2HP151DA							
180	30 x 40	1.38	1.93	0.921	0.368	ECOS2HP181DA							
220	30 x 45	1.50	2.10	0.754	0.339	ECOS2HP221DA							
150	35 x 25	1.20	1.68	1.105	0.442	ECOS2HP151EA							
180	35 x 30	1.36	1.90	0.921	0.368	ECOS2HP181EA							
220	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							
330	40 x 40	2.16	3.02	0.502	0.276	ECOS2HP331FA							
470	40 x 50	2.70	3.78	0.353	0.194	ECOS2HP471FA							

TS-HA Series two terminal snap-in

- 3000 hour* life at 105°C with high ripple current capability
- Wide range of case sizes including 20mm, low profile lengths
- **NEW:** 40mm diameter sizes through 100WV.
- Can vent construction



Rated Working Voltage:	10 ~ 250 VDC								385 ~ 450 VDC							
Operating Temperature:	-40 ~ +105°C								-25 ~ +105°C							
Nominal Capacitance:	68 ~ 68000μF (±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: $\frac{(\text{rated cap. } [\mu\text{F}] - 33000)}{1000}$															
Endurance:	3000 hours* at +105°C with maximum specified ripple current (see page 4) *2000 hours for 20mm diameter or 20mm length sizes															

Part Number System**TS-HA Standard Ratings**

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms})		20°C ESR (Ω, max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
10 VDC Working, 13 VDC Surge						
6800	20 x 25	1.30	1.50	0.110	0.093	ECOS1AA682AA
8200	20 x 30	1.60	1.84	0.091	0.077	ECOS1AA822AA
10000	20 x 30	1.80	2.07	0.075	0.063	ECOS1AA103AA
12000	20 x 35	2.20	2.53	0.062	0.053	ECOS1AA123AA
15000	20 x 40	2.30	2.65	0.053	0.045	ECOS1AA153AA
10000	22 x 25	1.80	2.07	0.075	0.063	ECOS1AA103BA
12000	22 x 30	2.20	2.53	0.062	0.053	ECOS1AA123BA
15000	22 x 35	2.30	2.65	0.053	0.045	ECOS1AA153BA
18000	22 x 40	2.40	2.76	0.044	0.038	ECOS1AA183BA
22000	22 x 45	2.60	2.99	0.038	0.032	ECOS1AA223BA
27000	22 x 50	3.10	3.57	0.033	0.028	ECOS1AA273BA
15000	25 x 25	2.30	2.65	0.053	0.045	ECOS1AA153CA
18000	25 x 30	2.40	2.76	0.044	0.038	ECOS1AA183CA
22000	25 x 35	2.60	2.99	0.038	0.032	ECOS1AA223CA
27000	25 x 40	3.10	3.57	0.033	0.028	ECOS1AA273CA
33000	25 x 45	3.40	3.91	0.027	0.023	ECOS1AA333DA
39000	25 x 50	3.70	4.26	0.025	0.021	ECOS1AA393CA
22000	30 x 25	2.60	2.99	0.038	0.032	ECOS1AA223DA
27000	30 x 30	3.10	3.57	0.033	0.028	ECOS1AA273DA
33000	30 x 35	3.40	3.91	0.027	0.023	ECOS1AA333EA
39000	30 x 40	3.70	4.26	0.025	0.021	ECOS1AA393EA
47000	30 x 45	4.20	4.83	0.023	0.020	ECOS1AA473DA
56000	30 x 50	5.00	5.75	0.022	0.019	ECOS1AA563DA
27000	35 x 25	3.10	3.57	0.033	0.028	ECOS1AA273EA
33000	35 x 30	3.40	3.91	0.027	0.023	ECOS1AA333EA
39000	35 x 30	3.70	4.26	0.025	0.021	ECOS1AA393EA
47000	35 x 35	4.20	4.83	0.023	0.020	ECOS1AA473EA
56000	35 x 40	5.00	5.75	0.022	0.021	ECOS1AA563EA
68000	35 x 50	5.50	6.33	0.021	0.020	ECOS1AA683EA
62000	40 x 40	5.42	6.23	0.023	0.022	ECOS1AA623FA
82000	40 x 50	7.36	8.46	0.018	0.017	ECOS1AA823FA
16 VDC Working, 20 VDC Surge						
6800	20 x 30	2.20	2.53	0.085	0.068	ECOS1CA682AA
8200	20 x 35	2.40	2.76	0.071	0.057	ECOS1CA822AA
10000	20 x 40	2.60	2.99	0.066	0.053	ECOS1CA103AA
3300	22 x 20	1.30	1.50	0.216	0.173	ECOS1CA332BL
6800	22 x 25	2.20	2.53	0.085	0.068	ECOS1CA682BA
8200	22 x 30	2.40	2.76	0.071	0.057	ECOS1CA822BA
10000	22 x 30	2.60	2.99	0.066	0.053	ECOS1CA103BA
12000	22 x 35	2.90	3.34	0.055	0.044	ECOS1CA123BA
15000	22 x 40	3.20	3.68	0.046	0.037	ECOS1CA153BA
18000	22 x 45	3.50	4.03	0.040	0.034	ECOS1CA183BA
4700	25 x 20	1.60	1.84	0.152	0.121	ECOS1CA472CL
10000	25 x 25	2.60	2.99	0.066	0.053	ECOS1CA103CA
12000	25 x 30	2.90	3.34	0.055	0.044	ECOS1CA123CA
15000	25 x 35	3.20	3.68	0.046	0.037	ECOS1CA153CA
18000	25 x 40	3.50	4.03	0.040	0.034	ECOS1CA183CA
22000	25 x 45	3.80	4.37	0.033	0.028	ECOS1CA223CA
27000	25 x 50	4.20	4.83	0.028	0.025	ECOS1CA273CA
6800	30 x 20	1.80	2.07	0.105	0.084	ECOS1CA682DL
12000	30 x 25	2.90	3.34	0.055	0.044	ECOS1CA123DA
15000	30 x 30	3.20	3.68	0.046	0.037	ECOS1CA153DA
18000	30 x 30	3.50	4.03	0.040	0.034	ECOS1CA183DA
22000	30 x 35	3.80	4.37	0.033	0.028	ECOS1CA223DA
27000	30 x 40	4.20	4.83	0.028	0.025	ECOS1CA273DA
33000	30 x 45	4.70	5.41	0.023	0.020	ECOS1CA333DA
39000	30 x 50	5.10	5.87	0.022	0.020	ECOS1CA393DA
10000	35 x 20	2.40	2.76	0.071	0.057	ECOS1CA103EL
18000	35 x 25	3.50	4.03	0.040	0.034	ECOS1CA183EA
22000	35 x 30	3.80	4.37	0.033	0.028	ECOS1CA223EA
27000	35 x 30	4.20	4.83	0.028	0.025	ECOS1CA273EA
33000	35 x 35	4.70	5.41	0.023	0.020	ECOS1CA333EA
39000	35 x 40	5.10	5.87	0.022	0.020	ECOS1CA393EA
47000	35 x 45	5.50	6.33	0.020	0.018	ECOS1CA473EA
56000	35 x 50	6.00	6.90	0.019	0.017	ECOS1CA563EA
47000	40 x 40	5.50	6.33	0.020	0.018	ECOS1CA473FA
68000	40 x 50	7.29	8.38	0.015	0.014	ECOS1CA683FA

TS-HA Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
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25 VDC Working, 32 VDC Surge						
4700	20 x 30	2.00	2.30	0.106	0.079	ECOS1EA472AA
5600	20 x 35	2.20	2.53	0.089	0.067	ECOS1EA562AA
6800	20 x 40	2.40	2.76	0.073	0.055	ECOS1EA682AA
2200	22 x 20	1.30	1.50	0.241	0.181	ECOS1EA222BL
4700	22 x 25	2.00	2.30	0.106	0.079	ECOS1EA472BA
5600	22 x 30	2.20	2.53	0.089	0.067	ECOS1EA562BA
6800	22 x 30	2.40	2.76	0.073	0.055	ECOS1EA682BA
8200	22 x 35	2.70	3.11	0.061	0.045	ECOS1EA822BA
10000	22 x 40	3.00	3.45	0.051	0.039	ECOS1EA103BA
12000	22 x 45	3.20	3.68	0.044	0.033	ECOS1EA123BA
3300	25 x 20	1.60	1.84	0.161	0.121	ECOS1EA332CL
6800	25 x 25	2.40	2.76	0.073	0.055	ECOS1EA682CA
8200	25 x 30	2.70	3.11	0.061	0.045	ECOS1EA822CA
10000	25 x 35	3.00	3.45	0.051	0.039	ECOS1EA103CA
12000	25 x 40	3.20	3.68	0.044	0.035	ECOS1EA123CA
15000	25 x 45	3.60	4.14	0.036	0.031	ECOS1EA153CA
18000	25 x 50	3.90	4.49	0.030	0.027	ECOS1EA183CA
4700	30 x 20	1.80	2.07	0.113	0.085	ECOS1EA472DL
8200	30 x 25	2.70	3.11	0.061	0.045	ECOS1EA822DA
10000	30 x 30	3.00	3.45	0.051	0.039	ECOS1EA103DA
12000	30 x 30	3.20	3.68	0.044	0.035	ECOS1EA123DA
15000	30 x 35	3.60	4.14	0.036	0.031	ECOS1EA153DA
18000	30 x 40	3.90	4.49	0.030	0.027	ECOS1EA183DA
22000	30 x 45	4.30	4.95	0.025	0.022	ECOS1EA223DA
6800	35 x 20	2.30	2.65	0.080	0.060	ECOS1EA682EL
12000	35 x 25	3.20	3.68	0.044	0.035	ECOS1EA123EA
15000	35 x 30	3.60	4.14	0.036	0.031	ECOS1EA153EA
18000	35 x 35	3.90	4.49	0.030	0.027	ECOS1EA183EA
22000	35 x 35	4.30	4.95	0.025	0.022	ECOS1EA223EA
27000	35 x 45	4.80	5.52	0.021	0.019	ECOS1EA273EA
33000	35 x 50	5.50	6.33	0.018	0.016	ECOS1EA333EA
33000	40 x 40	5.50	6.33	0.018	0.016	ECOS1EA333FA
47000	40 x 50	6.47	7.44	0.015	0.014	ECOS1EA473FA

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
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35 VDC Working, 44 VDC Surge						
3300	20 x 30	1.90	2.19	0.121	0.090	ECOS1VA332AA
3900	20 x 35	2.00	2.30	0.111	0.083	ECOS1VA392AA
4700	20 x 40	2.20	2.53	0.088	0.066	ECOS1VA472AA
1500	22 x 20	1.10	1.27	0.287	0.216	ECOS1VA152BL
3300	22 x 25	1.90	2.19	0.121	0.090	ECOS1VA332BA
3900	22 x 30	2.00	2.30	0.111	0.083	ECOS1VA392BA
4700	22 x 35	2.20	2.53	0.088	0.066	ECOS1VA472BA
5600	22 x 35	2.40	2.76	0.074	0.056	ECOS1VA562BA
6800	22 x 40	2.60	2.99	0.061	0.046	ECOS1VA682BA
8200	22 x 50	2.90	3.34	0.051	0.038	ECOS1VA822BA
2200	25 x 20	1.40	1.61	0.196	0.147	ECOS1VA222CL
4700	25 x 25	2.20	2.53	0.088	0.066	ECOS1VA472CA
5600	25 x 30	2.40	2.76	0.074	0.056	ECOS1VA562CA
6800	25 x 35	2.60	2.99	0.061	0.046	ECOS1VA682CA
8200	25 x 40	2.90	3.34	0.051	0.038	ECOS1VA822CA
10000	25 x 45	3.20	3.68	0.041	0.031	ECOS1VA103CA
12000	25 x 50	3.50	4.03	0.035	0.026	ECOS1VA123CA
3300	30 x 20	1.70	1.96	0.131	0.098	ECOS1VA332DL
5600	30 x 25	2.40	2.76	0.074	0.056	ECOS1VA562DA
6800	30 x 30	2.60	2.99	0.061	0.046	ECOS1VA682DA
8200	30 x 30	2.90	3.34	0.051	0.038	ECOS1VA822DA
10000	30 x 35	3.20	3.68	0.041	0.031	ECOS1VA103DA
12000	30 x 40	3.50	4.03	0.035	0.026	ECOS1VA123DA
15000	30 x 45	3.90	4.49	0.030	0.022	ECOS1VA153DA
4700	35 x 20	2.00	2.30	0.095	0.071	ECOS1VA472EL
8200	35 x 25	2.90	3.34	0.051	0.038	ECOS1VA822EA
10000	35 x 30	3.20	3.68	0.041	0.031	ECOS1VA103EA
12000	35 x 30	3.50	4.03	0.035	0.026	ECOS1VA123EA
15000	35 x 35	3.90	4.49	0.030	0.022	ECOS1VA153EA
18000	35 x 40	4.30	4.95	0.028	0.021	ECOS1VA183EA
22000	35 x 50	5.00	5.75	0.023	0.017	ECOS1VA223EA
22000	40 x 40	5.00	5.75	0.023	0.017	ECOS1VA222FA
27000	40 x 50	5.44	6.26	0.020	0.015	ECOS1VA273FA

50 VDC Working, 63 VDC Surge						
1800	20 x 30	1.50	1.73	0.129	0.097	ECOS1HA182AA
2200	20 x 35	1.70	1.96	0.105	0.079	ECOS1HA222AA
2700	20 x 40	1.80	2.07	0.086	0.064	ECOS1HA272AA
1000	22 x 20	0.90	1.04	0.265	0.199	ECOS1HA102BL
1800	22 x 25	1.50	1.73	0.129	0.097	ECOS1HA182BA
2200	22 x 30	1.70	1.96	0.105	0.079	ECOS1HA222BA
2700	22 x 30	1.80	2.07	0.086	0.064	ECOS1HA272BA
3300	22 x 35	2.00	2.30	0.070	0.053	ECOS1HA332BA
3900	22 x 40	2.20	2.53	0.064	0.048	ECOS1HA392BA
4700	22 x 45	2.50	2.88	0.053	0.040	ECOS1HA472BA
5600	22 x 50	2.80	3.22	0.050	0.038	ECOS1HA562BA
1500	25 x 20	1.20	1.38	0.177	0.133	ECOS1HA152CL
2700	25 x 25	1.80	2.07	0.086	0.064	ECOS1HA272CA
3300	25 x 30	2.00	2.30	0.070	0.053	ECOS1HA332CA
3900	25 x 35	2.20	2.53	0.064	0.048	ECOS1HA392CA
4700	25 x 40	2.50	2.88	0.053	0.040	ECOS1HA472CA
5600	25 x 40	2.80	3.22	0.050	0.038	ECOS1HA562CA
6800	25 x 50	3.30	3.80	0.046	0.035	ECOS1HA682CA
2200	30 x 20	1.40	1.61	0.121	0.090	ECOS1HA222DL
3900	30 x 25	2.20	2.53	0.064	0.048	ECOS1HA392DA
4700	30 x 30	2.50	2.88	0.053	0.040	ECOS1HA472DA
5600	30 x 35	2.80	3.22	0.050	0.038	ECOS1HA562DA
6800	30 x 40	3.30	3.80	0.046	0.035	ECOS1HA682DA
8200	30 x 45	3.60	4.14	0.038	0.029	ECOS1HA822DA
10000	30 x 50	4.00	4.60	0.033	0.025	ECOS1HA103DA
3300	35 x 20	1.70	1.96	0.085	0.064	ECOS1HA332EL
4700	35 x 25	2.50	2.88	0.053	0.040	ECOS1HA472EA
5600	35 x 30	2.80	3.22	0.050	0.038	ECOS1HA562EA
6800	35 x 30	3.30	3.80	0.046	0.035	ECOS1HA682EA
8200	35 x 35	3.60	4.14	0.038	0.029	ECOS1HA822EA
10000	35 x 40	4.00	4.60	0.033	0.025	ECOS1HA103EA
12000	35 x 45	4.50	5.18	0.028	0.022	ECOS1HA123EA
15000	35 x 50	4.80	5.52	0.022	0.018	ECOS1HA153EA
15000	40 x 40	4.80	5.52	0.022	0.018	ECOS1HA153FA
22000	40 x 50	5.15	5.92	0.016	0.013	ECOS1HA223FA

63 VDC Working, 79 VDC Surge						
1200	20 x 30	1.40	1.61	0.235	0.176	ECOS1JA122AA
1500	20 x 35	1.50	1.73	0.188	0.141	ECOS1JA152AA
1800	20 x 40	1.70	1.96	0.157	0.117	ECOS1JA182AA
680	22 x 20	0.90	1.04	0.463	0.347	ECOS1JA681BL
1200	22 x 25	1.40	1.61	0.235	0.176	ECOS1JA122BA
1500	22 x 30	1.50	1.73	0.188	0.141	ECOS1JA152BA
1800	22 x 30	1.70	1.96	0.157	0.117	ECOS1JA182BA
2200	22 x 35	2.00	2.30	0.128	0.096	ECOS1JA222BA
2700	22 x 40	2.20	2.53	0.104	0.078	ECOS1JA272BA
3300	22 x 50	2.50	2.88	0.090	0.068	ECOS1JA332BA
3900	25 x 45	2.70	3.11	0.077	0.057	ECOS1JA392CA
4700	25 x 50	3.00	3.45	0.063	0.048	ECOS1JA472CA
1500	30 x 20	1.30	1.50	0.210	0.157	ECOS1JA152DL
2700	30 x 25	2.20	2.53	0.104	0.078	ECOS1JA272DA
3300	30 x 30	2.50	2.88	0.090	0.068	ECOS1JA332DA
3900	30 x 35	2.70	3.11	0.077	0.057	ECOS1JA392DA
4700	30 x 40	3.00	3.45	0.063	0.048	ECOS1JA472DA
5600	30 x 45	3.30	3.80	0.053	0.040	ECOS1JA562DA
6800	30 x 50	3.60	4.14	0.049	0.037	ECOS1JA682DA
2200	35 x 20	1.50	1.73	0.143	0.107	ECOS1JA222EL
3						

TS-HA Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
80 VDC Working, 100 VDC Surge						
820	20 x 30	1.20	1.38	0.222	0.145	ECOS1KA821AA
1000	20 x 35	1.30	1.50	0.182	0.119	ECOS1KA102AA
1200	20 x 40	1.50	1.73	0.166	0.116	ECOS1KA122AA
470	22 x 20	0.80	0.92	0.459	0.298	ECOS1KA471BL
820	22 x 25	1.20	1.38	0.222	0.145	ECOS1KA821BA
1000	22 x 30	1.30	1.50	0.182	0.119	ECOS1KA102BA
1200	22 x 30	1.50	1.73	0.166	0.116	ECOS1KA122BA
1500	22 x 35	1.70	1.96	0.133	0.093	ECOS1KA152BA
1800	22 x 40	1.80	2.07	0.111	0.077	ECOS1KA182BA
2200	22 x 45	2.10	2.42	0.090	0.063	ECOS1KA222BA
680	25 x 20	1.00	1.15	0.317	0.206	ECOS1KA681CL
1000	25 x 25	1.30	1.50	0.182	0.119	ECOS1KA102CA
1200	25 x 25	1.50	1.73	0.166	0.116	ECOS1KA122CA
1500	25 x 30	1.70	1.96	0.133	0.093	ECOS1KA152CA
1800	25 x 35	1.80	2.07	0.111	0.077	ECOS1KA182CA
2200	25 x 35	2.10	2.42	0.090	0.063	ECOS1KA222CA
2700	25 x 45	2.40	2.76	0.074	0.055	ECOS1KA272CA
3300	25 x 50	2.60	2.99	0.065	0.049	ECOS1KA332CA
1000	30 x 20	1.20	1.38	0.216	0.140	ECOS1KA102DL
1800	30 x 25	1.80	2.07	0.111	0.077	ECOS1KA182DA
2200	30 x 30	2.10	2.42	0.090	0.063	ECOS1KA222DA
2700	30 x 35	2.40	2.76	0.074	0.055	ECOS1KA272DA
3300	30 x 40	2.60	2.99	0.065	0.049	ECOS1KA332DA
3900	30 x 45	3.00	3.45	0.060	0.045	ECOS1KA392DA
4700	30 x 50	3.30	3.80	0.049	0.037	ECOS1KA472DA
1500	35 x 20	1.40	1.61	0.155	0.108	ECOS1KA152EL
2200	35 x 25	2.10	2.42	0.090	0.063	ECOS1KA222EA
2700	35 x 30	2.40	2.76	0.074	0.055	ECOS1KA272EA
3300	35 x 30	2.60	2.99	0.065	0.049	ECOS1KA332EA
3900	35 x 35	3.00	3.45	0.060	0.045	ECOS1KA392EA
4700	35 x 40	3.30	3.80	0.049	0.037	ECOS1KA472EA
5600	35 x 45	3.70	4.26	0.050	0.038	ECOS1KA562EA
6800	35 x 50	3.90	4.49	0.041	0.031	ECOS1KA682EA
6800	40 x 40	3.90	4.49	0.041	0.031	ECOS1KA682FA
8200	40 x 50	4.29	4.93	0.036	0.027	ECOS1KA822FA

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
100 VDC Working, 125 VDC Surge						
560	20 x 30	1.10	1.65	0.296	0.178	ECOS2AA561AA
820	20 x 35	1.40	2.10	0.202	0.121	ECOS2AA821AA
1000	20 x 40	1.70	2.55	0.182	0.109	ECOS2AA102AA
330	22 x 20	0.80	1.20	0.653	0.392	ECOS2AA331BL
560	22 x 25	1.10	1.65	0.296	0.178	ECOS2AA561BA
820	22 x 30	1.40	2.10	0.202	0.121	ECOS2AA821BA
1000	22 x 35	1.70	2.55	0.182	0.109	ECOS2AA102BA
1200	22 x 40	1.80	2.70	0.152	0.091	ECOS2AA122BA
1500	22 x 45	2.10	3.15	0.122	0.073	ECOS2AA152BA
470	25 x 20	1.00	1.50	0.459	0.275	ECOS2AA471CL
820	25 x 25	1.40	2.10	0.202	0.121	ECOS2AA821CA
1000	25 x 30	1.70	2.55	0.182	0.109	ECOS2AA102CA
1200	25 x 35	1.80	2.70	0.152	0.091	ECOS2AA122CA
1500	25 x 40	2.10	3.15	0.122	0.079	ECOS2AA152CA
1800	25 x 45	2.30	3.45	0.111	0.072	ECOS2AA182CA
2200	25 x 50	2.60	3.90	0.090	0.059	ECOS2AA222CA
680	30 x 20	1.10	1.65	0.317	0.190	ECOS2AA681DL
1200	30 x 25	1.80	2.70	0.152	0.091	ECOS2AA122DA
1500	30 x 30	2.10	3.15	0.122	0.079	ECOS2AA152DA
1800	30 x 35	2.30	3.45	0.111	0.072	ECOS2AA182DA
2200	30 x 40	2.60	3.90	0.090	0.059	ECOS2AA222DA
2700	30 x 45	2.90	4.35	0.080	0.052	ECOS2AA272DA
3300	30 x 50	3.20	4.80	0.075	0.053	ECOS2AA332DA
1000	35 x 20	1.20	1.80	0.216	0.129	ECOS2AA102EL
1500	35 x 25	2.10	3.15	0.122	0.079	ECOS2AA152EA
1800	35 x 30	2.30	3.45	0.111	0.072	ECOS2AA182EA
2200	35 x 35	2.60	3.90	0.090	0.059	ECOS2AA222EA
2700	35 x 35	2.90	4.35	0.080	0.052	ECOS2AA272EA
3300	35 x 40	3.20	4.80	0.075	0.053	ECOS2AA332EA
3900	35 x 45	3.60	5.40	0.064	0.045	ECOS2AA392EA
4700	35 x 50	3.80	5.70	0.053	0.040	ECOS2AA472EA
4700	40 x 40	3.80	5.70	0.053	0.040	ECOS2AA472FA
6800	40 x 50	4.57	6.86	0.037	0.027	ECOS2AA682FA

Cap. (μ F)	Size (mm) D x L	Max 106°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 100-200VDC Surge	20°C ESR (Ω , max.) 200-250VDC Surge	Panasonic Part Number	
160 VDC Working, 200 VDC Surge						
220	20 x 25	1.00	1.40	0.829	0.373	ECOS2CA221AA
270	20 x 30	1.10	1.54	0.675	0.304	ECOS2CA271AA
330	20 x 35	1.20	1.68	0.653	0.294	ECOS2CA331AA
390	20 x 40	1.30	1.82	0.468	0.210	ECOS2CA391AA
150	22 x 20	0.55	0.77	1.437	0.647	ECOS2CA151BL
270	22 x 25	1.10	1.54	0.675	0.304	ECOS2CA271BA
330	22 x 30	1.20	1.68	0.553	0.249	ECOS2CA331BA
390	22 x 30	1.30	1.82	0.553	0.249	ECOS2CA391BA
470	22 x 35	1.40	1.96	0.529	0.238	ECOS2CA471BA
560	22 x 40	1.50	2.10	0.385	0.173	ECOS2CA561BA
680	22 x 45	1.70	2.38	0.317	0.143	ECOS2CA681BA
220	25 x 20	0.75	1.05	0.980	0.441	ECOS2CA221CL
390	25 x 25	1.30	1.82	0.553	0.249	ECOS2CA391CA
470	25 x 30	1.40	1.96	0.459	0.206	ECOS2CA471CA
560	25 x 30	1.50	2.10	0.385	0.173	ECOS2CA561CA
680	25 x 35	1.70	2.38	0.317	0.143	ECOS2CA681CA
220	25 x 40	0.75	1.05	0.980	0.441	ECOS2CA221CL
390	25 x 45	1.30	1.82	0.553	0.249	ECOS2CA391DA
470	25 x 50	1.40	1.96	0.459	0.206	ECOS2CA471DA
560	25 x 50	1.50	2.10	0.385	0.173	ECOS2CA561DA
680	25 x 55	1.70	2.38	0.317	0.143	ECOS2CA681DA
220	30 x 20	1.00	1.40	0.553	0.249	ECOS2CA331DL
390	30 x 25	1.50	2.10	0.385	0.173	ECOS2CA561DA
680	30 x 30	1.70	2.38	0.317	0.143	ECOS2CA681DA
220	30 x 30	2.00	2.80	0.263	0.118	ECOS2CA821DA
1000	30 x 35	2.20	3.08	0.216	0.108	ECOS2CA102DA
1200	30 x 40	2.30	3.22	0.180	0.090	ECOS2CA122DA
1500	30 x 45	2.50	3.50	0.166	0.083	ECOS2CA152DA
1800	30 x 50	2.70	3.78	0.138	0.083	ECOS2CA182DA
470	35 x 20	1.15	1.61	0.459	0.206	ECOS2CA471EL
1500	35 x 35	2.50	3.50	0.166	0.083	ECOS2CA152EA
1800	35 x 40	2.70	3.78	0.138	0.069	ECOS2CA182EA
2200	35 x 50	2.90	4.06	0.113	0.057	ECOS2CA222EA

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 100-200VDC Surge	20°C ESR (Ω , max.) 200-250VDC Surge	Panasonic Part Number	
200 VDC Working, 250 VDC Surge						
220	20 x 30	1.00	1.40	0.754	0.339	ECOS2DA221AA
270	20 x 35	1.10	1.54	0.614	0.276	ECOS2DA271AA
330	20 x 40	1.20	1.68	0.502	0.226	ECOS2DA331AA
100	22 x 20	0.50	0.70	1.989	0.895	ECOS2DA101BL
220	22 x 25	1.00	1.40	0.754	0.339	ECOS2DA221BA
270	22 x 30	1.10	1.54	0.614	0.276	ECOS2DA271BA
330	22 x 30	1.20	1.68	0.502	0.226	ECOS2DA331BA
390	22 x 35	1.30	1.82	0.425	0.191	ECOS2DA391BA
470	22 x 40	1.40	1.96	0.353	0.159	ECOS2DA471BA
560	22 x 45	1.50	2.10	0.296	0.133	ECOS2DA561BA
150	25 x 20	0.65	0.91	1.326	0.597	ECOS2DA151CL
270	25 x 25	1.10	1.54	0.614	0.276	ECOS2DA271CA
330	25 x 25	1.20	1.68	0.502	0.226	ECOS2DA331CA
390	25 x 30	1.30	1.82	0.425	0.191	ECOS2DA391CA
470	25 x 35	1.40	1.96	0.353	0.159	ECOS2DA471CA
560	25 x 35	1.50	2.10	0.296	0.133	ECOS2DA561CA
680	25 x 40	1.70	2.38	0.244	0.110	ECOS2DA681CA
820	25 x 50	2.00	2.80	0.222	0.111	ECOS2DA821CA
220</td						

TS-HA Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
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250 VDC Working, 300 VDC Surge						
180	20 x 35	0.90	1.26	0.921	0.461	ECOS2EA181AA
220	20 x 40	1.00	1.40	0.754	0.377	ECOS2EA221AA
68	22 x 20	0.40	0.56	2.926	1.463	ECOS2EA680BL
180	22 x 30	0.90	1.26	0.921	0.461	ECOS2EA181BA
220	22 x 30	1.00	1.40	0.754	0.377	ECOS2EA221BA
270	22 x 35	1.10	1.54	0.614	0.307	ECOS2EA271BA
330	22 x 40	1.20	1.68	0.502	0.251	ECOS2EA331BA
390	22 x 45	1.30	1.82	0.425	0.213	ECOS2EA391BA
100	25 x 20	0.50	0.70	1.989	0.995	ECOS2EA101CL
180	25 x 25	0.90	1.26	0.921	0.461	ECOS2EA181CA
220	25 x 25	1.00	1.40	0.754	0.377	ECOS2EA221CA
270	25 x 30	1.10	1.54	0.614	0.307	ECOS2EA271CA
330	25 x 35	1.20	1.68	0.502	0.251	ECOS2EA331CA
390	25 x 35	1.30	1.82	0.425	0.213	ECOS2EA391CA
470	25 x 45	1.40	1.96	0.353	0.176	ECOS2EA471CA
560	25 x 50	1.50	2.10	0.296	0.148	ECOS2EA561CA
150	30 x 20	0.65	0.91	1.326	0.663	ECOS2EA151DL
270	30 x 25	1.10	1.54	0.614	0.307	ECOS2EA271DA
330	30 x 25	1.20	1.68	0.502	0.251	ECOS2EA331DA
390	30 x 30	1.30	1.82	0.425	0.213	ECOS2EA391DA
470	30 x 35	1.40	1.96	0.353	0.176	ECOS2EA471DA
560	30 x 35	1.50	2.10	0.296	0.148	ECOS2EA561DA
680	30 x 45	1.70	2.38	0.244	0.122	ECOS2EA681DA
820	30 x 50	2.00	2.80	0.202	0.101	ECOS2EA821DA
220	35 x 20	0.87	1.22	0.904	0.452	ECOS2EA221EL
470	35 x 30	1.40	1.96	0.353	0.176	ECOS2EA471EA
560	35 x 30	1.50	2.10	0.296	0.148	ECOS2EA561EA
680	35 x 35	1.70	2.38	0.244	0.122	ECOS2EA681EA
820	35 x 40	2.00	2.80	0.202	0.101	ECOS2EA821EA
1000	35 x 45	2.20	3.08	0.199	0.099	ECOS2EA102EA
1200	35 x 50	2.30	3.22	0.166	0.083	ECOS2EA122EA

385 VDC Working, 435 VDC Surge						
56	20 x 30	0.51	0.71	2.368	0.829	ECOS2GA560AA
68	20 x 35	0.56	0.78	1.950	0.683	ECOS2GA680AA
82	20 x 40	0.64	0.90	1.617	0.566	ECOS2GA820AA
33	22 x 20	0.20	0.28	5.024	1.758	ECOS2GA330BL
56	22 x 25	0.51	0.71	2.368	0.829	ECOS2GA560BA
68	22 x 30	0.56	0.78	1.950	0.683	ECOS2GA680BA
82	22 x 35	0.64	0.90	1.617	0.566	ECOS2GA820BA
100	22 x 35	0.69	0.97	1.326	0.464	ECOS2GA101BA
120	22 x 40	0.75	1.05	1.105	0.387	ECOS2GA121BA
150	22 x 50	0.82	1.15	0.884	0.309	ECOS2GA151BA
47	25 x 20	0.25	0.35	3.527	1.235	ECOS2GA470CL
68	25 x 25	0.56	0.78	1.950	0.683	ECOS2GA680CA
82	25 x 25	0.64	0.90	1.617	0.566	ECOS2GA820CA
100	25 x 30	0.69	0.97	1.326	0.464	ECOS2GA101CA
120	25 x 35	0.75	1.05	1.105	0.387	ECOS2GA121CA
150	25 x 40	0.82	1.15	0.884	0.309	ECOS2GA151CA
180	25 x 45	0.95	1.33	0.737	0.258	ECOS2GA181CA
220	25 x 50	1.10	1.54	0.603	0.211	ECOS2GA221CA
68	30 x 20	0.35	0.49	2.438	0.853	ECOS2GA680DL
120	30 x 25	0.75	1.05	1.105	0.387	ECOS2GA121DA
150	30 x 30	0.82	1.15	0.884	0.309	ECOS2GA151DA
180	30 x 35	0.95	1.33	0.737	0.258	ECOS2GA181DA
220	30 x 40	1.10	1.54	0.603	0.211	ECOS2GA221DA
270	30 x 45	1.20	1.68	0.491	0.172	ECOS2GA271DA
330	30 x 50	1.35	1.89	0.402	0.161	ECOS2GA331DA
100	35 x 20	0.47	0.66	1.658	0.580	ECOS2GA101EL
180	35 x 25	0.95	1.33	0.737	0.258	ECOS2GA181EA
220	35 x 30	1.10	1.54	0.603	0.211	ECOS2GA221EA
270	35 x 35	1.20	1.68	0.491	0.172	ECOS2GA271EA
330	35 x 40	1.35	1.89	0.402	0.161	ECOS2GA331EA
390	35 x 45	1.55	2.17	0.340	0.136	ECOS2GA391EA
470	35 x 50	1.75	2.45	0.282	0.127	ECOS2GA471EA

400 VDC Working, 450 VDC Surge						
56	20 x 30	0.51	0.71	2.368	0.829	ECOS2GA560AA
68	20 x 35	0.56	0.78	1.950	0.683	ECOS2GA680AA
82	20 x 40	0.64	0.90	1.617	0.566	ECOS2GA820AA
33	22 x 20	0.20	0.28	5.024	1.758	ECOS2GA330BL
56	22 x 25	0.51	0.71	2.368	0.829	ECOS2GA560BA
68	22 x 30	0.56	0.78	1.950	0.683	ECOS2GA680BA
82	22 x 35	0.64	0.90	1.617	0.566	ECOS2GA820BA
100	22 x 35	0.69	0.97	1.326	0.464	ECOS2GA101BA
120	22 x 40	0.75	1.05	1.105	0.387	ECOS2GA121BA
150	22 x 50	0.82	1.15	0.884	0.309	ECOS2GA151BA
47	25 x 20	0.25	0.35	3.527	1.235	ECOS2GA470CL
68	25 x 25	0.56	0.78	1.950	0.683	ECOS2GA680CA
82	25 x 25	0.64	0.90	1.617	0.566	ECOS2GA820CA
100	25 x 30	0.69	0.97	1.326	0.464	ECOS2GA101CA
120	25 x 35	0.75	1.05	1.105	0.387	ECOS2GA121CA
150	25 x 40	0.82	1.15	0.884	0.309	ECOS2GA151CA
180	25 x 45	0.95	1.33	0.737	0.258	ECOS2GA181CA
220	25 x 50	1.10	1.54	0.603	0.211	ECOS2GA221CA
68	30 x 20	0.35	0.49	2.438	0.853	ECOS2GA680DL
120	30 x 25	0.75	1.05	1.105	0.387	ECOS2GA121DA
150	30 x 30	0.82	1.15	0.884	0.309	ECOS2GA151DA
180	30 x 35	0.95	1.33	0.737	0.258	ECOS2GA181DA
220	30 x 40	1.10	1.54	0.603	0.211	ECOS2GA221DA
270	30 x 45	1.20	1.68	0.491	0.172	ECOS2GA271DA
330	30 x 50	1.35	1.89	0.402	0.161	ECOS2GA331DA
100	35 x 20	0.47	0.66	1.658	0.580	ECOS2GA101EL
180	35 x 25	0.95	1.33	0.737	0.258	ECOS2GA181EA
220	35 x 30	1.10	1.54	0.603	0.211	ECOS2GA221EA
270	35 x 35	1.20	1.68	0.491	0.172	ECOS2GA271EA
330	35 x 40	1.35	1.89	0.402	0.161	ECOS2GA331EA
390	35 x 45	1.55	2.17	0.340	0.136	ECOS2GA391EA
470	35 x 50	1.75	2.45	0.282	0.127	ECOS2GA471EA

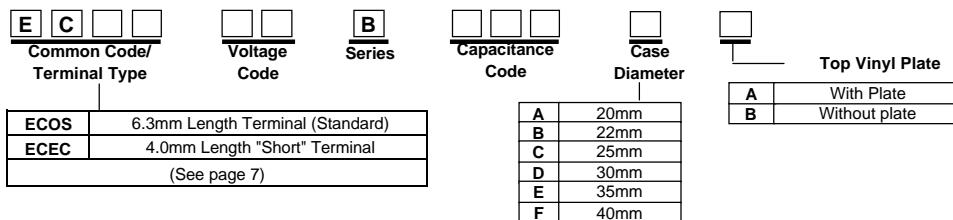
450 VDC Working, 500 VDC Surge						
56	22 x 25	0.40	0.56	2.368	0.947	ECOS2WA560BA
68	22 x 30	0.50	0.70	1.950	0.780	ECOS2WA680BA
82	22 x 35	0.56	0.78	1.617	0.647	ECOS2WA820BA
100	22 x 40	0.64	0.90	1.326	0.531	ECOS2WA101BA
120	22 x 45	0.72	1.01	1.105	0.442	ECOS2WA121BA
150	22 x 50	0.79	1.11	0.884	0.354	ECOS2WA151BA
68	25 x 25	0.50	0.70	1.950	0.780	ECOS2WA680CA
100	25 x 30	0.64	0.90	1.326	0.531	ECOS2WA101CA
120	25 x 35	0.72	1.01	1.105	0.442	ECOS2WA121CA
150	25 x 40	0.79	1.11	0.884	0.354	ECOS2WA151CA
180	25 x 45	0.87	1.22	0.737	0.295	ECOS2WA181CA
220	25 x 50	1.00	1.40	0.678	0.271	ECOS2WA221CA
100	30 x 25	0.64	0.90	1.326	0.531	ECOS2WA101DA
150	30 x 30	0.79	1.11	0.884	0.354	ECOS2WA151DA
180	30 x 35	0.87	1.22	0.737	0.295	ECOS2WA181DA
220	30 x 40	1.00	1.40	0.678	0.271	ECOS2WA221DA
270	30 x 45	1.17	1.64	0.614	0.246	ECOS2WA271DA
330	30 x 50	1.38	1.93	0.502	0.201	ECOS2WA331DA
150	35 x 25	0.79	1.11	0.884	0.354	ECOS2WA151EA
220	35 x 30	1.00	1.40	0.678	0.271	ECOS2WA221EA
270	35 x 35	1.17	1.64	0.614	0.246	ECOS2WA271EA
330	35 x 40	1.38	1.93	0.502	0.201	ECOS2WA331EA
390	35 x 50	1.55	2.17	0.425	0.170	ECOS2WA391EA

TS-HB Series two terminal snap-in

- Very compact size (20 ~ 25% smaller than TS-HA series)
- Long 3000 hour life at 105°C with high ripple current capability
- **NEW:** 40mm diameter case sizes
- Can vent construction



Rated Working Voltage:	160 ~ 250 VDC	385 ~ 450 VDC
Operating Temperature:	-40 ~ +105°C	-25 ~ +105°C
Nominal Capacitance:	330 ~ 2700μF (±20%)	82 ~ 560μF (±20%)
Dissipation Factor: (120 Hz, +20°C)	Working Voltage [V]: Max. D.F. (%):	160 ~ 450 15
Endurance:	3000 hours at +105°C with maximum specified ripple current (see page 4)	

Part Number System**TS-HB Standard Ratings**

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω, max.) 10k-50kHz	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number	Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω, max.) 10k-50kHz	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number
160 VDC Working, 200 VDC Surge													
470	22 x 30	1.40	1.96	0.423	0.190	ECOS2CB471BA	390	22 x 30	1.30	1.82	0.510	0.230	ECOS2DB391BA
560	22 x 35	1.50	2.10	0.355	0.160	ECOS2CB561BA	470	22 x 35	1.40	1.96	0.423	0.190	ECOS2DB471BA
680	22 x 40	1.70	2.38	0.293	0.132	ECOS2CB681BA	560	22 x 40	1.50	2.10	0.355	0.160	ECOS2DB561BA
820	22 x 45	2.00	2.80	0.243	0.109	ECOS2CB821BA	680	22 x 45	1.70	2.38	0.293	0.132	ECOS2DB681BA
1000	22 x 50	2.20	3.08	0.199	0.090	ECOS2CB102BA	390	25 x 25	1.30	1.82	0.510	0.230	ECOS2DB391CA
680	25 x 30	1.70	2.38	0.293	0.132	ECOS2CB681CA	470	25 x 30	1.40	1.96	0.423	0.190	ECOS2DB471CA
820	25 x 35	2.00	2.80	0.243	0.109	ECOS2CB821CA	560	25 x 30	1.50	2.10	0.355	0.160	ECOS2DB561CA
1000	25 x 40	2.20	3.08	0.199	0.090	ECOS2CB102CA	680	25 x 35	1.70	2.38	0.293	0.132	ECOS2DB681CA
1200	25 x 45	2.30	3.22	0.180	0.090	ECOS2CB122CA	820	25 x 45	2.00	2.80	0.263	0.118	ECOS2DB821CA
1000	30 x 30	2.20	3.08	0.199	0.090	ECOS2CB102DA	1000	25 x 50	2.20	3.08	0.216	0.108	ECOS2DB102CA
1200	30 x 35	2.30	3.22	0.180	0.090	ECOS2CB122DA	560	30 x 25	1.50	2.10	0.355	0.160	ECOS2DB561DA
1500	30 x 40	2.50	3.50	0.144	0.072	ECOS2CB152DA	820	30 x 30	2.00	2.80	0.263	0.118	ECOS2DB821DA
1800	30 x 45	2.70	3.78	0.129	0.064	ECOS2CB182DA	1000	30 x 35	2.20	3.08	0.216	0.108	ECOS2DB102DA
1000	35 x 25	2.20	3.08	0.199	0.090	ECOS2CB102EA	1200	30 x 40	2.30	3.22	0.193	0.097	ECOS2DB122DA
1200	35 x 30	2.30	3.22	0.180	0.090	ECOS2CB122EA	1500	30 x 50	2.50	3.50	0.155	0.077	ECOS2DB152DA
1500	35 x 30	2.50	3.50	0.144	0.072	ECOS2CB152EA	820	35 x 25	2.00	2.80	0.263	0.118	ECOS2DB821EA
1800	35 x 35	2.70	3.78	0.129	0.064	ECOS2CB182EA	1000	35 x 30	2.20	3.08	0.216	0.108	ECOS2DB102EA
2200	35 x 45	2.90	4.06	0.105	0.063	ECOS2CB222EA	1200	35 x 35	2.30	3.22	0.193	0.097	ECOS2DB122EA
2700	35 x 50	3.10	4.34	0.086	0.052	ECOS2CB272EA	1500	35 x 40	2.50	3.50	0.155	0.077	ECOS2DB152EA
2200	40 x 40	2.90	4.06	0.105	0.063	ECOS2CB222FA	1800	35 x 45	2.70	3.78	0.129	0.077	ECOS2DB182EA
3300	40 x 50	3.36	4.70	0.070	0.042	ECOS2CB332FA	2200	35 x 50	2.90	4.06	0.105	0.063	ECOS2DB222EA
							1800	40 x 40	2.70	3.78	0.129	0.077	ECOS2DB182FA
							2700	40 x 50	3.55	4.97	0.086	0.052	ECOS2DB272FA

TS-HB Standard Ratings (continued)

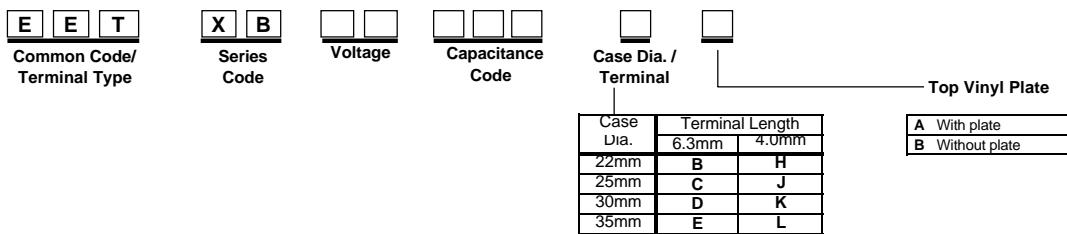
Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 120Hz	20kHz	Panasonic Part Number	Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20kHz	Panasonic Part Number	
250 VDC Working, 300 VDC Surge												
180	22 x 25	0.90	1.26	0.921	0.461	ECOS2EB181BA	82	22 x 30	0.64	0.90	2.022	0.809
220	22 x 30	1.00	1.40	0.754	0.377	ECOS2EB221BA	100	22 x 30	0.69	0.97	1.658	0.663
270	22 x 35	1.10	1.54	0.614	0.307	ECOS2EB271BA	120	22 x 35	0.75	1.05	1.382	0.553
330	22 x 40	1.20	1.68	0.502	0.251	ECOS2EB331BA	150	22 x 40	0.82	1.15	1.105	0.442
390	22 x 45	1.30	1.82	0.425	0.213	ECOS2EB391BA	180	22 x 45	0.95	1.33	0.921	0.368
470	22 x 50	1.40	1.96	0.353	0.176	ECOS2EB471BA	100	25 x 25	0.69	0.97	1.658	0.663
330	25 x 30	1.20	1.68	0.502	0.251	ECOS2EB331CA	120	25 x 30	0.75	1.05	1.382	0.553
470	25 x 40	1.40	1.96	0.353	0.176	ECOS2EB471CA	150	25 x 30	0.82	1.15	1.105	0.442
560	25 x 45	1.50	2.10	0.296	0.148	ECOS2EB561CA	180	25 x 35	0.95	1.33	0.921	0.368
680	25 x 50	1.70	2.38	0.244	0.134	ECOS2EB681CA	220	25 x 45	1.10	1.54	0.754	0.301
390	30 x 25	1.30	1.82	0.425	0.213	ECOS2EB391DA	270	25 x 50	1.20	1.68	0.675	0.270
470	30 x 30	1.40	1.96	0.353	0.176	ECOS2EB471DA	150	30 x 25	0.82	1.15	1.105	0.442
680	30 x 40	1.70	2.38	0.244	0.134	ECOS2EB681DA	180	30 x 30	0.95	1.33	0.921	0.368
820	30 x 45	2.00	2.80	0.202	0.111	ECOS2EB821DA	220	30 x 30	1.10	1.54	0.829	0.332
1000	30 x 50	2.20	3.08	0.199	0.109	ECOS2EB102DA	330	30 x 45	1.35	1.89	0.553	0.221
560	35 x 25	1.50	2.10	0.296	0.148	ECOS2EB561EA	390	30 x 50	1.55	2.17	0.510	0.204
680	35 x 30	1.70	2.38	0.244	0.134	ECOS2EB681EA	220	35 x 25	1.10	1.54	0.829	0.332
820	35 x 35	2.00	2.80	0.202	0.111	ECOS2EB821EA	270	35 x 30	1.20	1.68	0.675	0.270
1000	35 x 40	2.20	3.08	0.199	0.109	ECOS2EB102EA	330	35 x 35	1.35	1.89	0.553	0.221
1200	35 x 45	2.30	3.22	0.166	0.099	ECOS2EB122EA	470	35 x 45	1.75	2.45	0.423	0.212
1500	35 x 50	2.50	3.50	0.144	0.093	ECOS2EB152EA	560	35 x 50	1.80	2.52	0.355	0.178
1200	40 x 40	2.66	3.72	0.180	0.117	ECOS2EB122FA	470	40 x 40	1.75	2.45	0.423	0.212
1800	40 x 50	3.25	4.55	0.120	0.078	ECOS2EB182FA	680	40 x 50	2.10	2.94	0.293	0.146
400 VDC Working, 450 VDC Surge												
82	22 x 30	0.64	0.90	2.022	0.708	ECOS2GB820BA	82	22 x 30	0.56	0.78	2.022	0.708
100	22 x 30	0.69	0.97	1.658	0.580	ECOS2GB101BA	100	22 x 35	0.64	0.90	1.658	0.580
120	22 x 35	0.75	1.05	1.382	0.484	ECOS2GB121BA	120	22 x 40	0.72	1.01	1.382	0.484
150	22 x 40	0.82	1.15	1.105	0.387	ECOS2GB151BA	150	22 x 50	0.79	1.11	1.105	0.387
180	22 x 45	0.95	1.33	0.921	0.322	ECOS2GB181BA	82	25 x 25	0.56	0.78	2.022	0.708
100	25 x 25	0.69	0.97	1.658	0.580	ECOS2GB101CA	100	25 x 30	0.64	0.90	1.658	0.580
120	25 x 30	0.75	1.05	1.382	0.484	ECOS2GB121CA	120	25 x 35	0.72	1.01	1.382	0.484
150	25 x 30	0.82	1.15	1.105	0.387	ECOS2GB151CA	150	25 x 40	0.79	1.11	1.105	0.387
180	25 x 35	0.95	1.33	0.921	0.322	ECOS2GB181CA	180	25 x 45	0.87	1.22	0.921	0.322
220	25 x 45	1.10	1.54	0.754	0.264	ECOS2GB221CA	220	25 x 50	1.00	1.40	0.754	0.264
270	25 x 50	1.20	1.68	0.614	0.215	ECOS2GB271CA	120	30 x 25	0.72	1.01	1.382	0.484
150	30 x 25	0.82	1.15	1.105	0.387	ECOS2GB151DA	150	30 x 30	0.79	1.11	1.105	0.387
180	30 x 30	0.95	1.33	0.921	0.322	ECOS2GB181DA	180	30 x 35	0.87	1.22	0.921	0.322
220	30 x 30	1.10	1.54	0.754	0.264	ECOS2GB221DA	220	30 x 40	1.00	1.40	0.754	0.264
270	30 x 35	1.20	1.68	0.614	0.215	ECOS2GB271DA	270	30 x 45	1.19	1.67	0.614	0.215
330	30 x 45	1.35	1.89	0.502	0.201	ECOS2GB331DA	330	30 x 50	1.38	1.93	0.502	0.176
390	30 x 50	1.55	2.17	0.425	0.170	ECOS2GB391DA	150	35 x 25	0.79	1.11	1.105	0.387
220	35 x 25	1.10	1.54	0.754	0.264	ECOS2GB221EA	220	35 x 30	1.00	1.40	0.754	0.264
270	35 x 30	1.20	1.68	0.614	0.215	ECOS2GB271EA	270	35 x 35	1.19	1.67	0.614	0.215
330	35 x 35	1.35	1.89	0.502	0.201	ECOS2GB331EA	330	35 x 40	1.38	1.93	0.502	0.176
390	35 x 40	1.55	2.17	0.425	0.170	ECOS2GB391EA	390	35 x 45	1.55	2.17	0.425	0.149
470	35 x 45	1.75	2.45	0.353	0.141	ECOS2GB471EA	470	35 x 50	1.74	2.44	0.353	0.123
560	35 x 50	1.80	2.52	0.296	0.118	ECOS2GB561EA	390	40 x 40	1.68	2.35	0.425	0.170
470	40 x 40	1.75	2.45	0.353	0.141	ECOS2GB471FA	560	40 x 50	2.17	3.04	0.296	0.118
680	40 x 50	2.10	2.94	0.244	0.098	ECOS2GB681FA						
450 VDC Working, 500 VDC Surge												
82	22 x 30	0.56	0.78	2.022	0.708	ECOS2WB820BA	82	22 x 30	0.56	0.78	2.022	0.708
100	22 x 35	0.64	0.90	1.658	0.580	ECOS2WB101BA	100	22 x 35	0.64	0.90	1.658	0.580
120	22 x 40	0.72	1.01	1.382	0.484	ECOS2WB121BA	120	22 x 40	0.72	1.01	1.382	0.484
150	22 x 50	0.79	1.11	1.105	0.387	ECOS2WB151BA	150	25 x 25	0.56	0.78	2.022	0.708
82	25 x 25	0.56	0.78	2.022	0.708	ECOS2WB820CA	100	25 x 30	0.64	0.90	1.658	0.580
100	25 x 30	0.64	0.90	1.658	0.580	ECOS2WB101CA	120	25 x 35	0.72	1.01	1.382	0.484
120	25 x 35	0.72	1.01	1.382	0.484	ECOS2WB121CA	150	25 x 40	0.79	1.11	1.105	0.387
150	25 x 40	0.79	1.11	1.105	0.387	ECOS2WB151CA	180	25 x 45	0.87	1.22	0.921	0.322
180	25 x 45	0.87	1.22	0.921	0.322	ECOS2WB181CA	220	25 x 50	1.00	1.40	0.754	0.264
220	25 x 50	1.00	1.40	0.754	0.264	ECOS2WB221CA	270	30 x 25	0.72	1.01	1.382	0.484
270	30 x 25	0.72	1.01	1.382	0.484	ECOS2WB271CA	330	30 x 30	0.79	1.11	1.105	0.387
330	30 x 30	0.79	1.11	1.105	0.387	ECOS2WB331DA	390	30 x 35	0.87	1.22	0.921	0.322
390	30 x 35	0.87	1.22	0.921	0.322	ECOS2WB391DA	470	30 x 40	1.00	1.40	0.754	0.264
470	30 x 40	1.00	1.40	0.754	0.264	ECOS2WB471DA	560	30 x 45	1.19	1.67	0.614	0.215
560	30 x 45	1.19	1.67	0.614	0.215	ECOS2WB561DA	330	35 x 40	1.38	1.93	0.502	0.176
390	35 x 40	1.38	1.93	0.502	0.176	ECOS2WB391EA	470	35 x 45	1.55	2.17	0.425	0.149
470	35 x 45	1.55	2.17	0.425	0.149	ECOS2WB471EA	390	40 x 40	1.68	2.35	0.425	0.170
560	35 x 45	1.74	2.44	0.353	0.123	ECOS2WB561EA	560	40 x 50	2.17	3.04	0.296	0.118
680	40 x 50	2.17	3.04	0.296	0.118	ECOS2WB681EA						

TS-XB Series two terminal snap-in

- 7000 hour life at 105°C
- Suitable for long life industrial applications
- Very compact size (40 ~ 60% smaller than TS - NXA series)
- Can vent construction



Rated Working Voltage:	160 ~ 250 VDC	315 ~ 450 VDC
Operating Temperature:	-40 ~ +105°C	-25 ~ +105°C
Nominal Capacitance:	180 ~ 2200μF	39 ~ 680μF
Capacitance Tolerance:	± 20%	
Dissipation Factor:	15% maximum (120Hz, +20°C)	
Endurance:	7000 hours at +105°C with maximum specified ripple current (see page 4)	

Part Number System**TS-XB Standard Ratings**

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms})		20°C ESR (Ω, max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
160 VDC Working, 200 VDC Surge						
270	22 x 25	1.10	1.54	0.655	0.295	EETXB2C271BD
330	22 x 30	1.20	1.68	0.536	0.241	EETXB2C331BD
390	22 x 30	1.30	1.82	0.453	0.204	EETXB2C391BD
470	22 x 35	1.40	1.96	0.376	0.169	EETXB2C471BD
560	22 x 40	1.50	2.10	0.316	0.142	EETXB2C561BD
680	22 x 45	1.70	2.38	0.260	0.117	EETXB2C681BD
390	25 x 25	1.30	1.82	0.453	0.204	EETXB2C391CD
470	25 x 30	1.40	1.96	0.376	0.169	EETXB2C471CD
560	25 x 30	1.50	2.10	0.316	0.142	EETXB2C561CD
680	25 x 35	1.70	2.38	0.260	0.117	EETXB2C681CD
820	25 x 40	2.00	2.80	0.216	0.097	EETXB2C821CD
1000	25 x 45	2.20	3.08	0.177	0.080	EETXB2C102CD
1200	25 x 50	2.30	3.22	0.160	0.080	EETXB2C122CD
560	30 x 25	1.50	2.10	0.316	0.142	EETXB2C561DD
680	30 x 30	1.70	2.38	0.260	0.117	EETXB2C681DD
820	30 x 30	2.00	2.80	0.216	0.097	EETXB2C821DD
1000	30 x 35	2.20	3.08	0.177	0.080	EETXB2C102DD
1200	30 x 40	2.30	3.22	0.160	0.080	EETXB2C122DD
1500	30 x 45	2.50	3.50	0.128	0.064	EETXB2C152DD
1800	30 x 50	2.70	3.78	0.115	0.057	EETXB2C182DD
1200	35 x 35	2.30	3.22	0.160	0.080	EETXB2C122ED
1500	35 x 35	2.50	3.50	0.128	0.064	EETXB2C152ED
1800	35 x 40	2.70	3.78	0.115	0.057	EETXB2C182ED
2200	35 x 50	2.90	4.06	0.094	0.056	EETXB2C222ED
180 VDC Working, 225 VDC Surge						
220	22 x 25	1.00	1.40	0.804	0.36	EETXB2P221BD
270	22 x 25	1.10	1.54	0.655	0.29	EETXB2P271BD
330	22 x 30	1.20	1.68	0.536	0.24	EETXB2P331BD
390	22 x 30	1.30	1.82	0.453	0.20	EETXB2P391BD
470	22 x 35	1.40	1.96	0.376	0.17	EETXB2P471BD
560	22 x 40	1.50	2.10	0.316	0.14	EETXB2P561BD
680	22 x 50	1.70	2.38	0.260	0.12	EETXB2P681BD
330	25 x 25	1.20	1.68	0.536	0.24	EETXB2P331CD
390	25 x 25	1.30	1.82	0.453	0.20	EETXB2P391CD
470	25 x 30	1.40	1.96	0.376	0.17	EETXB2P471CD
560	25 x 35	1.50	2.10	0.316	0.14	EETXB2P561CD
680	25 x 40	1.70	2.38	0.260	0.12	EETXB2P681CD
820	25 x 45	2.00	2.80	0.216	0.10	EETXB2P821CD
470	30 x 25	1.40	1.96	0.376	0.17	EETXB2P471DD
560	30 x 25	1.50	2.10	0.316	0.14	EETXB2P561DD
680	30 x 30	1.70	2.38	0.260	0.12	EETXB2P681DD
820	30 x 35	2.00	2.80	0.234	0.11	EETXB2P821DD
1000	30 x 40	2.20	3.08	0.192	0.10	EETXB2P102DD
1200	30 x 45	2.30	3.22	0.160	0.08	EETXB2P122DD
1500	30 x 50	2.50	3.50	0.138	0.07	EETXB2P152DD
820	35 x 30	2.00	2.80	0.234	0.11	EETXB2P681ED
1000	35 x 30	2.20	3.08	0.192	0.10	EETXB2P102ED
1200	35 x 35	2.30	3.22	0.172	0.09	EETXB2P122ED
1500	35 x 40	2.50	3.50	0.138	0.07	EETXB2P152ED
1800	35 x 45	2.70	3.78	0.115	0.07	EETXB2P182ED
2200	35 x 50	2.90	4.06	0.094	0.06	EETXB2P222ED

TS-XB Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
200 VDC Working, 250 VDC Surge						
220	22 x 25	1.00	1.40	0.804	0.36	EETXB2D221B□
270	22 x 30	1.10	1.54	0.655	0.29	EETXB2D271B□
330	22 x 30	1.20	1.68	0.536	0.24	EETXB2D331B□
390	22 x 35	1.30	1.82	0.453	0.20	EETXB2D391B□
470	22 x 40	1.40	1.96	0.376	0.17	EETXB2D471B□
560	22 x 45	1.50	2.10	0.316	0.14	EETXB2D561B□
270	25 x 25	1.10	1.54	0.655	0.29	EETXB2D271C□
330	25 x 25	1.20	1.68	0.536	0.24	EETXB2D331C□
390	25 x 30	1.30	1.82	0.453	0.20	EETXB2D391C□
470	25 x 35	1.40	1.96	0.376	0.17	EETXB2D471C□
560	25 x 35	1.50	2.10	0.316	0.14	EETXB2D561C□
680	25 x 40	1.70	2.38	0.260	0.12	EETXB2D681C□
820	25 x 50	2.00	2.80	0.216	0.10	EETXB2D821C□
390	30 x 25	1.30	1.82	0.453	0.20	EETXB2D391D□
470	30 x 30	1.40	1.96	0.376	0.17	EETXB2D471D□
560	30 x 30	1.50	2.10	0.316	0.14	EETXB2D561D□
680	30 x 35	1.70	2.38	0.260	0.12	EETXB2D681D□
820	30 x 40	2.00	2.80	0.216	0.10	EETXB2D821D□
1000	30 x 45	2.20	3.08	0.177	0.09	EETXB2D102D□
1200	30 x 50	2.30	3.22	0.160	0.08	EETXB2D122D□
820	35 x 30	2.00	2.80	0.216	0.10	EETXB2D821E□
1000	35 x 35	2.20	3.08	0.177	0.09	EETXB2D102E□
1200	35 x 40	2.30	3.22	0.160	0.08	EETXB2D122E□
1500	35 x 50	2.50	3.50	0.128	0.06	EETXB2D152E□
250 VDC Working, 300 VDC Surge						
180	22 x 30	0.90	1.26	0.819	0.41	EETXB2E181B□
220	22 x 30	1.00	1.40	0.670	0.33	EETXB2E221B□
270	22 x 35	1.10	1.54	0.546	0.27	EETXB2E271B□
330	22 x 40	1.20	1.68	0.447	0.22	EETXB2E331B□
390	22 x 45	1.30	1.82	0.378	0.19	EETXB2E391B□
180	25 x 25	0.90	1.26	0.819	0.41	EETXB2E181C□
220	25 x 25	1.00	1.40	0.670	0.33	EETXB2E221C□
270	25 x 30	1.10	1.54	0.546	0.27	EETXB2E271C□
330	25 x 35	1.20	1.68	0.447	0.22	EETXB2E331C□
390	25 x 35	1.30	1.82	0.378	0.19	EETXB2E391C□
470	25 x 45	1.40	1.96	0.314	0.16	EETXB2E471C□
560	25 x 50	1.50	2.10	0.263	0.13	EETXB2E561C□
270	30 x 25	1.10	1.54	0.546	0.27	EETXB2E271D□
330	30 x 25	1.20	1.68	0.447	0.22	EETXB2E331D□
390	30 x 30	1.30	1.82	0.378	0.19	EETXB2E391D□
470	30 x 35	1.40	1.96	0.314	0.16	EETXB2E471D□
560	30 x 35	1.50	2.10	0.263	0.13	EETXB2E561D□
680	30 x 45	1.70	2.38	0.217	0.12	EETXB2E681D□
820	30 x 50	2.00	2.80	0.180	0.10	EETXB2E821D□
470	35 x 30	1.40	1.96	0.314	0.16	EETXB2E471E□
560	35 x 30	1.50	2.10	0.263	0.13	EETXB2E561E□
680	35 x 35	1.70	2.38	0.217	0.12	EETXB2E681E□
820	35 x 40	2.00	2.80	0.180	0.10	EETXB2E821E□
1000	35 x 45	2.20	3.08	0.177	0.10	EETXB2E102E□
1200	35 x 50	2.30	3.22	0.160	0.08	EETXB2E122E□
315 VDC Working, 365 VDC Surge						
82	22 x 25	0.64	0.90	1.797	0.90	EETXB2F820B□
100	22 x 30	0.69	0.97	1.474	0.74	EETXB2F101B□
120	22 x 30	0.75	1.05	1.228	0.61	EETXB2F121B□
150	22 x 35	0.82	1.15	0.982	0.49	EETXB2F151B□
180	22 x 40	0.90	1.26	0.819	0.41	EETXB2F181B□
220	22 x 45	1.00	1.40	0.737	0.37	EETXB2F221B□
120	25 x 25	0.75	1.05	1.228	0.61	EETXB2F121C□
150	25 x 30	0.82	1.15	0.982	0.49	EETXB2F151C□
180	25 x 35	0.90	1.26	0.819	0.41	EETXB2F181C□
220	25 x 40	1.00	1.40	0.737	0.37	EETXB2F221C□
270	25 x 45	1.10	1.54	0.600	0.30	EETXB2F271C□
330	25 x 50	1.20	1.68	0.491	0.25	EETXB2F331C□
150	30 x 25	0.82	1.15	0.982	0.49	EETXB2F151D□
180	30 x 25	0.90	1.26	0.819	0.41	EETXB2F181D□
220	30 x 30	1.00	1.40	0.737	0.37	EETXB2F221D□
270	30 x 35	1.10	1.54	0.600	0.30	EETXB2F271D□
330	30 x 40	1.20	1.68	0.491	0.25	EETXB2F331D□
390	30 x 45	1.30	1.82	0.453	0.23	EETXB2F391D□
470	30 x 50	1.40	1.96	0.376	0.19	EETXB2F471D□
270	35 x 30	1.10	1.54	0.600	0.30	EETXB2F271E□
330	35 x 30	1.20	1.68	0.491	0.25	EETXB2F331E□
390	35 x 35	1.30	1.82	0.453	0.23	EETXB2F391E□
470	35 x 40	1.40	1.96	0.376	0.19	EETXB2F471E□
560	35 x 45	1.50	2.10	0.316	0.16	EETXB2F561E□
680	35 x 50	1.70	2.38	0.260	0.14	EETXB2F681E□
350 VDC Working, 400 VDC Surge						
82	22 x 25	0.64	0.90	1.797	0.90	EETXB2V820B□
100	22 x 30	0.69	0.97	1.474	0.74	EETXB2V101B□
120	22 x 35	0.75	1.05	1.228	0.61	EETXB2V121B□
150	22 x 40	0.82	1.15	0.982	0.49	EETXB2V151B□
180	22 x 45	0.90	1.26	0.819	0.41	EETXB2V181B□
220	22 x 50	1.00	1.40	0.737	0.37	EETXB2V221B□
100	25 x 25	0.69	0.97	1.474	0.74	EETXB2V101C□
120	25 x 30	0.75	1.05	1.228	0.61	EETXB2V121C□
150	25 x 30	0.82	1.15	0.982	0.49	EETXB2V151C□
180	25 x 35	0.90	1.26	0.819	0.41	EETXB2V181C□
220	25 x 40	1.00	1.40	0.737	0.37	EETXB2V221C□
270	25 x 50	1.10	1.54	0.600	0.30	EETXB2V271C□
150	30 x 25	0.82	1.15	0.982	0.49	EETXB2V151D□
180	30 x 30	0.90	1.26	0.819	0.41	EETXB2V181D□
220	30 x 30	1.00	1.40	0.737	0.37	EETXB2V221D□
270	30 x 35	1.10	1.54	0.600	0.30	EETXB2V271D□
330	30 x 45	1.20	1.68	0.491	0.25	EETXB2V331D□
390	30 x 50	1.30	1.82	0.453	0.23	EETXB2V391D□
270	35 x 30	1.10	1.54	0.600	0.30	EETXB2V271E□
330	35 x 35	1.20	1.68	0.491	0.25	EETXB2V331E□
390	35 x 40	1.30	1.82	0.453	0.23	EETXB2V391E□
470	35 x 40	1.40	1.96	0.376	0.19	EETXB2V471E□
560	35 x 50	1.50	2.10	0.316	0.16	EETXB2V561E□

TS-XB Standard Ratings (continued)

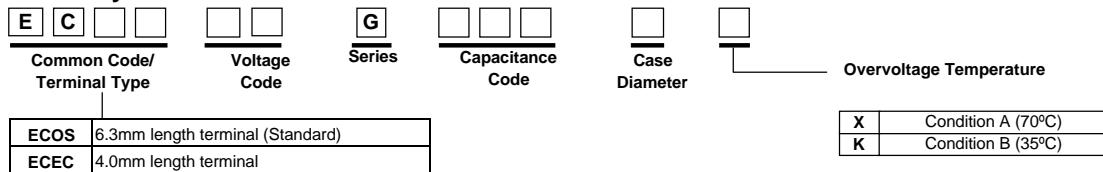
Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
400 VDC Working, 450 VDC Surge						
56	22 x 25	0.51	0.71	2.631	0.92	EETXB2G560B□
68	22 x 30	0.56	0.78	2.167	0.76	EETXB2G680B□
82	22 x 35	0.64	0.90	1.797	0.63	EETXB2G820B□
100	22 x 35	0.69	0.97	1.474	0.52	EETXB2G101B□
120	22 x 40	0.75	1.05	1.228	0.43	EETXB2G121B□
150	22 x 50	0.82	1.15	0.982	0.34	EETXB2G151B□
68	25 x 25	0.56	0.78	2.167	0.76	EETXB2G680CL□
82	25 x 25	0.64	0.90	1.797	0.63	EETXB2G820C□
100	25 x 30	0.69	0.97	1.474	0.52	EETXB2G101C□
120	25 x 35	0.75	1.05	1.228	0.43	EETXB2G121C□
150	25 x 40	0.82	1.15	0.982	0.34	EETXB2G151C□
180	25 x 45	0.90	1.26	0.819	0.29	EETXB2G181C□
220	25 x 50	1.00	1.40	0.670	0.23	EETXB2G221C□
120	30 x 25	0.75	1.05	1.228	0.43	EETXB2G121D□
150	30 x 30	0.82	1.15	0.982	0.34	EETXB2G151D□
180	30 x 35	0.90	1.26	0.819	0.29	EETXB2G181D□
220	30 x 40	1.00	1.40	0.670	0.23	EETXB2G221D□
270	30 x 45	1.10	1.54	0.546	0.19	EETXB2G271D□
330	30 x 50	1.20	1.68	0.447	0.18	EETXB2G331D□
180	35 x 25	0.90	1.26	0.819	0.29	EETXB2G181E□
220	35 x 30	1.00	1.40	0.670	0.23	EETXB2G221E□
270	35 x 35	1.10	1.54	0.546	0.19	EETXB2G271E□
330	35 x 40	1.20	1.68	0.447	0.18	EETXB2G331E□
390	35 x 45	1.30	1.82	0.378	0.15	EETXB2G391E□
470	35 x 50	1.40	1.96	0.314	0.13	EETXB2G471E□
450 VDC Working, 500 VDC Surge						
39	22 x 25	0.37	0.52	3.779	1.32	EETXB2W390B□
47	22 x 30	0.40	0.56	3.135	1.10	EETXB2W470B□
56	22 x 35	0.47	0.66	2.631	0.92	EETXB2W560B□
68	22 x 40	0.53	0.74	2.167	0.76	EETXB2W680B□
82	22 x 45	0.56	0.78	1.797	0.63	EETXB2W820B□
100	22 x 50	0.64	0.90	1.474	0.52	EETXB2W101B□
56	25 x 25	0.47	0.66	2.631	0.92	EETXB2W560C□
68	25 x 30	0.53	0.74	2.167	0.76	EETXB2W680C□
82	25 x 35	0.56	0.78	1.797	0.63	EETXB2W820C□
100	25 x 40	0.64	0.90	1.474	0.52	EETXB2W101C□
120	25 x 45	0.72	1.01	1.228	0.43	EETXB2W121C□
150	25 x 50	0.79	1.11	0.982	0.34	EETXB2W151C□
82	30 x 25	0.56	0.78	1.797	0.63	EETXB2W280D□
100	30 x 30	0.64	0.90	1.474	0.52	EETXB2W101D□
120	30 x 30	0.72	1.01	1.228	0.43	EETXB2W121D□
150	30 x 40	0.79	1.11	0.982	0.34	EETXB2W151D□
180	30 x 45	0.87	1.22	0.819	0.29	EETXB2W181D□
220	30 x 50	1.00	1.40	0.670	0.23	EETXB2W221D□
150	35 x 30	0.79	1.11	0.982	0.34	EETXB2W151E□
180	35 x 35	0.87	1.22	0.819	0.29	EETXB2W181E□
220	35 x 40	1.00	1.40	0.670	0.23	EETXB2W221E□
270	35 x 45	1.19	1.67	0.546	0.19	EETXB2W271E□
330	35 x 50	1.38	1.93	0.447	0.16	EETXB2W331E□

TS-EX Series two terminal snap-in

- High reliability design for abnormal overvoltage conditions
- 2000 hour, 105°C endurance with high ripple current capability
- VDE-0806 Specification

Specifications

Rated Working Voltage:	250 VDC
Operating Temperature:	-40 ~ +105°C
Nominal Capacitance:	100 ~ 1200μF
Dissipation Factor:	20% max. (120 Hz, +20°C)
Endurance:	2000 hours at +105°C with maximum specified ripple current (see page 4)
Overvoltage Characteristics:	Capacitor shall not vent or short-circuit when 360 VDC is applied for a time period of 7 hours; Condition A: 70°C ambient temperature Condition B: 35°C ambient temperature

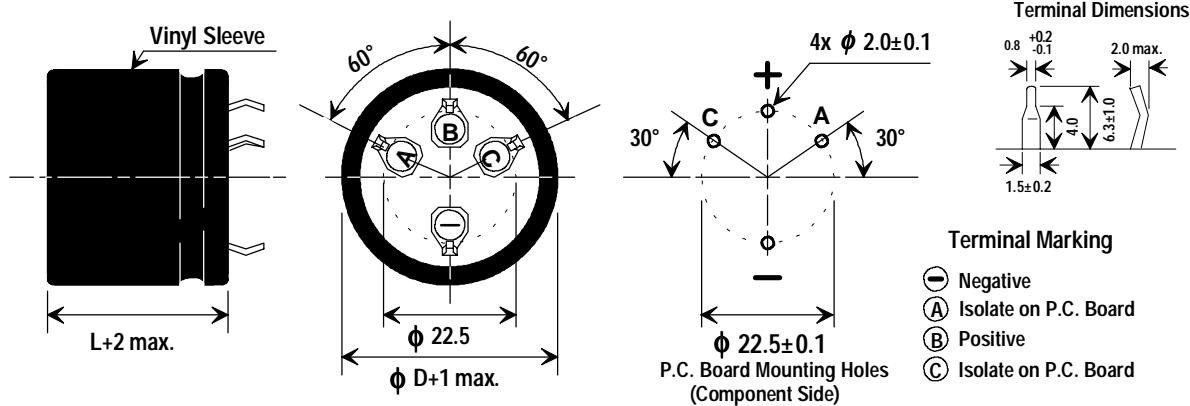
Part Number System**TS-EX Standard Ratings**

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz	Max 105°C R.C. (A _{rms}) 10k-50kHz	Max 20°C ESR (Ω) 120Hz	Max 20°C ESR (Ω) 20kHz	Panasonic Part Number	Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz	Max 105°C R.C. (A _{rms}) 10k-50kHz	Max 20°C ESR (Ω) 120Hz	Max 20°C ESR (Ω) 20kHz	Panasonic Part Number
250 VDC Working, Condition A (70°C)													
100	22 x 25	0.70	0.98	1.768	0.884	ECOS2EG101DX	120	22 x 25	0.75	1.05	1.474	0.737	ECOS2EG121DK
120	22 x 30	0.75	1.05	1.474	0.737	ECOS2EG121EX	150	22 x 30	0.80	1.12	1.590	0.589	ECOS2EG151EK
150	22 x 30	0.80	1.12	1.590	0.589	ECOS2EG151EX	180	22 x 30	0.90	1.26	1.682	0.491	ECOS2EG181EK
180	22 x 35	0.90	1.26	1.682	0.491	ECOS2EG181FX	220	22 x 35	1.00	1.40	1.804	0.402	ECOS2EG221FK
220	22 x 40	1.00	1.40	1.804	0.402	ECOS2EG221GX	270	22 x 40	1.10	1.54	1.926	0.327	ECOS2EG271GK
270	22 x 45	1.10	1.54	1.926	0.327	ECOS2EG271GX	330	22 x 50	1.20	1.68	2.048	0.268	ECOS2EG331GK
330	22 x 50	1.20	1.68	2.048	0.268	ECOS2EG331HX	390	22 x 50	1.30	1.82	2.170	0.227	ECOS2EG391HK
150	25 x 25	0.80	1.12	1.179	0.589	ECOS2EG151JX	180	25 x 25	0.90	1.26	1.301	0.491	ECOS2EG181JK
180	25 x 30	0.90	1.26	1.301	0.491	ECOS2EG181KX	220	25 x 30	1.00	1.40	1.423	0.402	ECOS2EG221KK
220	25 x 30	1.00	1.40	1.423	0.402	ECOS2EG221KX	270	25 x 30	1.10	1.54	1.545	0.327	ECOS2EG271KK
270	25 x 35	1.10	1.54	1.545	0.327	ECOS2EG271LX	330	25 x 35	1.20	1.68	1.667	0.268	ECOS2EG331LK
330	25 x 40	1.20	1.68	1.667	0.268	ECOS2EG331MX	390	25 x 40	1.30	1.82	1.789	0.227	ECOS2EG391MK
390	25 x 45	1.30	1.82	1.789	0.227	ECOS2EG391MX	470	25 x 45	1.40	1.96	1.911	0.188	ECOS2EG471NK
470	25 x 50	1.40	1.96	1.911	0.188	ECOS2EG471NX	560	25 x 50	1.50	2.10	2.033	0.158	ECOS2EG561NK
220	30 x 25	1.00	1.40	0.804	0.402	ECOS2EG221QX	270	30 x 25	1.10	1.54	0.655	0.327	ECOS2EG271QK
270	30 x 30	1.10	1.54	0.655	0.327	ECOS2EG271RX	330	30 x 30	1.20	1.68	0.536	0.268	ECOS2EG331RK
330	30 x 30	1.20	1.68	0.536	0.268	ECOS2EG331RX	390	30 x 30	1.30	1.82	0.453	0.227	ECOS2EG391RK
390	30 x 35	1.30	1.82	0.453	0.227	ECOS2EG391SX	470	30 x 35	1.40	1.96	0.376	0.188	ECOS2EG471SK
470	30 x 40	1.40	1.96	0.376	0.188	ECOS2EG471TX	560	30 x 40	1.50	2.10	0.316	0.158	ECOS2EG561TK
560	30 x 45	1.50	2.10	0.316	0.158	ECOS2EG561TX	680	30 x 45	1.70	2.38	0.260	0.130	ECOS2EG681TK
680	30 x 50	1.70	2.38	0.260	0.130	ECOS2EG681UX	820	30 x 50	2.00	2.80	0.216	0.108	ECOS2EG821UK
330	35 x 25	1.20	1.68	0.536	0.268	ECOS2EG331WX	390	35 x 25	1.30	1.82	0.453	0.227	ECOS2EG391WK
390	35 x 30	1.30	1.82	0.453	0.227	ECOS2EG391XX	470	35 x 30	1.40	1.96	0.376	0.188	ECOS2EG471XK
470	35 x 30	1.40	1.96	0.376	0.188	ECOS2EG471XX	560	35 x 30	1.50	2.10	0.316	0.158	ECOS2EG561XK
560	35 x 35	1.50	2.10	0.316	0.158	ECOS2EG561VX	680	35 x 35	1.70	2.38	0.260	0.130	ECOS2EG681VK
680	35 x 40	1.70	2.38	0.260	0.130	ECOS2EG681YX	820	35 x 40	2.00	2.80	0.216	0.108	ECOS2EG821YK
820	35 x 45	2.00	2.80	0.252	0.126	ECOS2EG821YX	1000	35 x 45	2.20	3.08	0.206	0.103	ECOS2EG102YK
1000	35 x 50	2.20	3.08	0.206	0.103	ECOS2EG102ZX	1200	35 x 50	2.30	3.22	0.172	0.086	ECOS2EG122ZK

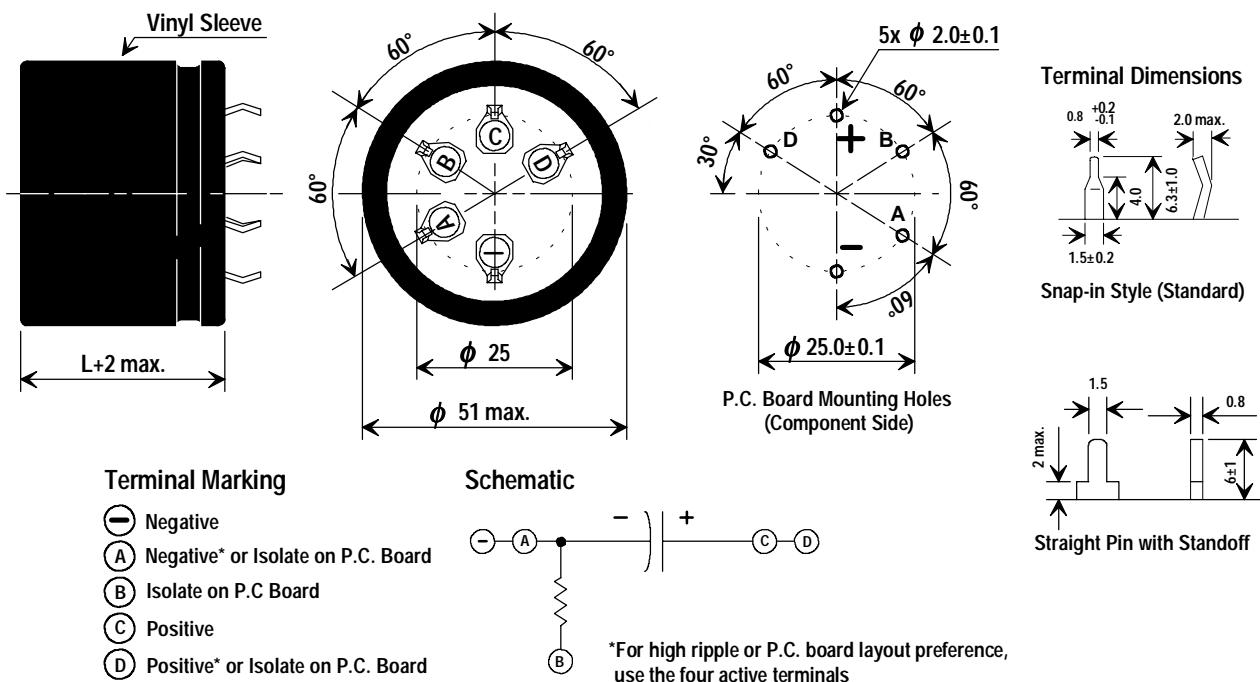
T Type General Information

Dimensions

T Type $\phi 35$ & 40mm Diameters



T Type $\phi 50$ mm Diameter



Ripple Current Multipliers

Ripple Current Frequency Correction Factors						
Frequency (Hz):	50	60	100~120	500	1k	10k~50k
16~100WV:	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 Temperature Correction Factors					
Max. Temperature	105°C	85°C	70°C	60°C	≤45°C
T-UP	---	1.0	1.3	1.4	1.5
T-HA	1.0	1.7	2.0	2.2	2.35

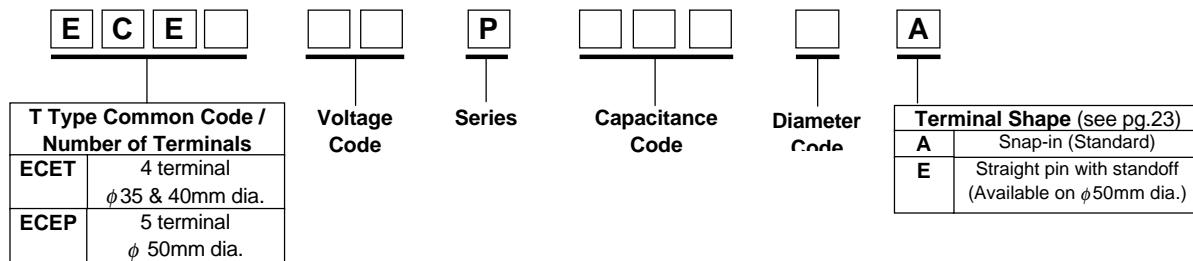
Note: Use of temperature correction factors can limit load life to the hours specified for the maximum operating temperature of the series.

T-UP Series multi terminal snap-in

- **NEW** 50mm diameter sizes with five P. C. mount terminals
- **NEW** lengths up to 105mm
- Endurance rating of 3000 hours at 85°C
- 4 or 5 terminal mounting provides stability and keyed polarity
- Can vent construction



Rated Working Voltage:	16 ~ 250 VDC	350 ~ 500 VDC
Operating Temperature:	-40 ~ +85°C	-25 ~ +85°C
Nominal Capacitance:	1200 ~ 270000μF ($\pm 20\%$ tolerance)	220 ~ 2700μF ($\pm 20\%$ tolerance)
Endurance:	3000 hours at +85°C with maximum specified ripple current (see page 4)	

Part Number System**T-UP Standard Ratings**

Cap. (μF)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120 Hz	Max 20°C E.S.R. (Ω) 10k-50kHz	Max 20°C E.S.R. (Ω) 120Hz	Max 20°C E.S.R. (Ω) 20kHz	Panasonic Part Number	Cap. (μF)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120Hz	Max 20°C E.S.R. (Ω) 10k-50kHz	Max 20°C E.S.R. (Ω) 120Hz	Max 20°C E.S.R. (Ω) 20kHz	Panasonic Part Number
16 VDC Working, 20 VDC Surge													
47000	35 x 40	7.47	8.59	0.021	0.019	ECET1CP473EA	33000	35 x 40	6.84	7.87	0.019	0.015	ECET1EP333EA
68000	35 x 50	9.05	10.41	0.018	0.017	ECET1CP683EA	47000	35 x 50	8.00	9.20	0.014	0.012	ECET1EP473EA
82000	35 x 63	10.02	11.52	0.016	0.015	ECET1CP823EA	56000	35 x 63	8.85	10.18	0.015	0.013	ECET1EP563EA
100000	35 x 80	11.00	12.65	0.015	0.014	ECET1CP104EA	68000	35 x 80	10.43	11.99	0.013	0.011	ECET1EP683EA
120000	35 x 105	12.81	14.73	0.014	0.013	ECET1CP124EA	100000	35 x 105	11.97	13.77	0.010	0.008	ECET1EP104EA
56000	40 x 40	9.05	10.41	0.022	0.021	ECET1CP563FA	39000	40 x 40	8.00	9.20	0.020	0.018	ECET1EP393FA
82000	40 x 50	10.29	11.83	0.016	0.015	ECET1CP823FA	56000	40 x 50	8.96	10.30	0.016	0.015	ECET1EP563FA
100000	40 x 63	11.36	13.06	0.018	0.017	ECET1CP104FA	68000	40 x 63	10.25	11.79	0.017	0.015	ECET1EP683FA
120000	40 x 80	12.42	14.28	0.017	0.016	ECET1CP124FA	100000	40 x 80	12.08	13.89	0.012	0.011	ECET1EP104FA
180000	40 x 105	14.85	17.08	0.013	0.012	ECET1CP184FA	150000	40 x 105	14.07	16.18	0.011	0.010	ECET1EP154FA
120000	50 x 50	13.17	15.15	0.014	0.013	ECEP1CP124HA	82000	50 x 50	12.29	14.13	0.016	0.015	ECEP1EP823HA
150000	50 x 63	14.40	16.56	0.012	0.011	ECEP1CP154HA	100000	50 x 63	13.45	15.47	0.014	0.013	ECEP1EP104HA
180000	50 x 80	15.69	18.04	0.011	0.010	ECEP1CP184HA	120000	50 x 80	15.29	17.58	0.012	0.011	ECEP1EP124HA
220000	50 x 92	16.73	19.24	0.010	0.009	ECEP1CP224HA	150000	50 x 92	16.01	18.41	0.011	0.010	ECEP1EP154HA
270000	50 x 105	17.79	20.46	0.009	0.008	ECEP1CP274HA	180000	50 x 105	16.89	19.42	0.010	0.009	ECEP1EP184HA
35 VDC Working, 44 VDC Surge													
22000	35 x 40	6.10	7.02	0.026	0.020	ECET1VP223EA	15000	35 x 40	6.44	7.41	0.028	0.021	ECET1HP153EA
33000	35 x 50	7.15	8.22	0.018	0.014	ECET1VP333EA	22000	35 x 50	7.57	8.71	0.021	0.017	ECET1HP223EA
39000	35 x 63	7.94	9.13	0.015	0.012	ECET1VP393EA	27000	35 x 63	8.31	9.56	0.018	0.015	ECET1HP273EA
47000	35 x 80	9.53	10.96	0.014	0.011	ECET1VP473EA	33000	35 x 80	9.23	10.61	0.015	0.012	ECET1HP333EA
68000	35 x 105	10.62	12.21	0.010	0.008	ECET1VP683EA	47000	35 x 105	10.27	11.81	0.014	0.011	ECET1HP473EA
27000	40 x 40	6.84	7.87	0.021	0.017	ECET1VP273FA	18000	40 x 40	6.94	7.98	0.023	0.017	ECET1HP183FA
39000	40 x 50	7.98	9.18	0.017	0.014	ECET1VP393FA	27000	40 x 50	8.12	9.34	0.018	0.015	ECET1HP273FA
47000	40 x 63	9.58	11.02	0.016	0.013	ECET1VP473FA	33000	40 x 63	9.10	10.47	0.018	0.014	ECET1HP333FA
56000	40 x 80	10.30	11.85	0.015	0.012	ECET1VP563FA	39000	40 x 80	10.12	11.64	0.015	0.012	ECET1HP393FA
82000	40 x 105	12.02	13.82	0.012	0.009	ECET1VP823FA	56000	40 x 105	11.47	13.19	0.012	0.009	ECET1HP563FA
56000	50 x 50	10.94	12.58	0.015	0.012	ECEP1VP563HA	33000	50 x 50	10.48	12.05	0.018	0.014	ECEP1HP333HA
68000	50 x 63	11.93	13.72	0.013	0.011	ECEP1VP683HA	47000	50 x 63	11.54	13.27	0.013	0.010	ECEP1HP473HA
82000	50 x 80	13.06	15.02	0.012	0.010	ECEP1VP823HA	56000	50 x 80	12.46	14.33	0.012	0.009	ECEP1HP563HA
100000	50 x 92	13.97	16.07	0.011	0.009	ECEP1VP104HA	68000	50 x 92	13.17	15.15	0.011	0.009	ECEP1HP683HA
120000	50 x 105	14.86	17.09	0.010	0.008	ECEP1VP124HA	82000	50 x 105	13.87	15.95	0.011	0.008	ECEP1HP823HA
50 VDC Working, 63 VDC Surge													

T-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A _{rms}) 120 Hz	Max. 20°C E.S.R. (Ω) 10k-50kHz	Max. 20°C E.S.R. (Ω) 120Hz	Max. 20°C E.S.R. (Ω) 20kHz	Panasonic Part Number
63 VDC Working, 79 VDC Surge						
10000	35 x 40	6.52	7.50	0.041	0.033	ECET1JP103EA
12000	35 x 50	7.15	8.22	0.035	0.028	ECET1JP123EA
15000	35 x 63	7.71	8.87	0.028	0.022	ECET1JP153EA
18000	35 x 80	9.41	10.82	0.023	0.018	ECET1JP183EA
27000	35 x 105	10.38	11.94	0.015	0.012	ECET1JP273EA
12000	40 x 40	7.15	8.22	0.035	0.028	ECET1JP123FA
15000	40 x 50	7.53	8.66	0.033	0.027	ECET1JP153FA
18000	40 x 63	9.25	10.64	0.028	0.022	ECET1JP183FA
27000	40 x 80	9.97	11.47	0.018	0.015	ECET1JP273FA
33000	40 x 105	11.76	13.52	0.015	0.012	ECET1JP333FA
27000	50 x 50	10.86	12.49	0.018	0.015	ECEP1JP273HA
33000	50 x 63	11.67	13.42	0.017	0.013	ECEP1JP333HA
47000	50 x 80	12.78	14.70	0.013	0.010	ECEP1JP473HA
51000	50 x 92	13.34	15.34	0.012	0.010	ECEP1JP513HA
56000	50 x 105	13.93	16.02	0.012	0.009	ECEP1JP563HA
100 VDC Working, 125 VDC Surge						
4700	35 x 40	5.13	5.90	0.071	0.049	ECET2AP472EA
6800	35 x 50	6.60	7.59	0.049	0.037	ECET2AP682EA
8200	35 x 63	7.05	8.11	0.040	0.030	ECET2AP822EA
10000	35 x 80	7.74	8.90	0.033	0.025	ECET2AP103EA
12000	35 x 105	8.57	9.86	0.028	0.021	ECET2AP123EA
5600	40 x 40	5.75	6.61	0.059	0.044	ECET2AP562FA
8200	40 x 50	7.28	8.37	0.040	0.030	ECET2AP822FA
10000	40 x 63	7.97	9.17	0.033	0.025	ECET2AP103FA
12000	40 x 80	8.65	9.95	0.028	0.021	ECET2AP123FA
15000	40 x 105	10.12	11.64	0.022	0.017	ECET2AP153FA
10000	50 x 50	8.82	10.14	0.033	0.025	ECEP2AP103HA
15000	50 x 63	10.07	11.58	0.022	0.017	ECEP2AP153HA
18000	50 x 80	11.00	12.65	0.018	0.014	ECEP2AP183HA
22000	50 x 92	11.76	13.52	0.015	0.011	ECEP2AP223HA
27000	50 x 105	12.53	14.41	0.014	0.010	ECEP2AP273HA
250 VDC Working, 300 VDC Surge						
1200	35 x 40	3.32	4.65	0.166	0.083	ECET2EP122EA
1500	35 x 50	4.04	5.66	0.133	0.066	ECET2EP152EA
1800	35 x 63	4.49	6.29	0.111	0.055	ECET2EP182EA
2200	35 x 80	4.94	6.92	0.090	0.045	ECET2EP222EA
3900	35 x 105	7.47	10.46	0.051	0.026	ECET2EP392EA
1500	40 x 40	4.04	5.66	0.133	0.066	ECET2EP152FA
1800	40 x 50	4.49	6.29	0.111	0.055	ECET2EP182FA
2200	40 x 63	4.94	6.92	0.090	0.045	ECET2EP222FA
3300	40 x 80	7.00	9.80	0.060	0.030	ECET2EP332FA
4700	40 x 105	8.88	12.43	0.042	0.021	ECET2EP472FA
2700	50 x 50	6.77	7.79	0.074	0.037	ECEP2EP272HA
3300	50 x 63	7.79	10.91	0.060	0.030	ECEP2EP332HA
4700	50 x 80	9.65	13.51	0.042	0.021	ECEP2EP472HA
5600	50 x 92	10.80	15.12	0.036	0.018	ECEP2EP562HA
6800	50 x 105	12.16	17.02	0.029	0.015	ECEP2EP682HA
400 VDC Working, 450 VDC Surge						
470	35 x 40	2.39	3.35	0.388	0.136	ECET2GP471EA
560	35 x 50	2.72	3.81	0.326	0.114	ECET2GP561EA
820	35 x 63	3.55	4.97	0.222	0.078	ECET2GP821EA
1200	35 x 80	4.52	6.33	0.152	0.053	ECET2GP122EA
1500	35 x 105	5.44	7.62	0.122	0.043	ECET2GP152EA
560	40 x 40	2.69	3.77	0.326	0.114	ECET2GP561FA
820	40 x 50	3.38	4.73	0.222	0.078	ECET2GP821FA
1200	40 x 63	4.52	6.33	0.152	0.053	ECET2GP122FA
1500	40 x 80	5.50	7.70	0.122	0.043	ECET2GP152FA
1800	40 x 105	6.53	9.14	0.101	0.035	ECET2GP182FA
1000	50 x 50	4.76	5.47	0.199	0.080	ECEP2GP102HA
1200	50 x 63	5.47	7.66	0.166	0.066	ECEP2GP122HA
1500	50 x 80	6.47	9.06	0.133	0.053	ECEP2GP152HA
1800	50 x 92	7.35	10.29	0.111	0.044	ECEP2GP182HA
2200	50 x 105	8.43	11.80	0.090	0.036	ECEP2GP222HA
80 VDC Working, 100 VDC Surge						
6800	35 x 40	5.16	5.93	0.046	0.035	ECET1KP682EA
8200	35 x 50	5.83	6.70	0.038	0.029	ECET1KP822EA
10000	35 x 63	6.38	7.34	0.033	0.025	ECET1KP103EA
12000	35 x 80	6.92	7.96	0.028	0.021	ECET1KP123EA
22000	35 x 105	9.86	11.34	0.015	0.011	ECET1KP223EA
8200	40 x 40	5.83	6.70	0.038	0.029	ECET1KP822FA
10000	40 x 50	6.56	7.54	0.033	0.025	ECET1KP103FA
12000	40 x 63	7.29	8.38	0.028	0.021	ECET1KP123FA
15000	40 x 80	8.93	10.27	0.024	0.018	ECET1KP153FA
27000	40 x 105	11.35	13.05	0.015	0.012	ECET1KP273FA
18000	50 x 50	10.00	11.50	0.023	0.017	ECEP1KP183HA
22000	50 x 63	11.08	12.74	0.019	0.014	ECEP1KP223HA
27000	50 x 80	12.33	14.18	0.015	0.012	ECEP1KP273HA
33000	50 x 92	13.37	15.38	0.014	0.010	ECEP1KP333HA
39000	50 x 105	14.34	16.49	0.013	0.010	ECEP1KP393HA
200 VDC Working, 250 VDC Surge						
1800	35 x 40	4.32	6.05	0.120	0.060	ECET2DP182EA
2200	35 x 50	4.92	6.89	0.098	0.054	ECET2DP222EA
2700	35 x 63	5.50	7.70	0.080	0.044	ECET2DP272EA
3300	35 x 80	6.44	9.02	0.065	0.036	ECET2DP332EA
5600	35 x 105	8.90	12.46	0.038	0.021	ECET2DP562EA
2200	40 x 40	4.92	6.89	0.098	0.054	ECET2DP222FA
2700	40 x 50	5.41	7.57	0.080	0.044	ECET2DP272FA
3300	40 x 63	6.32	8.85	0.065	0.036	ECET2DP332FA
4700	40 x 80	8.38	11.73	0.046	0.025	ECET2DP472FA
6800	40 x 105	8.65	12.11	0.032	0.017	ECET2DP682FA
3900	50 x 50	8.22	9.45	0.055	0.030	ECEP2DP392HA
4700	50 x 63	9.32	13.05	0.046	0.025	ECEP2DP472HA
6800	50 x 80	11.41	15.97	0.032	0.017	ECEP2DP682HA
7500	50 x 92	12.28	17.19	0.029	0.016	ECEP2DP752HA
8200	50 x 105	13.16	18.42	0.026	0.014	ECEP2DP822HA
350 VDC Working, 400 VDC Surge						
470	35 x 40	2.40	3.36	0.388	0.175	ECET2VP471EA
680	35 x 50	2.96	4.14	0.366	0.165	ECET2VP681EA
1000	35 x 63	3.80	5.32	0.249	0.112	ECET2VP102EA
1200	35 x 80	4.42	6.19	0.207	0.093	ECET2VP122EA
1800	35 x 105	5.79	8.11	0.138	0.062	ECET2VP182EA
680	40 x 40	2.96	4.14	0.366	0.165	ECET2VP681FA
1000	40 x 50	3.80	5.32	0.249	0.112	ECET2VP102FA
1200	40 x 63	4.42	6.19	0.207	0.093	ECET2VP122FA
1800	40 x 80	5.85	8.19	0.138	0.062	ECET2VP182FA
2200	40 x 105	6.91	9.67	0.113	0.051	ECET2VP222FA
1200	50 x 50	5.18	5.96	0.207	0.093	ECEP2VP122HA
1500	50 x 63	6.01	8.41	0.166	0.075	ECEP2VP152HA
1800	50 x 80	6.89	9.65	0.138	0.062	ECEP2VP182HA
2200	50 x 92	7.79	10.91	0.113	0.051	ECEP2VP222HA
2700	50 x 105	8.80	12.32	0.092	0.041	ECEP2VP272HA
450 VDC Working, 500 VDC Surge						
330	35 x 40	2.01	2.81	0.553	0.249	ECET2WP331EA
470	35 x 50	2.53	3.54	0.423	0.233	ECET2WP471EA
560	35 x 63	2.90	4.06	0.355	0.195	ECET2WP561EA
820	35 x 80	3.78	5.29	0.243	0.133	ECET2WP821EA
1200	35 x 105	4.80	6.72	0.166	0.091	ECET2WP122EA
470	40 x 40	2.53	3.54	0.423	0.233	ECET2WP471FA
680	40 x 50	3.15	4.41	0.293	0.161	ECET2WP681FA
820	40 x 63	3.70	5.18	0.243	0.133	ECET2WP821FA
1200	40 x 80	4.84	6.78	0.166	0.091	ECET2WP122FA
1500	40 x 105	5.81	8.13	0.133	0.073	ECET2WP152FA
820	50 x 50	4.31	4.96	0.263	0.145	ECEP2WP821HA
1000	50 x 63	4.96	6.94	0.216	0.119	ECEP2WP102HA
1200	50 x 80	5.71	7.99	0.180	0.099	ECEP2WP122HA
1500	50 x 92	6.55	9.17	0.144	0.079	ECEP2WP152HA
1800	50 x 105	7.36	10.30	0.120	0.066	ECEP2WP182HA

T-UP Standard Ratings (continued)

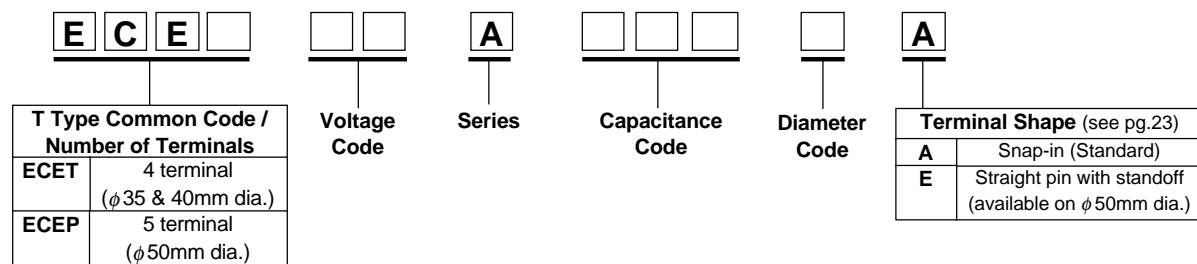
Cap. (μ F)	Size (mm) D x L	Max. 85°C R.C. (A_{rms}) 120 Hz	Max. 20°C E.S.R. (Ω) 10k-50kHz	Max. 20°C E.S.R. (Ω) 120Hz	Max. 20°C E.S.R. (Ω) 20kHz	Panasonic Part Number
500 VDC Working, 550 VDC Surge						
270	35 x 40	1.76	2.46	0.614	0.276	ECET2HP271EA
390	35 x 50	2.22	3.11	0.425	0.234	ECET2HP391EA
470	35 x 63	2.58	3.61	0.353	0.194	ECET2HP471EA
680	35 x 80	3.21	4.49	0.244	0.134	ECET2HP681EA
820	35 x 105	3.97	5.56	0.202	0.111	ECET2HP821EA
330	40 x 40	2.16	3.02	0.502	0.276	ECET2HP331FA
470	40 x 50	2.70	3.78	0.353	0.194	ECET2HP471FA
560	40 x 63	3.11	4.35	0.326	0.179	ECET2HP561FA
820	40 x 80	3.88	5.43	0.222	0.122	ECET2HP821FA
1200	40 x 105	5.90	8.26	0.152	0.084	ECET2HP122FA
560	50 x 50	3.52	4.05	0.355	0.195	ECEP2HP561HA
680	50 x 63	4.07	5.70	0.293	0.161	ECEP2HP681HA
1000	50 x 80	5.05	7.07	0.199	0.109	ECEP2HP102HA
1200	50 x 92	5.74	8.04	0.166	0.091	ECEP2HP122HA
1500	50 x 105	6.65	9.31	0.144	0.079	ECEP2HP152HA

T-HA Series multi terminal snap-in

- **NEW** 50mm Diameter Sizes with Five P. C. Mount Terminals
- **NEW** lengths up to 105mm
- Endurance rating of 3000 hours at 105°C
- 4 or 5 terminal mounting provides stability and keyed polarity
- Can vent construction



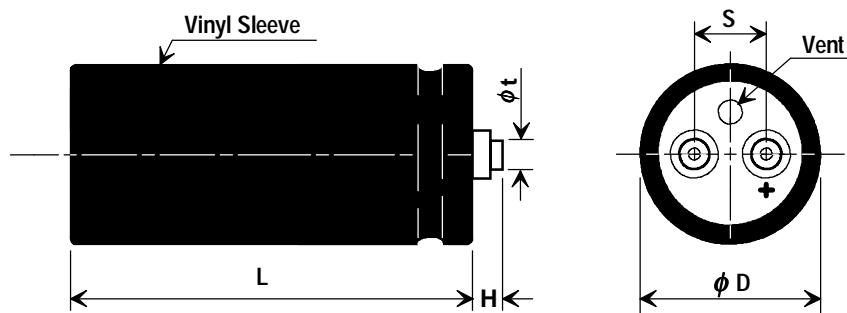
Rated Working Voltage:	16 ~ 250 VDC	350 ~ 450 VDC
Operating Temperature:	-40 ~ +105°C	-25 ~ +105°C
Nominal Capacitance:	1000~250000μF ($\pm 20\%$ tolerance)	330~2200μF ($\pm 20\%$ tolerance)
Endurance:	3000 hours at +105°C with maximum specified ripple current (see page 4)	

Part Number System**T-HA Standard Ratings**

Cap. (μF)	Size (mm)	Max 105°C R.C. (A _{rms})	Max 20°C ESR (Ω)	Panasonic Part Number	Cap. (μF)	Size (mm)	Max 105°C R.C. (A _{rms})	Max 20°C ESR (Ω)	Panasonic Part Number
16 VDC Working, 20 VDC Surge									
39000	35 x 40	5.10	5.87	0.022	0.020	ECET1CA393EA	27000	35 x 40	4.80
56000	35 x 50	6.00	6.90	0.019	0.017	ECET1CA563EA	33000	35 x 50	5.50
68000	35 x 63	6.62	7.61	0.017	0.015	ECET1CA683EA	47000	35 x 63	6.56
100000	35 x 80	8.03	9.23	0.015	0.013	ECET1CA104EA	56000	35 x 80	7.25
120000	35 x 105	8.71	10.02	0.014	0.012	ECET1CA124EA	82000	35 x 105	8.58
47000	40 x 40	5.50	6.33	0.020	0.018	ECET1CA473FA	33000	40 x 40	5.50
68000	40 x 50	7.29	8.38	0.015	0.014	ECET1CA683FA	47000	40 x 50	6.47
82000	40 x 63	7.66	8.81	0.017	0.015	ECET1CA823FA	56000	40 x 63	7.17
120000	40 x 80	8.79	10.11	0.014	0.012	ECET1CA124FA	82000	40 x 80	8.68
150000	40 x 105	9.88	11.36	0.013	0.012	ECET1CA154FA	100000	40 x 105	9.76
120000	50 x 50	9.02	10.37	0.015	0.014	ECEP1CA124HA	82000	50 x 50	9.20
150000	50 x 63	10.15	11.67	0.014	0.013	ECEP1CA154HA	100000	50 x 63	10.02
180000	50 x 80	11.02	12.67	0.013	0.012	ECEP1CA184HA	120000	50 x 80	10.93
220000	50 x 92	11.71	13.47	0.012	0.011	ECEP1CA224HA	150000	50 x 92	11.70
250000	50 x 105	12.31	14.16	0.011	0.010	ECEP1CA254HA	180000	50 x 105	12.42
35 VDC Working, 44 VDC Surge									
18000	35 x 40	4.30	4.95	0.028	0.021	ECET1VA183EA	10000	35 x 40	4.00
22000	35 x 50	5.00	5.75	0.023	0.017	ECET1VA223EA	15000	35 x 50	4.80
27000	35 x 63	5.53	6.36	0.025	0.018	ECET1VA273EA	18000	35 x 63	5.27
39000	35 x 80	6.52	7.50	0.019	0.014	ECET1VA393EA	27000	35 x 80	6.16
47000	35 x 105	8.07	9.28	0.017	0.013	ECET1VA473EA	33000	35 x 105	7.23
22000	40 x 40	5.00	5.75	0.023	0.017	ECET1VA223FA	15000	40 x 40	4.80
27000	40 x 50	5.44	6.26	0.020	0.015	ECET1VA273FA	22000	40 x 50	5.15
33000	40 x 63	6.61	7.60	0.019	0.014	ECET1VA333FA	27000	40 x 63	6.05
47000	40 x 80	7.79	8.96	0.018	0.013	ECET1VA473FA	39000	40 x 80	7.55
68000	40 x 105	9.27	10.66	0.016	0.012	ECET1VA683FA	47000	40 x 105	8.18
47000	50 x 50	8.25	9.49	0.021	0.016	ECEP1VA473HA	33000	50 x 50	7.75
56000	50 x 63	9.07	10.43	0.019	0.014	ECEP1VA563HA	39000	50 x 63	8.40
68000	50 x 80	10.07	11.58	0.017	0.013	ECEP1VA683HA	47000	50 x 80	9.19
82000	50 x 92	10.89	12.52	0.015	0.011	ECEP1VA823HA	56000	50 x 92	9.79
100000	50 x 105	11.75	13.51	0.013	0.010	ECEP1VA104HA	68000	50 x 105	10.42
25 VDC Working, 32 VDC Surge									
27000	35 x 40	4.80	5.52	0.018	0.017	ECET1EA273EA	10000	35 x 40	4.00
33000	35 x 50	5.50	6.33	0.018	0.016	ECET1EA333EA	15000	35 x 50	4.80
47000	35 x 63	6.56	7.54	0.017	0.015	ECET1EA473EA	18000	35 x 63	5.27
56000	35 x 80	7.25	8.34	0.015	0.013	ECET1EA563EA	27000	35 x 80	6.16
82000	35 x 105	8.58	9.87	0.013	0.012	ECET1EA823EA	33000	40 x 40	5.50
33000	40 x 40	5.50	6.33	0.018	0.016	ECET1EA333FA	47000	40 x 50	6.47
47000	40 x 50	6.47	7.44	0.015	0.014	ECET1EA473FA	56000	40 x 63	7.17
56000	40 x 63	7.17	8.25	0.014	0.013	ECET1EA563FA	82000	40 x 80	8.68
82000	40 x 80	8.68	9.98	0.013	0.012	ECET1EA823FA	100000	40 x 105	9.76
100000	40 x 105	9.76	11.22	0.012	0.010	ECET1EA104FA	82000	50 x 50	9.20
82000	50 x 50	9.20	10.58	0.016	0.015	ECEP1EA823HA	100000	50 x 63	10.02
100000	50 x 63	10.02	11.52	0.015	0.013	ECEP1EA104HA	120000	50 x 80	10.93
120000	50 x 80	10.93	12.57	0.013	0.012	ECEP1EA124HA	150000	50 x 92	11.70
150000	50 x 92	11.70	13.46	0.012	0.011	ECEP1EA154HA	180000	50 x 105	12.42
180000	50 x 105	12.42	14.28	0.010	0.009	ECEP1EA184HA			
35 VDC Working, 44 VDC Surge									
10000	35 x 40	4.00	4.60	0.033	0.025	ECET1HA103EA	10000	35 x 40	4.00
15000	35 x 50	4.80	5.52	0.022	0.018	ECET1HA153EA	15000	35 x 50	4.80
18000	35 x 63	5.27	6.06	0.020	0.016	ECET1HA183EA	18000	35 x 63	5.27
27000	35 x 80	6.16	7.08	0.015	0.012	ECET1HA273EA	27000	35 x 80	6.16
33000	35 x 105	7.23	8.31	0.013	0.010	ECET1HA333EA	33000	35 x 105	7.23
15000	40 x 40	4.80	5.52	0.022	0.018	ECET1HA153FA	15000	40 x 40	4.80
22000	40 x 50	5.15	5.92	0.016	0.013	ECET1HA223FA	22000	40 x 50	5.15
27000	40 x 63	6.05	6.96	0.015	0.012	ECET1HA273FA	27000	40 x 63	6.05
39000	40 x 80	7.55	8.68	0.014	0.011	ECET1HA393FA	39000	40 x 80	7.55
47000	40 x 105	8.18	9.41	0.012	0.010	ECET1HA473FA	47000	40 x 105	8.18
33000	50 x 50	7.75	8.91	0.018	0.014	ECEP1HA333HA	33000	50 x 50	7.75
39000	50 x 63	8.40	9.66	0.016	0.013	ECEP1HA393HA	39000	50 x 63	8.40
47000	50 x 80	9.19	10.57	0.014	0.011	ECEP1HA473HA	47000	50 x 80	9.19
56000	50 x 92	9.79	11.26	0.012	0.009	ECEP1HA563HA	56000	50 x 92	9.79
68000	50 x 105	10.42	11.98	0.011	0.009	ECEP1HA683HA	68000	50 x 105	10.42
50 VDC Working, 63 VDC Surge									

T-HA Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120 Hz	Max 20°C ESR (Ω) 10k~50kHz	Max 20°C ESR (Ω) 120Hz	Max 20°C ESR (Ω) 20kHz	Panasonic Part Number
63 VDC Working, 79 VDC Surge						
6800	35 x 40	3.60	4.14	0.049	0.037	ECET1JA682EA
12000	35 x 50	4.40	5.06	0.028	0.023	ECET1JA123EA
15000	35 x 63	4.92	5.66	0.024	0.021	ECET1JA153EA
18000	35 x 80	5.79	6.66	0.022	0.019	ECET1JA183EA
27000	35 x 105	6.53	7.51	0.017	0.014	ECET1JA273EA
12000	40 x 40	4.52	5.20	0.030	0.026	ECET1JA123FA
15000	40 x 50	4.80	5.52	0.027	0.023	ECET1JA153FA
18000	40 x 63	5.39	6.20	0.023	0.020	ECET1JA183FA
27000	40 x 80	6.59	7.58	0.017	0.014	ECET1JA273FA
39000	40 x 105	7.53	8.66	0.014	0.012	ECET1JA333FA
22000	50 x 50	6.76	7.77	0.019	0.016	ECEP1JA223HA
27000	50 x 63	7.34	8.44	0.017	0.014	ECEP1JA273HA
33000	50 x 80	8.00	9.20	0.015	0.013	ECEP1JA333HA
39000	50 x 92	8.48	9.75	0.014	0.012	ECEP1JA393HA
47000	50 x 105	8.99	10.34	0.012	0.010	ECEP1JA473HA
80 VDC Working, 100 VDC Surge						
4700	35 x 40	3.30	3.80	0.049	0.037	ECET1KA472EA
6800	35 x 50	3.90	4.49	0.041	0.031	ECET1KA682EA
8200	35 x 63	4.39	5.05	0.036	0.027	ECET1KA822EA
10000	35 x 80	4.88	5.61	0.031	0.024	ECET1KA103EA
15000	35 x 105	6.13	7.05	0.024	0.018	ECET1KA153EA
6800	40 x 40	3.90	4.49	0.041	0.031	ECET1KA682FA
8200	40 x 50	4.29	4.93	0.036	0.027	ECET1KA822FA
10000	40 x 63	4.73	5.44	0.033	0.025	ECET1KA103FA
15000	40 x 80	5.97	6.87	0.025	0.019	ECET1KA153FA
22000	40 x 105	6.95	7.99	0.019	0.014	ECET1KA223FA
12000	50 x 50	6.03	6.93	0.035	0.026	ECEP1KA123HA
15000	50 x 63	6.65	7.65	0.028	0.021	ECEP1KA153HA
18000	50 x 80	7.29	8.38	0.026	0.019	ECEP1KA183HA
22000	50 x 92	7.83	9.00	0.022	0.016	ECEP1KA223HA
27000	50 x 105	8.38	9.64	0.018	0.014	ECEP1KA273HA
100 VDC Working, 125 VDC Surge						
3300	35 x 40	3.20	3.68	0.075	0.053	ECET2AA332EA
4700	35 x 50	3.80	4.37	0.053	0.040	ECET2AA472EA
5600	35 x 63	4.06	4.67	0.044	0.033	ECET2AA562EA
8200	35 x 80	5.15	5.92	0.030	0.023	ECET2AA822EA
10000	35 x 105	6.38	7.34	0.025	0.019	ECET2AA103EA
4700	40 x 40	3.80	4.37	0.053	0.040	ECET2AA472FA
6800	40 x 50	4.57	5.26	0.037	0.027	ECET2AA682FA
8200	40 x 63	5.02	5.77	0.030	0.023	ECET2AA822FA
12000	40 x 80	6.44	7.41	0.021	0.016	ECET2AA123FA
15000	40 x 105	7.37	8.48	0.017	0.012	ECET2AA153FA
8200	50 x 50	6.14	7.06	0.030	0.023	ECEP2AA822HA
12000	50 x 63	7.17	8.25	0.022	0.017	ECEP2AA123HA
15000	50 x 80	8.01	9.21	0.019	0.014	ECEP2AA153HA
18000	50 x 92	8.64	9.94	0.017	0.012	ECEP2AA183HA
22000	50 x 105	9.32	10.72	0.015	0.011	ECEP2AA223HA
200 VDC Working, 250 VDC Surge						
1500	35 x 40	2.50	3.50	0.133	0.066	ECET2DA152EA
2200	35 x 50	2.90	4.06	0.098	0.059	ECET2DA222EA
2700	35 x 63	3.65	5.11	0.080	0.048	ECET2DA272EA
3300	35 x 80	4.52	6.33	0.065	0.039	ECET2DA332EA
4700	35 x 105	5.70	7.98	0.046	0.028	ECET2DA472EA
1800	40 x 40	2.70	3.78	0.129	0.077	ECET2DA182FA
2700	40 x 50	3.55	4.97	0.086	0.052	ECET2DA272FA
3300	40 x 63	4.40	6.16	0.070	0.042	ECET2DA332FA
4700	40 x 80	5.76	8.06	0.049	0.030	ECET2DA472FA
5600	40 x 105	6.76	9.46	0.041	0.025	ECET2DA562FA
3300	50 x 50	5.20	7.28	0.075	0.045	ECEP2DA272HA
3900	50 x 63	5.90	8.26	0.064	0.038	ECEP2DA332HA
4700	50 x 80	6.82	9.55	0.053	0.032	ECEP2DA472HA
5600	50 x 92	7.68	10.75	0.044	0.027	ECEP2DA512HA
6800	50 x 105	8.71	12.19	0.034	0.020	ECEP2DA562HA
250 VDC Working, 300 VDC Surge						
1000	35 x 40	2.20	3.08	0.199	0.109	ECET2EA102EA
1200	35 x 50	2.30	3.22	0.180	0.117	ECET2EA122EA
1500	35 x 63	2.57	3.60	0.144	0.093	ECET2EA152EA
2200	35 x 80	3.75	5.25	0.098	0.064	ECET2EA222EA
2700	35 x 105	4.80	6.72	0.080	0.052	ECET2EA272EA
1200	40 x 40	2.66	3.72	0.180	0.117	ECET2EA122FA
1800	40 x 50	3.15	4.41	0.120	0.078	ECET2EA182FA
2200	40 x 63	3.68	5.15	0.098	0.064	ECET2EA222FA
3300	40 x 80	4.86	6.80	0.065	0.042	ECET2EA332FA
3900	40 x 105	5.61	7.85	0.055	0.036	ECET2EA392FA
2200	50 x 50	4.35	6.09	0.098	0.064	ECEP2EA222HA
2700	50 x 63	4.98	6.97	0.080	0.052	ECEP2EA272HA
3900	50 x 80	6.10	8.54	0.055	0.036	ECEP2EA392HA
4300	50 x 92	6.67	9.34	0.050	0.033	ECEP2EA452HA
4700	50 x 105	7.03	9.84	0.046	0.030	ECEP2EA472HA
350 VDC Working, 400 VDC Surge						
470	35 x 40	2.00	2.80	0.459	0.183	ECET2VA471EA
680	35 x 50	2.15	3.01	0.317	0.127	ECET2VA681EA
820	35 x 63	2.65	3.71	0.263	0.105	ECET2VA821EA
1200	35 x 80	3.22	4.51	0.180	0.072	ECET2VA122EA
1500	35 x 105	4.78	6.69	0.144	0.057	ECET2VA152EA
680	40 x 40	2.30	3.22	0.317	0.127	ECET2VA681HA
820	40 x 50	2.65	3.71	0.263	0.105	ECET2VA821FA
1200	40 x 63	3.22	4.51	0.180	0.072	ECET2VA122FA
1500	40 x 80	3.75	5.25	0.144	0.057	ECET2VA152FA
1800	40 x 105	5.23	7.32	0.120	0.048	ECET2VA182FA
1000	50 x 50	3.56	4.98	0.216	0.086	ECEP2VA102HA
1500	50 x 63	4.16	5.82	0.144	0.057	ECEP2VA152HA
1800	50 x 80	5.69	7.97	0.120	0.048	ECEP2VA182HA
2000	50 x 92	6.34	8.88	0.108	0.043	ECEP2VA202HA
2200	50 x 105	7.03	9.84	#REF!	#REF!	ECEP2VA222HA
450 VDC Working, 500 VDC Surge						
330	35 x 40	1.37	1.92	0.502	0.176	ECET2WA331EA
470	35 x 50	1.74	2.44	0.353	0.123	ECET2WA471EA
560	35 x 63	2.15	3.01	0.296	0.104	ECET2WA561EA
820	35 x 80	2.70	3.78	0.202	0.071	ECET2WA821EA
1000	35 x 105	3.47	4.86	0.166	0.058	ECET2WA102EA
390	40 x 40	1.68	2.35	0.425	0.149	ECET2WA391FA
560	40 x 50	2.10	2.94	0.296	0.104	ECET2WA561FA
680	40 x 63	2.50	3.50	0.244	0.085	ECET2WA681FA
1000	40 x 80	3.50	4.90	0.166	0.058	ECET2WA102FA
1200	40 x 105	4.33	6.06	0.138	0.048	ECET2WA122FA
680	50 x 50	2.90	4.06	0.244	0.085	ECEP2WA681HA
820	50 x 63	3.42	4.79	0.222	0.078	ECEP2WA821HA
1200	50 x 80	4.70	6.58	0.152	0.053	ECEP2WA122HA
1300	50 x 92	5.18	7.25	0.140	0.049	ECEP2WA132HA
1500	50 x 105	6.03	8.44	0.122	0.043	ECEP2WA152HA

G Type General Information**Dimensions (mm)**

Case Code	Nominal Size D x L	Sleeved Case Dimensions		
		$\phi D \pm 0.79$	$L \pm 1.58$	$S \pm 0.41$
CA	35 x 41		42.1	
CC	35 x 54		54.8	
CE	35 x 67		67.5	
CG	35 x 79		80.2	
CH	35 x 92		92.9	
CK	35 x 105		105.6	
CL	35 x 117		118.3	
CN	35 x 130		131.0	
CP	35 x 143		143.7	
FB	51 x 48		48.4	
FC	51 x 54		54.8	
FE	51 x 67		67.5	
FG	51 x 79		80.2	
FH	51 x 92		92.9	
FK	51 x 105		105.6	
FL	51 x 117		118.3	
FN	51 x 130		131.0	
FP	51 x 143		143.7	
GG	64 x 79		80.2	
GH	64 x 92		92.9	
GK	64 x 105		105.6	
GL	64 x 130		118.3	
GN	64 x 130		131.0	
GP	64 x 143		143.7	
HG	76 x 79		80.2	
HH	76 x 92		92.9	
HK	76 x 105		105.6	
HL	76 x 117		118.3	
HN	76 x 130		131.0	
HP	76 x 143		143.7	
HW	76 x 219		219.9	

Terminal Code	Terminal Specifications				
	Thread	Thread Depth	$H \pm 0.79$	$\phi t \pm 0.25$	
E	10-32 NF-2B	9.5	6.4	8.0	
L	10-32 NF-2B	5.5	1.6	8.0	
M	M5	9.5	6.4	8.0	
H	1/4-28 NF-2B	11.9	6.4	17.4	
J	1/4-28 NF-2B	8.7	2.8	17.4	
X	M6	11.9	6.4	17.4	
Y	M6	8.7	2.8	17.4	

Terminal Code	Nominal Diameter				Max. ripple current (A)
	35mm	51mm	64mm	76mm	
E	S	S	S	S	
L	O	O	O	O	30
M	O	O	O	O	
H	N.A.	N.A.	O	O	
J	N.A.	N.A.	O	O	
X	N.A.	N.A.	O	O	
Y	N.A.	N.A.	O	O	50

S: standard O: optional N.A.: not available

Ripple Current Multipliers

Ripple Current Frequency Correction Factors						
Frequency (Hz):	50	60	100~120	300~360	1k	10k~50k
16~100 WV:	0.9	0.95	1.0	1.05	1.08	1.15
160~500 WV:	0.75	0.8	1.0	1.2	1.25	1.4

Ripple Current Temperature Correction Factors					
Max. Temperature	105°C	85°C	70°C	60°C	$\leq 45^\circ\text{C}$
G-AA	---	1.0	1.6	2.0	2.2
G-BA	1.0	1.75	2.0	2.2	2.35

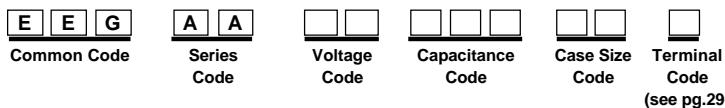
Note: Use of temperature correction factors can limit load life to the hours specified for the maximum operating temperature of the series.

G-AA Series screw terminal style

- General purpose for industrial applications
- High ripple current with 3000 hour life
- High CV designs
- Customized designs available



Rated Working Voltage:	16 ~ 500 VDC
Operating Temperature:	-40 ~ +85°C
Nominal Capacitance:	150 ~ 1200000μF
Capacitance Tolerance:	± 20%
Endurance:	3000 hours at +85°C with maximum specified ripple current (see page 4)

Part Number System**G-AA Typical Ratings**

Cap. (μF)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number	Cap. (μF)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω, max.) 10k-50kHz	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number	
16 VDC Working, 20 VDC Surge													
33000	35 x 41	5.16	5.93	0.0313	0.0281	EEGAA1C333CA	27000	35 x 41	4.95	5.69	0.0327	0.0295	EEGAA1D273CA
39000	35 x 54	5.86	6.74	0.0269	0.0242	EEGAA1C393CC	33000	35 x 54	5.72	6.58	0.0274	0.0246	EEGAA1D333CC
56000	35 x 67	7.30	8.40	0.0196	0.0177	EEGAA1C563CE	47000	35 x 67	7.12	8.19	0.0202	0.0181	EEGAA1D473CE
68000	35 x 79	8.31	9.56	0.0167	0.0150	EEGAA1C683CG	56000	35 x 79	8.05	9.26	0.0174	0.0157	EEGAA1D563CG
82000	35 x 92	9.37	10.78	0.0143	0.0129	EEGAA1C823CH	68000	35 x 92	9.12	10.49	0.0149	0.0134	EEGAA1D683CH
100000	35 x 105	10.51	12.09	0.0123	0.0110	EEGAA1C104CK	82000	35 x 105	10.21	11.74	0.0129	0.0116	EEGAA1D823CK
120000	35 x 117	11.67	13.42	0.0107	0.0096	EEGAA1C124CL	100000	35 x 117	11.45	13.17	0.0112	0.0100	EEGAA1D104CL
130000	35 x 130	12.41	14.27	0.0101	0.0091	EEGAA1C134CN	110000	35 x 130	12.25	14.09	0.0104	0.0094	EEGAA1D114CN
150000	35 x 143	13.44	15.46	0.0091	0.0082	EEGAA1C154CP	120000	35 x 143	13.04	15.00	0.0098	0.0088	EEGAA1D124CP
82000	51 x 48	10.01	11.51	0.0143	0.0129	EEGAA1C823FB	68000	51 x 48	9.75	11.21	0.0149	0.0134	EEGAA1D683FB
100000	51 x 54	11.01	12.66	0.0123	0.0110	EEGAA1C104FC	82000	51 x 54	10.70	12.31	0.0129	0.0116	EEGAA1D823FC
120000	51 x 67	12.41	14.27	0.0107	0.0096	EEGAA1C124FE	100000	51 x 67	12.17	14.00	0.0112	0.0100	EEGAA1D104FE
150000	51 x 79	13.98	16.08	0.0091	0.0082	EEGAA1C154FG	120000	51 x 79	13.57	15.61	0.0098	0.0088	EEGAA1D124FG
180000	51 x 92	15.42	17.73	0.0081	0.0073	EEGAA1C184FH	150000	51 x 92	15.22	17.50	0.0085	0.0077	EEGAA1D154FH
220000	51 x 105	16.93	19.47	0.0072	0.0064	EEGAA1C224FK	180000	51 x 105	16.68	19.18	0.0076	0.0069	EEGAA1D184FK
270000	51 x 130	19.08	21.94	0.0052	0.0047	EEGAA1C274FN	220000	51 x 130	18.86	21.69	0.0068	0.0061	EEGAA1D224FN
330000	51 x 143	20.63	23.72	0.0070	0.0063	EEGAA1C334FP	270000	51 x 143	20.50	23.58	0.0061	0.0055	EEGAA1D274FP
270000	64 x 79	19.31	22.21	0.0064	0.0057	EEGAA1C274GG	220000	64 x 79	19.08	21.94	0.0068	0.0061	EEGAA1D224GG
330000	64 x 92	21.02	24.17	0.0057	0.0052	EEGAA1C334GH	270000	64 x 92	20.89	24.02	0.0061	0.0055	EEGAA1D274GH
390000	64 x 105	22.50	25.88	0.0053	0.0048	EEGAA1C394GK	330000	64 x 105	22.62	26.01	0.0056	0.0050	EEGAA1D334GK
470000	64 x 117	24.11	27.73	0.0049	0.0044	EEGAA1C474GL	390000	64 x 117	24.21	27.84	0.0052	0.0047	EEGAA1D394GL
500000	64 x 130	25.05	28.81	0.0048	0.0043	EEGAA1C504GN	430000	64 x 130	25.38	29.19	0.0050	0.0045	EEGAA1D434GN
560000	64 x 143	26.23	30.16	0.0046	0.0041	EEGAA1C564GP	470000	64 x 143	26.49	30.46	0.0049	0.0044	EEGAA1D474GP
390000	76 x 79	23.79	27.36	0.0053	0.0048	EEGAA1C394HG	330000	76 x 79	23.92	27.51	0.0056	0.0050	EEGAA1D334HG
470000	76 x 92	25.51	29.34	0.0049	0.0044	EEGAA1C474HH	390000	76 x 92	25.62	29.46	0.0052	0.0047	EEGAA1D394HH
560000	76 x 105	27.08	31.14	0.0046	0.0041	EEGAA1C564HK	470000	76 x 105	27.34	31.44	0.0049	0.0044	EEGAA1D474HK
680000	76 x 117	28.74	33.05	0.0043	0.0039	EEGAA1C684HL	560000	76 x 117	29.03	33.38	0.0046	0.0041	EEGAA1D684HL
750000	76 x 130	29.88	34.36	0.0042	0.0037	EEGAA1C754HN	620000	76 x 130	30.25	34.79	0.0045	0.0040	EEGAA1D624HN
820000	76 x 143	30.97	35.62	0.0040	0.0036	EEGAA1C824HP	680000	76 x 143	31.41	36.12	0.0044	0.0039	EEGAA1D684HP
1200000	76 x 219	36.78	42.30	0.0037	0.0033	EEGAA1C125HW	1000000	76 x 219	37.54	43.17	0.0040	0.0036	EEGAA1D105HW

Aluminum Electrolytic Capacitors

G-AA Typical Ratings (continued)

Cap. (μF)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms}) 120Hz 10k-50kHz	20°C ESR (Ω , max.) 120Hz 20kHz	Panasonic Part Number	Cap. (μF)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms}) 120Hz 10k-50kHz	20°C ESR (Ω , max.) 120Hz 20kHz	Panasonic Part Number				
25 VDC Working, 32 VDC Surge													
22000	35 x 41	4.93	5.67	0.0234	0.0199	EEGAA1E223CA	15000	35 x 41	4.12	4.74	0.0344	0.0292	EEGAA1V153CA
27000	35 x 54	5.70	6.56	0.0196	0.0167	EEGAA1E273CC	18000	35 x 54	4.73	5.44	0.0289	0.0246	EEGAA1V183CC
39000	35 x 67	7.16	8.23	0.0144	0.0123	EEGAA1E393CE	22000	35 x 67	5.53	6.36	0.0239	0.0203	EEGAA1V223CE
47000	35 x 79	8.15	9.37	0.0124	0.0106	EEGAA1E473CG	33000	35 x 79	6.99	8.04	0.0164	0.0140	EEGAA1V333CG
56000	35 x 92	9.17	10.55	0.0109	0.0092	EEGAA1E563CH	39000	35 x 92	7.87	9.05	0.0141	0.0120	EEGAA1V393CH
68000	35 x 105	10.31	11.86	0.0094	0.0080	EEGAA1E683CK	47000	35 x 105	8.86	10.19	0.0120	0.0102	EEGAA1V473CK
82000	35 x 117	11.53	13.26	0.0083	0.0070	EEGAA1E823CL	56000	35 x 117	9.91	11.40	0.0103	0.0088	EEGAA1V563CL
91000	35 x 130	12.39	14.25	0.0077	0.0066	EEGAA1E913CN	62000	35 x 130	10.68	12.28	0.0094	0.0080	EEGAA1V623CN
100000	35 x 143	13.23	15.21	0.0073	0.0062	EEGAA1E104CP	68000	35 x 143	11.43	13.14	0.0087	0.0074	EEGAA1V683CP
56000	51 x 48	9.78	11.25	0.0109	0.0092	EEGAA1E563FB	33000	51 x 48	7.70	8.86	0.0164	0.0140	EEGAA1V333FB
68000	51 x 54	10.79	12.41	0.0094	0.0080	EEGAA1E683FC	47000	51 x 54	9.16	10.53	0.0120	0.0102	EEGAA1V473FC
82000	51 x 67	12.24	14.08	0.0083	0.0070	EEGAA1E823FE	56000	51 x 67	10.39	11.95	0.0103	0.0088	EEGAA1V563FE
100000	51 x 79	13.75	15.81	0.0073	0.0062	EEGAA1E104FG	68000	51 x 79	11.73	13.49	0.0087	0.0074	EEGAA1V683FG
120000	51 x 92	15.24	17.53	0.0065	0.0056	EEGAA1E124FH	82000	51 x 92	13.12	15.09	0.0075	0.0064	EEGAA1V823FH
150000	51 x 105	16.98	19.53	0.0058	0.0049	EEGAA1E154FK	100000	51 x 105	14.61	16.80	0.0064	0.0055	EEGAA1V104FK
180000	51 x 130	19.13	22.00	0.0053	0.0045	EEGAA1E184FN	120000	51 x 130	16.60	19.09	0.0056	0.0048	EEGAA1V124FN
220000	51 x 143	20.84	23.97	0.0048	0.0041	EEGAA1E224FP	150000	51 x 143	18.40	21.16	0.0048	0.0041	EEGAA1V154FP
180000	64 x 79	19.33	22.23	0.0053	0.0045	EEGAA1E184GG	120000	64 x 79	16.78	19.30	0.0056	0.0048	EEGAA1V124GG
220000	64 x 92	21.20	24.38	0.0048	0.0041	EEGAA1E224GH	150000	64 x 92	18.72	21.53	0.0048	0.0041	EEGAA1V154GH
270000	64 x 105	23.05	26.51	0.0044	0.0038	EEGAA1E274GK	180000	64 x 105	20.42	23.48	0.0042	0.0036	EEGAA1V184GK
310000	64 x 117	24.57	28.26	0.0042	0.0036	EEGAA1E314GL	200000	64 x 117	21.71	24.97	0.0040	0.0034	EEGAA1V204GL
330000	64 x 130	25.60	29.44	0.0041	0.0035	EEGAA1E334GN	220000	64 x 130	22.91	26.35	0.0037	0.0032	EEGAA1V224GN
390000	64 x 143	27.21	31.29	0.0039	0.0033	EEGAA1E394GP	270000	64 x 143	24.81	28.53	0.0033	0.0028	EEGAA1V274GP
270000	76 x 79	24.34	27.99	0.0044	0.0038	EEGAA1E274HG	180000	76 x 79	21.56	24.79	0.0042	0.0036	EEGAA1V184HG
330000	76 x 92	26.34	30.29	0.0041	0.0035	EEGAA1E334HH	220000	76 x 92	23.57	27.11	0.0037	0.0032	EEGAA1V224HH
390000	76 x 105	28.06	32.27	0.0039	0.0033	EEGAA1E394HK	250000	76 x 105	25.07	28.83	0.0035	0.0029	EEGAA1V254HK
470000	76 x 117	29.91	34.40	0.0037	0.0032	EEGAA1E474HL	270000	76 x 117	26.29	30.23	0.0033	0.0028	EEGAA1V274HL
520000	76 x 130	31.20	35.88	0.0036	0.0031	EEGAA1E524HN	330000	76 x 130	28.27	32.51	0.0030	0.0025	EEGAA1V334HN
560000	76 x 143	32.33	37.18	0.0036	0.0030	EEGAA1E564HP	360000	76 x 143	29.50	33.93	0.0029	0.0024	EEGAA1V364HP
910000	76 x 219	39.28	45.17	0.0032	0.0028	EEGAA1E914HW	560000	76 x 219	36.46	41.93	0.0024	0.0020	EEGAA1V564HW
50 VDC Working, 63 VDC Surge													
8200	35 x 41	3.36	3.86	0.0539	0.0458	EEGAA1H822CA	6800	35 x 41	3.35	3.85	0.0542	0.0461	EEGAA1J682CA
10000	35 x 54	3.86	4.44	0.0442	0.0376	EEGAA1H103CC	8200	35 x 54	3.85	4.43	0.0449	0.0382	EEGAA1J822CC
15000	35 x 67	4.97	5.72	0.0295	0.0251	EEGAA1H153CE	12000	35 x 67	4.90	5.64	0.0307	0.0261	EEGAA1J123CE
18000	35 x 79	5.68	6.53	0.0246	0.0209	EEGAA1H183CG	15000	35 x 79	5.70	6.56	0.0246	0.0209	EEGAA1J153CG
22000	35 x 92	6.50	7.48	0.0201	0.0171	EEGAA1H223CH	18000	35 x 92	6.47	7.44	0.0205	0.0174	EEGAA1J183CH
27000	35 x 105	7.38	8.49	0.0164	0.0139	EEGAA1H273CK	22000	35 x 105	7.33	8.43	0.0167	0.0142	EEGAA1J223CK
33000	35 x 117	8.36	9.61	0.0134	0.0114	EEGAA1H333CL	24000	35 x 117	7.91	9.10	0.0154	0.0130	EEGAA1J243CL
36000	35 x 130	8.96	10.30	0.0125	0.0106	EEGAA1H363CN	27000	35 x 130	8.59	9.88	0.0164	0.0139	EEGAA1J273CN
39000	35 x 143	9.55	10.98	0.0117	0.0099	EEGAA1H393CP	33000	35 x 143	9.62	11.06	0.0134	0.0114	EEGAA1J333CP
22000	51 x 48	6.96	8.00	0.0201	0.0171	EEGAA1H223FB	15000	51 x 48	6.34	7.29	0.0295	0.0251	EEGAA1J153FB
27000	51 x 54	7.76	8.92	0.0164	0.0139	EEGAA1H273FC	18000	51 x 54	7.01	8.06	0.0246	0.0209	EEGAA1J183FC
33000	51 x 67	8.92	10.26	0.0134	0.0114	EEGAA1H333FE	22000	51 x 67	8.07	9.28	0.0201	0.0171	EEGAA1J223FE
39000	51 x 79	9.97	11.47	0.0117	0.0099	EEGAA1H393FG	33000	51 x 79	9.97	11.47	0.0134	0.0114	EEGAA1J333FG
47000	51 x 92	11.17	12.85	0.0101	0.0086	EEGAA1H473FH	39000	51 x 92	11.07	12.73	0.0116	0.0099	EEGAA1J393FH
56000	51 x 105	12.36	14.21	0.0088	0.0075	EEGAA1H563FK	47000	51 x 105	12.29	14.13	0.0100	0.0085	EEGAA1J473FK
68000	51 x 130	14.15	16.27	0.0077	0.0065	EEGAA1H683FN	56000	51 x 130	13.94	16.03	0.0087	0.0074	EEGAA1J563FN
82000	51 x 143	15.54	17.87	0.0067	0.0057	EEGAA1H823FP	68000	51 x 143	15.33	17.63	0.0075	0.0063	EEGAA1J683FP
68000	64 x 79	14.27	16.41	0.0077	0.0065	EEGAA1H683GG	56000	64 x 79	14.06	16.17	0.0087	0.0074	EEGAA1J563GG
82000	64 x 92	15.78	18.15	0.0067	0.0057	EEGAA1H823GH	68000	64 x 92	15.57	17.91	0.0075	0.0063	EEGAA1J683GH
100000	64 x 105	17.37	19.98	0.0059	0.0051	EEGAA1H104GK	82000	64 x 105	17.04	19.60	0.0065	0.0055	EEGAA1J823GK
120000	64 x 117	18.96	21.80	0.0053	0.0045	EEGAA1H124GL	100000	64 x 117	18.65	21.45	0.0057	0.0048	EEGAA1J104GL
140000	64 x 130	20.36	23.41	0.0049	0.0042	EEGAA1H144GN	110000	64 x 130	19.68	22.63	0.0053	0.0045	EEGAA1J114GN
150000	64 x 143	21.28	24.47	0.0047	0.0040	EEGAA1H154GP	120000	64 x 143	20.67	23.77	0.0050	0.0043	EEGAA1J124GP
100000	76 x 79	18.31	21.06	0.0059	0.0051	EEGAA1H104HG	82000	76 x 79	17.96	20.65	0.0065	0.0055	EEGAA1J823HG
120000	76 x 92	20.00	23.00	0.0053	0.0045	EEGAA1H124HH	100000	76 x 92	19.68	22.63	0.0057	0.0048	EEGAA1J104HH
150000	76 x 105	21.91	25.20	0.0047	0.0040	EEGAA1H154HK	120000	76 x 105	21.27	24.46	0.0050	0.0043	EEGAA1J124HK
180000	76 x 117	23.63	27.17	0.0043	0.0037	EEGAA1H184HL	130000	76 x 117	22.33	25.68	0.0048	0.0041	EEGAA1J184HL
200000	76 x 130	24.84	28.57	0.0041	0.0035	EEGAA1H204HN	150000	76 x 130	23.71	27.27	0.0044	0.0037	EEGAA1J154HN
220000	76 x 143	25.99	29.89	0.0039	0.0033	EEGAA1H224HP	180000	76 x 143	25.31	29.11	0.0040	0.0034	EEGAA1J184HP
390000	76 x 219	32.95	37.89	0.0032	0.0027	EEGAA1H394HW	270000	76 x 219	31.09	35.75	0.0033	0.0028	EEGAA1J274HW

Aluminum Electrolytic Capacitors

G-AA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms}) 120Hz 10k-50kHz	20°C ESR (Ω , max.) 120Hz 20kHz	Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms}) 120Hz 10k-50kHz	20°C ESR (Ω , max.) 120Hz 20kHz	Panasonic Part Number							
80 VDC Working, 100 VDC Surge																
3900	35 x 41	2.83	3.25	0.0945	0.0756	EEGAA1K392CA	2700	35 x 41	2.22	2.55	0.1092	0.0873	EEGAA2A272CA			
5600	35 x 54	3.56	4.09	0.0658	0.0526	EEGAA1K562CC	3300	35 x 54	2.58	2.97	0.0893	0.0714	EEGAA2A332CC			
6800	35 x 67	4.17	4.80	0.0542	0.0433	EEGAA1K682CE	4700	35 x 67	3.27	3.76	0.0627	0.0502	EEGAA2A472CE			
10000	35 x 79	5.26	6.05	0.0368	0.0295	EEGAA1K103CG	5600	35 x 79	3.74	4.30	0.0526	0.0421	EEGAA2A562CG			
12000	35 x 92	5.99	6.89	0.0307	0.0246	EEGAA1K123CH	6800	35 x 92	4.29	4.93	0.0433	0.0347	EEGAA2A682CH			
13000	35 x 105	6.46	7.43	0.0283	0.0227	EEGAA1K133CK	8200	35 x 105	4.88	5.61	0.0359	0.0288	EEGAA2A822CK			
15000	35 x 117	7.17	8.25	0.0246	0.0196	EEGAA1K153CL	10000	35 x 117	5.58	6.42	0.0295	0.0236	EEGAA2A103CL			
18000	35 x 130	8.05	9.26	0.0205	0.0164	EEGAA1K183CN	12000	35 x 130	6.29	7.23	0.0246	0.0196	EEGAA2A213CN			
22000	35 x 143	9.08	10.44	0.0167	0.0134	EEGAA1K223CP	13000	35 x 143	6.74	7.75	0.0227	0.0181	EEGAA2A133CP			
10000	51 x 48	6.04	6.95	0.0368	0.0295	EEGAA1K103FB	6800	51 x 48	4.72	5.43	0.0433	0.0347	EEGAA2A682FB			
12000	51 x 54	6.71	7.72	0.0307	0.0246	EEGAA1K123FC	8200	51 x 54	5.27	6.06	0.0359	0.0288	EEGAA2A822FC			
15000	51 x 67	7.84	9.02	0.0246	0.0196	EEGAA1K153FE	10000	51 x 67	6.11	7.03	0.0295	0.0236	EEGAA2A103FE			
22000	51 x 79	9.72	11.18	0.0167	0.0134	EEGAA1K223FG	15000	51 x 79	7.72	8.88	0.0196	0.0157	EEGAA2A153FG			
27000	51 x 92	11.05	12.71	0.0136	0.0109	EEGAA1K273FH	18000	51 x 92	8.73	10.04	0.0164	0.0131	EEGAA2A183FH			
33000	51 x 105	12.44	14.31	0.0112	0.0089	EEGAA1K333FK	22000	51 x 105	9.90	11.39	0.0134	0.0107	EEGAA2A223FK			
39000	51 x 130	14.18	16.31	0.0102	0.0082	EEGAA1K393FN	27000	51 x 130	11.56	13.29	0.0109	0.0087	EEGAA2A273FN			
47000	51 x 143	15.71	18.07	0.0091	0.0073	EEGAA1K473FP	33000	51 x 143	12.98	14.93	0.0098	0.0079	EEGAA2A333FP			
39000	64 x 79	13.65	15.70	0.0132	0.0106	EEGAA1K393GG	22000	64 x 79	10.95	12.59	0.0167	0.0134	EEGAA2A223GG			
47000	64 x 92	15.22	17.50	0.0110	0.0088	EEGAA1K473GH	27000	64 x 92	12.43	14.29	0.0136	0.0109	EEGAA2A273GH			
51000	64 x 105	16.19	18.62	0.0101	0.0081	EEGAA1K513GK	33000	64 x 105	14.00	16.10	0.0112	0.0089	EEGAA2A333GK			
56000	64 x 117	17.29	19.88	0.0092	0.0074	EEGAA1K563GL	39000	64 x 117	15.51	17.84	0.0094	0.0076	EEGAA2A393GL			
68000	64 x 130	19.07	21.93	0.0080	0.0064	EEGAA1K683GN	44000	64 x 130	16.76	19.27	0.0084	0.0067	EEGAA2A443GN			
82000	64 x 143	20.87	24.00	0.0066	0.0053	EEGAA1K823GP	47000	64 x 143	17.66	20.31	0.0078	0.0063	EEGAA2A473GP			
56000	76 x 79	17.58	20.22	0.0105	0.0084	EEGAA1K563HG	33000	76 x 79	15.18	17.46	0.0156	0.0125	EEGAA2A333HG			
68000	76 x 92	19.48	22.40	0.0087	0.0069	EEGAA1K683HH	39000	76 x 92	16.83	19.35	0.0132	0.0106	EEGAA2A393HH			
75000	76 x 105	20.71	23.82	0.0079	0.0063	EEGAA1K753HK	47000	76 x 105	18.71	21.52	0.0110	0.0088	EEGAA2A473HK			
82000	76 x 117	21.95	25.24	0.0072	0.0058	EEGAA1K823HL	56000	76 x 117	20.66	23.76	0.0092	0.0074	EEGAA2A563HL			
100000	76 x 130	24.00	27.60	0.0059	0.0047	EEGAA1K104HN	62000	76 x 130	22.05	25.36	0.0083	0.0067	EEGAA2A623HN			
110000	76 x 143	25.30	29.10	0.0060	0.0048	EEGAA1K114HP	72000	76 x 143	23.91	27.50	0.0072	0.0057	EEGAA2A723HP			
180000	76 x 219	32.90	37.84	0.0041	0.0033	EEGAA1K184HW	120000	76 x 219	32.58	37.47	0.0049	0.0039	EEGAA2A124HW			
200 VDC Working, 250 VDC Surge																
820	35 x 41	2.69	3.77	0.270	0.202	EEGAA2D821CA	250 VDC Working, 300 VDC Surge									
1200	35 x 54	3.41	4.77	0.184	0.138	EEGAA2D122CC	560	35 x 41	2.40	3.36	0.395	0.296	EEGAA2E561CA			
1500	35 x 67	4.05	5.67	0.147	0.111	EEGAA2D152CE	820	35 x 54	3.05	4.27	0.270	0.202	EEGAA2E821CC			
1800	35 x 79	4.65	6.51	0.123	0.092	EEGAA2D182CG	1200	35 x 67	3.92	5.49	0.184	0.138	EEGAA2E122CE			
2200	35 x 92	5.35	7.49	0.100	0.075	EEGAA2D222CH	1500	35 x 79	4.58	6.41	0.147	0.111	EEGAA2E152CG			
2700	35 x 105	6.12	8.57	0.082	0.061	EEGAA2D272CK	1800	35 x 92	5.23	7.32	0.123	0.092	EEGAA2E182CH			
3300	35 x 117	6.98	9.77	0.067	0.050	EEGAA2D332CL	2200	35 x 105	5.98	8.37	0.100	0.075	EEGAA2E222CK			
3900	35 x 130	7.80	10.92	0.057	0.043	EEGAA2D392CN	2500	35 x 117	6.60	9.24	0.088	0.066	EEGAA2E252CL			
4700	35 x 143	8.75	12.25	0.047	0.035	EEGAA2D472CP	2700	35 x 130	7.07	9.90	0.082	0.061	EEGAA2E272CN			
1800	51 x 48	5.16	7.22	0.123	0.092	EEGAA2D182FB	3300	35 x 143	8.01	11.21	0.067	0.050	EEGAA2E332CP			
2700	51 x 54	6.38	8.93	0.082	0.061	EEGAA2D272FC	1500	51 x 48	5.06	7.08	0.147	0.111	EEGAA2E152FB			
3300	51 x 67	7.38	10.33	0.067	0.050	EEGAA2D332FE	1800	51 x 54	5.63	7.88	0.123	0.092	EEGAA2E182FC			
3900	51 x 79	8.32	11.65	0.057	0.043	EEGAA2D392FG	2200	51 x 67	6.53	9.14	0.100	0.075	EEGAA2E222FE			
5600	51 x 92	10.18	14.25	0.039	0.030	EEGAA2D562FH	3300	51 x 79	8.24	11.54	0.067	0.050	EEGAA2E332FG			
6200	51 x 105	11.00	15.40	0.036	0.027	EEGAA2D622FK	3900	51 x 92	9.25	12.95	0.057	0.043	EEGAA2E392FH			
8200	51 x 130	13.21	18.49	0.027	0.020	EEGAA2D822FN	4700	51 x 105	10.41	14.57	0.047	0.035	EEGAA2E472FK			
10000	51 x 143	14.74	20.64	0.022	0.017	EEGAA2D103FP	6800	51 x 130	13.04	18.26	0.033	0.024	EEGAA2E682FN			
5600	64 x 79	11.64	16.30	0.039	0.030	EEGAA2D562GG	8200	51 x 143	14.52	20.33	0.027	0.020	EEGAA2E822FP			
8200	64 x 92	14.21	19.89	0.027	0.020	EEGAA2D822GH	5600	64 x 79	12.00	16.80	0.039	0.030	EEGAA2E562GG			
10000	64 x 105	15.89	22.25	0.022	0.017	EEGAA2D103GK	6800	64 x 92	13.52	18.93	0.033	0.024	EEGAA2E682GH			
12000	64 x 117	17.62	24.67	0.018	0.014	EEGAA2D123GL	8200	64 x 105	15.08	21.11	0.027	0.020	EEGAA2E822GK			
15000	64 x 130	19.71	27.59	0.015	0.011	EEGAA2D153GN	10000	64 x 117	16.88	23.63	0.022	0.017	EEGAA2E103GL			
17000	64 x 143	21.17	29.64	0.013	0.010	EEGAA2D173GP	12000	64 x 130	18.64	26.10	0.018	0.014	EEGAA2E123GN			
10000	76 x 79	16.69	23.37	0.022	0.017	EEGAA2D103HG	13000	64 x 143	19.71	27.59	0.017	0.013	EEGAA2E133GP			
12000	76 x 92	18.52	25.93	0.018	0.014	EEGAA2D123HH	8200	76 x 79	15.81	22.13	0.027	0.020	EEGAA2E822HG			
15000	76 x 105	20.73	29.02	0.015	0.011	EEGAA2D153HK	10000	76 x 92	17.70	24.78	0.022	0.017	EEGAA2E103HH			
18000	76 x 117	22.78	31.89	0.012	0.009	EEGAA2D183HL	12000	76 x 105	19.56	27.38	0.018	0.014	EEGAA2E123HK			
21000	76 x 130	24.62	34.47	0.011	0.008	EEGAA2D213HN	15000	76 x 117	21.89	30.65	0.015	0.011	EEGAA2E153HL			
22000	76 x 143	25.59	35.83	0.010	0.008	EEGAA2D223HP	17000	76 x 130	23.48	32.87	0.013	0.010	EEGAA2E173HN			
37000	76 x 219	34.04	47.66	0.008	0.006	EEGAA2D373HW	18000	76 x 143	24.52	34.33	0.012	0.009	EEGAA2E183HP			
							27000	76 x 219	31.85	44.59	0.010	0.007	EEGAA2E273HW			

Aluminum Electrolytic Capacitors

G-AA Typical Ratings (continued)

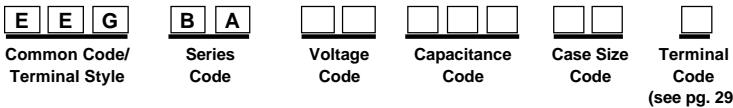
Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
350 VDC Working, 400 VDC Surge													
330	35 x 41	1.71	2.39	0.536	0.402	EEGAA2V331CA	270	35 x 41	1.74	2.44	0.655	0.458	EEGAA2G271CA
470	35 x 54	2.15	3.01	0.376	0.282	EEGAA2V471CC	390	35 x 54	2.21	3.09	0.453	0.317	EEGAA2G391CC
560	35 x 67	2.49	3.49	0.316	0.237	EEGAA2V561CE	470	35 x 67	2.58	3.61	0.376	0.263	EEGAA2G471CE
680	35 x 79	2.89	4.05	0.260	0.195	EEGAA2V681CG	560	35 x 79	2.96	4.14	0.316	0.221	EEGAA2G561CG
820	35 x 92	3.31	4.63	0.216	0.162	EEGAA2V821CH	680	35 x 92	3.41	4.77	0.260	0.182	EEGAA2G681CH
1000	35 x 105	3.80	5.32	0.177	0.133	EEGAA2V102CK	820	35 x 105	3.88	5.43	0.216	0.151	EEGAA2G821CK
1200	35 x 117	4.33	6.06	0.147	0.111	EEGAA2V122CL	1000	35 x 117	4.46	6.24	0.177	0.124	EEGAA2G102CL
1500	35 x 130	5.00	7.00	0.118	0.088	EEGAA2V152CN	1200	35 x 130	5.04	7.06	0.147	0.103	EEGAA2G122CN
1800	35 x 143	5.64	7.90	0.098	0.074	EEGAA2V182CP	1300	35 x 143	5.41	7.57	0.136	0.095	EEGAA2G132CP
820	51 x 48	3.64	5.10	0.216	0.162	EEGAA2V821FB	680	51 x 48	3.58	5.01	0.260	0.182	EEGAA2G681FB
1000	51 x 54	4.10	5.74	0.177	0.133	EEGAA2V102FC	820	51 x 54	4.01	5.61	0.216	0.151	EEGAA2G821FC
1200	51 x 67	4.73	6.62	0.147	0.111	EEGAA2V122FE	1000	51 x 67	4.67	6.54	0.177	0.124	EEGAA2G102FE
1800	51 x 79	6.04	8.46	0.098	0.074	EEGAA2V182FG	1500	51 x 79	5.96	8.34	0.118	0.083	EEGAA2G152FG
2200	51 x 92	6.94	9.72	0.080	0.060	EEGAA2V222FH	1800	51 x 92	6.78	9.49	0.098	0.069	EEGAA2G182FH
2700	51 x 105	7.95	11.13	0.065	0.049	EEGAA2V272FK	2200	51 x 105	7.75	10.85	0.080	0.056	EEGAA2G222FK
3300	51 x 130	9.35	13.09	0.054	0.040	EEGAA2V332FN	2700	51 x 130	9.14	12.80	0.065	0.046	EEGAA2G272FL
3900	51 x 143	10.45	14.63	0.045	0.034	EEGAA2V392FP	3300	51 x 143	10.38	14.53	0.054	0.038	EEGAA2G332FP
2700	64 x 79	8.50	11.90	0.065	0.049	EEGAA2V272GG	2200	64 x 79	8.24	11.54	0.080	0.056	EEGAA2G222GG
3300	64 x 92	9.72	13.61	0.054	0.040	EEGAA2V332GH	2700	64 x 92	9.45	13.23	0.065	0.046	EEGAA2G272GH
3900	64 x 105	10.89	15.25	0.045	0.034	EEGAA2V392GK	3300	64 x 105	10.76	15.06	0.054	0.038	EEGAA2G332GK
4700	64 x 117	12.32	17.25	0.038	0.028	EEGAA2V472GL	3900	64 x 117	12.05	16.87	0.045	0.032	EEGAA2G392GL
5600	64 x 130	13.81	19.33	0.032	0.024	EEGAA2V562GN	4700	64 x 130	13.59	19.03	0.038	0.026	EEGAA2G472GN
6200	64 x 143	14.89	20.85	0.029	0.021	EEGAA2V622GP	5100	64 x 143	14.51	20.31	0.035	0.024	EEGAA2G512GP
4700	76 x 79	12.96	18.14	0.038	0.028	EEGAA2V472HG	3900	76 x 79	12.22	17.11	0.045	0.032	EEGAA2G392HG
5600	76 x 92	14.60	20.44	0.032	0.024	EEGAA2V562HH	4300	76 x 92	13.24	18.54	0.041	0.029	EEGAA2G432HH
6200	76 x 105	15.78	22.09	0.029	0.021	EEGAA2V622HK	4700	76 x 105	14.22	19.91	0.038	0.026	EEGAA2G472HK
6800	76 x 117	16.98	23.77	0.026	0.020	EEGAA2V682HL	5600	76 x 117	15.95	22.33	0.032	0.022	EEGAA2G562HL
8200	76 x 130	19.11	26.75	0.022	0.016	EEGAA2V822HN	6800	76 x 130	18.01	25.21	0.026	0.018	EEGAA2G682HN
9100	76 x 143	20.60	28.84	0.019	0.015	EEGAA2V912HP	7500	76 x 143	19.36	27.10	0.024	0.017	EEGAA2G752HP
15000	76 x 219	30.03	42.04	0.012	0.009	EEGAA2V153HW	12000	76 x 219	27.80	38.92	0.015	0.010	EEGAA2G123HW
450 VDC Working, 500 VDC Surge													
220	35 x 41	1.57	2.20	0.804	0.522	EEGAA2W221CA	150	35 x 41	1.24	1.74	1.375	0.963	EEGAA2H151CA
270	35 x 54	1.83	2.56	0.655	0.426	EEGAA2W271CC	180	35 x 54	1.43	2.00	1.146	0.802	EEGAA2H181CC
390	35 x 67	2.35	3.29	0.453	0.295	EEGAA2W391CE	220	35 x 67	1.69	2.37	0.938	0.656	EEGAA2H221CE
470	35 x 79	2.71	3.79	0.376	0.245	EEGAA2W471CG	330	35 x 79	2.17	3.04	0.625	0.438	EEGAA2H331CG
560	35 x 92	3.09	4.33	0.316	0.205	EEGAA2W561CH	390	35 x 92	2.47	3.46	0.529	0.370	EEGAA2H391CH
680	35 x 105	3.54	4.96	0.260	0.169	EEGAA2W681CK	470	35 x 105	2.81	3.93	0.439	0.307	EEGAA2H471CK
820	35 x 117	4.03	5.64	0.216	0.140	EEGAA2W821CL	560	35 x 117	3.18	4.45	0.368	0.258	EEGAA2H561CL
1000	35 x 130	4.60	6.44	0.177	0.115	EEGAA2W102CN	680	35 x 130	3.62	5.07	0.303	0.212	EEGAA2H681CN
1100	35 x 143	4.98	6.97	0.161	0.104	EEGAA2W112CP	750	35 x 143	3.92	5.49	0.275	0.193	EEGAA2H751CP
560	51 x 48	3.25	4.55	0.316	0.205	EEGAA2W561FB	390	51 x 48	2.71	3.79	0.529	0.370	EEGAA2H391FB
680	51 x 54	3.65	5.11	0.260	0.169	EEGAA2W681FC	470	51 x 54	3.03	4.24	0.439	0.307	EEGAA2H471FC
820	51 x 67	4.23	5.92	0.216	0.140	EEGAA2W821FE	560	51 x 67	3.48	4.87	0.368	0.258	EEGAA2H561FE
1000	51 x 79	4.87	6.82	0.177	0.115	EEGAA2W102FG	820	51 x 79	4.39	6.15	0.252	0.176	EEGAA2H821FG
1200	51 x 92	5.54	7.76	0.147	0.096	EEGAA2W122FH	1000	51 x 92	5.03	7.04	0.206	0.144	EEGAA2H102FH
1500	51 x 105	6.40	8.96	0.118	0.077	EEGAA2W152FK	1200	51 x 105	6.35	8.89	0.172	0.120	EEGAA2H122FK
2200	51 x 130	8.25	11.55	0.080	0.052	EEGAA2W222FN	1500	51 x 130	6.76	9.46	0.138	0.096	EEGAA2H152FN
2700	51 x 143	9.39	13.15	0.065	0.043	EEGAA2W272FP	1800	51 x 143	7.59	10.63	0.115	0.080	EEGAA2H182FP
1800	64 x 79	7.45	10.43	0.098	0.064	EEGAA2W182GG	1200	64 x 79	6.29	8.81	0.172	0.120	EEGAA2H122GG
2200	64 x 92	8.53	11.94	0.080	0.052	EEGAA2W222GH	1500	64 x 92	7.27	10.18	0.138	0.096	EEGAA2H152GH
2700	64 x 105	9.73	13.62	0.065	0.043	EEGAA2W272GK	1800	64 x 105	8.18	11.45	0.115	0.080	EEGAA2H182GK
3300	64 x 117	11.09	15.53	0.054	0.035	EEGAA2W332GL	2200	64 x 117	9.30	13.02	0.094	0.066	EEGAA2H222GL
3600	64 x 130	11.89	16.65	0.049	0.032	EEGAA2W362GN	2400	64 x 130	9.96	13.94	0.086	0.060	EEGAA2H242GN
3900	64 x 143	12.69	17.77	0.045	0.029	EEGAA2W392GP	2700	64 x 143	10.82	15.15	0.076	0.053	EEGAA2H272GP
2700	76 x 79	10.17	14.24	0.065	0.043	EEGAA2W272HG	2000	76 x 79	8.91	12.47	0.103	0.072	EEGAA2H202HG
3300	76 x 92	11.60	16.24	0.054	0.035	EEGAA2W332HH	2400	76 x 92	10.04	14.06	0.086	0.060	EEGAA2H242HH
3900	76 x 105	12.95	18.13	0.045	0.029	EEGAA2W392HK	2700	76 x 105	10.92	15.29	0.076	0.053	EEGAA2H272HK
4700	76 x 117	14.62	20.47	0.038	0.024	EEGAA2W472HL	3300	76 x 117	12.37	17.32	0.063	0.044	EEGAA2H332HL
5600	76 x 130	16.34	22.88	0.032	0.021	EEGAA2W562HN	3600	76 x 130	13.21	18.49	0.057	0.040	EEGAA2H362HN
6200	76 x 143	17.60	24.64	0.029	0.019	EEGAA2W622HP	3900	76 x 143	14.05	19.67	0.053	0.037	EEGAA2H392HP
10000	76 x 219	25.38	35.53	0.018	0.011	EEGAA2W103HW	6800	76 x 219	20.71	28.99	0.030	0.021	EEGAA2H682HW

G-BA Series screw terminal style

- Long life for industrial applications
- 2000 hour life @ 105°C with ripple current applied
- High CV design
- Customized designs available



Rated Working Voltage:	10 ~ 450 VDC
Operating Temperature:	-40 ~ +105°C
Nominal Capacitance:	220 ~ 1200000μF
Capacitance Tolerance:	± 20%
Endurance:	2000 hours at +105°C with maximum specified ripple current (see page 4)

Part Number System**G-BA Typical Ratings**

Cap. (μF)	Nominal Size D x L (mm)	Max 105°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω, max.) 10k~50kHz	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number	Cap. (μF)	Nominal Size D x L (mm)	Max 105°C R.C. (A _{rms}) 120Hz	20°C ESR (Ω, max.) 10k~50kHz	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number
10 VDC Working, 13 VDC Surge													
33000	35 x 41	4.67	5.37	0.0402	0.0362	EEGBA1A333CA	22000	35 x 41	4.47	5.14	0.0435	0.0392	EEGBA1C223CA
39000	35 x 54	5.31	6.11	0.0345	0.0310	EEGBA1A393CC	33000	35 x 54	5.65	6.50	0.0301	0.0271	EEGBA1C333CC
56000	35 x 67	6.62	7.61	0.0249	0.0224	EEGBA1A563CE	47000	35 x 67	6.99	8.04	0.0221	0.0199	EEGBA1C473CE
75000	35 x 79	7.86	9.04	0.0194	0.0174	EEGBA1A753CG	56000	35 x 79	7.89	9.07	0.0191	0.0172	EEGBA1C563CG
82000	35 x 92	8.52	9.80	0.0180	0.0162	EEGBA1A823CH	68000	35 x 92	8.91	10.25	0.0163	0.0146	EEGBA1C683CH
100000	35 x 105	9.56	10.99	0.0153	0.0138	EEGBA1A104CK	82000	35 x 105	9.93	11.42	0.0141	0.0126	EEGBA1C823CK
120000	35 x 117	10.64	12.24	0.0132	0.0119	EEGBA1A124CL	91000	35 x 117	10.71	12.32	0.0130	0.0117	EEGBA1C913CL
130000	35 x 130	11.32	13.02	0.0125	0.0112	EEGBA1A134CN	100000	35 x 130	11.44	13.16	0.0121	0.0109	EEGBA1C104CN
150000	35 x 143	12.28	14.12	0.0112	0.0101	EEGBA1A154CP	120000	35 x 143	12.55	14.43	0.0106	0.0096	EEGBA1C124CP
82000	51 x 48	9.10	10.47	0.0180	0.0162	EEGBA1A823FB	56000	51 x 48	8.81	10.13	0.0191	0.0172	EEGBA1C563FB
100000	51 x 54	10.03	11.53	0.0153	0.0138	EEGBA1A104FC	75000	51 x 54	10.07	11.58	0.0151	0.0136	EEGBA1C753FC
120000	51 x 67	11.32	13.02	0.0132	0.0119	EEGBA1A124FE	100000	51 x 67	11.78	13.55	0.0121	0.0109	EEGBA1C104FE
150000	51 x 79	12.77	14.69	0.0112	0.0101	EEGBA1A154FG	120000	51 x 79	13.06	15.02	0.0106	0.0096	EEGBA1C124FG
180000	51 x 92	14.11	16.23	0.0098	0.0089	EEGBA1A184FH	150000	51 x 92	14.56	16.74	0.0092	0.0082	EEGBA1C154FH
220000	51 x 105	15.53	17.86	0.0086	0.0077	EEGBA1A224FK	180000	51 x 105	15.87	18.25	0.0082	0.0073	EEGBA1C184FK
270000	51 x 130	17.54	20.17	0.0076	0.0068	EEGBA1A274FN	220000	51 x 130	17.83	20.50	0.0073	0.0065	EEGBA1C224FN
330000	51 x 143	19.00	21.85	0.0067	0.0061	EEGBA1A334FP	270000	51 x 143	19.26	22.15	0.0065	0.0059	EEGBA1C274FP
270000	64 x 79	17.74	20.40	0.0076	0.0068	EEGBA1A274GG	180000	64 x 79	17.09	19.65	0.0082	0.0073	EEGBA1C184GG
330000	64 x 92	19.36	22.26	0.0067	0.0061	EEGBA1A334GH	220000	64 x 92	18.67	21.47	0.0073	0.0065	EEGBA1C224GH
390000	64 x 105	20.76	23.87	0.0062	0.0056	EEGBA1A394GK	270000	64 x 105	20.21	23.24	0.0065	0.0059	EEGBA1C274GK
470000	64 x 117	22.29	25.63	0.0056	0.0051	EEGBA1A474GL	330000	64 x 117	21.76	25.02	0.0059	0.0053	EEGBA1C334GL
510000	64 x 130	23.27	26.76	0.0054	0.0049	EEGBA1A514GN	390000	64 x 130	23.08	26.54	0.0055	0.0050	EEGBA1C394GN
560000	64 x 143	24.29	27.93	0.0052	0.0047	EEGBA1A564GP	470000	64 x 143	24.46	28.13	0.0051	0.0046	EEGBA1C474GP
390000	76 x 79	21.95	25.24	0.0062	0.0056	EEGBA1A394HG	330000	76 x 79	22.32	25.67	0.0059	0.0053	EEGBA1C334HG
470000	76 x 92	23.58	27.12	0.0056	0.0051	EEGBA1A474HH	390000	76 x 92	23.79	27.36	0.0055	0.0050	EEGBA1C394HH
560000	76 x 105	25.08	28.84	0.0052	0.0047	EEGBA1A564HK	470000	76 x 105	25.25	29.04	0.0051	0.0046	EEGBA1C474HK
680000	76 x 117	26.68	30.68	0.0048	0.0044	EEGBA1A684HL	510000	76 x 117	26.29	30.23	0.0050	0.0045	EEGBA1C514HL
750000	76 x 130	27.76	31.92	0.0047	0.0042	EEGBA1A754HN	560000	76 x 130	27.32	31.42	0.0048	0.0043	EEGBA1C564HN
820000	76 x 143	28.79	33.11	0.0045	0.0041	EEGBA1A824HP	620000	76 x 143	28.36	32.61	0.0047	0.0042	EEGBA1C624HP
1200000	76 x 219	34.30	39.45	0.0041	0.0036	EEGBA1A125HW	1000000	76 x 219	34.01	39.11	0.0041	0.0037	EEGBA1C105HW

Aluminum Electrolytic Capacitors

G-BA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
25 VDC Working, 32 VDC Surge													
18000	35 x 41	4.52	5.20	0.0368	0.0313	EEGBA1E183CA	12000	35 x 41	4.36	5.01	0.0491	0.0418	EEGBA1V123CA
22000	35 x 54	5.21	5.99	0.0309	0.0263	EEGBA1E223CC	18000	35 x 54	5.51	6.34	0.0337	0.0287	EEGBA1V183CC
33000	35 x 67	6.62	7.61	0.0220	0.0187	EEGBA1E333CE	22000	35 x 67	6.41	7.37	0.0281	0.0239	EEGBA1V223CE
39000	35 x 79	7.46	8.58	0.0192	0.0163	EEGBA1E393CG	27000	35 x 79	7.33	8.43	0.0235	0.0200	EEGBA1V273CG
47000	35 x 92	8.41	9.67	0.0167	0.0142	EEGBA1E473CH	33000	35 x 92	8.32	9.57	0.0197	0.0168	EEGBA1V333CH
56000	35 x 105	9.35	10.75	0.0146	0.0124	EEGBA1E563CK	39000	35 x 105	9.23	10.61	0.0172	0.0146	EEGBA1V393CK
68000	35 x 117	10.43	11.99	0.0128	0.0109	EEGBA1E683CL	47000	35 x 117	10.29	11.83	0.0147	0.0125	EEGBA1V473CL
75000	35 x 130	11.17	12.85	0.0120	0.0102	EEGBA1E753CN	51000	35 x 130	10.95	12.59	0.0138	0.0117	EEGBA1V513CN
82000	35 x 143	11.88	13.66	0.0113	0.0096	EEGBA1E823CP	56000	35 x 143	11.68	13.43	0.0129	0.0109	EEGBA1V563CP
47000	51 x 48	8.96	10.30	0.0167	0.0142	EEGBA1E473FB	33000	51 x 48	8.76	10.07	0.0197	0.0168	EEGBA1V333FB
56000	51 x 54	9.78	11.25	0.0146	0.0124	EEGBA1E563FC	39000	51 x 54	9.54	10.97	0.0172	0.0146	EEGBA1V393FC
68000	51 x 67	11.08	12.74	0.0128	0.0109	EEGBA1E683FE	47000	51 x 67	10.79	12.41	0.0147	0.0125	EEGBA1V473FE
100000	51 x 79	13.18	15.16	0.0100	0.0085	EEGBA1E104FG	68000	51 x 79	12.80	14.72	0.0111	0.0094	EEGBA1V683FG
120000	51 x 92	14.49	16.66	0.0090	0.0077	EEGBA1E124FH	82000	51 x 92	14.12	16.24	0.0097	0.0083	EEGBA1V823FH
130000	51 x 105	15.33	17.63	0.0087	0.0074	EEGBA1E134FK	100000	51 x 105	15.47	17.79	0.0085	0.0072	EEGBA1V104FK
150000	51 x 130	16.99	19.54	0.0081	0.0068	EEGBA1E154FN	120000	51 x 130	17.31	19.91	0.0076	0.0064	EEGBA1V124FN
180000	51 x 143	18.32	21.07	0.0074	0.0063	EEGBA1E184FP	150000	51 x 143	18.80	21.62	0.0067	0.0057	EEGBA1V154FP
120000	64 x 79	16.11	18.53	0.0090	0.0077	EEGBA1E124GG	100000	64 x 79	16.64	19.14	0.0085	0.0072	EEGBA1V104GG
150000	64 x 92	17.76	20.42	0.0081	0.0068	EEGBA1E154GH	120000	64 x 92	18.10	20.82	0.0076	0.0064	EEGBA1V124GH
180000	64 x 105	19.19	22.07	0.0074	0.0063	EEGBA1E184GK	150000	64 x 105	19.70	22.66	0.0067	0.0057	EEGBA1V154GK
220000	64 x 117	20.74	23.85	0.0068	0.0058	EEGBA1E224GL	180000	64 x 117	21.15	24.32	0.0060	0.0051	EEGBA1V184GL
270000	64 x 130	22.24	25.58	0.0063	0.0054	EEGBA1E274GN	220000	64 x 130	22.60	25.99	0.0055	0.0047	EEGBA1V224GN
330000	64 x 143	23.68	27.23	0.0059	0.0050	EEGBA1E334GP	270000	64 x 143	24.03	27.63	0.0050	0.0043	EEGBA1V274GP
220000	76 x 79	21.25	24.44	0.0068	0.0058	EEGBA1E224HG	150000	76 x 79	20.80	23.92	0.0067	0.0057	EEGBA1V154HG
270000	76 x 92	22.89	26.32	0.0063	0.0054	EEGBA1E274HH	180000	76 x 92	22.35	25.70	0.0060	0.0051	EEGBA1V184HH
330000	76 x 105	24.42	28.08	0.0059	0.0050	EEGBA1E334HK	220000	76 x 105	23.89	27.47	0.0055	0.0047	EEGBA1V224HK
390000	76 x 117	25.81	29.68	0.0056	0.0048	EEGBA1E394HL	270000	76 x 117	25.46	29.28	0.0050	0.0043	EEGBA1V274HL
430000	76 x 130	26.84	30.87	0.0055	0.0047	EEGBA1E434HN	300000	76 x 130	26.53	30.51	0.0048	0.0041	EEGBA1V304HN
470000	76 x 143	27.82	31.99	0.0054	0.0046	EEGBA1E474HP	330000	76 x 143	27.53	31.66	0.0046	0.0039	EEGBA1V334HP
570000	76 x 219	33.26	38.25	0.0049	0.0042	EEGBA1E754HW	560000	76 x 219	33.28	38.27	0.0039	0.0034	EEGBA1V564HW
50 VDC Working, 63 VDC Surge													
8200	35 x 41	4.11	4.73	0.0539	0.0458	EEGBA1H822CA	5600	35 x 41	3.80	4.37	0.0658	0.0559	EEGBA1J562CA
12000	35 x 54	5.11	5.88	0.0368	0.0313	EEGBA1H123CC	8200	35 x 54	4.76	5.47	0.0449	0.0382	EEGBA1J822CC
15000	35 x 67	5.99	6.89	0.0295	0.0251	EEGBA1H153CE	10000	35 x 67	5.54	6.37	0.0368	0.0313	EEGBA1J103CE
18000	35 x 79	6.80	7.82	0.0246	0.0209	EEGBA1H183CG	12000	35 x 79	6.29	7.23	0.0307	0.0261	EEGBA1J123CG
22000	35 x 92	7.72	8.88	0.0201	0.0171	EEGBA1H223CH	15000	35 x 92	7.22	8.30	0.0246	0.0209	EEGBA1J153CH
27000	35 x 105	8.69	9.99	0.0164	0.0139	EEGBA1H273CK	18000	35 x 105	8.08	9.29	0.0205	0.0174	EEGBA1J183CK
33000	35 x 117	9.73	11.19	0.0134	0.0114	EEGBA1H333CL	22000	35 x 117	9.07	10.43	0.0167	0.0142	EEGBA1J223CL
36000	35 x 130	10.38	11.94	0.0125	0.0106	EEGBA1H363CN	27000	35 x 130	10.12	11.64	0.0164	0.0139	EEGBA1J273CN
39000	35 x 143	11.01	12.66	0.0118	0.0100	EEGBA1H393CP	30000	35 x 143	10.83	12.45	0.0147	0.0125	EEGBA1J303CP
22000	51 x 48	8.27	9.51	0.0201	0.0171	EEGBA1H223FB	15000	51 x 48	7.69	8.84	0.0295	0.0251	EEGBA1J153FB
27000	51 x 54	9.13	10.50	0.0164	0.0139	EEGBA1H273FC	18000	51 x 54	8.44	9.71	0.0246	0.0209	EEGBA1J183FC
33000	51 x 67	10.38	11.94	0.0134	0.0114	EEGBA1H333FG	22000	51 x 67	9.62	11.06	0.0201	0.0171	EEGBA1J223FE
39000	51 x 79	11.49	13.21	0.0118	0.0100	EEGBA1H393FG	33000	51 x 79	11.61	13.35	0.0134	0.0114	EEGBA1J333FG
47000	51 x 92	12.72	14.63	0.0103	0.0087	EEGBA1H473FH	39000	51 x 92	12.75	14.66	0.0117	0.0099	EEGBA1J393FH
56000	51 x 105	13.91	16.00	0.0091	0.0077	EEGBA1H563FK	47000	51 x 105	13.96	16.05	0.0101	0.0086	EEGBA1J473FK
82000	51 x 130	16.51	18.99	0.0072	0.0061	EEGBA1H823FN	56000	51 x 130	15.63	17.97	0.0089	0.0075	EEGBA1J563FN
91000	51 x 143	17.43	20.04	0.0068	0.0057	EEGBA1H913FP	68000	51 x 143	16.92	19.46	0.0077	0.0066	EEGBA1J683FP
75000	64 x 79	16.26	18.70	0.0076	0.0064	EEGBA1H753GG	47000	64 x 79	14.99	17.24	0.0101	0.0086	EEGBA1J473GG
82000	64 x 92	17.23	19.81	0.0072	0.0061	EEGBA1H823GH	56000	64 x 92	16.32	18.77	0.0089	0.0075	EEGBA1J563GH
100000	64 x 105	18.65	21.45	0.0064	0.0055	EEGBA1H104GK	68000	64 x 105	17.70	20.36	0.0077	0.0066	EEGBA1J683GK
120000	64 x 117	20.03	23.03	0.0058	0.0050	EEGBA1H124GL	82000	64 x 117	19.09	21.95	0.0068	0.0058	EEGBA1J823GL
130000	64 x 130	20.92	24.06	0.0056	0.0048	EEGBA1H134GN	100000	64 x 130	20.48	23.55	0.0060	0.0051	EEGBA1J104GN
150000	64 x 143	22.06	25.37	0.0053	0.0045	EEGBA1H154GP	110000	64 x 143	21.40	24.61	0.0057	0.0048	EEGBA1J114GP
100000	76 x 79	19.66	22.61	0.0064	0.0055	EEGBA1H104HG	82000	76 x 79	19.53	22.46	0.0068	0.0058	EEGBA1J823HG
120000	76 x 92	21.13	24.30	0.0058	0.0050	EEGBA1H124HH	91000	76 x 92	20.62	23.71	0.0064	0.0054	EEGBA1J913HH
150000	76 x 105	22.71	26.12	0.0053	0.0045	EEGBA1H154HK	100000	76 x 105	21.61	24.85	0.0060	0.0051	EEGBA1J104HK
160000	76 x 117	23.63	27.17	0.0051	0.0044	EEGBA1H164HL	120000	76 x 117	23.02	26.47	0.0054	0.0046	EEGBA1J124HL
180000	76 x 130	24.71	28.42	0.0049	0.0042	EEGBA1H184HN	130000	76 x 130	23.93	27.52	0.0052	0.0044	EEGBA1J134HN
200000	76 x 143	25.72	29.58	0.0047	0.0040	EEGBA1H204HP	150000	76 x 143	25.09	28.85	0.0048	0.0041	EEGBA1J154HP
330000	76 x 219	31.19	35.87	0.0040	0.0034	EEGBA1H334HW	220000	76 x 219	30.06	34.57	0.0040	0.0034	EEGBA1J224HW

Aluminum Electrolytic Capacitors

G-BA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
80 VDC Working, 100 VDC Surge													
3300	35 x 41	3.37	3.88	0.1116	0.0893	EEGBA1K332CA	2200	35 x 41	2.48	2.85	0.1340	0.1072	EEGBA2A222CA
3900	35 x 54	3.84	4.42	0.0945	0.0756	EEGBA1K392CC	3300	35 x 54	3.18	3.66	0.0893	0.0714	EEGBA2A332CC
4700	35 x 67	4.46	5.13	0.0784	0.0627	EEGBA1K472CE	4700	35 x 67	4.00	4.60	0.0627	0.0502	EEGBA2A472CE
6800	35 x 79	5.54	6.37	0.0542	0.0433	EEGBA1K682CG	5600	35 x 79	4.56	5.24	0.0526	0.0421	EEGBA2A562CG
8200	35 x 92	6.30	7.25	0.0449	0.0359	EEGBA1K822CH	6800	35 x 92	5.21	5.99	0.0433	0.0347	EEGBA2A682CH
10000	35 x 105	7.13	8.20	0.0368	0.0295	EEGBA1K103CK	8200	35 x 105	5.89	6.77	0.0359	0.0288	EEGBA2A822CK
12000	35 x 117	8.00	9.20	0.0307	0.0246	EEGBA1K123CL	9100	35 x 117	6.41	7.37	0.0324	0.0259	EEGBA2A912CL
15000	35 x 130	9.05	10.41	0.0246	0.0196	EEGBA1K153CN	10000	35 x 130	6.91	7.95	0.0295	0.0236	EEGBA2A103CN
18000	35 x 143	10.02	11.52	0.0205	0.0164	EEGBA1K183CP	12000	35 x 143	7.71	8.87	0.0246	0.0196	EEGBA2A123CP
8200	51 x 48	6.92	7.96	0.0449	0.0359	EEGBA1K822FB	5600	51 x 48	5.24	6.03	0.0526	0.0421	EEGBA2A562FB
12000	51 x 54	8.30	9.55	0.0307	0.0246	EEGBA1K123FC	7500	51 x 54	6.11	7.03	0.0393	0.0314	EEGBA2A752FC
15000	51 x 67	9.58	11.02	0.0246	0.0196	EEGBA1K153FE	10000	51 x 67	7.32	8.42	0.0295	0.0236	EEGBA2A103FE
18000	51 x 79	10.73	12.34	0.0205	0.0164	EEGBA1K183FG	12000	51 x 79	8.26	9.50	0.0246	0.0196	EEGBA2A123FG
22000	51 x 92	12.02	13.82	0.0167	0.0134	EEGBA1K223FH	15000	51 x 92	9.43	10.84	0.0196	0.0157	EEGBA2A153FH
27000	51 x 105	13.36	15.36	0.0136	0.0109	EEGBA1K273FK	18000	51 x 105	10.50	12.08	0.0164	0.0131	EEGBA2A183FK
33000	51 x 130	15.20	17.48	0.0121	0.0096	EEGBA1K333FN	22000	51 x 130	12.09	13.90	0.0134	0.0107	EEGBA2A223FN
39000	51 x 143	16.46	18.93	0.0110	0.0088	EEGBA1K393FP	27000	51 x 143	13.41	15.42	0.0120	0.0096	EEGBA2A273FP
27000	64 x 79	13.69	15.74	0.0191	0.0153	EEGBA1K273GG	18000	64 x 79	11.61	13.35	0.0205	0.0164	EEGBA2A183GG
33000	64 x 92	15.14	17.41	0.0156	0.0125	EEGBA1K333GH	22000	64 x 92	13.00	14.95	0.0167	0.0134	EEGBA2A223GH
39000	64 x 105	16.43	18.89	0.0132	0.0106	EEGBA1K393GK	27000	64 x 105	14.46	16.63	0.0136	0.0109	EEGBA2A273GK
43000	64 x 117	17.43	20.04	0.0120	0.0096	EEGBA1K433GL	33000	64 x 117	16.00	18.40	0.0112	0.0089	EEGBA2A333GL
47000	64 x 130	18.36	21.11	0.0116	0.0093	EEGBA1K473GN	39000	64 x 130	17.38	19.99	0.0094	0.0076	EEGBA2A393GN
56000	64 x 143	19.73	22.69	0.0097	0.0078	EEGBA1K563GP	47000	64 x 143	18.89	21.72	0.0078	0.0063	EEGBA2A473GP
47000	76 x 79	18.18	20.91	0.0125	0.0100	EEGBA1K473HG	33000	76 x 79	16.84	19.37	0.0156	0.0125	EEGBA2A333HG
56000	76 x 92	19.65	22.60	0.0105	0.0084	EEGBA1K563HH	39000	76 x 92	18.37	21.13	0.0132	0.0106	EEGBA2A393HH
68000	76 x 105	21.18	24.36	0.0087	0.0069	EEGBA1K683HK	47000	76 x 105	20.01	23.01	0.0110	0.0088	EEGBA2A473HK
75000	76 x 117	22.26	25.60	0.0079	0.0063	EEGBA1K753HL	52000	76 x 117	21.20	24.38	0.0099	0.0079	EEGBA2A523HL
82000	76 x 130	23.25	26.74	0.0072	0.0058	EEGBA1K823HN	56000	76 x 130	22.18	25.51	0.0092	0.0074	EEGBA2A563HN
91000	76 x 143	24.30	27.95	0.0073	0.0058	EEGBA1K913HP	68000	76 x 143	23.93	27.52	0.0076	0.0061	EEGBA2A683HP
150000	76 x 219	30.30	34.85	0.0041	0.0033	EEGBA1K154HW	100000	76 x 219	29.74	34.20	0.0041	0.0033	EEGBA2A104HW
200 VDC Working, 250 VDC Surge													
820	35 x 41	1.55	2.17	0.180	0.135	EEGBA2D821CA	560	35 x 41	1.39	1.95	0.263	0.197	EEGBA2E561CA
1000	35 x 54	1.81	2.53	0.147	0.111	EEGBA2D102CC	820	35 x 54	1.77	2.48	0.180	0.135	EEGBA2E821CC
1500	35 x 67	2.36	3.30	0.098	0.074	EEGBA2D152CE	1000	35 x 67	2.08	2.91	0.147	0.111	EEGBA2E102CE
1800	35 x 79	2.71	3.79	0.082	0.061	EEGBA2D182CG	1200	35 x 79	2.39	3.35	0.123	0.092	EEGBA2E122CG
2200	35 x 92	3.13	4.38	0.067	0.050	EEGBA2D222CH	1500	35 x 92	2.80	3.92	0.098	0.074	EEGBA2E152CH
2700	35 x 105	3.61	5.05	0.055	0.041	EEGBA2D272CK	1800	35 x 105	3.18	4.45	0.082	0.061	EEGBA2E182CK
3000	35 x 117	3.95	5.53	0.049	0.037	EEGBA2D302CL	2200	35 x 117	3.65	5.11	0.067	0.050	EEGBA2E222CL
3300	35 x 130	4.28	5.99	0.045	0.033	EEGBA2D332CN	2400	35 x 130	3.94	5.52	0.061	0.046	EEGBA2E242CN
3900	35 x 143	4.80	6.72	0.038	0.028	EEGBA2D392CP	2700	35 x 143	4.31	6.03	0.055	0.041	EEGBA2E272CP
2200	51 x 48	3.33	4.66	0.067	0.050	EEGBA2D222FB	1500	51 x 48	2.95	4.13	0.098	0.074	EEGBA2E152FB
2700	51 x 54	3.76	5.26	0.055	0.041	EEGBA2D272FC	1800	51 x 54	3.30	4.62	0.082	0.061	EEGBA2E182FC
3300	51 x 67	4.38	6.13	0.045	0.033	EEGBA2D332FE	2200	51 x 67	3.84	5.38	0.067	0.050	EEGBA2E222FE
4700	51 x 79	5.45	7.63	0.031	0.024	EEGBA2D472FG	2700	51 x 79	4.44	6.22	0.055	0.041	EEGBA2E272FG
5100	51 x 92	5.90	8.26	0.029	0.022	EEGBA2D512FH	3300	51 x 92	5.09	7.13	0.045	0.033	EEGBA2E332FH
5600	51 x 105	6.39	8.95	0.026	0.020	EEGBA2D562FK	3900	51 x 105	5.72	8.01	0.038	0.028	EEGBA2E392FK
6800	51 x 130	7.49	10.49	0.022	0.016	EEGBA2D682FN	4700	51 x 130	6.69	9.37	0.031	0.024	EEGBA2E472FN
8200	51 x 143	8.45	11.83	0.018	0.013	EEGBA2D822FP	5600	51 x 143	7.50	10.50	0.026	0.020	EEGBA2E562FP
6800	64 x 79	7.79	10.91	0.022	0.016	EEGBA2D682GG	4700	64 x 79	6.70	9.38	0.031	0.024	EEGBA2E472GG
8200	64 x 92	8.85	12.39	0.018	0.013	EEGBA2D822GH	5600	64 x 92	7.57	10.60	0.026	0.020	EEGBA2E562GH
10000	64 x 105	10.06	14.08	0.015	0.011	EEGBA2D103GK	6800	64 x 105	8.59	12.03	0.022	0.016	EEGBA2E682GK
12000	64 x 117	11.36	15.90	0.012	0.009	EEGBA2D123GL	8200	64 x 117	9.72	13.61	0.018	0.013	EEGBA2E822GL
13000	64 x 130	12.14	17.00	0.011	0.009	EEGBA2D133GN	9100	64 x 130	10.52	14.73	0.016	0.012	EEGBA2E912GN
15000	64 x 143	13.38	18.73	0.010	0.007	EEGBA2D153GP	10000	64 x 143	11.30	15.82	0.015	0.011	EEGBA2E103GP
10000	76 x 79	10.57	14.80	0.016	0.012	EEGBA2D103HG	7500	76 x 79	9.46	13.24	0.022	0.016	EEGBA2E752HG
12000	76 x 92	11.94	16.72	0.014	0.010	EEGBA2D123HH	8200	76 x 92	10.20	14.28	0.020	0.015	EEGBA2E822HH
15000	76 x 105	13.72	19.21	0.011	0.008	EEGBA2D153HK	10000	76 x 105	11.57	16.20	0.016	0.012	EEGBA2E103HK
18000	76 x 117	15.45	21.63	0.009	0.007	EEGBA2D183HL	12000	76 x 117	13.03	18.24	0.014	0.010	EEGBA2E123HL
20000	76 x 130	16.68	23.35	0.008	0.006	EEGBA2D203HN	13000	76 x 130	13.89	19.45	0.012	0.009	EEGBA2E133HN
22000	76 x 143	17.90	25.06	0.007	0.006	EEGBA2D223HP	15000	76 x 143	15.27	21.38	0.011	0.008	EEGBA2E153HP
33000	76 x 219	24.90	34.86	0.005	0.004	EEGBA2D333HW	22000	76 x 219	21.00	29.40	0.008	0.006	EEGBA2E223HW

G-BA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms}) 120Hz	20°C ESR (Ω , max.) 10k-50kHz	20°C ESR (Ω , max.) 120Hz	20°C ESR (Ω , max.) 20kHz	Panasonic Part Number
300 VDC Working, 350 VDC Surge													
390	35 x 41	1.11	1.55	0.378	0.283	EEGBA2U391CA	330	35 x 41	0.99	1.39	0.447	0.313	EEGBA2V331CA
470	35 x 54	1.29	1.81	0.314	0.235	EEGBA2U471CC	390	35 x 54	1.13	1.58	0.378	0.264	EEGBA2V391CC
680	35 x 67	1.65	2.31	0.217	0.163	EEGBA2U681CE	560	35 x 67	1.44	2.02	0.263	0.184	EEGBA2V561CE
820	35 x 79	1.90	2.66	0.180	0.135	EEGBA2U821CG	680	35 x 79	1.67	2.34	0.217	0.152	EEGBA2V681CG
1000	35 x 92	2.19	3.07	0.147	0.111	EEGBA2U102CH	820	35 x 92	1.91	2.67	0.180	0.126	EEGBA2V821CH
1200	35 x 105	2.50	3.50	0.123	0.092	EEGBA2U122CK	1000	35 x 105	2.19	3.07	0.147	0.103	EEGBA2V102CK
1500	35 x 117	2.90	4.06	0.098	0.074	EEGBA2U152CL	1200	35 x 117	2.50	3.50	0.123	0.086	EEGBA2V122CL
1600	35 x 130	3.09	4.33	0.092	0.069	EEGBA2U162CN	1300	35 x 130	2.69	3.77	0.113	0.079	EEGBA2V132CN
1800	35 x 143	3.38	4.73	0.082	0.061	EEGBA2U182CP	1500	35 x 143	2.98	4.17	0.098	0.069	EEGBA2V152CP
1000	51 x 48	2.32	3.25	0.147	0.111	EEGBA2U102FB	820	51 x 48	2.10	2.94	0.180	0.126	EEGBA2V821FB
1200	51 x 54	2.59	3.63	0.123	0.092	EEGBA2U122FC	1000	51 x 54	2.37	3.32	0.147	0.103	EEGBA2V102FC
1500	51 x 67	3.06	4.28	0.098	0.074	EEGBA2U152FE	1200	51 x 67	2.73	3.82	0.123	0.086	EEGBA2V122FE
2200	51 x 79	3.86	5.40	0.067	0.050	EEGBA2U222FG	1500	51 x 79	3.19	4.47	0.098	0.069	EEGBA2V152FG
2700	51 x 92	4.44	6.22	0.055	0.041	EEGBA2U272FH	1800	51 x 92	3.63	5.08	0.082	0.057	EEGBA2V182FH
3300	51 x 105	5.07	7.10	0.045	0.033	EEGBA2U332FK	2200	51 x 105	4.14	5.80	0.067	0.047	EEGBA2V222FK
3900	51 x 130	5.87	8.22	0.038	0.028	EEGBA2U392FN	2700	51 x 130	4.89	6.85	0.055	0.038	EEGBA2V272FN
4700	51 x 143	6.62	9.27	0.031	0.024	EEGBA2U472FP	3300	51 x 143	5.55	7.77	0.045	0.031	EEGBA2V332FP
3300	64 x 79	5.61	7.85	0.045	0.033	EEGBA2U332GG	2700	64 x 79	4.91	6.87	0.055	0.038	EEGBA2V272GG
3900	64 x 92	6.32	8.85	0.038	0.028	EEGBA2U392GH	3300	64 x 92	5.61	7.85	0.045	0.031	EEGBA2V332GH
4700	64 x 105	7.14	10.00	0.031	0.024	EEGBA2U472GK	3900	64 x 105	6.29	8.81	0.038	0.026	EEGBA2V392GK
5600	64 x 117	8.04	11.26	0.026	0.020	EEGBA2U562GL	4700	64 x 117	7.11	9.95	0.031	0.022	EEGBA2V472GL
6200	64 x 130	8.68	12.15	0.024	0.018	EEGBA2U622GN	5100	64 x 130	7.61	10.65	0.029	0.020	EEGBA2V512GN
6800	64 x 143	9.32	13.05	0.022	0.016	EEGBA2U682GP	5600	64 x 143	8.17	11.44	0.026	0.018	EEGBA2V562GP
5100	76 x 79	7.80	10.92	0.032	0.024	EEGBA2U512HG	3900	76 x 79	6.82	9.55	0.042	0.029	EEGBA2V392HG
6200	76 x 92	8.87	12.42	0.026	0.020	EEGBA2U622HH	4700	76 x 92	7.72	10.81	0.034	0.024	EEGBA2V472HH
6800	76 x 105	9.54	13.36	0.024	0.018	EEGBA2U682HK	5600	76 x 105	8.66	12.12	0.029	0.020	EEGBA2V562HK
8200	76 x 117	10.77	15.08	0.020	0.015	EEGBA2U822HL	6800	76 x 117	9.81	13.73	0.024	0.017	EEGBA2V862HL
9100	76 x 130	11.62	16.27	0.018	0.013	EEGBA2U912HN	7500	76 x 130	10.55	14.77	0.022	0.015	EEGBA2V752HN
10000	76 x 143	12.47	17.46	0.016	0.012	EEGBA2U103HP	8200	76 x 143	11.29	15.81	0.020	0.014	EEGBA2V822HP
18000	76 x 219	18.99	26.59	0.010	0.007	EEGBA2U183HW	12000	76 x 219	15.51	21.71	0.015	0.010	EEGBA2V123HW
400 VDC Working, 450 VDC Surge													
270	35 x 41	0.97	1.36	0.546	0.355	EEGBA2G271CA	220	35 x 41	0.88	1.23	0.670	0.435	EEGBA2W221CA
330	35 x 54	1.13	1.58	0.447	0.290	EEGBA2G331CC	270	35 x 54	1.03	1.44	0.546	0.355	EEGBA2W271CC
390	35 x 67	1.31	1.83	0.378	0.246	EEGBA2G391CE	330	35 x 67	1.21	1.69	0.447	0.290	EEGBA2W331CE
560	35 x 79	1.65	2.31	0.263	0.171	EEGBA2G561CG	470	35 x 79	1.51	2.11	0.314	0.204	EEGBA2W471CG
680	35 x 92	1.90	2.66	0.217	0.141	EEGBA2G681CH	560	35 x 92	1.73	2.42	0.263	0.171	EEGBA2W561CH
820	35 x 105	2.17	3.04	0.180	0.117	EEGBA2G821CK	680	35 x 105	1.98	2.77	0.217	0.141	EEGBA2W681CK
910	35 x 117	2.38	3.33	0.162	0.105	EEGBA2G911CL	750	35 x 117	2.16	3.02	0.196	0.128	EEGBA2W751CL
1000	35 x 130	2.57	3.60	0.147	0.096	EEGBA2G102CN	820	35 x 130	2.33	3.26	0.180	0.117	EEGBA2W821CN
1200	35 x 143	2.91	4.07	0.123	0.080	EEGBA2G122CP	1000	35 x 143	2.65	3.71	0.147	0.096	EEGBA2W102CP
560	51 x 48	1.82	2.55	0.263	0.171	EEGBA2G561FB	470	51 x 48	1.67	2.34	0.314	0.204	EEGBA2W471FB
680	51 x 54	2.04	2.86	0.217	0.141	EEGBA2G681FC	560	51 x 54	1.85	2.59	0.263	0.171	EEGBA2W561FC
1000	51 x 67	2.61	3.65	0.147	0.096	EEGBA2G102FE	820	51 x 67	2.36	3.30	0.180	0.117	EEGBA2W821FE
1200	51 x 79	2.98	4.17	0.123	0.080	EEGBA2G122FG	1000	51 x 79	2.72	3.81	0.147	0.096	EEGBA2W102FG
1500	51 x 92	3.46	4.84	0.098	0.064	EEGBA2G152FH	1200	51 x 92	3.10	4.34	0.123	0.080	EEGBA2W122FH
1800	51 x 105	3.92	5.49	0.082	0.053	EEGBA2G182FK	1500	51 x 105	3.58	5.01	0.098	0.064	EEGBA2W152FK
2200	51 x 130	4.61	6.45	0.067	0.044	EEGBA2G222FN	1800	51 x 130	4.17	5.84	0.082	0.053	EEGBA2W182FN
2700	51 x 143	5.25	7.35	0.055	0.035	EEGBA2G272FP	2200	51 x 143	4.74	6.64	0.067	0.044	EEGBA2W222FP
2200	64 x 79	4.61	6.45	0.067	0.044	EEGBA2G222GG	1500	64 x 79	3.80	5.32	0.098	0.064	EEGBA2W152GG
2700	64 x 92	5.28	7.39	0.055	0.035	EEGBA2G272GH	1800	64 x 92	4.31	6.03	0.082	0.053	EEGBA2W182GH
3300	64 x 105	6.01	8.41	0.045	0.029	EEGBA2G332GK	2200	64 x 105	4.91	6.87	0.067	0.044	EEGBA2W222GK
3600	64 x 117	6.47	9.06	0.041	0.027	EEGBA2G362GL	2700	64 x 117	5.61	7.85	0.055	0.035	EEGBA2W272GL
3900	64 x 130	6.92	9.69	0.038	0.025	EEGBA2G392GN	3300	64 x 130	6.36	8.90	0.045	0.029	EEGBA2W332GN
4700	64 x 143	7.79	10.91	0.031	0.020	EEGBA2G472GP	3900	64 x 143	7.09	9.93	0.038	0.025	EEGBA2W392GP
3300	76 x 79	6.29	8.81	0.049	0.032	EEGBA2G332HG	2700	76 x 79	5.69	7.97	0.060	0.039	EEGBA2W272HG
3900	76 x 92	7.05	9.87	0.042	0.027	EEGBA2G392HH	3300	76 x 92	6.48	9.07	0.049	0.032	EEGBA2W332HH
4700	76 x 105	7.95	11.13	0.034	0.022	EEGBA2G472HK	3900	76 x 105	7.24	10.14	0.042	0.027	EEGBA2W392HK
5200	76 x 117	8.59	12.03	0.031	0.020	EEGBA2G522HL	4300	76 x 117	7.82	10.95	0.038	0.025	EEGBA2W432HL
5600	76 x 130	9.14	12.80	0.029	0.019	EEGBA2G562HN	4700	76 x 130	8.37	11.72	0.034	0.022	EEGBA2W472HN
6800	76 x 143	10.30	14.42	0.024	0.015	EEGBA2G682HP	5600	76 x 143	9.35	13.09	0.029	0.019	EEGBA2W562HP
10000	76 x 219	14.19	19.87	0.018	0.011	EEGBA2G103HW	9100	76 x 219	13.54	18.96	0.019	0.013	EEGBA2W912HW