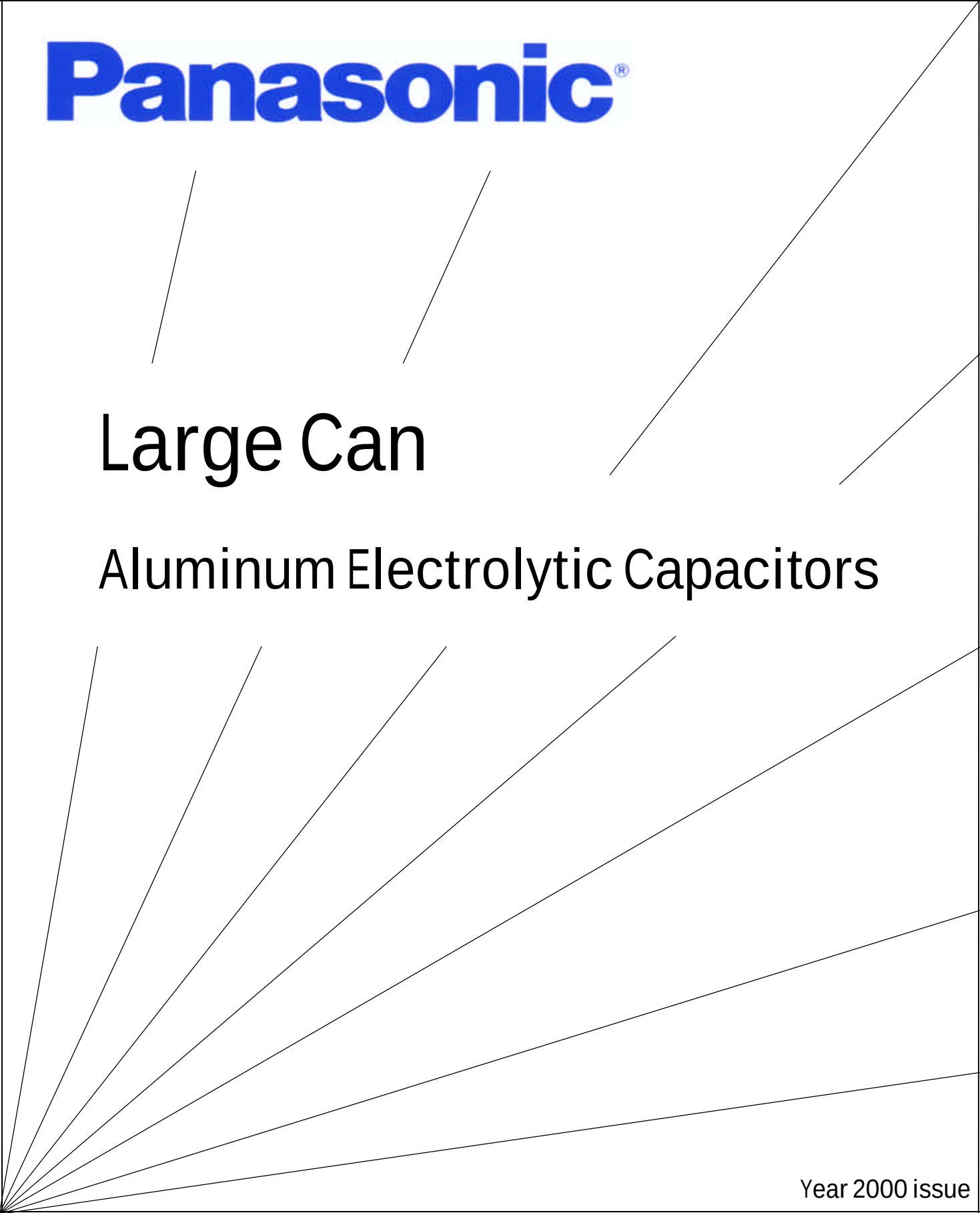




Panasonic®

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
2 terminal snap-in style (TS Type)							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
4 / 5 terminal snap-in style (T Type)							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
Screw terminal "computer grade" style (G Type)							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 ±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: ≤ Initial specified value
 Cap. change: ≤ ±20% of initial measured value
 D. F. / E.S.R.: ≤ 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.

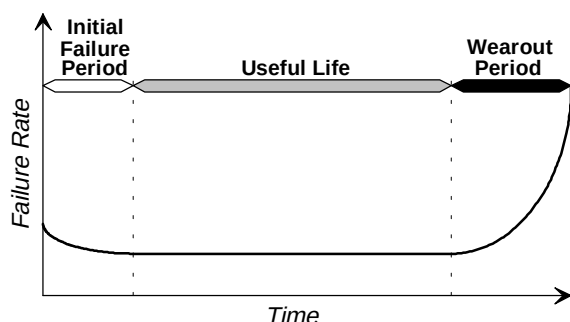
End of life is defined by the occurrence of one of the following when stabilized at 20°C;

◆ Capacitance change exceeds ±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 1000 Ω 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.

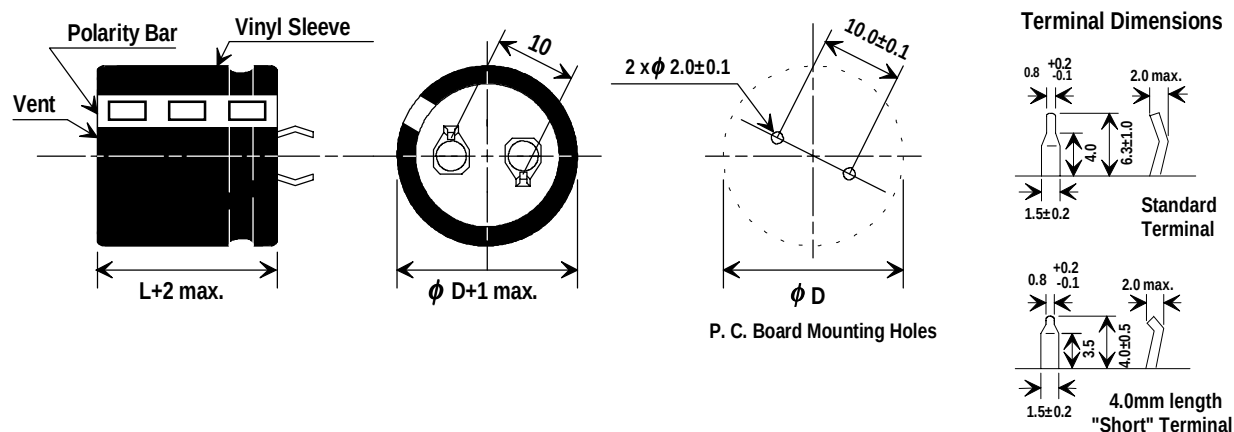
If electrolyte or vapors enter the eye, immediately flush the eye with large amounts of water and seek medical attention.

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	10k~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.

- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-----------------------------|----|----|----|----|----|----|-----|----------------------|--|----|----|----|----|----|----|-----|-----------|----------------|--|----|----|----|----|----|----|----|----|
| Rated Working Voltage: | 16 ~ 250 VDC | 350 ~ 500 VDC | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Temperature: | -40 ~ +85°C | -25 ~ +85°C | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nominal Capacitance: | 120 ~ 68000µF (±20% tolerance) | 33 ~ 680µF (±20% tolerance) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor:
(120 Hz, +20°C) | <table border="1"> <tr> <td colspan="2">Working Voltage [V]:</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td><td>160 ~ 500</td></tr> <tr> <td colspan="2">Max. D.F. (%):</td><td>50</td><td>40</td><td>35</td><td>30</td><td>25</td><td>20</td><td>20</td><td>15</td></tr> </table> | | | | | | | | | Working Voltage [V]: | | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 ~ 500 | Max. D.F. (%): | | 50 | 40 | 35 | 30 | 25 | 20 | 20 | 15 |
| | Working Voltage [V]: | | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 ~ 500 | | | | | | | | | | | | | | | | | | | |
| | Max. D.F. (%): | | 50 | 40 | 35 | 30 | 25 | 20 | 20 | 15 | | | | | | | | | | | | | | | | | | | |
| For capacitance values > 33000µF, add the value of: $\frac{(\text{rated cap. } [\mu\text{F}] - 33000)}{1000}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endurance: | 3000 hours* at +85°C with maximum specified ripple current (see page 4)
*2000 hours for 20mm diameter or 20mm length sizes | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Common Code/ Terminal Type

ECOS	6.3mm Length Terminal (Standard)
ECEC	4.0mm Length "Short" Terminal

(See page 7)

Voltage Code

Series

Capacitance Code

A	20mm
B	22mm
C	25mm
D	30mm
E	35mm
F	40mm

Case Diameter

Suffix, Top Vinyl Plate

25 ~ 50mm lengths	
A	With Plate
B	Without plate
20mm length	
L	With Plate
G	Without plate
Extended Capacitance Ratings	
X	With plate

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

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A_{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10k~50kHz	120Hz	20kHz	
35 VDC Working, 44 VDC Surge						
3300	20 x 25	2.73	3.14	0.111	0.083	ECOS1VP332AA
3900	20 x 30	2.94	3.38	0.094	0.070	ECOS1VP392AA
4700	20 x 35	3.26	3.75	0.078	0.058	ECOS1VP472AA
5600	20 x 40	3.36	3.86	0.080	0.060	ECOS1VP562AA
2200	22 x 20	1.40	1.61	0.181	0.136	ECOS1VP222BL
4700	22 x 30	3.26	3.75	0.078	0.058	ECOS1VP472BA
5600	22 x 30	3.36	3.86	0.080	0.060	ECOS1VP562BA
6800	22 x 35	3.68	4.23	0.066	0.049	ECOS1VP682BA
8200	22 x 40	4.00	4.60	0.057	0.042	ECOS1VP822BA
10000	22 x 45	4.42	5.08	0.050	0.037	ECOS1VP103BA
3300	25 x 20	1.70	1.96	0.121	0.090	ECOS1VP332CL
4700	25 x 25	3.26	3.75	0.078	0.058	ECOS1VP472CA
5600	25 x 25	3.36	3.86	0.080	0.060	ECOS1VP562CA
6800	25 x 30	3.68	4.23	0.066	0.049	ECOS1VP682CA
8200	25 x 35	4.00	4.60	0.057	0.042	ECOS1VP822CA
10000	25 x 40	4.42	5.08	0.050	0.037	ECOS1VP103CA
12000	25 x 45	5.05	5.81	0.044	0.033	ECOS1VP123CA
15000	25 x 50	5.57	6.41	0.036	0.027	ECOS1VP153CA
4700	30 x 20	2.00	2.30	0.088	0.066	ECOS1VP472DL
10000	30 x 30	4.42	5.08	0.050	0.037	ECOS1VP103DA
12000	30 x 35	5.05	5.81	0.044	0.033	ECOS1VP123DA
15000	30 x 40	5.57	6.41	0.036	0.027	ECOS1VP153DA
18000	30 x 45	5.68	6.53	0.030	0.023	ECOS1VP183DA
22000	30 x 50	6.10	7.02	0.026	0.020	ECOS1VP223DA
6800	35 x 20	2.40	2.76	0.071	0.053	ECOS1VP682EL
10000	35 x 25	4.42	5.08	0.050	0.037	ECOS1VP103EA
12000	35 x 30	5.05	5.81	0.044	0.033	ECOS1VP123EA
15000	35 x 30	5.57	6.41	0.036	0.027	ECOS1VP153EA
18000	35 x 35	5.68	6.53	0.030	0.023	ECOS1VP183EA
22000	35 x 40	6.10	7.02	0.026	0.020	ECOS1VP223EA
27000	35 x 45	6.84	7.87	0.021	0.017	ECOS1VP273EA
33000	35 x 50	7.15	8.22	0.018	0.014	ECOS1VP333EA
27000	40 x 40	6.84	7.87	0.021	0.017	ECOS1VP273FA
39000	40 x 50	7.98	9.18	0.017	0.014	ECOS1VP393FA
63 VDC Working, 79 VDC Surge						
2200	20 x 35	2.52	2.90	0.151	0.113	ECOS1JP222AA
2700	20 x 40	3.73	4.29	0.123	0.092	ECOS1JP272AA
1000	22 x 20	1.20	1.38	0.381	0.286	ECOS1JP102BL
2200	22 x 30	2.52	2.90	0.151	0.113	ECOS1JP222BA
2700	22 x 35	3.73	4.29	0.123	0.092	ECOS1JP272BA
3300	22 x 40	4.10	4.72	0.105	0.079	ECOS1JP332BA
3900	22 x 45	4.44	5.11	0.098	0.073	ECOS1JP392BA
4700	22 x 50	4.86	5.59	0.081	0.061	ECOS1JP472BA
1500	25 x 20	1.30	1.50	0.254	0.191	ECOS1JP152CL
2200	25 x 25	2.52	2.90	0.151	0.113	ECOS1JP222CA
2700	25 x 30	3.73	4.29	0.123	0.092	ECOS1JP272CA
3300	25 x 30	4.10	4.72	0.105	0.079	ECOS1JP332CA
3900	25 x 35	4.44	5.11	0.098	0.073	ECOS1JP392CA
4700	25 x 40	4.86	5.59	0.081	0.061	ECOS1JP472CA
5600	25 x 45	5.36	6.16	0.068	0.051	ECOS1JP562CA
6800	25 x 50	5.84	6.72	0.061	0.046	ECOS1JP682CA
2200	30 x 20	1.50	1.73	0.173	0.130	ECOS1JP222DL
3300	30 x 25	4.10	4.72	0.105	0.079	ECOS1JP332DA
3900	30 x 30	4.44	5.11	0.098	0.073	ECOS1JP392DA
4700	30 x 30	4.86	5.59	0.081	0.061	ECOS1JP472DA
5600	30 x 35	5.36	6.16	0.068	0.051	ECOS1JP562DA
6800	30 x 40	5.84	6.72	0.061	0.046	ECOS1JP682DA
8200	30 x 45	6.00	6.90	0.051	0.038	ECOS1JP822DA
3300	35 x 20	1.70	1.96	0.126	0.094	ECOS1JP332EL
4700	35 x 25	4.86	5.59	0.081	0.061	ECOS1JP472EA
5600	35 x 30	5.36	6.16	0.068	0.051	ECOS1JP562EA
6800	35 x 30	5.84	6.72	0.061	0.046	ECOS1JP682EA
8200	35 x 35	6.00	6.90	0.051	0.038	ECOS1JP822EA
10000	35 x 40	6.52	7.50	0.041	0.033	ECOS1JP103EA
12000	35 x 50	7.15	8.22	0.035	0.028	ECOS1JP123EA
12000	40 x 40	7.15	8.22	0.035	0.028	ECOS1JP123FA
15000	40 x 50	7.53	8.66	0.033	0.027	ECOS1JP153FA
80 VDC Working, 100 VDC Surge						
1200	20 x 30	2.08	2.39	0.221	0.166	ECOS1KP122AA
1500	20 x 35	2.26	2.60	0.177	0.133	ECOS1KP152AA
1800	20 x 40	2.52	2.90	0.147	0.111	ECOS1KP182AA
2200	20 x 50	2.73	3.14	0.136	0.102	ECOS1KP222AA
680	22 x 20	1.00	1.15	0.439	0.329	ECOS1KP681BL
1500	22 x 30	2.26	2.60	0.177	0.133	ECOS1KP152BA
1800	22 x 35	2.52	2.90	0.147	0.111	ECOS1KP182BA
2200	22 x 40	2.73	3.14	0.121	0.090	ECOS1KP222BA
2700	22 x 45	2.78	3.20	0.098	0.074	ECOS1KP272BA
3300	22 x 50	3.21	3.69	0.085	0.064	ECOS1KP332BA
1000	25 x 20	1.20	1.38	0.298	0.224	ECOS1KP102CL
1500	25 x 25	2.26	2.60	0.177	0.133	ECOS1KP152CA
1800	25 x 30	2.52	2.90	0.147	0.111	ECOS1KP182CA
2200	25 x 30	2.73	3.14	0.121	0.090	ECOS1KP222CA
2700	25 x 35	2.78	3.20	0.098	0.074	ECOS1KP272CA
3300	25 x 40	3.21	3.69	0.085	0.064	ECOS1KP332CA
3900	25 x 45	3.59	4.13	0.077	0.057	ECOS1KP392CA
4700	25 x 50	4.09	4.70	0.063	0.048	ECOS1KP472CA
1500	30 x 20	1.40	1.61	0.199	0.149	ECOS1KP152DL
2200	30 x 25	2.73	3.14	0.121	0.090	ECOS1KP222DA
2700	30 x 30	2.78	3.20	0.098	0.074	ECOS1KP272DA
3300	30 x 30	3.21	3.69	0.085	0.064	ECOS1KP332DA
3900	30 x 35	3.59	4.13	0.077	0.057	ECOS1KP392DA
4700	30 x 40	4.09	4.70	0.063	0.048	ECOS1KP472DA
5600	30 x 45	4.55	5.23	0.056	0.042	ECOS1KP562DA
6800	30 x 50	5.16	5.93	0.046	0.035	ECOS1KP682DA
2200	35 x 20	1.70	1.96	0.136	0.102	ECOS1KP222EL
5600	35 x 35	4.55	5.23	0.056	0.042	ECOS1KP562EA
6800	35 x 40	5.16	5.93	0.046	0.035	ECOS1KP682EA
8200	35 x 50	5.83	6.70	0.038	0.029	ECOS1KP822EA
8200	40 x 40	5.83	6.70	0.038	0.029	ECOS1KP822FA
10000	40 x 50	6.56	7.54	0.033	0.025	ECOS1KP103FA

TS-UP Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 85°C R.C. (A_{rms})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
100 VDC Working, 125 VDC Surge						
560	20 x 25	1.35	1.55	0.385	0.250	ECOS2AP561AA
820	20 x 30	1.59	1.83	0.263	0.171	ECOS2AP821AA
1000	20 x 35	1.96	2.25	0.216	0.140	ECOS2AP102AA
1200	20 x 40	2.31	2.66	0.180	0.117	ECOS2AP122AA
1500	20 x 50	2.57	2.96	0.144	0.093	ECOS2AP152AA
470	22 x 20	1.00	1.15	0.459	0.298	ECOS2AP471BL
680	22 x 25	1.61	1.85	0.317	0.206	ECOS2AP681BA
1000	22 x 30	1.96	2.25	0.216	0.140	ECOS2AP102BA
1200	22 x 35	2.31	2.66	0.193	0.126	ECOS2AP122BA
1500	22 x 40	2.57	2.96	0.155	0.101	ECOS2AP152BA
1800	22 x 45	2.84	3.27	0.129	0.084	ECOS2AP182BA
2200	22 x 50	3.14	3.61	0.121	0.078	ECOS2AP222BA
680	25 x 20	1.10	1.27	0.366	0.238	ECOS2AP681CL
1000	25 x 25	1.96	2.25	0.216	0.140	ECOS2AP102CA
1200	25 x 30	2.31	2.66	0.180	0.117	ECOS2AP122CA
1500	25 x 30	2.57	2.96	0.155	0.101	ECOS2AP152CA
1800	25 x 35	2.84	3.27	0.138	0.090	ECOS2AP182CA
2200	25 x 40	3.14	3.61	0.121	0.078	ECOS2AP222CA
2700	25 x 45	3.71	4.27	0.104	0.068	ECOS2AP272CA
3300	25 x 50	4.06	4.67	0.090	0.059	ECOS2AP332CA
1000	30 x 20	1.20	1.38	0.249	0.162	ECOS2AP102DL
1500	30 x 25	2.57	2.96	0.155	0.101	ECOS2AP152DA
1800	30 x 30	2.84	3.27	0.138	0.090	ECOS2AP182DA
2200	30 x 30	3.14	3.61	0.121	0.078	ECOS2AP222DA
2700	30 x 35	3.71	4.27	0.104	0.068	ECOS2AP272DA
3300	30 x 40	4.06	4.67	0.090	0.059	ECOS2AP332DA
3900	30 x 45	4.54	5.22	0.077	0.050	ECOS2AP392DA
4700	30 x 50	5.13	5.90	0.071	0.049	ECOS2AP472DA
1500	35 x 20	1.50	1.73	0.177	0.115	ECOS2AP152EL
2200	35 x 25	3.14	3.61	0.121	0.078	ECOS2AP222EA
2700	35 x 30	3.71	4.27	0.104	0.068	ECOS2AP272EA
3900	35 x 35	4.54	5.22	0.081	0.052	ECOS2AP392EA
4700	35 x 40	5.13	5.90	0.071	0.049	ECOS2AP472EA
5600	35 x 45	5.75	6.61	0.059	0.041	ECOS2AP562EA
6800	35 x 50	6.60	7.59	0.049	0.037	ECOS2AP682EA
5600	40 x 40	5.75	6.61	0.059	0.044	ECOS2AP562FA
8200	40 x 50	7.28	8.37	0.040	0.030	ECOS2AP822FA
200 VDC Working, 250 VDC Surge						
270	20 x 30	1.41	1.97	0.614	0.276	ECOS2DP271AA
330	20 x 35	1.56	2.18	0.553	0.249	ECOS2DP331AA
470	20 x 40	1.85	2.59	0.388	0.175	ECOS2DP471AX
680	20 x 50	2.52	3.53	0.268	0.121	ECOS2DP681AX
150	22 x 20	0.65	0.91	1.326	0.597	ECOS2DP151BL
270	22 x 25	1.41	1.97	0.614	0.276	ECOS2DP271BA
330	22 x 25	1.56	2.18	0.553	0.249	ECOS2DP331BX
390	22 x 30	1.68	2.35	0.468	0.210	ECOS2DP391BA
470	22 x 35	1.85	2.59	0.388	0.175	ECOS2DP471BA
560	22 x 40	2.43	3.40	0.326	0.147	ECOS2DP561BA
680	22 x 45	2.68	3.75	0.268	0.121	ECOS2DP681BA
220	25 x 20	0.87	1.22	0.904	0.407	ECOS2DP221CL
390	25 x 25	1.68	2.35	0.468	0.210	ECOS2DP391CA
470	25 x 30	1.85	2.59	0.388	0.175	ECOS2DP471CA
560	25 x 30	2.43	3.40	0.326	0.147	ECOS2DP561CX
680	25 x 35	2.68	3.75	0.268	0.121	ECOS2DP681CA
820	25 x 45	2.93	4.10	0.222	0.100	ECOS2DP821CA
1000	25 x 45	3.25	4.55	0.199	0.090	ECOS2DP102CX
1000	25 x 50	3.25	4.55	0.199	0.090	ECOS2DP102CA
330	30 x 20	1.00	1.40	0.603	0.271	ECOS2DP331DL
560	30 x 25	2.43	3.40	0.326	0.147	ECOS2DP561DA
680	30 x 30	2.68	3.75	0.268	0.121	ECOS2DP681DX
820	30 x 30	2.93	4.10	0.222	0.100	ECOS2DP821DX
820	30 x 35	2.93	4.10	0.222	0.100	ECOS2DP821DA
1000	30 x 35	3.25	4.55	0.199	0.090	ECOS2DP102DX
250 VDC Working, 300 VDC Surge						
180	20 x 30	1.07	1.50	0.921	0.368	ECOS2EP181AA
220	20 x 35	1.17	1.64	0.754	0.301	ECOS2EP221AA
120	22 x 20	0.45	0.63	1.658	0.663	ECOS2EP121BL
180	22 x 25	1.07	1.50	0.921	0.368	ECOS2EP181BA
220	22 x 25	1.17	1.64	0.754	0.301	ECOS2EP221BX
270	22 x 30	1.31	1.83	0.614	0.246	ECOS2EP271BA
330	22 x 35	1.75	2.45	0.553	0.221	ECOS2EP331BA
390	22 x 40	1.91	2.67	0.468	0.187	ECOS2EP391BA
470	22 x 45	2.11	2.95	0.388	0.155	ECOS2EP471BA
150	25 x 20	0.65	0.91	1.326	0.531	ECOS2EP151CL
270	25 x 25	1.31	1.83	0.614	0.246	ECOS2EP271CA
330	25 x 30	1.75	2.45	0.502	0.201	ECOS2EP331CA
390	25 x 30	1.91	2.67	0.468	0.187	ECOS2EP391CX
390	25 x 35	1.91	2.67	0.468	0.187	ECOS2EP391CA
470	25 x 35	2.11	2.95	0.388	0.155	ECOS2EP471CX
470	25 x 40	2.11	2.95	0.388	0.155	ECOS2EP471CA
560	25 x 40	2.25	3.15	0.326	0.130	ECOS2EP561CX
560	25 x 45	2.25	3.15	0.326	0.130	ECOS2EP561CA
680	25 x 45	2.50	3.50	0.268	0.107	ECOS2EP681CX
680	25 x 50	2.50	3.50	0.268	0.107	ECOS2EP681CA
220	30 x 20	0.87	1.22	0.829	0.332	ECOS2EP221DL
390	30 x 25	1.91	2.67	0.425	0.170	ECOS2EP391DX
470	30 x 25	2.11	2.95	0.353	0.141	ECOS2EP471DX
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})		Max. 20°C ESR (Ω)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
200 VDC Working, 250 VDC Surge (continued)						
1000	30 x 40	3.25	4.55	0.199	0.090	ECOS2DP102DA
1200	30 x 40	3.50	4.90	0.166	0.075	ECOS2DP122DX
1200	30 x 45	3.50	4.90	0.166	0.075	ECOS2DP122DA
1500	30 x 45	3.87	5.42	0.144	0.072	ECOS2DP152DX
1500	30 x 50	3.87	5.42	0.144	0.072	ECOS2DP152DA
1800	30 x 50	4.32	6.05	0.120	0.060	ECOS2DP182DX
470	35 x 20	1.30	1.82	0.459	0.206	ECOS2DP471EL
820	35 x 25	2.93	4.10	0.243	0.109	ECOS2DP821EA
1000	35 x 30	3.25	4.55	0.199	0.090	ECOS2DP102EA
1200	35 x 30	3.50	4.90	0.166	0.075	ECOS2DP122EX
1200	35 x 35	3.50	4.90	0.166	0.075	ECOS2DP122EA
1500	35 x 35	3.87	5.42	0.144	0.072	ECOS2DP152EX
1500	35 x 40	3.87	5.42	0.144	0.072	ECOS2DP152EA
1800	35 x 40	4.32	6.05	0.120	0.060	ECOS2DP182EX
1800	35 x 45	4.32	6.05	0.120	0.060	ECOS2DP182EA
2200	35 x 45	4.92	6.89	0.098	0.054	ECOS2DP222EX
2200	35 x 50	4.92	6.89	0.098	0.054	ECOS2DP222EA
2200	40 x 40	4.92	6.89	0.098	0.054	ECOS2DP222FA
2700	40 x 50	5.41	7.57	0.080	0.044	ECOS2DP272FA
250 VDC Working, 300 VDC Surge (continued)						
560	30 x 35	2.25	3.15	0.326	0.130	ECOS2EP561DA
680	30 x 35	2.25	3.15	0.268	0.107	ECOS2EP681DX
680	30 x 40	2.50	3.50	0.268	0.107	ECOS2EP681DA
820	30 x 40	2.50	3.50	0.222	0.089	ECOS2EP821DX
820	30 x 45	2.77	3.88	0.222	0.089	ECOS2EP821DA
1000	30 x 45	3.32	4.65	0.182	0.073	ECOS2EP102DX
1000	30 x 50	3.32	4.65	0.199	0.090	ECOS2EP102DA
330	35 x 20	1.10	1.54	0.553	0.221	ECOS2EP331EL
560	35 x 25	2.25	3.15	0.326	0.130	ECOS2EP561EA
680	35 x 30	2.50	3.50	0.268	0.107	ECOS2EP681EA
820	35 x 30	2.77	3.88	0.222	0.089	ECOS2EP821EX
820	35 x 35	2.77	3.88	0.243	0.109	ECOS2EP821EA
1000	35 x 35	3.32	4.65	0.199	0.090	ECOS2EP102EX
1000	35 x 40	3.32	4.65	0.199	0.099	ECOS2EP102EA
1200	35 x 40	3.53	4.94	0.166	0.083	ECOS2EP122EX
1200	35 x 45	3.53	4.94	0.166	0.083	ECOS2EP122EA
1500	35 x 50	4.04	5.66	0.133	0.066	ECOS2EP152EA
1500	40 x 40	4.04	5.66	0.133	0.066	ECOS2EP152FA
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
100	20 x 35	0.91	1.27	1.658	0.580	ECOS2VP101AA
82	22 x 25	0.83	1.16	2.022	0.708	ECOS2VP820BA
100	22 x 30	0.91	1.27	1.658	0.580	ECOS2VP101BA
120	22 x 30	1.00	1.40	1.382	0.484	ECOS2VP121BA
150	22 x 35	1.12	1.57	1.105	0.387	ECOS2VP151BA
180	22 x 40	1.22	1.71	0.921	0.322	ECOS2VP181BA
220	22 x 45	1.44	2.02	0.754	0.264	ECOS2VP221BA
120	25 x 25	1.00	1.40	1.382	0.484	ECOS2VP121CA
150	25 x 25	1.12	1.57	1.105	0.387	ECOS2VP151CX
150	25 x 30	1.12	1.57	1.105	0.387	ECOS2VP151CA
180	25 x 30	1.22	1.71	0.921	0.322	ECOS2VP181CX
180	25 x 35	1.22	1.71	0.921	0.322	ECOS2VP181CA
220	25 x 35	1.44	2.02	0.754	0.264	ECOS2VP221CX
220	25 x 40	1.44	2.02	0.754	0.264	ECOS2VP221CA
270	25 x 40	1.66	2.32	0.614	0.215	ECOS2VP271CX
330	25 x 50	1.88	2.63	0.502	0.176	ECOS2VP331CA
390	25 x 50	2.06	2.88	0.425	0.149	ECOS2VP391CX
150	30 x 25	1.12	1.57	1.105	0.387	ECOS2VP151DA
180	30 x 25	1.22	1.71	0.921	0.322	ECOS2VP181DA
220	30 x 25	1.44	2.02	0.754	0.264	ECOS2VP221DX
220	30 x 30	1.44	2.02	0.754	0.264	ECOS2VP221DA
270	30 x 30	1.66	2.32	0.614	0.215	ECOS2VP271DX
270	30 x 35	1.66	2.32	0.614	0.215	ECOS2VP271DA
330	30 x 35	1.88	2.63	0.502	0.176	ECOS2VP331DX
330	30 x 40	1.88	2.63	0.502	0.176	ECOS2VP331DA
390	30 x 40	2.06	2.88	0.425	0.149	ECOS2VP391DX
390	30 x 45	2.06	2.88	0.468	0.164	ECOS2VP391DA
470	30 x 50	2.40	3.36	0.388	0.136	ECOS2VP471DA
560	30 x 50	2.60	3.64	0.326	0.114	ECOS2VP561DX
220	35 x 25	1.44	2.02	0.754	0.264	ECOS2VP221EA
270	35 x 25	1.66	2.32	0.614	0.215	ECOS2VP271EX
270	35 x 30	1.66	2.32	0.614	0.215	ECOS2VP271EA
330	35 x 30	1.88	2.63	0.502	0.176	ECOS2VP331EA
390	35 x 30	2.06	2.88	0.425	0.149	ECOS2VP391EX
390	35 x 35	2.06	2.88	0.425	0.149	ECOS2VP391EA
470	35 x 35	2.40	3.36	0.353	0.123	ECOS2VP471EX
470	35 x 40	2.40	3.36	0.353	0.123	ECOS2VP471EA
560	35 x 40	2.60	3.64	0.296	0.104	ECOS2VP561EX
470	35 x 45	2.40	3.36	0.353	0.123	ECOS2VP471EA
560	35 x 45	2.60	3.64	0.355	0.142	ECOS2VP561EA
680	35 x 45	2.96	4.14	0.293	0.117	ECOS2VP681EX
680	35 x 50	2.96	4.14	0.293	0.117	ECOS2VP681EA
820	35 x 50	3.55	4.97	0.243	0.097	ECOS2VP821EX
680	40 x 40	2.96	4.14	0.293	0.117	ECOS2VP681FA
1000	40 x 50	3.80	5.32	0.199	0.080	ECOS2VP102FA
385 VDC Working, 435 VDC Surge						
68	20 x 30	0.76	1.06	2.438	0.853	ECOS2TP680AA
82	20 x 30	0.83	1.16	2.022	0.708	ECOS2TP820AA
100	20 x 35	0.92	1.29	1.658	0.580	ECOS2TP101AA
120	20 x 40	1.02	1.43	1.382	0.553	ECOS2TP121AA
47	22 x 20	0.25	0.35	4.233	1.481	ECOS2TP470BL
68	22 x 25	0.76	1.06	2.438	0.853	ECOS2TP680BA
82	22 x 25	0.83	1.16	2.022	0.708	ECOS2TP820BA
100	22 x 30	0.92	1.29	1.658	0.580	ECOS2TP101BA
120	22 x 35	1.02	1.43	1.382	0.553	ECOS2TP121BA
150	22 x 35	1.16	1.62	1.105	0.442	ECOS2TP151BX
150	22 x 40	1.16	1.62	1.105	0.442	ECOS2TP151BA
180	22 x 40	1.44	2.02	0.921	0.368	ECOS2TP181BX
180	22 x 45	1.44	2.02	0.921	0.368	ECOS2TP181BA
220	22 x 45	1.49	2.09	0.829	0.373	ECOS2TP221BX
220	22 x 50	1.49	2.09	0.829	0.373	ECOS2TP221BA
68	25 x 20	0.35	0.49	2.926	1.024	ECOS2TP680CL
100	25 x 25	0.92	1.29	1.658	0.580	ECOS2TP101CA
120	25 x 25	1.02	1.43	1.382	0.553	ECOS2TP121CX
120	25 x 30	1.02	1.43	1.382	0.553	ECOS2TP121CA
150	25 x 30	1.16	1.62	1.105	0.442	ECOS2TP151CA
180	25 x 30	1.44	2.02	0.921	0.368	ECOS2TP181CX
180	25 x 35	1.44	2.02	0.921	0.368	ECOS2TP181CA
220	25 x 40	1.49	2.09	0.829	0.373	ECOS2TP221CA
270	25 x 45	1.67	2.34	0.675	0.304	ECOS2TP271CA
330	25 x 50	1.90	2.66	0.553	0.249	ECOS2TP331CX
100	30 x 20	0.47	0.66	1.989	0.696	ECOS2TP101DL
150	30 x 25	1.16	1.62	1.105	0.442	ECOS2TP151DA
180	30 x 25	1.44	2.02	0.921	0.368	ECOS2TP181DX
180	30 x 30	1.44	2.02	0.921	0.368	ECOS2TP181DA
220	30 x 30	1.49	2.09	0.829	0.373	ECOS2TP221DA
270	30 x 35	1.67	2.34	0.675	0.304	ECOS2TP271DA
330	30 x 40	1.90	2.66	0.553	0.249	ECOS2TP331DA
390	30 x 45	2.13	2.98	0.468	0.210	ECOS2TP391DA
470	30 x 50	2.39	3.35	0.388	0.175	ECOS2TP471DA
150	35 x 20	0.60	0.84	1.326	0.531	ECOS2TP151EL
270	35 x 25	1.67	2.34	0.675	0.304	ECOS2TP271EX
270	35 x 30	1.67	2.34	0.675	0.304	ECOS2TP271EA
330	35 x 30	1.90	2.66	0.553	0.249	ECOS2TP331EX
330	35 x 35	1.90	2.66	0.553	0.249	ECOS2TP331EA
390	35 x 35	2.13	2.98	0.468	0.210	ECOS2TP391EX
390	35 x 40	2.13	2.98	0.468	0.210	ECOS2TP391EA
470	35 x 40	2.39	3.35	0.388	0.175	ECOS2TP471EX
470	35 x 45	2.39	3.35	0.388	0.175	ECOS2TP471EA
560	35 x 45	2.69	3.77	0.326	0.147	ECOS2TP561EX
560	35 x 50	2.69	3.77	0.326	0.147	ECOS2TP561EA
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	Max. 85°C R.C. (A_{rms}) 10k-50kHz	Max. 20°C ESR (Ω) 120Hz	Max. 20°C ESR (Ω) 20kHz	Panasonic Part Number
400 VDC Working, 450 VDC Surge						
82	20 x 30	0.83	1.16	2.022	0.708	ECOS2GP820AA
100	20 x 35	0.92	1.29	1.658	0.580	ECOS2GP101AA
120	20 x 40	1.02	1.43	1.382	0.484	ECOS2GP121AA
47	22 x 20	0.25	0.35	3.527	1.235	ECOS2GP470BL
82	22 x 25	0.83	1.16	2.022	0.708	ECOS2GP820BA
100	22 x 30	0.92	1.29	1.658	0.580	ECOS2GP101BA
120	22 x 35	1.02	1.43	1.382	0.484	ECOS2GP121BA
150	22 x 40	1.16	1.62	1.105	0.387	ECOS2GP151BA
180	22 x 45	1.44	2.02	0.921	0.322	ECOS2GP181BA
220	22 x 50	1.49	2.09	0.754	0.264	ECOS2GP221BA
68	25 x 20	0.35	0.49	2.926	1.024	ECOS2GP680CL
100	25 x 25	0.92	1.29	1.658	0.580	ECOS2GP101CA
120	25 x 25	1.02	1.43	1.382	0.484	ECOS2GP121CX
150	25 x 30	1.16	1.62	1.105	0.387	ECOS2GP151CA
180	25 x 30	1.44	2.02	0.921	0.322	ECOS2GP181CX
180	25 x 35	1.44	2.02	0.921	0.322	ECOS2GP181CA
220	25 x 40	1.49	2.09	0.754	0.264	ECOS2GP221CA
270	25 x 45	1.67	2.34	0.675	0.236	ECOS2GP271CA
100	30 x 20	0.47	0.66	1.989	0.696	ECOS2GP101DL
150	30 x 25	1.16	1.62	1.105	0.387	ECOS2GP151DA
220	30 x 30	1.49	2.09	0.754	0.264	ECOS2GP221DA
270	30 x 35	1.67	2.34	0.675	0.236	ECOS2GP271DA
330	30 x 40	1.90	2.66	0.553	0.193	ECOS2GP331DA
390	30 x 45	2.13	2.98	0.468	0.164	ECOS2GP391DA
150	35 x 20	0.60	0.84	1.326	0.464	ECOS2GP151EL
270	35 x 30	1.67	2.34	0.675	0.236	ECOS2GP271EA
330	35 x 30	1.90	2.66	0.553	0.193	ECOS2GP331EX
330	35 x 35	1.90	2.66	0.553	0.193	ECOS2GP331EA
390	35 x 35	2.13	2.98	0.468	0.164	ECOS2GP391EX
390	35 x 40	2.13	2.98	0.468	0.164	ECOS2GP391EA
470	35 x 40	2.39	3.35	0.388	0.136	ECOS2GP471EX
470	35 x 45	2.39	3.35	0.388	0.136	ECOS2GP471EA
560	35 x 45	2.69	3.77	0.326	0.114	ECOS2GP561EX
560	35 x 50	2.69	3.77	0.326	0.114	ECOS2GP561EA
680	35 x 50	3.00	4.20	0.268	0.094	ECOS2GP681EX
560	40 x 40	2.69	3.77	0.326	0.114	ECOS2GP561FA
820	40 x 50	3.38	4.73	0.222	0.078	ECOS2GP821FA
450 VDC Working, 500 VDC Surge						
56	20 x 30	0.70	0.98	2.960	1.184	ECOS2WP560AA
82	20 x 35	0.83	1.16	2.022	0.809	ECOS2WP820AA
33	22 x 20	0.20	0.28	6.028	2.411	ECOS2WP330BL
56	22 x 25	0.70	0.98	2.960	1.184	ECOS2WP560BA
82	22 x 30	0.83	1.16	2.022	0.809	ECOS2WP820BA
100	22 x 35	0.93	1.30	1.658	0.663	ECOS2WP101BA
120	22 x 40	1.04	1.46	1.382	0.553	ECOS2WP121BA
150	22 x 50	1.19	1.67	1.105	0.442	ECOS2WP151BA
47	25 x 20	0.29	0.41	4.233	1.693	ECOS2WP470CL
82	25 x 25	0.83	1.16	2.022	0.809	ECOS2WP820CA
120	25 x 30	1.04	1.46	1.382	0.553	ECOS2WP121CA
150	25 x 40	1.19	1.67	1.105	0.442	ECOS2WP151CA
180	25 x 40	1.35	1.89	0.921	0.368	ECOS2WP181CX
180	25 x 45	1.35	1.89	0.921	0.368	ECOS2WP181CA
220	25 x 45	1.55	2.17	0.754	0.301	ECOS2WP221CX
220	25 x 50	1.55	2.17	0.754	0.301	ECOS2WP221CA
68	30 x 20	0.38	0.53	2.926	1.170	ECOS2WP680DL
120	30 x 25	1.04	1.46	1.382	0.553	ECOS2WP121DA
150	30 x 30	1.19	1.67	1.105	0.442	ECOS2WP151DA
180	30 x 30	1.35	1.89	0.921	0.368	ECOS2WP181DX
180	30 x 35	1.35	1.89	0.921	0.368	ECOS2WP181DA
220	30 x 35	1.55	2.17	0.754	0.301	ECOS2WP221DX
220	30 x 40	1.55	2.17	0.754	0.301	ECOS2WP221DA
270	30 x 45	1.78	2.49	0.675	0.270	ECOS2WP271DA
330	30 x 50	2.01	2.81	0.553	0.249	ECOS2WP331DA
100	35 x 20	0.52	0.73	1.989	0.796	ECOS2WP101EL
180	35 x 25	1.35	1.89	0.921	0.368	ECOS2WP181EA
220	35 x 30	1.55	2.17	0.754	0.301	ECOS2WP221EA
270	35 x 30	1.78	2.49	0.614	0.246	ECOS2WP271EX
270	35 x 35	1.78	2.49	0.675	0.270	ECOS2WP271EA
330	35 x 35	2.01	2.81	0.553	0.221	ECOS2WP331EX
330	35 x 40	2.01	2.81	0.553	0.249	ECOS2WP331EA
390	35 x 45	2.24	3.14	0.510	0.255	ECOS2WP391EA
470	35 x 45	2.53	3.54	0.423	0.233	ECOS2WP471EX
470	35 x 50	2.53	3.54	0.423	0.233	ECOS2WP471EA
470	40 x 40	2.53	3.54	0.423	0.233	ECOS2WP471FA
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

E C Common Code/ Terminal Type	Voltage Code	A Series	Capacitance Code	Case Diameter	Top Vinyl Plate
ECOS 6.3mm Length Terminal (Standard)			A 20mm		25 ~ 50mm lengths
ECEC 4mm Length "Short" Terminal			B 22mm		A With Plate
(See page 7)			C 25mm		B Without plate
			D 30mm		20mm length
			E 35mm		L With Plate
			F 40mm		G Without plate

TS-HA Standard Ratings (continued)

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	20kHz	Panasonic Part Number
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
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
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	ECOS1VA223FA
27000	40 x 50	5.44	6.26	0.020	0.015	ECOS1VA273FA
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
1000	25 x 20	1.20	1.38	0.315	0.236	ECOS1JA102CL
1800	25 x 25	1.70	1.96	0.157	0.117	ECOS1JA182CA
2200	25 x 30	2.00	2.30	0.128	0.096	ECOS1JA222CA
2700	25 x 35	2.20	2.53	0.104	0.078	ECOS1JA272CA
3300	25 x 40	2.50	2.88	0.090	0.068	ECOS1JA332CA
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
3300	35 x 25	2.50	2.88	0.090	0.068	ECOS1JA332EA
3900	35 x 30	2.70	3.11	0.077	0.057	ECOS1JA392EA
4700	35 x 30	3.00	3.45	0.063	0.048	ECOS1JA472EA
5600	35 x 35	3.30	3.80	0.053	0.040	ECOS1JA562EA
6800	35 x 40	3.60	4.14	0.049	0.037	ECOS1JA682EA
8200	35 x 45	3.90	4.49	0.040	0.030	ECOS1JA822EA
10000	35 x 50	4.40	5.06	0.033	0.028	ECOS1JA103EA
12000	40 x 40	4.52	5.20	0.030	0.026	ECOS1JA123FA
15000	40 x 50	4.80	5.52	0.027	0.023	ECOS1JA153FA

TS-HA Standard Ratings (continued)

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
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
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 30	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
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
820	25 x 40	2.00	2.80	0.263	0.118	ECOS2CA821CA
1000	25 x 45	2.20	3.08	0.216	0.108	ECOS2CA102CA
1200	25 x 50	2.30	3.22	0.180	0.090	ECOS2CA122CA
330	30 x 20	1.00	1.40	0.553	0.249	ECOS2CA331DL
560	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
820	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
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	30 x 20	0.87	1.22	0.904	0.407	ECOS2DA221DL
390	30 x 25	1.30	1.82	0.425	0.191	ECOS2DA391DA
470	30 x 25	1.40	1.96	0.353	0.159	ECOS2DA471DA
560	30 x 30	1.50	2.10	0.296	0.133	ECOS2DA561DA
680	30 x 30	1.70	2.38	0.244	0.110	ECOS2DA681DA
820	30 x 35	2.00	2.80	0.222	0.111	ECOS2DA821DA
1000	30 x 45	2.20	3.08	0.199	0.099	ECOS2DA102DA
1200	30 x 50	2.30	3.22	0.166	0.083	ECOS2DA122DA
330	35 x 20	1.10	1.54	0.603	0.271	ECOS2DA331EL
820	35 x 30	2.00	2.80	0.222	0.111	ECOS2DA821EA
1000	35 x 35	2.20	3.08	0.199	0.099	ECOS2DA102EA
1200	35 x 40	2.30	3.22	0.166	0.083	ECOS2DA122EA
1500	35 x 50	2.50	3.50	0.144	0.072	ECOS2DA152EA

TS-HA Standard Ratings (continued)

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	20k Hz	Panasonic Part Number
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
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
385 VDC Working, 435 VDC Surge						
56	20 x 30	0.51	0.71	2.368	0.829	ECOS2TA560AA
68	20 x 35	0.56	0.78	1.950	0.683	ECOS2TA680AA
82	20 x 40	0.64	0.90	1.617	0.566	ECOS2TA820AA
33	22 x 20	0.20	0.28	5.024	1.758	ECOS2TA330BL
56	22 x 25	0.51	0.71	2.368	0.829	ECOS2TA560BA
68	22 x 30	0.56	0.78	1.950	0.683	ECOS2TA680BA
82	22 x 35	0.64	0.90	1.617	0.566	ECOS2TA820BA
100	22 x 35	0.69	0.97	1.326	0.464	ECOS2TA101BA
120	22 x 35	0.75	1.05	1.105	0.387	ECOS2TA121BA
150	22 x 50	0.82	1.15	0.884	0.309	ECOS2TA151BA
47	25 x 20	0.25	0.35	3.527	1.235	ECOS2TA470CL
68	25 x 25	0.56	0.78	1.950	0.683	ECOS2TA680CA
82	25 x 25	0.64	0.90	1.617	0.566	ECOS2TA820CA
100	25 x 30	0.69	0.97	1.326	0.464	ECOS2TA101CA
120	25 x 30	0.75	1.05	1.105	0.387	ECOS2TA121CA
150	25 x 40	0.82	1.15	0.884	0.309	ECOS2TA151CA
180	25 x 45	0.95	1.33	0.737	0.258	ECOS2TA181CA
220	25 x 50	1.10	1.54	0.603	0.211	ECOS2TA221CA
68	30 x 20	0.35	0.49	2.438	0.853	ECOS2TA680DL
150	30 x 30	0.82	1.15	0.884	0.309	ECOS2TA151DA
180	30 x 35	0.95	1.33	0.737	0.258	ECOS2TA181DA
220	30 x 40	1.10	1.54	0.603	0.211	ECOS2TA221DA
270	30 x 45	1.20	1.68	0.491	0.172	ECOS2TA271DA
330	30 x 50	1.35	1.89	0.402	0.161	ECOS2TA331DA
100	35 x 20	0.47	0.66	1.658	0.580	ECOS2TA101EL
180	35 x 25	0.95	1.33	0.737	0.258	ECOS2TA181EA
220	35 x 30	1.10	1.54	0.603	0.211	ECOS2TA221EA
270	35 x 35	1.20	1.68	0.491	0.172	ECOS2TA271EA
330	35 x 40	1.35	1.89	0.402	0.161	ECOS2TA331EA
390	35 x 45	1.55	2.17	0.340	0.136	ECOS2TA391EA
470	35 x 50	1.75	2.45	0.282	0.127	ECOS2TA471EA
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]:	160 ~ 450
	Max. D.F. (%):	15
Endurance:	3000 hours at +105°C with maximum specified ripple current (see page 4)	

Part Number System

E C 	 	B	 	 	
Common Code/ Terminal Type	Voltage Code	Series	Capacitance Code	Case Diameter	Top Vinyl Plate
ECOS 6.3mm Length Terminal (Standard)				A 20mm	A With Plate
ECEC 4.0mm Length "Short" Terminal				B 22mm	B Without plate
(See page 7)				C 25mm	
				D 30mm	
				E 35mm	
				F 40mm	

TS-HB Standard Ratings

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz	10k-50kHz	20°C ESR (Ω, max.) 120Hz	20kHz	Panasonic Part Number
160 VDC Working, 200 VDC Surge						
470	22 x 30	1.40	1.96	0.423	0.190	ECOS2CB471BA
560	22 x 35	1.50	2.10	0.355	0.160	ECOS2CB561BA
680	22 x 40	1.70	2.38	0.293	0.132	ECOS2CB681BA
820	22 x 45	2.00	2.80	0.243	0.109	ECOS2CB821BA
1000	22 x 50	2.20	3.08	0.199	0.090	ECOS2CB102BA
680	25 x 30	1.70	2.38	0.293	0.132	ECOS2CB681CA
820	25 x 35	2.00	2.80	0.243	0.109	ECOS2CB821CA
1000	25 x 40	2.20	3.08	0.199	0.090	ECOS2CB102CA
1200	25 x 45	2.30	3.22	0.180	0.090	ECOS2CB122CA
1000	30 x 30	2.20	3.08	0.199	0.090	ECOS2CB102DA
1200	30 x 35	2.30	3.22	0.180	0.090	ECOS2CB122DA
1500	30 x 40	2.50	3.50	0.144	0.072	ECOS2CB152DA
1800	30 x 45	2.70	3.78	0.129	0.064	ECOS2CB182DA
1000	35 x 25	2.20	3.08	0.199	0.090	ECOS2CB102EA
1200	35 x 30	2.30	3.22	0.180	0.090	ECOS2CB122EA
1500	35 x 30	2.50	3.50	0.144	0.072	ECOS2CB152EA
1800	35 x 35	2.70	3.78	0.129	0.064	ECOS2CB182EA
2200	35 x 45	2.90	4.06	0.105	0.063	ECOS2CB222EA
2700	35 x 50	3.10	4.34	0.086	0.052	ECOS2CB272EA
2200	40 x 40	2.90	4.06	0.105	0.063	ECOS2CB222FA
3300	40 x 50	3.36	4.70	0.070	0.042	ECOS2CB332FA
200 VDC Working, 250 VDC Surge						
390	22 x 30	1.30	1.82	0.510	0.230	ECOS2DB391BA
470	22 x 35	1.40	1.96	0.423	0.190	ECOS2DB471BA
560	22 x 40	1.50	2.10	0.355	0.160	ECOS2DB561BA
680	22 x 45	1.70	2.38	0.293	0.132	ECOS2DB681BA
390	25 x 25	1.30	1.82	0.510	0.230	ECOS2DB391CA
470	25 x 30	1.40	1.96	0.423	0.190	ECOS2DB471CA
560	25 x 30	1.50	2.10	0.355	0.160	ECOS2DB561CA
680	25 x 35	1.70	2.38	0.293	0.132	ECOS2DB681CA
820	25 x 45	2.00	2.80	0.263	0.118	ECOS2DB821CA
1000	25 x 50	2.20	3.08	0.216	0.108	ECOS2DB102CA
560	30 x 25	1.50	2.10	0.355	0.160	ECOS2DB561DA
820	30 x 30	2.00	2.80	0.263	0.118	ECOS2DB821DA
1000	30 x 35	2.20	3.08	0.216	0.108	ECOS2DB102DA
1200	30 x 40	2.30	3.22	0.193	0.097	ECOS2DB122DA
1500	30 x 50	2.50	3.50	0.155	0.077	ECOS2DB152DA
820	35 x 25	2.00	2.80	0.263	0.118	ECOS2DB821EA
1000	35 x 30	2.20	3.08	0.216	0.108	ECOS2DB102EA
1200	35 x 35	2.30	3.22	0.193	0.097	ECOS2DB122EA
1500	35 x 40	2.50	3.50	0.155	0.077	ECOS2DB152EA
1800	35 x 45	2.70	3.78	0.129	0.077	ECOS2DB182EA
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})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
250 VDC Working, 300 VDC Surge						
180	22 x 25	0.90	1.26	0.921	0.461	ECOS2EB181BA
220	22 x 30	1.00	1.40	0.754	0.377	ECOS2EB221BA
270	22 x 35	1.10	1.54	0.614	0.307	ECOS2EB271BA
330	22 x 40	1.20	1.68	0.502	0.251	ECOS2EB331BA
390	22 x 45	1.30	1.82	0.425	0.213	ECOS2EB391BA
470	22 x 50	1.40	1.96	0.353	0.176	ECOS2EB471BA
330	25 x 30	1.20	1.68	0.502	0.251	ECOS2EB331CA
470	25 x 40	1.40	1.96	0.353	0.176	ECOS2EB471CA
560	25 x 45	1.50	2.10	0.296	0.148	ECOS2EB561CA
680	25 x 50	1.70	2.38	0.244	0.134	ECOS2EB681CA
390	30 x 25	1.30	1.82	0.425	0.213	ECOS2EB391DA
470	30 x 30	1.40	1.96	0.353	0.176	ECOS2EB471DA
680	30 x 40	1.70	2.38	0.244	0.134	ECOS2EB681DA
820	30 x 45	2.00	2.80	0.202	0.111	ECOS2EB821DA
1000	30 x 50	2.20	3.08	0.199	0.109	ECOS2EB102DA
560	35 x 25	1.50	2.10	0.296	0.148	ECOS2EB561EA
680	35 x 30	1.70	2.38	0.244	0.134	ECOS2EB681EA
820	35 x 35	2.00	2.80	0.202	0.111	ECOS2EB821EA
1000	35 x 40	2.20	3.08	0.199	0.109	ECOS2EB102EA
1200	35 x 45	2.30	3.22	0.166	0.099	ECOS2EB122EA
1500	35 x 50	2.50	3.50	0.144	0.093	ECOS2EB152EA
1200	40 x 40	2.66	3.72	0.180	0.117	ECOS2EB122FA
1800	40 x 50	3.25	4.55	0.120	0.078	ECOS2EB182FA
400 VDC Working, 450 VDC Surge						
82	22 x 30	0.64	0.90	2.022	0.708	ECOS2GB820BA
100	22 x 30	0.69	0.97	1.658	0.580	ECOS2GB101BA
120	22 x 35	0.75	1.05	1.382	0.484	ECOS2GB121BA
150	22 x 40	0.82	1.15	1.105	0.387	ECOS2GB151BA
180	22 x 45	0.95	1.33	0.921	0.322	ECOS2GB181BA
100	25 x 25	0.69	0.97	1.658	0.580	ECOS2GB101CA
120	25 x 30	0.75	1.05	1.382	0.484	ECOS2GB121CA
150	25 x 30	0.82	1.15	1.105	0.387	ECOS2GB151CA
180	25 x 35	0.95	1.33	0.921	0.322	ECOS2GB181CA
220	25 x 45	1.10	1.54	0.754	0.264	ECOS2GB221CA
270	25 x 50	1.20	1.68	0.614	0.215	ECOS2GB271CA
150	30 x 25	0.82	1.15	1.105	0.387	ECOS2GB151DA
180	30 x 30	0.95	1.33	0.921	0.322	ECOS2GB181DA
220	30 x 30	1.10	1.54	0.754	0.264	ECOS2GB221DA
270	30 x 35	1.20	1.68	0.614	0.215	ECOS2GB271DA
330	30 x 45	1.35	1.89	0.502	0.201	ECOS2GB331DA
390	30 x 50	1.55	2.17	0.425	0.170	ECOS2GB391DA
220	35 x 25	1.10	1.54	0.754	0.264	ECOS2GB221EA
270	35 x 30	1.20	1.68	0.614	0.215	ECOS2GB271EA
330	35 x 35	1.35	1.89	0.502	0.201	ECOS2GB331EA
390	35 x 40	1.55	2.17	0.425	0.170	ECOS2GB391EA
470	35 x 45	1.75	2.45	0.353	0.141	ECOS2GB471EA
560	35 x 50	1.80	2.52	0.296	0.118	ECOS2GB561EA
470	40 x 40	1.75	2.45	0.353	0.141	ECOS2GB471FA
680	40 x 50	2.10	2.94	0.244	0.098	ECOS2GB681FA
385 VDC Working, 435 VDC Surge						
82	22 x 30	0.64	0.90	2.022	0.809	ECOS2TB820BA
100	22 x 30	0.69	0.97	1.658	0.663	ECOS2TB101BA
120	22 x 35	0.75	1.05	1.382	0.553	ECOS2TB121BA
150	22 x 40	0.82	1.15	1.105	0.442	ECOS2TB151BA
180	22 x 45	0.95	1.33	0.921	0.368	ECOS2TB181BA
100	25 x 25	0.69	0.97	1.658	0.663	ECOS2TB101CA
120	25 x 30	0.75	1.05	1.382	0.553	ECOS2TB121CA
150	25 x 30	0.82	1.15	1.105	0.442	ECOS2TB151CA
180	25 x 35	0.95	1.33	0.921	0.368	ECOS2TB181CA
220	25 x 45	1.10	1.54	0.754	0.301	ECOS2TB221CA
270	25 x 50	1.20	1.68	0.675	0.270	ECOS2TB271CA
150	30 x 25	0.82	1.15	1.105	0.442	ECOS2TB151DA
180	30 x 30	0.95	1.33	0.921	0.368	ECOS2TB181DA
220	30 x 30	1.10	1.54	0.829	0.332	ECOS2TB221DA
330	30 x 45	1.35	1.89	0.553	0.221	ECOS2TB331DA
390	30 x 50	1.55	2.17	0.510	0.204	ECOS2TB391DA
220	35 x 25	1.10	1.54	0.829	0.332	ECOS2TB221EA
270	35 x 30	1.20	1.68	0.675	0.270	ECOS2TB271EA
330	35 x 35	1.35	1.89	0.553	0.221	ECOS2TB331EA
470	35 x 45	1.75	2.45	0.423	0.212	ECOS2TB471EA
560	35 x 50	1.80	2.52	0.355	0.178	ECOS2TB561EA
470	40 x 40	1.75	2.45	0.423	0.212	ECOS2TB471FA
680	40 x 50	2.10	2.94	0.293	0.146	ECOS2TB681FA
450 VDC Working, 500 VDC Surge						
82	22 x 30	0.56	0.78	2.022	0.708	ECOS2WB820BA
100	22 x 35	0.64	0.90	1.658	0.580	ECOS2WB101BA
120	22 x 40	0.72	1.01	1.382	0.484	ECOS2WB121BA
150	22 x 50	0.79	1.11	1.105	0.387	ECOS2WB151BA
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	ECOS2WB101CA
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	ECOS2WB151CA
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	ECOS2WB221CA
120	30 x 25	0.72	1.01	1.382	0.484	ECOS2WB121DA
150	30 x 30	0.79	1.11	1.105	0.387	ECOS2WB151DA
180	30 x 35	0.87	1.22	0.921	0.322	ECOS2WB181DA
220	30 x 40	1.00	1.40	0.754	0.264	ECOS2WB221DA
270	30 x 45	1.19	1.67	0.614	0.215	ECOS2WB271DA
330	30 x 50	1.38	1.93	0.502	0.176	ECOS2WB331DA
150	35 x 25	0.79	1.11	1.105	0.387	ECOS2WB151EA
220	35 x 30	1.00	1.40	0.754	0.264	ECOS2WB221EA
270	35 x 35	1.19	1.67	0.614	0.215	ECOS2WB271EA
330	35 x 40	1.38	1.93	0.502	0.176	ECOS2WB331EA
390	35 x 45	1.55	2.17	0.425	0.149	ECOS2WB391EA
470	35 x 50	1.74	2.44	0.353	0.123	ECOS2WB471EA
390	40 x 40	1.68	2.35	0.425	0.170	ECOS2WB391FA
560	40 x 50	2.17	3.04	0.296	0.118	ECOS2WB561FA

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

E E T
Common Code/
Terminal Type

X B
Series
Code

□ □
Voltage

□ □ □
Capacitance
Code

□ □
Case Dia. /
Terminal

Case Dia.	Terminal Length	
	6.3mm	4.0mm
22mm	B	H
25mm	C	J
30mm	D	K
35mm	E	L

Top Vinyl Plate

A	With plate
B	Without plate

TS-XB Standard Ratings

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz	10k-50kHz	20°C ESR (Ω, max.) 120Hz	20kHz	Panasonic Part Number
160 VDC Working, 200 VDC Surge						
270	22 x 25	1.10	1.54	0.655	0.295	EETXB2C271B□
330	22 x 30	1.20	1.68	0.536	0.241	EETXB2C331B□
390	22 x 30	1.30	1.82	0.453	0.204	EETXB2C391B□
470	22 x 35	1.40	1.96	0.376	0.169	EETXB2C471B□
560	22 x 40	1.50	2.10	0.316	0.142	EETXB2C561B□
680	22 x 45	1.70	2.38	0.260	0.117	EETXB2C681B□
390	25 x 25	1.30	1.82	0.453	0.204	EETXB2C391C□
470	25 x 30	1.40	1.96	0.376	0.169	EETXB2C471C□
560	25 x 30	1.50	2.10	0.316	0.142	EETXB2C561C□
680	25 x 35	1.70	2.38	0.260	0.117	EETXB2C681C□
820	25 x 40	2.00	2.80	0.216	0.097	EETXB2C821C□
1000	25 x 45	2.20	3.08	0.177	0.080	EETXB2C102C□
1200	25 x 50	2.30	3.22	0.160	0.080	EETXB2C122C□
560	30 x 25	1.50	2.10	0.316	0.142	EETXB2C561D□
680	30 x 30	1.70	2.38	0.260	0.117	EETXB2C681D□
820	30 x 30	2.00	2.80	0.216	0.097	EETXB2C821D□
1000	30 x 35	2.20	3.08	0.177	0.080	EETXB2C102D□
1200	30 x 40	2.30	3.22	0.160	0.080	EETXB2C122D□
1500	30 x 45	2.50	3.50	0.128	0.064	EETXB2C152D□
1800	30 x 50	2.70	3.78	0.115	0.057	EETXB2C182D□
1200	35 x 35	2.30	3.22	0.160	0.080	EETXB2C122E□
1500	35 x 35	2.50	3.50	0.128	0.064	EETXB2C152E□
1800	35 x 40	2.70	3.78	0.115	0.057	EETXB2C182E□
2200	35 x 50	2.90	4.06	0.094	0.056	EETXB2C222E□
180 VDC Working, 225 VDC Surge						
220	22 x 25	1.00	1.40	0.804	0.36	EETXB2P221B□
270	22 x 25	1.10	1.54	0.655	0.29	EETXB2P271B□
330	22 x 30	1.20	1.68	0.536	0.24	EETXB2P331B□
390	22 x 30	1.30	1.82	0.453	0.20	EETXB2P391B□
470	22 x 35	1.40	1.96	0.376	0.17	EETXB2P471B□
560	22 x 40	1.50	2.10	0.316	0.14	EETXB2P561B□
680	22 x 50	1.70	2.38	0.260	0.12	EETXB2P681B□
330	25 x 25	1.20	1.68	0.536	0.24	EETXB2P331C□
390	25 x 25	1.30	1.82	0.453	0.20	EETXB2P391C□
470	25 x 30	1.40	1.96	0.376	0.17	EETXB2P471C□
560	25 x 35	1.50	2.10	0.316	0.14	EETXB2P561C□
680	25 x 40	1.70	2.38	0.260	0.12	EETXB2P681C□
820	25 x 45	2.00	2.80	0.216	0.10	EETXB2P821C□
470	30 x 25	1.40	1.96	0.376	0.17	EETXB2P471D□
560	30 x 25	1.50	2.10	0.316	0.14	EETXB2P561D□
680	30 x 30	1.70	2.38	0.260	0.12	EETXB2P681D□
820	30 x 35	2.00	2.80	0.234	0.11	EETXB2P821D□
1000	30 x 40	2.20	3.08	0.192	0.10	EETXB2P102D□
1200	30 x 45	2.30	3.22	0.160	0.08	EETXB2P122D□
1500	30 x 50	2.50	3.50	0.138	0.07	EETXB2P152D□
820	35 x 30	2.00	2.80	0.234	0.11	EETXB2P821E□
1000	35 x 30	2.20	3.08	0.192	0.10	EETXB2P102E□
1200	35 x 35	2.30	3.22	0.172	0.09	EETXB2P122E□
1500	35 x 40	2.50	3.50	0.138	0.07	EETXB2P152E□
1800	35 x 45	2.70	3.78	0.115	0.07	EETXB2P182E□
2200	35 x 50	2.90	4.06	0.094	0.06	EETXB2P222E□

TS-XB Standard Ratings (continued)

Cap. (μ F)	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	
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	0.147	0.09	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})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz	
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	EETXB2G680C□
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□

Cap. (μ F)	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	
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	EETXB2W820D□
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□

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

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

Common Code/Terminal Type

Voltage Code

Series

Capacitance Code

Case Diameter

Overvoltage Temperature

ECOS	6.3mm length terminal (Standard)
ECFC	4.0mm length terminal

X	Condition A (70°C)
K	Condition B (35°C)

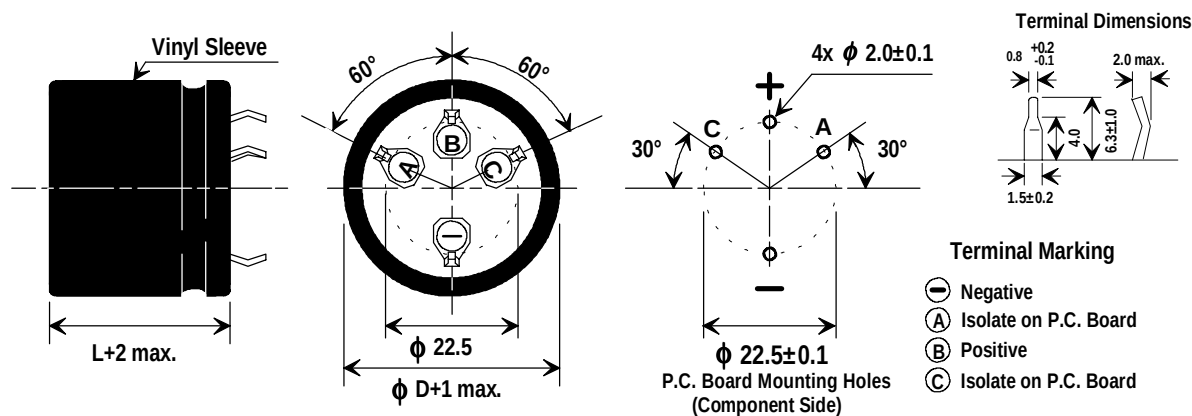
Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz 10k-50kHz		Max 20°C ESR (Ω) 120Hz 20kHz		Panasonic Part Number
250 VDC Working, Condition A (70°C)						
100	22 x 25	0.70	0.98	1.768	0.884	ECOS2EG101DX
120	22 x 30	0.75	1.05	1.474	0.737	ECOS2EG121EX
150	22 x 30	0.80	1.12	1.179	0.589	ECOS2EG151EX
180	22 x 35	0.90	1.26	0.982	0.491	ECOS2EG181FX
220	22 x 40	1.00	1.40	0.804	0.402	ECOS2EG221GX
270	22 x 45	1.10	1.54	0.655	0.327	ECOS2EG271GX
330	22 x 50	1.20	1.68	0.536	0.268	ECOS2EG331HX
150	25 x 25	0.80	1.12	1.179	0.589	ECOS2EG151JX
180	25 x 30	0.90	1.26	0.982	0.491	ECOS2EG181KX
220	25 x 30	1.00	1.40	0.804	0.402	ECOS2EG221KX
270	25 x 35	1.10	1.54	0.655	0.327	ECOS2EG271LX
330	25 x 40	1.20	1.68	0.536	0.268	ECOS2EG331MX
390	25 x 45	1.30	1.82	0.453	0.227	ECOS2EG391MX
470	25 x 50	1.40	1.96	0.376	0.188	ECOS2EG471NX
220	30 x 25	1.00	1.40	0.804	0.402	ECOS2EG221QX
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	ECOS2EG331RX
390	30 x 35	1.30	1.82	0.453	0.227	ECOS2EG391SX
470	30 x 40	1.40	1.96	0.376	0.188	ECOS2EG471TX
560	30 x 45	1.50	2.10	0.316	0.158	ECOS2EG561TX
680	30 x 50	1.70	2.38	0.260	0.130	ECOS2EG681UX
330	35 x 25	1.20	1.68	0.536	0.268	ECOS2EG331WX
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	ECOS2EG471YX
560	35 x 35	1.50	2.10	0.316	0.158	ECOS2EG561VX
680	35 x 40	1.70	2.38	0.260	0.130	ECOS2EG681YX
820	35 x 45	2.00	2.80	0.252	0.126	ECOS2EG821YX
1000	35 x 50	2.20	3.08	0.206	0.103	ECOS2EG102ZX

Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120Hz 10k-50kHz		Max 20°C ESR (Ω) 120Hz 20kHz		Panasonic Part Number
250 VDC Working, Condition B (35°C)						
120	22 x 25	0.75	1.05	1.474	0.737	ECOS2EG121DK
150	22 x 30	0.80	1.12	1.179	0.589	ECOS2EG151EK
180	22 x 30	0.90	1.26	0.982	0.491	ECOS2EG181EK
220	22 x 35	1.00	1.40	0.804	0.402	ECOS2EG221FK
270	22 x 40	1.10	1.54	0.655	0.327	ECOS2EG271GK
330	22 x 45	1.20	1.68	0.536	0.268	ECOS2EG331GK
390	22 x 50	1.30	1.82	0.453	0.227	ECOS2EG391HK
180	25 x 25	0.90	1.26	0.982	0.491	ECOS2EG181JK
220	25 x 30	1.00	1.40	0.804	0.402	ECOS2EG221KK
270	25 x 30	1.10	1.54	0.655	0.327	ECOS2EG271KK
330	25 x 35	1.20	1.68	0.536	0.268	ECOS2EG331LK
390	25 x 40	1.30	1.82	0.453	0.227	ECOS2EG391MK
470	25 x 45	1.40	1.96	0.376	0.188	ECOS2EG471NK
560	25 x 50	1.50	2.10	0.316	0.158	ECOS2EG561NK
270	30 x 25	1.10	1.54	0.655	0.327	ECOS2EG271QK
330	30 x 30	1.20	1.68	0.536	0.268	ECOS2EG331RK
390	30 x 30	1.30	1.82	0.453	0.227	ECOS2EG391RK
470	30 x 35	1.40	1.96	0.376	0.188	ECOS2EG471SK
560	30 x 40	1.50	2.10	0.316	0.158	ECOS2EG561TK
680	30 x 45	1.70	2.38	0.260	0.130	ECOS2EG681TK
820	30 x 50	2.00	2.80	0.216	0.108	ECOS2EG821UK
390						

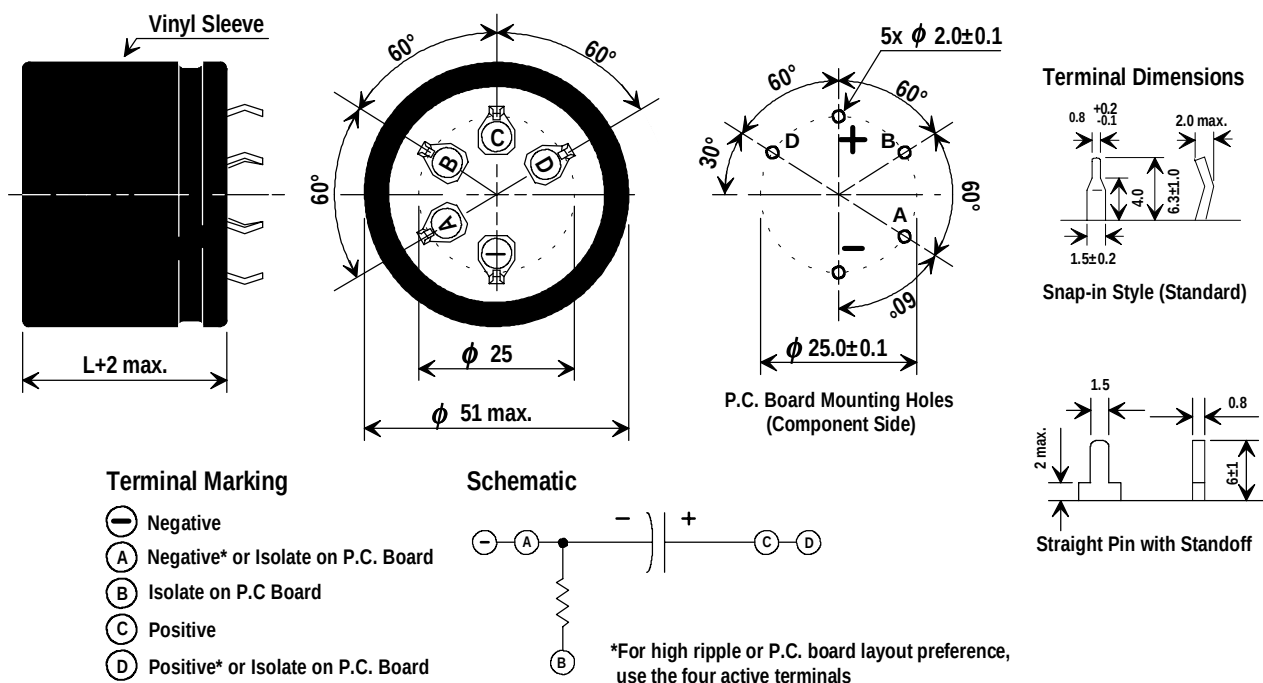
T Type General Information

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 (±20% tolerance)	220 ~ 2700μF (±20% tolerance)
Endurance:	3000 hours at +85°C with maximum specified ripple current (see page 4)	

Part Number System

E	C	E			P					A
T Type Common Code / Number of Terminals				Voltage Code	Series	Capacitance Code			Diameter Code	Terminal Shape (see pg.23)
ECET	4 terminal φ35 & 40mm dia.									A Snap-in (Standard)
ECEP	5 terminal φ 50mm dia.									E Straight pin with standoff (Available on φ50mm dia.)

T-UP Standard Ratings

Cap. (μF)	Size (mm) D x L	Max 85°C R.C. (A _{rms}) 120 Hz	Max 85°C R.C. (A _{rms}) 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 85°C R.C. (A _{rms}) 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							25 VDC Working, 32 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							50 VDC Working, 63 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

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. (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
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 (±20% tolerance)	330 ~ 2200μF (±20% tolerance)
Endurance:	3000 hours at +105°C with maximum specified ripple current (see page 4)	

Part Number System

E C E			A			A
T Type Common Code / Number of Terminals		Voltage Code	Series	Capacitance Code	Diameter Code	Terminal Shape (see pg.23)
ECET	4 terminal (φ 35 & 40mm dia.)					A Snap-in (Standard)
ECEP	5 terminal (φ 50mm dia.)					E Straight pin with standoff (available on φ 50mm dia.)

T-HA Standard Ratings

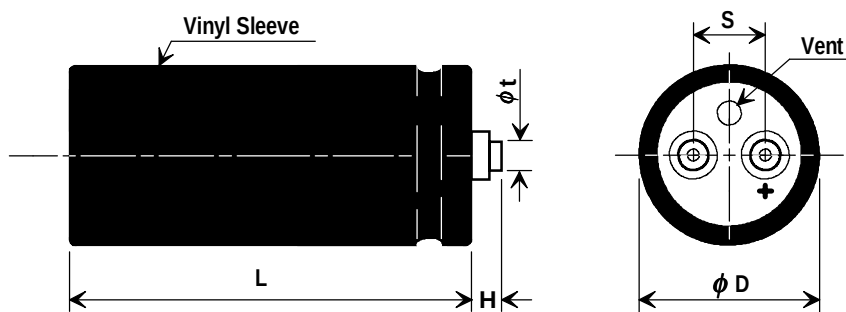
Cap. (μF)	Size (mm) D x L	Max 105°C R.C. (A _{rms}) 120 Hz	Max 20°C ESR (Ω) 10k-50kHz	Max 20°C ESR (Ω) 120Hz	Max 20°C ESR (Ω) 20kHz	Panasonic Part Number
16 VDC Working, 20 VDC Surge						
39000	35 x 40	5.10	5.87	0.022	0.020	ECET1CA393EA
56000	35 x 50	6.00	6.90	0.019	0.017	ECET1CA563EA
68000	35 x 63	6.62	7.61	0.017	0.015	ECET1CA683EA
100000	35 x 80	8.03	9.23	0.015	0.013	ECET1CA104EA
120000	35 x 105	8.71	10.02	0.014	0.012	ECET1CA124EA
47000	40 x 40	5.50	6.33	0.020	0.018	ECET1CA473FA
68000	40 x 50	7.29	8.38	0.015	0.014	ECET1CA683FA
82000	40 x 63	7.66	8.81	0.017	0.015	ECET1CA823FA
120000	40 x 80	8.79	10.11	0.014	0.012	ECET1CA124FA
150000	40 x 105	9.88	11.36	0.013	0.012	ECET1CA154FA
120000	50 x 50	9.02	10.37	0.015	0.014	ECEP1CA124HA
150000	50 x 63	10.15	11.67	0.014	0.013	ECEP1CA154HA
180000	50 x 80	11.02	12.67	0.013	0.012	ECEP1CA184HA
220000	50 x 92	11.71	13.47	0.012	0.011	ECEP1CA224HA
250000	50 x 105	12.31	14.16	0.011	0.010	ECEP1CA254HA
25 VDC Working, 32 VDC Surge						
27000	35 x 40	4.80	5.52	0.018	0.017	ECET1EA273EA
33000	35 x 50	5.50	6.33	0.018	0.016	ECET1EA333EA
47000	35 x 63	6.56	7.54	0.017	0.015	ECET1EA473EA
56000	35 x 80	7.25	8.34	0.015	0.013	ECET1EA563EA
82000	35 x 105	8.58	9.87	0.013	0.012	ECET1EA823EA
33000	40 x 40	5.50	6.33	0.018	0.016	ECET1EA333FA
47000	40 x 50	6.47	7.44	0.015	0.014	ECET1EA473FA
56000	40 x 63	7.17	8.25	0.014	0.013	ECET1EA563FA
82000	40 x 80	8.68	9.98	0.013	0.012	ECET1EA823FA
100000	40 x 105	9.76	11.22	0.012	0.010	ECET1EA104FA
82000	50 x 50	9.20	10.58	0.016	0.015	ECEP1EA823HA
100000	50 x 63	10.02	11.52	0.015	0.013	ECEP1EA104HA
120000	50 x 80	10.93	12.57	0.013	0.012	ECEP1EA124HA
150000	50 x 92	11.70	13.46	0.012	0.011	ECEP1EA154HA
180000	50 x 105	12.42	14.28	0.010	0.009	ECEP1EA184HA
35 VDC Working, 44 VDC Surge						
18000	35 x 40	4.30	4.95	0.028	0.021	ECET1VA183EA
22000	35 x 50	5.00	5.75	0.023	0.017	ECET1VA223EA
27000	35 x 63	5.53	6.36	0.025	0.018	ECET1VA273EA
39000	35 x 80	6.52	7.50	0.019	0.014	ECET1VA393EA
47000	35 x 105	8.07	9.28	0.017	0.013	ECET1VA473EA
22000	40 x 40	5.00	5.75	0.023	0.017	ECET1VA223FA
27000	40 x 50	5.44	6.26	0.020	0.015	ECET1VA273FA
33000	40 x 63	6.61	7.60	0.019	0.014	ECET1VA333FA
47000	40 x 80	7.79	8.96	0.018	0.013	ECET1VA473FA
68000	40 x 105	9.27	10.66	0.016	0.012	ECET1VA683FA
47000	50 x 50	8.25	9.49	0.021	0.016	ECEP1VA473HA
56000	50 x 63	9.07	10.43	0.019	0.014	ECEP1VA563HA
68000	50 x 80	10.07	11.58	0.017	0.013	ECEP1VA683HA
82000	50 x 92	10.89	12.52	0.015	0.011	ECEP1VA823HA
100000	50 x 105	11.75	13.51	0.013	0.010	ECEP1VA104HA
50 VDC Working, 63 VDC Surge						
10000	35 x 40	4.00	4.60	0.033	0.025	ECET1HA103EA
15000	35 x 50	4.80	5.52	0.022	0.018	ECET1HA153EA
18000	35 x 63	5.27	6.06	0.020	0.016	ECET1HA183EA
27000	35 x 80	6.16	7.08	0.015	0.012	ECET1HA273EA
33000	35 x 105	7.23	8.31	0.013	0.010	ECET1HA333EA
15000	40 x 40	4.80	5.52	0.022	0.018	ECET1HA153FA
22000	40 x 50	5.15	5.92	0.016	0.013	ECET1HA223FA
27000	40 x 63	6.05	6.96	0.015	0.012	ECET1HA273FA
39000	40 x 80	7.55	8.68	0.014	0.011	ECET1HA393FA
47000	40 x 105	8.18	9.41	0.012	0.010	ECET1HA473FA
33000	50 x 50	7.75	8.91	0.018	0.014	ECEP1HA333HA
39000	50 x 63	8.40	9.66	0.016	0.013	ECEP1HA393HA
47000	50 x 80	9.19	10.57	0.014	0.011	ECEP1HA473HA
56000	50 x 92	9.79	11.26	0.012	0.009	ECEP1HA563HA
68000	50 x 105	10.42	11.98	0.011	0.009	ECEP1HA683HA

T-HA Standard Ratings (continued)

Cap. (μ F)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120 Hz	Max 105°C R.C. (A_{rms}) 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	ECEP1KA822FA
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	ECEP1KA223HA
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	ECEP2DA222HA
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	ECET2VA681FA
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
400 VDC Working, 450 VDC Surge						
390	35 x 40	1.55	2.17	0.425	0.170	ECET2GA391EA
560	35 x 50	1.80	2.52	0.296	0.118	ECET2GA561EA
820	35 x 63	2.44	3.42	0.202	0.081	ECET2GA821EA
1000	35 x 80	3.00	4.20	0.166	0.066	ECET2GA102EA
1200	35 x 105	3.26	4.56	0.138	0.055	ECET2GA122EA
470	40 x 40	1.75	2.45	0.353	0.141	ECET2GA471FA
680	40 x 50	2.17	3.04	0.244	0.098	ECET2GA681FA
1000	40 x 63	3.00	4.20	0.166	0.066	ECET2GA102FA
1200	40 x 80	3.30	4.62	0.138	0.055	ECET2GA122FA
1500	40 x 105	3.96	5.54	0.111	0.044	ECET2GA152FA
820	50 x 50	2.92	4.09	0.202	0.081	ECEP2GA821HA
1200	50 x 63	3.67	5.14	0.152	0.061	ECEP2GA122HA
1500	50 x 80	4.31	6.03	0.122	0.049	ECEP2GA152HA
1600	50 x 92	4.60	6.44	0.114	0.046	ECEP2GA162HA
1800	50 x 105	5.04	7.06	0.101	0.041	ECEP2GA182HA
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			Terminal Specifications				
		$\phi D \pm 0.79$	$L \pm 1.58$	$S \pm 0.41$	Terminal Code	Thread	Thread Depth	$H \pm 0.79$	$\phi t \pm 0.25$
CA	35 x 41	35.4	42.1	12.7	E	10-32 NF-2B	9.5	6.4	8.0
CC	35 x 54		54.8		L	10-32 NF-2B	5.5	1.6	8.0
CE	35 x 67		67.5		M	M5	9.5	6.4	8.0
CG	35 x 79		80.2		H	1/4-28 NF-2B	11.9	6.4	17.4
CH	35 x 92		92.9		J	1/4-28 NF-2B	8.7	2.8	17.4
CK	35 x 105		105.6		X	M6	11.9	6.4	17.4
CL	35 x 117		118.3		Y	M6	8.7	2.8	17.4
CN	35 x 130		131.0						
CP	35 x 143		143.7						
FB	51 x 48	51.3	48.4	21.9					
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	64.0	80.2	28.6					
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	76.7	80.2	31.8					
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	Nominal Diameter				Max. ripple current (A)
	35mm	51mm	64mm	76mm	
E	S	S	S	S	30
L	O	O	O	O	
M	O	O	O	O	
H	N.A.	N.A.	O	O	50
J	N.A.	N.A.	O	O	
X	N.A.	N.A.	O	O	
Y	N.A.	N.A.	O	O	

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	≤45°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.

- | | |
|------------------------|--|
| 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) |

Common Code Series Code Voltage Code Capacitance Code Case Size Code Terminal Code
(see pg.29)

Capacitor Typical Ratings							Capacitor Typical Ratings						
Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A _{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
16 VDC Working, 20 VDC Surge							20 VDC Working, 24 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	0.0122	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	EEGAA1C104CF□	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					

G-AA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
25 VDC Working, 32 VDC Surge							35 VDC Working, 44 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	EEGAA1E124GH□	82000	51 x 92	13.12	15.09	0.0075	0.0064	EEGAA1V823GH□
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							63 VDC Working, 79 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	EEGAA1J134HL□
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□

G-AA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
80 VDC Working, 100 VDC Surge							100 VDC Working, 125 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	EEGAA2A123CN□
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	EEGAA2A4823FH□
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							250 VDC Working, 300 VDC Surge						
820	35 x 41	2.69	3.77	0.270	0.202	EEGAA2D821CA□	560	35 x 41	2.40	3.36	0.395	0.296	EEGAA2E561CA□
1200	35 x 54	3.41	4.77	0.184	0.138	EEGAA2D122CC□	820	35 x 54	3.05	4.27	0.270	0.202	EEGAA2E821CC□
1500	35 x 67	4.05	5.67	0.147	0.111	EEGAA2D152CE□	1200	35 x 67	3.92	5.49	0.184	0.138	EEGAA2E122CE□
1800	35 x 79	4.65	6.51	0.123	0.092	EEGAA2D182CG□	1500	35 x 79	4.58	6.41	0.147	0.111	EEGAA2E152CG□
2200	35 x 92	5.35	7.49	0.100	0.075	EEGAA2D222CH□	1800	35 x 92	5.23	7.32	0.123	0.092	EEGAA2E182CH□
2700	35 x 105	6.12	8.57	0.082	0.061	EEGAA2D272CK□	2200	35 x 105	5.98	8.37	0.100	0.075	EEGAA2E222CK□
3300	35 x 117	6.98	9.77	0.067	0.050	EEGAA2D332CL□	2500	35 x 117	6.60	9.24	0.088	0.066	EEGAA2E252CL□
3900	35 x 130	7.80	10.92	0.057	0.043	EEGAA2D392CN□	2700	35 x 130	7.07	9.90	0.082	0.061	EEGAA2E272CN□
4700	35 x 143	8.75	12.25	0.047	0.035	EEGAA2D472CP□	3300	35 x 143	8.01	11.21	0.067	0.050	EEGAA2E332CP□
1800	51 x 48	5.16	7.22	0.123	0.092	EEGAA2D182FB□	1500	51 x 48	5.06	7.08	0.147	0.111	EEGAA2E152FB□
2700	51 x 54	6.38	8.93	0.082	0.061	EEGAA2D272FC□	1800	51 x 54	5.63	7.88	0.123	0.092	EEGAA2E182FC□
3300	51 x 67	7.38	10.33	0.067	0.050	EEGAA2D332FE□	2200	51 x 67	6.53	9.14	0.100	0.075	EEGAA2E222FE□
3900	51 x 79	8.32	11.65	0.057	0.043	EEGAA2D392FG□	3300	51 x 79	8.24	11.54	0.067	0.050	EEGAA2E332FG□
5600	51 x 92	10.18	14.25	0.039	0.030	EEGAA2D562FH□	3900	51 x 92	9.25	12.95	0.057	0.043	EEGAA2E392FH□
6200	51 x 105	11.00	15.40	0.036	0.027	EEGAA2D622FK□	4700	51 x 105	10.41	14.57	0.047	0.035	EEGAA2E472FK□
8200	51 x 130	13.21	18.49	0.027	0.020	EEGAA2D822FN□	6800	51 x 130	13.04	18.26	0.033	0.024	EEGAA2E682FN□
10000	51 x 143	14.74	20.64	0.022	0.017	EEGAA2D103FP□	8200	51 x 143	14.52	20.33	0.027	0.020	EEGAA2E822FP□
5600	64 x 79	11.64	16.30	0.039	0.030	EEGAA2D562GG□	5600	64 x 79	12.00	16.80	0.039	0.030	EEGAA2E562GG□
8200	64 x 92	14.21	19.89	0.027	0.020	EEGAA2D822GH□	6800	64 x 92	13.52	18.93	0.033	0.024	EEGAA2E682GH□
10000	64 x 105	15.89	22.25	0.022	0.017	EEGAA2D103GK□	8200	64 x 105	15.08	21.11	0.027	0.020	EEGAA2E822GK□
12000	64 x 117	17.62	24.67	0.018	0.014	EEGAA2D123GL□	10000	64 x 117	16.88	23.63	0.022	0.017	EEGAA2E103GL□
15000	64 x 130	19.71	27.59	0.015	0.011	EEGAA2D153GN□	12000	64 x 130	18.64	26.10	0.018	0.014	EEGAA2E123GN□
17000	64 x 143	21.17	29.64	0.013	0.010	EEGAA2D173GP□	13000	64 x 143	19.71	27.59	0.017	0.013	EEGAA2E133GP□
10000	76 x 79	16.69	23.37	0.022	0.017	EEGAA2D103HG□	8200	76 x 79	15.81	22.13	0.027	0.020	EEGAA2E822HG□
12000	76 x 92	18.52	25.93	0.018	0.014	EEGAA2D123HH□	10000	76 x 92	17.70	24.78	0.022	0.017	EEGAA2E103HH□
15000	76 x 105	20.73	29.02	0.015	0.011	EEGAA2D153HK□	12000	76 x 105	19.56	27.38	0.018	0.014	EEGAA2E123HK□
18000	76 x 117	22.78	31.89	0.012	0.009	EEGAA2D183HL□	15000	76 x 117	21.89	30.65	0.015	0.011	EEGAA2E153HL□
21000	76 x 130	24.62	34.47	0.011	0.008	EEGAA2D213HN□	17000	76 x 130	23.48	32.87	0.013	0.010	EEGAA2E173HN□
22000	76 x 143	25.59	35.83	0.010	0.008	EEGAA2D223HP□	18000	76 x 143	24.52	34.33	0.012	0.009	EEGAA2E183HP□
37000	76 x 219	34.04	47.66	0.008	0.006	EEGAA2D373HW□	27000	76 x 219	31.85	44.59	0.010	0.007	EEGAA2E273HW□

G-AA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 85°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
350 VDC Working, 400 VDC Surge							400 VDC Working, 450 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	EEGAA2G272FN□
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							500 VDC Working, 550 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 SystemCommon Code/
Terminal StyleSeries
CodeVoltage
CodeCapacitance
CodeCase Size
CodeTerminal
Code
(see pg. 29)**G-BA Typical Ratings**

Cap. (μF)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μF)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
10 VDC Working, 13 VDC Surge							16 VDC Working, 20 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})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
25 VDC Working, 32 VDC Surge							35 VDC Working, 44 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□
750000	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							63 VDC Working, 79 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	EEGBA1H333FE□	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□

G-BA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
80 VDC Working, 100 VDC Surge							100 VDC Working, 125 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							250 VDC Working, 300 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□

Aluminum Electrolytic Capacitors

G-BA Typical Ratings (continued)

Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number	Cap. (μ F)	Nominal Size D x L (mm)	Max 105°C R.C. (A_{rms})		20°C ESR (Ω , max.)		Panasonic Part Number
		120Hz	10k-50kHz	120Hz	20kHz				120Hz	10k-50kHz	120Hz	20kHz	
300 VDC Working, 350 VDC Surge							350 VDC Working, 400 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	EEGBA2V682HL□
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							450 VDC Working, 500 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□