

CAPXON

ELECTROLYTIC
CAPACITORS

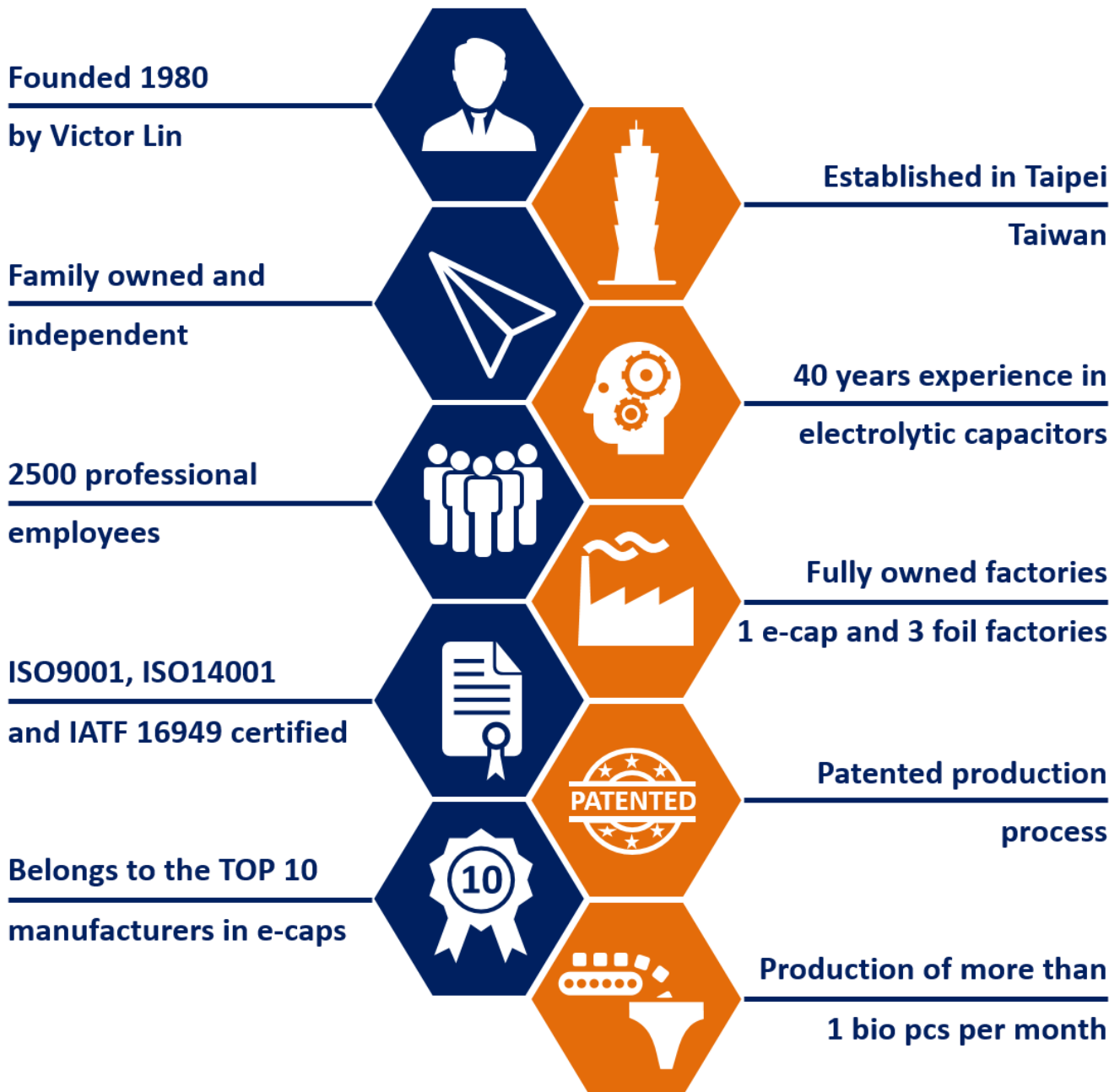
SCREW TYPE CAPACITORS



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10 FACTS ABOUT CAPXON



A WORLD OF ELECTROLYTIC CAPACITORS

CapXon's know-how in Electrolytic Capacitors covers technologies with aluminium foil. These are Aluminum Electrolytics, Solid Conductive Polymers and the combination known as Hybrid Conductive Polymers:

Aluminum Electrolytic	Description	Features
	<p>Rated Voltage • V_R</p> <p>Cathode Material</p> <p>Self-healing of Dielectric</p> <p>Package</p> <p>Stability</p> <p>Lifetime</p> <p>Reliability</p>	<p>4 VDC to 650 VDC</p> <p>Liquid Electrolyte</p> <p>Yes</p> <p>Widest range in all sizes</p> <p>Reduced performance at low temperature</p> <p>Limited life at high temperature</p> <p>Automotive AEC-Q200 qualified</p>
Solid Conductive Polymer	Description	Features
	<p>Rated Voltage • V_R</p> <p>Cathode Material</p> <p>Self-Healing of Dielectric</p> <p>ESR</p> <p>Stability</p> <p>Lifetime</p> <p>Reliability</p>	<p>2.5 VDC to 100 VDC</p> <p>Solid Conductive Polymer</p> <p>No</p> <p>Ultra-low ESR at high frequency</p> <p>Stable for low and high temperature</p> <p>Very stable and long life - no dry out</p> <p>Only internal standard qualification</p>
Hybrid Conductive Polymer	Description	Features
	<p>Rated Voltage • V_R</p> <p>Cathode Material</p> <p>Self-Healing of Dielectric</p> <p>ESR</p> <p>Stability</p> <p>Leakage Current • I_{LEAK}</p> <p>Reliability</p>	<p>16 VDC to 400 VDC</p> <p>Solid Conductive Polymer & Liquid Electrolyte</p> <p>Yes</p> <p>Very low ESR at high frequency</p> <p>Even more stable than liquid type</p> <p>Lower leakage current than Solid Conductive Polymer Type</p> <p>Automotive AEC-Q200 qualified</p>

COMPARISON OF ELECTROLYTIC CAPACITOR TECHNOLOGIES

Characteristics	Aluminum Electrolytic Capacitor	Solid Conductive Polymer Capacitor	Hybrid Conductive Polymer Capacitor
ESR at High Frequency	● (120 ~ 1 000 mΩ)	++ (7 ~ 15 mΩ)	+ (20 ~ 30 mΩ)
Leakage Current · I _{LEAK}	++ (0.01·C _R ·V _R)	● (0.2·C _R ·V _R)	++ (0.01·C _R ·V _R)
Ripple Current · I _R	● (~ 600 mA)	++ (2 000 ~ 7 000 mA)	+ (2 000 ~ 3 000 mA)
Rated Voltage · V _R	++ (~ 700 V)	● (~ 100 V)	+ (~ 400 V)
Operating Temperature Characteristics	+ (-40 ~ + 125 °C)	+ (-55 ~ + 125 °C)	++ (-55 ~ + 150 °C)
Low Temperature Characteristics	● (-40 ~ + 125 °C)	++ (-55 ~ + 125 °C)	+ (-55 ~ + 150 °C)
Lifetime	● (105 °C / 3 000h)	++ (105 °C / 5 000h)	++ (105 °C / 10 000h)
Failure Mode	+ Open	● Short	+ Open

++ ... best performance

+ ... well performance

● ... basic performance

CERTIFICATION ACCORDING TO INTERNATIONAL STANDARDS

Quality, the environment, safety, and conservation of resources are the focus of our daily added value.

To meet the high requirements in the electronics industry, CapXon, as a global company, is certified according to the highest international standards. In this way, we ensure that all procedures and processes in our company are always structured and continuously optimized based on the valid and defined requirements.

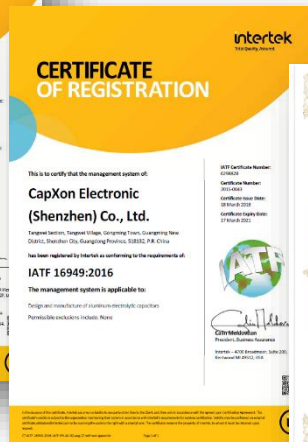
CapXon is certified according to the following standards:



ISO 9001



ISO 14001



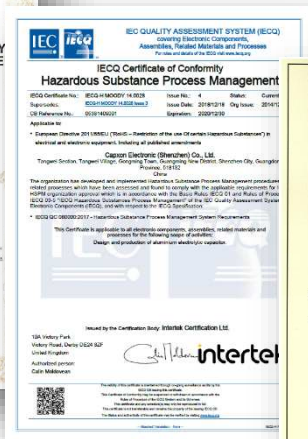
IATF 16949



ISO 50001



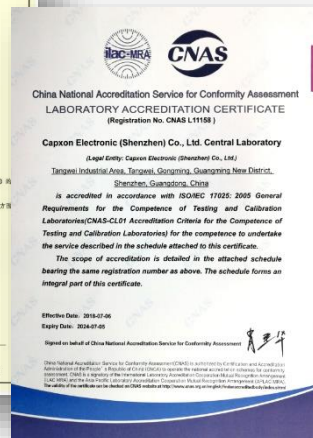
OHSAS 18001



OC 080000



China RoHS



ISO/IEC 17025

SMART PRODUCTION

Since 1980 CapXon focuses on research, development and manufacturing of Aluminum Electrolytic Capacitors and is a leading brand with its own capacitor production in Shenzhen and its own foil production in Yichang, Qinghai and Baotou. 40 years of experience give us a deep understanding of foil material, high performance electrolytes, advance lead wire technology, conductive polymer and electrochemical systems.

Precision equipment ensures the quality of key components



Capacitor production for all core technologies as Aluminium Electrolytic, Solid Conductive and Hybrid Conductive Polymer capacitors with R&D and Quality headquarters in Shenzhen

Development of our own production process and machinery with the highest grade of automated production equipment and software



ADVANCED TECHNOLOGY

Only with the best production equipment and well-trained staff is it possible to maintain and expand the market position. Every year CapXon invests very large sums in machine, software and the education for our more than 2500 employees. To recognize deviation immediately during the production process, CapXon uses various precise inspection equipment.

All productions are qualified with strict specifications and every operation is monitored and measured at the machine



The products and the production meet the requirements of all industries even Medical or Automotive

Automated and full controlled manufacturing process



NEW RESEARCH

Highly roughened and formed anode foils are the heart of every Aluminum Electrolytic Capacitor. CapXon has been conducting intensive research and development for decades to bring low-voltage and high-voltage films into new spheres and at the same time to optimize processability and durability. The electrolytes and conductive polymers used on the cathode side are subject to a continuous improvement process, taking commercial and technical aspects into account.

Electrolyte and polymer development to achieve maximum product reliability and a long life



High grade etching foil, high grade forming foil through consistent further development to the limit of what is technically feasible

Well-equipped ISO/IEC 17025: 2005 accredited laboratories for research, analysis and testing



COMPONENT RELIABILITY DATA

In this section, the main parameters for predictive reliability and availability calculations are explained and in which way CapXon can provide you with such data.

FAILURE RATE λ

The failure rate λ describes the frequency which components possibly fail. The failure rate describes how many defects can be expected, if you run the application in operation for a certain time.

The failure rate can be calculated as following:

$$(1) \quad \lambda = \frac{n}{N \cdot t}$$

n ... Number of defect components

N ... Number of tested components

t ... Amount of operating hours

FAILURE CRITERIA

Capacitors will show certain wear-out phenomenon's by aging and so as times goes by the capacitors can possibly change their electrical performance.

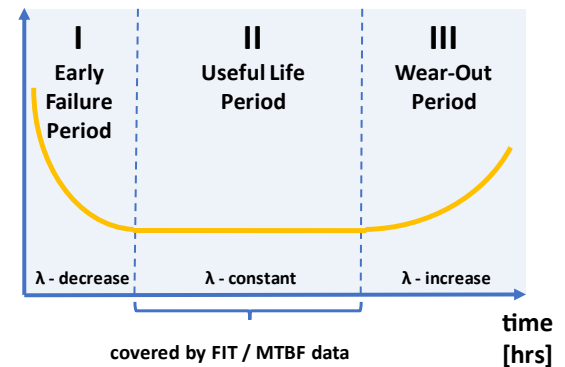
As soon as the component is no longer fulfilling their electrical spec, stated features or with customer agreed parameters, the status of capacitor is seen as in failure mode or defect. This does not necessarily mean that the application will fail. An essential influence are the design and dimensioning by customer, which lead to major impact on possible failure modes and fail criteria for the application itself.

All given data by CapXon is just concerning the failure mode cases of the single component and is not representing the complexity of complete applications, assembled systems nor full electronic PCB boards.

BATHTUB CURVE

It's a widely used model within the reliability engineering to describe the expected failure rates over the whole application lifetime / product life cycle.

λ - Failure Rate



Bathtub curve

The Bathtub Curve states the failure rate behaviour within the three different product life cycle stages. These are the Early Failure Period, the Useful Life Period and the Wear Out Period.

With production control, monitoring and quality assurance, it is possible to reduce the early failures to a best possible minimum.

Failures within the Useful Life Period, which are described as FIT or MTBF value, are defined as events of coincidence and are not representing any systematic or epidemic failures.

FIT – FAILURES IN TIME

FIT - Failures In Time is the common way to describe the expected failure rate for electronics.

The FIT values describe certain failure rate within the useful life period and provides the basis for calculations, assumptions and extrapolation of reliability and availability to gather the understanding for expected failures / defects. These calculated figures are used to decide whether the component is a proper choice for the desired use case. Additionally, it need to be clarified whether redundancies are necessary and which redundancies are needed to fulfil the desired mission profile of an application.

The unit FIT defines the expected amount of failures per application hour.

$$(2) \quad 1 \text{ FIT} = \frac{10^{-9}}{h} = \frac{10^{-9} \text{ failures}}{\text{per operating hour}}$$

So as higher the stated FIT value is, as higher the statistical chance of defect is.

Please find the following example of a failure rate test determined by a useful life test:

- Number of failures $n = 2$
- Number of tested components $N = 10\ 000$
- Operating hours $t = 20\ 000\ h$

$$(3) \quad \lambda = \frac{n}{N \cdot t} = \frac{2}{10\ 000 \cdot 20\ 000\ h} = 10\ FIT$$

$$(4) \quad 10\ FIT = \frac{10^{-8}}{h} = \frac{0.001\%}{1\ 000\ h}$$

MTBF - MEANTIME BETWEEN FAILURES

It's the predicted elapsed time between inherent failures of an electronic system during normal operation. The MTBF can be calculated as arithmetic mean / average time between failures of a system.

Assuming a constant failure rate, the MTBF can be easily calculated by reciprocal value of the Failure Rate λ :

$$(5) \quad MTBF = \frac{1}{\lambda}$$

MTBF is just a different way to describe the failure rate and can be easily converted to FIT and vice versa:

$$(6) \quad MTBF = \frac{10^9\ h}{FIT} = \frac{114\ 000\ years}{FIT}$$

$$(7) \quad FIT = \frac{10^9\ h}{MTBF} = \frac{114\ 000\ years}{MTBF}$$

The **MTBF** values are just covering the useful life period (flat middle section) of the bathtub curve. Because of this, a FIT or MTBF value can't be extrapolated to estimate the service lifetime for a component. FIT or MTBF values doesn't cover the higher failure rates of the wear-out period, where the expected failure rate would be higher due to occurring wear-out phenomenon's.

LIFETIME TESTS

Due to the fact that all electrolytic capacitors show aging behaviour and a possible drift of electrical parameters over usage time, lifetime tests are performed by manufacturers to describe the related reliability and performance of a certain capacitor. Different product series as well as the single product itself can provide very different lifetime performance. So, these test results are given to select the proper product in relation to the applied stress profile of application to gain the desired application performance within the whole product life cycle.

There are various names (e.g. Endurance, Load Life, Useful Life, Operational Life, Life Expectancy, Shelf Life, ...) and different lifetime tests that are existing within the industry. Please kindly check the specific test specification and given data for the capacitor before design-in.

Sadly, there is no standardized naming and test criteria existing, given by any international accepted standard committee for all the lifetime tests, which are applied to electrolytic capacitors. Customers need to compare competitor products carefully with each other to see if test specifications are similar or different.

Please see particular datasheets for the specific test results and criteria of an individual product of CapXon.

Again, please note that the criteria of failure are given by the test specification limits of the dedicated lifetime test and as soon as a component is not fulfilling these given limits, it is rated as a failure. So, failure does not necessarily mean defect or breakdown of application. It is just describing that the drift of electrical performance is bigger than the checked limits of the particular test. It doesn't matter whether the measured C value is lower as the allowed test limit or the component is in a failure mode of open circuit, both cases are treated the same as a failure. Design and dimensioning of application will arrange how much drift of electrical parameters can be accepted for the individual capacitor. For example, when the rate of capacitance change is becoming critical within the application is defined by customer design. The lifetime tests are in place to provide a common and industry-wide comparable performance index of the capacitors.

As manufacturer, we can state and check how fast a drift of capacitance and further parameters will happen. Dimensioning within application design will set how long an error-free operation is possible. A proper dimensioning can enlarge the acceptable drift and so the lifetime performance. But be aware, if it is not done properly or component is overstressed, it also can shorten the expected lifetime performance. Please be aware to check dimensioning and drift estimation to assure your product performance for the desired lifetime. For support with lifetime estimations and dimensioning, we are pleased to support you and feel free to get in touch with our technical support.

In the following section CapXon's lifetime tests, which are performed with our products, are described in detail.

ENDURANCE

The Endurance test of the product checks the performance of its electrical parameters, such as capacitance change, leakage current and dissipation factor on their behaviour over time at a predetermined test setup of electrical stress and ambient condition.

Depending on the product series, the Endurance test is performed according to one of the settings below:

Setting 1 - applying Endurance test:

- max. Temperature
- V_R - Rated Voltage

Setting 2 - applying Endurance test:

- max. Temperature
- V_R - Rated Voltage
- I_R - Rated Ripple

Setting 1 is in accordance to the IEC 60364-4 / JIS 51001-4 test criteria and Setting 2 is enlarging the electrical stress setup with additional appliance of I_R , to get a more representative result in comparison to possible real-life application stress.

The Endurance test is performed within product qualification at the stage of internal product validation and is repeated periodically for product requalification.

USEFUL LIFE

To get more representative understanding of lifetime performance for typical capacitor use, the useful life test represents such criteria.

The applied electrical stress is like the Endurance test - Setting 2. The test specification limits are wider as the endurance test specification, but as described the applied electrical stress stays similar. So, a larger acceptable drift of electrical parameters results in a larger expected lifetime. This represents the operational frame which is set by customer at dimensioning the capacitor specification for their application and the possible borders of an error-free operation.

Also, we state a FIT value related to the useful life test. These failure rate describes the deviation / possibility of occurrence of failures within the useful life period when the settings of useful life test are applied. This is related to the middle section of the bathtub curve the so-called useful life period (see above page 12 - Bathtub Curve of Product Reliability).

In the datasheet you will find the following phrase:

Failure Rate (during useful Life): 1%/1 000h with a confidence level of 60%. As a result, this is like a 10 000 FIT:

$$\lambda = \frac{1\%}{h} = 10\,000 \text{ FIT} = 10\,000 \text{ failures} * 10^{-9h}$$

Example:

If you have 8 000 components running in applications for 5 000 hours with the test conditions applied like the useful life test, you can estimate the number of components that show a higher drift as given by the useful life test spec borders as follows:

- Number of components $N = 8\,000$
- Operating hours $t = 5\,000 \text{ h}$

$$\lambda = \frac{n}{N * t}$$

$$n = \lambda * N * t = \frac{1\%}{1\,000h} * 8\,000 * 5\,000h = 400$$

This means that when there are 8 000 pcs in operation for 5 000 hours at the maximum possible operating conditions (max. temp., V_R & I_R similar to useful life test criteria) an amount of 400 products (with a confidence level of 60%) can be expected to show a higher drift as given in the test spec.

SHELF LIFE

The shelf life test simulates the aging of the capacitor, if it is just stressed with ambient temperature without any electrical load. The shelf life is not defining the possible storage time of the capacitor but just to describe the aging situation before mounting / PCB assembly.

The Shelf Life test criteria shall be satisfied, if the capacitor was restored to 20°C and following a conditioning by voltage treatment in accordance with 4.1 of JIS 5101-4 was applied, before measuring the capacitor.

LIFETIME TEST EXAMPLES

Example 1 - Useful Life, Endurance (Setting 1) and Shelf life tests of SMD types – HV Series:

Lifetime Test		
Endurance 105°C (V _a applied)	Test	2 000 hours
	ΔC/C	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I _{leak}	≤ the initial specified value
Shelf Life 105°C (None)	Test	1 000 hours
	ΔC/C	≤ ±30% of initial measured value
	tanδ	≤ 300% of initial specified value
	I _{leak}	≤ the initial specified value
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed below	
	ΔC/C	Within ±10% of initial value
	tanδ	Less than specified value
	I _{leak}	Less than specified value

Example 2 - of Useful Life, Endurance (Setting 2) and Shelf life tests of Radial types – GF Series

Lifetime Test			
Endurance 105°C (V _a & I _a applied)	Test	2 000 hours	ø D 5 ~ 6.3 mm
		3 000 hours	ø D 8 mm
		5 000 hours	ø D ≥ 10 mm
	ΔC/C	≤ ±20% of initial measured value	
	tanδ	≤ 200% of initial specified value	
Shelf Life 105°C (None)	Test	1 000 hours	
		ΔC/C ≤ ±20% of initial measured value	
		tanδ ≤ 200% of initial specified value	
		I _{leak} ≤ the initial specified value	

Example 3 - of Useful Life, Endurance (Setting 2) and Shelf life tests of Snap In types – HU Series:

Lifetime Test		V _a ≤ 100V		V _a > 100V	
		Test		Test	
Useful Life 105°C (V _a & I _a applied)	Test	5 000 hours		8 000 hours	
	ΔC/C	≤ ±30% of initial measured value		≤ ±20% of initial measured value	
	tanδ	≤ 300% of initial specified value		≤ 200% of initial specified value	
	I _{leak}	≤ the initial specified value		≤ the initial specified value	
Endurance 105°C (V _a applied)	Test	3 000 hours			
	ΔC/C	≤ ±15% of initial measured value		≤ ±10% of initial measured value	
	tanδ	≤ 130% of initial specified value		≤ 130% of initial specified value	
	I _{leak}	≤ the initial specified value		≤ the initial specified value	
Shelf Life 105°C (None)	Test	1 000 hours			
	ΔC/C	≤ ±15% of initial measured value		≤ ±10% of initial measured value	
	tanδ	≤ 130% of initial specified value		≤ 130% of initial specified value	
	I _{leak}	≤ the initial specified value		≤ the initial specified value	

Example 4 - Useful Life, Endurance (Setting 2) and Shelf life tests of Screw types – RK Series:

Lifetime Test		
Useful Life 105°C (V _a & I _a applied)	Test	4 000 hours
	ΔC/C	≤ ±45% of initial measured value
	tanδ	≤ 300% of initial specified value
	I _{leak}	≤ the initial specified value
Endurance 105°C (V _a applied)	Test	2 000 hours
	ΔC/C	≤ ±15% of initial measured value
	tanδ	≤ 130% of initial specified value
	I _{leak}	≤ the initial specified value
Shelf Life 105°C (None)	Test	1 000 hours
	ΔC/C	≤ ±15% of initial measured value
	tanδ	≤ 130% of initial specified value
	I _{leak}	≤ the initial specified value

TELCORDIA SR-332

This industry-wide accepted standard provides data and tools for reliability predictions of components, devices or full hardware units of electronic equipment. Telcordia (for-

merly Bellcore). With the given figures and data, it is possible to assure system availability and to gather the desired system reliability.

FIT & MTBF DATA OF CAPXON PRODUCTS

CapXon provides FIT & MTBF values based on Telcordia SR332 standard for all components. From our perspective, it provides more reliable prediction because it is more specific and detailed than MIL-217 or Siemens SN 29500.

Please find the FIT values for CapXon components and application-based reliability prediction calculations on the following page.

The table of SMD / RADIAL / Snap-In is covering all Electrolytic Technologies – Liquid, Solid and Hybrid Electrolytic Capacitors in SMD & Radial.

The table of Screw capacitors is just concerning Liquid Aluminum Electrolytic Capacitors.

Mounting Type	SMD / Radial / Snap-In					
	100%		75%		50%	
Electrical Stress						
Operating Temp. [°C]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]
≤ 30	1,19	0,28	0,65	0,15	0,36	0,08
35	1,52	0,35	0,84	0,19	0,46	0,11
40	1,94	0,45	1,06	0,25	0,58	0,14
45	2,45	0,57	1,34	0,31	0,74	0,17
50	3,07	0,71	1,68	0,39	0,92	0,22
55	3,82	0,89	2,10	0,49	1,15	0,27
60	4,72	1,10	2,59	0,60	1,42	0,33
65	5,80	1,35	3,19	0,74	1,75	0,41
70	7,09	1,65	3,89	0,91	2,14	0,50
75	8,61	2,01	4,73	1,10	2,59	0,60
80	10,40	2,42	5,71	1,33	3,13	0,73
85	12,50	2,91	6,86	1,60	3,76	0,88
90	14,94	3,48	8,20	1,91	4,50	1,05
95	17,78	4,14	9,76	2,27	5,35	1,25
100	21,05	4,90	11,55	2,69	6,34	1,48
105	24,82	5,78	13,62	3,17	7,47	1,74
110	29,13	6,78	15,99	3,72	8,77	2,04
115	34,05	7,93	18,69	4,35	10,26	2,39
120	39,65	9,23	21,76	5,07	11,94	2,78
125	45,99	10,71	25,24	5,88	13,85	3,23
130	53,15	12,38	29,17	6,79	16,01	3,73
135	61,20	14,25	33,59	7,82	18,43	4,29
140	70,24	16,36	38,55	8,98	21,15	4,93
145	80,34	18,71	44,09	10,27	24,20	5,64
150	91,60	21,33	50,27	11,71	27,59	6,43

Table 1: FIT values for SMD, Radial, Snap-In

Remark: Above values are only valid within the max. specified temperature range of the particular component. All given FIT data is meant for lifetime predictions only and is not representing any warranty.

For particular products (e.g. screw capacitors) within the datasheet, further FIT or MTBF data is added and in such a case, this substitutes the general information stated above.

Mounting Type	Screw terminal					
	100%		75%		50%	
Electrical Stress						
Operating Temp. [°C]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]	λ [FIT]	σ [FIT]
≤ 30	34,20	24,43	18,77	13,40	10,30	7,36
35	43,85	31,32	24,06	17,19	13,21	9,43
40	55,78	39,84	30,61	21,87	16,80	12,00
45	70,42	50,30	38,65	27,61	21,21	15,15
50	88,27	63,05	48,44	34,60	26,59	18,99
55	109,88	78,48	60,30	43,07	33,09	23,64
60	135,88	97,06	74,57	53,27	40,93	29,23
65	166,99	119,28	91,65	65,46	50,30	35,93
70	203,99	145,71	111,95	79,97	61,44	43,89
75	247,76	176,97	135,97	97,12	74,62	53,30
80	299,26	213,76	164,24	117,31	90,14	64,38
85	359,57	256,84	197,34	140,96	108,30	77,36
90	429,86	307,04	235,91	168,51	129,47	92,48
95	511,39	365,28	280,66	200,47	154,03	110,02
100	605,57	432,55	332,34	237,39	182,39	130,28
105	713,89	509,92	391,79	279,85	215,02	153,59

Table 2: FIT values for Screw types

λ - Mean Component Failure Rate

σ - Standard Deviation of Component Failure Rate

CALCULATION OF FIT VALUE FOR APPLICATION CASE

By using the given Telcordia SR-332 figures and by the assumption that the failure rate follows a gamma distribution, the FIT value can be calculated with given mean λ and standard deviation σ (see section tables in section 8.8) and desired UCL - Upper Confidence Level as follows:

$$\text{shape } \kappa = \left(\frac{\lambda}{\sigma} \right)^2$$

$$\text{scale } \theta = \frac{\sigma^2}{\lambda}$$

The desired FIT value for the application case is the P% quantile of the gamma distribution and it can be calculated by the inverse cumulative gamma distribution with the shape κ and scale θ parameters as follows:

$$\lambda_{P\%UCL} = G^{-1}(P/100; \kappa; \theta)$$

If the shape κ parameter is >100 the FIT can also be calculated by using the P% quantile of the normal distribution, by inverse cumulative distribution of normal distribution with mean λ and standard deviation σ :

$$\lambda_{P\%UCL} = N^{-1}(P/100; \lambda; \sigma)$$

Customer need to define which UCL is desired for the reliability prediction for their application case (typical values for UCL are e.g. 60%,90%, 95%, 99%).

CALCULATION EXAMPLE

Example 1:

GF Series – Radial type
Aluminum Electrolytic Capacitor

@ 70°C and 75% electrical stress
Upper Confidence Level (UCL) = 90%

Values according to table 1 at page 16:

$\lambda = 3.89$ FIT / $\sigma = 0.91$ FIT

$$\text{shape } \kappa = \left(\frac{3.89}{0.91} \right)^2 = 18.27$$

$$\text{scale } \theta = \frac{0.91^2}{3.89} = 0.21$$

$$\lambda_{90\%UCL} = G^{-1}(90/100; 18.27; 0.21) = 5.02 \text{ FIT}$$

In Microsoft Excel you can solve this with the following formula:

International / American Excel Version:
=GAMMAINV(0.9,18.27,0.21)

European Excel Version:
=GAMMAINV(0,9;18,27;0,21)

Example 2:

RG Series - Screw type
Aluminum Electrolytic Capacitor

@ 60°C and 75% electrical stress
Upper Confidence Level (UCL) = 90%

Values according to table 2 at page 16:

$\lambda = 74.57$ FIT / $\sigma = 53,27$ FIT

$$\text{shape } \kappa = \left(\frac{74.57}{53.27} \right)^2 = 2.01$$

$$\text{scale } \theta = \frac{0.91^2}{3.89} = 38.05 \text{ FIT}$$

$$\lambda_{90\%UCL} = G^{-1}(90/100; 2.01; 38.05) = 148.57 \text{ FIT}$$

In Microsoft Excel you can solve this with the following formula:

International / American Excel Version:
=GAMMAINV(0.9,2.01,38.05)

European Excel Version:
=GAMMAINV(0,9;2,01;38,05)

QUALITY MANAGEMENT SYSTEM

We are committed and living the principle of **QUALITY FIRST - to offer highly satisfying products and service to the customer**. This global aim is shared by the CapXon quality and environmental management system and part of our business philosophy:

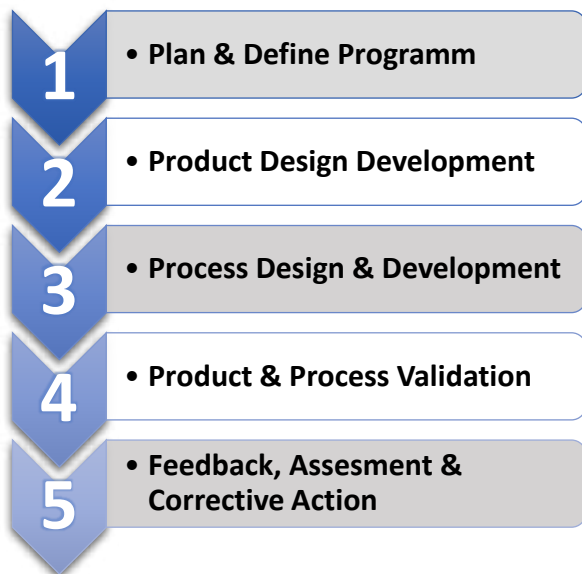
QUALITY MANAGEMENT SYSTEM CERTIFICATION

In accordance with our quality commitment, CapXon quality management is certified by **ISO 9001** and **IATF 16949**. The certification covers our production plants as well as our sales organization. This standard is applied throughout the company and is used to implement, monitor and to proceed the CapXon quality policy in all process steps.

PRODUCT AND PROCESS QUALITY

Our product and process development follows the sequence and phases of **APQP – Advance Product Quality Planning**:

5 Phases of APQP



Quality tools such quality tools, including **5S, PDCA, FMEA, (DFMEA & PFMEA), MSA, APQP, PPAP, SPC** and others, are in place to minimize risks, provide constant monitoring and ensure continuous improvements in conjunction with regular internal audits and QM reviews.

QUALITY ASSURANCE

For our sample checks, we refer to **AQL - Acceptable Quality Level** figures, which are based on a random sampling

plan in accordance with **MIL-STD-1916**. Referring to instructions of this standard, a delivered lot will be accepted with a probability of 90%, if the percentage of non-conformance does not exceed the stated AQL figure. As a general internal target, the percentage of non-conformance in deliveries from CapXon is significantly below the AQL figure. The acceptance value we apply to non-conform components is $c=0$.

INCOMING GOODS INSPECTION BY CUSTOMER

We recommend applying planned random sampling checks in accordance with MIL-STD-1916, is compliant with MIL STD 105 D and IEC 60410, for incoming goods inspection. The test methods, which shall be applied, are laid down in the relevant standards.

ENVIRONMENTAL MANAGEMENT

Environmental Policy

CapXon defines internally the following environmental protection principles:

- comply with the given law & regulations
- observe and act to reduce pollution
- produce cleanly
- reduce the consumption and save resources
- cut down usage of toxic substances
- make continuous improvements
- protect the environment

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATION

CapXon environmental management system is certified in accordance with ISO 14001 and is applied throughout the whole company as well as CapXon's environmental policy is implemented.

ENVIRONMENTAL HAZARDOUS SUBSTANCES FREE MANAGEMENT SYSTEM

To show our commitment to protect the environment and people, CapXon drives a sustainable effort to produce environment-friendly products.

IECQ QC 080000 HSPM - Hazardous Substance Process Management, which is based on the quality management system of ISO 9001.

The CapXon QC080000 based HSF management system is company-wide applied for implementing the CapXon environmental Hazardous Substances management and that CapXon products effectively in the management of hazardous substances.

ENERGY MANAGEMENT SYSTEM

CapXon establishes comprehensive energy use management in accordance with the requirements of ISO 50001 Energy Management System in order to meet the social responsibility of low carbon environmental protection and efficiency

CERTIFICATION IN ACCORDANCE TO ISO 14001, ISO 50001, QC 080000

The CapXon Group operates an environmental management system that conforms to the requirements of **ISO 14001** and is mandatory for all plants. The CapXon Group operates an Energy management system that conforms to the requirements of **ISO 50001** and is mandatory for all plants. The CapXon Group operates an environmental **Hazardous Substances Free management system** that conforms to the requirements of QC 080000 and is mandatory for all plants. The company certificate is posted on the CapXon internet: (www.capxongroup.com).

RoHS COMPLIANCE

The abbreviation **RoHS** is usually called **Restriction of Hazardous Substances**, the full term is the short term for the **Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment** and is referring to the EU directive 2011/65/EU. The RoHS 2 – 2011/65/Eu substituted the former RoHS 1- 2002/95/EC.

The aim of RoHS is to banish Hazardous Substances of electronic waste, which can harm the environment and others. Based on this regulation, we as component manufacturer, need to design, observe and control that such hazardous materials are fully avoided and reduced to the max. Moreover, it's possible to replace them by adequate non concerned materials within the given limitations .

For all by RoHS scoped materials (excluding exempt products) the maximum permitted concentrations are:

all concerned materials (except Cd)

- 0,1% / 1000ppm

Cadmium -Cd:

- 0,01% or 100ppm

These limitations for the restricted materials focus on each homogeneous material within the product. So, the limitations are concerning each individual / single substance or part, which can be separated mechanically (e.g. aluminum can, rubber sealant) and are not apply to the weight of the whole component itself.

Last update of RoHS was Directive (EU) 2015/863, which was published on 2015-03-31 and implemented by 2019-07-22. According to this directive, the following ten substances are restricted:

- **Pb** - Lead
- **Hg**- Mercury
- **Cd** - Cadmium
- **Cr⁺⁶** - Hexavalent chromium
- **PBB** - Polybrominated biphenyls
- **PBDE** - Polybrominated diphenyl ether
- **DEHP** - Bis (2-ethylhexyl) phthalate
- **BBP** - Butyl benzyl phthalate
- **DBP** - Dibutyl phthalate
- **DIBP** - Diisobutyl phthalate

By the update DEHP, BBP, DBP and DIBP were added to the list of hazardous substances.

Since 2011 RoHS compliance is mandatory to be able to get CE approval.

C-RoHS / CHINA RoHS COMPLIANCE

The common speech so called China RoHS means the conformance to **SJ/T 11363-2006** for electrical components and assemblies and is fully called **Administrative Measure on the Control of Pollution Caused by Electronic Information Products**.

In China RoHS, the following substances are banned because they are considered as environmentally hazardous:

- **Pb** - Lead
- **Hg**- Mercury
- **Cd** - Cadmium
- **Cr⁺⁶** - Hexavalent chromium
- **PBB** - Polybrominated biphenyls
- **PBDE** - Polybrominated diphenyl ether

Since December 2012, CapXon has provided China RoHS certification for our products and certifications.

SONY GP CERTIFICATION

Since Nov 2011, CapXon has been certified as Green Partner by SONY and we are running an environmental management system that continuously meet the requirements of the SONY Green Partner Program and we are working in

accordance with the Sony environmental quality assurance. The Certificate is listed by **SONY GP Certificate No.: FC012746**

REACH CERTIFICATION

REACH is the abbreviation for Registration, Evaluation, Authorization of Chemicals and by Regulation (EC) No 1907 /2006 it is

So each manufacturer or importer, who is shipping goods to the European Union, need to declare and be compliant according to REACH, if within the shipped goods a substance, which is listed out SVHC-List (Substances of Very High Concern) is included and overall a total mass of bigger a ton per year is imported.

CapXon is working in accordance with REACH requirements and certification is available for our products.

ROHS & REACH MARKING

Within our datasheets, we mark the RoHS and REACH compliance with our "RoHS & REACH compliant"- marking, please see marking below for reference:



HALOGEN FREE (HF)

The Halogen Free requirements are based on customer and environmental regulations on management and control requirements of halogens, such as the **European Directive 2002/95/EC, IEC 61249-2-21, Montreal Protocol on Substances that Deplete the Ozone Layer and Controls the Stockholm joint pledge about durable organic pollutant.**

Concerned by the halogen-free initiative are elements like:

- **Fluorine**
- **Chlorine**
- **Bromine**
- **Iodine**
- **Astatine**

In case of fire, these elements can release toxic fumes, which could harm humans and can also cause corrosion of metals.

CapXon is using halogen-free materials for all our electrolytic capacitors. Since 31st of Oct 2009 all products meet the halogen-free requirements.

BANNED AND ENVIRONMENTAL HAZARDOUS SUBSTANCES IN COMPONENTS

As a manufacturer of passive components, we develop our products focussing on sustainability. In order to guarantee a standardized procedure within CapXon, a mandatory avoidance list of Environmental Hazardous Substances with special interest is part of our environmental management system. The planning and development instructions include regulations and guidelines that aim to identify environmental aspects and to optimize products as well as processes with respect to material usage and environmental compliance to design them with sparing use of resources and to substitute hazardous substances as far as possible.

The environmental officer provides support in the assessment of the environmental impacts of our development projects and as part of our environmental management these aspects are checked and recorded in internal design reviews.

AEC-Q200 & AUTOMOTIVE REQUIREMENTS

To serve the high standards of automotive applications, CapXon provides AEC-Q200 versions for many of their product series.

If AEC-Q200 version is available, the product series or single component is marked with the following marking on the datasheet:



Marking of components with references in reliability testing to AEC-Q200

The AEC-Q200 versions are different in case of reliability testing, production monitoring and available material declaration. For details, please see the table below:

	Standard Version	AEC-Q200 Version
Reliability Testing		
Tests according to internal specification	✓	✓
Tests according to AEC-Q200 applied test range related to product	✗	✓
Production Monitoring		
Production & documentation in accordance with ISO 9001	✓	✓
Production & documentation in accordance with IATF 16949	✗	✓
Compliance and Declarations		
RoHS & REACH compliance	✓	✓
IMDS entry available (on request)	✗	✓
PPAP (on request)	✗	✓

Table 9: Differences between standard and AEC-Q200 components

AEC-Q200

The AEC-Q200 was issued as a global reliability test standard by the AEC - Automotive Electronics Council. The overall aim of this standard is to define the minimum stress test driven qualification requirements and references of test conditions for qualification of passive components.

AEC-Q200 qualified components are highly qualified products for critical surroundings and can withstand the harsh and challenging usage conditions of an automotive environment.

For Aluminum Electrolytic Capacitors, concerning all technologies of Liquid Aluminum Electrolytic, Solid and hybrid types, the AEC-Q200 claims a test plan of 27 different reliability tests (e.g.: Temperature Cycling, Vibration, Biased Humidity, Surge Voltage, ...) with a sample size of about 77 pcs. and a maximum test duration of particular test of about 1000 hours.

By AEC-Q200 at least the temperature range of -40°C to 105°C need to be tested and applicable for Aluminum Electrolytic Capacitors, if not, differently specified by datasheet.

In case of AEC-Q200 version, reliability testing is performed for the dedicated components in addition to CapXon's internal qualification setup as well as additional agreed requirements between CapXon and their customers.

PPAP

PPAP – Production Part Approval Process is a documentation to assure quality of supplier and their production process within the automotive supply chain.

The PPAP covers and ensure the following aspects:

- Manufacturability and meeting all given quality requirements
- Design records and specification requirements
- Manufacturing process can consistently meet all component requirements

For our AEC-Q200 components, we provide PPAP Level 3 on request, which is providing product samples as well as the complete supporting data.

IMDS

The IMDS – International Material Database System contains information about the used materials within the build-up of the component.

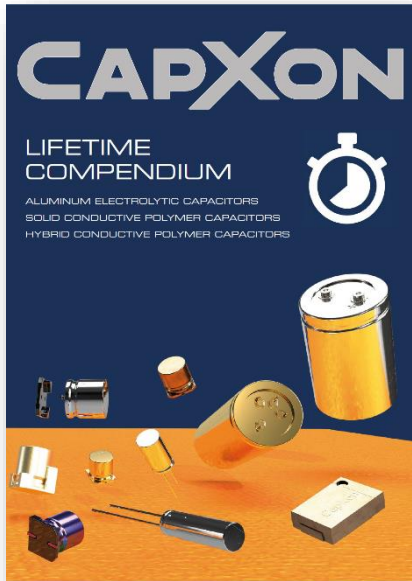
With IMDS, it is possible to monitor and control hazardous substances and prohibited substances down to the single component. IMDS is mainly used to fulfil various reporting requirements of automotive manufacturers.

For all our AEC-Q200 components and in case of an automotive use case, we provide IMDS entries on request. For further information, visit our website <http://www.capxongroup.com/en/> or contact CapXon directly.

LIFETIME ESTIMATION • LIFETIME COMPENDIUM

The accurate estimation of the lifetime of components is one of the elementary considerations of any electronic assembly. If electrolytic capacitors are not properly designed for the application environment and load, they will inevitably lead to a disproportionate change in their electrical performance or, in the worst case, failure of the capacitor. CapXon's lifetime compendium helps users to calculate and estimate the expected lifetime of Aluminum Electrolytic Capacitors.

The lifetime compendium is available to download from our website http://www.capxongroup.com/files/Lifetime%20Compendium_EN.pdf



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Technical Background

LIFETIME COMPENDIUM

structure of the component. To explain and calculate the additional heating, the relationship of the thermal resistance, or the ability of electronic components to dissipate heat.

WITH

- P_T Thermal power [W]
- ΔT_c Core temperature rise (°C) by internal heating due to the application current
- R_{th} Thermal resistance of the electrolytic capacitor [°C/W]
- β Radiation coefficient [W/(cm²·K)]
- A Surface of the capacitor [cm²]

(3) $P_T = \frac{\Delta T_c}{R_{th}} = \beta \cdot A \cdot \Delta T_c$

(4) $\Delta T_c = \frac{P_T}{\beta \cdot A}$

DETERMINATION OF THE CORE TEMPERATURE INCREASE ΔT_c

To calculate the lifetime, the determination of ΔT_c , core temperature rise due to the application current in the capacitor, is necessary.

This can be done in different ways:

- Temperature measurement of core temperature T_c

By this very precise method, a thermocouple (usually a K sensor) is inserted into the capacitor, which is possible only during the production of the e-cap, and determines the core temperature T_c over this. The ambient temperature T_a is measured secondarily.

Fig. 2: Thermal output of the e-cap via convection, radiation and dissipation

Fig. 4: Snap-in capacitor with integrated thermocouple for measuring the core temperature

The integration of a temperature sensor is not that simple and only possible with electrolytic capacitors with convection.

Calculation base

LIFETIME COMPENDIUM

For all CapXon high-performance series ≤ 200V, see table 3

(8) $I_{\Delta T} = I_{eq} \cdot K_{Temp} \cdot K_{Applic} = I_{eq} \cdot 2^{\frac{K_{Temp} \cdot \Delta T_c}{100}} \cdot 2^{\frac{K_{Applic} \cdot I_{eq}}{100}}$

WITH

- I_{eq} Ripple current influence
- ΔT_c Core temperature increase (°C) by internal heating due to the internal ripple current

Upper operating temperature T_a

Upper operating temperature T_a	85°C	105°C	115°C	≥ 120°C
Thermal shock rate ΔT_c	30°C	5°C	5°C	5°C

Table 3: Maximum permissible core temperature rise due to the permissible internal alternating current

HIGH VOLTAGE E-CAPS (≥ 160V) WITH LIQUID ELECTROLYTES

Under the low voltage electrolytic capacitors are described in the previous chapter, in e-cap series with ≥ 160V another series following the IEC class is added: the operating voltage is applied to the side leads capacitor. It is 50% lower than the nominal voltage of the capacitor V_{th} . The thermal stress on the electrolytic dielectric, which in turn leads to an extension of the service life. For all cases V_{th} between 80% to 100% of V_{nom} take for calculations $V_{th} = 80\%$.

K_{Temp}	K_{Applic}	Type	Product	CapXon series
1	1	Radial	1K, 1L, 2D (23A), 1K, 1L (D), 23A, 5R (D), 33A, 5R (D), 33A, 5R (D), 100V	1K, 1L, 2D (23A), 1K, 1L (D), 23A, 5R (D), 33A, 5R (D), 100V
1	1	Snap-in	1R, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V	1R, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V
1	1	Screw terminal	1R, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V	1R, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V, 1R (D), 100V, 1L (D), 100V

Table 2: Influence of the application current and the application voltage on CapXon high-voltage series

K_{Temp}	K_{Applic}	Type	Product	CapXon series
1	1.5	Radial	1H, 1L, 1S, 1A, 1L, 1H, 1K	1H, 1L, 1S, 1A, 1L, 1H, 1K

Table 3: Influence of the application current and application voltage on CapXon high voltage series for use in lightning application

Application example

LIFETIME COMPENDIUM

CALCULATION EXAMPLE - OUTPUT FILTER CAP - IN A SWITCH MODE POWER SUPPLY

Fig. 1: Principal diagram for switching mode power supply with inductor PFC and galvanically isolated output

Output voltage: 21V
 Rated I_{out}: 13 A rms = 37 A rms
 Operating cycles: 200,000 during the operating period of 10 years

Operation under different conditions according to the following table:

Operation in Mode 1		Operation in Mode 2		Stand / Sleep	
Duty cycle D_{max} : 0.815	Duration t_{on} : 130 μs	Duty cycle D_{max} : 0.3815	Duration t_{on} : 381.5 μs	Duty cycle D_{max} : 0.02	Duration t_{on} : 120 μs
Ambient temperature T_a : 70°C	Ambient temperature T_a : 70°C	Ambient temperature T_a : 70°C	Ambient temperature T_a : 70°C	Ambient temperature T_a : 45°C	Ambient temperature T_a : 45°C
Frequency f (RMS)	5.5A	300Hz	1.8A	10Hz	0.05A
Frequency f (RMS)	2A	300Hz	1.2A		
Frequency f (RMS)	1.70A	1.70A	0.0A		
Frequency f (RMS)	0.8A	300Hz	0.7A		

Table 16: Requirement profile for the calculation example - switched-mode power supply

Selected Type: GFS41M035G250ETA

Rated capacitance C _r	Rated voltage V _r	Rated current I _r	Dimension φ x L	Endurance
500μF	35V	3.0A at 100kHz/105°C	10mm x 25mm	5000h at 105°C

Table 17: Main parameter GFS41M035G250ETA

Graphical estimation

LIFETIME COMPENDIUM

The first step is to calculate the equivalent I_{200h} values for the two application currents I_{eq} and I_{eq2} as well as the resulting RMS value I_{RMS}

WITH

(15) $I_{RMS} = \sqrt{I_{eq}^2 + I_{eq2}^2}$

(16) $I_{RMS} = \sqrt{I_{eq1}^2 + I_{eq2}^2 + \dots + I_{eqn}^2}$

The necessary ripple current correction factors are shown in table 14. Extract data sheet 06 series

Frequency [Hz]	50 [Hz]	120	300	1k	2.5k
Ripple current correction factor K_f	0.8	1.2	1.5	1.5	1.4

Table 20: Ripple current correction factor for the CapXon series

Eqn.: I_{200h} current 1: $I_{RMS} = 20A$

Eqn.: I_{200h} current 2: $I_{RMS} = 11.4A$

RMS value: $I_{RMS} = \sqrt{20^2 + 11.4^2} = 23A$

In the second step, the ripple current ratio I_{eq} can be calculated with

Ripple current ratio: $\frac{I_{eq}}{I_{RMS}} = \frac{20A}{23A} = 0.87$

Fig. 10: Nomogram for the CapXon series with intersection point for the application example

The ripple current ratio and the ambient temperature of 60°C show the intersection of the graph in the nomogram. The useful life is between the 50,000h and 100,000h curve, exactly at 60,000h and meets the minimum requirement of > 40,000h.

TECHNICAL NOTES • TECHNICAL COMPENDIUM

Due to their compact design, **Aluminum Electrolytic Capacitors** are the most common high-capacitance storage and filter elements in electronics. Like all electronic components, they do not have an “ideal” electrical behavior, they have losses. Their properties are very dependent on temperature and frequency. Detailed knowledge of these components is an absolute must for all electronics developers, especially for power supplies and converters.

The CapXon Technical Compendium describes the basics, electrical parameters, production steps, provides suggestions for the selection of suitable capacitors and design rules for reliable and long-lasting operation.

The technical compendium is available to download from our website http://www.capxongroup.com/files/Technical%20Compendium_EN.pdf



Basics

TECHNICAL INFORMATION

1. BASICS

Aluminum Electrolytic Capacitors are by far the most important and common high-capacitance storage or filter capacitors in electronic devices.

The enormous importance of electrolytic capacitors is related to their properties:

- Extremely high CV (capacitance per volume) values on the smallest volume
- High dielectric strength of even the thinnest layers (2 to a 10⁶ V/mm)
- Relatively high dielectric constant ε (expansion of regions A)
- Etching ability of aluminum, which allows a surface enlargement of up to 200 times and thus a dramatic space reduction
- Very wide range of design and dimensions

1.1. BASIC STRUCTURE OF A CAPACITOR

When voltage is applied between both conducting electrode plates, a certain amount of charge Q will be stored in the dielectric surface by a proportional relative voltage. The proportional constant is designating the ability of the capacitor to store energy in electric field.

Fig. 1: Basic structure of a point capacitor

The capacitance can be calculated using the amount of charge and the applied voltage

$$C = \frac{Q}{U}$$

Fig. 2: Sectional view of an aluminum electrolytic capacitor

WITH

- C Capacitance [F]
- Q Charge [C]
- U Applied voltage [V]

$$C = \epsilon_0 \cdot \epsilon_r \cdot \frac{A}{d}$$

WITH

- ε₀ Absolutely Permittivity (8.85 · 10⁻¹² F/m)
- ε_r Relative Permittivity [F/m] – depending on used dielectric material
- A Surface of capacitor electrode [m²]
- d Distance between the capacitor plates [m]

1.2. CONSTRUCTION OF ALUMINUM ELECTROLYTIC CAPACITORS

All Aluminum Electrolytic Capacitors are based on the knowledge that an oxide layer, which is electrochemically produced on aluminum, allows current to pass in one direction and blocks the current in the other direction, like the principle of a semiconductor diode. Even very thin layers enable very high dielectric strength. The oxide layer thus forms the dielectric of the capacitor.

The oxide layer has a porous structure, even before it is processed in order to achieve an optimal electrical connection of this rough surface, a conductive liquid, the electrolyte, is used. The liquid penetrates the pores and wets the coarse layer. The electrolyte is in turn contacted electrically via a second aluminum foil (current supply foil).

Fig. 3: Production steps - from foil to capacitor

The processing of the foils, the so-called etching process, the forming and the subsequent manufacture of the elec-

Production steps

TECHNICAL INFORMATION

2. PRODUCTION STEPS

To achieve the highest level of reliability for all our products, CapXon only uses 99.99% pure aluminum in its electrolytic capacitors. Foreign atoms on the surface in connection with the electrolyte would lead to corrosion.

Raw material Aluminum foil

Foil etching

The surface of the aluminum foil is enlarged by 50 to 200 times by etching. At CapXon, this is done in its own facilities using appropriate continuous baths. The etching process, especially of high-quality high-voltage foils, requires enormous know-how and decades of experience. The electrolyte thin foils (20 – 100µm) have to be mechanically stable enough to survive the further manufacturing steps like multiple etching, weaving, drying, chemical rinsing without damage. Only a high understanding of the complex processing of etched aluminum foils are the guarantee for an aluminum electrolytic capacitor of the highest quality!

Foil forming

The oxide layer required as a dielectric is produced electrochemically on the anode foil after the roughening process (etching) by immersing the foil in a bath with boric acid or similar chemical and applying voltage during the process. The process is called forming. Over time, the layer thickness increases, while the current decreases and the roughness of the oxide layer increases. At first very strongly then increasingly a maximum value. Depending on the bath composition, rated voltages of 650V or higher can be achieved.

Forming

The oxide layer required as a dielectric is produced electrochemically on the anode foil after the roughening process (etching) by immersing the foil in a bath with boric acid or similar chemical and applying voltage during the process. The process is called forming. Over time, the layer thickness increases, while the current decreases and the roughness of the oxide layer increases. At first very strongly then increasingly a maximum value. Depending on the bath composition, rated voltages of 650V or higher can be achieved.

Fig. 4: Direct link between forming voltage, oxide layer thickness and specific capacitance

The processing of the foils, the so-called etching process, the forming and the subsequent manufacture of the elec-

Electrical parameters

TECHNICAL INFORMATION

Apart from the ultra low ESR already explained, what are the main advantages of conductive polymer capacitors?

Technology	Solid Conductive Polymer	Hybrid Conductive Polymer
Capacitance	4.7 ~ 3000µF	1 ~ 1500µF
Rated voltage	2.5 ~ 300VDC	16 ~ 400VDC
Max. temperature	100 ~ 125°C	100 ~ 150°C
ESR	7 ~ 15mΩ	11 ~ 20mΩ

Table 17: Allow ranges of solid electrolytic and hybrid polymer capacitors

In addition to the voltage dependence, the large temperature coefficient and thus the temperature dependence of class 2 ceramics add to the difficulty, depending on the used material, the capacitance can drift by 50% over the entire temperature range, e.g. from -40°C to +85°C!

Fig. 24: Change in capacitance as a function of temperature for a NaCC and a polymer capacitor

Another point is aging, as the decrease in capacitance over time. For Class 2 ferroelectric ceramic capacitors, this behavior is called “aging”. It occurs in ferroelectric dielectrics where domains of polarization in the dielectric contribute to the overall polarization. Their degradation in the dielectric reduces the relative permittivity and over time, so that the capacitance of ceramic capacitors of class 2 decreases.

Polymer capacitors do not exhibit such behavior and behave stably over temperature, time, and applied voltage.

4.4. EXTREMELY LONG LIFE

In order to achieve a high capacity in the smallest space at the same time, acceptable costs remained so far only the way to use aluminum capacitors with liquid electrolyte.

Apart from the temperature and frequency-related disadvantages, the lifetime of these capacitors must always be considered.

The use of a liquid electrolyte results in changes in electrical properties over time.

As a result, an aluminum electrolytic capacitor slowly but constantly loses electrolyte during the time - the component is driving out. The lower the temperature of the capacitor, the slower the desiccation process, hence a longer life.

Fig. 23: Change in capacitance as a function of the applied voltage for an NaCC and a polymer capacitor

Capacitor selection

TECHNICAL INFORMATION

6.2. HIGH FREQUENCY OUTPUT SMOOTHING

In the output stage on the secondary side, a rectification and smoothing circuit converts the AC voltage supplied by the transformer MOSFET into the desired DC voltage. For example, 230VAC. The smoothing circuit can consist of capacitors or the combination of capacitor and inductor. See Fig. 56. The output current smooth ripples in the rectified voltage and also ensure the stability during transient increase in the load current.

Fig. 27: Output smoothing capacitors in a Flyback SMPS

When the MOSFET is not turned on, no current flows through the secondary diode and the output capacitors must supply the load with power. When the MOSFET is turned off, the diode conducts, supplies the load and charges the output capacitor too.

Technology	Type	Normal	Low ESR	ESR-Opt.	ESR-Opt.	ESR-Opt.	ESR-Opt.	ESR-Opt.	ESR-Opt.
Aluminum Electrolytic	SMC	RM	RL	RM	RL	RM	RL	RM	RL
SMC	FD	FL	FL	FL	FL	FL	FL	FL	FL
Conductive Polymer	SMC	PS	PP	PS	PP	PS	PP	PS	PP
Hybrid	SMC	-	AL	AL	AL	AL	AL	AL	AL
Electrolytic	SMC	-	AS	AS	AS	AS	AS	AS	AS

Table 20: Recommended capacitor series for output smoothing

6.3. BUFFERING

The block diagram in Figure 30 shows a microcontroller (µC) that is supplied by a linear voltage regulator, whose output voltage is 5V. In the application we assume a steadily under fluctuation with minimal power consumption and an operating mode of 0.5µA. As standby current (I_{standby}) and an operating current between 10mA and 100mA are necessary for the µC. The threshold value between standby and operating current is therefore 10mA, which leads to a sudden current requirement of the µC that rises to 100mA on the linear regulator.

Fig. 28: Simple µC power supply circuit

These rise times are too fast for the connected voltage regulator, so that the control loop does not yet react and there is a voltage drop at the input of the µC. The result would be an unstable operation of the µC, misoperation of binary values or, in the worst case, a system crash.

Design rules

TECHNICAL INFORMATION

7. DESIGN RULES

7.1. ARRANGEMENT

Never arrange electrolytic capacitors near hot components such as heaters, transformers, power semiconductors etc. to avoid thermal heating of the liquid electrolyte.

7.3. CLEARANCE / OVERPRESSURE VENT

During operation, current flows through the capacitor and the above-mentioned ESR creates conduction in the form of heat.

The hydrogen released inside the electrolytic capacitor increases the internal pressure. If the internal pressure is too high, the overpressure vent opens and the gas escapes in a controlled manner.

In order not to impair the functioning of the vent, a minimum distance to other components must be maintained above.

No conducting tracks, wires or other circuit parts may be arranged above the valve.

Fig. 30: Recommended distance for optimal cooling

If possible, leave the half diameter between the electrolytic capacitor for optimal cooling of the heat-sensitive component.

7.2. CONDUCTOR TRACKS

Make conductor tracks sufficiently thick. Especially at high I_{PK} currents the track can be very hot. If the proximity effect is ignored, large widths at 25µm doesn't help! Provide 100µm, 200µm thickness or more.

Power	Track thickness
Very low	35µm
> 25W	100µm
> 100W	200µm

Table 31: Recommended track thickness for high-voltage SMC current

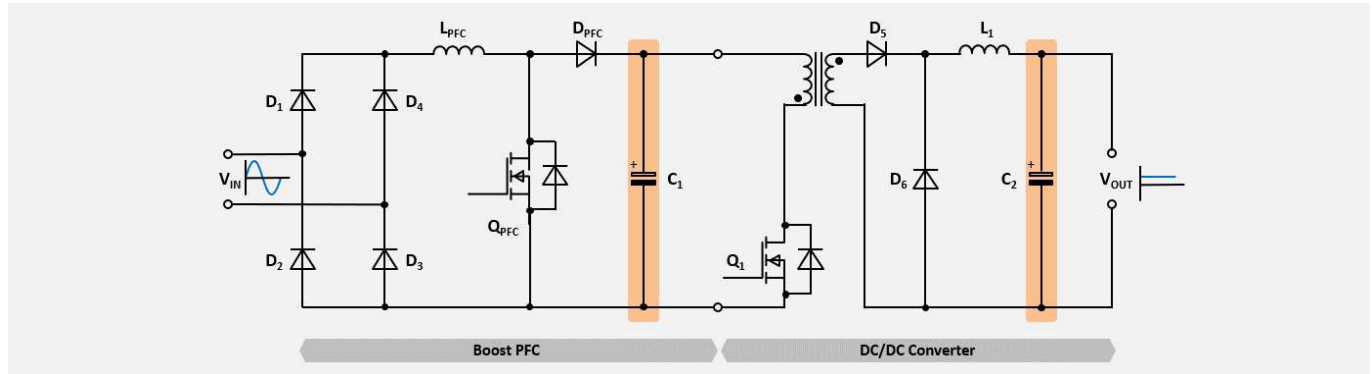
No other conductor tracks may run under the electrolytic capacitor and the minimum distance to the housing should be 3mm or more.

Case diameter Ø	Clearance distance CI
4mm to 16mm	Min. 2mm
16mm to 35mm	Min. 3mm
> 40mm	Min. 4mm

Table 32: Recommended minimum clearance distance between topology capacitor and device case

SWITCH MODE POWER SUPPLY (SMPS)

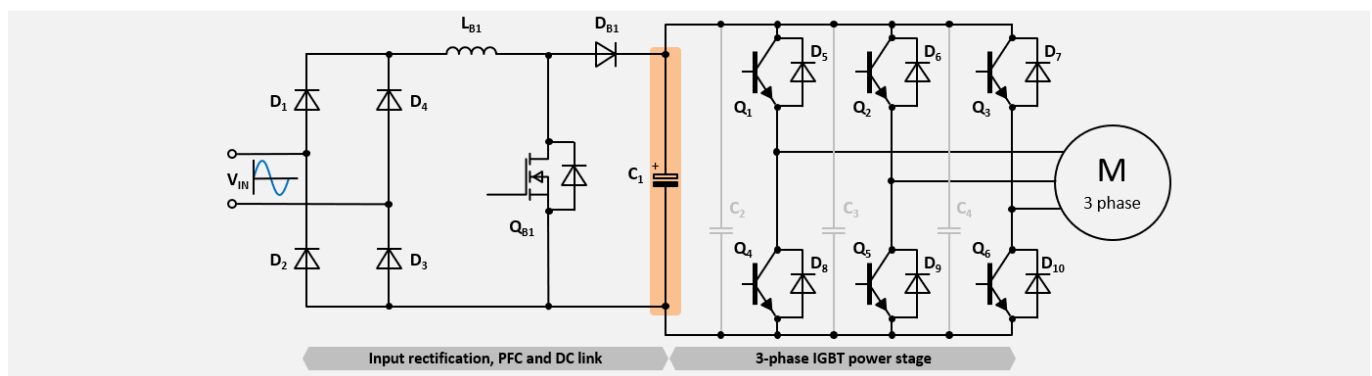
Example of a Switch Mode Power Supply with boost Power Factor Correction (PFC) and downstream DC/DC converter in Fly-back topology with recommended products.



Designation	Circuit	Purpose	Specification	Series	Part Number
C ₁	Boost PFC	Inductor ripple current filtering	100µF; 400V; 105°C; Radial; 2000h D18xL31.5mm; 0.53A@120Hz	KM	KM101M400K315A
C ₁	Boost PFC	Inductor ripple current filtering	470µF; 450V; 105°C; Snap-In ; 5000h D35xL45mm; 1.94A@120Hz	HP	HP471M450P450A
C ₂	DC/DC Converter	Output filtering	470µF; 25V; 105°C; SMD; 2000h D10xL10.5mm; 0.65A@100kHz	DV	DV471M025G105A
C ₂	DC/DC Converter	Output filtering	1000µF; 25V; 105°C; Radial; 10000h D13xL20mm; 1.91A@100kHz	FH	FH102M025I200A
C ₂	DC/DC Converter	Output filtering	82µF; 25V; 105°C; Radial; 2000h D8xL11.5mm; 4.1A@100kHz	PS	PS820M025F115A

INDUSTRIAL MOTOR DRIVE

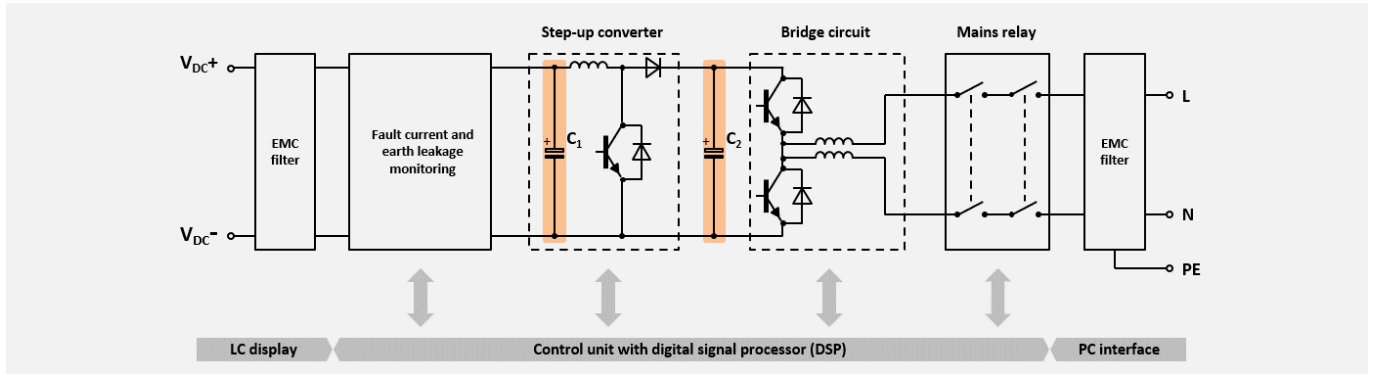
Example of a typical industrial motor drive for pumps, fans or compressors. The power circuit consist input rectifier, Power Factor Correction (PFC), DC link bank and 3-phase IGBT power stage. CapXon offers the full range of DC link solutions in electrolyte technology



Designation	Circuit	Purpose	Specification	Series	Part Number
C ₁	DC link bank	Energy storage and supply	560µF; 450V; 85°C; Snap-In; 7000h D30xL50mm; 3.17A@120Hz	UC	UC561M450O500A
C ₁	DC link bank	Energy storage and supply	470µF; 500V; 85°C; Snap-In; 10000h D35xL55mm; 2.99A@120Hz	UD	UD471M500P550A
C ₁	DC link bank	Energy storage and supply	680µF; 450V; 105°C; Snap-In; 8000h D35xL60mm; 2.94A@120Hz	UK	UK681M450P600A
C ₁	DC link bank	Energy storage and supply	680µF; 450V; 105°C; Snap-In; 10000h D35xL55mm; 3A@120Hz	UL	UL821M450Q550A

PHOTO VOLTAIC INVERTER

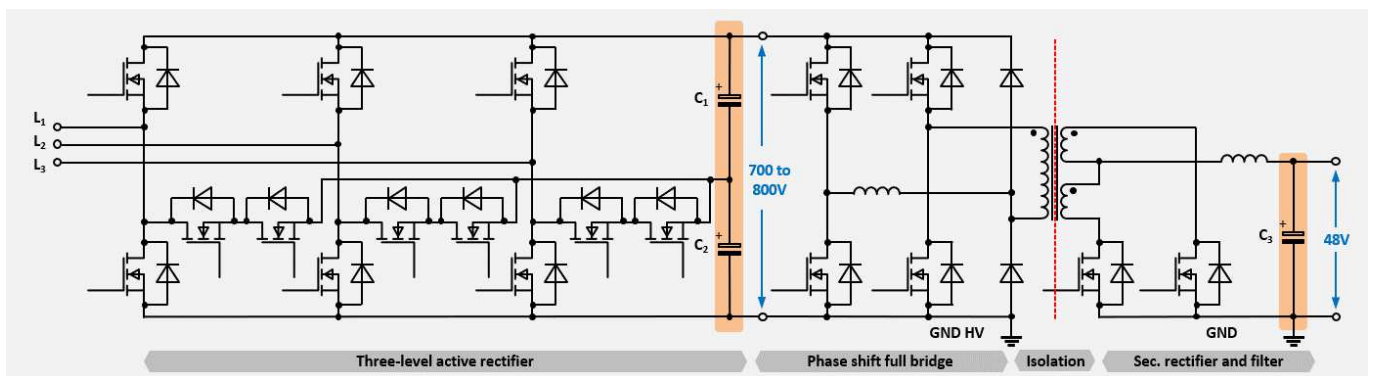
Block diagram of the power circuit of a photo voltaic inverter with EMC filter, monitoring circuit, step-up converter, bridge circuit, and mains relay with recommended products.



Designation	Circuit	Purpose	Specification	Series	Part Number
C ₁ , C ₂	Step-up + DC link	Energy storage and supply	680μF; 500V; 105°C; Snap-In; 5000h D40xL60mm; 3A@120Hz	UJ	UJ681M500Q600A
C ₁ , C ₂	Step-up + DC link	Energy storage and supply	5600μF; 450V; 105°C; Screw; 20000h D63.5xL165mm; 21.7@120Hz	RX	RX562M450SA65A
C ₁ , C ₂	Step-up + DC link	Energy storage and supply	470μF; 450V; 105°C; Snap-In; 10000h D30xL50mm; 1.97A@120Hz	UL	UL471M450O500A
C ₁ , C ₂	Step-up + DC link	Energy storage and supply	1000μF; 450V; 105°C; Screw; 8000h D51xL80mm; 4.6A@120Hz	RH	RH102M350R800A

3-PHASE HIGH VOLTAGE BATTERY CHARGER

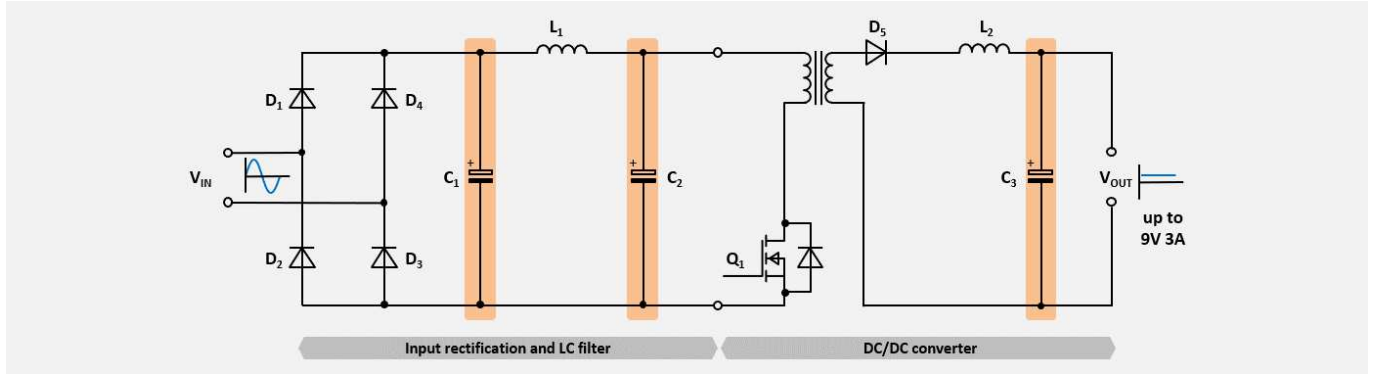
Principal circuit of a 3-phase high voltage battery charger for bidirectional applications such as electric vehicle charging (e-cars, fork-lift trucks, transport vehicles with recommend products for the active rectifier and output filter.



Designation	Circuit	Purpose	Specification	Series	Part Number
C ₁ , C ₂	Three-level active rectifier	Energy storage and supply	2200μF; 450V; 85°C; Snap-In; 7000h D45xL90mm; 8.5A@120Hz	UC	UC222M450V900A
C ₁ , C ₂	Three-level active rectifier	Energy storage and supply	1000μF; 500V; 105°C; Snap-In; 5000h D40xL80mm; 4.68A@120Hz	UJ	UJ102M500Q800A
C ₃	Output filter	Output buffering and ensure stability	56μF; 63V; 105°C; Radial; 10000h D10xL12.5mm; 2.4A@100kHz	AS	AS560M063G125PTA
C ₃	Output filter	Output buffering and ensure stability	150μF; 63V; 105°C; Radial; 2000h D10xL18mm; 3A@100kHz	PH	PH151M063G125PTA

27W PORTABLE POWER USB-C ADAPTER

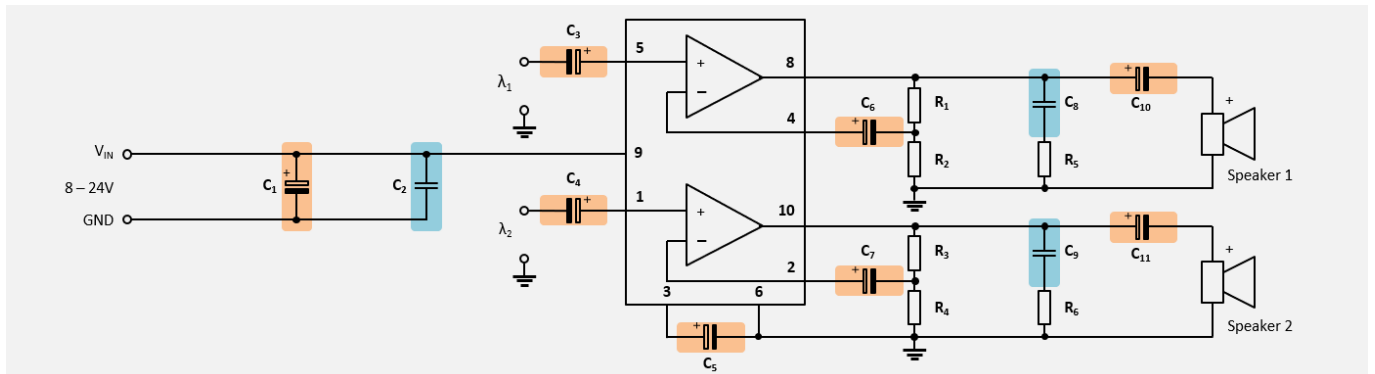
Example of a portable power adapter for USB-C laptops, smartphones and tablets with recommend products for the LC filter and to ensure stability (smoothing) during transient increase in the load voltage.



Designation	Circuit	Purpose	Specification	Series	Part Number
C ₁ , C ₂	LC filter	Input filtering	22µF; 400V; 105°C; Radial; 2000h D10xL25mm; 0.125A@120Hz	KM	KM220M400G250A
C ₁ , C ₂	LC filter	Input filtering	15µF; 400V; 105°C; Radial; 5000h D10xL20mm; 0.24A@120Hz	KF	KF150M400G200A
C ₃	DC/DC converter	Output filtering	470µF; 16V; 105°C; Radial; 2000h D5.5xL11mm; 2.69A@100kHz	PX	PX471M016C090P
C ₃	DC/DC converter	Output filtering	330µF; 12V; 105°C; Radial; 2000h D5xL9mm; 2.69A@100kHz	PX	PX331M012C090P

AUDIO SPEAKER

Example of an active audio speaker with treble and bass and the recommend products for the NF filter as well as the acoustic coupling.

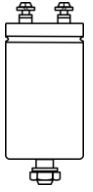


Designation	Circuit	Purpose	Specification	Series	Part Number
C ₁ , C ₃ , C ₄ , C ₅ C ₆ , C ₇ , C ₁₀ , C ₁₁	Audio speaker	NF filter	470µF; 35V; 85°C; Radial; 2000h D10xL16mm; 0.63A@120Hz	RW	RW471M035G160A
C ₂ , C ₈ , C ₉	Audio speaker	Acoustic coupling	47µF; 35V; 85°C; Radial; 2000h D10xL12.5mm; 0.15A@120Hz	NR	NR470M035G125ETA

TECHNICAL TERMS

Item	Description	SI units
V_R	Rated voltage	V
V_S	Surge voltage	V
V_{Ripple_AC}	Ripple voltage	V
$V_{Reverse}$	Reverse voltage	V
V_A	Application voltage, operating voltage	A
I_R	Rated ripple current, rated alternating current	A
I_A	Application current, operating current	A
I_{A_Max}	Maximum application current, maximum operating current	A
I_{Leak}	Leakage current	A
T_{0_Max}	Upper category temperature	°C
T_{0_Min}	Lower category temperature	°C
T_A	Application temperature, operating temperature	°C
T_S	Capacitor surface temperature	°C
ΔT_0	Core temperature increase by internal heating due to rated ripple current	°C
ΔT_A	Core temperature increase by internal heating due to application ripple current	°C
C_R	Rated capacitance	F
ΔC	Capacitance tolerance	%
C/C_R	Capacitance drift	-
$\tan \delta$	Dissipation factor	-
Z	Impedance	Ω
ESR	Equivalent series resistance	Ω
ESL	Equivalent series inductance	H
X_C	Capacitive reactance	Ω
X_L	Inductive reactance	Ω
f	Frequency	Hz
ω	Angular frequency	Hz
λ	FIT = failure in time	-
K_f	Multiplier for ripple current vs. frequency	-
K_T	Multiplier for ripple current vs. temperature	-
K_0	Dielectric constant derating coefficient at high temperature	-
L_0	Specified lifetime at max. capacitor temperature, rated voltage (and rated ripple current)	h
L_A	Expected lifetime at application conditions	h

OVERVIEW - SCREW TERMINAL ALUMINUM ELECTROLYTIC CAPACITORS



Features



Series	Page	High Ripple Current	Long Life	Standard	Ultra Long Life	With Stud	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)	Useful Life (hours)
RS	27				•	•	-40	+85	10	100	1800	10mF	2000	12000
RG	39			•		•	-40	+85	160	450	390	39000	2000	6000
							-25		500	630	1000	10000		
RP	47		•			•	-40	+85	160	450	270	68000	2000	10000
							-25		500	630	100	10000		
RX	61				•	•	-40	+85	160	450	220	1mF	5000	20000
							-25		500	630	10000	15000		
RU	75	•			•	•	-40	+85	160	450	1000	33000	2000	12000
							-25		500		820	10000		
RK	82			•		•	-40	+105	10	100	1000	10mF	2000	4000
RM	93		•			•	-40	+105	160	450	180	68000	2000	6000
							-25		500		330	10000		
RH	103	•	•			•	-40	+105	160	450	220	47000	2000	8000
RL	110		•		•	•	-40	+105	160	450	220	22000	5000	10000

RS SERIES ■ LONG LIFE 85°C TYPE

KEY FEATURES

- ALUMINUM ELECTROLYTIC CAPACITOR ■ Screw terminal type
- Useful life: 85°C ■ 12 000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +85°C	
Rated Voltage Range	V_R	10 ~ 100V DC	
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$	
Capacitance Range	C_R	1800 ~ 1000000 μ F	
Cap. Tolerance	ΔC	$\pm 20\%$ (120Hz ■ 20°C)	
Leakage Current (20°C ■ V_R applied)	I_{LEAK}	$\leq 0.018 \cdot (C_R \cdot V_R)^{0.85} + 4$ (μ A) or 5mA (whichever is smaller) ■ After 5 minutes [I_{LEAK} (μ A) ; C_R (μ F) ; V_R (V)]	
Dissipation Factor % (20°C ■ 120Hz)	$\tan \delta$	Not to exceed the values shown in standard ratings	
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	10 ~ 100
		Z-25°C/Z+20°C	3
		Z-40°C/Z+20°C	12
Lifetime Test			
Useful Life 85°C (V_R & I_R applied)	Test	12 000 hours	
	$\Delta C/C_R$	$\leq \pm 45\%$ of initial measured value	
	$\tan \delta$	$\leq 300\%$ of initial specified value	
	I_{Leak}	\leq the initial specified value	
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ■ parts show higher drift as test criteria		
Endurance 85°C (V_R & I_R applied)	Test	2 000 hours	
	$\Delta C/C_R$	$\leq \pm 20\%$ of initial measured value	
	$\tan \delta$	$\leq 200\%$ of initial specified value	
	I_{Leak}	\leq the initial specified value	
Shelf Life 85°C ($V_R = 0$)	Test	1 000 hours	
	$\Delta C/C_R$	$\leq \pm 20\%$ of initial measured value	
	$\tan \delta$	$\leq 200\%$ of initial specified value	
	I_{Leak}	\leq the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		
Vibration Resistance Test		Max. 10g force, f_{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ■ IEC 60068-2-6	

★ Remark: For Halogen Free products see chapter SLEEVE AND PRINTING selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	$\tan\delta$ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
10	33000	35	50	75	15	28	4500	RS333M010P500□□□
	39000	35	50	75	13	24	4750	RS393M010P500□□□
	47000	35	65	75	11	21	5400	RS473M010P650□□□
	56000	35	65	75	10	18	6000	RS563M010P650□□□
	68000	35	80	75	9	15	7600	RS683M010P800□□□
	82000	35	80	75	8	12	7700	RS823M010P800□□□
	100000	35	100	75	7	10	9300	RS104M010PA00□□□
	120000	35	120	75	6	10	9500	RS124M010PA20□□□
	150000	51	80	100	5	9	10100	RS154M010R800□□□
	180000	51	80	100	5	9	10800	RS184M010R800□□□
	220000	51	100	100	5	9	13000	RS224M010RA00□□□
	270000	51	120	100	4	8	14000	RS274M010RA20□□□
	330000	63.5	96	120	4	7	15600	RS334M010S960□□□
	390000	63.5	100	120	4	7	16200	RS394M010SA00□□□
	470000	63.5	120	120	3	6	18100	RS474M010SA20□□□
	560000	76.2	100	150	3	6	18400	RS564M010TA00□□□
	680000	76.2	120	150	3	6	19000	RS684M010TA20□□□
820000	76.2	155	150	3	6	24000	RS824M010TA55□□□	
16	22000	35	50	60	14	25	5000	RS223M016P500□□□
	27000	35	50	60	12	22	6300	RS273M016P500□□□
	33000	35	60	60	11	19	8500	RS333M016P600□□□
	33000	35	80	60	11	19	9500	RS333M016P800□□□
	47000	35	100	60	8	15	10000	RS473M016PA00□□□
	47000	35	80	60	8	15	9000	RS473M016P800□□□
	56000	35	80	60	7	13	9800	RS563M016P800□□□
	68000	35	100	60	7	13	10500	RS683M016PA00□□□
	68000	35	105	60	7	13	10800	RS683M016PA05□□□
	68000	51	80	70	7	13	12000	RS683M016R800□□□
	82000	35	100	60	6	11	12000	RS823M016PA00□□□
	100000	35	120	60	5	10	12500	RS104M016PA20□□□
	100000	51	100	70	5	10	14000	RS104M016RA00□□□
	100000	51	80	70	5	10	13000	RS104M016R800□□□
	120000	35	120	60	5	10	14200	RS124M016PA20□□□
	120000	51	80	70	5	10	14800	RS124M016R800□□□
	150000	51	100	70	5	9	16000	RS154M016RA00□□□
	150000	51	140	70	5	9	17200	RS154M016RA40□□□
	150000	51	80	70	5	9	15000	RS154M016R800□□□
	220000	51	120	70	4	8	14500	RS224M016RA20□□□
	220000	51	140	70	4	8	15600	RS224M016RA40□□□
	220000	63.5	105	80	4	8	17000	RS224M016SA05□□□
	220000	63.5	120	80	4	8	18000	RS224M016SA20□□□
	270000	63.5	100	80	4	7	18500	RS274M016SA00□□□
	270000	63.5	96	80	4	7	18200	RS274M016S960□□□
	330000	63.5	105	80	4	7	19000	RS334M016SA05□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r • Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
16	330000	63.5	120	80	4	7	20100	RS334M016SA20□□□
	330000	63.5	140	80	4	7	21500	RS334M016SA40□□□
	330000	76.2	120	120	4	7	22000	RS334M016TA20□□□
	390000	63.5	130	80	3	6	22500	RS394M016SA30□□□
	390000	76.2	100	120	3	6	22800	RS394M016TA00□□□
	390000	76.2	120	120	3	6	24700	RS394M016TA20□□□
	470000	76.2	115	120	3	6	25000	RS474M016TA15□□□
	470000	76.2	120	120	3	6	25500	RS474M016TA20□□□
	470000	76.2	140	120	3	6	27300	RS474M016TA40□□□
	560000	76.2	130	120	3	6	27600	RS564M016TA30□□□
	560000	76.2	140	120	3	6	28500	RS564M016TA40□□□
	680000	76.2	145	120	3	6	28700	RS684M016TA45□□□
	680000	76.2	160	120	3	6	30100	RS684M016TA60□□□
	820000	76.2	220	120	3	5	31000	RS824M016TB20□□□
	1000000	89	160	140	3	5	32000	RS105M016XA60□□□
	1000000	89	200	140	3	5	35300	RS105M016XB00□□□
25	15000	35	50	40	18	35	4000	RS153M025P500□□□
	18000	35	50	40	16	29	4500	RS183M025P500□□□
	22000	35	60	40	13	24	5500	RS223M025P600□□□
	27000	35	65	40	12	20	6900	RS273M025P650□□□
	33000	35	80	40	10	19	8200	RS333M025P800□□□
	39000	35	80	40	9	17	9000	RS393M025P800□□□
	47000	35	100	40	8	15	9500	RS473M025PA00□□□
	47000	35	105	40	8	15	9700	RS473M025PA05□□□
	47000	35	120	40	8	15	10300	RS473M025PA20□□□
	56000	35	100	40	7	13	10500	RS563M025PA00□□□
	56000	35	120	40	7	13	11400	RS563M025PA20□□□
	68000	35	120	40	6	11	12000	RS683M025PA20□□□
	68000	51	80	50	6	11	12300	RS683M025R800□□□
	82000	35	120	40	7	12	12500	RS823M025PA20□□□
	82000	51	80	50	7	12	12800	RS823M025R800□□□
	100000	51	100	50	5	10	13400	RS104M025RA00□□□
	100000	51	105	50	5	10	13700	RS104M025RA05□□□
	120000	51	115	50	5	9	14000	RS124M025RA15□□□
	120000	51	120	50	5	9	14300	RS124M025RA20□□□
	150000	51	120	50	4	8	15000	RS154M025RA20□□□
	150000	51	140	50	4	8	16100	RS154M025RA40□□□
	150000	63.5	105	70	4	8	16200	RS154M025SA05□□□
	180000	63.5	120	70	4	7	16800	RS184M025SA20□□□
	220000	63.5	105	70	4	7	17000	RS224M025SA05□□□
	220000	63.5	120	70	4	7	18000	RS224M025SA20□□□
	270000	63.5	130	70	3	6	18800	RS274M025SA30□□□
	270000	76.2	100	80	3	6	19300	RS274M025TA00□□□
	330000	76.2	120	80	3	6	21000	RS334M025TA20□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r • Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
25	330000	76.2	140	80	3	6	22500	RS334M025TA40□□□
	390000	76.2	115	80	3	6	22800	RS394M025TA15□□□
	390000	76.2	140	80	3	6	24800	RS394M025TA40□□□
	470000	76.2	150	80	3	6	25300	RS474M025TA50□□□
	560000	89	130	130	3	6	26000	RS564M025XA30□□□
	560000	89	140	130	3	6	26800	RS564M025XA40□□□
	680000	89	160	130	3	6	27500	RS684M025XA60□□□
	820000	89	190	130	3	6	30000	RS824M025XA90□□□
1000000	89	220	130	3	6	33000	RS105M025XB20□□□	
35	10000	35	50	30	19	40	4000	RS103M035P500□□□
	12000	35	50	30	17	33	4300	RS123M035P500□□□
	15000	35	50	30	14	27	4500	RS153M035P500□□□
	15000	35	80	30	14	27	5500	RS153M035P800□□□
	18000	35	80	30	12	22	6000	RS183M035P800□□□
	22000	35	100	30	10	18	7000	RS223M035PA00□□□
	22000	35	80	30	10	18	6300	RS223M035P800□□□
	27000	35	100	30	9	17	8000	RS273M035PA00□□□
	27000	35	80	30	9	17	7200	RS273M035P800□□□
	33000	35	100	30	8	15	9300	RS333M035PA00□□□
	33000	35	80	30	8	15	8400	RS333M035P800□□□
	39000	35	100	30	7	13	10000	RS393M035PA00□□□
	39000	35	120	30	7	13	10900	RS393M035PA20□□□
	47000	35	120	30	6	11	11500	RS473M035PA20□□□
	47000	51	96	50	6	11	12800	RS473M035R960□□□
	56000	51	96	50	6	10	13300	RS563M035R960□□□
	68000	51	100	50	5	10	15400	RS683M035RA00□□□
	68000	51	80	50	5	10	14000	RS683M035R800□□□
	82000	51	100	50	5	9	16000	RS823M035RA00□□□
	82000	63.5	96	60	5	9	17700	RS823M035S960□□□
	100000	51	120	50	4	8	18500	RS104M035RA20□□□
	100000	63.5	100	60	4	8	19300	RS104M035SA00□□□
	100000	63.5	115	60	4	8	20500	RS104M035SA15□□□
	120000	51	120	50	4	7	21000	RS124M035RA20□□□
	120000	63.5	120	60	4	7	23000	RS124M035SA20□□□
	150000	63.5	100	60	3	6	23700	RS154M035SA00□□□
	150000	63.5	120	60	3	6	25700	RS154M035SA20□□□
	180000	63.5	120	60	3	6	26200	RS184M035SA20□□□
	180000	76.2	115	70	3	6	27000	RS184M035TA15□□□
	220000	76.2	100	70	3	6	27600	RS224M035TA00□□□
	220000	76.2	140	70	3	6	31900	RS224M035TA40□□□
	220000	76.2	145	70	3	6	32400	RS224M035TA45□□□
270000	76.2	120	70	3	5	32700	RS274M035TA20□□□	
330000	76.2	140	70	3	5	33100	RS334M035TA40□□□	
330000	76.2	160	70	3	5	35100	RS334M035TA60□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μF)	ϕD (mm)	L (mm)	$\tan\delta$ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
35	330000	89	130	90	3	5	35500	RS334M035XA30□□□
	390000	89	155	90	3	5	36000	RS394M035XA55□□□
	470000	89	140	90	3	5	37000	RS474M035XA40□□□
	470000	89	170	90	3	5	40300	RS474M035XA70□□□
	680000	89	220	90	3	5	43000	RS684M035XB20□□□
40	10000	35	55	30	19	37	6300	RS103M040P550□□□
	15000	35	80	30	14	27	9000	RS153M040P800□□□
	22000	35	80	30	10	18	11000	RS223M040P800□□□
	33000	35	105	30	8	15	12000	RS333M040PA05□□□
	47000	51	80	50	6	11	14200	RS473M040R800□□□
	68000	51	105	50	5	10	15500	RS683M040RA05□□□
	100000	63.5	105	60	4	8	17000	RS104M040SA05□□□
	150000	76.2	105	70	3	6	19000	RS154M040TA05□□□
50	220000	76.2	140	70	3	6	21000	RS224M040TA40□□□
	6800	35	50	25	22	42	3700	RS682M050P500□□□
	10000	35	50	25	16	30	6400	RS103M050P500□□□
	10000	35	60	25	16	30	6600	RS103M050P600□□□
	12000	35	65	25	13	25	6900	RS123M050P650□□□
	12000	35	80	25	13	25	7200	RS123M050P800□□□
	15000	35	80	25	11	21	8700	RS153M050P800□□□
	18000	35	100	25	10	18	8800	RS183M050PA00□□□
	18000	35	80	25	10	18	8500	RS183M050P800□□□
	22000	35	100	25	8	15	10000	RS223M050PA00□□□
	22000	35	120	25	8	15	10500	RS223M050PA20□□□
	27000	35	120	25	7	13	10000	RS273M050PA20□□□
	33000	51	100	30	6	11	11000	RS333M050RA00□□□
	33000	51	80	30	6	11	11800	RS333M050R800□□□
	39000	51	100	30	6	10	12500	RS393M050RA00□□□
	39000	51	80	30	6	10	12000	RS393M050R800□□□
	47000	51	100	30	5	10	12800	RS473M050RA00□□□
	47000	51	115	30	5	10	13000	RS473M050RA15□□□
	56000	51	100	30	4	8	13000	RS563M050RA00□□□
	56000	63.5	96	50	4	8	13500	RS563M050S960□□□
	68000	51	120	30	3	8	13000	RS683M050RA20□□□
	68000	51	140	30	3	8	13500	RS683M050RA40□□□
	68000	63.5	96	50	3	8	13500	RS683M050S960□□□
	82000	63.5	100	50	3	7	14000	RS823M050SA00□□□
	82000	63.5	115	50	3	7	14000	RS823M050SA15□□□
	100000	63.5	120	50	3	7	14500	RS104M050SA20□□□
	100000	63.5	140	50	3	7	15500	RS104M050SA40□□□
	100000	76.2	100	60	3	7	14000	RS104M050TA00□□□
	100000	76.2	115	60	3	7	15000	RS104M050TA15□□□
	120000	63.5	120	50	3	7	16000	RS124M050SA20□□□
	120000	63.5	145	50	3	7	17000	RS124M050SA45□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
50	120000	76.2	115	60	3	7	17000	RS124M050TA15□□□
	150000	76.2	120	60	3	6	18200	RS154M050TA20□□□
	150000	76.2	130	60	3	6	18800	RS154M050TA30□□□
	150000	76.2	140	60	3	6	19000	RS154M050TA40□□□
	180000	76.2	140	60	3	6	20000	RS184M050TA40□□□
	180000	76.2	145	60	3	6	21000	RS184M050TA45□□□
	180000	76.2	155	60	3	6	22000	RS184M050TA55□□□
	220000	76.2	160	60	3	6	21500	RS224M050TA60□□□
	220000	89	130	80	3	6	21500	RS224M050XA30□□□
	270000	89	140	80	3	5	24700	RS274M050XA40□□□
	270000	89	155	80	3	5	25500	RS274M050XA55□□□
	330000	89	160	80	3	5	26000	RS334M050XA60□□□
63	3900	35	50	20	42	68	2600	RS392M063P500□□□
	4700	35	50	20	30	56	4700	RS472M063P500□□□
	4700	35	55	20	30	56	4800	RS472M063P550□□□
	5600	35	50	20	24	47	5000	RS562M063P500□□□
	5600	35	55	20	24	47	5300	RS562M063P550□□□
	6800	35	50	20	22	39	5200	RS682M063P500□□□
	6800	35	55	20	22	39	5900	RS682M063P550□□□
	6800	35	65	20	22	39	6200	RS682M063P650□□□
	8200	35	65	20	18	32	6500	RS822M063P650□□□
	8200	35	80	20	18	32	6800	RS822M063P800□□□
	10000	35	60	20	16	27	6900	RS103M063P600□□□
	10000	35	80	20	16	27	7500	RS103M063P800□□□
	12000	35	100	20	14	22	8800	RS123M063PA00□□□
	12000	35	80	20	14	22	8000	RS123M063P800□□□
	15000	35	105	20	11	21	10000	RS153M063PA05□□□
	18000	35	100	20	10	19	10000	RS183M063PA00□□□
	18000	35	120	20	10	19	10500	RS183M063PA20□□□
	22000	51	80	25	8	15	11000	RS223M063R800□□□
	27000	51	80	25	7	13	11500	RS273M063R800□□□
	27000	51	96	25	7	13	12000	RS273M063R960□□□
	33000	51	100	25	6	11	13500	RS333M063RA00□□□
	33000	51	105	25	6	11	14000	RS333M063RA05□□□
	39000	51	100	25	6	10	14000	RS393M063RA00□□□
	39000	51	115	25	6	10	14500	RS393M063RA15□□□
	39000	51	120	25	6	10	15000	RS393M063RA20□□□
	47000	51	120	25	5	10	16500	RS473M063RA20□□□
	47000	51	130	25	5	10	17000	RS473M063RA30□□□
	47000	63.5	100	30	5	10	17000	RS473M063SA00□□□
	47000	63.5	105	30	5	10	19000	RS473M063SA05□□□
	56000	63.5	100	30	4	8	17000	RS563M063SA00□□□
56000	63.5	115	30	4	8	18500	RS563M063SA15□□□	
68000	63.5	120	30	3	7	19000	RS683M063SA20□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
63	68000	63.5	145	30	3	7	20500	RS683M063SA45□□□
	68000	76.2	105	40	3	7	20200	RS683M063TA05□□□
	82000	63.5	130	30	3	7	20500	RS823M063SA30□□□
	82000	63.5	145	30	3	7	21000	RS823M063SA45□□□
	100000	76.2	115	40	3	7	22000	RS104M063TA15□□□
	100000	76.2	120	40	3	7	23000	RS104M063TA20□□□
	100000	76.2	130	40	3	7	24000	RS104M063TA30□□□
	100000	76.2	140	40	3	7	25000	RS104M063TA40□□□
	120000	76.2	130	40	3	7	26000	RS124M063TA30□□□
	120000	76.2	140	40	3	7	27000	RS124M063TA40□□□
	120000	76.2	145	40	3	7	27500	RS124M063TA45□□□
	150000	76.2	155	40	3	7	28500	RS154M063TA55□□□
	150000	76.2	220	40	3	7	31000	RS154M063TB20□□□
	150000	89	140	60	3	7	28500	RS154M063XA40□□□
	180000	89	130	60	3	6	29000	RS184M063XA30□□□
	220000	89	155	60	3	6	31000	RS224M063XA55□□□
	220000	89	160	60	3	6	31500	RS224M063XA60□□□
	270000	76.2	220	40	3	5	32000	RS274M063TB20□□□
330000	89	220	60	3	5	34000	RS334M063XB20□□□	
80	3300	35	50	20	50	80	2500	RS332M080P500□□□
	3900	35	50	20	36	68	2800	RS392M080P500□□□
	4700	35	60	20	25	46	5000	RS472M080P600□□□
	5600	35	65	20	22	40	5500	RS562M080P650□□□
	5600	35	80	20	22	40	6000	RS562M080P800□□□
	6800	35	60	20	19	35	6300	RS682M080P600□□□
	6800	35	80	20	19	35	6500	RS682M080P800□□□
	8200	35	80	20	17	32	7200	RS822M080P800□□□
	10000	35	100	20	13	23	8500	RS103M080PA00□□□
	10000	35	80	20	13	23	8000	RS103M080P800□□□
	12000	35	100	20	11	20	9200	RS123M080PA00□□□
	12000	35	120	20	11	20	9500	RS123M080PA20□□□
	15000	35	120	20	9	17	10500	RS153M080PA20□□□
	15000	51	80	20	9	17	10500	RS153M080R800□□□
	18000	35	120	20	8	15	11000	RS183M080PA20□□□
	18000	51	80	20	8	15	11000	RS183M080R800□□□
	22000	51	100	20	7	12	12000	RS223M080RA00□□□
	22000	51	96	20	7	12	11800	RS223M080R960□□□
	27000	51	96	20	7	11	13000	RS273M080R960□□□
	27000	63.5	100	25	7	11	15000	RS273M080SA00□□□
	33000	51	115	20	6	11	14800	RS333M080RA15□□□
	33000	51	120	20	6	11	15200	RS333M080RA20□□□
33000	63.5	100	25	6	11	15200	RS333M080SA00□□□	
39000	51	130	20	6	11	16000	RS393M080RA30□□□	
39000	63.5	120	25	6	11	16500	RS393M080SA20□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕD (mm)	L (mm)	$\tan\delta$ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
80	47000	63.5	115	25	6	10	20000	RS473M080SA15□□□
	47000	63.5	120	25	6	10	20500	RS473M080SA20□□□
	47000	63.5	145	25	6	10	21000	RS473M080SA45□□□
	56000	63.5	130	25	5	10	22000	RS563M080SA30□□□
	56000	63.5	145	25	5	10	23000	RS563M080SA45□□□
	68000	76.2	115	30	5	10	22000	RS683M080TA15□□□
	68000	76.2	120	30	5	10	23000	RS683M080TA20□□□
	68000	76.2	145	30	5	10	24000	RS683M080TA45□□□
	82000	76.2	130	30	5	9	24000	RS823M080TA30□□□
	82000	76.2	140	30	5	9	24500	RS823M080TA40□□□
	82000	76.2	145	30	5	9	25000	RS823M080TA45□□□
	100000	76.2	155	30	4	8	25500	RS104M080TA55□□□
	100000	76.2	160	30	4	8	26000	RS104M080TA60□□□
	100000	89	140	50	4	8	26000	RS104M080XA40□□□
	120000	89	130	50	4	7	23000	RS124M080XA30□□□
	150000	89	155	50	4	7	29000	RS154M080XA55□□□
	150000	89	160	50	4	7	30000	RS154M080XA60□□□
220000	89	230	50	3	6	33000	RS224M080XB30□□□	
100	1800	35	50	15	50	90	3500	RS182M100P500□□□
	2200	35	50	15	40	75	4300	RS222M100P500□□□
	2700	35	50	15	35	65	4500	RS272M100P500□□□
	3300	35	65	15	28	53	4800	RS332M100P650□□□
	3300	35	80	15	28	53	5300	RS332M100P800□□□
	3900	35	80	15	24	42	5600	RS392M100P800□□□
	4700	35	80	15	20	36	6700	RS472M100P800□□□
	5600	35	100	15	18	29	7200	RS562M100PA00□□□
	6800	35	100	15	15	24	7500	RS682M100PA00□□□
	6800	35	105	15	15	24	8700	RS682M100PA05□□□
	6800	35	80	15	15	24	8000	RS682M100P800□□□
	8200	35	120	15	12	20	9500	RS822M100PA20□□□
	8200	51	80	20	12	20	9500	RS822M100R800□□□
	10000	35	120	15	12	18	10000	RS103M100PA20□□□
	10000	51	80	20	9	18	10000	RS103M100R800□□□
	12000	51	80	20	9	16	10500	RS123M100R800□□□
	15000	51	100	20	8	15	12400	RS153M100RA00□□□
	15000	51	105	20	8	15	13000	RS153M100RA05□□□
	15000	51	80	20	8	15	11000	RS153M100R800□□□
	15000	51	96	20	8	15	11500	RS153M100R960□□□
	18000	51	100	20	7	14	12600	RS183M100RA00□□□
	18000	51	115	20	7	14	14000	RS183M100RA15□□□
	18000	51	120	20	7	14	14500	RS183M100RA20□□□
	18000	63.5	100	25	7	14	15000	RS183M100SA00□□□
	22000	51	100	20	6	11	13300	RS223M100RA00□□□
22000	51	120	20	6	11	15500	RS223M100RA20□□□	

STANDARD RATINGS

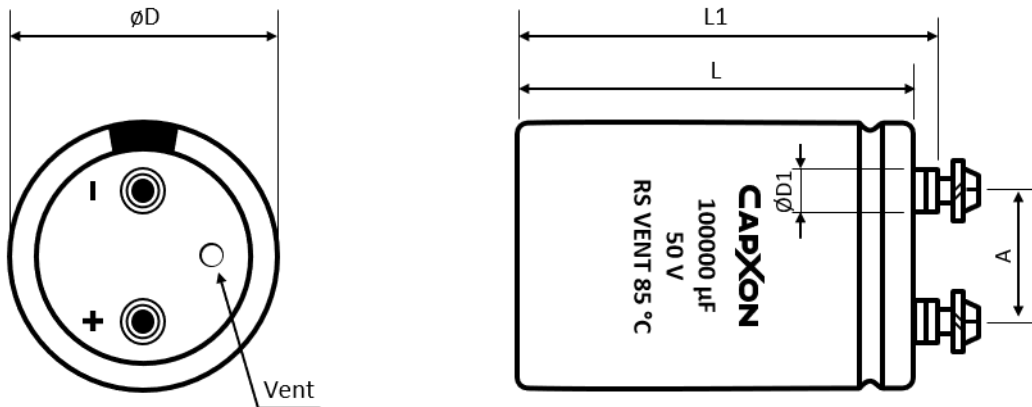
□□□ see terminal code at dimensions table

V_R (V)	C_R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
100	22000	51	130	20	6	11	16000	RS223M100RA30□□□
	22000	63.5	100	25	6	11	16500	RS223M100SA00□□□
	22000	63.5	105	25	6	11	17000	RS223M100SA05□□□
	27000	63.5	115	25	6	10	18000	RS273M100SA15□□□
	27000	63.5	120	25	6	10	18500	RS273M100SA20□□□
	33000	51	140	20	5	9	18500	RS333M100RA40□□□
	33000	63.5	130	25	5	9	18800	RS333M100SA30□□□
	33000	63.5	145	25	5	9	19000	RS333M100SA45□□□
	33000	76.2	100	30	5	9	18800	RS333M100TA00□□□
	33000	76.2	105	30	5	9	19000	RS333M100TA05□□□
	39000	76.2	115	30	5	9	20200	RS393M100TA15□□□
	39000	76.2	120	30	5	9	20500	RS393M100TA20□□□
	39000	76.2	145	30	5	9	21000	RS393M100TA45□□□
	47000	63.5	140	25	5	9	22000	RS473M100SA40□□□
	47000	76.2	130	30	5	9	24000	RS473M100TA30□□□
	47000	76.2	140	30	5	9	25000	RS473M100TA40□□□
	47000	76.2	145	30	5	9	25200	RS473M100TA45□□□
	56000	76.2	155	30	4	8	26000	RS563M100TA55□□□
	68000	76.2	140	30	4	8	26400	RS683M100TA40□□□
	68000	89	130	30	4	8	26500	RS683M100XA30□□□
	68000	89	140	30	4	8	26700	RS683M100XA40□□□
	82000	89	155	30	4	7	27000	RS823M100XA55□□□
	100000	89	160	30	4	7	27200	RS104M100XA60□□□
	100000	89	170	30	4	7	27500	RS104M100XA70□□□
150000	89	230	30	3	6	31000	RS154M100XB30□□□	

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

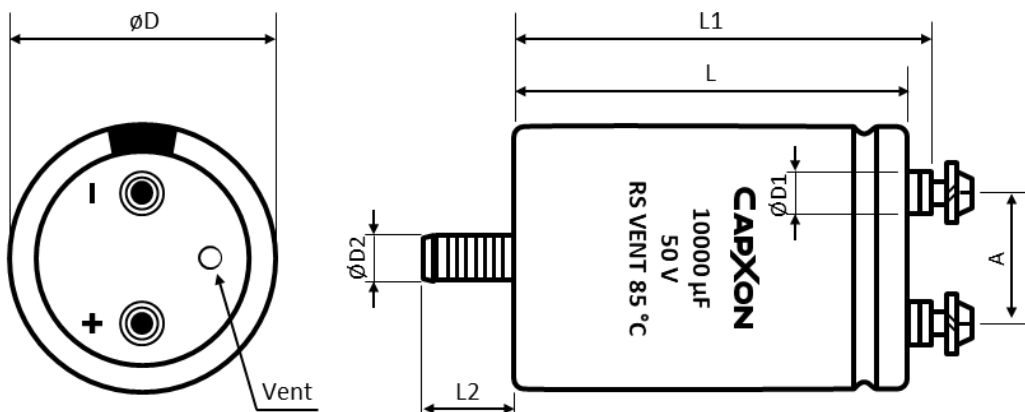
V_R (V)	∅ D (mm)	Frequency (Hz)				
		50/60	100/120	1k	10k	≥ 50k
10 ~ 50	35 ~ 89	0.95	1	1.05	1.09	1.12
63 ~ 80	35	0.9	1	1.1	1.18	1.22
	50 ~ 89	0.95	1	1.05	1.09	1.12
100	35	0.8	1	1.22	1.3	1.33
	50	0.9	1	1.1	1.18	1.22
	63.5 ~ 89	0.95	1	1.05	1.09	1.12

DIMENSIONS - Ring clamp mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$D1 \text{ max.}$	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67

DIMENSIONS - Threaded stud mounting - All dimensions in mm



DIMENSIONS • Threaded stud mounting • All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RS563M016P800E50
> 35	PVC	Thermo	Yes	No	-	RS334M025TA20E50
> 35	PET	Thermo	No	No	(*) Note	RS334M025TA20E50*
> 35	PET	Ink	No	Yes	(**) Note	RS334M025TA20E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

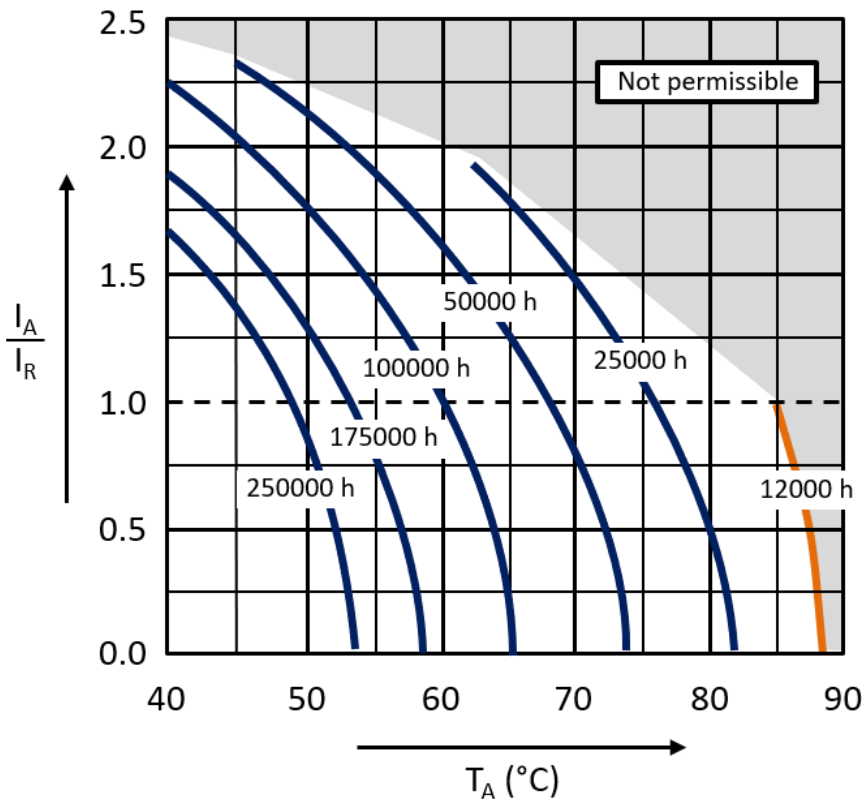
- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines Page 134	Packaging Information Liquid Screw Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RG SERIES ▪ STANDARD 85°C TYPE

Key FEATURES



- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Screw terminal type
- Useful life: 85°C ▪ 6000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics			
Operating Temperature Range		-40 ~ +85°C		-25 ~ +85°C	
Rated Voltage Range	V _R	160 ~ 450V DC		500 ~ 630V DC	
Surge Voltage	V _S	(V _R ≤ 315V): V _S = 1.15·V _R		(V _R > 315V): V _S = 1.10·V _R	
Capacitance Range	C _R	390 ~ 39000μF		1000 ~ 10000μF	
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)			
Leakage Current (20°C ▪ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (μA) or 5mA (whichever is smaller) ▪ After 5 minutes [I _{LEAK} (μA) ; C _R (μF) ; V _R (V)]			
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V _R (V DC)	160 ~ 450	500 ~ 550	≥ 600
		tanδ	15	20	25
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450	≥ 500	
		Z-25°C/Z+20°C	4	4	
		Z-40°C/Z+20°C	10	-	

Lifetime Test			
Useful Life 85°C (V _R & I _R applied)	Test	6000 hours	
	ΔC/C _R	≤ ±15% of initial measured value	
	tanδ	≤ 175% of initial specified value	
	I _{Leak}	≤ the initial specified value	
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ▪ parts show higher drift as test criteria		
Endurance 85°C (V _R & I _R applied)	Test	2000 hours	
	ΔC/C _R	≤ ±10% of initial measured value	
	tanδ	≤ 130% of initial specified value	
	I _{Leak}	≤ the initial specified value	
Shelf Life 85°C (V _R = 0)	Test	1000 hours	
	ΔC/C _R	≤ ±10% of initial measured value	
	tanδ	≤ 130% of initial specified value	
	I _{Leak}	≤ the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4		
Vibration Resistance Test	Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6		

★ Remark: For **Halogen Free** products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
160	1000	35	60	120	200	2800	RG102M160P60□□□
	1500	35	60	76	130	3000	RG152M160P60□□□
	2200	35	100	53	90	4000	RG222M160PA00□□□
	3300	35	100	35	60	4700	RG332M160PA00□□□
	3900	51	75	30	51	5300	RG392M160R750□□□
	4700	51	75	25	42	6000	RG472M160R750□□□
	5600	51	96	21	36	7000	RG562M160R960□□□
	6800	51	96	17	29	8500	RG682M160R960□□□
	8200	51	115	14	24	9200	RG822M160RA15□□□
	10000	51	120	12	20	10500	RG103M160RA20□□□
	10000	63.5	96	12	20	10500	RG103M160S960□□□
	12000	51	120	10	17	11500	RG123M160RA20□□□
	12000	63.5	100	10	17	11700	RG123M160SA00□□□
	15000	63.5	120	8	13	14300	RG153M160SA20□□□
	18000	63.5	130	7	11	15600	RG183M160SA30□□□
	22000	76.2	120	5	9	16700	RG223M160TA20□□□
	27000	76.2	130	4	7	20200	RG273M160TA30□□□
	33000	89	130	4	6	23800	RG333M160XA30□□□
39000	89	157	3	5	27900	RG393M160XA57□□□	
200	1000	35	60	120	200	3000	RG102M200P600□□□
	1500	35	80	76	130	3300	RG152M200P800□□□
	2200	35	100	53	90	4200	RG222M200PA00□□□
	2700	35	120	43	74	4700	RG272M200PA20□□□
	3300	35	120	35	60	4800	RG332M200PA20□□□
	3300	51	80	35	60	4900	RG332M200R800□□□
	3900	51	75	30	51	5500	RG392M200R750□□□
	4700	51	96	25	42	6400	RG472M200R960□□□
	5600	51	115	21	36	7600	RG562M200RA15□□□
	6800	51	130	17	29	8800	RG682M200RA30□□□
	8200	63.5	96	14	24	9400	RG822M200S960□□□
	10000	63.5	120	12	20	11200	RG103M200SA20□□□
	10000	63.5	96	12	20	10400	RG103M200S960□□□
	15000	76.2	96	8	13	14400	RG153M200T960□□□
	18000	76.2	130	7	11	16500	RG183M200TA30□□□
	22000	76.2	155	5	9	19600	RG223M200TA55□□□
	22000	89	120	5	9	19200	RG223M200XA20□□□
	27000	89	130	4	7	21500	RG273M200XA30□□□
33000	89	157	4	6	25300	RG333M200XA57□□□	
250	680	35	60	170	290	1800	RG681M250P600□□□
	1000	35	80	120	200	3300	RG102M250P800□□□
	1500	35	80	76	130	3500	RG152M250P800□□□
	1800	35	100	65	110	3500	RG182M250PA00□□□
	2200	35	120	53	90	3800	RG222M250PA20□□□
	2200	51	75	53	90	4000	RG222M250R750□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
250	2700	51	75	43	74	4400	RG272M250R750□□□
	3300	51	96	35	60	5400	RG332M250R960□□□
	3900	51	115	30	51	6300	RG392M250RA15□□□
	4700	51	120	25	42	7000	RG472M250RA20□□□
	4700	63.5	96	25	42	7300	RG472M250S960□□□
	5600	63.5	96	21	36	7800	RG562M250S960□□□
	6800	51	140	17	29	8500	RG682M250RA40□□□
	6800	63.5	115	17	29	9100	RG682M250SA15□□□
	6800	76.2	100	17	29	9500	RG682M250TA00□□□
	8200	63.5	115	14	24	10000	RG822M250SA15□□□
	10000	63.5	130	12	20	11700	RG103M250SA30□□□
	10000	76.2	115	12	20	12200	RG103M250TA15□□□
	12000	76.2	115	10	17	12900	RG123M250TA15□□□
	15000	76.2	130	8	13	15100	RG153M250TA30□□□
	15000	89	120	8	13	15900	RG153M250XA20□□□
	18000	76.2	155	7	11	17700	RG183M250TA55□□□
22000	89	157	5	9	20900	RG223M250XA57□□□	
350	390	35	50	300	510	1700	RG391M350P500□□□
	470	35	80	250	420	2200	RG471M350P800□□□
	560	35	80	210	360	2400	RG561M350P800□□□
	680	35	80	170	290	2600	RG681M350P800□□□
	820	35	100	140	240	3100	RG821M350PA00□□□
	1000	35	100	120	200	3500	RG102M350PA00□□□
	1200	51	75	100	170	3800	RG122M350R750□□□
	1500	51	75	76	130	4300	RG152M350R750□□□
	1800	51	80	65	110	6980	RG182M350R800□□□
	2200	51	96	53	90	8000	RG222M350R960□□□
	2700	51	105	43	74	9100	RG272M350RA05□□□
	2700	63.5	80	43	74	9200	RG272M350S800□□□
	3300	51	115	35	60	10300	RG332M350RA15□□□
	3300	63.5	96	35	60	10900	RG332M350S960□□□
	3900	51	130	30	51	11500	RG392M350RA30□□□
	3900	63.5	100	30	51	11700	RG392M350SA00□□□
	4700	63.5	100	25	42	15100	RG472M350SA00□□□
	5600	63.5	115	21	36	17500	RG562M350SA15□□□
	5600	76.2	96	21	36	18200	RG562M350T960□□□
	6800	63.5	140	17	29	20500	RG682M350SA40□□□
	6800	76.2	100	17	29	20100	RG682M350TA00□□□
	8200	76.2	115	14	24	23400	RG822M350TA15□□□
	10000	76.2	135	12	20	27700	RG103M350TA35□□□
	10000	89	120	12	20	28700	RG103M350XA20□□□
12000	76.2	168	10	17	30100	RG123M350TA68□□□	
12000	89	125	10	17	28900	RG123M350XA25□□□	
15000	89	150	8	13	34900	RG153M350XA50□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

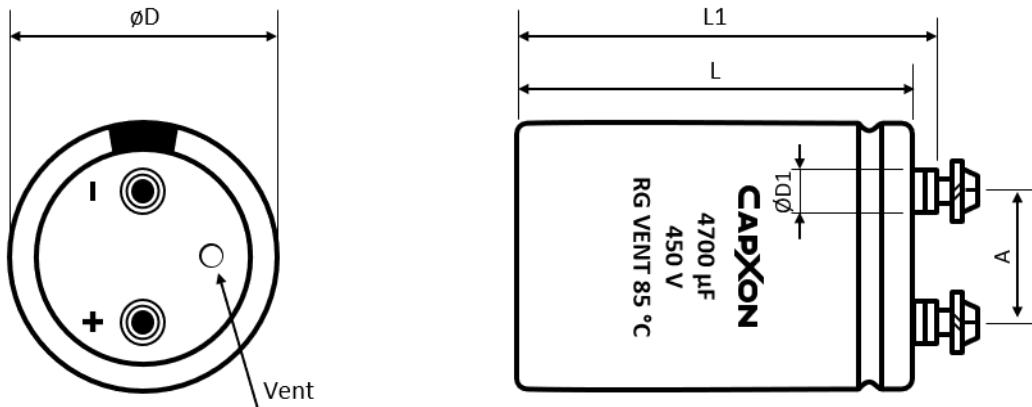
V _R (V)	CR (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
400	1000	51	75	120	200	3500	RG102M400R750□□□
	1200	51	75	100	170	3850	RG122M400R750□□□
	1500	51	80	76	130	6590	RG152M400R800□□□
	1800	51	96	65	110	7490	RG182M400R960□□□
	2200	51	105	53	90	8500	RG222M400RA05□□□
	2200	63.5	80	53	90	8000	RG222M400S800□□□
	2700	51	118	43	74	9730	RG272M400RA18□□□
	2700	63.5	96	43	74	10000	RG272M400S960□□□
	3300	63.5	96	35	60	12600	RG332M400S960□□□
	3900	63.5	100	30	51	13700	RG392M400SA00□□□
	4700	63.5	115	25	42	16000	RG472M400SA15□□□
	4700	76.2	96	25	42	16700	RG472M400T960□□□
	5600	63.5	130	21	36	18400	RG562M400SA30□□□
	5600	76.2	105	21	36	18600	RG562M400TA05□□□
	6800	76.2	110	17	29	20900	RG682M400TA10□□□
	8200	76.2	130	14	24	24700	RG822M400TA30□□□
	10000	76.2	160	12	20	26900	RG103M400TA60□□□
	10000	89	125	12	20	26400	RG103M400XA25□□□
12000	76.2	190	10	17	31800	RG123M400TA90□□□	
12000	89	145	10	17	30800	RG123M400XA45□□□	
15000	89	236	8	13	38200	RG153M400XB36□□□	
450	1000	51	75	120	200	3500	RG102M450R750□□□
	1200	51	80	100	170	5360	RG122M450R800□□□
	1500	51	96	76	130	6220	RG152M450R960□□□
	1500	63.5	80	76	130	6250	RG152M450S800□□□
	1800	51	96	65	110	7910	RG182M450R960□□□
	2200	51	118	53	90	8000	RG222M450RA18□□□
	2200	63.5	96	53	90	8260	RG222M450S960□□□
	2700	63.5	100	43	74	11400	RG272M450SA00□□□
	3300	63.5	105	35	60	12900	RG332M450SA05□□□
	3900	63.5	115	30	51	14600	RG392M450SA15□□□
	3900	76.2	100	30	51	15200	RG392M450TA00□□□
	4700	63.5	135	25	42	17200	RG472M450SA35□□□
	4700	76.2	105	25	42	17000	RG472M450TA05□□□
	5600	76.2	115	21	36	19300	RG562M450TA15□□□
	6800	76.2	135	17	29	22800	RG682M450TA35□□□
	10000	76.2	190	12	20	29000	RG103M450TA90□□□
10000	89	150	12	20	28500	RG103M450XA50□□□	
12000	89	236	10	17	33000	RG123M450XB36□□□	
500	1000	51	115	160	270	4600	RG102M500RA15□□□
	1000	51	85	160	270	4020	RG102M500R850□□□
	1200	51	96	130	220	4220	RG122M500R960□□□
	1500	51	115	110	180	5140	RG152M500RA15□□□
	1500	63.5	96	110	180	5420	RG152M500S960□□□
	1800	51	130	88	150	5940	RG182M500RA30□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

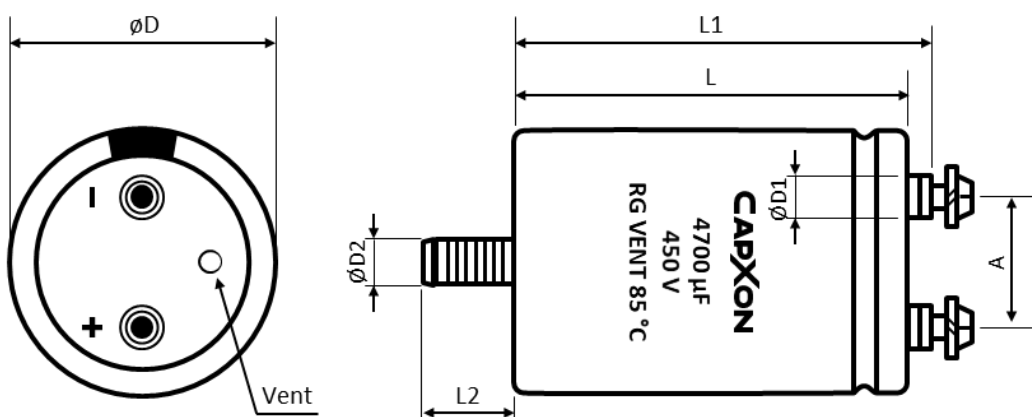
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
500	1800	63.5	96	88	150	5950	RG182M500S960□□□
	2200	63.5	115	71	120	7100	RG222M500SA15□□□
	2200	76.2	96	71	120	7300	RG222M500T960□□□
	2700	63.5	130	58	98	8310	RG272M500SA30□□□
	3300	76.2	115	47	80	9650	RG332M500TA15□□□
	3900	76.2	130	40	68	11100	RG392M500TA30□□□
	4700	76.2	155	33	56	13100	RG472M500TA55□□□
	5600	89	145	28	47	13800	RG562M500XA45□□□
	6800	89	155	23	39	15900	RG682M500XA55□□□
	8200	89	180	19	32	17200	RG822M500XA80□□□
10000	89	236	16	27	22100	RG103M500XB36□□□	
550	1200	51	115	130	220	4600	RG122M550RA15□□□
	1500	63.5	96	110	180	5420	RG152M550S960□□□
	1800	76.2	80	88	150	6120	RG182M550T800□□□
	2200	76.2	96	71	120	7300	RG222M550T960□□□
	2700	76.2	115	58	98	8730	RG272M550TA15□□□
	3300	76.2	130	47	80	10200	RG332M550TA30□□□
	3900	76.2	155	40	68	12100	RG392M550TA55□□□
	4700	76.2	180	33	56	15100	RG472M550TA80□□□
5600	89	155	28	47	14500	RG562M550XA55□□□	
600	1200	63.5	96	160	280	7700	RG122M600S960□□□
	1500	63.5	115	130	220	8300	RG152M600SA15□□□
	1500	76.2	96	130	220	8500	RG152M600T960□□□
	1800	63.5	130	110	180	10300	RG182M600SA30□□□
	1800	76.2	96	110	180	10100	RG182M600T960□□□
	2200	76.2	115	88	150	12000	RG222M600TA15□□□
	2700	76.2	130	71	120	12100	RG272M600TA30□□□
	3000	76.2	155	65	110	15600	RG302M600TA55□□□
	3300	76.2	155	59	100	16400	RG332M600TA55□□□
	3300	89	130	59	100	16570	RG332M600XA30□□□
	3900	76.2	190	50	85	17700	RG392M600TA90□□□
	3900	89	145	50	85	17400	RG392M600XA45□□□
	4700	89	157	41	71	21000	RG472M600XA57□□□
5600	89	190	35	59	22800	RG562M600XA90□□□	
6800	89	220	29	49	24400	RG682M600XB20□□□	
630	1000	63.5	130	190	330	6000	RG102M630SA30□□□
	1200	76.2	115	160	280	6700	RG122M630TA15□□□
	1500	76.2	130	130	220	8100	RG152M630TA30□□□
	1800	76.2	155	110	180	9800	RG182M630TA55□□□
	2200	89	130	88	150	10700	RG222M630XA30□□□
	2700	89	157	71	120	12800	RG272M630XA57□□□
	3300	89	171	59	100	14700	RG332M630XA71□□□
	3900	89	196	50	85	17900	RG392M630XA96□□□
	4700	100	220	41	71	21600	RG472M630DB20□□□
5600	100	250	35	59	24900	RG562M630DB50□□□	

DIMENSIONS • Ring clamp mounting • All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$D1$ max.	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M8	100	100 ~ 240	110 ~ 250	17.5	41.5	16	5	A87

DIMENSIONS • Threaded stud mounting • All dimensions in



DIMENSIONS • Threaded stud mounting • All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M8	100	100 ~ 240	110 ~ 250	16	17.5	M12	41.5	16	5	E87

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RG332M160PA00E50
> 35	PVC	Thermo	Yes	No	-	RG103M200SA20E50
> 35	PET	Thermo	No	No	(*) Note	RG103M200SA20E50*
> 35	PET	Ink	No	Yes	(**) Note	RG103M200SA20E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

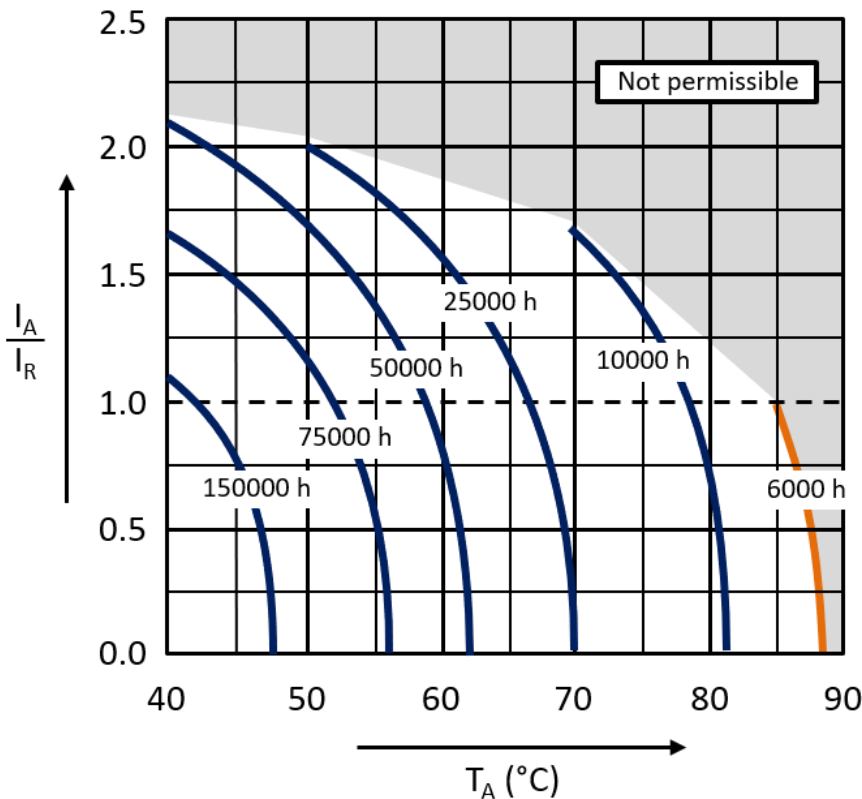
Frequency (Hz)	50/60	100/120	300	1k	≥ 3k
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RP SERIES ■ LONG LIFE 85°C TYPE

KEY FEATURES



- ALUMINUM ELECTROLYTIC CAPACITOR ■ Screw terminal type
- Useful life: 85°C ■ 10000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics			
Operating Temperature Range		-40 ~ +85°C		-25 ~ +85°C	
Rated Voltage Range	V _R	160 ~ 450V DC		500 ~ 630V DC	
Surge Voltage	V _S	(V _R ≤ 315V): V _S = 1.15·V _R		(V _R > 315V): V _S = 1.10·V _R	
Capacitance Range	C _R	270 ~ 68000μF		100 ~ 10000μF	
Cap. Tolerance	ΔC	±20% (120Hz ■ 20°C)			
Leakage Current (20°C ■ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (μA) or 5mA (whichever is smaller) ■ After 5 minutes [I _{LEAK} (μA) ; C _R (μF) ; V _R (V)]			
Dissipation Factor % (20°C ■ 120Hz)	tanδ	V _R (V DC)	160 ~ 450	≥ 500 ~ 550	≥ 600
		tanδ	15	20	25
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450	≥ 500	
		Z-25°C/Z+20°C	4	4	
		Z-40°C/Z+20°C	10	-	

Lifetime Test					
Useful Life 85°C (V _R & I _R applied)	Test	10 000 hours			
	ΔC/C _R	≤ ±15% of initial measured value			
	tanδ	≤ 175% of initial specified value			
	I _{Leak}	≤ the initial specified value			
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ■ parts show higher drift as test criteria				
Endurance 85°C (V _R & I _R applied)	Test	2 000 hours			
	ΔC/C _R	≤ ±10% of initial measured value			
	tanδ	≤ 130% of initial specified value			
	I _{Leak}	≤ the initial specified value			
Shelf Life 85°C (V _R = 0)	Test	1 000 hours			
	ΔC/C _R	≤ ±10% of initial measured value			
	tanδ	≤ 130% of initial specified value			
	I _{Leak}	≤ the initial specified value			
	Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4				
Vibration Resistance Test	Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ■ IEC 60068-2-6				

★ Remark: For Halogen Free products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
160	1000	35	60	110	200	2800	RP102M160P600□□□
	1500	35	60	74	130	3100	RP152M160P600□□□
	2200	35	80	52	90	4200	RP222M160P800□□□
	2200	35	100	52	90	4700	RP222M160PA00□□□
	3300	35	100	34	60	5300	RP332M160PA00□□□
	3300	35	120	34	60	5800	RP332M160PA20□□□
	3900	51	75	29	51	5500	RP392M160R750□□□
	3900	51	80	29	51	5650	RP392M160R800□□□
	4700	51	75	24	42	5900	RP472M160R750□□□
	4700	51	80	24	42	6100	RP472M160R800□□□
	5600	51	96	20	36	7200	RP562M160R960□□□
	6800	51	96	17	29	8000	RP682M160R960□□□
	6800	51	100	17	29	8100	RP682M160RA00□□□
	6800	51	120	17	29	8800	RP682M160RA20□□□
	8200	51	115	14	24	9300	RP822M160RA15□□□
	8200	51	120	14	24	9500	RP822M160RA20□□□
	10000	51	140	11	20	10900	RP103M160RA40□□□
	10000	63.5	96	11	20	10500	RP103M160S960□□□
	10000	63.5	100	11	20	10700	RP103M160SA00□□□
	12000	63.5	96	10	17	11500	RP123M160S960□□□
	15000	63.5	120	8	13	14000	RP153M160SA20□□□
	15000	63.5	130	8	13	14500	RP153M160SA30□□□
	15000	76.2	100	8	13	14600	RP153M160TA00□□□
	18000	63.5	130	6	11	15700	RP183M160SA30□□□
	22000	76.2	120	5	9	17600	RP223M160TA20□□□
	22000	76.2	130	5	9	18300	RP223M160TA30□□□
	27000	76.2	130	4	7	20300	RP273M160TA30□□□
	33000	76.2	160	3	6	22000	RP333M160TA60□□□
	33000	89	130	3	6	23800	RP333M160XA30□□□
	33000	89	140	3	6	24600	RP333M160XA40□□□
39000	89	157	3	6	28000	RP393M160XA57□□□	
47000	89	170	3	6	28200	RP473M160XA70□□□	
68000	89	230	3	5	28500	RP683M160XB30□□□	
200	1000	35	60	110	200	3000	RP102M200P600□□□
	1500	35	80	74	130	3500	RP152M200P800□□□
	2200	35	100	52	90	4800	RP222M200PA00□□□
	2700	35	120	42	74	5500	RP272M200PA20□□□
	3300	35	120	34	60	5900	RP332M200PA20□□□
	3300	51	75	34	60	6000	RP332M200R750□□□
	3900	51	75	29	51	6200	RP392M200R750□□□
	4700	51	96	24	42	6400	RP472M200R960□□□
	4700	51	100	24	42	6500	RP472M200RA00□□□
	5600	51	115	20	36	7600	RP562M200RA15□□□
	6800	51	120	17	29	8700	RP682M200RA20□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
200	6800	51	130	17	29	9000	RP682M200RA30□□□
	8200	63.5	96	14	24	9500	RP822M200S960□□□
	8200	63.5	100	14	24	9700	RP822M200SA00□□□
	10000	63.5	96	11	20	10400	RP103M200S960□□□
	10000	63.5	120	11	20	11500	RP103M200SA20□□□
	12000	76.2	96	10	17	12100	RP123M200T960□□□
	15000	76.2	96	8	13	14600	RP153M200T960□□□
	15000	76.2	120	8	13	16000	RP153M200TA20□□□
	18000	76.2	130	6	11	16600	RP183M200TA30□□□
	22000	76.2	155	5	9	19800	RP223M200TA55□□□
	22000	89	120	5	9	19300	RP223M200XA20□□□
	27000	89	130	4	7	21500	RP273M200XA30□□□
	33000	89	157	3	6	25600	RP333M200XA57□□□
	47000	89	220	3	5	28300	RP473M200XB20□□□
250	680	35	60	170	290	2500	RP681M250P600□□□
	1000	35	80	110	200	3100	RP102M250P800□□□
	1500	35	80	74	130	3800	RP152M250P800□□□
	1800	35	100	63	110	3900	RP182M250PA00□□□
	2200	35	120	52	90	4900	RP222M250PA20□□□
	2200	51	75	52	90	4800	RP222M250R750□□□
	2700	51	75	42	74	4900	RP272M250R750□□□
	3300	51	96	34	60	6100	RP332M250R960□□□
	3300	51	100	34	60	6200	RP332M250RA00□□□
	3900	51	115	29	51	6500	RP392M250RA15□□□
	4700	51	120	24	42	8400	RP472M250RA20□□□
	4700	51	140	24	42	9100	RP472M250RA40□□□
	4700	63.5	96	24	42	8650	RP472M250S960□□□
	5600	63.5	96	20	36	9300	RP562M250S960□□□
	6800	51	140	17	29	9900	RP682M250RA40□□□
	6800	63.5	115	17	29	10200	RP682M250SA15□□□
	6800	76.2	100	17	29	10600	RP682M250TA00□□□
	8200	63.5	115	14	24	10900	RP822M250SA15□□□
	10000	63.5	130	11	20	11700	RP103M250SA30□□□
	10000	76.2	120	11	20	12500	RP103M250TA20□□□
	10000	76.2	140	11	20	13300	RP103M250TA40□□□
	12000	76.2	115	10	17	12800	RP123M250TA15□□□
	15000	76.2	130	8	13	15200	RP153M250TA30□□□
	15000	76.2	150	8	13	16200	RP153M250TA50□□□
	15000	89	120	8	13	16000	RP153M250XA20□□□
	18000	76.2	155	6	11	17800	RP183M250TA55□□□
	22000	89	157	5	9	21000	RP223M250XA57□□□
33000	89	220	3	6	25700	RP333M250XB20□□□	
47000	100	240	3	5	28400	RP473M250DB40□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
350	390	35	50	290	510	1900	RP391M350P500□□□
	470	35	60	240	420	2100	RP471M350P600□□□
	470	35	65	240	420	2200	RP471M350P650□□□
	560	35	70	210	360	2300	RP561M350P700□□□
	680	35	80	170	290	2800	RP681M350P800□□□
	820	35	90	140	240	3000	RP821M350P900□□□
	1000	35	100	110	200	3600	RP102M350PA00□□□
	1000	51	65	110	200	3700	RP102M350R650□□□
	1200	35	120	97	170	3900	RP122M350PA20□□□
	1200	51	75	97	170	3900	RP122M350R750□□□
	1500	51	60	74	130	4400	RP152M350R600□□□
	1500	51	65	74	130	4500	RP152M350R650□□□
	1500	51	75	74	130	4800	RP152M350R750□□□
	1800	51	70	63	110	5800	RP182M350R700□□□
	1800	51	75	63	110	6000	RP182M350R750□□□
	1800	51	80	63	110	6100	RP182M350R800□□□
	1800	51	85	63	110	6300	RP182M350R850□□□
	2200	51	80	52	90	6700	RP222M350R800□□□
	2200	51	96	52	90	7300	RP222M350R960□□□
	2200	51	105	52	90	7600	RP222M350RA05□□□
	2200	51	120	52	90	8000	RP222M350RA20□□□
	2700	51	90	42	74	7800	RP272M350R900□□□
	2700	51	105	42	74	8400	RP272M350RA05□□□
	2700	51	115	42	74	8700	RP272M350RA15□□□
	2700	63.5	65	42	74	7700	RP272M350S650□□□
	2700	63.5	80	42	74	8400	RP272M350S800□□□
	2700	63.5	96	42	74	9100	RP272M350S960□□□
	3300	51	105	34	60	8500	RP332M350RA05□□□
	3300	51	120	34	60	9100	RP332M350RA20□□□
	3300	51	130	34	60	9400	RP332M350RA30□□□
	3300	63.5	75	34	60	8400	RP332M350S750□□□
	3300	63.5	85	34	60	8800	RP332M350S850□□□
	3300	63.5	96	34	60	9300	RP332M350S960□□□
	3300	63.5	115	34	60	10000	RP332M350SA15□□□
	3900	51	130	29	51	11300	RP392M350RA30□□□
	3900	63.5	80	29	51	10300	RP392M350S800□□□
	3900	63.5	96	29	51	11100	RP392M350S960□□□
	3900	63.5	105	29	51	11600	RP392M350SA05□□□
	3900	63.5	115	29	51	12000	RP392M350SA15□□□
	3900	76.2	100	29	51	12600	RP392M350TA00□□□
4700	51	140	24	42	12900	RP472M350RA40□□□	
4700	63.5	90	24	42	12000	RP472M350S900□□□	
4700	63.5	115	24	42	13300	RP472M350SA15□□□	
4700	63.5	130	24	42	14000	RP472M350SA30□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
350	4700	76.2	70	24	42	12000	RP472M350T700□□□
	4700	76.2	96	24	42	13700	RP472M350T960□□□
	4700	76.2	100	24	42	13800	RP472M350TA00□□□
	5600	63.5	100	20	36	13500	RP562M350SA00□□□
	5600	63.5	130	20	36	15200	RP562M350SA30□□□
	5600	76.2	85	20	36	14100	RP562M350T850□□□
	5600	76.2	96	20	36	14800	RP562M350T960□□□
	5600	76.2	115	20	36	16000	RP562M350TA15□□□
	5600	76.2	125	20	36	16500	RP562M350TA25□□□
	5600	89	105	20	36	16800	RP562M350XA05□□□
	6800	63.5	125	17	29	15900	RP682M350SA25□□□
	6800	63.5	143	17	29	16900	RP682M350SA43□□□
	6800	76.2	95	17	29	15700	RP682M350T950□□□
	6800	76.2	115	17	29	17000	RP682M350TA15□□□
	6800	76.2	130	17	29	17900	RP682M350TA30□□□
	6800	76.2	140	17	29	18500	RP682M350TA40□□□
	6800	89	100	17	29	17500	RP682M350XA00□□□
	8200	63.5	145	14	24	18600	RP822M350SA45□□□
	8200	76.2	105	14	24	17900	RP822M350TA05□□□
	8200	76.2	130	14	24	19600	RP822M350TA30□□□
	8200	76.2	143	14	24	20400	RP822M350TA43□□□
	8200	76.2	155	14	24	21200	RP822M350TA55□□□
	10000	63.5	165	11	20	21800	RP103M350SA65□□□
	10000	76.2	125	11	20	21300	RP103M350TA25□□□
	10000	76.2	155	11	20	23400	RP103M350TA55□□□
	10000	76.2	170	11	20	24400	RP103M350TA70□□□
	10000	76.2	190	11	20	25600	RP103M350TA90□□□
	10000	89	95	11	20	20800	RP103M350X950□□□
	10000	89	120	11	20	22900	RP103M350XA20□□□
	10000	89	130	11	20	23700	RP103M350XA30□□□
	10000	89	157	11	20	25700	RP103M350XA57□□□
	12000	76.2	150	10	17	23500	RP123M350TA50□□□
	12000	76.2	180	10	17	25500	RP123M350TA80□□□
	12000	76.2	220	10	17	27900	RP123M350TB20□□□
	12000	89	110	10	17	22500	RP123M350XA10□□□
	12000	89	130	10	17	24100	RP123M350XA30□□□
	12000	89	145	10	17	25300	RP123M350XA45□□□
	12000	89	155	10	17	26000	RP123M350XA55□□□
	15000	76.2	190	8	13	29200	RP153M350TA90□□□
	15000	89	140	8	13	27800	RP153M350XA40□□□
15000	89	155	8	13	29100	RP153M350XA55□□□	
15000	89	190	8	13	31800	RP153M350XA90□□□	
15000	89	219	8	13	34000	RP153M350XB19□□□	
18000	76.2	210	6	11	31000	RP183M350TB10□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
350	18000	89	155	6	11	29500	RP183M350XA55□□□
	18000	89	220	6	11	34500	RP183M350XB20□□□
	22000	89	190	5	9	32100	RP223M350XA90□□□
	22000	89	230	5	9	35400	RP223M350XB30□□□
	39000	100	240	3	5	42000	RP393M350DB40□□□
400	330	35	50	340	600	1800	RP331M400P500□□□
	390	35	60	290	510	2000	RP391M400P600□□□
	390	35	65	290	510	2100	RP391M400P650□□□
	470	35	70	240	420	2200	RP471M400P700□□□
	560	35	80	210	360	2800	RP561M400P800□□□
	680	35	90	170	290	2900	RP681M400P900□□□
	820	35	100	140	240	3500	RP821M400PA00□□□
	1000	35	120	110	200	4000	RP102M400PA20□□□
	1000	51	60	110	200	3600	RP102M400R600□□□
	1000	51	65	110	200	3800	RP102M400R650□□□
	1000	51	75	110	200	4000	RP102M400R750□□□
	1200	51	65	97	170	4600	RP122M400R650□□□
	1200	51	75	97	170	4900	RP122M400R750□□□
	1500	51	75	74	130	5400	RP152M400R750□□□
	1500	51	80	74	130	5600	RP152M400R800□□□
	1500	51	85	74	130	5700	RP152M400R850□□□
	1500	51	100	74	130	6100	RP152M400RA00□□□
	1500	51	105	74	130	6300	RP152M400RA05□□□
	1800	51	85	63	110	6300	RP182M400R850□□□
	1800	51	96	63	110	6600	RP182M400R960□□□
	1800	63.5	65	63	110	6400	RP182M400S650□□□
	2200	51	96	52	90	7400	RP222M400R960□□□
	2200	51	105	52	90	7700	RP222M400RA05□□□
	2200	51	120	52	90	8200	RP222M400RA20□□□
	2200	51	130	52	90	8500	RP222M400RA30□□□
	2200	63.5	75	52	90	7500	RP222M400S750□□□
	2200	63.5	96	52	90	8400	RP222M400S960□□□
	2700	51	115	42	74	8800	RP272M400RA15□□□
	2700	63.5	85	42	74	8700	RP272M400S850□□□
	2700	63.5	96	42	74	9200	RP272M400S960□□□
	2700	63.5	105	42	74	9600	RP272M400SA05□□□
	3300	51	130	34	60	10400	RP332M400RA30□□□
	3300	51	145	34	60	10900	RP332M400RA45□□□
	3300	63.5	95	34	60	10200	RP332M400S950□□□
	3300	63.5	100	34	60	10400	RP332M400SA00□□□
3300	63.5	115	34	60	11100	RP332M400SA15□□□	
3300	63.5	120	34	60	11300	RP332M400SA20□□□	
3300	76.2	100	34	60	11600	RP332M400TA00□□□	
3900	51	170	29	51	12800	RP392M400RA70□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +85°C - 120Hz (mA rms)	CapXon Part Number
400	3900	63.5	105	29	51	11600	RP392M400SA05□□□
	3900	63.5	115	29	51	12100	RP392M400SA15□□□
	3900	63.5	130	29	51	12800	RP392M400SA30□□□
	3900	76.2	85	29	51	11800	RP392M400T850□□□
	3900	76.2	96	29	51	12400	RP392M400T960□□□
	3900	76.2	105	29	51	12900	RP392M400TA05□□□
	4700	63.5	125	24	42	13900	RP472M400SA25□□□
	4700	63.5	130	24	42	14100	RP472M400SA30□□□
	4700	76.2	95	24	42	13700	RP472M400T950□□□
	4700	76.2	100	24	42	14000	RP472M400TA00□□□
	4700	76.2	105	24	42	14200	RP472M400TA05□□□
	4700	76.2	115	24	42	14800	RP472M400TA15□□□
	4700	76.2	120	24	42	15100	RP472M400TA20□□□
	5600	63.5	140	20	36	15800	RP562M400SA40□□□
	5600	63.5	155	20	36	16500	RP562M400SA55□□□
	5600	76.2	105	20	36	16700	RP562M400TA05□□□
	5600	76.2	130	20	36	18300	RP562M400TA30□□□
	6800	63.5	165	17	29	17500	RP682M400SA65□□□
	6800	76.2	115	17	29	17100	RP682M400TA15□□□
	6800	76.2	130	17	29	17400	RP682M400TA30□□□
	6800	76.2	140	17	29	18000	RP682M400TA40□□□
	6800	76.2	155	17	29	18800	RP682M400TA55□□□
	6800	89	157	17	29	20600	RP682M400XA57□□□
	8200	63.5	210	14	24	22200	RP822M400SB10□□□
	8200	76.2	150	14	24	21000	RP822M400TA50□□□
	8200	76.2	155	14	24	21300	RP822M400TA55□□□
	8200	89	120	14	24	20800	RP822M400XA20□□□
	8200	89	130	14	24	21500	RP822M400XA30□□□
	8200	89	157	14	24	23400	RP822M400XA57□□□
	10000	76.2	160	11	20	23900	RP103M400TA60□□□
	10000	76.2	170	11	20	24500	RP103M400TA70□□□
	10000	76.2	190	11	20	25800	RP103M400TA90□□□
	10000	89	130	11	20	23800	RP103M400XA30□□□
	10000	89	155	11	20	25700	RP103M400XA55□□□
	12000	76.2	220	10	17	28000	RP123M400TB20□□□
	12000	89	155	10	17	26100	RP123M400XA55□□□
	12000	89	190	10	17	28600	RP123M400XA90□□□
	12000	89	219	10	17	30500	RP123M400XB19□□□
	15000	76.2	230	8	13	31900	RP153M400TB30□□□
	15000	89	180	8	13	31100	RP153M400XA80□□□
15000	89	220	8	13	34000	RP153M400XB20□□□	
18000	89	230	6	11	34600	RP183M400XB30□□□	
22000	100	240	5	9	36000	RP223M400DB40□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
450	270	35	50	420	740	1700	RP271M450P500□□□
	330	35	60	340	600	1800	RP331M450P600□□□
	330	35	65	340	600	1900	RP331M450P650□□□
	390	35	70	290	510	2100	RP391M450P700□□□
	390	35	80	290	510	2200	RP391M450P800□□□
	470	35	80	240	420	2400	RP471M450P800□□□
	560	35	90	210	360	2900	RP561M450P900□□□
	680	35	100	170	290	3100	RP681M450PA00□□□
	820	35	120	140	240	3600	RP821M450PA20□□□
	820	51	60	140	240	3300	RP821M450R600□□□
	820	51	75	140	240	3600	RP821M450R750□□□
	1000	51	70	110	200	4340	RP102M450R700□□□
	1000	51	75	110	200	4470	RP102M450R750□□□
	1000	51	80	110	200	4600	RP102M450R800□□□
	1200	51	75	97	170	5000	RP122M450R750□□□
	1200	51	96	97	170	5600	RP122M450R960□□□
	1500	51	85	74	130	5800	RP152M450R850□□□
	1500	51	105	74	130	6400	RP152M450RA05□□□
	1500	51	115	74	130	6700	RP152M450RA15□□□
	1500	51	120	74	130	6800	RP152M450RA20□□□
	1500	63.5	65	74	130	5900	RP152M450S650□□□
	1500	63.5	80	74	130	6400	RP152M450S800□□□
	1800	51	95	63	110	6600	RP182M450R950□□□
	1800	51	118	63	110	7300	RP182M450RA18□□□
	1800	51	130	63	110	7600	RP182M450RA30□□□
	1800	63.5	75	63	110	6800	RP182M450S750□□□
	1800	63.5	96	63	110	7500	RP182M450S960□□□
	2200	51	125	52	90	8400	RP222M450RA25□□□
	2200	51	130	52	90	8600	RP222M450RA30□□□
	2200	63.5	85	52	90	8100	RP222M450S850□□□
	2200	63.5	96	52	90	8500	RP222M450S960□□□
	2200	63.5	100	52	90	8600	RP222M450SA00□□□
	2200	63.5	120	52	90	9400	RP222M450SA20□□□
	2700	51	145	42	74	9900	RP272M450RA45□□□
	2700	63.5	90	42	74	9000	RP272M450S900□□□
	2700	63.5	96	42	74	9300	RP272M450S960□□□
	2700	63.5	115	42	74	10100	RP272M450SA15□□□
	2700	76.2	96	42	74	10300	RP272M450T960□□□
	3300	51	170	34	60	11900	RP332M450RA70□□□
	3300	63.5	105	34	60	10800	RP332M450SA05□□□
3300	63.5	115	34	60	11200	RP332M450SA15□□□	
3300	63.5	130	34	60	11800	RP332M450SA30□□□	
3300	76.2	85	34	60	10900	RP332M450T850□□□	
3300	76.2	96	34	60	11500	RP332M450T960□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
450	3300	76.2	100	34	60	11700	RP332M450TA00□□□
	3300	76.2	120	34	60	12600	RP332M450TA20□□□
	3900	63.5	125	29	51	12700	RP392M450SA25□□□
	3900	63.5	130	29	51	12900	RP392M450SA30□□□
	3900	76.2	95	29	51	12500	RP392M450T950□□□
	3900	76.2	100	29	51	12800	RP392M450TA00□□□
	3900	76.2	115	29	51	13500	RP392M450TA15□□□
	4700	63.5	145	24	42	14900	RP472M450SA45□□□
	4700	63.5	155	24	42	15400	RP472M450SA55□□□
	4700	76.2	105	24	42	14400	RP472M450TA05□□□
	4700	76.2	115	24	42	14900	RP472M450TA15□□□
	4700	76.2	120	24	42	15200	RP472M450TA20□□□
	4700	76.2	130	24	42	15700	RP472M450TA30□□□
	4700	76.2	160	24	42	17200	RP472M450TA60□□□
	4700	89	119	24	42	16600	RP472M450XA19□□□
	5600	63.5	165	20	36	18500	RP562M450SA65□□□
	5600	76.2	125	20	36	18100	RP562M450TA25□□□
	5600	76.2	130	20	36	18400	RP562M450TA30□□□
	5600	76.2	155	20	36	19900	RP562M450TA55□□□
	5600	89	134	20	36	20400	RP562M450XA34□□□
	6800	63.5	210	17	29	19600	RP682M450SB10□□□
	6800	76.2	140	17	29	18000	RP682M450TA40□□□
	6800	76.2	150	17	29	18600	RP682M450TA50□□□
	6800	89	120	17	29	18400	RP682M450XA20□□□
	6800	89	130	17	29	19100	RP682M450XA30□□□
	6800	89	157	17	29	20700	RP682M450XA57□□□
	8200	76.2	170	13	24	22300	RP822M450TA70□□□
	8200	76.2	220	13	24	25000	RP822M450TB20□□□
	8200	89	130	13	24	21600	RP822M450XA30□□□
	8200	89	155	13	24	23400	RP822M450XA55□□□
	10000	76.2	210	11	20	27100	RP103M450TB10□□□
	10000	76.2	215	11	20	27400	RP103M450TB15□□□
	10000	76.2	220	11	20	27700	RP103M450TB20□□□
10000	89	155	11	20	25800	RP103M450XA55□□□	
10000	89	170	11	20	26900	RP103M450XA70□□□	
12000	89	190	10	17	28700	RP123M450XA90□□□	
12000	89	220	10	17	30600	RP123M450XB20□□□	
15000	89	220	8	13	34100	RP153M450XB20□□□	
500	120	35	50	1260	2210	800	RP121M500P500□□□
	270	35	80	560	980	1300	RP271M500P800□□□
	330	35	100	460	800	1500	RP331M500PA00□□□
	390	35	120	390	680	1800	RP391M500PA20□□□
	470	51	60	320	560	2200	RP471M500R600□□□
	470	51	75	320	560	2400	RP471M500R750□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
500	680	51	65	220	390	2800	RP681M500R650□□□
	680	51	96	220	390	3300	RP681M500R960□□□
	820	51	75	180	320	3200	RP821M500R750□□□
	820	51	115	180	320	3900	RP821M500RA15□□□
	1000	51	85	150	270	3700	RP102M500R850□□□
	1000	51	130	150	270	4500	RP102M500RA30□□□
	1000	63.5	96	150	270	4400	RP102M500S960□□□
	1200	51	96	130	220	4300	RP122M500R960□□□
	1500	51	115	100	180	5200	RP152M500RA15□□□
	1500	63.5	96	100	180	5400	RP152M500S960□□□
	1500	63.5	115	100	180	5900	RP152M500SA15□□□
	1500	76.2	96	100	180	6000	RP152M500T960□□□
	1800	51	130	86	150	6000	RP182M500RA30□□□
	1800	63.5	96	86	150	5900	RP182M500S960□□□
	1800	63.5	130	86	150	6800	RP182M500SA30□□□
	2200	63.5	115	69	120	7100	RP222M500SA15□□□
	2200	76.2	96	69	120	7300	RP222M500T960□□□
	2200	76.2	115	69	120	7900	RP222M500TA15□□□
	2700	63.5	130	56	98	8600	RP272M500SA30□□□
	2700	76.2	155	56	98	10300	RP272M500TA55□□□
	3300	76.2	115	46	80	10100	RP332M500TA15□□□
	3900	76.2	130	39	68	11500	RP392M500TA30□□□
	3900	89	155	39	68	13600	RP392M500XA55□□□
	4700	76.2	155	32	56	13400	RP472M500TA55□□□
5600	89	157	27	47	14800	RP562M500XA57□□□	
6800	89	155	22	39	16000	RP682M500XA55□□□	
8200	89	196	18	32	18200	RP822M500XA96□□□	
10000	89	220	15	27	22300	RP103M500XB20□□□	
550	100	35	50	1510	2650	700	RP101M550P500□□□
	180	35	80	840	1470	1100	RP181M550P800□□□
	270	35	100	560	980	1400	RP271M550PA00□□□
	330	35	120	460	800	1700	RP331M550PA20□□□
	390	51	60	390	680	2000	RP391M550R600□□□
	390	51	75	390	680	2200	RP391M550R750□□□
	560	51	65	270	470	2500	RP561M550R650□□□
	560	51	96	270	470	3000	RP561M550R960□□□
	560	63.5	96	270	470	3300	RP561M550S960□□□
	680	51	75	220	390	2900	RP681M550R750□□□
	680	51	96	220	390	3300	RP681M550R960□□□
	680	51	115	220	390	3600	RP681M550RA15□□□
	680	63.5	115	220	390	4000	RP681M550SA15□□□
	820	51	80	180	320	3400	RP821M550R800□□□
	820	51	85	180	320	3500	RP821M550R850□□□
	820	51	96	180	320	3700	RP821M550R960□□□

STANDARD RATINGS

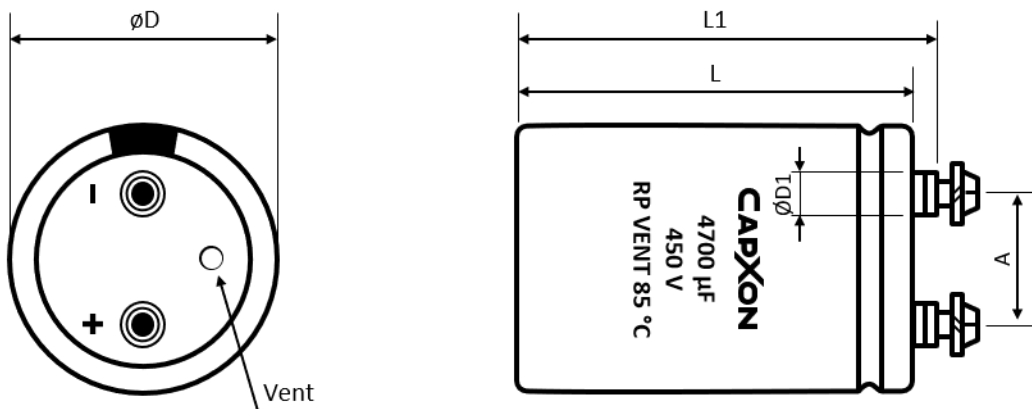
□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕD (mm)	L (mm)	Typ. ESR +20°C - 120Hz (m Ω)	Max. ESR +20°C - 120Hz (m Ω)	I_R - Max. Ripple Current +85°C - 120Hz (mA rms)	CapXon Part Number
550	820	51	130	180	320	4200	RP821M550RA30□□□
	820	63.5	130	180	320	4800	RP821M550SA30□□□
	1000	51	96	150	270	4900	RP102M550R960□□□
	1000	51	105	150	270	5100	RP102M550RA05□□□
	1200	51	105	130	220	5800	RP122M550RA05□□□
	1200	51	115	130	220	6000	RP122M550RA15□□□
	1200	63.5	80	130	220	5800	RP122M550S800□□□
	1200	76.2	96	130	220	7000	RP122M550T960□□□
	1500	51	130	100	180	7400	RP152M550RA30□□□
	1500	63.5	96	100	180	7300	RP152M550S960□□□
	1500	76.2	115	100	180	8800	RP152M550TA15□□□
	1800	63.5	96	86	150	8300	RP182M550S960□□□
	1800	63.5	118	86	150	9100	RP182M550SA18□□□
	1800	76.2	80	86	150	8600	RP182M550T800□□□
	1800	76.2	96	86	150	9200	RP182M550T960□□□
	1800	76.2	130	86	150	10500	RP182M550TA30□□□
	2200	63.5	118	69	120	9400	RP222M550SA18□□□
	2200	63.5	130	69	120	9800	RP222M550SA30□□□
	2200	76.2	96	69	120	9500	RP222M550T960□□□
	2200	76.2	105	69	120	9900	RP222M550TA05□□□
	2200	76.2	155	69	120	11700	RP222M550TA55□□□
	2700	63.5	130	56	98	10800	RP272M550SA30□□□
	2700	76.2	105	56	98	10900	RP272M550TA05□□□
	2700	76.2	115	56	98	11300	RP272M550TA15□□□
	2700	76.2	130	56	98	12000	RP272M550TA30□□□
	3300	76.2	118	46	80	12100	RP332M550TA18□□□
	3300	76.2	130	46	80	12600	RP332M550TA30□□□
	3300	76.2	143	46	80	13200	RP332M550TA43□□□
	3900	76.2	143	39	68	14200	RP392M550TA43□□□
	3900	89	120	39	68	14400	RP392M550XA20□□□
	4700	76.2	155	32	56	16200	RP472M550TA55□□□
	4700	89	145	32	56	17200	RP472M550XA45□□□
	4700	89	157	32	56	17800	RP472M550XA57□□□
	5600	76.2	190	27	47	18800	RP562M550TA90□□□
	5600	89	145	27	47	18200	RP562M550XA45□□□
	5600	89	155	27	47	18700	RP562M550XA55□□□
6800	76.2	220	22	39	21800	RP682M550TB20□□□	
6800	89	170	22	39	21100	RP682M550XA70□□□	
8200	89	197	18	32	25300	RP822M550XA97□□□	

STANDARD RATINGS

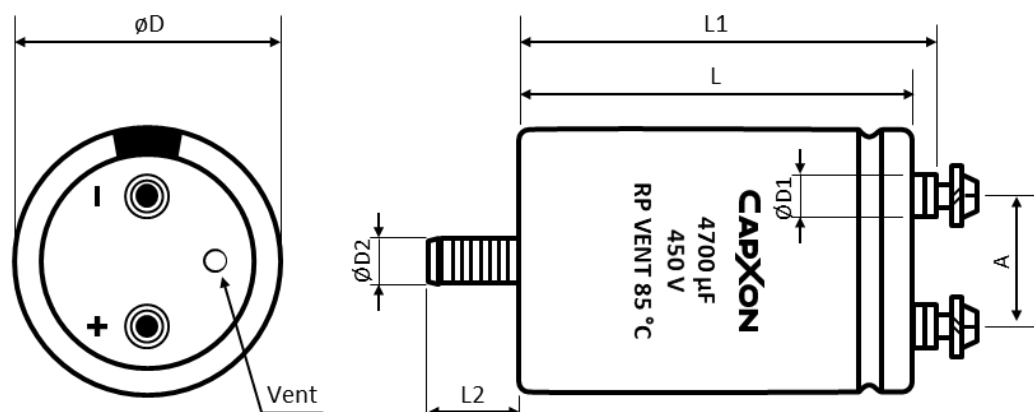
□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
630	1000	63.5	130	190	330	6000	RP102M630SA30□□□
	1200	76.2	110	160	280	6800	RP122M630TA10□□□
	1500	76.2	130	130	220	8200	RP152M630TA30□□□
	1800	76.2	150	100	180	9700	RP182M630TA50□□□
	2200	89	130	86	150	10800	RP222M630XA30□□□
	2700	89	150	69	120	12700	RP272M630XA50□□□
	3300	89	170	57	100	14800	RP332M630XA70□□□
	3900	89	190	49	85	17400	RP392M630XA90□□□
	4700	100	220	40	71	21500	RP472M630DB20□□□
5600	100	240	34	59	24800	RP562M630DB40□□□	

DIMENSIONS - Ring clamp mounting - All dimensions in mm


Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	D1 max.	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M8	100	100 ~ 240	110 ~ 250	17.5	41.5	16	5	A87

DIMENSIONS - Threaded stud mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$L2 \pm 1$	D1 max.	D2	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M8	100	100 ~ 240	110 ~ 250	16	17.5	M12	41.5	16	5	E87

SLEEVE AND PRINTING SELECTION TABLE

Diameter ϕD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RP332M200PA20E50
> 35	PVC	Thermo	Yes	No	-	RP103M250TA40E50
> 35	PET	Thermo	No	No	(*) Note	RP103M250TA40E50*
> 35	PET	Ink	No	Yes	(**) Note	RP103M250TA40E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information "Accessories".

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

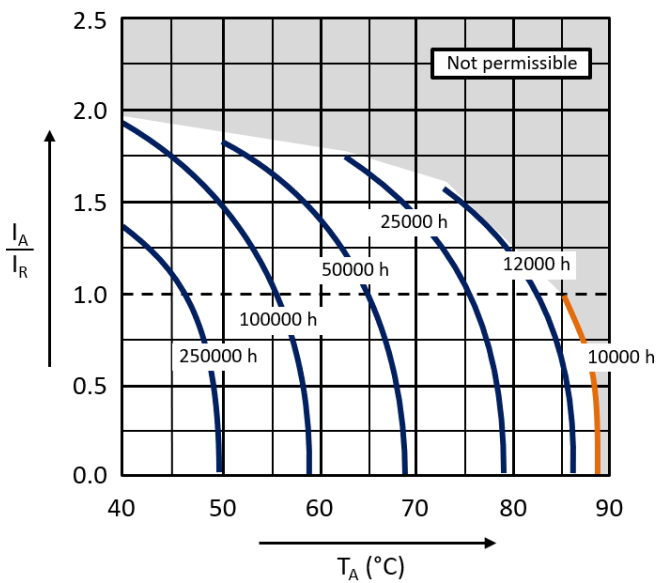
Frequency (Hz)	50/60	100/120	300	1k	$\geq 3k$
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current

I_R : Maximum permissible rated ripple current (A RMS)

T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RX SERIES ■ ULTRA LONG LIFE 85°C TYPE

KEY FEATURES



- **ALUMINUM ELECTROLYTIC CAPACITOR** ■ Screw terminal type
- Useful life: 85°C ■ 20000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics			
Operating Temperature Range		-40 ~ +85°C		-25 ~ +85°C	
Rated Voltage Range	V _R	160 ~ 450V DC		500 ~ 650V DC	
Surge Voltage	V _S	(V _R ≤ 315V): V _S = 1.15·V _R		(V _R > 315V): V _S = 1.10·V _R	
Capacitance Range	C _R	220 ~ 100000µF		1000 ~ 15000µF	
Cap. Tolerance	ΔC	±20% (120Hz ■ 20°C)			
Leakage Current (20°C ■ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (µA) or 5mA (whichever is smaller) ■ After 5 minutes [I _{LEAK} (µA) ; C _R (µF) ; V _R (V)]			
Dissipation Factor % (20°C ■ 120Hz)	tanδ	V _R (V DC)	160 ~ 450	500 ~ 550	≥ 600
		tanδ	15	20	25
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450	≥ 500	
		Z-25°C/Z+20°C	4	4	
		Z-40°C/Z+20°C	10	-	

Lifetime Test			
Useful Life 85°C (V _R & I _R applied)	Test	20 000 hours	
	ΔC/C _R	≤ ±15% of initial measured value	
	tanδ	≤ 175% of initial specified value	
	I _{Leak}	≤ the initial specified value	
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ■ parts show higher drift as test criteria		
Endurance 85°C (V _R & I _R applied)	Test	5 000 hours	
	ΔC/C _R	≤ ±10% of initial measured value	
	tanδ	≤ 150% of initial specified value	
	I _{Leak}	≤ the initial specified value	
Shelf Life 85°C (V _R = 0)	Test	1 000 hours	
	ΔC/C _R	≤ ±10% of initial measured value	
	tanδ	≤ 150% of initial specified value	
	I _{Leak}	≤ the initial specified value	
Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4			
Vibration Resistance Test	Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ■ IEC 60068-2-6		

★ Remark: For **Halogen Free** products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
160	1000	35	60	110	200	2500	RX102M160P600□□□
	1500	35	80	68	130	3300	RX152M160P800□□□
	2200	35	80	48	90	3450	RX222M160P800□□□
	2200	35	100	48	90	3500	RX222M160PA00□□□
	3300	35	120	32	60	4720	RX332M160PA20□□□
	3300	51	80	32	60	4800	RX332M160R800□□□
	4700	51	80	22	42	5100	RX472M160R800□□□
	4700	51	100	22	42	6000	RX472M160RA00□□□
	6800	51	100	15	29	6400	RX682M160RA00□□□
	6800	51	140	15	29	7000	RX682M160RA40□□□
	6800	63.5	100	15	29	7000	RX682M160SA00□□□
	10000	63.5	100	10	20	9110	RX103M160SA00□□□
	10000	63.5	120	10	20	10000	RX103M160SA20□□□
	15000	76.2	100	7	13	12100	RX153M160TA00□□□
	15000	76.2	120	7	13	13000	RX153M160TA20□□□
	22000	76.2	140	6	11	17000	RX223M160TA40□□□
	22000	89	130	6	11	18000	RX223M160XA30□□□
	33000	89	140	5	9	19300	RX333M160XA40□□□
	47000	89	170	4	7	20700	RX473M160XA70□□□
	47000	89	220	4	7	23000	RX473M160XB20□□□
68000	89	220	4	6	23200	RX683M160XB20□□□	
100000	100	250	3	5	24500	RX104M160DB50□□□	
200	680	35	50	150	290	1900	RX681M200P500□□□
	1000	35	60	110	200	2600	RX102M200P600□□□
	1500	35	80	68	130	3400	RX152M200P800□□□
	2200	35	100	48	90	3600	RX222M200PA00□□□
	2200	35	120	48	90	4000	RX222M200PA20□□□
	2200	51	80	48	90	4000	RX222M200R800□□□
	3300	51	80	32	60	4820	RX332M200R800□□□
	3300	51	100	32	60	5000	RX332M200RA00□□□
	4700	51	140	22	42	6500	RX472M200RA40□□□
	4700	63.5	100	22	42	6480	RX472M200SA00□□□
	6800	51	140	15	29	7400	RX682M200RA40□□□
	6800	63.5	120	15	29	8000	RX682M200SA20□□□
	10000	63.5	120	10	20	10300	RX103M200SA20□□□
	10000	76.2	120	10	20	13100	RX103M200TA20□□□
	15000	76.2	120	7	13	13400	RX153M200TA20□□□
	15000	76.2	140	7	13	15000	RX153M200TA40□□□
	15000	76.2	160	7	13	16100	RX153M200TA60□□□
	22000	76.2	160	6	9	17400	RX223M200TA60□□□
	22000	89	140	6	9	17800	RX223M200XA40□□□
	33000	89	170	4	7	19550	RX333M200XA70□□□
47000	89	220	3	6	21000	RX473M200XB20□□□	
68000	100	250	3	5	22700	RX683M200DB50□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
250	470	35	60	220	420	2700	RX471M250P600□□□
	680	35	80	150	290	2800	RX681M250P800□□□
	1000	35	80	110	200	2980	RX102M250P800□□□
	1000	35	100	110	200	3300	RX102M250PA00□□□
	1500	35	100	68	130	3600	RX152M250PA00□□□
	1500	51	80	68	130	3700	RX152M250R800□□□
	2200	51	80	48	90	4100	RX222M250R800□□□
	2200	51	100	48	90	5500	RX222M250RA00□□□
	3300	51	100	32	60	5500	RX332M250RA00□□□
	3300	51	140	32	60	6000	RX332M250RA40□□□
	3300	63.5	100	32	60	6000	RX332M250SA00□□□
	4700	63.5	100	22	42	7350	RX472M250SA00□□□
	4700	63.5	120	22	42	8000	RX472M250SA20□□□
	6800	63.5	120	15	29	8950	RX682M250SA20□□□
	6800	76.2	120	15	29	10000	RX682M250TA20□□□
	10000	76.2	120	10	20	13300	RX103M250TA20□□□
	10000	76.2	160	10	20	14000	RX103M250TA60□□□
	10000	89	140	10	20	14000	RX103M250XA40□□□
	15000	89	140	7	13	16500	RX153M250XA40□□□
	15000	89	170	7	13	18000	RX153M250XA70□□□
22000	89	170	5	9	18300	RX223M250XA70□□□	
22000	89	220	5	9	22400	RX223M250XB20□□□	
33000	89	220	3	6	22500	RX333M250XB20□□□	
47000	100	250	3	5	28500	RX473M250DB50□□□	
350	330	35	60	320	600	2100	RX331M350P600□□□
	470	35	80	220	420	3000	RX471M350P800□□□
	680	35	100	150	290	3800	RX681M350PA00□□□
	820	35	80	130	240	4100	RX821M350P800□□□
	1000	35	100	110	200	4500	RX102M350PA00□□□
	1000	51	60	110	200	4000	RX102M350R600□□□
	1000	51	80	110	200	5700	RX102M350R800□□□
	1200	51	60	89	170	4950	RX122M350R600□□□
	1200	51	83	89	170	5800	RX122M350R830□□□
	1500	51	75	68	130	6000	RX152M350R750□□□
	1500	51	100	68	130	7000	RX152M350RA00□□□
	1800	51	75	58	110	6800	RX182M350R750□□□
	1800	51	90	58	110	7350	RX182M350R900□□□
	1800	63.5	96	58	110	8500	RX182M350S960□□□
	2200	51	105	48	90	8500	RX222M350RA05□□□
	2200	51	120	48	90	9000	RX222M350RA20□□□
	2700	51	105	39	74	9400	RX272M350RA05□□□
	2700	51	115	39	74	10600	RX272M350RA15□□□
	2700	63.5	80	39	74	9800	RX272M350S800□□□
	2700	63.5	85	39	74	10100	RX272M350S850□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
350	3300	51	115	32	60	10800	RX332M350RA15□□□
	3300	51	130	32	60	12500	RX332M350RA30□□□
	3300	63.5	90	32	60	12000	RX332M350S900□□□
	3300	63.5	100	32	60	12500	RX332M350SA00□□□
	3900	63.5	100	27	51	13000	RX392M350SA00□□□
	3900	63.5	115	27	51	13900	RX392M350SA15□□□
	3900	76.2	80	27	51	13000	RX392M350T800□□□
	4700	63.5	105	22	42	14000	RX472M350SA05□□□
	4700	63.5	115	22	42	14500	RX472M350SA15□□□
	4700	76.2	90	22	42	14000	RX472M350T900□□□
	4700	76.2	120	22	42	16000	RX472M350TA20□□□
	5600	63.5	130	19	36	17400	RX562M350SA30□□□
	5600	63.5	150	19	36	19000	RX562M350SA50□□□
	5600	76.2	100	19	36	16800	RX562M350TA00□□□
	5600	76.2	115	19	36	18000	RX562M350TA15□□□
	6800	63.5	140	15	29	19000	RX682M350SA40□□□
	6800	63.5	155	15	29	19600	RX682M350SA55□□□
	6800	76.2	105	15	29	19000	RX682M350TA05□□□
	6800	76.2	115	15	29	20000	RX682M350TA15□□□
	6800	89	100	15	29	20000	RX682M350XA00□□□
	8200	63.5	170	13	24	20700	RX822M350SA70□□□
	8200	63.5	190	13	24	22000	RX822M350SA90□□□
	8200	76.2	120	13	24	20000	RX822M350TA20□□□
	8200	76.2	143	13	24	21000	RX822M350TA43□□□
	8200	76.2	155	13	24	22500	RX822M350TA55□□□
	8200	89	105	13	24	20000	RX822M350XA05□□□
	8200	89	120	13	24	22000	RX822M350XA20□□□
	10000	76.2	140	10	20	24000	RX103M350TA40□□□
	10000	76.2	155	10	20	25000	RX103M350TA55□□□
	10000	89	130	10	20	27000	RX103M350XA30□□□
	10000	89	155	10	20	29000	RX103M350XA55□□□
	12000	76.2	170	9	17	27600	RX123M350TA70□□□
	12000	89	130	9	17	27500	RX123M350XA30□□□
	12000	89	155	9	17	29500	RX123M350XA55□□□
	12000	89	170	9	17	31000	RX123M350XA70□□□
	15000	76.2	220	7	13	35400	RX153M350TB20□□□
	15000	89	155	7	13	33800	RX153M350XA55□□□
	15000	89	170	7	13	35100	RX153M350XA70□□□
	15000	89	190	7	13	36000	RX153M350XA90□□□
	18000	89	180	6	11	43800	RX183M350XA80□□□
18000	89	220	6	11	44600	RX183M350XB20□□□	
18000	100	190	6	11	48000	RX183M350DA90□□□	
22000	89	220	5	9	46700	RX223M350XB20□□□	
22000	100	250	5	9	48000	RX223M350DB50□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
400	220	35	50	470	900	1900	RX221M400P500□□□
	330	35	60	320	600	2300	RX331M400P600□□□
	470	35	80	220	420	4400	RX471M400P800□□□
	680	35	80	150	290	4500	RX681M400P800□□□
	680	35	120	150	290	5000	RX681M400PA20□□□
	680	51	80	150	290	6000	RX681M400R800□□□
	820	35	100	130	240	4700	RX821M400PA00□□□
	1000	51	60	110	200	4800	RX102M400R600□□□
	1000	51	80	110	200	6200	RX102M400R800□□□
	1200	51	70	89	170	5000	RX122M400R700□□□
	1200	51	83	89	170	6500	RX122M400R830□□□
	1500	51	80	68	130	6400	RX152M400R800□□□
	1500	51	95	68	130	7000	RX152M400R950□□□
	1500	63.5	95	68	130	8000	RX152M400S950□□□
	1800	51	85	58	110	7000	RX182M400R850□□□
	1800	51	95	58	110	7400	RX182M400R950□□□
	2200	51	105	48	90	8800	RX222M400RA05□□□
	2200	51	115	48	90	10000	RX222M400RA15□□□
	2200	63.5	85	48	90	10100	RX222M400S850□□□
	2200	63.5	100	48	90	11500	RX222M400SA00□□□
	2200	76.2	105	48	90	12500	RX222M400TA05□□□
	2700	51	115	39	74	10800	RX272M400RA15□□□
	2700	51	130	39	74	11000	RX272M400RA30□□□
	2700	63.5	90	39	74	11000	RX272M400S900□□□
	2700	63.5	105	39	74	12000	RX272M400SA05□□□
	2700	76.2	75	39	74	11600	RX272M400T750□□□
	3300	51	130	32	60	12800	RX332M400RA30□□□
	3300	51	150	32	60	14000	RX332M400RA50□□□
	3300	63.5	95	32	60	13000	RX332M400S950□□□
	3300	63.5	115	32	60	14000	RX332M400SA15□□□
	3300	76.2	90	32	60	14000	RX332M400T900□□□
	3300	76.2	105	32	60	14300	RX332M400TA05□□□
	3300	76.2	120	32	60	15000	RX332M400TA20□□□
	3900	63.5	100	27	51	14200	RX392M400SA00□□□
	3900	63.5	115	27	51	15200	RX392M400SA15□□□
	3900	76.2	90	27	51	15100	RX392M400T900□□□
	3900	76.2	120	27	51	16500	RX392M400TA20□□□
	4700	63.5	120	22	42	16000	RX472M400SA20□□□
	4700	63.5	155	22	42	17500	RX472M400SA55□□□
	4700	76.2	105	22	42	15500	RX472M400TA05□□□
5600	63.5	145	19	36	18000	RX562M400SA45□□□	
5600	63.5	155	19	36	18200	RX562M400SA55□□□	
5600	63.5	170	19	36	19000	RX562M400SA70□□□	
5600	76.2	105	19	36	17000	RX562M400TA05□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
400	5600	76.2	130	19	36	19000	RX562M400TA30□□□
	5600	89	92	19	36	18000	RX562M400X920□□□
	6800	63.5	160	15	29	23500	RX682M400SA60□□□
	6800	63.5	190	15	29	24200	RX682M400SA90□□□
	6800	76.2	130	15	29	19200	RX682M400TA30□□□
	6800	76.2	150	15	29	21500	RX682M400TA50□□□
	6800	89	105	15	29	21200	RX682M400XA05□□□
	6800	89	120	15	29	22300	RX682M400XA20□□□
	8200	76.2	135	13	24	24000	RX822M400TA35□□□
	8200	76.2	155	13	24	25000	RX822M400TA55□□□
	8200	76.2	170	13	24	26200	RX822M400TA70□□□
	8200	89	120	13	24	25000	RX822M400XA20□□□
	8200	89	140	13	24	26000	RX822M400XA40□□□
	10000	76.2	160	10	20	31600	RX103M400TA60□□□
	10000	76.2	180	10	20	33000	RX103M400TA80□□□
	10000	89	130	10	20	31000	RX103M400XA30□□□
	10000	89	155	10	20	34000	RX103M400XA55□□□
	12000	76.2	220	9	17	34000	RX123M400TB20□□□
	12000	89	155	9	17	30000	RX123M400XA55□□□
	12000	89	170	9	17	31300	RX123M400XA70□□□
15000	89	180	7	13	39900	RX153M400XA80□□□	
15000	89	200	7	13	40700	RX153M400XB00□□□	
18000	89	210	6	11	43000	RX183M400XB10□□□	
18000	89	240	6	11	45000	RX183M400XB40□□□	
22000	100	240	5	9	47000	RX223M400DB40□□□	
420	820	51	60	130	240	3800	RX821M420R600□□□
	1000	51	70	110	200	5100	RX102M420R700□□□
	1200	51	80	89	170	6600	RX122M420R800□□□
	1800	51	95	58	110	7600	RX182M420R950□□□
	1800	51	105	58	110	8000	RX182M420RA05□□□
	2200	51	115	48	90	10100	RX222M420RA15□□□
	2700	51	120	39	74	11000	RX272M420RA20□□□
	2700	63.5	90	39	74	11000	RX272M420S900□□□
	3300	51	130	32	60	13000	RX332M420RA30□□□
	3300	63.5	105	32	60	13500	RX332M420SA05□□□
	3300	76.2	105	32	60	14600	RX332M420TA05□□□
	3900	63.5	115	27	51	15800	RX392M420SA15□□□
	3900	63.5	130	27	51	16400	RX392M420SA30□□□
	3900	76.2	90	27	51	15500	RX392M420T900□□□
	4700	63.5	143	22	42	17000	RX472M420SA43□□□
	4700	63.5	155	22	42	17800	RX472M420SA55□□□
	4700	76.2	105	22	42	15700	RX472M420TA05□□□
	4700	76.2	143	22	42	17500	RX472M420TA43□□□
5600	63.5	170	19	36	19200	RX562M420SA70□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
420	5600	76.2	115	76.2	115	17500	RX562M420TA15□□□
	5600	76.2	130	76.2	130	19200	RX562M420TA30□□□
	5600	89	90	89	90	18100	RX562M420X900□□□
	6800	76.2	143	76.2	143	21100	RX682M420TA43□□□
	6800	76.2	155	76.2	155	22000	RX682M420TA55□□□
	6800	89	105	89	105	19900	RX682M420XA05□□□
	6800	89	115	89	115	20500	RX682M420XA15□□□
	8200	76.2	170	76.2	170	27100	RX822M420TA70□□□
	8200	89	115	89	115	25000	RX822M420XA15□□□
	8200	89	130	89	130	26200	RX822M420XA30□□□
	10000	76.2	180	76.2	180	34000	RX103M420TA80□□□
	10000	76.2	220	76.2	220	37000	RX103M420TB20□□□
	10000	89	143	89	143	33000	RX103M420XA43□□□
	10000	89	155	89	155	35000	RX103M420XA55□□□
	12000	76.2	220	76.2	220	35000	RX123M420TB20□□□
	12000	89	155	89	155	31100	RX123M420XA55□□□
	12000	89	170	89	170	31700	RX123M420XA70□□□
15000	89	190	89	190	40100	RX153M420XA90□□□	
18000	89	220	89	220	43300	RX183M420XB20□□□	
450	220	35	50	35	50	2000	RX221M450P500□□□
	330	35	60	35	60	2500	RX331M450P600□□□
	470	35	80	35	80	4500	RX471M450P800□□□
	470	51	75	51	75	4500	RX471M450R750□□□
	680	35	100	35	100	4600	RX681M450PA00□□□
	680	35	120	35	120	5200	RX681M450PA20□□□
	680	51	80	51	80	6200	RX681M450R800□□□
	820	35	110	35	110	6400	RX821M450PA10□□□
	820	51	60	51	60	6000	RX821M450R600□□□
	1000	51	70	51	70	6300	RX102M450R700□□□
	1000	51	80	51	80	6500	RX102M450R800□□□
	1200	51	80	51	80	7000	RX122M450R800□□□
	1200	51	95	51	95	7300	RX122M450R950□□□
	1200	63.5	95	63.5	95	8300	RX122M450S950□□□
	1500	51	95	51	95	7500	RX152M450R950□□□
	1500	51	115	51	115	7800	RX152M450RA15□□□
	1800	51	105	51	105	8200	RX182M450RA05□□□
	1800	51	115	51	115	8400	RX182M450RA15□□□
	1800	63.5	80	63.5	80	8000	RX182M450S800□□□
	1800	63.5	105	63.5	105	8500	RX182M450SA05□□□
	2200	51	115	51	115	10200	RX222M450RA15□□□
2200	51	130	51	130	11000	RX222M450RA30□□□	
2200	63.5	90	63.5	90	10000	RX222M450S900□□□	
2200	63.5	120	63.5	120	12100	RX222M450SA20□□□	
2200	76.2	85	76.2	85	11000	RX222M450T850□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕD (mm)	L (mm)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R • Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
450	2700	51	115	39	74	11200	RX272M450RA15□□□
	2700	51	130	39	74	12000	RX272M450RA30□□□
	2700	63.5	95	39	74	12000	RX272M450S950□□□
	2700	63.5	115	39	74	13000	RX272M450SA15□□□
	2700	76.2	80	39	74	12000	RX272M450T800□□□
	2700	76.2	130	39	74	14800	RX272M450TA30□□□
	3300	63.5	105	32	60	13600	RX332M450SA05□□□
	3300	63.5	115	32	60	14000	RX332M450SA15□□□
	3300	76.2	100	32	60	15500	RX332M450TA00□□□
	3300	76.2	120	32	60	16000	RX332M450TA20□□□
	3900	63.5	125	27	51	16000	RX392M450SA25□□□
	3900	63.5	150	27	51	16600	RX392M450SA50□□□
	3900	76.2	90	27	51	15000	RX392M450T900□□□
	3900	76.2	115	27	51	17000	RX392M450TA15□□□
	3900	89	90	27	51	17000	RX392M450X900□□□
	4700	63.5	145	22	42	18700	RX472M450SA45□□□
	4700	63.5	170	22	42	20000	RX472M450SA70□□□
	4700	76.2	105	22	42	18000	RX472M450TA05□□□
	4700	76.2	130	22	42	20000	RX472M450TA30□□□
	4700	89	110	22	42	20000	RX472M450XA10□□□
	5600	63.5	165	19	36	21700	RX562M450SA65□□□
	5600	63.5	190	19	36	23200	RX562M450SA90□□□
	5600	76.2	115	19	36	20500	RX562M450TA15□□□
	5600	76.2	130	19	36	21600	RX562M450TA30□□□
	5600	89	90	19	36	20200	RX562M450X900□□□
	5600	89	120	19	36	22800	RX562M450XA20□□□
	6800	89	105	15	29	22800	RX682M450XA05□□□
	6800	89	130	15	29	25000	RX682M450XA30□□□
	8200	76.2	165	13	24	27000	RX822M450TA65□□□
	8200	76.2	180	13	24	30000	RX822M450TA80□□□
	8200	89	130	13	24	29000	RX822M450XA30□□□
	8200	89	155	13	24	31000	RX822M450XA55□□□
	10000	76.2	220	10	20	37500	RX103M450TB20□□□
	10000	89	155	10	20	36100	RX103M450XA55□□□
	10000	89	170	10	20	37600	RX103M450XA70□□□
	12000	76.2	220	9	17	39100	RX123M450TB20□□□
	12000	89	155	9	17	36400	RX123M450XA55□□□
	12000	89	190	9	17	39900	RX123M450XA90□□□
	12000	100	190	9	17	42500	RX123M450DA90□□□
	15000	89	220	7	13	43500	RX153M450XB20□□□
15000	89	240	7	13	45300	RX153M450XB40□□□	
15000	100	195	7	13	43900	RX153M450DA95□□□	
18000	100	237	6	11	48000	RX183M450DB37□□□	
22000	89	236	5	9	48000	RX223M450XB36□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
500	1000	51	95	140	270	5600	RX102M500R950□□□
	1000	51	110	140	270	6000	RX102M500RA10□□□
	1000	63.5	80	140	270	6000	RX102M500S800□□□
	1200	51	95	120	220	7100	RX122M500R950□□□
	1200	51	115	120	220	8000	RX122M500RA15□□□
	1200	63.5	85	120	220	8100	RX122M500S850□□□
	1500	51	100	95	180	7200	RX152M500RA00□□□
	1500	51	115	95	180	7500	RX152M500RA15□□□
	1500	63.5	90	95	180	7500	RX152M500S900□□□
	1500	63.5	105	95	180	7800	RX152M500SA05□□□
	1800	51	130	79	150	8300	RX182M500RA30□□□
	1800	63.5	90	79	150	8200	RX182M500S900□□□
	1800	63.5	115	79	150	8600	RX182M500SA15□□□
	2200	51	143	63	120	12100	RX222M500RA43□□□
	2200	51	150	63	120	12500	RX222M500RA50□□□
	2200	63.5	105	63	120	11500	RX222M500SA05□□□
	2200	63.5	115	63	120	12200	RX222M500SA15□□□
	2700	63.5	115	52	98	13200	RX272M500SA15□□□
	2700	63.5	143	52	98	13800	RX272M500SA43□□□
	2700	76.2	90	52	98	12200	RX272M500T900□□□
	2700	76.2	110	52	98	13100	RX272M500TA10□□□
	3300	63.5	130	42	80	14300	RX332M500SA30□□□
	3300	63.5	150	42	80	15100	RX332M500SA50□□□
	3300	76.2	105	42	80	15100	RX332M500TA05□□□
	3300	76.2	115	42	80	16000	RX332M500TA15□□□
	3900	63.5	170	36	68	17200	RX392M500SA70□□□
	3900	76.2	115	36	68	17500	RX392M500TA15□□□
	3900	76.2	130	36	68	18200	RX392M500TA30□□□
	3900	89	90	36	68	17800	RX392M500X900□□□
	3900	89	120	36	68	19500	RX392M500XA20□□□
	4700	76.2	135	30	56	20500	RX472M500TA35□□□
	4700	76.2	150	30	56	21800	RX472M500TA50□□□
	4700	89	105	30	56	20000	RX472M500XA05□□□
	4700	89	130	30	56	22000	RX472M500XA30□□□
	5600	76.2	143	25	47	20000	RX562M500TA43□□□
	5600	76.2	170	25	47	20800	RX562M500TA70□□□
	5600	89	115	25	47	18200	RX562M500XA15□□□
	5600	89	130	25	47	19500	RX562M500XA30□□□
	6800	76.2	180	21	39	31000	RX682M500TA80□□□
	6800	76.2	190	21	39	31500	RX682M500TA90□□□
6800	89	143	21	39	30600	RX682M500XA43□□□	
6800	89	170	21	39	31800	RX682M500XA70□□□	
8200	76.2	220	17	32	31800	RX822M500TB20□□□	
8200	89	155	17	32	32000	RX822M500XA55□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

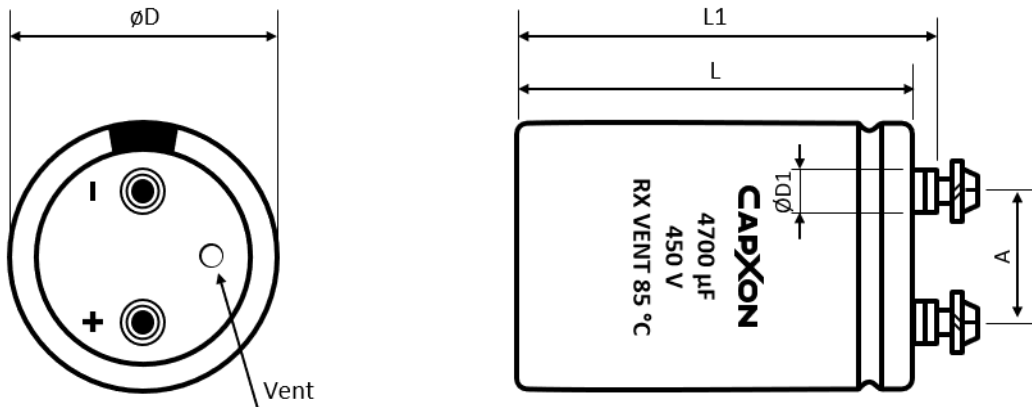
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
500	8200	89	175	17	32	33000	RX822M500XA75□□□
	8200	100	175	17	32	34100	RX822M500DA75□□□
	10000	89	190	14	27	38300	RX103M500XA90□□□
	10000	89	220	14	27	39500	RX103M500XB20□□□
	10000	100	190	14	27	41500	RX103M500DA90□□□
	12000	89	220	12	22	39100	RX123M500XB20□□□
	12000	89	240	12	22	40500	RX123M500XB40□□□
	12000	100	210	12	22	41600	RX123M500DB10□□□
	12000	100	240	12	22	42400	RX123M500DB40□□□
	15000	100	250	9	18	43500	RX153M500DB50□□□
550	1200	51	110	120	220	6400	RX122M550RA10□□□
	1200	63.5	110	120	220	8000	RX122M550SA10□□□
	1500	51	130	95	180	7700	RX152M550RA30□□□
	1500	63.5	130	95	180	9000	RX152M550SA30□□□
	1800	63.5	105	79	150	8700	RX182M550SA05□□□
	1800	63.5	120	79	150	9000	RX182M550SA20□□□
	1800	76.2	110	79	150	10000	RX182M550TA10□□□
	2200	63.5	120	63	120	10300	RX222M550SA20□□□
	2200	76.2	130	63	120	13000	RX222M550TA30□□□
	2700	63.5	150	52	98	12500	RX272M550SA50□□□
	2700	76.2	105	52	98	12300	RX272M550TA05□□□
	2700	76.2	155	52	98	16000	RX272M550TA55□□□
	3300	63.5	170	42	80	15200	RX332M550SA70□□□
	3300	76.2	130	42	80	15600	RX332M550TA30□□□
	3300	76.2	155	42	80	17000	RX332M550TA55□□□
	3900	76.2	140	36	68	18400	RX392M550TA40□□□
	3900	89	150	36	68	21000	RX392M550XA50□□□
	4700	76.2	170	30	56	22200	RX472M550TA70□□□
	4700	89	130	30	56	23200	RX472M550XA30□□□
	4700	89	170	30	56	25000	RX472M550XA70□□□
	5600	76.2	190	25	47	25000	RX562M550TA90□□□
	5600	89	150	25	47	24500	RX562M550XA50□□□
	5600	89	190	25	47	27200	RX562M550XA90□□□
	6800	89	170	21	39	27500	RX682M550XA70□□□
	6800	89	190	21	39	28900	RX682M550XA90□□□
	8200	89	220	17	32	36500	RX822M550XB20□□□
	8200	100	170	17	32	35000	RX822M550DA70□□□
	8200	100	220	17	32	40000	RX822M550DB20□□□
	10000	89	240	14	27	42500	RX103M550XB40□□□
	10000	100	200	14	27	42400	RX103M550DB00□□□
10000	100	250	14	27	43000	RX103M550DB50□□□	
600	1200	63.5	95	150	280	7000	RX122M600S950□□□
	1500	63.5	110	120	220	8400	RX152M600SA10□□□
	1800	63.5	125	95	180	9700	RX182M600SA25□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

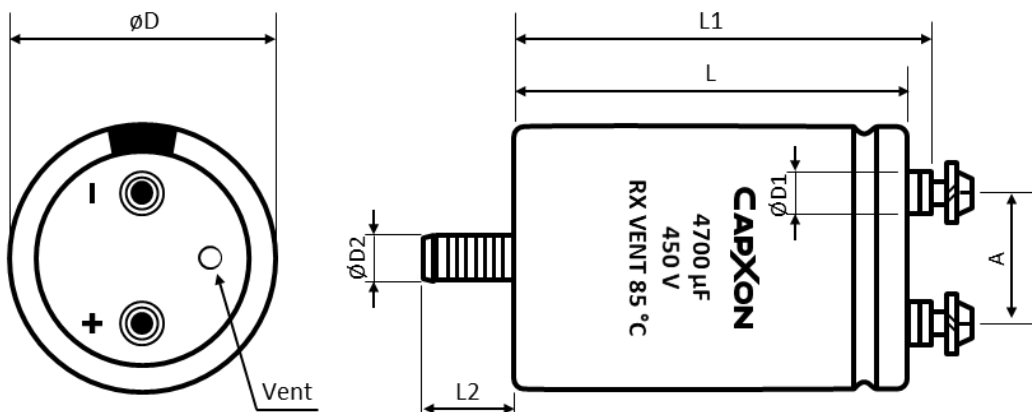
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +85°C - 120Hz (mA rms)	CapXon Part Number
600	1800	76.2	95	95	180	9500	RX182M600T950□□□
	2200	63.5	145	79	150	11400	RX222M600SA45□□□
	2200	76.2	110	79	150	11200	RX222M600TA10□□□
	2700	63.5	170	63	120	13500	RX272M600SA70□□□
	2700	76.2	125	63	120	13200	RX272M600TA25□□□
	3300	76.2	145	53	100	15500	RX332M600TA45□□□
	3900	76.2	170	45	85	21100	RX392M600TA70□□□
	3900	89	130	45	85	19800	RX392M600XA30□□□
	4700	76.2	190	37	71	22500	RX472M600TA90□□□
	4700	89	150	37	71	24000	RX472M600XA50□□□
	5600	89	170	31	59	26000	RX562M600XA70□□□
650	1000	63.5	100	170	330	7200	RX102M650SA00□□□
	1200	63.5	110	150	280	8000	RX122M650SA10□□□
	1500	63.5	130	120	220	9200	RX152M650SA30□□□
	1800	63.5	150	95	180	10500	RX182M650SA50□□□
	2200	63.5	170	79	150	12300	RX222M650SA70□□□
	2700	76.2	150	63	120	14500	RX272M650TA50□□□
	3300	76.2	170	53	100	16800	RX332M650TA70□□□
	3900	89	155	45	85	22000	RX392M650XA55□□□
4700	89	190	37	71	28000	RX472M650XA90□□□	

DIMENSIONS - Ring clamp mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$D1 \text{ max.}$	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M8	100	100 ~ 240	110 ~ 250	17.5	41.5	16	5	A87

DIMENSIONS - Threaded stud mounting - All dimensions in mm



DIMENSIONS • Threaded stud mounting • All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M8	100	100 ~ 240	110 ~ 250	16	17.5	M12	41.5	16	5	E87

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RX102M250P800E50
> 35	PVC	Thermo	Yes	No	-	RX272M400T750E50
> 35	PET	Thermo	No	No	(*) Note	RX272M400T750E50*
> 35	PET	Ink	No	Yes	(**) Note	RX272M400T750E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

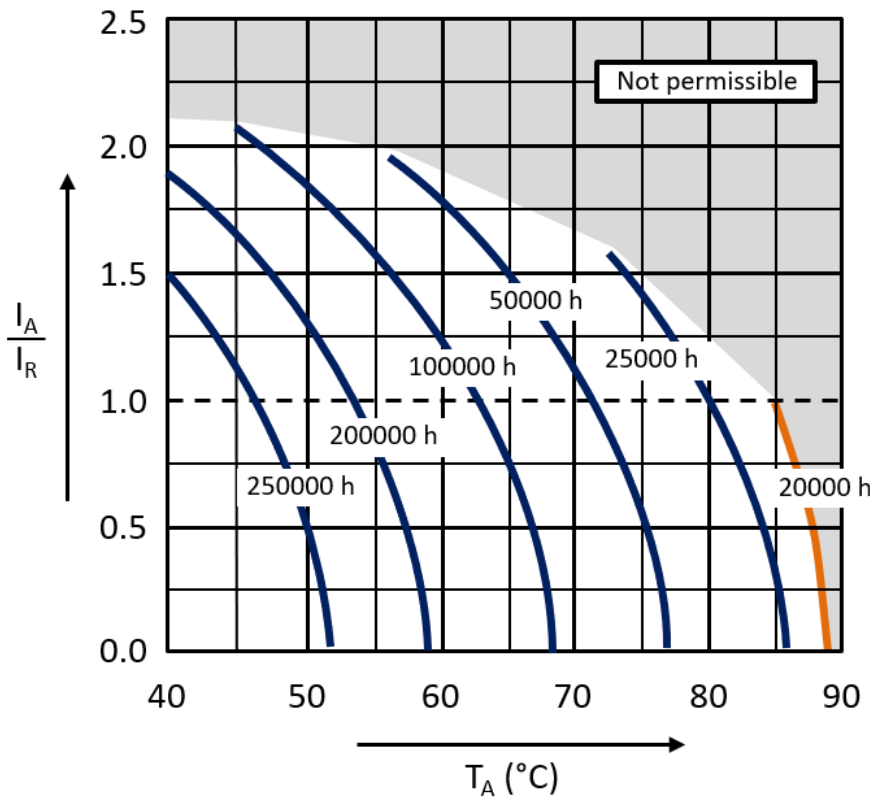
Frequency (Hz)	50/60	100/120	300	1k	≥ 3k
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly

RU SERIES ▪ LONG LIFE 85°C TYPE

KEY FEATURES



- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Screw terminal type
- Useful life: 85°C ▪ 12 000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics		
Operating Temperature Range		-40 ~ +85°C		-25 ~ +85°C
Rated Voltage Range	V _R	200 ~ 450V DC		500V DC
Surge Voltage	V _S	(V _R ≤ 315V): V _S = 1.15·V _R		(V _R > 315V): V _S = 1.10·V _R
Capacitance Range	C _R	1000 ~ 33000µF		820 ~ 10000µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)		
Leakage Current (20°C ▪ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (µA) or 5mA (whichever is smaller) ▪ After 5 minutes [I _{LEAK} (µA) ; C _R (µF) ; V _R (V)]		
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V _R (V DC)	160 ~ 450	500
		tanδ	15	20
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450	500
		Z-25°C/Z+20°C	4	4
		Z-40°C/Z+20°C	10	-

Lifetime Test				
Useful Life 85°C (V _R & I _R applied)	Test	12 000 hours		
	ΔC/C _R	≤ ±15% of initial measured value		
	tanδ	≤ 175% of initial specified value		
	I _{Leak}	≤ the initial specified value		
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ▪ parts show higher drift as test criteria			
Endurance 85°C (V _R & I _R applied)	Test	2 000 hours		
	ΔC/C _R	≤ ±10% of initial measured value		
	tanδ	≤ 130% of initial specified value		
	I _{Leak}	≤ the initial specified value		
Shelf Life 85°C (V _R = 0)	Test	1 000 hours		
	ΔC/C _R	≤ ±10% of initial measured value		
	tanδ	≤ 130% of initial specified value		
	I _{Leak}	≤ the initial specified value		
	Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4			
Vibration Resistance Test	Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6			

★ Remark: For **Halogen Free** products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +85°C - 120Hz (mA rms)	CapXon Part Number
200	3300	51	80	33	60	8590	RU332M200R800□□□
	3900	51	95	28	51	9780	RU392M200R950□□□
	4700	51	105	24	42	11300	RU472M200RA05□□□
	4700	63.5	80	24	42	11400	RU472M200S800□□□
	5600	51	115	20	36	12400	RU562M200RA15□□□
	5600	63.5	95	20	36	12900	RU562M200S950□□□
	6800	63.5	95	16	29	14000	RU682M200S950□□□
	8200	63.5	115	13	24	17600	RU822M200SA15□□□
	8200	76.2	95	13	24	18000	RU822M200T950□□□
	10000	63.5	130	11	20	19800	RU103M200SA30□□□
	10000	76.2	105	11	20	20000	RU103M200TA05□□□
	12000	76.2	115	9	17	22300	RU123M200TA15□□□
	15000	76.2	140	7	13	27800	RU153M200TA40□□□
	15000	89	120	7	13	28400	RU153M200XA20□□□
	18000	76.2	155	6	11	30500	RU183M200TA55□□□
	18000	89	140	6	11	31800	RU183M200XA40□□□
	22000	76.2	190	5	9	34600	RU223M200TA90□□□
	22000	89	170	5	9	35900	RU223M200XA70□□□
	27000	76.2	220	4	7	39400	RU273M200TB20□□□
	27000	89	195	4	7	40600	RU273M200XA95□□□
33000	89	220	3	6	45900	RU333M200XB20□□□	
250	2700	51	80	41	74	7280	RU272M250R800□□□
	3300	51	80	33	60	8900	RU332M250R800□□□
	3900	51	105	28	51	9930	RU392M250RA05□□□
	3900	63.5	80	28	51	10000	RU392M250S800□□□
	4700	51	130	24	42	11600	RU472M250RA30□□□
	4700	63.5	95	24	42	11700	RU472M250S950□□□
	5600	63.5	95	20	36	12300	RU562M250S950□□□
	6800	63.5	115	16	29	15400	RU682M250SA15□□□
	6800	76.2	95	16	29	15800	RU682M250T950□□□
	8200	63.5	130	13	24	17400	RU822M250SA30□□□
	8200	76.2	105	13	24	17600	RU822M250TA05□□□
	10000	76.2	115	11	20	20200	RU103M250TA15□□□
	10000	89	120	11	20	22500	RU103M250XA20□□□
	12000	76.2	140	9	17	24200	RU123M250TA40□□□
	12000	89	120	9	17	24700	RU123M250XA20□□□
	15000	76.2	160	7	13	27500	RU153M250TA60□□□
	15000	89	140	7	13	28300	RU153M250XA40□□□
	18000	76.2	190	6	11	30600	RU183M250TA90□□□
	18000	89	170	6	11	31700	RU183M250XA70□□□
	22000	76.2	220	5	9	34800	RU223M250TB20□□□
22000	89	195	5	9	35900	RU223M250XA95□□□	
27000	89	220	4	7	40800	RU273M250XB20□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕD (mm)	L (mm)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
350	1500	51	80	72	130	6440	RU152M350R800□□□
	1800	51	80	61	110	9510	RU182M350R800□□□
	2200	51	80	50	90	9700	RU222M350R800□□□
	2200	51	95	50	90	10800	RU222M350R950□□□
	2200	63.5	80	50	90	11300	RU222M350S800□□□
	2700	51	95	41	74	12000	RU272M350R950□□□
	2700	63.5	80	41	74	12600	RU272M350S800□□□
	3300	51	115	33	60	14300	RU332M350RA15□□□
	3300	63.5	90	33	60	14500	RU332M350S900□□□
	3900	51	130	28	51	16200	RU392M350RA30□□□
	3900	63.5	95	28	51	16300	RU392M350S950□□□
	3900	63.5	105	28	51	16600	RU392M350SA05□□□
	4700	63.5	105	24	42	17900	RU472M350SA05□□□
	4700	76.2	95	24	42	19300	RU472M350T950□□□
	5600	63.5	120	20	36	19400	RU562M350SA20□□□
	5600	76.2	95	20	36	20200	RU562M350T950□□□
	6800	63.5	140	16	29	23200	RU682M350SA40□□□
	6800	76.2	105	16	29	23100	RU682M350TA05□□□
	6800	89	100	16	29	25000	RU682M350XA00□□□
	8200	76.2	115	13	24	25100	RU822M350TA15□□□
	8200	89	120	13	24	29600	RU822M350XA20□□□
	10000	76.2	140	11	20	32100	RU103M350TA40□□□
	10000	89	120	11	20	33200	RU103M350XA20□□□
	12000	76.2	170	9	17	35300	RU123M350TA70□□□
	12000	89	140	9	17	37300	RU123M350XA40□□□
	15000	76.2	190	7	13	41000	RU153M350TA90□□□
15000	89	160	7	13	41900	RU153M350XA60□□□	
18000	89	195	6	11	48100	RU183M350XA95□□□	
22000	89	220	5	9	50500	RU223M350XB20□□□	
400	1000	51	80	110	200	4600	RU102M400R800□□□
	1500	51	80	72	130	7000	RU152M400R800□□□
	1800	51	95	61	110	9980	RU182M400R950□□□
	2200	51	100	50	90	11200	RU222M400RA00□□□
	2200	63.5	80	50	90	11600	RU222M400S800□□□
	2700	51	115	41	74	13200	RU272M400RA15□□□
	2700	63.5	95	41	74	13900	RU272M400S950□□□
	3300	51	130	33	60	14600	RU332M400RA30□□□
	3300	63.5	105	33	60	15000	RU332M400SA05□□□
	3900	63.5	105	28	51	16100	RU392M400SA05□□□
	3900	76.2	95	28	51	18300	RU392M400T950□□□
	4700	63.5	130	24	42	20200	RU472M400SA30□□□
	4700	76.2	95	24	42	20000	RU472M400T950□□□
	5600	63.5	140	20	36	21500	RU562M400SA40□□□
	5600	76.2	115	20	36	21800	RU562M400TA15□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

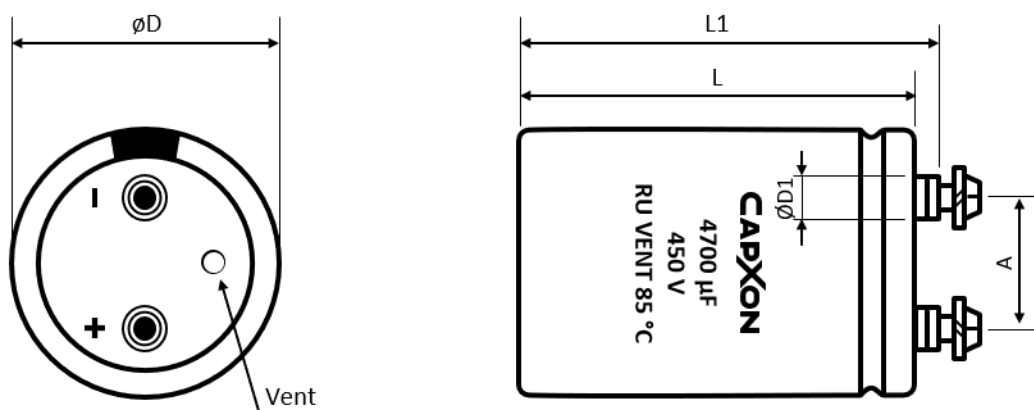
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +85°C • 120Hz (mA rms)	CapXon Part Number
400	6800	76.2	130	16	29	25200	RU682M400TA30□□□
	6800	89	120	16	29	27300	RU682M400XA20□□□
	8200	76.2	155	13	24	29200	RU822M400TA55□□□
	8200	89	120	13	24	29100	RU822M400XA20□□□
	10000	76.2	165	11	20	32500	RU103M400TA65□□□
	10000	89	140	11	20	34700	RU103M400XA40□□□
	12000	76.2	220	8	17	39500	RU123M400TB20□□□
	12000	89	160	8	17	38000	RU123M400XA60□□□
	15000	76.2	230	7	13	42100	RU153M400TB30□□□
	15000	89	180	7	13	41600	RU153M400XA80□□□
	18000	89	220	6	11	46400	RU183M400XB20□□□
450	1200	51	80	94	170	7110	RU122M450R800□□□
	1500	51	80	72	130	7790	RU152M450R800□□□
	1800	51	105	61	110	9590	RU182M450RA05□□□
	1800	63.5	80	61	110	9770	RU182M450S800□□□
	2200	51	115	50	90	11000	RU222M450RA15□□□
	2200	63.5	95	50	90	11400	RU222M450S950□□□
	2700	63.5	95	41	74	12600	RU272M450S950□□□
	2700	76.2	95	41	74	14200	RU272M450T950□□□
	3300	63.5	115	33	60	14400	RU332M450SA15□□□
	3300	76.2	95	33	60	15000	RU332M450T950□□□
	3900	63.5	130	28	51	16200	RU392M450SA30□□□
	3900	76.2	105	28	51	16300	RU392M450TA05□□□
	4700	76.2	115	24	42	20400	RU472M450TA15□□□
	5600	76.2	130	20	36	22900	RU562M450TA30□□□
	5600	89	120	20	36	24200	RU562M450XA20□□□
	6800	76.2	155	16	29	27300	RU682M450TA55□□□
	8200	76.2	190	13	24	29600	RU822M450TA90□□□
	8200	89	170	13	24	30700	RU822M450XA70□□□
	10000	76.2	220	11	20	32600	RU103M450TB20□□□
	10000	89	170	11	20	33400	RU103M450XA70□□□
12000	89	195	9	17	37700	RU123M450XA95□□□	
500	820	51	80	180	320	5090	RU821M500R800□□□
	1000	51	95	150	270	5800	RU102M500R950□□□
	1200	51	95	120	220	6570	RU122M500R950□□□
	1200	63.5	80	120	220	7000	RU122M500S800□□□
	1500	51	115	100	180	7680	RU152M500RA15□□□
	1500	63.5	80	100	180	7790	RU152M500S800□□□
	1800	51	130	83	150	8770	RU182M500RA30□□□
	1800	63.5	95	83	150	8830	RU182M500S950□□□
	2200	63.5	105	67	120	10000	RU222M500SA05□□□
	2700	63.5	115	55	98	11500	RU272M500SA15□□□
	2700	76.2	95	55	98	11900	RU272M500T950□□□
	3300	63.5	140	45	80	13200	RU332M500SA40□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

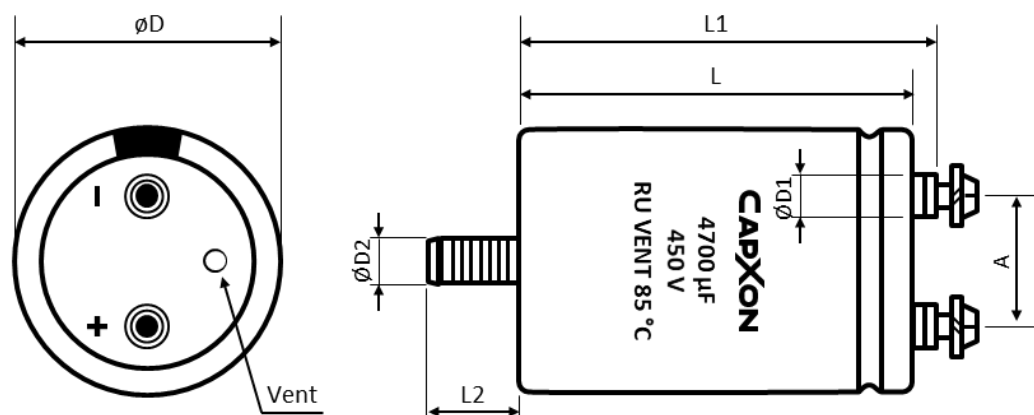
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +85°C - 120Hz (mA rms)	CapXon Part Number
500	3300	76.2	115	45	80	13500	RU332M500TA15□□□
	3900	76.2	130	38	68	15100	RU392M500TA30□□□
	4700	76.2	120	31	56	18700	RU472M500TA20□□□
	5600	76.2	165	26	47	19900	RU562M500TA65□□□
	5600	89	140	26	47	20800	RU562M500XA40□□□
	6800	76.2	190	22	39	22800	RU682M500TA90□□□
	6800	89	170	22	39	23500	RU682M500XA70□□□
	8200	76.2	220	18	32	26200	RU822M500TB20□□□
	8200	89	195	18	32	26600	RU822M500XA95□□□
	10000	89	220	15	27	30400	RU103M500XB20□□□

DIMENSIONS - Ring clamp mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	D1 max.	A ± 0.5			
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67

DIMENSIONS - Threaded stud mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$L2 \pm 1$	$D1$ max.	$D2$	$A \pm 0.5$			
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67

SLEEVE AND PRINTING SELECTION TABLE

Diameter $\varnothing D$ (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
> 35	PVC	Thermo	Yes	No	-	RU273M200TB20E50
> 35	PET	Thermo	No	No	(*) Note	RU273M200TB20E50*
> 35	PET	Ink	No	Yes	(**) Note	RU273M200TB20E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information "Accessories".

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

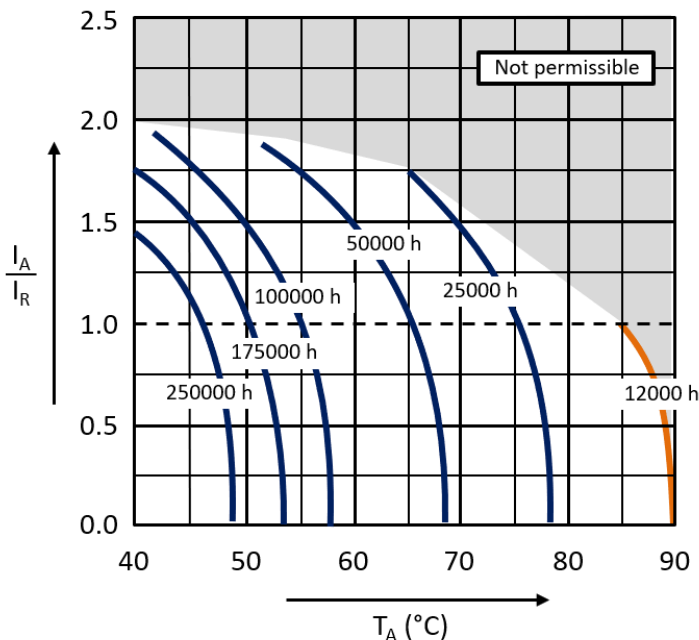
Frequency (Hz)	50/60	100/120	300	1k	$\geq 3k$
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RK SERIES ■ LONG LIFE 105°C TYPE

KEY FEATURES

- **ALUMINUM ELECTROLYTIC CAPACITOR** ■ Screw terminal type
- Useful life: 105°C ■ 4000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +105°C	
Rated Voltage Range	V_R	10 ~ 100V DC	
Surge Voltage	V_S	$V_S = 1.15 \cdot V_R$	
Capacitance Range	C_R	1000 ~ 1000000 μ F	
Cap. Tolerance	ΔC	$\pm 20\%$ (120Hz ■ 20°C)	
Leakage Current (20°C ■ V_R applied)	I_{LEAK}	$\leq 0.018 \cdot (C_R \cdot V_R)^{0.85} + 4$ (μ A) or 5mA (whichever is smaller) ■ After 5 minutes [I_{LEAK} (μ A) ; C_R (μ F) ; V_R (V)]	
Dissipation Factor % (20°C ■ 120Hz)	$\tan \delta$	Not to exceed the values shown in standard ratings	
Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	10 ~ 100
		Z-25°C/Z+20°C	3
		Z-40°C/Z+20°C	12
Lifetime Test			
Useful Life 105°C (V_R & I_R applied)	Test	4 000 hours	
	$\Delta C/C_R$	$\leq \pm 45\%$ of initial measured value	
	$\tan \delta$	$\leq 300\%$ of initial specified value	
	I_{Leak}	\leq the initial specified value	
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ■ parts show higher drift as test criteria		
Endurance 105°C (V_R & I_R applied)	Test	2 000 hours	
	$\Delta C/C_R$	$\leq \pm 20\%$ of initial measured value	
	$\tan \delta$	$\leq 200\%$ of initial specified value	
	I_{Leak}	\leq the initial specified value	
Shelf Life 105°C ($V_R = 0$)	Test	1 000 hours	
	$\Delta C/C_R$	$\leq \pm 20\%$ of initial measured value	
	$\tan \delta$	$\leq 200\%$ of initial specified value	
	I_{Leak}	\leq the initial specified value	
	Before measurement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4		
Vibration Resistance Test		Max. 10g force, f_{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ■ IEC 60068-2-6	

★ Remark: For **Halogen Free** products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r = Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
10	27000	35	50	75	20	37	4900	RK273M010P500□□□
	33000	35	50	75	15	30	5100	RK333M010P500□□□
	39000	35	60	75	13	26	5900	RK393M010P600□□□
	47000	35	80	75	12	21	7100	RK473M010P800□□□
	56000	35	80	75	12	18	8000	RK563M010P800□□□
	68000	35	100	75	10	18	8500	RK683M010PA00□□□
	68000	51	80	100	10	20	8500	RK683M010R800□□□
	82000	35	100	75	8	17	8900	RK823M010PA00□□□
	100000	35	120	75	8	16	10700	RK104M010PA20□□□
	100000	51	80	100	8	16	10700	RK104M010R800□□□
	120000	51	80	100	7	14	11000	RK124M010R800□□□
	150000	51	100	100	7	12	13200	RK154M010RA00□□□
	180000	51	120	100	7	11	15700	RK184M010RA20□□□
	220000	51	120	100	7	10	16800	RK224M010RA20□□□
	270000	63.5	120	120	6	9	19600	RK274M010SA20□□□
	330000	63.5	120	120	6	9	20500	RK334M010SA20□□□
	390000	76.2	120	150	6	8	21300	RK394M010TA20□□□
	470000	76.2	120	150	6	8	22000	RK474M010TA20□□□
	560000	76.2	140	150	5	7	23600	RK564M010TA40□□□
	680000	89	140	180	5	7	26000	RK684M010XA40□□□
680000	89	170	180	5	7	27500	RK684M010XA70□□□	
1000000	89	220	180	5	6	30000	RK105M010XB20□□□	
16	18000	35	50	60	24	44	4200	RK183M016P500□□□
	22000	35	50	60	21	36	4700	RK223M016P500□□□
	22000	35	60	60	21	36	4900	RK223M016P600□□□
	27000	35	50	60	18	29	5500	RK273M016P500□□□
	33000	35	65	60	16	24	5700	RK333M016P650□□□
	33000	35	80	60	16	24	6700	RK333M016P800□□□
	39000	35	65	60	14	20	6800	RK393M016P650□□□
	47000	35	80	60	13	18	7300	RK473M016P800□□□
	47000	35	100	60	13	18	8800	RK473M016PA00□□□
	56000	35	100	60	12	16	9000	RK563M016PA00□□□
	68000	35	100	60	12	15	9200	RK683M016PA00□□□
	68000	51	80	70	12	15	9500	RK683M016R800□□□
	82000	51	80	70	10	14	10700	RK823M016R800□□□
	100000	51	80	70	9	13	11000	RK104M016R800□□□
	100000	51	100	70	9	13	12500	RK104M016RA00□□□
	120000	51	100	70	8	12	13100	RK124M016RA00□□□
	150000	51	120	70	7	11	15500	RK154M016RA20□□□
	180000	51	120	70	6	10	15700	RK184M016RA20□□□
	220000	63.5	120	80	6	10	18000	RK224M016SA20□□□
	270000	63.5	120	80	5	9	20000	RK274M016SA20□□□
330000	76.2	120	120	5	9	21300	RK334M016TA20□□□	
390000	76.2	120	120	5	9	21500	RK394M016TA20□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r = Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
16	470000	76.2	140	120	5	8	24200	RK474M016TA40□□□
	470000	76.2	160	120	5	8	25500	RK474M016TA60□□□
	470000	89	140	140	5	8	26500	RK474M016XA40□□□
	560000	89	140	140	4	8	28100	RK564M016XA40□□□
	680000	89	140	140	4	8	28500	RK684M016XA40□□□
	1000000	89	220	140	4	8	35000	RK105M016XB20□□□
25	10000	35	50	40	27	53	2900	RK103M025P500□□□
	12000	35	50	40	23	44	3700	RK123M025P500□□□
	15000	35	50	40	21	35	5300	RK153M025P500□□□
	15000	35	55	40	21	35	5500	RK153M025P550□□□
	18000	35	60	40	19	29	5500	RK183M025P600□□□
	22000	35	60	40	14	24	6500	RK223M025P600□□□
	22000	35	80	40	14	24	7400	RK223M025P800□□□
	27000	35	80	40	12	20	8000	RK273M025P800□□□
	33000	35	80	40	10	18	8800	RK333M025P800□□□
	33000	35	100	40	10	18	9700	RK333M025PA00□□□
	39000	35	100	40	9	17	10000	RK393M025PA00□□□
	47000	35	105	40	8	15	11000	RK473M025PA05□□□
	47000	35	120	40	8	15	11700	RK473M025PA20□□□
	47000	51	80	50	8	17	12000	RK473M025R800□□□
	56000	51	80	50	7	14	12500	RK563M025R800□□□
	68000	51	80	50	6	13	13000	RK683M025R800□□□
	68000	51	100	50	6	13	14300	RK683M025RA00□□□
	82000	51	100	50	6	12	14600	RK823M025RA00□□□
	100000	51	105	50	5	10	15000	RK104M025RA05□□□
	100000	51	120	50	5	10	16000	RK104M025RA20□□□
	100000	63.5	100	70	5	10	16300	RK104M025SA00□□□
	120000	63.5	100	70	5	9	17000	RK124M025SA00□□□
	150000	63.5	105	70	5	8	18000	RK154M025SA05□□□
	150000	63.5	120	70	5	8	19000	RK154M025SA20□□□
	180000	63.5	120	70	4	7	19500	RK184M025SA20□□□
	220000	76.2	105	80	4	6	20000	RK224M025TA05□□□
	220000	76.2	115	80	4	6	20800	RK224M025TA15□□□
	220000	76.2	120	80	4	6	21200	RK224M025TA20□□□
	270000	76.2	120	80	4	5	21700	RK274M025TA20□□□
	330000	76.2	145	80	4	5	24000	RK334M025TA45□□□
	330000	76.2	160	80	4	5	25000	RK334M025TA60□□□
	330000	89	130	130	4	5	25000	RK334M025XA30□□□
	330000	89	140	130	4	5	26000	RK334M025XA40□□□
	390000	89	140	130	4	4	26500	RK394M025XA40□□□
470000	89	170	130	3	4	28000	RK474M025XA70□□□	
680000	89	220	130	3	4	31000	RK684M025XB20□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕD (mm)	L (mm)	$\tan\delta$ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
35	6800	35	50	30	30	59	2600	RK682M035P500□□□
	8200	35	50	30	25	49	3300	RK822M035P500□□□
	10000	35	50	30	20	40	3600	RK103M035P500□□□
	10000	35	60	30	20	40	3800	RK103M035P600□□□
	12000	35	60	30	19	33	4800	RK123M035P600□□□
	15000	35	60	30	17	27	5600	RK153M035P600□□□
	15000	35	80	30	17	27	6000	RK153M035P800□□□
	18000	35	80	30	15	22	6300	RK183M035P800□□□
	22000	35	80	30	13	18	7600	RK223M035P800□□□
	22000	35	100	30	13	18	7900	RK223M035PA00□□□
	27000	35	100	30	11	15	8200	RK273M035PA00□□□
	33000	35	120	30	9	13	10200	RK333M035PA20□□□
	33000	51	80	50	9	13	10700	RK333M035R800□□□
	39000	51	80	50	7	12	11000	RK393M035R800□□□
	47000	51	100	50	5	11	12500	RK473M035RA00□□□
	56000	51	100	50	5	11	13000	RK563M035RA00□□□
	68000	51	120	50	5	10	14500	RK683M035RA20□□□
	82000	63.5	100	60	4	9	14800	RK823M035SA00□□□
	100000	63.5	120	60	4	9	17600	RK104M035SA20□□□
	120000	63.5	120	60	4	9	18000	RK124M035SA20□□□
	150000	76.2	120	70	4	8	20000	RK154M035TA20□□□
	180000	76.2	120	70	4	8	20500	RK184M035TA20□□□
	220000	76.2	140	70	3	7	23400	RK224M035TA40□□□
	220000	76.2	160	70	3	7	25000	RK224M035TA60□□□
	220000	89	130	90	3	7	24500	RK224M035XA30□□□
	220000	89	140	90	3	7	25000	RK224M035XA40□□□
	270000	89	140	90	3	7	25500	RK274M035XA40□□□
	330000	89	160	90	3	6	30000	RK334M035XA60□□□
330000	89	170	90	3	6	31000	RK334M035XA70□□□	
470000	89	220	90	3	6	34000	RK474M035XB20□□□	
40	10000	35	55	30	17	38	5300	RK103M040P550□□□
	15000	35	80	30	12	23	7400	RK153M040P800□□□
	22000	35	105	30	9	17	9500	RK223M040PA05□□□
	33000	51	80	50	6	12	11000	RK333M040R800□□□
	47000	51	105	50	5	10	14000	RK473M040RA05□□□
	68000	51	105	50	5	9	15000	RK683M040RA05□□□
	100000	63.5	105	60	4	8	18000	RK104M040SA05□□□
	150000	76.2	105	70	4	7	20000	RK154M040TA05□□□
220000	76.2	143	70	3	5	24000	RK224M040TA43□□□	
50	3300	35	50	25	47	100	2200	RK332M050P500□□□
	3900	35	50	25	40	85	2800	RK392M050P500□□□
	4700	35	50	25	35	71	3300	RK472M050P500□□□
	5600	35	50	25	29	59	3500	RK562M050P500□□□
	6800	35	50	25	25	49	3700	RK682M050P500□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	$\tan\delta$ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (m Ω)	Max. ESR +20°C • 120Hz (m Ω)	I_R - Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
50	6800	35	80	25	25	49	4500	RK682M050P800□□□
	8200	35	60	25	23	40	4500	RK822M050P600□□□
	10000	35	60	25	18	33	5500	RK103M050P600□□□
	10000	35	80	25	18	33	5800	RK103M050P800□□□
	12000	35	80	25	15	28	6000	RK123M050P800□□□
	15000	35	80	25	13	22	7600	RK153M050P800□□□
	18000	35	100	25	11	18	8000	RK183M050PA00□□□
	22000	35	120	25	9	15	9800	RK223M050PA20□□□
	22000	51	80	30	9	18	10000	RK223M050R800□□□
	27000	51	80	30	8	15	10200	RK273M050R800□□□
	33000	51	100	30	7	13	11200	RK333M050RA00□□□
	33000	51	115	30	7	13	11500	RK333M050RA15□□□
	33000	51	120	30	7	13	12000	RK333M050RA20□□□
	39000	51	120	30	7	12	13200	RK393M050RA20□□□
	47000	51	120	30	6	11	14500	RK473M050RA20□□□
	47000	63.5	100	50	6	11	14500	RK473M050SA00□□□
	56000	63.5	100	50	6	9	14600	RK563M050SA00□□□
	68000	63.5	115	50	6	8	16000	RK683M050SA15□□□
	68000	63.5	120	50	6	8	16600	RK683M050SA20□□□
	82000	76.2	120	60	5	7	18900	RK823M050TA20□□□
	100000	76.2	120	60	5	7	19500	RK104M050TA20□□□
	120000	76.2	120	60	5	7	20000	RK124M050TA20□□□
	150000	89	130	80	5	7	22500	RK154M050XA30□□□
	150000	89	140	80	5	7	23900	RK154M050XA40□□□
	180000	89	140	80	4	6	24200	RK184M050XA40□□□
	180000	89	155	80	4	6	25000	RK184M050XA55□□□
	220000	89	170	80	4	6	26500	RK224M050XA70□□□
	330000	89	220	80	4	6	32000	RK334M050XB20□□□
63	2200	35	50	20	65	120	2100	RK222M063P500□□□
	2700	35	50	20	46	98	2300	RK272M063P500□□□
	3300	35	50	20	42	80	2500	RK332M063P500□□□
	3900	35	50	20	37	68	2800	RK392M063P500□□□
	4700	35	50	20	30	56	3500	RK472M063P500□□□
	4700	35	55	20	30	56	4400	RK472M063P550□□□
	5600	35	60	20	26	47	4700	RK562M063P600□□□
	6800	35	60	20	22	39	5300	RK682M063P600□□□
	6800	35	80	20	22	39	6000	RK682M063P800□□□
	8200	35	80	20	18	32	6200	RK822M063P800□□□
	10000	35	80	20	14	27	7200	RK103M063P800□□□
	10000	35	100	20	14	27	7800	RK103M063PA00□□□
	10000	35	105	20	14	27	8100	RK103M063PA05□□□
	12000	35	100	20	12	22	8300	RK123M063PA00□□□
	15000	35	120	20	10	19	8800	RK153M063PA20□□□
	15000	51	80	25	10	19	9500	RK153M063R800□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

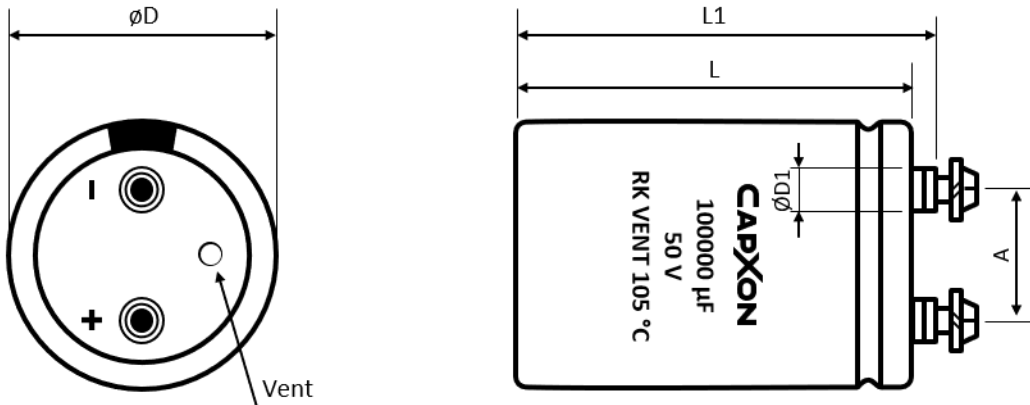
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r - Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
63	18000	51	80	25	9	17	10000	RK183M063R800□□□
	22000	51	100	25	7	14	11000	RK223M063RA00□□□
	22000	51	105	25	7	14	12000	RK223M063RA05□□□
	27000	51	120	25	6	12	12500	RK273M063RA20□□□
	33000	51	120	25	6	11	14000	RK333M063RA20□□□
	33000	63.5	100	30	6	11	14500	RK333M063SA00□□□
	33000	63.5	105	30	6	11	15000	RK333M063SA05□□□
	39000	63.5	100	30	5	11	15000	RK393M063SA00□□□
	47000	63.5	105	30	5	10	17000	RK473M063SA05□□□
	56000	63.5	120	30	5	9	18000	RK563M063SA20□□□
	68000	63.5	140	30	4	8	19500	RK683M063SA40□□□
	68000	76.2	105	40	4	8	19000	RK683M063TA05□□□
	68000	76.2	120	40	4	8	20000	RK683M063TA20□□□
	82000	76.2	140	40	4	8	21000	RK823M063TA40□□□
	100000	76.2	140	40	4	7	22500	RK104M063TA40□□□
	100000	76.2	145	40	4	7	23000	RK104M063TA45□□□
	100000	89	130	60	4	7	24000	RK104M063XA30□□□
	120000	89	140	60	4	7	25000	RK124M063XA40□□□
	150000	89	160	60	4	6	27000	RK154M063XA60□□□
	150000	89	170	60	4	6	28000	RK154M063XA70□□□
220000	89	220	60	3	5	29500	RK224M063XB20□□□	
80	2200	35	50	20	63	120	2400	RK222M080P500□□□
	2700	35	50	20	45	98	2700	RK272M080P500□□□
	3300	35	50	20	40	80	3000	RK332M080P500□□□
	3900	35	60	20	35	68	3400	RK392M080P600□□□
	4700	35	60	20	28	56	4600	RK472M080P600□□□
	5600	35	80	20	25	47	5000	RK562M080P800□□□
	6800	35	80	20	21	39	5500	RK682M080P800□□□
	8200	35	100	20	17	32	6500	RK822M080PA00□□□
	10000	35	120	20	13	27	8500	RK103M080PA20□□□
	12000	51	80	20	12	22	8600	RK123M080R800□□□
	15000	51	100	20	9	18	10000	RK153M080RA00□□□
	18000	51	120	20	8	15	10500	RK183M080RA20□□□
	22000	51	100	20	7	12	13000	RK223M080RA00□□□
	22000	51	120	20	7	12	13500	RK223M080RA20□□□
	22000	63.5	100	25	7	15	13700	RK223M080SA00□□□
	27000	63.5	100	25	6	12	14000	RK273M080SA00□□□
	33000	51	140	20	6	11	14000	RK333M080RA40□□□
	33000	76.2	100	30	6	11	15000	RK333M080TA00□□□
	39000	76.2	100	30	5	10	15000	RK393M080TA00□□□
	47000	63.5	140	25	5	9	16500	RK473M080SA40□□□
	47000	76.2	120	30	5	9	16500	RK473M080TA20□□□
	56000	76.2	120	30	5	8	18500	RK563M080TA20□□□
	68000	76.2	140	30	4	7	22000	RK683M080TA40□□□
	82000	89	130	50	4	7	22500	RK823M080XA30□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

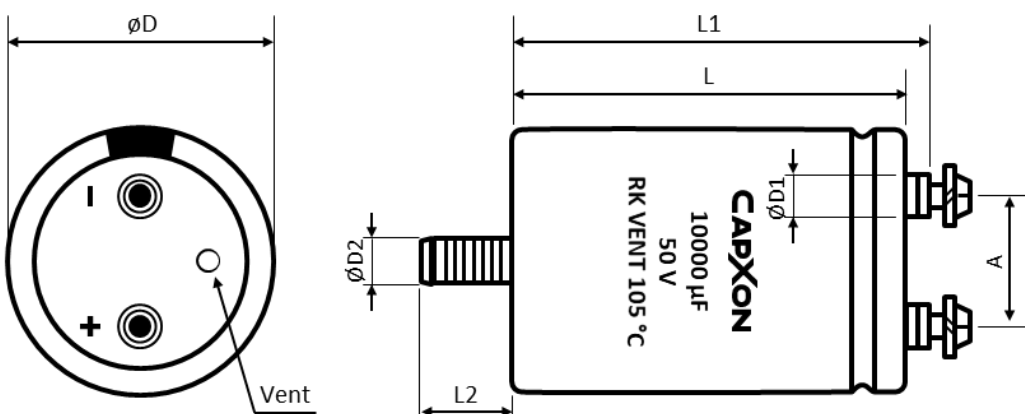
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	tanδ % (+20°C) (120Hz)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _r - Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
80	100000	89	160	50	4	6	24800	RK104M080XA60□□□
	100000	89	170	50	4	6	25000	RK104M080XA70□□□
	150000	89	220	50	4	6	27000	RK154M080XB20□□□
100	1000	35	50	15	65	120	1400	RK102M100P500□□□
	1500	35	50	15	52	104	2200	RK152M100P500□□□
	1800	35	50	15	43	85	2700	RK182M100P500□□□
	2200	35	50	15	35	70	3000	RK222M100P500□□□
	2200	35	60	15	35	60	4100	RK222M100P600□□□
	2700	35	60	15	29	55	4700	RK272M100P600□□□
	3300	35	80	15	24	48	5700	RK332M100P800□□□
	3900	35	80	15	21	42	6000	RK392M100P800□□□
	4700	35	100	15	18	35	6500	RK472M100PA00□□□
	4700	35	105	15	18	35	6700	RK472M100PA05□□□
	4700	51	80	20	18	35	6500	RK472M100R800□□□
	5600	35	100	15	15	30	6800	RK562M100PA00□□□
	6800	35	120	15	12	24	7000	RK682M100PA20□□□
	6800	51	80	20	12	24	8700	RK682M100R800□□□
	6800	51	100	20	12	19	9500	RK682M100RA00□□□
	8200	51	80	20	9	32	10000	RK822M100R800□□□
	10000	51	100	20	7	14	10500	RK103M100RA00□□□
	10000	51	105	20	7	14	11000	RK103M100RA05□□□
	10000	51	120	20	7	14	12500	RK103M100RA20□□□
	12000	51	120	20	6	12	13000	RK123M100RA20□□□
	15000	63.5	100	25	5	10	14500	RK153M100SA00□□□
	15000	63.5	105	25	5	10	15000	RK153M100SA05□□□
	15000	63.5	120	25	5	10	16000	RK153M100SA20□□□
	18000	63.5	100	25	5	10	16000	RK183M100SA00□□□
	22000	63.5	120	25	5	9	16500	RK223M100SA20□□□
	22000	76.2	100	30	5	9	16500	RK223M100TA00□□□
	22000	76.2	105	30	5	9	17000	RK223M100TA05□□□
	22000	76.2	120	30	5	9	18000	RK223M100TA20□□□
	27000	76.2	120	30	4	9	18500	RK273M100TA20□□□
	33000	76.2	120	30	4	8	16000	RK333M100TA20□□□
	33000	76.2	130	30	4	8	19500	RK333M100TA30□□□
	33000	76.2	140	30	4	8	20500	RK333M100TA40□□□
	33000	76.2	145	30	4	8	21000	RK333M100TA45□□□
	39000	76.2	140	30	4	8	21000	RK393M100TA40□□□
	47000	76.2	160	30	4	8	23000	RK473M100TA60□□□
	47000	89	130	30	4	8	22000	RK473M100XA30□□□
	47000	89	140	30	4	8	23500	RK473M100XA40□□□
	56000	89	140	30	3	7	24000	RK563M100XA40□□□
	68000	89	160	30	3	7	25500	RK683M100XA60□□□
	68000	89	170	30	3	7	26000	RK683M100XA70□□□
	100000	89	220	30	3	7	28000	RK104M100XB20□□□
	100000	89	230	30	3	7	30000	RK104M100XB30□□□

DIMENSIONS - Ring clamp mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$D1$ max.	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67

DIMENSIONS - Threaded stud mounting - All dimensions in mm



DIMENSIONS • Threaded stud mounting • All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RK473M016P800E50
> 35	PVC	Thermo	Yes	No	-	RK154M025SA20E50
> 35	PET	Thermo	No	No	(*) Note	RK154M025SA20E50*
> 35	PET	Ink	No	Yes	(**) Note	RK154M025SA20E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

MULTIPLIER K_f FOR RIPPLE CURRENT VS. FREQUENCY

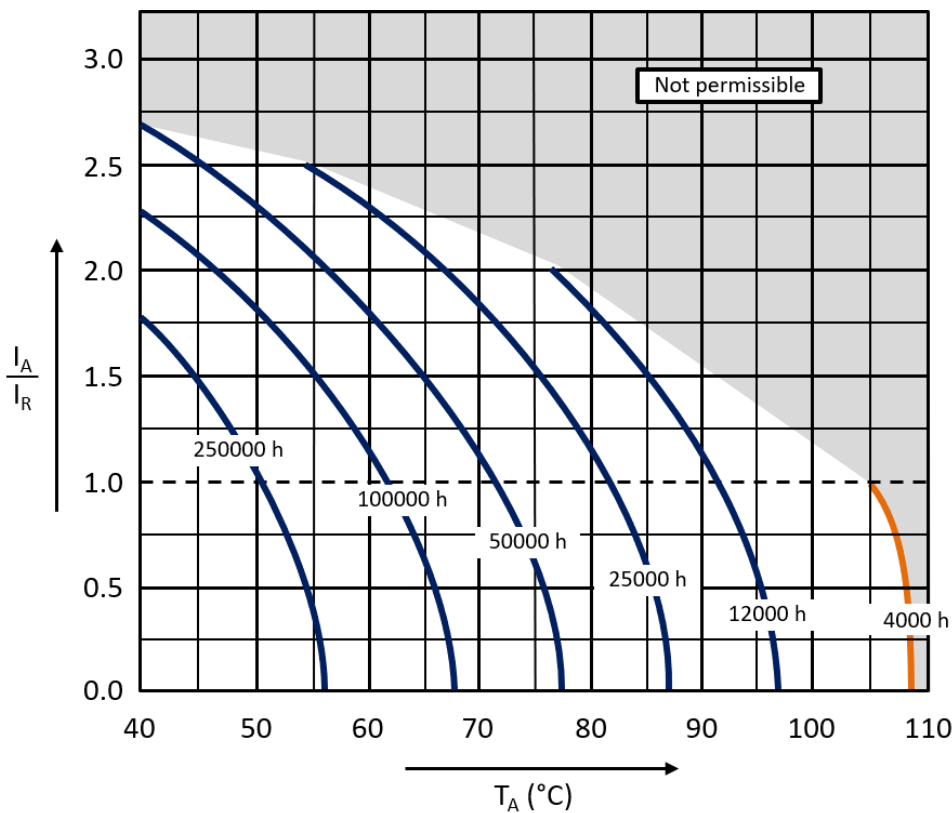
V_R (V)	ØD (mm)	Frequency (Hz)				
		50/60	100/120	1k	10k	≥ 50k
10 ~ 50	35 ~ 89	0.95	1	1.05	1.09	1.12
63 ~ 80	35	0.9	1	1.1	1.18	1.22
	50 ~ 89	0.95	1	1.05	1.09	1.12
100	35	0.8	1	1.22	1.3	1.33
	50	0.9	1	1.1	1.18	1.22
	63.5 ~ 89	0.95	1	1.05	1.09	1.12

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines Page 134	Packaging Information Liquid Screw Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor



DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RM SERIES ■ STANDARD 105°C TYPE

KEY FEATURES

- ALUMINUM ELECTROLYTIC CAPACITOR ■ Screw terminal type
- Useful life: 105°C ■ 6000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +105°C	-25 ~ +105°C
Rated Voltage Range	V _R	160 ~ 450V DC	500V DC
Surge Voltage	V _S	(V _R ≤ 315V): V _S = 1.15·V _R	(V _R > 315V): V _S = 1.10·V _R
Capacitance Range	C _R	180 ~ 68000μF	330 ~ 10000μF
Cap. Tolerance	ΔC	±20% (120Hz ■ 20°C)	
Leakage Current (20°C ■ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (μA) or 5mA (whichever is smaller) ■ After 5 minutes [I _{LEAK} (μA) ; C _R (μF) ; V _R (V)]	
Dissipation Factor % (20°C ■ 120Hz)	tanδ	V _R (V DC)	160 ~ 450
		tanδ	15
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450
		Z-25°C/Z+20°C	4
		Z-40°C/Z+20°C	10

Lifetime Test	
Useful Life 105°C (V _R & I _R applied)	Test 6000 hours
	ΔC/C _R ≤ ±15% of initial measured value
	tanδ ≤ 175% of initial specified value
	I _{Leak} ≤ the initial specified value
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ■ parts show higher drift as test criteria
Endurance 105°C (V _R & I _R applied)	Test 2000 hours
	ΔC/C _R ≤ ±10% of initial measured value
	tanδ ≤ 130% of initial specified value
	I _{Leak} ≤ the initial specified value
Shelf Life 105°C (V _R = 0)	Test 1000 hours
	ΔC/C _R ≤ ±10% of initial measured value
	tanδ ≤ 130% of initial specified value
	I _{Leak} ≤ the initial specified value
Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4	
Vibration Resistance Test	Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ■ IEC 60068-2-6

★ Remark: For Halogen Free products see chapter SLEEVE AND PRINTING selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (m Ω)	Max. ESR +20°C - 120Hz (m Ω)	I_R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
160	470	35	50	230	420	1100	RM471M160P500□□□
	560	35	50	200	360	1300	RM561M160P500□□□
	680	35	50	160	290	1400	RM681M160P500□□□
	820	35	50	130	240	1500	RM821M160P500□□□
	1000	35	50	110	200	1600	RM102M160P500□□□
	1200	35	60	94	170	2000	RM122M160P600□□□
	1500	35	60	72	130	2200	RM152M160P600□□□
	1800	35	80	61	110	2600	RM182M160P800□□□
	2200	35	80	50	90	2900	RM222M160P800□□□
	2700	35	100	41	74	3400	RM272M160PA00□□□
	3300	51	75	33	60	3900	RM332M160R750□□□
	3900	51	75	28	51	4000	RM392M160R750□□□
	4700	51	96	24	42	4700	RM472M160R960□□□
	5600	51	96	20	36	5200	RM562M160R960□□□
	6800	51	120	16	29	6200	RM682M160RA20□□□
	6800	63.5	96	16	29	6200	RM682M160S960□□□
	8200	63.5	96	13	24	7100	RM822M160S960□□□
	10000	63.5	120	11	20	8500	RM103M160SA20□□□
	10000	76.2	96	11	20	8500	RM103M160T960□□□
	12000	76.2	100	9	17	9500	RM123M160TA00□□□
	15000	76.2	120	7	13	11500	RM153M160TA20□□□
	18000	76.2	140	6	11	13500	RM183M160TA40□□□
	22000	76.2	140	5	9	14000	RM223M160TA40□□□
	22000	89	130	5	9	14800	RM223M160XA30□□□
27000	89	140	4	8	16100	RM273M160XA40□□□	
33000	89	140	3	7	16600	RM333M160XA40□□□	
47000	89	220	3	7	17500	RM473M160XB20□□□	
68000	100	250	2	6	19300	RM683M160DB50□□□	
200	330	35	50	330	600	1000	RM331M200P500□□□
	390	35	50	280	510	1100	RM391M200P500□□□
	470	35	50	230	420	1200	RM471M200P500□□□
	560	35	50	200	360	1400	RM561M200P500□□□
	680	35	50	160	290	1500	RM681M200P500□□□
	820	35	50	130	240	1600	RM821M200P500□□□
	1000	35	60	110	200	1800	RM102M200P600□□□
	1200	35	60	94	170	2100	RM122M200P600□□□
	1500	35	80	72	130	2300	RM152M200P800□□□
	1800	35	80	61	110	2700	RM182M200P800□□□
	2200	35	100	50	90	3100	RM222M200PA00□□□
	2200	51	75	50	90	3200	RM222M200R750□□□
	2700	35	120	41	74	3700	RM272M200PA20□□□
	2700	51	96	41	74	3700	RM272M200R960□□□
	3300	51	80	33	60	4200	RM332M200R800□□□
	3900	51	100	28	51	5000	RM392M200RA00□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R - Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
200	4700	51	140	24	42	5800	RM472M200RA40□□□
	4700	63.5	96	24	42	5400	RM472M200S960□□□
	5600	63.5	96	20	36	5900	RM562M200S960□□□
	6800	63.5	115	16	29	7000	RM682M200SA15□□□
	8200	63.5	120	13	24	7700	RM822M200SA20□□□
	10000	76.2	115	11	20	9700	RM103M200TA15□□□
	12000	76.2	120	9	17	10300	RM123M200TA20□□□
	15000	76.2	140	7	13	11600	RM153M200TA40□□□
	15000	89	130	7	13	12300	RM153M200XA30□□□
	18000	89	140	6	11	13600	RM183M200XA40□□□
	22000	76.2	160	5	9	14000	RM223M200TA60□□□
	22000	89	140	5	9	15200	RM223M200XA40□□□
	33000	89	220	4	6	16600	RM333M200XB20□□□
47000	89	250	3	5	19900	RM473M200XB50□□□	
250	270	35	50	410	740	900	RM271M250P500□□□
	330	35	50	330	600	1100	RM331M250P500□□□
	390	35	50	280	510	1200	RM391M250P500□□□
	470	35	50	230	420	1300	RM471M250P500□□□
	560	35	50	200	360	1500	RM561M250P500□□□
	680	35	60	160	290	1600	RM681M250P600□□□
	820	35	80	130	240	1700	RM821M250P800□□□
	1000	35	80	110	200	1900	RM102M250P800□□□
	1200	35	80	94	170	2200	RM122M250P800□□□
	1500	35	100	72	130	2400	RM152M250PA00□□□
	1500	51	75	72	130	2500	RM152M250R750□□□
	1800	35	120	61	110	2800	RM182M250PA20□□□
	1800	51	75	61	110	2800	RM182M250R750□□□
	2200	51	96	50	90	3300	RM222M250R960□□□
	2700	51	100	41	74	3800	RM272M250RA00□□□
	3300	51	120	33	60	4300	RM332M250RA20□□□
	3300	63.5	96	33	60	4300	RM332M250S960□□□
	3900	51	120	28	51	5100	RM392M250RA20□□□
	3900	63.5	96	28	51	4700	RM392M250S960□□□
	4700	63.5	115	24	42	5800	RM472M250SA15□□□
	5600	63.5	120	20	36	6400	RM562M250SA20□□□
	6800	76.2	115	16	29	7800	RM682M250TA15□□□
	8200	76.2	120	13	24	8500	RM822M250TA20□□□
	10000	76.2	140	11	20	10100	RM103M250TA40□□□
10000	89	140	11	20	10300	RM103M250XA40□□□	
12000	89	140	9	17	12000	RM123M250XA40□□□	
15000	89	157	7	13	12600	RM153M250XA57□□□	
22000	89	220	5	9	15500	RM223M250XB20□□□	
33000	100	250	3	6	17100	RM333M250DB50□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R = Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
315	180	35	50	620	1110	800	RM181M315P500□□□
	220	35	50	500	900	1000	RM221M315P500□□□
	270	35	50	410	740	1100	RM271M315P500□□□
	330	35	50	330	600	1200	RM331M315P500□□□
	390	35	50	280	510	1300	RM391M315P500□□□
	470	35	60	230	420	1500	RM471M315P600□□□
	560	35	55	200	360	2500	RM561M315P550□□□
	680	35	65	160	290	3000	RM681M315P650□□□
	820	35	75	130	240	3400	RM821M315P750□□□
	1000	35	80	110	200	3900	RM102M315P800□□□
	1200	35	100	94	170	4600	RM122M315PA00□□□
	1500	51	70	72	130	5500	RM152M315R700□□□
	1800	51	75	61	110	6100	RM182M315R750□□□
	2200	51	90	50	90	7300	RM222M315R900□□□
	2700	51	100	41	74	8500	RM272M315RA00□□□
	3300	63.5	85	33	60	10000	RM332M315S850□□□
	3900	63.5	96	28	51	11400	RM392M315S960□□□
	4700	76.2	85	24	42	13200	RM472M315T850□□□
5600	76.2	96	20	36	15100	RM562M315T960□□□	
6800	76.2	110	16	29	17700	RM682M315TA10□□□	
8200	89	100	13	24	17800	RM822M315XA00□□□	
10000	89	115	11	20	20200	RM103M315XA15□□□	
350	180	35	50	620	1110	900	RM181M350P500□□□
	220	35	50	500	900	1100	RM221M350P500□□□
	270	35	50	410	740	1200	RM271M350P500□□□
	330	35	50	330	600	1300	RM331M350P500□□□
	390	35	60	280	510	1400	RM391M350P600□□□
	470	35	55	230	420	2300	RM471M350P550□□□
	560	35	60	200	360	2600	RM561M350P600□□□
	680	35	70	160	290	3100	RM681M350P700□□□
	820	35	80	130	240	3500	RM821M350P800□□□
	1000	35	90	110	200	4100	RM102M350P900□□□
	1000	51	75	110	200	4300	RM102M350R750□□□
	1200	51	65	94	170	4700	RM122M350R650□□□
	1500	51	75	72	130	5600	RM152M350R750□□□
	1800	51	85	61	110	6500	RM182M350R850□□□
	2200	51	100	50	90	7700	RM222M350RA00□□□
	2700	51	105	41	74	8700	RM272M350RA05□□□
	2700	63.5	80	41	74	8800	RM272M350S800□□□
	3300	51	130	33	60	10100	RM332M350RA30□□□
	3300	63.5	96	33	60	10100	RM332M350S960□□□
	3900	63.5	105	28	51	11200	RM392M350SA05□□□
3900	76.2	80	28	51	11800	RM392M350T800□□□	
4700	63.5	130	24	42	12700	RM472M350SA30□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
350	4700	76.2	96	24	42	13300	RM472M350T96□□□
	5600	63.5	130	20	36	14200	RM562M350SA30□□□
	5600	76.2	105	20	36	15700	RM562M350TA05□□□
	6800	76.2	125	16	29	18700	RM682M350TA25□□□
	6800	89	120	16	29	18800	RM682M350XA20□□□
	8200	76.2	143	13	24	19000	RM822M350TA43□□□
	8200	89	115	13	24	18900	RM822M350XA15□□□
	10000	76.2	160	11	20	19500	RM103M350TA60□□□
	10000	89	140	11	20	21000	RM103M350XA40□□□
	12000	76.2	190	9	17	24800	RM123M350TA90□□□
	12000	89	145	9	17	25700	RM123M350XA45□□□
	15000	76.2	220	7	13	29100	RM153M350TB20□□□
	15000	89	170	7	13	29600	RM153M350XA70□□□
	18000	89	200	6	11	33200	RM183M350XB00□□□
400	180	35	50	620	1110	1000	RM181M400P500□□□
	220	35	50	500	900	1200	RM221M400P500□□□
	270	35	50	410	740	1300	RM271M400P500□□□
	330	35	60	330	600	1500	RM331M400P600□□□
	390	35	55	280	510	2100	RM391M400P550□□□
	470	35	60	230	420	2400	RM471M400P600□□□
	560	35	70	200	360	2800	RM561M400P700□□□
	680	51	80	160	290	3700	RM681M400R800□□□
	820	35	90	130	240	3700	RM821M400P900□□□
	1000	51	65	110	200	4400	RM102M400R650□□□
	1200	51	75	94	170	5000	RM122M400R750□□□
	1500	51	85	72	130	5800	RM152M400R850□□□
	1800	51	96	61	110	7000	RM182M400R960□□□
	2200	51	115	50	90	8100	RM222M400RA15□□□
	2200	63.5	85	50	90	8200	RM222M400S850□□□
	2700	51	130	41	74	9400	RM272M400RA30□□□
	2700	63.5	96	41	74	9300	RM272M400S960□□□
	3300	63.5	105	33	60	10800	RM332M400SA05□□□
	3300	76.2	105	33	60	11300	RM332M400TA05□□□
	3900	63.5	118	28	51	11800	RM392M400SA18□□□
	3900	76.2	105	28	51	12300	RM392M400TA05□□□
	4700	63.5	143	24	42	13500	RM472M400SA43□□□
	4700	76.2	105	24	42	14400	RM472M400TA05□□□
	4700	89	97	24	42	14900	RM472M400X970□□□
	5600	63.5	195	20	36	17200	RM562M400SA95□□□
	5600	76.2	130	20	36	15800	RM562M400TA30□□□
	5600	89	96	20	36	15300	RM562M400X960□□□
	6800	76.2	143	16	29	19000	RM682M400TA43□□□
6800	89	115	16	29	18900	RM682M400XA15□□□	
8200	76.2	170	13	24	20600	RM822M400TA70□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

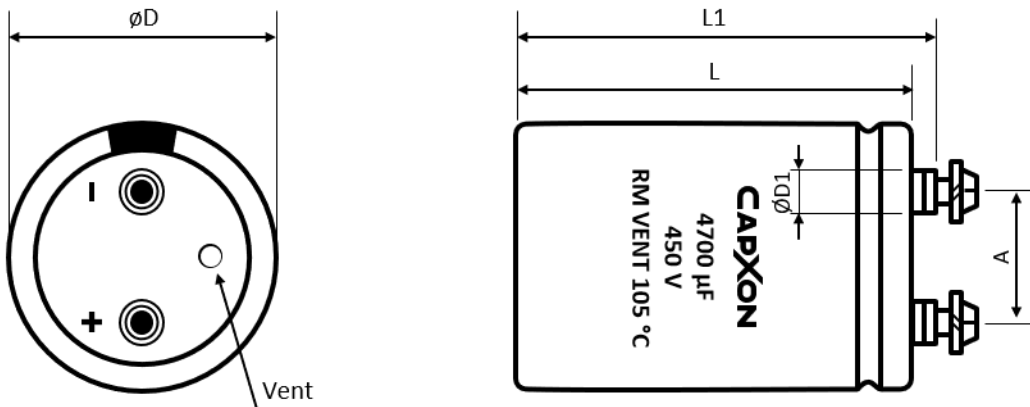
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C • 120Hz (mΩ)	Max. ESR +20°C • 120Hz (mΩ)	I _R = Max. Ripple Current +105°C • 120Hz (mA rms)	CapXon Part Number
400	8200	89	130	13	24	19300	RM822M400XA30□□□
	10000	76.2	190	11	20	21800	RM103M400TA90□□□
	10000	89	160	11	20	22000	RM103M400XA60□□□
	12000	76.2	220	9	17	27000	RM123M400TB20□□□
	12000	89	180	9	17	26000	RM123M400XA80□□□
	15000	89	200	7	13	29700	RM153M400XB00□□□
450	220	35	50	500	900	1200	RM221M450P500□□□
	330	35	55	330	600	1900	RM331M450P550□□□
	390	35	65	280	510	2300	RM391M450P650□□□
	470	35	75	230	420	2600	RM471M450P750□□□
	560	35	80	200	360	2900	RM561M450P800□□□
	680	35	100	160	290	3600	RM681M450PA00□□□
	680	51	80	160	290	3800	RM681M450R800□□□
	820	35	110	130	240	4200	RM821M450PA10□□□
	1000	51	80	110	200	4700	RM102M450R800□□□
	1200	51	90	94	170	5400	RM122M450R900□□□
	1500	51	105	72	130	6800	RM152M450RA05□□□
	1500	63.5	80	72	130	7000	RM152M450S800□□□
	1800	51	130	61	110	7800	RM182M450RA30□□□
	1800	63.5	96	61	110	7800	RM182M450S960□□□
	2200	63.5	96	50	90	8600	RM222M450S960□□□
	2700	63.5	118	41	74	10200	RM272M450SA18□□□
	2700	76.2	96	41	74	10700	RM272M450T960□□□
	3300	63.5	145	33	60	11500	RM332M450SA45□□□
	3300	76.2	120	33	60	11000	RM332M450TA20□□□
	3300	89	97	33	60	13100	RM332M450X970□□□
	3900	76.2	130	28	51	13400	RM392M450TA30□□□
	3900	89	120	28	51	14900	RM392M450XA20□□□
	4700	76.2	120	24	42	14500	RM472M450TA20□□□
	4700	89	120	24	42	16700	RM472M450XA20□□□
	5600	76.2	160	20	36	15900	RM562M450TA60□□□
	5600	89	120	20	36	15400	RM562M450XA20□□□
	6800	76.2	160	16	29	19100	RM682M450TA60□□□
	6800	89	140	16	29	19200	RM682M450XA40□□□
	8200	76.2	220	13	24	23100	RM822M450TB20□□□
	8200	89	170	13	24	23700	RM822M450XA70□□□
10000	89	200	11	20	24000	RM103M450XB00□□□	
500	330	51	80	440	800	2800	RM331M500R800□□□
	470	51	60	310	560	2700	RM471M500R600□□□
	680	51	80	220	390	4100	RM681M500R800□□□
	820	51	85	180	320	4300	RM821M500R850□□□
	1000	51	105	150	270	4800	RM102M500RA05□□□
	1200	51	120	120	220	6000	RM122M500RA20□□□
	1200	63.5	85	120	220	5800	RM122M500S850□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

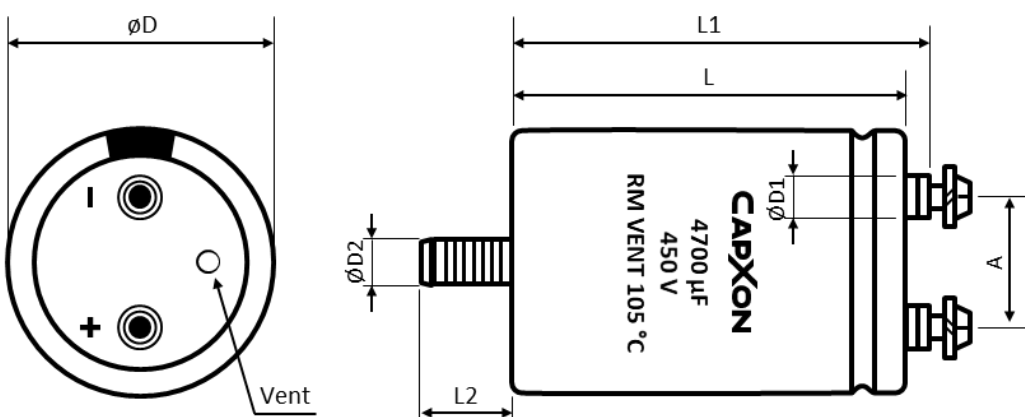
V_R (V)	C_R (μF)	ϕD (mm)	L (mm)	Typ. ESR +20°C - 120Hz (m Ω)	Max. ESR +20°C - 120Hz (m Ω)	I_R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
500	1500	51	130	100	180	7000	RM152M500RA30□□□
	1500	63.5	96	100	180	7100	RM152M500S960□□□
	1800	63.5	105	83	150	7900	RM182M500SA05□□□
	2200	63.5	130	67	120	9400	RM222M500SA30□□□
	2200	76.2	96	67	120	9500	RM222M500T960□□□
	2700	63.5	145	55	98	10300	RM272M500SA45□□□
	2700	76.2	105	55	98	10800	RM272M500TA05□□□
	2700	89	97	55	98	11600	RM272M500X970□□□
	3300	63.5	170	45	80	13000	RM332M500SA70□□□
	3300	76.2	130	45	80	12200	RM332M500TA30□□□
	3300	89	120	45	80	13400	RM332M500XA20□□□
	3900	76.2	145	38	68	13500	RM392M500TA45□□□
	3900	89	120	38	68	15000	RM392M500XA20□□□
	4700	76.2	170	31	56	16000	RM472M500TA70□□□
	4700	89	145	31	56	16800	RM472M500XA45□□□
	5600	76.2	220	26	47	18100	RM562M500TB20□□□
	5600	89	150	26	47	17900	RM562M500XA50□□□
	6800	89	170	22	39	20800	RM682M500XA70□□□
8200	89	220	18	32	25600	RM822M500XB20□□□	
10000	89	250	15	27	30000	RM103M500XB50□□□	

DIMENSIONS - Ring clamp mounting - All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	D1 max.	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M8	100	100 ~ 240	110 ~ 250	17.5	41.5	16	5	A87

DIMENSIONS - Threaded stud mounting - All dimensions in mm



DIMENSIONS • Threaded stud mounting • All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M8	100	100 ~ 240	110 ~ 250	16	17.5	M12	41.5	16	5	E87

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RM821M200P500E50
> 35	PVC	Thermo	Yes	No	-	RM472M350T960E50
> 35	PET	Thermo	No	No	(*) Note	RM472M350T960E50*
> 35	PET	Ink	No	Yes	(**) Note	RM472M350T960E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

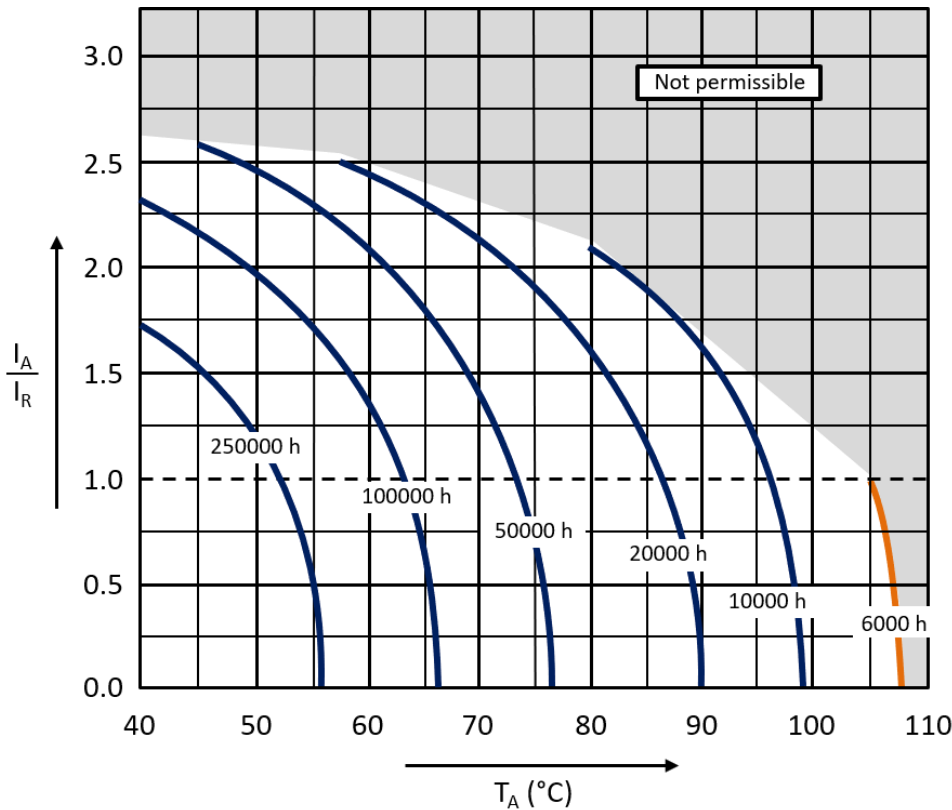
Frequency (Hz)	50/60	100/120	300	1k	≥ 3k
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RH SERIES ▪ LONG LIFE 105°C TYPE

KEY FEATURES  HIGH VOLTAGE  LONG LIFE

- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Screw terminal type
- Useful life: 105°C ▪ 8000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +105°C	
Rated Voltage Range	V _R	160 ~ 450V DC	
Surge Voltage	V _S	V _S = 1.10·V _R	
Capacitance Range	C _R	220 ~ 47000μF	
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)	
Leakage Current (20°C ▪ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (μA) or 5mA (whichever is smaller) ▪ After 5 minutes [I _{LEAK} (μA) ; C _R (μF) ; V _R (V)]	
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V _R (V DC)	160 ~ 450
		tanδ	15
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450
		Z-25°C/Z+20°C	4
		Z-40°C/Z+20°C	10

Lifetime Test			
Useful Life 105°C (V _R & I _R applied)	Test	8000 hours	
	ΔC/C _R	≤ ±15% of initial measured value	
	tanδ	≤ 175% of initial specified value	
	I _{Leak}	≤ the initial specified value	
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ▪ parts show higher drift as test criteria		
Endurance 105°C (V _R & I _R applied)	Test	2000 hours	
	ΔC/C _R	≤ ±10% of initial measured value	
	tanδ	≤ 130% of initial specified value	
	I _{Leak}	≤ the initial specified value	
Shelf Life 105°C (V _R = 0)	Test	1000 hours	
	ΔC/C _R	≤ ±10% of initial measured value	
	tanδ	≤ 130% of initial specified value	
	I _{Leak}	≤ the initial specified value	
Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4			
Vibration Resistance Test	Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6		

★ Remark: For **Halogen Free** products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V_R (V)	C_R (μ F)	ϕ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (m Ω)	Max. ESR +20°C - 120Hz (m Ω)	I_R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
160	1000	35	60	110	200	1900	RH102M160P600□□□
	1500	35	80	68	130	2500	RH152M160P800□□□
	2200	35	100	48	90	3300	RH222M160PA00□□□
	3300	35	120	32	60	4500	RH332M160PA20□□□
	3300	51	80	32	60	4500	RH332M160R800□□□
	4700	51	100	22	42	5500	RH472M160RA00□□□
	6800	51	140	15	29	7800	RH682M160RA40□□□
	6800	63.5	100	15	29	7500	RH682M160SA00□□□
	10000	63.5	120	10	20	8800	RH103M160SA20□□□
	15000	76.2	120	7	13	10800	RH153M160TA20□□□
	22000	76.2	140	5	9	13800	RH223M160TA40□□□
	22000	89	130	5	9	14500	RH223M160XA30□□□
	33000	89	140	3	6	15500	RH333M160XA40□□□
	47000	89	220	3	5	19200	RH473M160XB20□□□
200	680	35	50	150	290	1400	RH681M200P500□□□
	1000	35	60	110	200	2000	RH102M200P600□□□
	1500	35	80	68	130	2500	RH152M200P800□□□
	2200	35	120	48	90	3600	RH222M200PA20□□□
	2200	51	80	48	90	3600	RH222M200R800□□□
	3300	51	80	32	60	4600	RH332M200R800□□□
	3300	51	100	32	60	4800	RH332M200RA00□□□
	4700	51	140	22	42	6400	RH472M200RA40□□□
	4700	63.5	100	22	42	6200	RH472M200SA00□□□
	6800	63.5	120	15	29	7700	RH682M200SA20□□□
	10000	76.2	120	10	20	10000	RH103M200TA20□□□
	15000	76.2	140	7	13	11500	RH153M200TA40□□□
	15000	76.2	160	7	13	12200	RH153M200TA60□□□
	22000	76.2	160	5	9	15500	RH223M200TA60□□□
	22000	89	140	5	9	16500	RH223M200XA40□□□
250	470	35	60	220	420	1200	RH471M250P600□□□
	680	35	80	150	290	1700	RH681M250P800□□□
	1000	35	100	110	200	2500	RH102M250PA00□□□
	1500	51	80	68	130	2900	RH152M250R800□□□
	2200	51	100	48	90	4000	RH222M250RA00□□□
	3300	51	140	32	60	5300	RH332M250RA40□□□
	3300	63.5	100	32	60	5000	RH332M250SA00□□□
	4700	63.5	120	22	42	6600	RH472M250SA20□□□
	6800	76.2	120	15	29	8300	RH682M250TA20□□□
	10000	76.2	160	10	20	11000	RH103M250TA60□□□
	10000	89	140	10	20	11500	RH103M250XA40□□□
	15000	89	170	7	13	14500	RH153M250XA70□□□
	22000	89	220	5	9	17000	RH223M250XB20□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

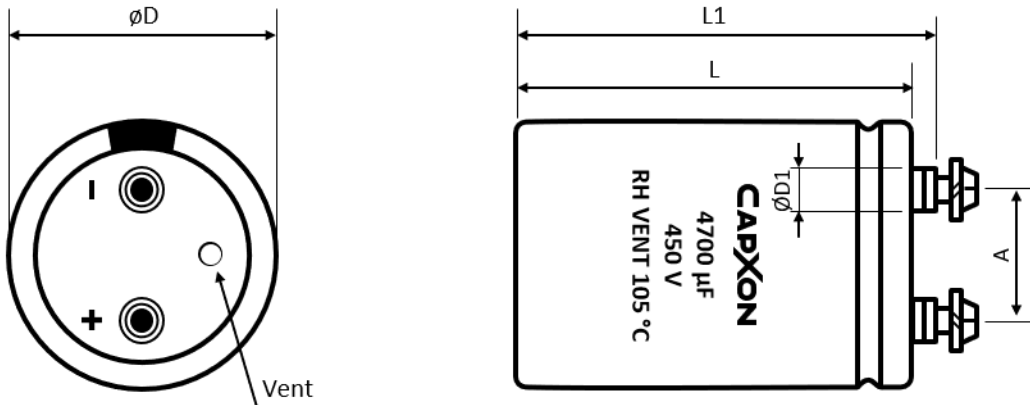
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
350	330	35	60	320	600	1600	RH331M350P600□□□
	470	35	80	220	420	2300	RH471M350P800□□□
	680	35	100	150	290	3300	RH681M350PA00□□□
	1000	35	120	110	200	4400	RH102M350PA20□□□
	1000	51	80	110	200	4600	RH102M350R800□□□
	1500	51	80	68	130	5700	RH152M350R800□□□
	1500	51	100	68	130	6800	RH152M350RA00□□□
	2200	51	105	48	90	7700	RH222M350RA05□□□
	2200	51	120	48	90	8300	RH222M350RA20□□□
	2200	51	140	48	90	8800	RH222M350RA40□□□
	2700	63.5	80	39	74	8700	RH272M350S800□□□
	3300	63.5	100	32	60	10000	RH332M350SA00□□□
	3300	63.5	120	32	60	10800	RH332M350SA20□□□
	3900	63.5	120	27	51	11500	RH392M350SA20□□□
	4700	63.5	145	22	42	12600	RH472M350SA45□□□
	4700	76.2	105	22	42	12600	RH472M350TA05□□□
	4700	76.2	120	22	42	13000	RH472M350TA20□□□
	5600	76.2	130	19	36	14800	RH562M350TA30□□□
	6800	76.2	140	15	29	16500	RH682M350TA40□□□
	8200	76.2	160	13	24	20000	RH822M350TA60□□□
	8200	89	145	13	24	21500	RH822M350XA45□□□
	10000	76.2	160	10	20	21500	RH103M350TA60□□□
	10000	76.2	190	10	20	23000	RH103M350TA90□□□
	10000	89	140	10	20	23000	RH103M350XA40□□□
12000	76.2	220	9	17	27500	RH123M350TB20□□□	
12000	89	170	9	17	28500	RH123M350XA70□□□	
15000	89	190	7	13	30000	RH153M350XA90□□□	
18000	89	220	6	11	34000	RH183M350XB20□□□	
400	220	35	50	470	900	1400	RH221M400P500□□□
	330	35	60	320	600	1700	RH331M400P600□□□
	470	35	80	220	420	3300	RH471M400P800□□□
	680	35	120	150	290	3900	RH681M400PA20□□□
	680	51	80	150	290	4100	RH681M400R800□□□
	1000	51	80	110	200	4700	RH102M400R800□□□
	1500	51	105	68	130	6400	RH152M400RA05□□□
	1500	51	120	68	130	7000	RH152M400RA20□□□
	2200	51	130	48	90	9100	RH222M400RA30□□□
	2200	63.5	100	48	90	8300	RH222M400SA00□□□
	2700	63.5	100	39	74	10000	RH272M400SA00□□□
	3300	63.5	130	32	60	11500	RH332M400SA30□□□
	3300	76.2	105	32	60	11700	RH332M400TA05□□□
	3300	76.2	120	32	60	12200	RH332M400TA20□□□
	3900	76.2	120	27	51	13000	RH392M400TA20□□□
	4700	76.2	120	22	42	14500	RH472M400TA20□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

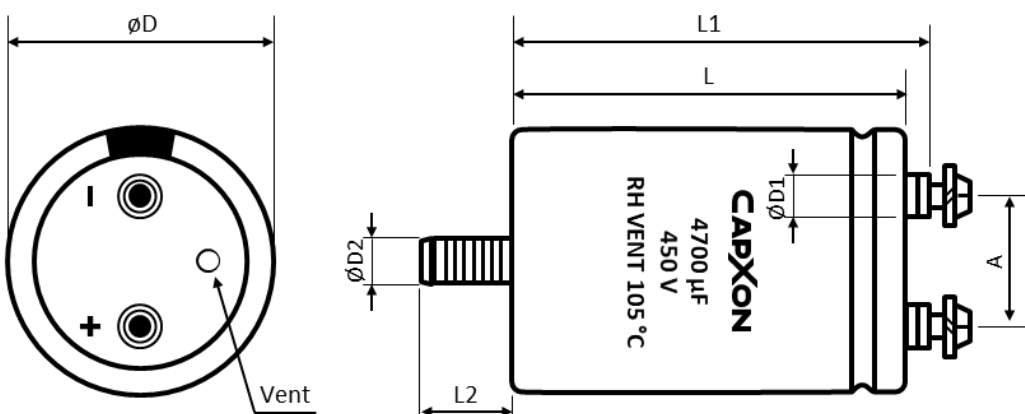
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
400	4700	76.2	130	22	42	15000	RH472M400TA30□□□
	5600	76.2	145	19	36	17000	RH562M400TA45□□□
	6800	76.2	160	15	29	19300	RH682M400TA60□□□
	6800	89	145	15	29	20000	RH682M400XA45□□□
	8200	89	160	13	24	22000	RH822M400XA60□□□
	10000	89	160	10	20	24000	RH103M400XA60□□□
	12000	89	180	9	17	28000	RH123M400XA80□□□
	15000	89	200	7	13	31000	RH153M400XB00□□□
450	220	35	50	470	900	1400	RH221M450P500□□□
	330	35	60	320	600	1700	RH331M450P600□□□
	470	35	80	220	420	3500	RH471M450P800□□□
	680	35	120	150	290	4200	RH681M450PA20□□□
	680	51	80	150	290	5500	RH681M450R800□□□
	1000	51	80	110	200	5800	RH102M450R800□□□
	1000	51	105	110	200	6500	RH102M450RA05□□□
	1500	51	120	68	130	7100	RH152M450RA20□□□
	2200	63.5	100	48	90	8400	RH222M450SA00□□□
	2200	63.5	120	48	90	9200	RH222M450SA20□□□
	2700	63.5	130	39	74	11300	RH272M450SA30□□□
	3300	63.5	145	32	60	13200	RH332M450SA45□□□
	3300	76.2	120	32	60	12700	RH332M450TA20□□□
	3900	76.2	145	27	51	15000	RH392M450TA45□□□
	4700	76.2	120	22	42	15000	RH472M450TA20□□□
	4700	76.2	160	22	42	17000	RH472M450TA60□□□
	5600	76.2	130	19	36	16000	RH562M450TA30□□□
	5600	76.2	160	19	36	17800	RH562M450TA60□□□
	5600	89	145	19	36	20000	RH562M450XA45□□□
	6800	76.2	160	15	29	20000	RH682M450TA60□□□
	6800	76.2	220	15	29	22000	RH682M450TB20□□□
	6800	89	170	15	29	23000	RH682M450XA70□□□
	8200	89	180	13	24	24000	RH822M450XA80□□□
	10000	89	200	10	20	27000	RH103M450XB00□□□
12000	89	236	9	17	29000	RH123M450XB36□□□	

DIMENSIONS • Ring clamp mounting • All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	D1 max.	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67

DIMENSIONS • Threaded stud mounting • All dimensions in mm



DIMENSIONS • Threaded stud mounting • All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RH102M350PA20E50
> 35	PVC	Thermo	Yes	No	-	RH682M400TA60E50
> 35	PET	Thermo	No	No	(*) Note	RH682M400TA60E50*
> 35	PET	Ink	No	Yes	(**) Note	RH682M400TA60E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

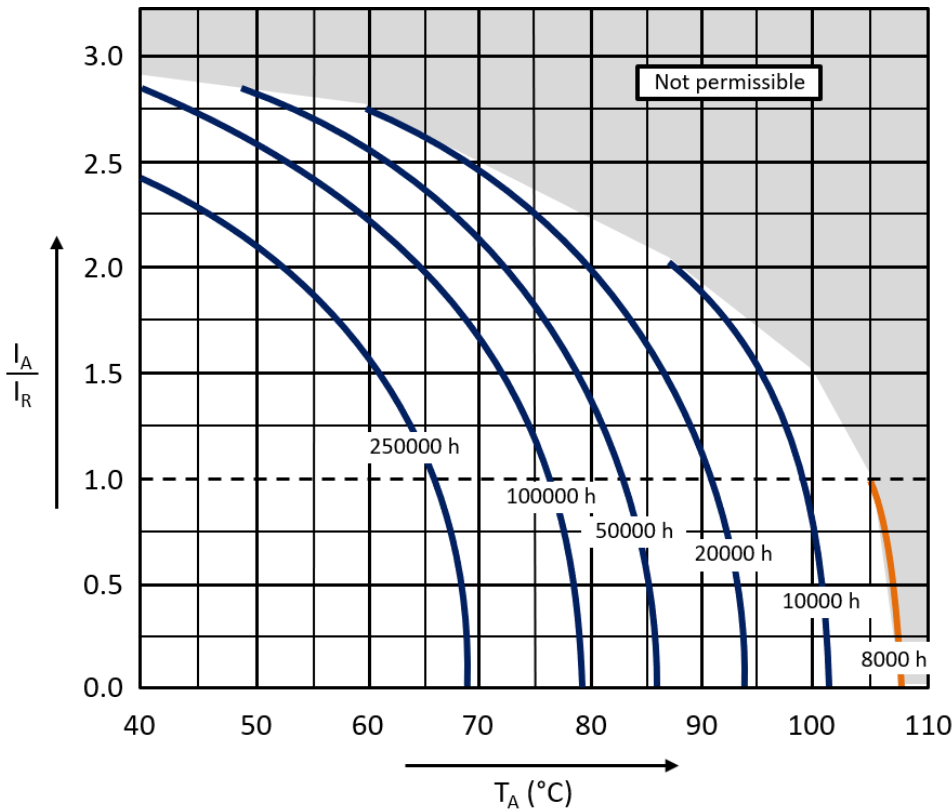
Frequency (Hz)	50/60	100/120	300	1k	≥ 3k
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RL SERIES ▪ ULTRA LONG LIFE 105°C TYPE

KEY FEATURES



- **ALUMINUM ELECTROLYTIC CAPACITOR** ▪ Screw terminal type
- Useful life: 105°C ▪ 10000 hours
- Wide capacitance range
- All-welded construction ensures highest reliability
- Bottom cooling possible due to the thermal construction



SPECIFICATIONS

Items		Performance Characteristics		
Operating Temperature Range		-40 ~ +105°C		-25 ~ +105°C
Rated Voltage Range	V _R	160 ~ 450V DC		500V DC
Surge Voltage	V _S	(V _R ≤ 315V): V _S = 1.15·V _R		(V _R > 315V): V _S = 1.10·V _R
Capacitance Range	C _R	220 ~ 22000µF		680 ~ 8200µF
Cap. Tolerance	ΔC	±20% (120Hz ▪ 20°C)		
Leakage Current (20°C ▪ V _R applied)	I _{LEAK}	≤ 0.018·(C _R ·V _R) ^{0.85} + 4 (µA) or 5mA (whichever is smaller) ▪ After 5 minutes [I _{LEAK} (µA) ; C _R (µF) ; V _R (V)]		
Dissipation Factor % (20°C ▪ 120Hz)	tanδ	V _R (V DC)	160 ~ 450	500
		tanδ	15	20
Low Temperature Characteristics at 120Hz	Z ratio max.	V _R (V DC)	160 ~ 450	500
		Z-25°C/Z+20°C	4	4
		Z-40°C/Z+20°C	10	-
Lifetime Test				
Useful Life 105°C (V _R & I _R applied)	Test	10000 hours		
	ΔC/C _R	≤ ±15% of initial measured value		
	tanδ	≤ 175% of initial specified value		
	I _{Leak}	≤ the initial specified value		
	Deviation Rate at Useful Life: 100 FIT = 0.01%/1000h with 60% confidence level ▪ parts show higher drift as test criteria			
Endurance 105°C (V _R & I _R applied)	Test	5000 hours		
	ΔC/C _R	≤ ±15% of initial measured value		
	tanδ	≤ 175% of initial specified value		
	I _{Leak}	≤ the initial specified value		
Shelf Life 105°C (V _R = 0)	Test	1000 hours		
	ΔC/C _R	≤ ±15% of initial measured value		
	tanδ	≤ 175% of initial specified value		
	I _{Leak}	≤ the initial specified value		
	Before measurement: Restore capacitor to 20°C, apply V _R for 30 min according JIS-C-5101-4			
Vibration Resistance Test		Max. 10g force, f _{RANGE} 10Hz ... 55Hz, amplitude 0.75mm; X/Y/Z-axis each 2h; capacitor rigidly clamped by body to surface ▪ IEC 60068-2-6		

★ Remark: For **Halogen Free** products see chapter **SLEEVE AND PRINTING** selection.

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
160	680	35	50	150	290	1600	RL681M160P500□□□
	820	35	80	120	240	2200	RL821M160P800□□□
	1000	35	80	100	200	2500	RL102M160P800□□□
	1200	35	80	87	170	2700	RL122M160P800□□□
	1500	35	80	67	130	2900	RL152M160P800□□□
	1800	35	100	56	110	3600	RL182M160PA00□□□
	2200	35	120	46	90	4200	RL222M160PA20□□□
	2700	35	120	38	74	4600	RL272M160PA20□□□
	3300	51	100	31	60	5800	RL332M160RA00□□□
	3900	51	120	26	51	6800	RL392M160RA20□□□
	4700	51	120	22	42	7500	RL472M160RA20□□□
	5600	51	120	18	36	8300	RL562M160RA20□□□
	6800	63.5	120	15	29	10200	RL682M160SA20□□□
	8200	76.2	100	12	24	11500	RL822M160TA00□□□
	10000	76.2	120	10	20	13000	RL103M160TA20□□□
	12000	76.2	140	9	17	14500	RL123M160TA40□□□
15000	89	140	7	13	17300	RL153M160XA40□□□	
200	470	35	50	220	420	1300	RL471M200P500□□□
	560	35	80	180	360	1700	RL561M200P800□□□
	680	35	80	150	290	1900	RL681M200P800□□□
	820	35	80	120	240	2100	RL821M200P800□□□
	1000	35	100	100	200	2600	RL102M200PA00□□□
	1200	35	120	87	170	3100	RL122M200PA20□□□
	1500	35	120	67	130	3500	RL152M200PA20□□□
	1800	51	80	56	110	3800	RL182M200R800□□□
	2200	51	100	46	90	4700	RL222M200RA00□□□
	2700	51	120	38	74	5700	RL272M200RA20□□□
	3300	51	120	31	60	6200	RL332M200RA20□□□
	3900	63.5	100	26	51	7100	RL392M200SA00□□□
	4700	63.5	120	22	42	8300	RL472M200SA20□□□
	5600	76.2	100	18	36	9400	RL562M200TA00□□□
	6800	76.2	120	15	29	11000	RL682M200TA20□□□
	8200	76.2	140	12	24	13000	RL822M200TA40□□□
10000	89	140	10	20	15800	RL103M200XA40□□□	
250	330	35	50	310	600	1100	RL331M250P500□□□
	390	35	80	260	510	1500	RL391M250P800□□□
	470	35	80	220	420	1600	RL471M250P800□□□
	560	35	80	180	360	1800	RL561M250P800□□□
	680	35	100	150	290	2100	RL681M250PA00□□□
	820	35	100	120	240	2300	RL821M250PA00□□□
	1000	35	120	100	200	2800	RL102M250PA20□□□
	1200	51	80	87	170	3200	RL122M250R800□□□
	1500	51	100	67	130	3900	RL152M250RA00□□□
	1800	51	120	56	110	4600	RL182M250RA20□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
250	2200	51	120	46	90	5100	RL222M250RA20□□□
	2700	63.5	100	38	74	6000	RL272M250SA00□□□
	3300	63.5	120	31	60	7000	RL332M250SA20□□□
	3900	76.2	100	26	51	7900	RL392M250TA00□□□
	4700	76.2	120	22	42	9200	RL472M250TA20□□□
	5600	76.2	140	18	36	10700	RL562M250TA40□□□
	6800	89	140	15	29	12900	RL682M250XA40□□□
350	330	35	80	310	600	2200	RL331M350P800□□□
	470	35	80	220	420	2900	RL471M350P800□□□
	680	51	60	150	290	3700	RL681M350R600□□□
	820	51	60	120	240	3800	RL821M350R600□□□
	1000	51	75	100	200	6400	RL102M350R750□□□
	1000	51	80	100	200	6600	RL102M350R800□□□
	1200	51	75	87	170	6600	RL122M350R750□□□
	1200	51	80	87	170	6700	RL122M350R800□□□
	1500	51	80	67	130	8000	RL152M350R800□□□
	1500	51	96	67	130	8700	RL152M350R960□□□
	1800	51	96	56	110	8800	RL182M350R960□□□
	1800	51	120	56	110	9700	RL182M350RA20□□□
	2200	51	98	46	90	10100	RL222M350R980□□□
	2200	51	120	46	90	11000	RL222M350RA20□□□
	2700	51	98	38	74	10500	RL272M350R980□□□
	2700	51	125	38	74	11700	RL272M350RA25□□□
	2700	63.5	85	38	74	11900	RL272M350S850□□□
	2700	63.5	100	38	74	12800	RL272M350SA00□□□
	3300	51	118	31	60	11500	RL332M350RA18□□□
	3300	51	145	31	60	12600	RL332M350RA45□□□
	3300	63.5	100	31	60	13800	RL332M350SA00□□□
	3900	63.5	100	26	51	15100	RL392M350SA00□□□
	3900	63.5	130	26	51	16900	RL392M350SA30□□□
	3900	76.2	100	26	51	16700	RL392M350TA00□□□
	4700	63.5	115	22	42	17900	RL472M350SA15□□□
	4700	76.2	110	22	42	19400	RL472M350TA10□□□
	5600	63.5	135	18	36	20500	RL562M350SA35□□□
	5600	63.5	170	18	36	22800	RL562M350SA70□□□
	5600	76.2	125	18	36	22200	RL562M350TA25□□□
	5600	89	105	18	36	24100	RL562M350XA05□□□
	6800	63.5	189	15	29	26400	RL682M350SA89□□□
	6800	76.2	125	15	29	24300	RL682M350TA25□□□
	6800	76.2	150	15	29	26300	RL682M350TA50□□□
	6800	89	119	15	29	27300	RL682M350XA19□□□
	8200	63.5	244	12	24	32500	RL822M350SB44□□□
8200	76.2	136	12	24	27500	RL822M350TA36□□□	
8200	76.2	170	12	24	30400	RL822M350TA70□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
350	8200	89	120	12	24	28500	RL822M350XA20□□□
	8200	89	150	12	24	31400	RL822M350XA50□□□
	10000	76.2	190	10	20	31600	RL103M350TA90□□□
	10000	76.2	220	10	20	33800	RL103M350TB20□□□
	10000	89	136	10	20	29700	RL103M350XA36□□□
	10000	89	170	10	20	32700	RL103M350XA70□□□
	12000	76.2	240	9	17	35300	RL123M350TB40□□□
	12000	89	136	9	17	29800	RL123M350XA36□□□
	12000	89	190	9	17	34300	RL123M350XA90□□□
	12000	100	190	9	17	36800	RL123M350DA90□□□
	15000	89	176	7	13	39000	RL153M350XA76□□□
	15000	89	220	7	13	43000	RL153M350XB20□□□
	15000	100	250	7	13	48700	RL153M350DB50□□□
	18000	89	186	6	11	40000	RL183M350XA86□□□
	18000	89	240	6	11	44900	RL183M350XB40□□□
	22000	89	230	5	9	45200	RL223M350XB30□□□
	22000	89	270	5	9	48700	RL223M350XB70□□□
22000	100	250	5	9	50000	RL223M350DB50□□□	
400	220	35	80	460	900	1700	RL221M400P800□□□
	330	35	80	310	600	2400	RL331M400P800□□□
	470	35	100	220	420	3200	RL471M400PA00□□□
	680	51	60	150	290	3800	RL681M400R600□□□
	680	51	80	150	290	4300	RL681M400R800□□□
	1000	51	75	100	200	6500	RL102M400R750□□□
	1000	51	80	100	200	6700	RL102M400R800□□□
	1200	51	80	87	170	7000	RL122M400R800□□□
	1200	51	96	87	170	7700	RL122M400R960□□□
	1500	51	96	67	130	8800	RL152M400R960□□□
	1500	51	115	67	130	9500	RL152M400RA15□□□
	1800	51	105	56	110	9600	RL182M400RA05□□□
	1800	51	140	56	110	10800	RL182M400RA40□□□
	1800	63.5	85	56	110	9900	RL182M400S850□□□
	2200	51	105	46	90	10500	RL222M400RA05□□□
	2200	51	125	46	90	11300	RL222M400RA25□□□
	2200	63.5	85	46	90	10800	RL222M400S850□□□
	2200	63.5	100	46	90	11600	RL222M400SA00□□□
	2700	51	145	38	74	13600	RL272M400RA45□□□
	2700	63.5	90	38	74	12400	RL272M400S900□□□
2700	63.5	115	38	74	13700	RL272M400SA15□□□	
3300	63.5	95	31	60	14500	RL332M400S950□□□	
3300	63.5	130	31	60	16700	RL332M400SA30□□□	
3300	76.2	75	31	60	14700	RL332M400T750□□□	
3300	76.2	100	31	60	16500	RL332M400TA00□□□	
3900	63.5	100	26	51	15800	RL392M400SA00□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
400	3900	63.5	150	26	51	18900	RL392M400SA50□□□
	3900	76.2	85	26	51	15300	RL392M400T850□□□
	3900	76.2	110	26	51	18300	RL392M400TA10□□□
	3900	76.2	130	26	51	19700	RL392M400TA30□□□
	4700	63.5	120	22	42	18600	RL472M400SA20□□□
	4700	63.5	170	22	42	21700	RL472M400SA70□□□
	4700	76.2	95	22	42	18600	RL472M400T950□□□
	4700	76.2	130	22	42	21200	RL472M400TA30□□□
	5600	63.5	135	18	36	22100	RL562M400SA35□□□
	5600	63.5	190	18	36	25800	RL562M400SA90□□□
	5600	76.2	105	18	36	21900	RL562M400TA05□□□
	5600	76.2	150	18	36	25600	RL562M400TA50□□□
	5600	89	105	18	36	24300	RL562M400XA05□□□
	6800	63.5	250	15	29	31200	RL682M400SB50□□□
	6800	76.2	125	15	29	25200	RL682M400TA25□□□
	6800	76.2	170	15	29	28900	RL682M400TA70□□□
	6800	89	105	15	29	25900	RL682M400XA05□□□
	6800	89	125	15	29	27900	RL682M400XA25□□□
	6800	89	140	15	29	29300	RL682M400XA40□□□
	6800	89	150	15	29	31000	RL682M400XA50□□□
	6800	89	155	15	29	31400	RL682M400XA55□□□
	8200	76.2	170	12	24	30600	RL822M400TA70□□□
	8200	76.2	210	12	24	33700	RL822M400TB10□□□
	8200	89	115	12	24	28200	RL822M400XA15□□□
	8200	89	125	12	24	29200	RL822M400XA25□□□
	8200	89	160	12	24	32500	RL822M400XA60□□□
	8200	89	170	12	24	33400	RL822M400XA70□□□
	10000	76.2	220	10	20	36400	RL103M400TB20□□□
	10000	89	135	10	20	31900	RL103M400XA35□□□
	10000	89	190	10	20	37100	RL103M400XA90□□□
	10000	100	190	10	20	39600	RL103M400DA90□□□
	12000	89	165	9	17	36800	RL123M400XA65□□□
12000	89	190	9	17	39100	RL123M400XA90□□□	
12000	89	220	9	17	41800	RL123M400XB20□□□	
12000	100	220	9	17	44600	RL123M400DB20□□□	
15000	89	195	7	13	39600	RL153M400XA95□□□	
15000	89	240	7	13	43500	RL153M400XB40□□□	
15000	100	220	7	13	44600	RL153M400DB20□□□	
18000	89	235	6	11	44000	RL183M400XB35□□□	
18000	89	270	6	11	46900	RL183M400XB70□□□	
450	220	35	80	460	900	1900	RL221M450P800□□□
	330	35	100	310	600	2500	RL331M450PA00□□□
	470	51	60	220	420	3000	RL471M450R600□□□
	560	51	60	180	360	3300	RL561M450R600□□□

STANDARD RATINGS

□□□ see terminal code at dimensions table

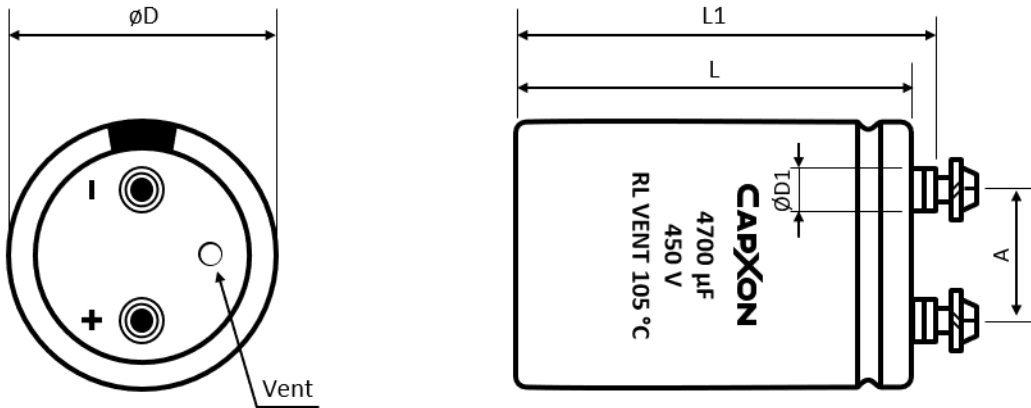
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
450	680	51	85	150	290	4500	RL681M450R850□□□
	1000	51	85	100	200	6900	RL102M450R850□□□
	1000	51	105	100	200	7600	RL102M450RA05□□□
	1200	51	85	87	170	7400	RL122M450R850□□□
	1200	51	115	87	170	8500	RL122M450RA15□□□
	1500	51	100	67	130	9100	RL152M450RA00□□□
	1500	51	115	67	130	9600	RL152M450RA15□□□
	1800	51	100	56	110	9500	RL182M450RA00□□□
	1800	63.5	85	56	110	10000	RL182M450S850□□□
	2200	51	120	46	90	11500	RL222M450RA20□□□
	2200	63.5	100	46	90	12000	RL222M450SA00□□□
	2700	51	143	38	74	13800	RL272M450RA43□□□
	2700	63.5	100	38	74	13200	RL272M450SA00□□□
	2700	63.5	130	38	74	14800	RL272M450SA30□□□
	2700	76.2	85	38	74	13700	RL272M450T850□□□
	2700	76.2	115	38	74	15600	RL272M450TA15□□□
	3300	63.5	115	31	60	14700	RL332M450SA15□□□
	3300	63.5	150	31	60	16600	RL332M450SA50□□□
	3300	76.2	95	31	60	16200	RL332M450T950□□□
	3300	76.2	130	31	60	18500	RL332M450TA30□□□
	3900	63.5	135	26	51	18000	RL392M450SA35□□□
	3900	63.5	170	26	51	20000	RL392M450SA70□□□
	3900	76.2	105	26	51	17900	RL392M450TA05□□□
	3900	76.2	130	26	51	19800	RL392M450TA30□□□
	3900	89	105	26	51	19600	RL392M450XA05□□□
	4700	63.5	165	22	42	21600	RL472M450SA65□□□
	4700	76.2	115	22	42	20400	RL472M450TA15□□□
	4700	76.2	130	22	42	21500	RL472M450TA30□□□
	4700	76.2	150	22	42	22900	RL472M450TA50□□□
	4700	89	105	22	42	21500	RL472M450XA05□□□
	5600	63.5	244	18	36	29400	RL562M450SB44□□□
	5600	76.2	135	18	36	22500	RL562M450TA35□□□
	5600	76.2	150	18	36	25900	RL562M450TA50□□□
	5600	76.2	190	18	36	28800	RL562M450TA90□□□
	5600	89	105	18	36	24800	RL562M450XA05□□□
	5600	89	125	18	36	26100	RL562M450XA25□□□
	5600	89	150	18	36	28900	RL562M450XA50□□□
	6800	76.2	170	15	29	29000	RL682M450TA70□□□
	6800	76.2	190	15	29	30500	RL682M450TA90□□□
	6800	76.2	220	15	29	32600	RL682M450TB20□□□
6800	89	115	15	29	26700	RL682M450XA15□□□	
6800	89	125	15	29	27700	RL682M450XA25□□□	
6800	89	170	15	29	31600	RL682M450XA70□□□	
8200	76.2	195	12	24	33600	RL822M450TA95□□□	

STANDARD RATINGS

□□□ see terminal code at dimensions table

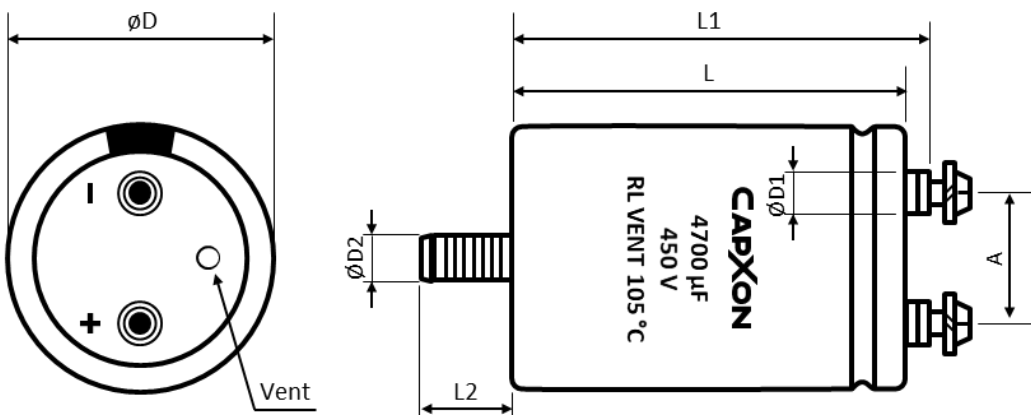
V _R (V)	C _R (μF)	∅ D (mm)	L (mm)	Typ. ESR +20°C - 120Hz (mΩ)	Max. ESR +20°C - 120Hz (mΩ)	I _R - Max. Ripple Current +105°C - 120Hz (mA rms)	CapXon Part Number
450	8200	76.2	240	12	24	37000	RL822M450TB40□□□
	8200	89	145	12	24	32100	RL822M450XA45□□□
	8200	89	190	12	24	36200	RL822M450XA90□□□
	10000	89	165	10	20	34900	RL103M450XA65□□□
	10000	89	190	10	20	37200	RL103M450XA90□□□
	10000	89	220	10	20	39700	RL103M450XB20□□□
	10000	100	220	10	20	42300	RL103M450DB20□□□
	12000	89	195	9	17	39400	RL123M450XA95□□□
	12000	89	230	9	17	42500	RL123M450XB30□□□
	12000	100	250	9	17	47000	RL123M450DB50□□□
	15000	89	235	7	13	44400	RL153M450XB35□□□
	15000	89	250	7	13	45700	RL153M450XB50□□□
500	680	51	75	200	390	4100	RL681M500R750□□□
	1000	51	90	140	270	5100	RL102M500R900□□□
	1200	51	115	110	220	5900	RL122M500RA15□□□
	1200	63.5	80	110	220	5700	RL122M500S800□□□
	1500	51	135	92	180	7100	RL152M500RA35□□□
	1500	63.5	90	92	180	6700	RL152M500S900□□□
	1800	63.5	100	77	150	7800	RL182M500SA00□□□
	1800	76.2	70	77	150	7500	RL182M500T700□□□
	2200	63.5	120	62	120	8600	RL222M500SA20□□□
	2200	76.2	95	62	120	8600	RL222M500T950□□□
	2700	63.5	135	50	98	9800	RL272M500SA35□□□
	2700	76.2	105	50	98	9700	RL272M500TA05□□□
	3300	63.5	165	41	80	11000	RL332M500SA65□□□
	3300	76.2	130	41	80	11000	RL332M500TA30□□□
	3900	76.2	145	35	68	13100	RL392M500TA45□□□
	3900	89	105	35	68	12500	RL392M500XA05□□□
	4700	76.2	165	29	56	14500	RL472M500TA65□□□
	4700	89	125	29	56	14000	RL472M500XA25□□□
	5600	89	145	24	47	15900	RL562M500XA45□□□
	6800	89	165	20	39	18600	RL682M500XA65□□□
8200	89	205	17	32	20300	RL822M500XB05□□□	

DIMENSIONS • Ring clamp mounting • All dimensions in mm



Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$D1$ max.	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M8	100	100 ~ 240	110 ~ 250	17.5	41.5	16	5	A87

DIMENSIONS • Threaded stud mounting • All dimensions in mm



DIMENSIONS - Threaded stud mounting - All dimensions in mm

Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M8	100	100 ~ 240	110 ~ 250	16	17.5	M12	41.5	16	5	E87

SLEEVE AND PRINTING SELECTION TABLE

Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RL331M250P500E50
> 35	PVC	Thermo	Yes	No	-	RL392M350TA00E50
> 35	PET	Thermo	No	No	(*) Note	RL392M350TA00E50*
> 35	PET	Ink	No	Yes	(**) Note	RL392M350TA00E50**

Note: (*) and (**) consult CapXon for further details.

ACCESSORIES

- The capacitors are supplied with suitable screws, serrated washers and plain washers. Accessories are not fastened to the capacitor.
- Suitable ring clamps and further assembly material see additional information “Accessories”.

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

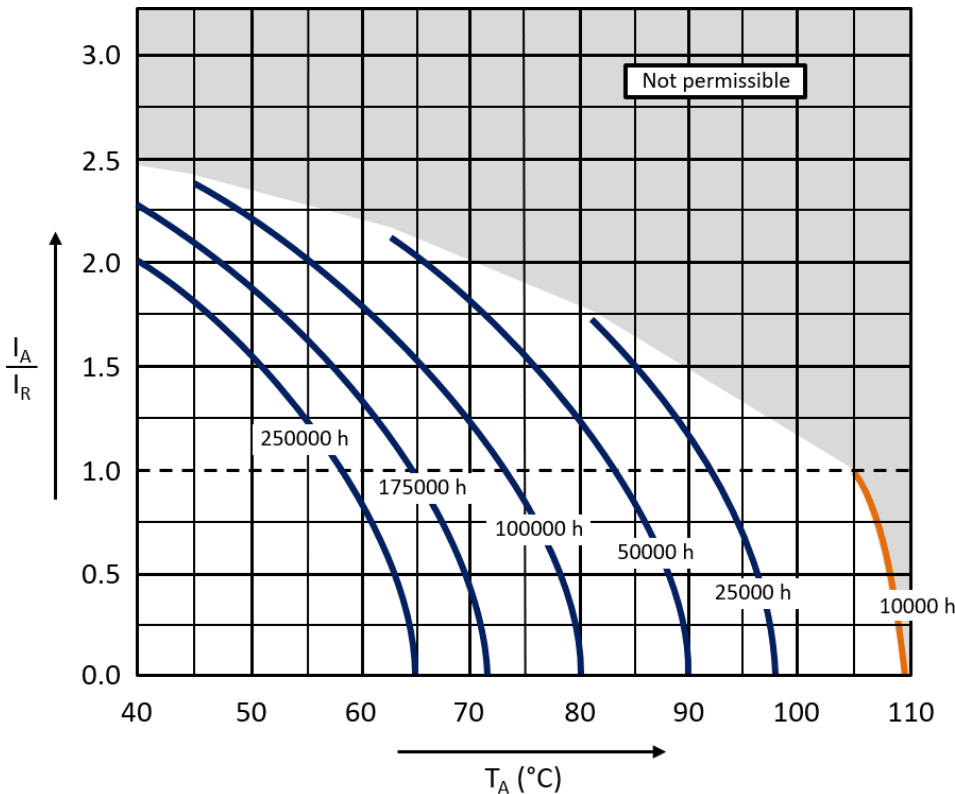
Frequency (Hz)	50/60	100/120	300	1k	≥ 3k
K_f	0.8	1	1.2	1.3	1.4

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following pages in the table.

General Precautions and Guidelines	Packaging Information Liquid Screw
Page 134	Page 120

USEFUL LIFE



With: I_A : Actual application current
 I_R : Maximum permissible rated ripple current (A RMS)
 T_A : Ambient temperature of the capacitor

DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

Except for the written expressed warranties, CapXon does not impliedly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any CapXon product.

For further information, please visit our website www.capxongroup.com or contact CapXon directly.

RP series ▪ 3300µF ▪ 450V ▪ ±20% ▪ Ø 63.5mm ▪ L 130mm ▪ M5 terminal 10.3mm ▪ With stud

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
R P		3 3 2			M		4 5 0		S		A 3 0			E		5 0		- - - -	
Series		Capacitance			Capacitance tolerance		Voltage		Case Ø (mm)		Height (mm)			Mounting code		Terminal code		Special requirement	
Code		µF			Code		Code		Code		Code			Code		Code		Code	
101		100			H		010		P		500			A		50		A51	
561		560			K		016		R		550			E		55		A55	
102		1000			S		025		S		600					60		A57	
472		4700			M		035		T		650					65		A60	
103		10000			N		040		X		700					70		A65	
683		68000			D		050		D		750					75		A68	
104		100000			I		063				800					80		A70	
394		390000			B		080				830					83		A71	
105		1000000			G		100				850					85		A75	
					Z		160				900					90		A76	
					Y		200				920					92		A80	
					X		250				950					95		A89	
					A		315				960					96		A90	
					J		350				970					97		A95	
					C		400				980					98		A96	
					E		420				A00					100		A97	
					V		450				A05					105		B00	
					Q		500				A15					115		B05	
					T		550				A18					118		B10	
					W		600				A19					119		B15	
					P		630				A20					120		B19	
					L		650				A25					125		B20	
					U						A30					130		B30	
					F						A34					134		B35	
					O						A35					135		B36	
											A36					135		B37	
											A40					140		B40	
											A41					141		B44	
											A43					143		B50	
											A45					145		B70	
											A50					150			

Please consult CapXon for further assistance

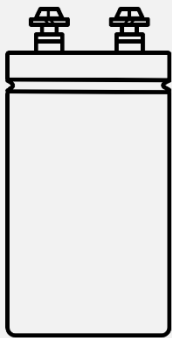
SLEEVE AND PRINTING SELECTION TABLE


Diameter ØD (mm)	Sleeve Material	Sleeve Printing	CapXon Standard	Halogen Free	Product Code Suffix	Product Code Example
35	PET	Ink	Yes	Yes	-	RG332M160PA00E50
> 35	PVC	Thermo	Yes	No	-	RG103M200SA20E50
> 35	PET	Thermo	No	No	(*) Note	RG103M200SA20E50*
> 35	PET	Ink	No	Yes	(**) Note	RG103M200SA20E50**

Note: (*) and (**) consult CapXon for further details.

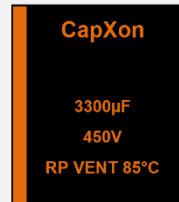
MARKING • SCREW TERMINAL ALUMINUM ELECTROLYTIC CAPACITORS

Aluminum Electrolytic Capacitor • Screw terminal type • Sleeve with ink printing

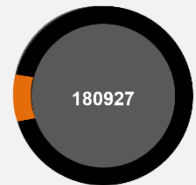


CapXon: Manufacturer trademark
 3300µF: Nominal capacitance
 450V: Rated voltage
 (-) polarity (Cathode indicate)
 RP: Series
 VENT: Safety vent
 85°C: Maximum operating temperature
 180927: Production datecode year/month/day (ex. 2018/September/27th)
 Printing color: Gold

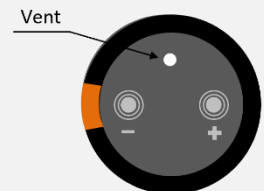
Side view



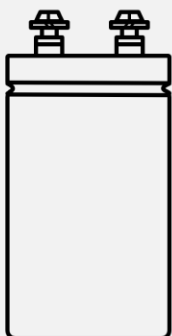
Top view




Bottom view



Aluminum Electrolytic Capacitor • Screw terminal type • Sleeve with thermal printing



CapXon: Manufacturer trademark
 RL: Series
 400V: Rated voltage
 1500µF: Nominal capacitance
 105°C: Maximum operating temperature
 +POSITIVE: (+) polarity (Anode indicate)
 (-) polarity (Cathode indicate)
 180927: Production datecode year/month/day (ex. 2018/September/27th)
 Printing color: Silver

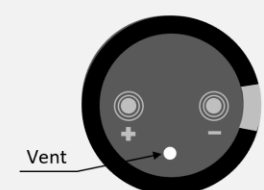
Side view



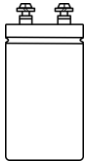
Top view



Bottom view

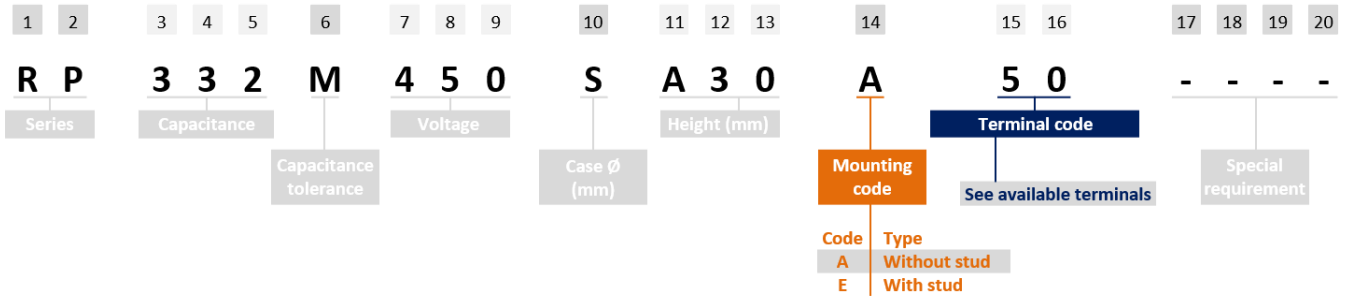


AVAILABLE TERMINALS ▪ SCREW TERMINAL TYPE ▪ WITHOUT STUD

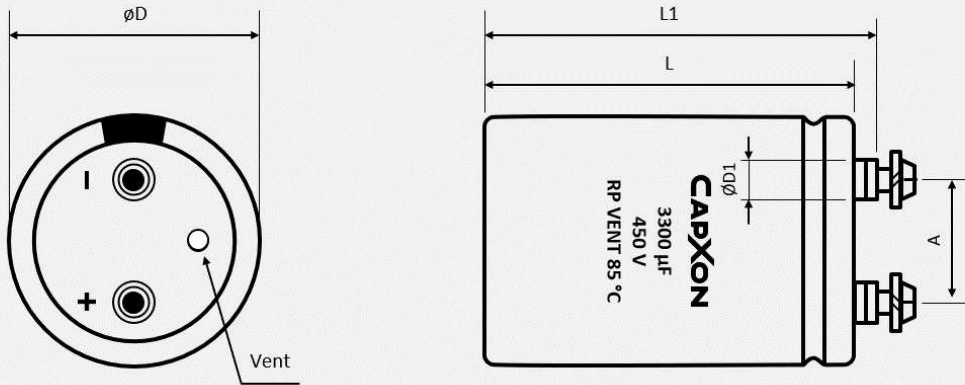


Screw terminal type example:

RP series ▪ 3300µF ▪ 450V ▪ ±20% ▪ ϕ 63.5mm ▪ L 130mm ▪ M5 terminal 10.3mm ▪ Without stud



Screw type ▪ Ring clip mounting



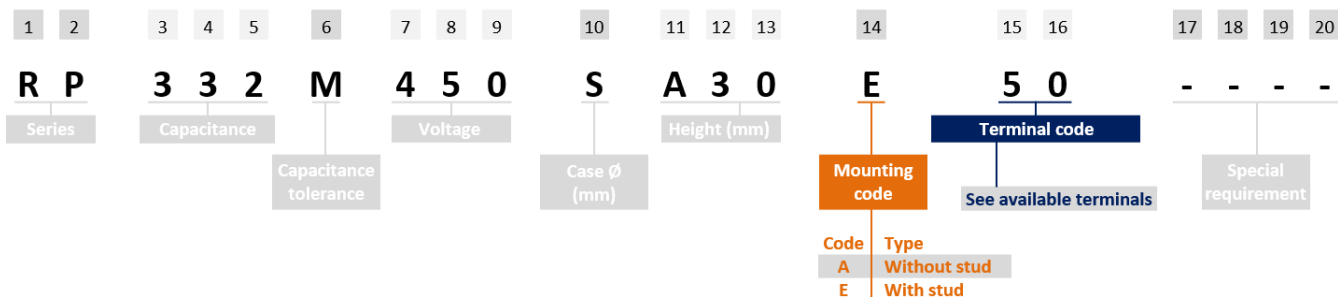
Terminal	Dimensions (mm) with insulating sleeve					Min. Full Thread (mm)	Max. Torque (Nm)	Mounting/ Terminal code
	$D \pm 2$	$L \pm 3$	$L1 \pm 3$	$D1 \text{ max.}$	$A \pm 0.5$			
M5	35	50 ~ 120	56.5 ~ 126.5	8.3	12.7	8	2	A50
M5	51	50 ~ 140	56.5 ~ 146.5	10.3	22	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	10.3	28.6	8	2	A50
M5	63.5	80 ~ 140	86.5 ~ 146.5	13	28.6	8	2	A53
M5	76.2	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M5	89	100 ~ 240	106.5 ~ 246.5	10.3	31.8	12	2.5	A50
M5	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A57
M6	76.2	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M6	89	100 ~ 240	106.5 ~ 246.5	17.5	31.8	12	2.5	A67
M8	100	100 ~ 240	110 ~ 250	17.5	41.5	16	5	A87

AVAILABLE TERMINALS ▪ SCREW TERMINAL TYPE ▪ WITH STUD

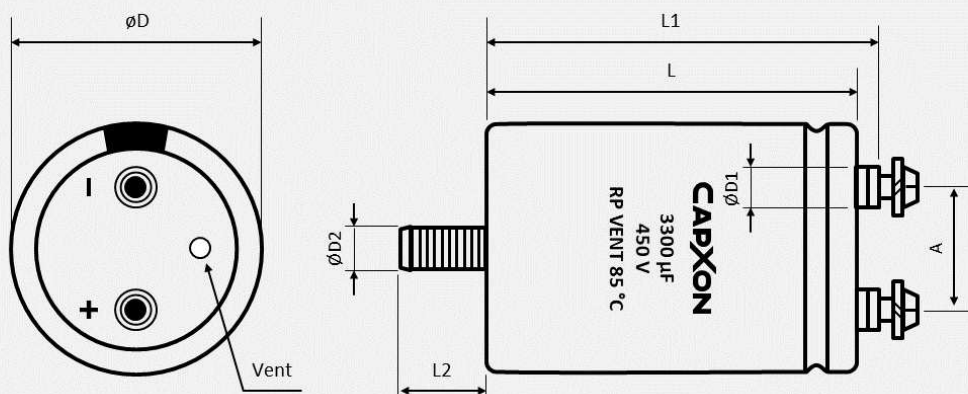


Screw terminal type example:

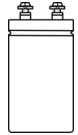
RP series ▪ 3300µF ▪ 450V ▪ ±20% ▪ ϕ 63.5mm ▪ L 130mm ▪ M5 terminal 10.3mm ▪ With stud



Screw type ▪ Threaded stud mounting

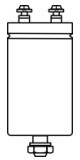


Terminal	Dimensions (mm) with insulating sleeve							Min. Full Thread (mm)	Max. Torque (Nm)	Mounting/ Terminal code
	D ± 2	L ± 3	L1 ± 3	L2 ± 1	D1 max.	D2	A ± 0.5			
M5	35	50 ~ 120	56.5 ~ 126.5	12	8.3	M8	12.7	8	2	E50
M5	51	50 ~ 140	56.5 ~ 146.5	16	10.3	M12	22	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	10.3	M12	28.6	8	2	E50
M5	63.5	80 ~ 140	86.5 ~ 146.5	16	13	M12	28.6	8	2	E53
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M5	89	100 ~ 240	106.5 ~ 246.5	16	10.3	M12	31.8	12	2.5	E50
M5	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E57
M6	76.2	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M6	89	100 ~ 240	106.5 ~ 246.5	16	17.5	M12	31.8	12	2.5	E67
M8	100	100 ~ 240	110 ~ 250	16	17.5	M12	41.5	16	5	E87



PACKAGING - SCREW TERMINAL TYPE - WITHOUT STUD

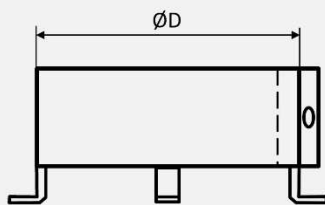
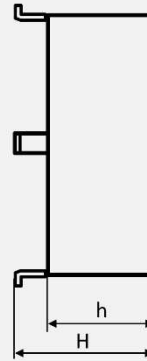
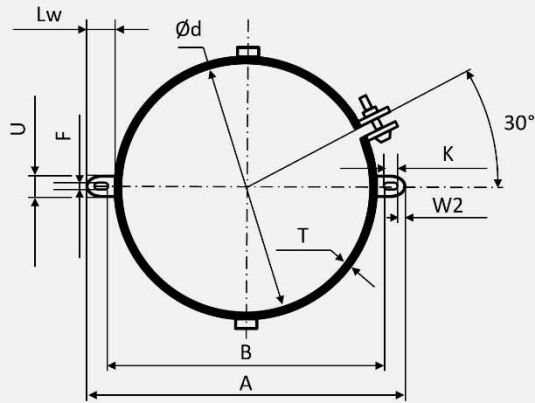
Ø D (mm)	Length L (mm)	Package layers	Box quantity (pcs)	Box size L x W x H (mm)	Country of origin	Tariff number
35	≤ 59	2	120	510 x 340 x 160	China	85322200
	60 to 70	2	120	510 x 340 x 180	China	85322200
	75 to 99	1	60	510 x 340 x 120	China	85322200
	100 to 125	1	60	510 x 340 x 145	China	85322200
51	≤ 59	2	70	510 x 340 x 180	China	85322200
	60 to 70	2	70	510 x 340 x 160	China	85322200
	75 to 99	1	35	510 x 340 x 180	China	85322200
	100 to 125	1	35	510 x 340 x 145	China	85322200
	130 to 140	1	35	510 x 340 x 160	China	85322200
	145 to 160	1	35	510 x 340 x 180	China	85322200
63.5	≤ 70	2	48	510 x 340 x 180	China	85322200
	75 to 95	1	24	510 x 340 x 120	China	85322200
	100 to 125	1	24	510 x 340 x 165	China	85322200
	130 to 140	1	24	510 x 340 x 160	China	85322200
	145 to 160	1	24	510 x 340 x 180	China	85322200
	165 to 180	1	24	510 x 340 x 200	China	85322200
	185 to 200	1	24	510 x 340 x 220	China	85322200
76.2	≤ 100	1	15	510 x 340 x 120	China	85322200
	> 100 to 125	1	15	510 x 340 x 145	China	85322200
	130 to 140	1	15	510 x 340 x 160	China	85322200
	145 to 160	1	15	510 x 340 x 180	China	85322200
	165 to 180	1	15	510 x 340 x 200	China	85322200
	185 to 200	1	15	510 x 340 x 220	China	85322200
	205 to 220	1	15	510 x 340 x 240	China	85322200
89	≤ 100	1	12	510 x 340 x 120	China	85322200
	> 100 to 125	1	12	510 x 340 x 145	China	85322200
	130 to 140	1	12	510 x 340 x 160	China	85322200
	145 to 160	1	12	510 x 340 x 180	China	85322200
	165 to 180	1	12	510 x 340 x 200	China	85322200
	185 to 200	1	12	510 x 340 x 220	China	85322200
	205 to 220	1	12	510 x 340 x 240	China	85322200
100	≤ 100	1	6	510 x 340 x 120	China	85322200
	> 100 to 125	1	6	510 x 340 x 145	China	85322200
	130 to 140	1	6	510 x 340 x 160	China	85322200
	145 to 160	1	6	510 x 340 x 180	China	85322200
	165 to 180	1	6	510 x 340 x 200	China	85322200
	185 to 200	1	6	510 x 340 x 220	China	85322200
	205 to 220	1	6	510 x 340 x 240	China	85322200


PACKAGING - SCREW TERMINAL TYPE - WITH STUD

∅ D (mm)	Length L (mm)	Package layers	Box quantity (pcs)	Box size L x W x H (mm)	Country of origin	Tariff number
35	≤ 59	2	120	510 x 340 x 180	China	85322200
	60 to 70	2	120	510 x 340 x 200	China	85322200
	75 to 99	1	60	510 x 340 x 120	China	85322200
	100 to 115	1	60	510 x 340 x 145	China	85322200
	120 to 125	1	60	510 x 340 x 160	China	85322200
51	≤ 59	2	70	510 x 340 x 180	China	85322200
	60 to 70	2	70	510 x 340 x 200	China	85322200
	75 to 99	1	35	510 x 340 x 120	China	85322200
	100 to 115	1	35	510 x 340 x 145	China	85322200
	120 to 125	1	35	510 x 340 x 160	China	85322200
	130 to 140	1	35	510 x 340 x 180	China	85322200
63.5	145 to 160	1	35	510 x 340 x 200	China	85322200
	≤ 70	2	48	510 x 340 x 200	China	85322200
	75 to 90	1	24	510 x 340 x 120	China	85322200
	100 to 115	1	24	510 x 340 x 145	China	85322200
	120 to 125	1	24	510 x 340 x 160	China	85322200
	130 to 140	1	24	510 x 340 x 180	China	85322200
	145 to 160	1	24	510 x 340 x 200	China	85322200
	165 to 180	1	24	510 x 340 x 220	China	85322200
76.2	185 to 200	1	24	510 x 340 x 240	China	85322200
	≤ 90	1	15	510 x 340 x 120	China	85322200
	100 to 115	1	15	510 x 340 x 145	China	85322200
	120 to 125	1	15	510 x 340 x 160	China	85322200
	130 to 140	1	15	510 x 340 x 180	China	85322200
	145 to 160	1	15	510 x 340 x 200	China	85322200
	165 to 180	1	15	510 x 340 x 220	China	85322200
	185 to 200	1	15	510 x 340 x 240	China	85322200
89	205 to 220	1	15	510 x 340 x 280	China	85322200
	≤ 90	1	12	510 x 340 x 120	China	85322200
	100 to 115	1	12	510 x 340 x 145	China	85322200
	120 to 125	1	12	510 x 340 x 160	China	85322200
	130 to 140	1	12	510 x 340 x 180	China	85322200
	145 to 160	1	12	510 x 340 x 200	China	85322200
	165 to 180	1	12	510 x 340 x 220	China	85322200
	185 to 200	1	12	510 x 340 x 240	China	85322200
100	205 to 240	1	12	510 x 340 x 280	China	85322200
	≤ 90	1	6	510 x 340 x 120	China	85322200
	100 to 115	1	6	510 x 340 x 145	China	85322200
	120 to 125	1	6	510 x 340 x 160	China	85322200
	130 to 140	1	6	510 x 340 x 180	China	85322200
	145 to 160	1	6	510 x 340 x 200	China	85322200
	165 to 180	1	6	510 x 340 x 220	China	85322200
	185 to 200	1	6	510 x 340 x 240	China	85322200
205 to 240	1	6	510 x 340 x 280	China	85322200	

ACCESSORIES FOR SCREW TERMINAL TYPE WITHOUT STUD • ALL DIMENSIONS IN mm

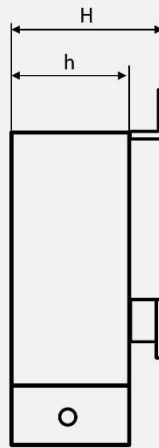
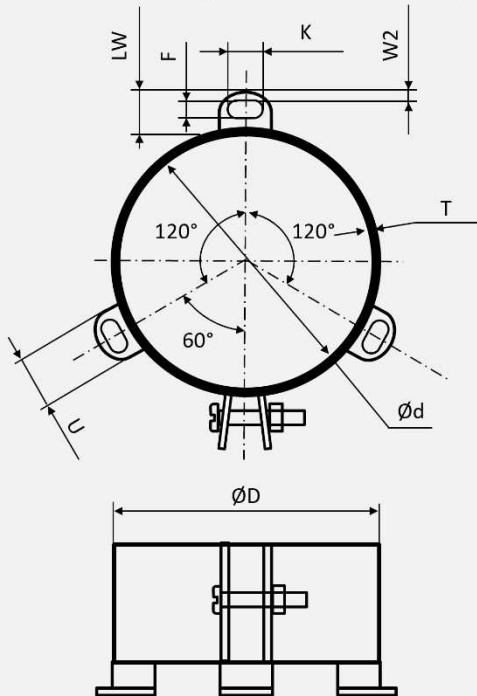
Ring clip • Two fastening brackets • Material galvanized iron



Diameter	ØD	Ød	A	B	T	U	LW	H	h	K	F	W2
Tolerance	±2	±2	±2	±2	±0.15	±1	±1	±1	±1	±0.5	±0.5	±0.5
Ø 35	38	36	60	43	0.9	11	10.5	15	12	5.8	3.5	2.2
Ø 51	54	52	77	58	1	11	11.5	20	15	5.8	4.5	3.2
Ø 63.5	66.5	64.5	90	71	1	14	11.5	30	24	6.85	4.5	2.3

ACCESSORIES FOR SCREW TERMINAL TYPE WITHOUT STUD • ALL DIMENSIONS IN mm

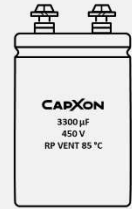
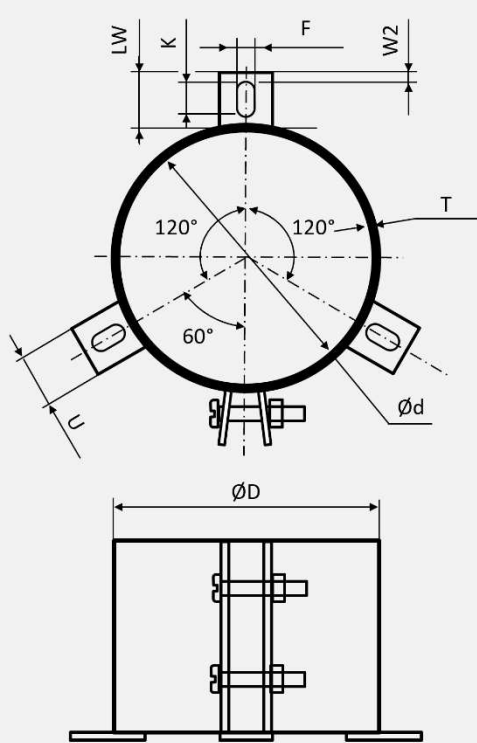
Ring clip • Three fastening brackets • Material galvanized iron



Diameter	ØD	Ød	T	U	LW	H	h	K	F	W2
Tolerance	±2	±2	±0.15	±1	±1	±1	±1	±0.5	±0.5	±0.5
Ø 51	54	52	1	14	11.5	30	24	6.85	4.5	2.5
Ø 63.5	68	66	1	14	11.5	30	24	7.3	4.8	2.5
Ø 76.2	80	78	1	14	11.5	30	24	7.3	4.8	2.5
Ø 89	95	93	1	14	11.5	30	24	6.85	4.5	2.5

ACCESSORIES FOR SCREW TERMINAL TYPE WITHOUT STUD • ALL DIMENSIONS IN mm

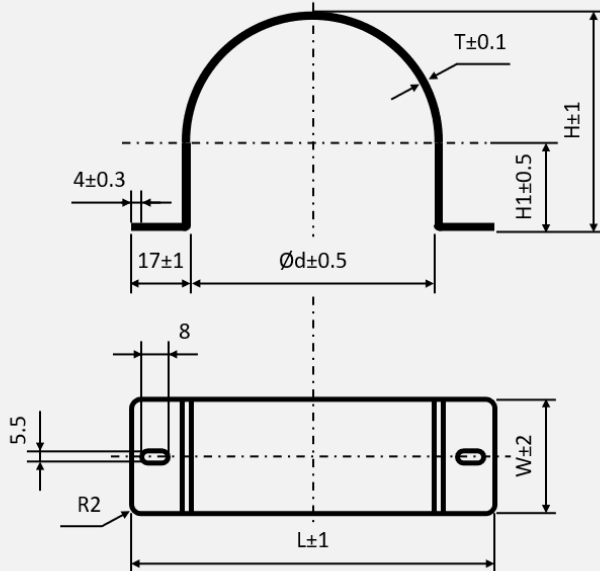
Ring clip • Three fastening brackets • Material galvanized iron



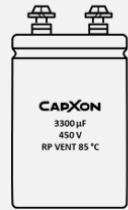
Diameter	ØD	Ød	T	U	LW	H	h	K	F	W2
Tolerance	±2	±2	±0.15	±1	±1	±1	±1	±0.5	±0.5	±0.5
Ø 100	106	104	1.2	15	15.5	52	50	8	6	3.2

ACCESSORIES FOR SCREW TERMINAL TYPE WITHOUT STUD • ALL DIMENSIONS IN mm

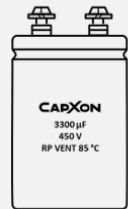
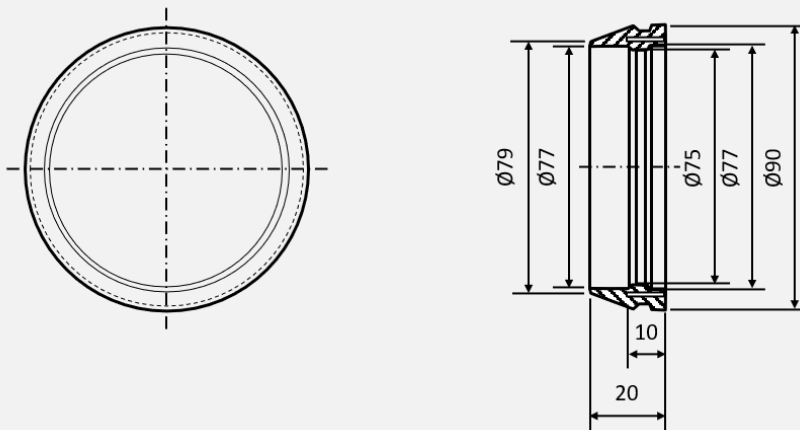
Semicircle clip • Two fastening brackets • Material galvanized iron



Diameter	Ød	L	W	H	H1	T
Ø 76.2	90	124	40	71	25	1

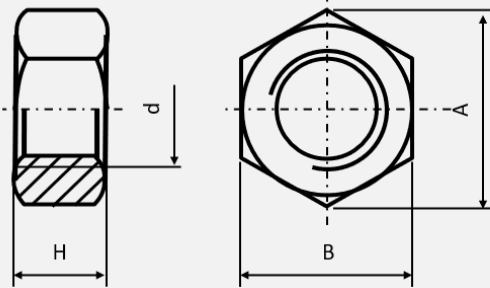


Clip loop • Material PPS (Polypropylene Sulfide Plastic)



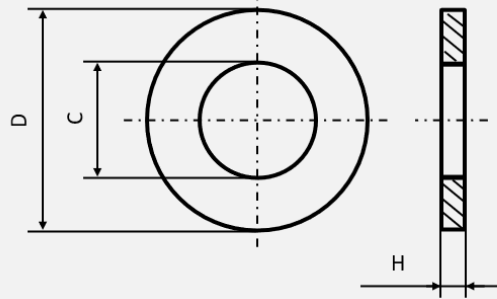
ACCESSORIES FOR SCREW TERMINAL TYPE WITH M12 STUD • ALL DIMENSIONS IN mm

Hex nut • Material Steel



Ød	H	A (min.)	B
M12	10	20.88	19

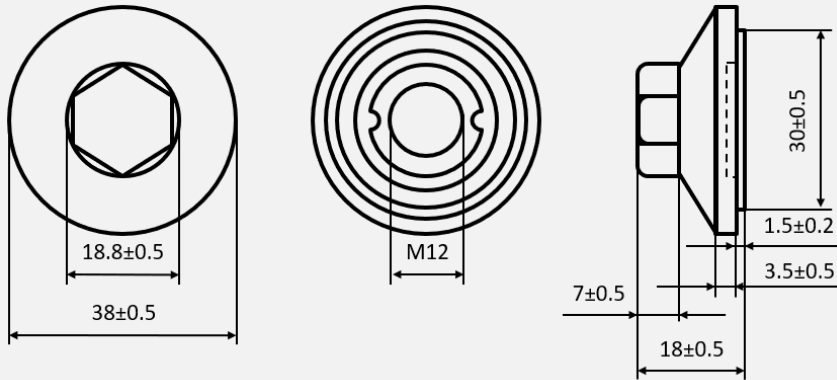
Washer • Material Steel



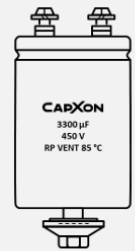
Ød	H	C	D
M12	2	13	20



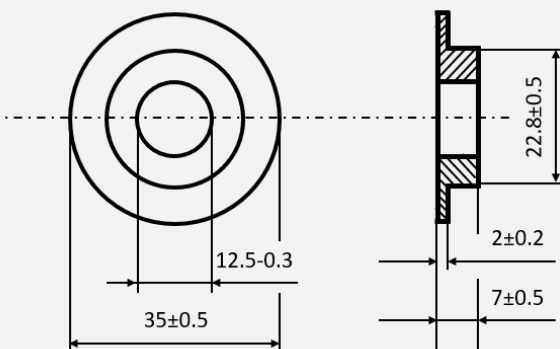
Hex nut • M12 • Ø 38mm • Material Nylon (Polyamide)



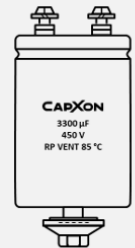
Screw size	Material	Color
M12 x 16mm	Nylon	White



Insulating shoulder washer • Ø 35mm • Material Nylon (Polyamide)



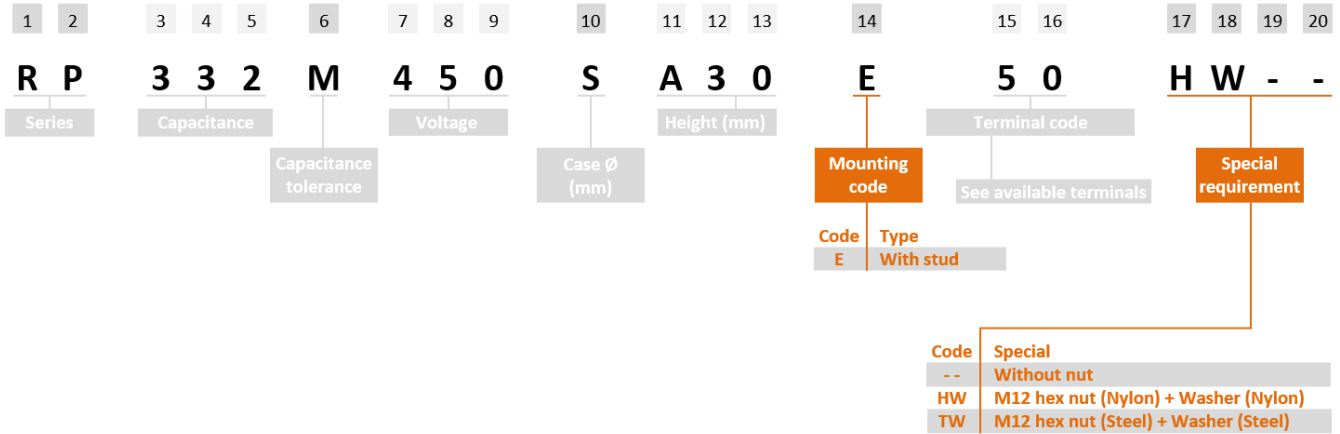
Screw size	Material	Color
M12 x 16mm	Nylon	White



ORDERING EXAMPLE

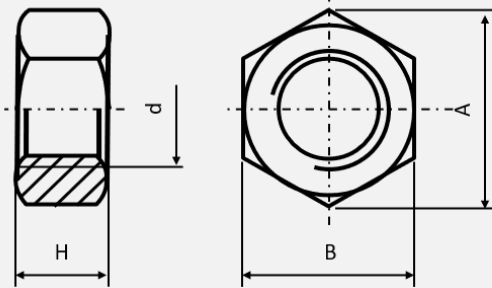
Screw terminal type example:

RP series ▪ 3300µF ▪ 450V ▪ ±20% ▪ Ø 63.5mm ▪ L 130mm ▪ M5 terminal 10.3mm ▪ M12 stud ▪ M12 hex nut (Nylon) and washer (Nylon)



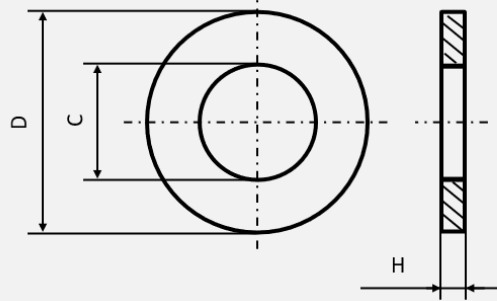
ACCESSORIES FOR SCREW TERMINAL TYPE WITH M8 STUD ▪ ALL DIMENSIONS IN mm

Hex nut ▪ Material Steel



Ød	H	A (min.)	B
M8	6.5	14.2	13

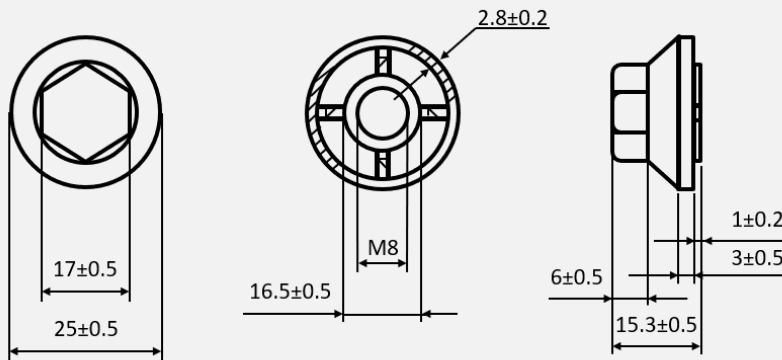
Washer ▪ Material Steel



Ød	H	C	D
M8	1.6	8.4	15



Hex nut ▪ M8 ▪ Ø 25mm ▪ Material Nylon (Polyamide)



Screw size	Material	Color
M8 x 12mm	Nylon	White



ORDERING EXAMPLE

Screw terminal type example:

RP series ▪ 470µF ▪ 450V ▪ ±20% ▪ Ø 35mm ▪ L 80mm ▪ M5 terminal 10.3mm ▪ M8 stud ▪ M8 hex nut (Nylon)



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
R	P	4	7	1	M	4	5	0	P	8	0	0	E	5	0	F	W	-	-
Series		Capacitance			Capacitance tolerance	Voltage			Case Ø (mm)	Height (mm)			Mounting code	Terminal code See available terminals		Special requirement			
Code		Code			Code	Code			Code	Code			Code	Code		Code			
E		E			E	E			E	E			E	E		E			
Type		Type			Type	Type			Type	Type			Type	Type		Type			
With stud		With stud			With stud	With stud			With stud	With stud			With stud	With stud		With stud			
		Special				Special				Special				Special		Special			
		Without nut				Without nut				Without nut				Without nut		Without nut			
		M8 hex nut (Nylon)				M8 hex nut (Nylon)				M8 hex nut (Nylon)				M8 hex nut (Nylon)		M8 hex nut (Nylon)			
		M8 hex nut (Steel) + Washer (Steel)				M8 hex nut (Steel) + Washer (Steel)				M8 hex nut (Steel) + Washer (Steel)				M8 hex nut (Steel) + Washer (Steel)		M8 hex nut (Steel) + Washer (Steel)			

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1. GENERAL PRECAUTIONS & GUIDELINES

In the following Precautions and Guidelines, CapXon provides instructions and requirements to assure a proper handling and desired performance of capacitors. Firstly, all general information is given, which applies to all technologies. The following chapters provides additional instructions specifically about technology and mounting style, which completes the full set of instructions.

1.1. GENERAL - ALL TYPES -

1.1.1. POLARITY

All conventional Electrolytic Capacitors have a polarity due to the internal construction. This polarity is marked on the component by printing on the top of component or on the sleeve of Aluminum Electrolytic Capacitors, including Radial, Snap-In and Screw types.

Any reverse voltage can cause short circuit breakdown of capacitor or leakage of electrolyte. Electrolytic Capacitors isn't designed for AC-voltage supply and only meant for DC-voltage applications.

For an application where polarity in circuit can be reversed or unknown, specific bi-polar aluminium electrolytic capacitors shall be used. We offer such components within our product range.

1.1.2. OVERVOLTAGE

Overvoltage can damage the capacitor and can cause a drastic increase in leakage current, which possibly shortens the lifetime of the capacitor. In a worst case, short circuit failure mode can happen. As a result, do not apply any continuous or temporary overvoltage.

The applied operating voltage, which is applied to the capacitor, should not exceed the rated voltage of the capacitor.

1.1.3. OPERATING TEMPERATURE

Only operate the capacitor within the limits of allowed temperature range, which is specified by datasheet. Be aware that the sum of thermal stress by ambient condition plus electrical stress is the main driving factor for aging. As the thermal stress level gets higher, the expected capacitor lifetime would be lower.

A drop in applied temperature, ambient condition or cooling within application can enlarge the expected lifetime of

the capacitor. For details, please see further documentation of lifetime estimation.

1.1.4. RIPPLE CURRENT

The applied ripple current shall not exceed the stated max. ripple current I_R on the datasheet at the specific frequency.

When capacitors are overstressed by ripple, it can generate massive heat inside the capacitor, which can result in deterioration, vent operation or capacitor breakage.

1.1.5. CHARGE AND DISCHARGING

Frequent and quick charge / discharge generates heat inside the capacitor and can cause possible increase of leakage current, reduction of the expected lifetime, decrease of capacitance, vent operation or breakage.

For such applications please see design rules or consult our technical support for assistance.

1.1.6. SOLDERING CONDITIONS

For recommended reflow solder profile, please see additional information at Section 2. Soldering Instructions.

Soldering by vapor phase for SMD types or any hand soldering are not recommended. No permission is released by CapXon side either. In case of such a usage, customer need to validate solder result and applied component stress within their own manufacturing process.

1.1.7. MSL – MOISTURE SENSITIVE LEVEL (ONLY FOR SMD TYPES)

Our standard SMD components are rated according to JEDEC J-STD020 with MSL1. Construction of this part does not include hygroscopic critical materials and are not prone to delamination or popcorn effects. Only SMD MLPC types of the Solid Conductive Polymer components have MSL3. Moreover, only this type requires additional actions or specific handling in factory floor by customer such as handling or storing the goods after opening the package in accordance to JEDEC J-STD020.

1.1.8. RESISTANCE TO CHEMICALS AND SOLVENTS FOR WASHING, GLUING, FILLING AND COATING

Due to the wide variety of suppliers and different chemical formulas of washing, gluing, filling and coating materials, the individually used material and appliance process need to be validated by customer itself. It is not possible to provide any global material usage approval from our side.

CapXon can provide additional information, including combination of chemicals which could be critical to the component behavior and can support measurements of component performance after appliance of washing, gluing, filling or coating materials. For specific support, please kindly contact our technical support for further advices.

1.1.9. CLEANING AND WASHING

Do not wash the assembled capacitors with the following cleaning agents:

- **Xylene**
 - can cause deterioration of the rubber seal material
- **Halogenated solvents**
 - can cause corrosion and electrical failure modes
- **Petroleum based solvents**
 - can cause degeneration of the rubber seal material
- **Alkali based solvents**
 - can cause corrosion and dissolving of aluminum can
- **Acetone**
 - component marking possibly dissolve

After finishing cleaning and washing, the below points need to be verified by customer:

Dry all solvents properly from PCB as well as capacitor surface sufficiently and apply air blower or air knife, with temperatures within the temperature range of the product specification, if needed.

Monitor pH value, conductivity, specific gravity and water content of cleaning solvents to be sure of possible contaminations and pollution. Contaminations can negatively affect the performance of the capacitor.

1.1.10. GLUING, FILLING OR COATING

It is not allowed to use any gluing (adhesives), filling or coating materials, which contains halogenated solvents. Halogen ions are critical, because they can diffuse or creep in the capacitor through rubber sealing and can possibly damage the internal capacitor element /structure result in serious failure modes for the capacitor.

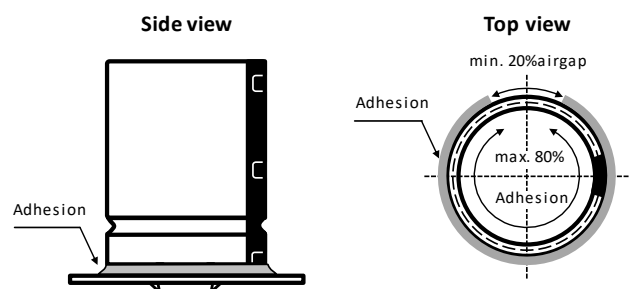
Additionally, please pay attention to the following points:

- Make sure that the surface of capacitor and the area between component bottom / rubber sealant is dry and clean before appliance of gluing, filling or coating material. It is important to avoid any contamination with chemical residues (e.g. flux residues, cleaning).
- Please follow and meet the stated gluing, coating, filling, heating and curing instructions from manufacturer or supplier of such materials. Be aware of possi-

ble shrinkage of such materials. Verify that the hardening was properly done and that no solvents / agents do remain.

- There should be no excessive heat nor mechanical pressure /stress at any stages from the production on customer side. Be aware of the possible material shrinkage of used material. High material shrinkage which leads to damage on capacitor is not CapXon's responsibility.
- The used materials of gluing, coating or filling can possibly react with the marking of component and this can change optical appearance such as the appearance and legibility.
- If the rubber seal surface is fully covered by gluing, filling or coating material, it is no longer possible to have a natural diffusion of gas between the inside of the capacitor and the ambient. So, to avoid such situation, it's strongly recommended to block maximum 80% of the sealed section on the bottom side of the capacitor.

Please find the example below of how gluing could be applied on Radial and Snap-In types.



Gluing reference example of a Snap-In capacitor

1.1.11. OPERATION AND ENVIRONMENT

As long as the application is powered, in operation and cap is not discharged, the user is never permitted to touch the electric terminals of the capacitor directly or to bridge the terminals by hand or any other conductive liquid or solid material. Otherwise, a short circuit of terminals can happen and a hard discharge can damage capacitor / application as well as it can harm the operator.

Within operation, please avoid the following environmental conditions to assure proper capacitor operation:

- high vibration, shocks or mechanical stress. For tested and allowed conditions, please see available references or contact us for details
- avoid direct sunlight, ozone and any kind of radiation or ultraviolet rays
- corrosive or toxic gases (e.g. ammonium, chlorine)

and compounds, bromine and compounds, hydrogen sulfide, sulfuric acid)

- ambient with high amount of damp condensation, water or types of oil

1.1.12. MECHANICAL STRESS

Best possible, avoid mechanical stress for the capacitor and do not apply any excessive mechanical stress to the lead wire pins or terminal.

After mounting, do not lift nor carry the PCB assembly by just grabbing the capacitor to pick up the board.

1.1.13. STORAGE

In case of long-term storage without applying voltage to the capacitor, leakage current tends to increase.

By applying the rated voltage before usage, the dielectric layer of aluminium oxide and leakage current can be stabilized.

If the capacitor is for more than 12 months, it is recommended to apply the DC rated voltage V_R for 30 minutes through 1k Ω protective series resistor.

The storage conditions for storage on customer side should be monitored and controlled to a temperature of 5°C up to 35°C and less than 75% rel. humidity.

1.1.14. DISPOSAL

Please follow your local governmental and organizational restrictions for disposal and if needed, contact your local responsible for correct handling.

In case of incineration, punch holes in the aluminum can in advanced to avoid explosion of capacitor and then burn with at least 800°C, otherwise it can result toxic gas.

1.2. ALUMINUM ELECTROLYTIC & HYBRID CONDUCTIVE POLYMER CAPACITORS - ALL MOUNTING STYLES -

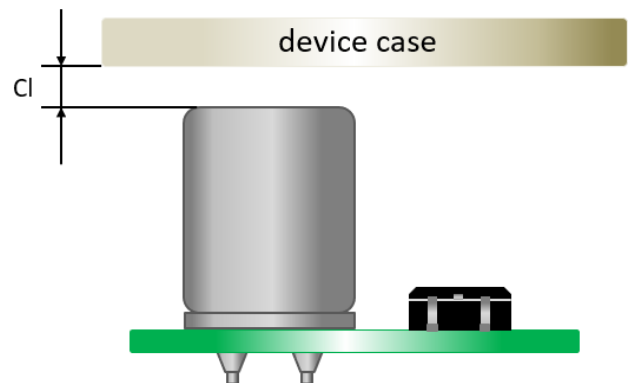
1.2.1. VENT & VENT OPERATION AT EMERGENCY

As a safety feature, most our regular electrolytic capacitors have a so-called vent, which is a pre-determined breaking point. In case of overstressed component, it can lead to internal gassing and due to this an internal overpressure will

result in vent operation. So, the vent will open to release such pressure and gas can become visible. If user detects vent operation or gassing out of the capacitor when operating, disconnect the application immediately from power supply to turn it off directly. If it can't be turned off, the capacitor or the conductive liquid / gas of electrolyte can result in short-circuits, which can dramatically damage the application.

Please notice to avoid being near with body or face above or in direction of capacitors vent when powered. When the running application is overstressed, gas leakage by vent is possible. By this gas with temperatures higher than 100°C can occur and can hurt human body and face. In such an event, if contact with skin, wash it immediately with plenty of water and soap. If contact with eyes, rinse immediately (e.g. eye shower) with plenty of water. If gas is inhaled, gargle right away with plenty of water. For all three cases, please consult a doctor for medical advices.

For proper operation of vent, consider space between the vent and covering surfaces (e.g. housing) as stated at the table below, it is strongly recommended for your mechanical construction / build-up of your product:



Minimum distance to be observed for the safe operation of the capacitor

Case diameter ϕ	Clearance distance Cl
6.3mm to 16mm	Min. 2mm
18mm to 35mm	Min. 3mm
≥ 40 mm	Min. 5mm

Recommended minimum clearance distance between topline capacitor and device case

If such a space is not provided, the vent will not operate completely or even cannot open in case of overpressure.

Case sizes which are smaller than 6.3mm in diameter have no vent on top, for these no space need to be considered.

1.2.2. SLEEVE MATERIAL (NOT FOR SMD)

The standard sleeve material for the majority of our Radial, Snap-In and Screw mounting capacitors is PET and for some series PVC is used as sleeve material. When sleeve is exposed to xylene, toluene or similar and afterwards exposed to high heat, the sleeve may be cracked or damaged.

The sleeve is not used as insulating material or layer and does not insulate capacitor to surroundings. For needed insulation, further actions need to be considered by customer and please follow our recommended design rules.

Sleeves are applied for all Aluminum Electrolytic Capacitors with Radial, Snap-In or Screw mounting and if desired for further customized solutions.

1.3. ALUMINUM ELECTROLYTIC - RADIAL TYPE -

1.3.1. PIN CUTTING & BENDING

Please take absolute care when cutting or bending pins, that the pin is fixed mechanically in direction of rubber sealant. It is necessary that the mechanical force while cutting and bending, which results in pulling or pressing force on pin, does not stress the inner construction of capacitor element or to damage the rubber sealant. Excessive pulling or pressing force on the pin with missing fixation can result in damage of internal pin to capacitor element connection and also the sealing can be weakened. So, please take care to assure appropriate cutting and bending. Do not pre-damage the capacitors and shorten their lifetime performance by incorrect handling.

1.3.2. SOLDERING

For recommended wave solder profile, please see additional solder instruction at section 2.5.

Improper soldering conditions may shrink or break the sleeve. Additionally, excessive heat can damage the internal capacitor element as terminals and lead wires conduct heat into the capacitor.

1.4. ALUMINUM ELECTROLYTIC CAPACITORS - SCREW TYPE -

1.4.1. MAINTENANCE

A regular inspection is recommended when screw capacitors are used at industrial applications. Before inspection, make sure to turn off the power, discharge screw capacitors carefully and do not apply mechanical force or pressure to the terminal to avoid damage. Inspection items are as stated below:

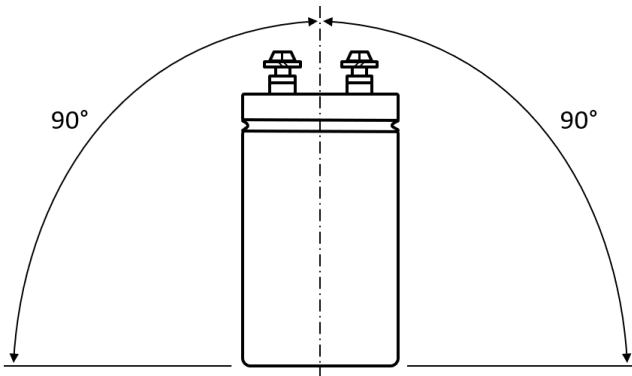
- Check on outer damage, deformation and electrolyte leakage
- Check electrical performance: leakage current, capacitance, DF value and other product specifications. If there is any abnormality detected, make sure a capacitor replacement will be done and handled properly

1.4.2. MOUNTING & INSTALLATION

Make sure capacitors rated capacitance, rated voltage and polarity is according to spec before installation. Please confirm that capacitors and circuit board terminal pitch is consistent to each other before installation. It may cause stress to internal capacitor element through the terminal. If the pitch is different, mounting was done nevertheless and strong mechanical stress was applied. In such case, this can cause short-circuit and other failure modes. Machine automated force and lead torque strength must be controlled properly when mounting happens with automated machine.

1.4.3. MOUNTING DIRECTION OF SCREW TYPE CAPACITORS

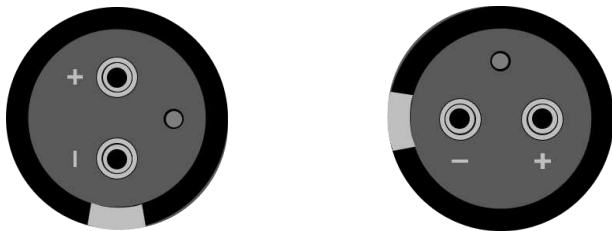
To avoid screw capacitor breakage / explosion, it is not allowed to be mounted with the safety vent downwards to ground, because vent can't function properly when mounted with vent to bottom side and existing gas pressure cannot release properly. Recommended mounting method is shown as figure below, to avoid any safety vent downwards installation. So, capacitor should be mounted with screw terminals up as shown below:



Recommended mounting direction

1.4.4. HORIZONTAL MOUNTING

For horizontal mounting following mounting is strongly recommended. Anode terminal in upper position with safety vent in horizontal position as figure below on left side or safety vent in upper position with anode and cathode terminal in horizontal as figure below on right side.



Recommended mounting position, also in accordance to EIAJ RCR-2367C

It may not damage capacitors directly, but an electrolyte leakage may happen, if installed by other mounting method in horizontal direction.

1.5. SOLID CONDUCTIVE POLYMER CAPACITORS

1.5.1. APPLICATION RESTRICTIONS

The leakage current of Solid Conductive Polymer Capacitors may vary which depends on thermal stress.

Please don't use Solid Conductive Polymer Capacitors in the following types of applications / circuits:

- High-impedance circuits - which are meant to sustain voltages
- Coupling circuits

- Time constant circuits - in addition to the leakage current fluctuation, capacitance may also fluctuate, which depends on operational temperature and humidity. The fluctuation of the capacitance may cause problems, if it is used as a time constant capacitor, which is extremely sensitive to the fluctuation of the capacitance. So, do not use it as a time constant capacitor.
- Other circuits - which are significantly affected by leakage current. If you want to use 2 or more capacitors in a series connection, please contact us before usage.

1.5.2. SUDDEN CHARGE AND DISCHARGE

Do not use the capacitor in circuits when capacitor is repetitively charged and discharged rapidly. If repetitively and rapid charging and discharging stresses the capacitor, it can result in reduction of capacitance or may cause further damage due to internal heating. The usage of a protective circuit is recommended to ensure reliability, when rush currents exceeds 10 times of capacitors allowed max. ripple current I_R , but never more than max. 10A. When measuring the leakage current, a protective resistor (1 k Ω) must be inserted to the circuit during the charge and discharge.

CAPXON

IATF 16949

AEC-Q200

ISO 9001

ISO 14001

QC 080000



www.capxongroup.com

Taiwan

CapXon Technology Limited Taiwan Branch
5F, No. 157, Datong Road, Sec. 2, XiZhi Dist.,
New Taipei City, 22183, Taiwan R. O. C.
+886-2-8692-6611
sales@capxon-taiwan.com

China

CapXon Electronic (Shen-Zhen) Co., Ltd.
Fengbin Industrial Park A102, Tangwei Community,
Fenghuang street, Guangming District, (No. 4132 Songbai Rd.)
Shenzhen 518106, China
+86-755-2717-7888
sales@capxon.com.cn

South Korea

CapXon Korea Office
RM309, Metrokhan, 239 Pyeongchon-daero, Dongan-gu,
Anyang-si, Gyeonggi-do, Korea, 14047
sales@capxon-korea.com

Southeast Asia

CapXon Singapore Office
51 Goldhill Plaza #07-10/11
Singapore 308900
+65-3-1572870
sales@capxon-asia.com

United States of America

CapXon US Office
New York +1-607-846 4546
sales@capxon-usa.com

Europe

CapXon Europe Office
Schwalbenweg 11
72793 Pfullingen, Germany
+49-7121-1452700
sales@capxon-europe.com

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