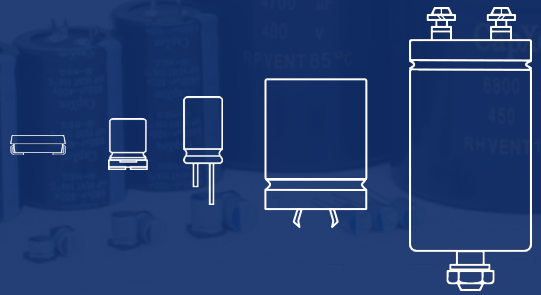
CAPXON

Distributor Update 2020



CAPXON

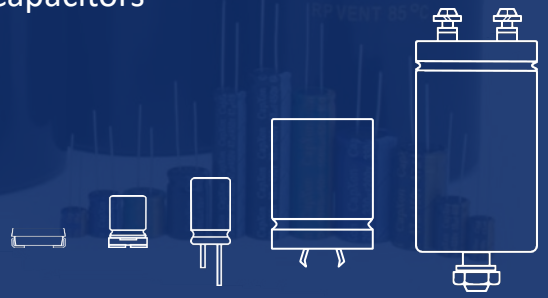
Agenda

New Marketing Material

Datasheets, Catalogs and more

Technologies / Portfolio / Applications

- Aluminum Electrolytic Capacitors
- Solid Conductive Polymer Capacitors
- Hybrid Conductive Polymer Capacitors




Round of
Introductions

Short Introduction

Our Team Mates

Dipl.-Ing

Thomas Steidl

Head of Business Development

Oversea Sales Division

Background:

- > 20 years of experience in technical sales, product marketing, field application engineering and business development
- Expertise in power electronics and related topologies, power modules, wide-bandgap semiconductors (GaN, SiC), peripheral passive components and optoelectronics (OLED, LED, infrared)
- Specialist in electronic energy storage devices of Electrolytic Capacitors, their applications well as other capacitor technologies

Desk: +49 71211452705
Cell: +49 1703125710

t.steidl@capxon-europe.com

www.capxongroup.com

CAPXON

Short Introduction

Our Team Mates

M.Eng. & M.A.

Stephan Menzel

Senior Key Account Manager

Oversea Sales Division

Background:

- More than 12 years of work experience in passive components & electronics industry
- Expertise in global sales & product marketing, industrial engineering and quality management
- In charge for strategic sales accounts, direct business and product marketing

Desk: +49 71211452703
Cell: +49 151 52851347

s.menzel@capxon-europe.com

www.capxongroup.com

CAPXON

That‘s who we are

10 facts about CapXon

CAPXON

Manufacturer of Electrolytic Capacitors

Founded 1980
by Victor Lin

Established in Taipei
Taiwan

Family owned and
independent

40 years experience in
electrolytic capacitors

2500 professional
employees

Fully owned factories
1 e-cap and 3 foil factories

ISO9001, ISO14001
and IATF 16949 certified

Patented production
process

Belongs to the TOP 10
manufacturers in e-caps

Production of more than
1 bio pcs per month

CAPXON

CAPXON

New datasheets / catalogs / website

CapXon

Datasheets

The Future

Single datasheet
Worldwide style

Family datasheet
Worldwide style


CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

AA SERIES • LONG LIFE UP TO 10000 HOURS

KEY FEATURES

- **HYBRID CONDUCTIVE POLYMER** • SMD type
- Endurance: 105°C • up to 10000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 version available

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +105°C
Rated Voltage Range	V_R	16 ~ 200V DC
Surge Voltage	V_S	($V_R \le 100V$): $V_S = 1.25 \cdot V_R$ ($V_R \ge 200V$): $V_S = 1.15 \cdot V_R$
Capacitance Range	C_R	10 ~ 1500µF
Cap. Tolerance	ΔC	±20% (120Hz • 20°C)
Leakage Current (20°C • V_R applied)	I_{LKR}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C • 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C • 100kHz)	ESR	Not to e
Lifetime Test		
Endurance 105°C (V_R & I_R applied)	Test	10000 hour
		5000 hours
	ΔC/C₀	Within ±30%
	tanδ	Less than 2
	ESR	Less than 2
	I_{LKR}	Less than th

DIMENSIONS STANDARD PACKAGE • All dimen

Capton_Ver. 001 – 03/31/2020

For further information plea

CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

AA SERIES • LONG LIFE UP TO 10000 HOURS

KEY FEATURES

- **HYBRID CONDUCTIVE POLYMER** • SMD type
- Endurance: 105°C • up to 10000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 version available

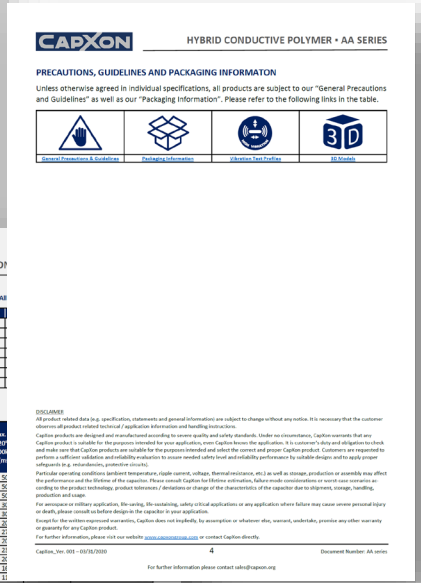
SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +105°C
Rated Voltage Range	V_R	16 ~ 200V DC
Surge Voltage	V_S	($V_R \le 100V$): $V_S = 1.25 \cdot V_R$ ($V_R \ge 200V$): $V_S = 1.15 \cdot V_R$
Capacitance Range	C_R	10 ~ 1500µF
Cap. Tolerance	ΔC	±20% (120Hz • 20°C)
Leakage Current (20°C • V_R applied)	I_{LKR}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor % (20°C • 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C • 100kHz)	ESR	Not to e
Lifetime Test		
Endurance 105°C (V_R & I_R applied)	Test	10000 hour
		5000 hours
	ΔC/C₀	Within ±30%
	tanδ	Less than 2
	ESR	Less than 2
	I_{LKR}	Less than th

DIMENSIONS STANDARD PACKAGE • All dimen

Capton_Ver. 001 – 03/31/2020

For further information plea


CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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 links in the table.

General Precautions & Guidelines	Packaging Information	Vibration Test Profiles	3D Models

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.

Capton products are designed and manufactured according to severe quality and safety standards. Under no circumstance, Capton warrants that any Capton product is suitable for the purposes intended for your application, even Capton knows the application. It is customer's duty and obligation to check and make sure that Capton products are suitable for the purposes intended and select the correct and proper Capton 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 Capton 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, Capton does not implicitly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any Capton product.

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

Capton_Ver. 001 – 03/31/2020 4 Document Number: AA series

For further information please contact sales@capxon.org

CAPXON

HYBRID CON

DIMENSIONS VP PACKAGE (VIBRATION PROOF) • All

ø D
6.3
8
8
10
10
10

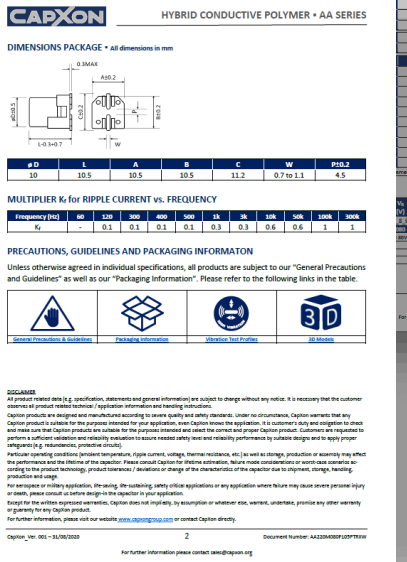
STANDARD RATINGS

V_R [V]	Unshield	Vibration-proof	C_R (µF)	ø D (mm)	L (mm)	I_{LKR} (µA, 2min)	tanδ +20°C • 120Hz (%)	Max +20° 100 (m
16	•	•	100	6.3	5.8	16.0	16	5
	•	•	120	6.3	5.8	19.2	16	5
	•	•	150	6.3	5.8	24.0	16	5
	•	•	220	6.3	7.7	35.2	16	3
	•	•	270	6.3	7.7	43.2	16	3
	•	•	330	10	10.5	52.8	16	2
	•	•	470	8	10.5	75.2	16	2
	•	•	470	10	10.5	75.2	16	2
	•	•	560	8	11.7	89.6	16	2
	•	•	560	10	10.5	89.6	16	2
	•	•	820	10	12.4	131.2	16	1
	•	•	1500	10	16.5	240.0	16	1
25	•		33	5	5.8	8.3	14	80
	•	•	56	5.8	5.8	14.0	14	50
	•	•	100	6.3	7.7	25.0	14	30
	•	•	220	8	10.5	55.0	14	27
	•	•	270	8	11.7	67.5	14	25
	•	•	330	10	10.5	82.5	14	20
	•	•	470	10	12.4	117.5	14	16
	•	•	560	10	16.5	140.0	14	11
35	•		22	5	5.8	7.7	12	100
	•	•	27	6.3	5.8	9.5	12	60
	•	•	47	6.3	5.8	16.5	12	60
	•	•	68	6.3	7.7	23.8	12	35
	•	•	100	8	10.5	35.0	12	27
	•	•	150	8	10.5	52.5	12	27
	•	•	180	8	11.7	63.0	12	25
	•	•	270	10	10.5	94.5	12	20
	•	•	330	10	12.4	115.5	12	17
	•	•	470	10	16.5	164.5	12	11

see description at end of standard ratings

Capton_Ver. 001 – 03/31/2020 2 Document Number: AA series

For further information please contact sales@capxon.org


CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

DIMENSIONS PACKAGE • All dimensions in mm

ø D	L	A	B	C	W	P±0.2
10	10.5	10.5	10.5	11.2	0.7 to 1.1	4.5

MULTIPLIER K_F for RIPPLE CURRENT vs. FREQUENCY

Frequency [Hz]	60	120	300	400	500	1k	3k	10k	50k	100k	300k
K_F	-	0.1	0.1	0.1	0.1	0.3	0.3	0.6	0.6	1	1

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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 links in the table.

General Precautions & Guidelines	Packaging Information	Vibration Test Profiles	3D Models

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.

Capton products are designed and manufactured according to severe quality and safety standards. Under no circumstance, Capton warrants that any Capton product is suitable for the purposes intended for your application, even Capton knows the application. It is customer's duty and obligation to check and make sure that Capton products are suitable for the purposes intended and select the correct and proper Capton 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 Capton 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.

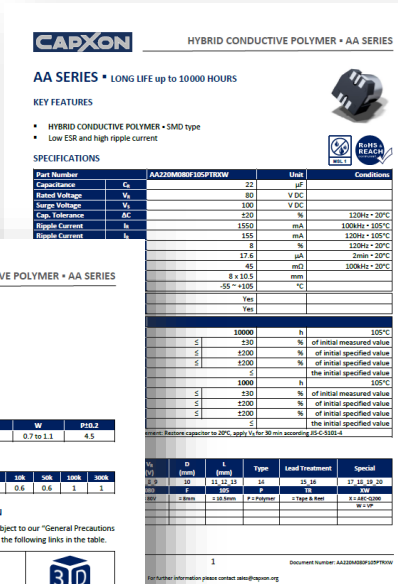
For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

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

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

Capton_Ver. 001 – 31/05/2020 2 Document Number: AA220M080P105PTRXW

For further information please contact sales@capxon.org


CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

AA SERIES • LONG LIFE up to 10000 HOURS

KEY FEATURES

- **HYBRID CONDUCTIVE POLYMER** • SMD type
- Low ESR and high ripple current

SPECIFICATIONS

Part Number		AA220M080P105PTRXW	Unit	Conditions
Capacitance	C_R	22	µF	
Rated Voltage	V_R	80	V DC	
Surge Voltage	V_S	100	V DC	
Cap. Tolerance	ΔC	±20	%	120Hz • 20°C
Ripple Current	I_R	1550	mA	100kHz • 105°C
Ripple Current	I_R	155	mA	120Hz • 105°C
		8	%	120Hz • 20°C
		17.6	µA	2min • 20°C
		45	mΩ	100kHz • 20°C
		8 x 10.5	mm	
		-55 ~ +105	°C	
		Yes		
		Yes		
		10000	h	105°C
	≤	±30	%	of initial measured value
	≤	±200	%	of initial specified value
	≤	±200	%	of initial specified value
	≤			the initial specified value
		1000	h	105°C
	≤	±30	%	of initial measured value
	≤	±200	%	of initial specified value
	≤	±200	%	of initial specified value
	≤			the initial specified value

rement: Restore capacitor to 20°C, apply V_R for 30 min according JIS-C-5101-4

	D (mm)	L (mm)	Type	Lead Treatment	Special
	10	11_12_13	16	15_16	17_18_19_20
	F	105	P	TR	XW
0mV	± 0.5mm	± 0.5mm	P = Polymer	= Tape & Reel	X = ø6~ø10MI W = VP

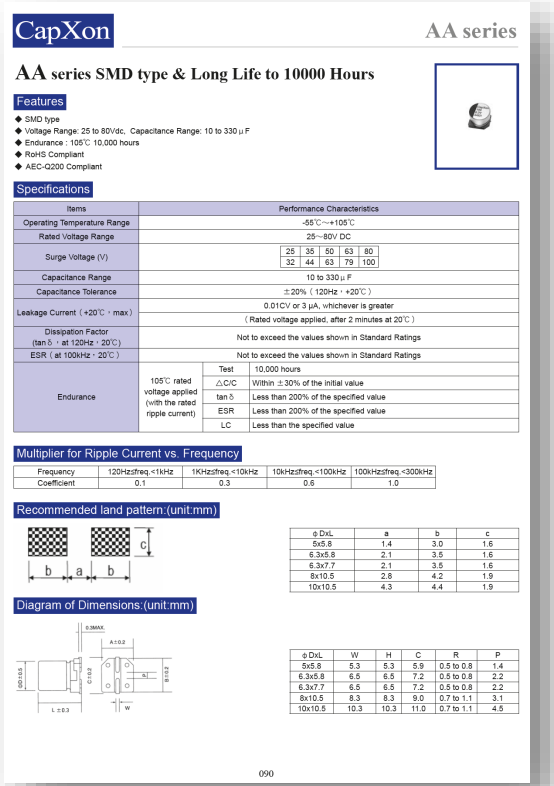
1 Document Number: AA220M080P105PTRXW

For further information please contact sales@capxon.org

CAPXON

New Datasheet Structure

Old datasheet



CapXon

AA series

AA series SMD type & Long Life to 10000 Hours

Features

- SMD type
- Voltage Range: 25 to 80Vdc, Capacitance Range: 10 to 330 μ F
- Endurance : 105℃ 10,000 hours
- RoHS Compliant
- AEC-Q200 Compliant

Specifications

Items	Performance Characteristics		
Operating Temperature Range	-55℃~+105℃		
Rated Voltage Range	25~80V DC		
Surge Voltage (V)	25 35 50 63 80 32 44 63 79 100		
Capacitance Range	10 to 330 μ F		
Capacitance Tolerance	±20% (120Hz・+20℃)		
Leakage Current (+20℃・max)	0.01CV or 3 μA, whichever is greater (Rated voltage applied, after 2 minutes at 20℃)		
Dissipation Factor (tan δ・at 120Hz・20℃)	Not to exceed the values shown in Standard Ratings		
ESR (at 100kHz・20℃)	Not to exceed the values shown in Standard Ratings		
Endurance	105℃ rated voltage applied (with the rated ripple current)	Test	10,000 hours
		△C/C	Within ±30% of the initial value
		tan δ	Less than 200% of the specified value
		ESR	Less than 200% of the specified value
		LC	Less than the specified value

Multiplier for Ripple Current vs. Frequency

Frequency	120Hz≤freq.<1kHz	1KHz≤freq.<10kHz	10kHz≤freq.<100kHz	100kHz≤freq.<300kHz
Coefficient	0.1	0.3	0.6	1.0

Recommended land pattern:(unit:mm)

φDxL	a	b	c
5x5.8	1.4	3.0	1.6
6.3x5.8	2.1	3.5	1.6
6.3x7.7	2.1	3.5	1.6
8x10.5	2.8	4.2	1.9
10x10.5	4.3	4.4	1.9

Diagram of Dimensions:(unit:mm)

φDxL	W	H	C	R	P
5x5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3x5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3x7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8x10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
10x10.5	10.3	10.3	11.0	0.7 to 1.1	4.5

090

New datasheet

Uniform CapXon logo (color / position / size) on all documents

Technology description

Key features represented with symbols

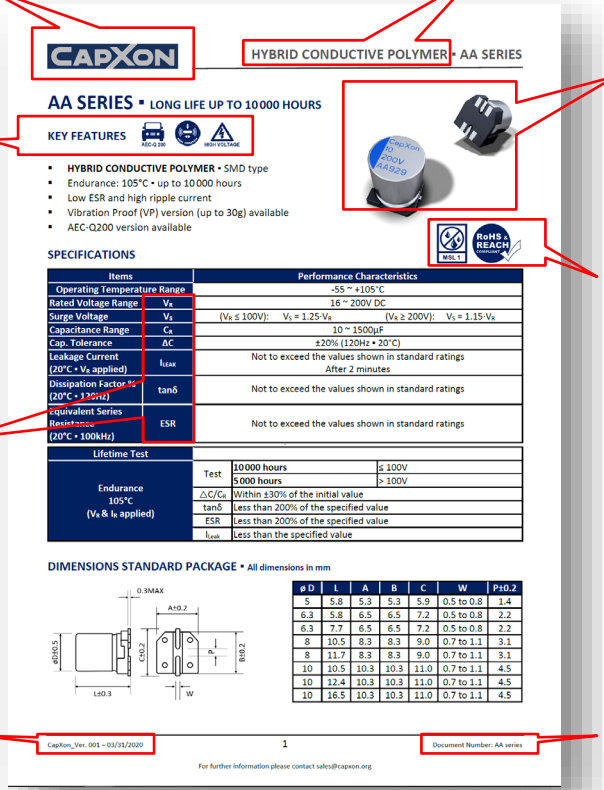
Professional illustration

Moisture sensivity level as well as REACh and RoHS compliance

Fixed definition of the technical terms

Data sheet edition revision number and document date

Document title



CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

AA SERIES • LONG LIFE UP TO 10000 HOURS

KEY FEATURES

- **HYBRID CONDUCTIVE POLYMER** • SMD type
- Endurance: 105°C • up to 10000 hours
- Low ESR and high ripple current
- Vibration Proof (VP) version (up to 30g) available
- AEC-Q200 version available

SPECIFICATIONS

Items		Performance Characteristics
Operating Temperature Range		-55 ~ +105°C
Rated Voltage Range	V_R	16 ~ 200V DC
Surge Voltage	V_S	($V_R \le 100V$): $V_S = 1.25 \cdot V_R$ ($V_R \ge 200V$): $V_S = 1.15 \cdot V_R$
Capacitance Range	C_R	10 ~ 1500μF
Cap. Tolerance	ΔC	±20% (120Hz • 20°C)
Leakage Current (20°C • V_R applied)	I_{LEAK}	Not to exceed the values shown in standard ratings After 2 minutes
Dissipation Factor (20°C • 120Hz)	tanδ	Not to exceed the values shown in standard ratings
Equivalent Series Resistance (20°C • 100kHz)	ESR	Not to exceed the values shown in standard ratings

Lifetime Test			
Endurance 105°C (V_R & I_R applied)	Test	10000 hours	≤ 100V
		5000 hours	> 100V
	△C/C_R	Within ±30% of the initial value	
	tanδ	Less than 200% of the specified value	
	ESR	Less than 200% of the specified value	
	I_{Leak}	Less than the specified value	

DIMENSIONS STANDARD PACKAGE • All dimensions in mm

ø D	L	A	B	C	W	P±0.2
5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.8	6.5	6.5	7.2	0.5 to 0.8	2.2
6.3	7.7	6.5	6.5	7.2	0.5 to 0.8	2.2
8	10.5	8.3	8.3	9.0	0.7 to 1.1	3.1
8	11.7	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.5	10.3	10.3	11.0	0.7 to 1.1	4.5
10	12.4	10.3	10.3	11.0	0.7 to 1.1	4.5
10	16.5	10.3	10.3	11.0	0.7 to 1.1	4.5

CapXon_Ver. 001 – 03/31/2020

1

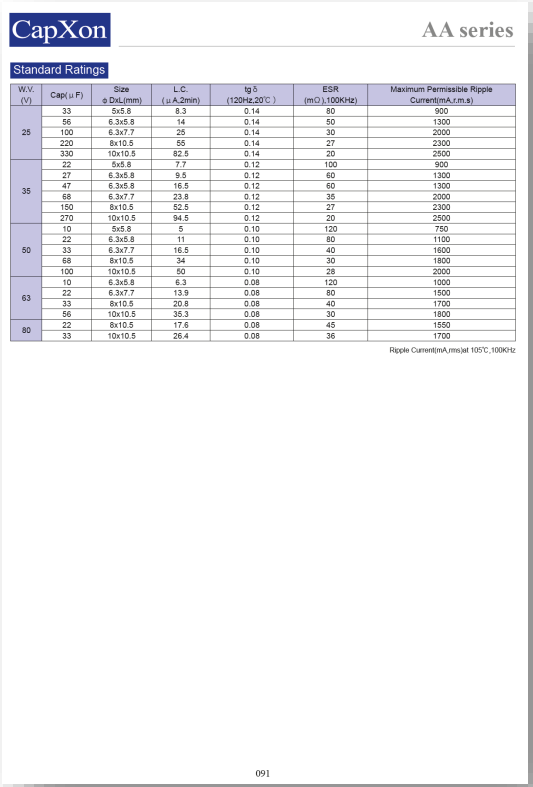
Document Number: AA series

For further information please contact sales@capxon.org

CAPXON

New Datasheet Structure

Old datasheet



CapXon

AA series

Standard Ratings

W.V. (V)	Cap(μF)	Size φ DxL(mm)	L.C. (μA,2min)	tgδ (120Hz,20℃)	ESR (mΩ),100KHz)	Maximum Permissible Ripple Current(mA,r.m.s)
25	33	5x5.8	8.3	0.14	80	900
	56	6.3x5.8	14	0.14	50	1300
	100	6.3x7.7	25	0.14	30	2000
	220	8x10.5	55	0.14	27	2300
	330	10x10.5	82.5	0.14	20	2500
35	22	5x5.8	7.7	0.12	100	900
	27	6.3x5.8	9.5	0.12	60	1300
	47	6.3x5.8	16.5	0.12	60	1300
	68	6.3x7.7	23.8	0.12	35	2000
	150	8x10.5	52.5	0.12	27	2300
	270	10x10.5	94.5	0.12	20	2500
50	10	5x5.8	5	0.10	120	750
	22	6.3x5.8	11	0.10	80	1100
	33	6.3x7.7	16.5	0.10	40	1600
	68	8x10.5	34	0.10	30	1800
	100	10x10.5	50	0.10	28	2000
63	10	6.3x5.8	6.3	0.08	120	1000
	22	6.3x7.7	13.9	0.08	80	1500
	33	8x10.5	20.8	0.08	40	1700
	56	10x10.5	35.3	0.08	30	1800
80	22	8x10.5	17.6	0.08	45	1550
	33	10x10.5	26.4	0.08	36	1700

Ripple Current(mA,rms)at 105℃, 100KHz

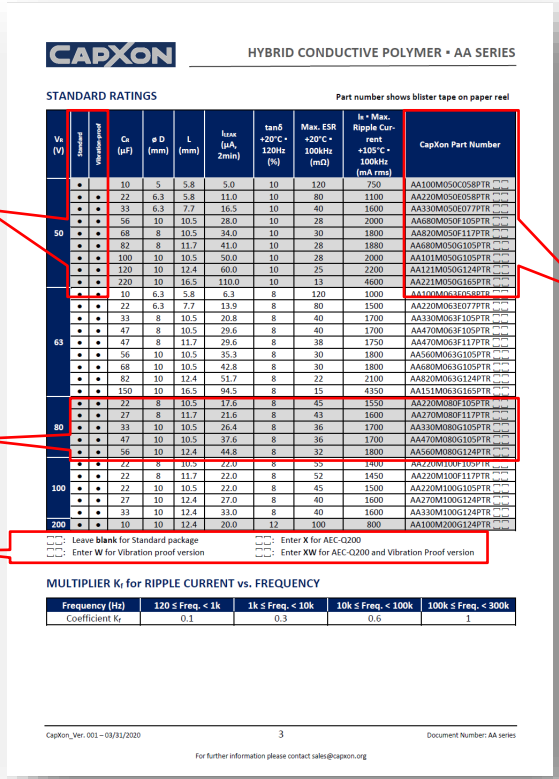
091

New datasheet

shows availability of standard and/or vibration-proof version

Different shading makes it easier to differentiate between voltages

[ ] [ ] Explanation of the available variants



CAPXON

HYBRID CONDUCTIVE POLYMER • AA SERIES

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Standard	Vibration-proof	C_R (μF)	ø D (mm)	L (mm)	I_{LEAK} (μA, 2min)	tanδ +20°C • 120Hz (%)	Max. ESR +20°C • 100kHz (mΩ)	I_R = Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
50	●		10	5	5.8	5.0	10	120	750	AA100M050C058PTR [ ] [ ]
	●	●	22	6.3	5.8	11.0	10	80	1100	AA220M050E058PTR [ ] [ ]
	●	●	33	6.3	7.7	16.5	10	40	1600	AA330M050E077PTR [ ] [ ]
	●	●	56	10	10.5	28.0	10	28	2000	AA680M050F105PTR [ ] [ ]
	●	●	68	8	10.5	34.0	10	30	1800	AA820M050F117PTR [ ] [ ]
	●	●	82	8	11.7	41.0	10	28	1880	AA680M050G105PTR [ ] [ ]
	●	●	100	10	10.5	50.0	10	28	2000	AA101M050G105PTR [ ] [ ]
	●	●	120	10	12.4	60.0	10	25	2200	AA121M050G124PTR [ ] [ ]
	●	●	220	10	16.5	110.0	10	13	4600	AA221M050G165PTR [ ] [ ]
63	●		10	6.3	5.8	6.3	8	120	1000	AA100M063E058PTR [ ] [ ]
	●	●	22	6.3	7.7	13.9	8	80	1500	AA220M063E077PTR [ ] [ ]
	●	●	33	8	10.5	20.8	8	40	1700	AA330M063F105PTR [ ] [ ]
	●	●	47	8	10.5	29.6	8	40	1700	AA470M063F105PTR [ ] [ ]
	●	●	47	8	11.7	29.6	8	38	1750	AA470M063F117PTR [ ] [ ]
	●	●	56	10	10.5	35.3	8	30	1800	AA560M063G105PTR [ ] [ ]
	●	●	68	10	10.5	42.8	8	30	1800	AA680M063G105PTR [ ] [ ]
	●	●	82	10	12.4	51.7	8	22	2100	AA820M063G124PTR [ ] [ ]
	●	●	150	10	16.5	94.5	8	15	4350	AA151M063G165PTR [ ] [ ]
80	●	●	22	8	10.5	17.6	8	45	1550	AA220M080F105PTR [ ] [ ]
	●	●	27	8	11.7	21.6	8	43	1600	AA270M080F117PTR [ ] [ ]
	●	●	33	10	10.5	26.4	8	36	1700	AA330M080G105PTR [ ] [ ]
	●	●	47	10	10.5	37.6	8	36	1700	AA470M080G105PTR [ ] [ ]
	●	●	56	10	12.4	44.8	8	32	1800	AA560M080G124PTR [ ] [ ]
100	●	●	22	8	10.5	22.0	8	55	1400	AA220M100F105PTR [ ] [ ]
	●	●	22	8	11.7	22.0	8	52	1450	AA220M100F117PTR [ ] [ ]
	●	●	22	10	10.5	22.0	8	45	1500	AA220M100G105PTR [ ] [ ]
	●	●	27	10	12.4	27.0	8	40	1600	AA270M100G124PTR [ ] [ ]
	●	●	33	10	12.4	33.0	8	40	1600	AA330M100G124PTR [ ] [ ]
200	●	●	10	10	12.4	20.0	12	100	800	AA100M200G124PTR [ ] [ ]

[ ] [ ]: Leave **blank** for Standard package
[ ] [ ]: Enter **W** for Vibration proof version
[ ] [ ]: Enter **X** for AEC-Q200
[ ] [ ]: Enter **XW** for AEC-Q200 and Vibration Proof version

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

Frequency (Hz)	120 ≤ Freq. < 1k	1k ≤ Freq. < 10k	10k ≤ Freq. < 100k	100k ≤ Freq. < 300k
Coefficient K_f	0.1	0.3	0.6	1

CapXon_Ver. 001 – 03/31/2020 3 Document Number: AA series

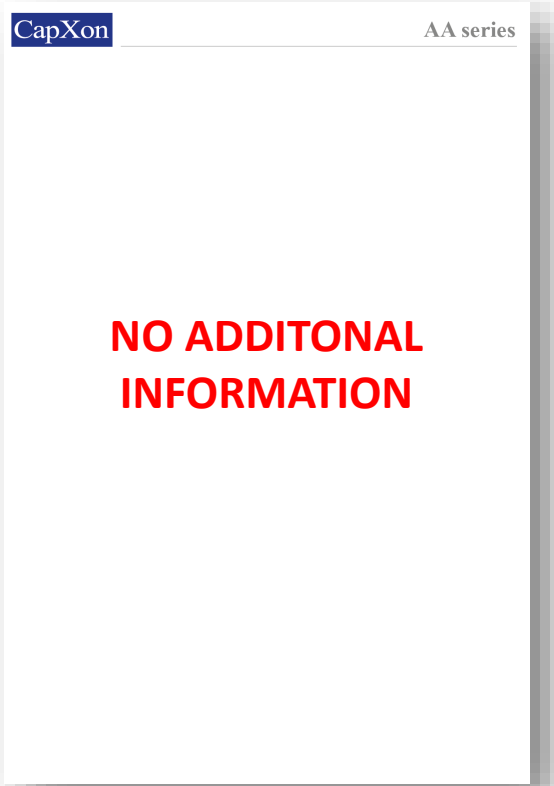
For further information please contact sales@capxon.org

CapXon partnumber to each individual item

CAPXON

New Datasheet Structure

Old datasheet

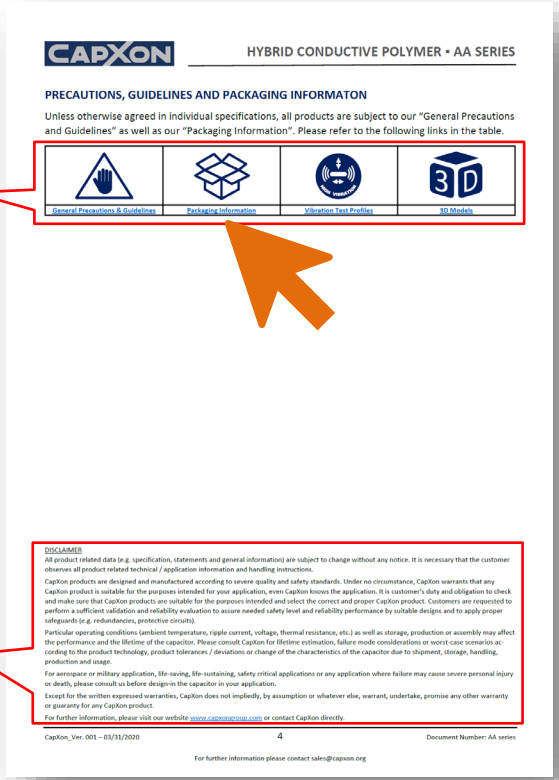


New datasheet

Further information on packaging, processing, soldering profiles, vibration profiles, 3D models and more

Online version with link to **CapXon Website landing page**

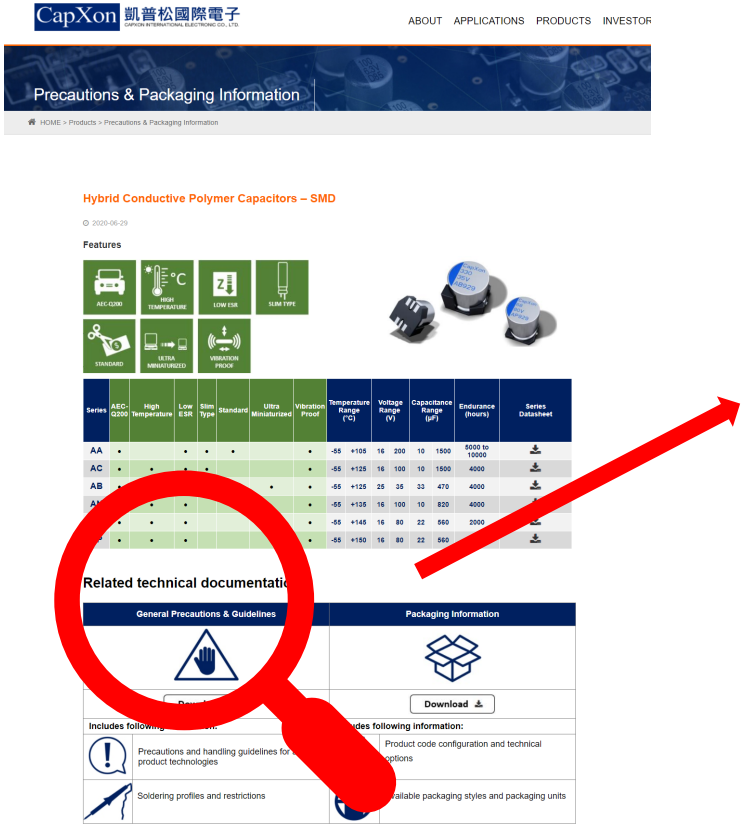
Catalogue version by naming the correct page



Disclaimer to exclude and limit breaches of duty of care, warranty rights or other breaches of duty

CAPXON

Website ▪ Landing Page



Related technical documentation

General Precautions & Guidelines	Packaging Information
Download	Download
Includes following information:	**Includes following information:**
Precautions and handling guidelines for all product technologies	Product code configuration and technical options
Soldering profiles and restrictions	Available packaging styles and packaging units

Vibration Specification	3D - Models
Download	Download
Includes following information:	**Includes following information:**
Vibration Test Profiles	Library of 3D STP-files

CapXon

Precautions & Guidelines

Relat…chnical documen…

General Precautions & Guidelines	Packaging Information
Download	Download
Includes following information:	Includes following information:
…utions and handling guides …chnologies	Product code configuration and technical options
Soldering profiles and restrictions	Available packaging styles and packaging units

Vibration Specification	3D - Models
Download	
Includes following information:	Includes following in…
Vibration Test Profiles	Li…

For all technologies

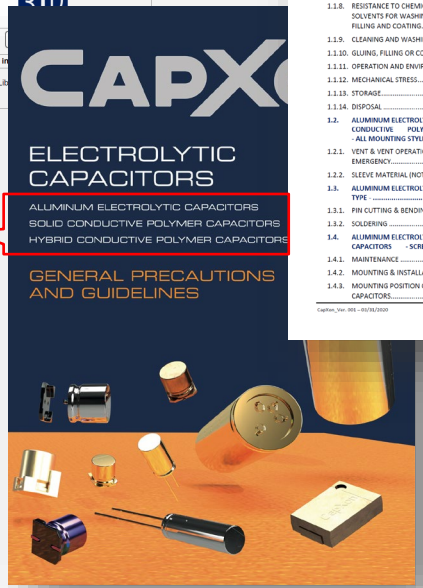
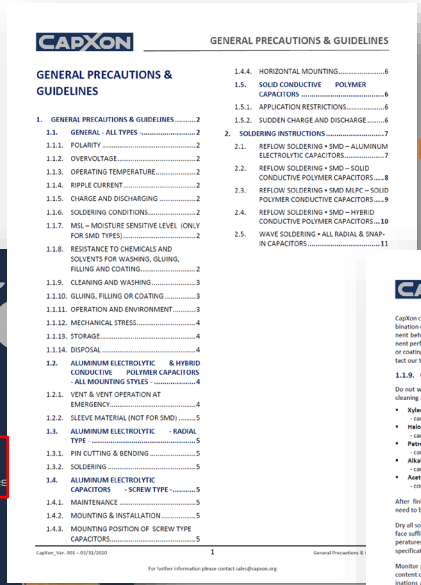


Table of contents



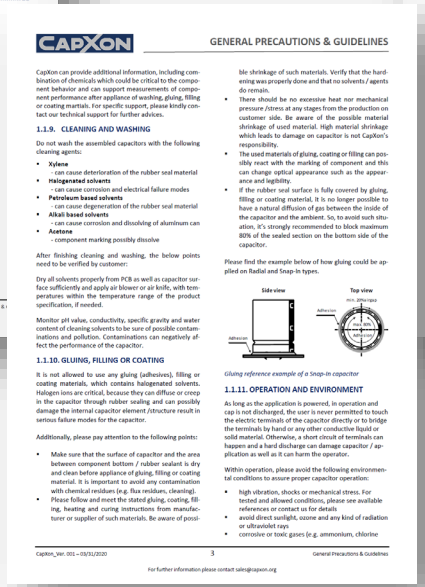
CAPXON — GENERAL PRECAUTIONS & GUIDELINES

GENERAL PRECAUTIONS & GUIDELINES

CapXon_Var. 001 – 03/31/2020 1 General Precautions & G…

For further information please contact sales@capxon.org

Guidelines & handling instructions



CAPXON — GENERAL PRECAUTIONS & GUIDELINES

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 martials. 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 possible 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.

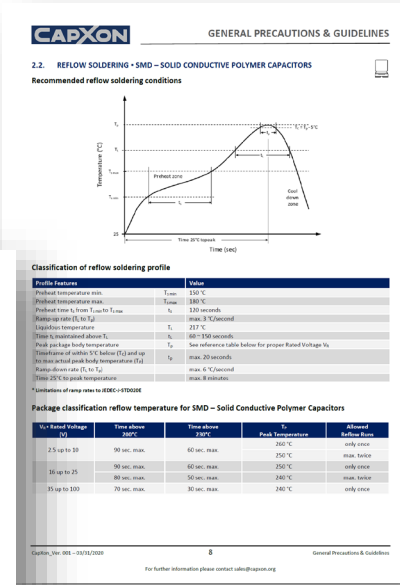
Within operation, please avoid the following environmental conditions to assure proper capacitor operation:

- 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

CapXon_Var. 001 – 03/31/2020 3 General Precautions & Guidelines

For further information please contact sales@capxon.org

Soldering profiles



CAPXON — GENERAL PRECAUTIONS & GUIDELINES

2.2. REFLOW SOLDERING • SMD – SOLID CONDUCTIVE POLYMER CAPACITORS

Recommended reflow soldering conditions

Classification of reflow soldering profile

Profile Features		Value
Preheat temperature min.	T_{smin}	150 °C
Preheat temperature max.	T_{smax}	180 °C
Preheat time t_s from T_{smin} to T_{smax}	t_s	120 seconds
Ramp-up rate (T_L to T_p)		max. 3 °C/second
Liquidous temperature	T_L	217 °C
Time t_L maintained above T_L	t_L	60 – 150 seconds
Peak package body temperature	T_p	See reference table below for proper Rated Voltage V_R
Time/frame of within 5°C below (T_C) and up to max actual peak body temperature (T_p)	t_p	max. 20 seconds
Ramp-down rate (T_L to T_p)		max. 6 °C/second
Time 25°C to peak temperature		max. 8 minutes

* Limitations of ramp rates to JEDEC-J-STD020E

Package classification reflow temperature for SMD – Solid Conductive Polymer Capacitors

V_R • Rated Voltage (V)	Time above 260°C	Time above 230°C	T_C Peak Temperature	Allowed Reflow Runs
2.5 up to 10	90 sec. max.	60 sec. max.	260 °C	only once
		250 °C	max. twice	
16 up to 25	90 sec. max.	60 sec. max.	250 °C	only once
	80 sec. max.	50 sec. max.	240 °C	max. twice
35 up to 100	70 sec. max.	30 sec. max.	240 °C	only once

CapXon_Var. 001 – 03/31/2020 8 General Precautions & Guidelines

For further information please contact sales@capxon.org

CAPXON

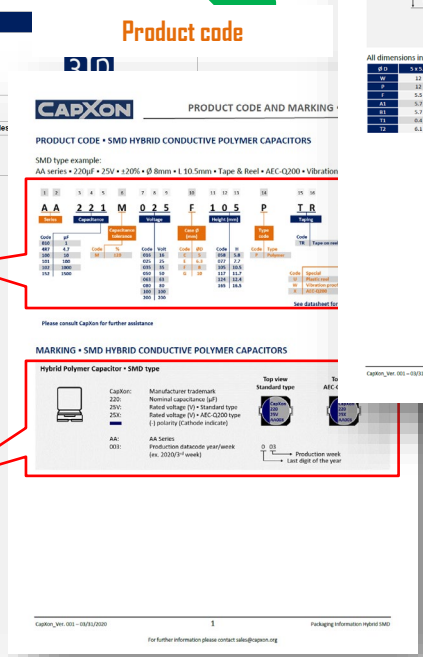
Packaging information

Related technical documentation

General Precautions & Guidelines	Packaging Information
Download	Download
Includes following information:	Includes following information:
Precautions and handling guidelines for all product technologies	Product code configuration and tech
Soldering profiles and restrictions	Available packaging styles and packaging u

Vibration Specification
Download
Includes following information:
Vibration Test Profiles

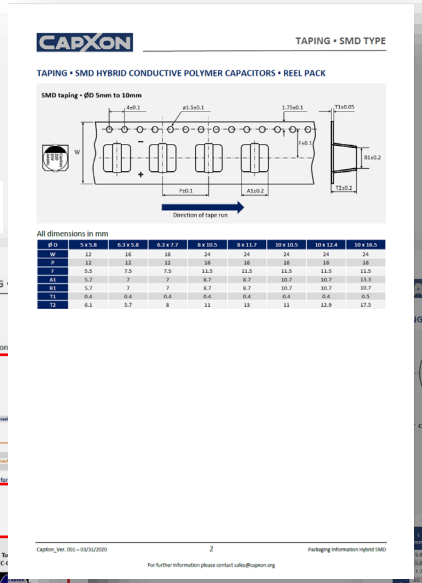
Product code



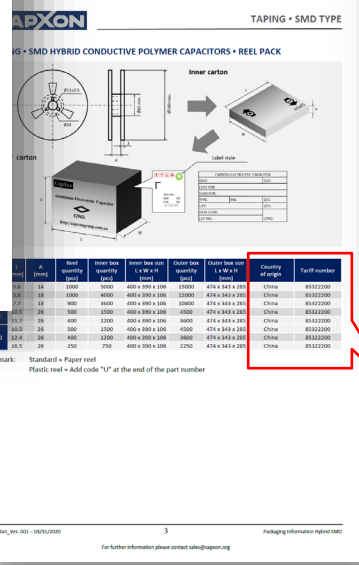
Part number system for the individual technologie and package style e.g. SMD Hybrid Polymer

Explanation of product marking as well as standard and automotive product

Tape dimensions

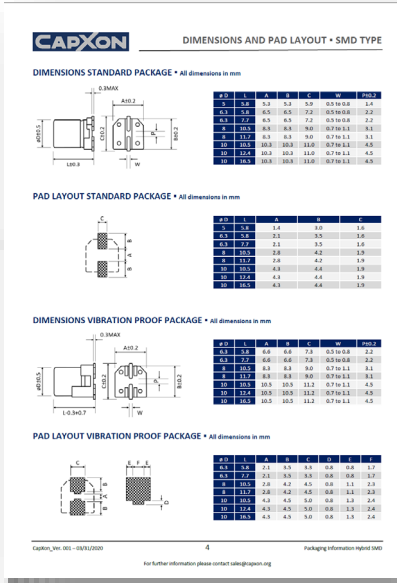


Reel dimensions and MOQ



Country of origin and tariff number

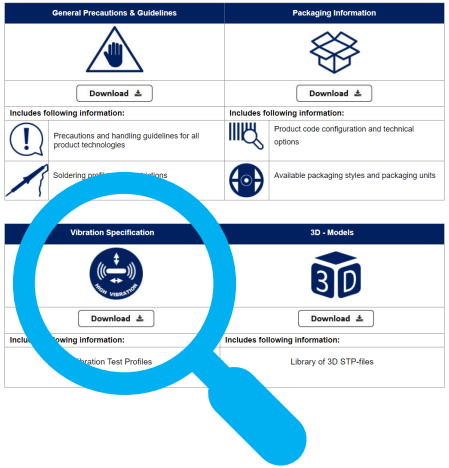
Dimensions and pad layout



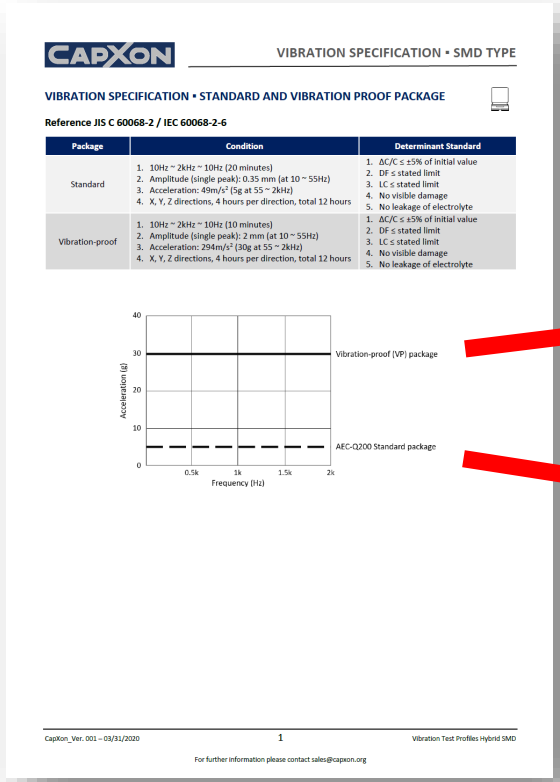
CAPXON

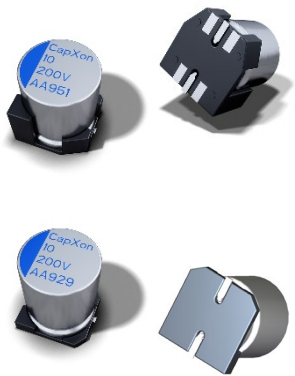
Vibration specification

Related technical documentation



Acceleration graph for standard and vibration-proof package according JIS C 60068-2 / IEC 60068-2



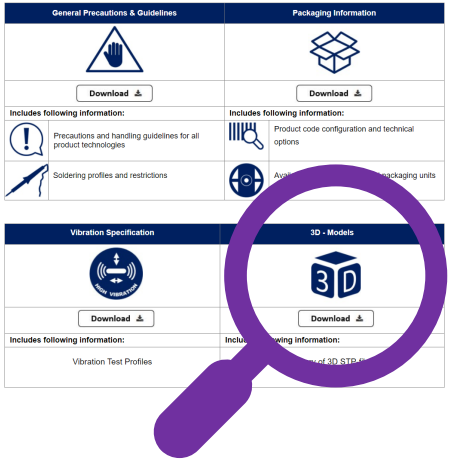


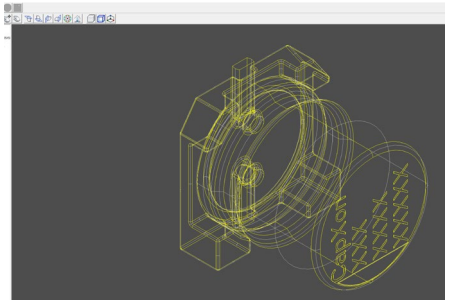
3D-Models

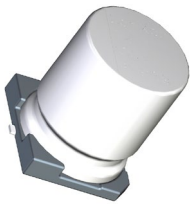
3D modeling is the process of developing a mathematical representation of any surface of an object (either inanimate or living) in three dimensions via specialized software

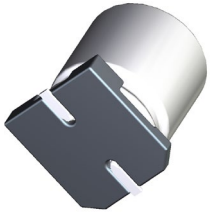
The product is called a 3D model

Related technical documentation









Zip-file with all step files for different dimensions

Name	Typ	Komprimierte Größe	Kennwortges...	Größe	Verhältnis	Änderungsdatum
Hybrid Polymer_SMD_5x5.8	Step File	178 KB	Nein	920 KB	81%	04.06.2020 06:29
Hybrid Polymer_SMD_6.3x5.8	Step File	182 KB	Nein	914 KB	81%	04.06.2020 06:29
Hybrid Polymer_SMD_6.3x7.7	Step File	183 KB	Nein	917 KB	81%	04.06.2020 06:29
Hybrid Polymer_SMD_8x10.5	Step File	152 KB	Nein	790 KB	81%	04.06.2020 06:29
Hybrid Polymer_SMD_8x11.7	Step File	153 KB	Nein	791 KB	81%	04.06.2020 06:29
Hybrid Polymer_SMD_10x10.5	Step File	219 KB	Nein	1.081 KB	80%	04.06.2020 06:29
Hybrid Polymer_SMD_10x12.4	Step File	219 KB	Nein	1.081 KB	80%	04.06.2020 06:29
Hybrid Polymer_SMD_10x16.5	Step File	218 KB	Nein	1.078 KB	80%	04.06.2020 06:29

CAPXON

Technical Terms

Old catalog

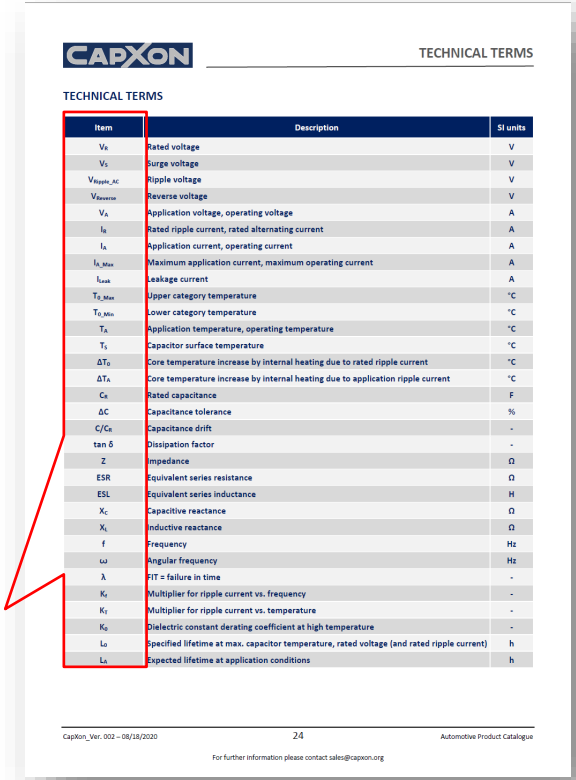
CapXon

NO TECHNICAL TERMS

Fixed definition of all technical terms in accordance with international guidelines and designations

For example:
I_R instead of RC for Rated Ripple Current
I_{LEAK} instead of LC for Leakage Current
tanδ instead of DF for the Dissipation Factor
...
...

New catalog



CAPXON TECHNICAL TERMS

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_{O_Max}	Upper category temperature	°C
T_{O_Min}	Lower category temperature	°C
T_A	Application temperature, operating temperature	°C
T_S	Capacitor surface temperature	°C
ΔT_O	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 δ	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_D	Dielectric constant derating coefficient at high temperature	-
L_O	Specified lifetime at max. capacitor temperature, rated voltage (and rated ripple current)	h
L_A	Expected lifetime at application conditions	h

CapXon_Ver. 002 – 08/18/2020 24 Automotive Product Catalogue

For further information please contact sales@capxon.org

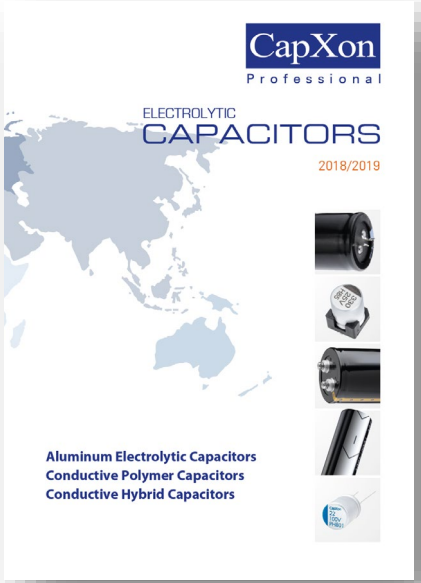
CAPXON

CapXon

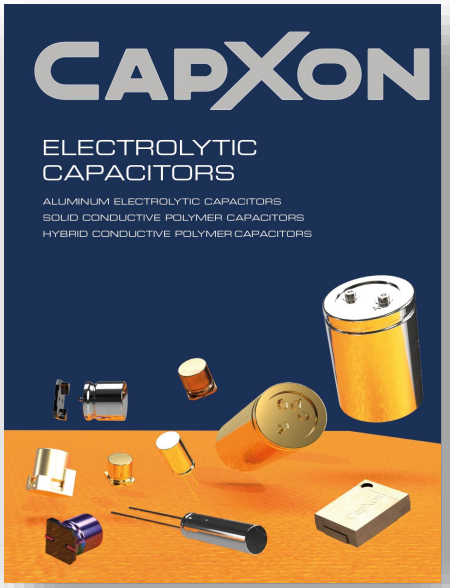
Catalogs

New Catalog Structure

Old catalog

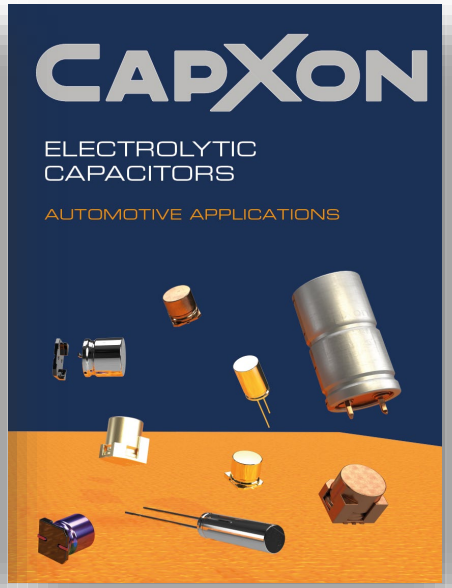


New catalogs
Divided into application areas



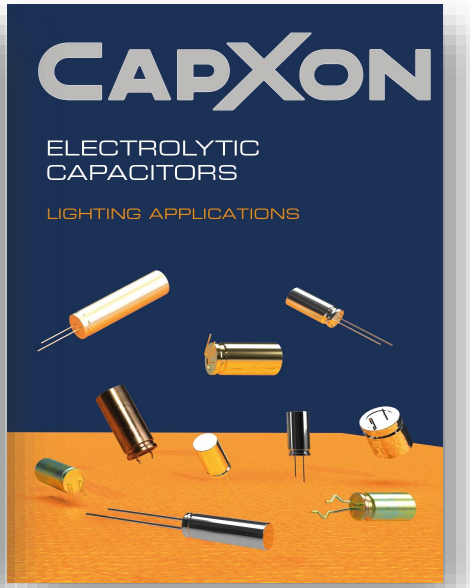
105 Product Series

Covers full Product Range



31 Product Series

All AEC-Q200 qualified



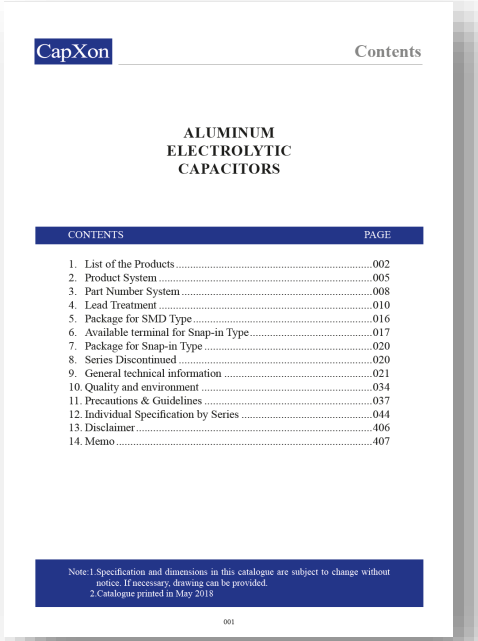
13 Product Series

Lighting & Photo Flash Specials

CAPXON

New Catalog Structure

Old catalog


CapXon

Contents

ALUMINUM ELECTROLYTIC CAPACITORS

CONTENTS PAGE

1. List of the Products 002
2. Product System 005
3. Part Number System 008
4. Lead Treatment 010
5. Package for SMD Type 016
6. Available terminal for Snap-in Type 017
7. Package for Snap-in Type 020
8. Series Discontinued 020
9. General technical information 021
10. Quality and environment 034
11. Precautions & Guidelines 037
12. Individual Specification by Series 044
13. Disclaimer 406
14. Memo 407

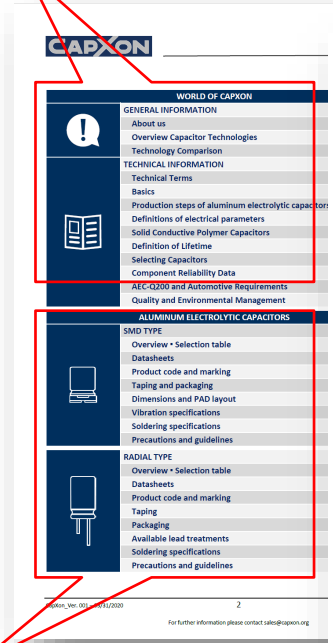
Note:1.Specification and dimensions in this catalogue are subject to change without notice. If necessary, drawing can be provided.
2.Catalogue printed in May 2018

001

Information to CapXon and our technologies

New catalogs

Divided in product technologies


CAPXON

WORLD OF CAPXON

GENERAL INFORMATION
- About us
- Overview Capacitor Technologies
- Technology Comparison

TECHNICAL INFORMATION
- Technical Terms
- Basics
- Production steps of aluminum electrolytic capacitors
- Definitions of electrical parameters
- Solid Conductive Polymer Capacitors
- Definition of Lifetime
- Selecting Capacitors
- Component Reliability Data
- AEC-Q200 and Automotive Requirements
- Quality and Environmental Management

ALUMINUM ELECTROLYTIC CAPACITORS

SMD TYPE
- Overview • Selection table
- Datasheets
- Product code and marking
- Taping and packaging
- Dimensions and PAD layout
- Vibration specifications
- Soldering specifications
- Precautions and guidelines

RADIAL TYPE
- Overview • Selection table
- Datasheets
- Product code and marking
- Taping
- Packaging
- Available lead treatments
- Soldering specifications
- Precautions and guidelines

CapXon_Ver. 001 – 03/31/2020 2

For further information please contact sales@capxon.org


CAPXON

CONTENT

ALUMINUM ELECTROLYTIC CAPACITORS

SNAP-IN TYPE
- Overview • Selection table
- Datasheets
- Product code and marking
- Packaging
- Available terminals
- Vibration specifications
- Soldering specifications
- Precautions and guidelines

SCREW TERMINAL TYPE
- Overview • Selection table
- Datasheets
- Product code and marking
- Dimensions and available terminals
- Packaging
- Accessories
- Precautions and guidelines

SOLID CONDUCTIVE POLYMER CAPACITORS

STACKED TYPE
- Overview • Selection table
- Datasheets
- Product code and marking
- Taping and packaging
- Dimensions and PAD layout
- Soldering specifications
- Precautions and guidelines

SMD TYPE
- Overview • Selection table
- Datasheets
- Product code and marking
- Taping and packaging
- Dimensions and PAD layout
- Soldering specifications
- Precautions and guidelines

CapXon_Ver. 001 – 03/31/2020 3 Main

For further information please contact sales@capxon.org


CAPXON

CONTENT

SOLID CONDUCTIVE POLYMER CAPACITORS	Page
RADIAL TYPE	
Overview • Selection table	710
Datasheets	739
Product code and marking	786
Taping	787
Packaging	789
Available lead treatments	793
Soldering specifications	794
Precautions and guidelines	795

HYBRID CONDUCTIVE POLYMER CAPACITORS	Page
SMD TYPE	
Overview • Selection table	799
Datasheets	800
Product code and marking	836
Taping and packaging	837
Dimensions and PAD layout	839
Vibration specifications	840
Soldering specifications	841
Precautions and guidelines	849
RADIAL TYPE	
Overview • Selection table	799
Datasheets	821
Product code and marking	842
Taping	843
Packaging	844
Available lead treatments	847
Soldering specifications	848
Precautions and guidelines	849

CapXon_Ver. 001 – 03/31/2020 4 Main Product Catalogue

For further information please contact sales@capxon.org

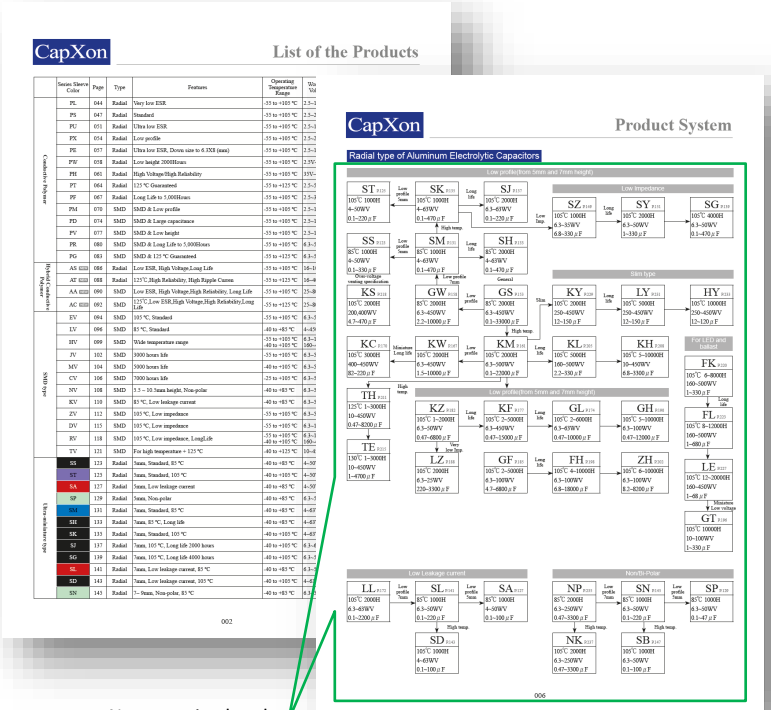
Clear structure with product symbols and different colors

- Aluminum Electrolytic
- Solid Conductive Polymer
- Hybrid Conductive Polymer

CAPXON

New Catalog Structure

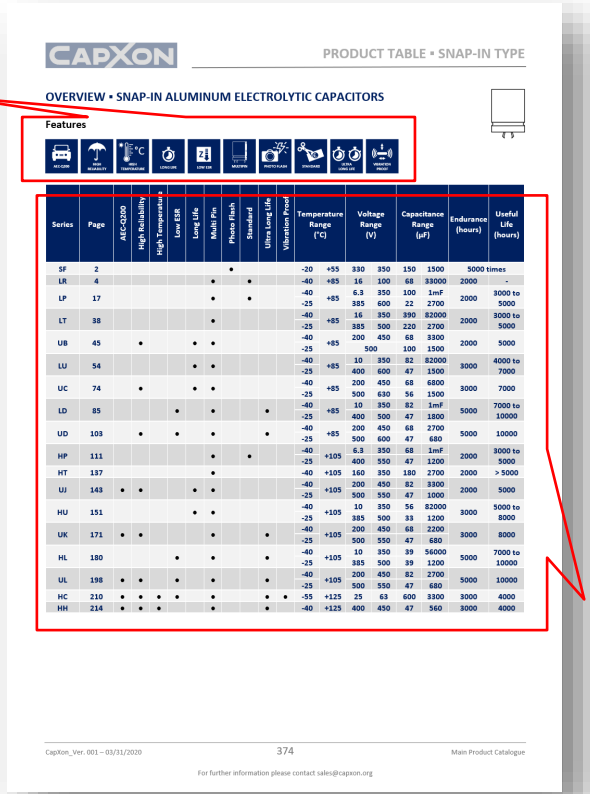
Old catalog



Not organized and totally confusing

New catalogs

Symbols shows the product features

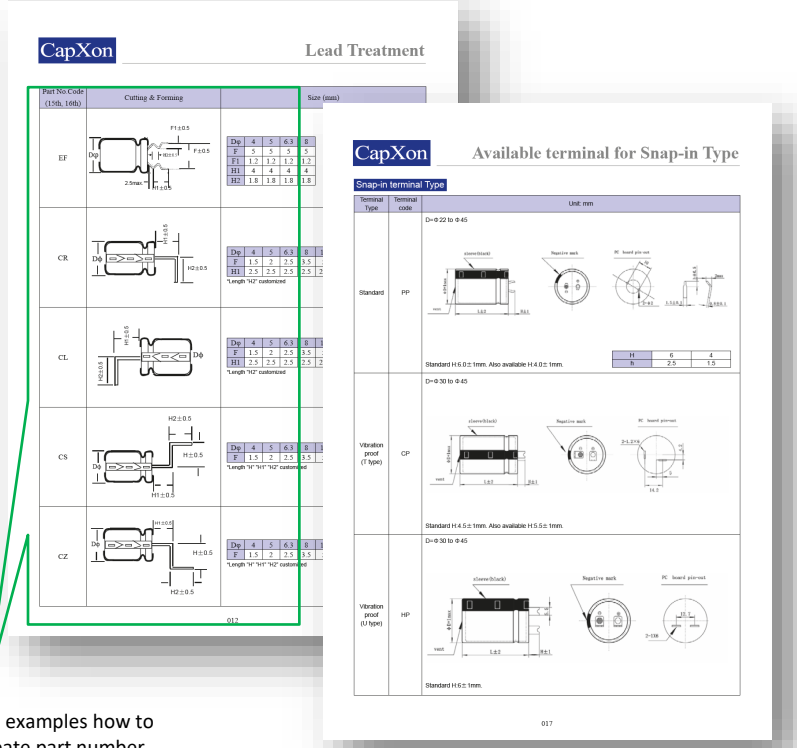


Clear structure and simple to choose the right product

CAPXON

New Catalog Structure

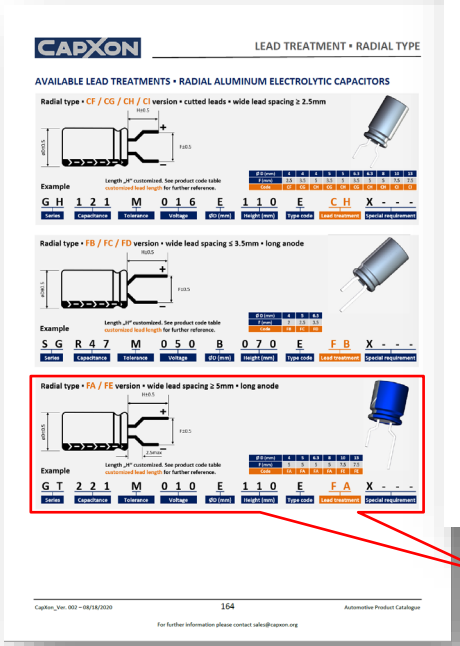
Old catalog

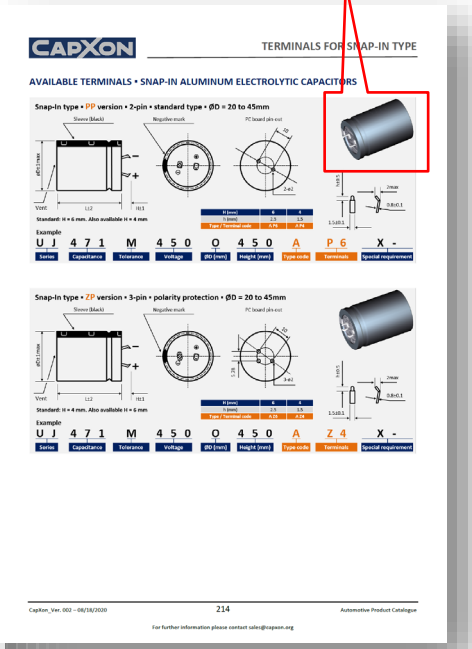


No examples how to create part number

New catalogs

3D drawing for a better understanding of the variant





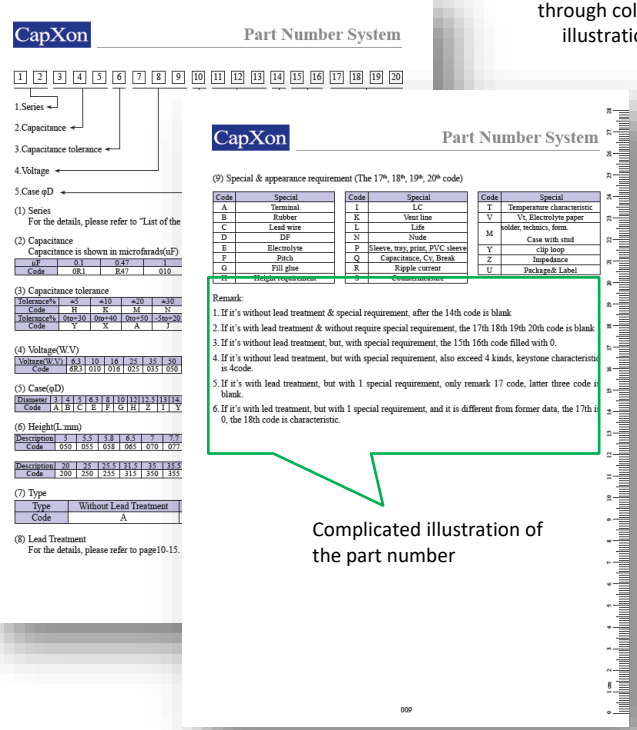
An example of the part number for each individual style

CAPXON

New Catalog Structure

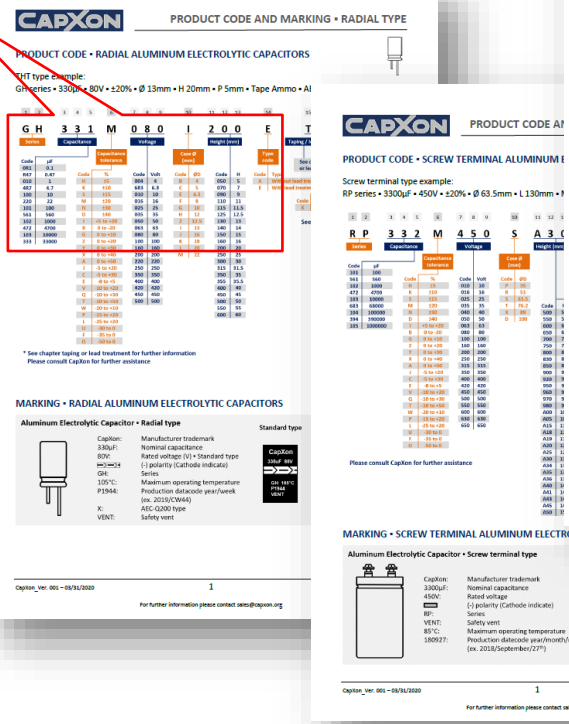
Old catalog

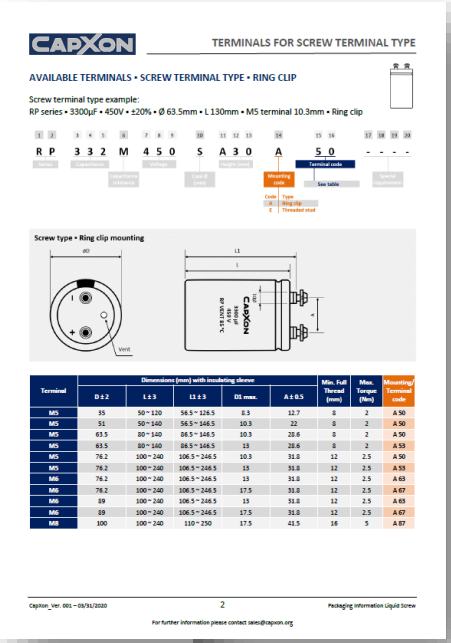
Clear separation of the areas through color illustration



Complicated illustration of the part number

New catalogs





CapXon

New Catalog Structure

Old catalog

CapXon

New catalogs

Brief introduction

CAPXON — ABOUT US

10 FACTS ABOUT CAPXON

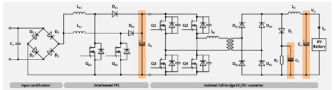
- Founded 1980 by Victor Lin
- Family owned and independent
- 2500 professional employees
- ISO9001, ISO14001 and IATF 16949 certified
- Belongs to the TOP 10 manufacturers in e-caps
- Established in Taipei Taiwan
- PATENTED

Application examples

CAPXON — APPLICATION EXAMPLES

EV ON BOARD CHARGER (OBC)

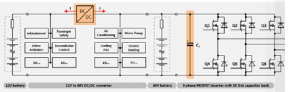
Example of an EV On Board Charger with 2 channel interleaved Power Factor Correction (PFC) and isolated full bridge DC/DC converter with recommended products.



Designation	Circuit	Purpose	Specification	Series	Part Number
C_{DC}	Interleaved PFC	Inductor ripple current filtering	150µF; 450V; 105°C; Radial; 12000h D18xL50+mm; 1.07rAp@12kHz	FL	FL151M450E500AX
C_{PFC}	Interleaved PFC	Inductor ripple current filtering	680µF; 450V; 105°C; Snap-In ; 10000h D35xL30mm; 2.54Ap@10kHz	UL	UL681M450P500APEK
C_{X}	Full-bridge DC/DC	Clamp voltage ringing filtering	3.3µF; 450V; 105°C; ±20%; 8000h D8xL16mm; 0.154Ap@10kHz	FL	FL3R3M450F160AX
C_{BL}	Full-bridge DC/DC	Low pass filtering	33µF; 450V; 105°C; Radial; 12000h D18xL25mm; 1.1Ap@100kHz	KH	KH330M450J250AX

12V TO 48V BOARD NET SYSTEM • 3-PHASE INVERTER CIRCUIT

Example of a dual battery system 12V / 48V combined with 48V electric motors in mild hybrid cars with recommended products for the DC link capacitor bank.



Designation	Circuit	Purpose	Specification	Series	Part Number
C_{12}	DC link bank	Energy coupling	150µF; 63V; 105°C; SMD; 10000h D10xL10.5mm; 4.35Ap@100kHz	AA	AA151M
C_{48}	DC link bank	Energy coupling	150µF; 63V; 125°C; SMD; 10000h D16xL16.5mm; 3.5Ap@100kHz	AA	AC151M

Reliabilty facts

CAPXON — RELIABILITY TESTS • AEC-Q200

RELIABILITY TESTS • AEC-Q200

As a prerequisite for being active in the supply chain of automobile manufacturers or their suppliers, compliance with the reliability standard AEC-Q200 (for passive components) and the quality standards according to IATF 16949 for zero defect quality are necessary. CapXon performs all reliability tests in its ISO/IEC 17025: 2005 accredited laboratory.

Endurance, useful life and temperature stress tests

Humidity bias, electrical characterization and temperature cycling tests

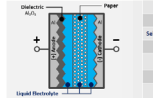
Technology overview

CAPXON

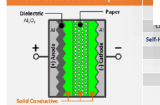
A WORLD OF ELECTROLYTIC CAPACITOR

CapXon's know-how in Electrolytic Capacitors covers tec… Conductive Polymers and the combination known as Hyb…

Aluminum Electrolytic

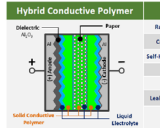


Solid Conductive Polymer



Solid Conductive Polymer	
Self-Healing of Dielectric	No
ESR	Ultra-low ESR at high frequency
Stability	Stable for low and high temperature
Lifetime	Very stable and long life - no dry out
Reliability	Only internal standard qualification

Hybrid Conductive Polymer



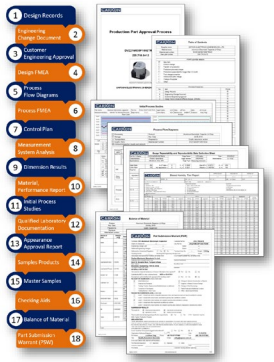
Hybrid Conductive Polymer	Description	Features
Rated Voltage • V_R		16 VDC to 400 VDC
Cathode Material		Solid Conductive Polymer & Liquid Electrolyte
Self-Healing of Dielectric		Yes
ESR		Very low ESR at high frequency
Stability		Even more stable than liquid type
Leakage Current • I_{LEAK}		Lower leakage current than Solid Conductive Polymer Type
Reliability		Automotive AEC-Q200 qualified

PPAP

CAPXON — PPAP

PPAP • PRODUCTION PART APPROVAL PROCESS

The **Production Part Approval Process** (PPAP) is a documented and standardized sampling procedure for series products in the automotive sector. The PPAP is part of the APQP requirements from the IATF 16949 and shows that CapXon can permanently produce, electrolytic capacitors under the requirements and specifications, specified by the customer.

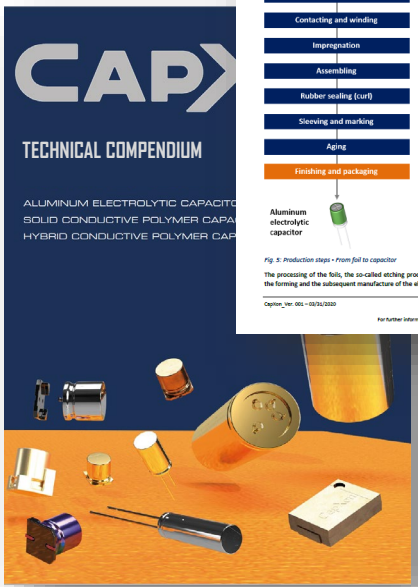


CapXon

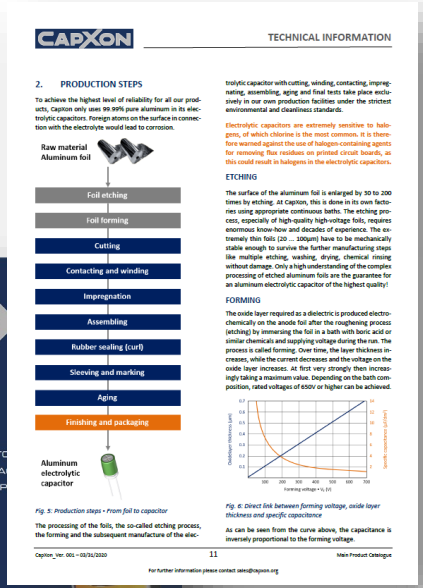
CapXon

Application Notes

Technical Compendium

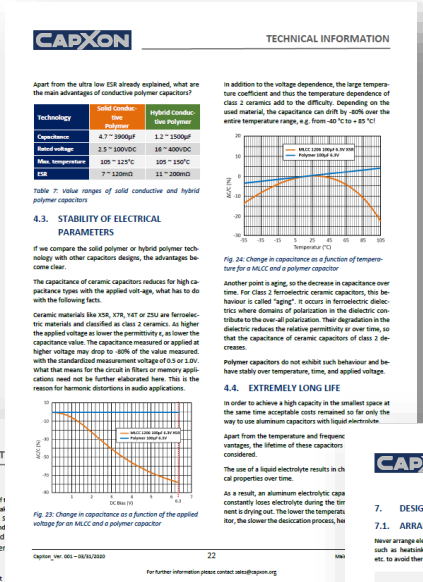


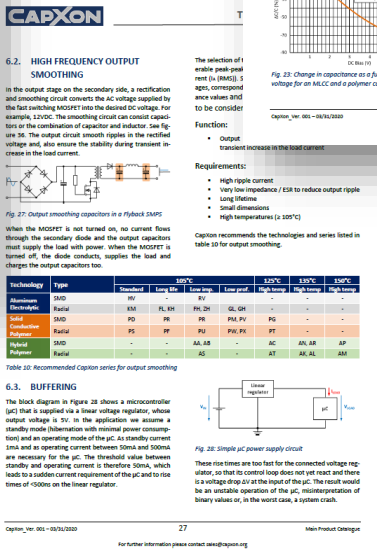
Production steps



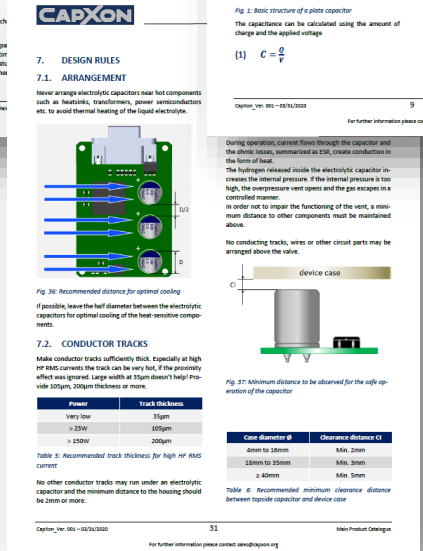
Capacitor selection

Electrical parameters

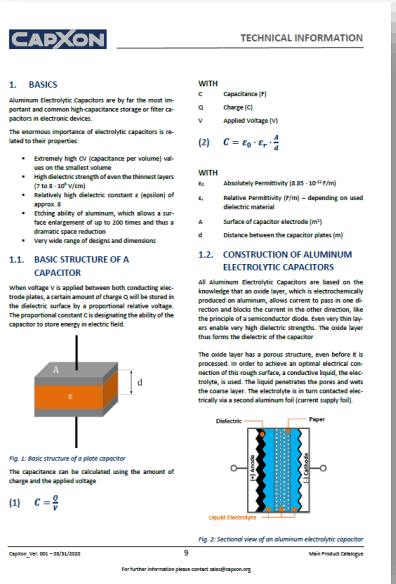




Design rules



Basics



CAPXON

Lifetime Compendium

Table of Content

CAPXON — CONTENT

CONTENT

For further information please contact sales@capxon.org

Calculation base

CAPXON — LIFETIME COMPENDIUM

For all CapXon high-performance series ≤ 100V, see table 1

(8) $I_A = I_0 \cdot K_{Temp} \cdot K_{Ripple} = I_0 \cdot 2^{\frac{T_{R,Max} - T_A}{10°C}} \cdot 2^{\frac{\Delta T_R - \Delta T_A}{5°C}}$

WITH

K_{Ripple} Ripple current influence

ΔT_R Core temperature rise (°C) by internal heating due to the rated ripple current

ΔT_A Core temperature rise (° C) by internal heating due to the application current

Upper capacitor temperature T_R	85°C	105°C	115°C	≥ 125°C
Temperature rise ΔT_R	10°C	5°C	5°C	5°C

Table 6: Maximum permissible core temperature rise due to the permissible rated alternating current

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

HIGH VOLTAGE

Unlike the low voltage electrolytic capacitors, as described in the previous chapter, in e-cap series with ≥ 160V another factor influencing the life-time is added - the operating voltage V_A applied to the electrolytic capacitor. If V_A is lower than the nominal voltage of the capacitor V_R, the thermal stress on its dielectric decreases, which in turn leads to an extension of the service life. For all cases V_A between 80% to 100% of V_R take directly V_R and if V_A lower than 80% of V_R take for calculations V_A=0.8*V_R.

K_{Ripple}	$K_{Voltage}$	Product Type		CapXon series
$2^{\frac{\Delta T_R - \Delta T_A}{8°C}}$	$\left(\frac{V_R}{V_A}\right)^{4.4} \cdot K_F$	Radial		FK, FL, GS (≥ 160V), HY, KC, KF (≥ 160V), KH (≥ 160V), KL, KM (≥ 160V), KS, KY, LE, LY, TE (≥ 160V), TH (≥ 160V)
		Snap-in		HH, HL (≥ 160V), HP (≥ 160V), HT, HU (≥ 160V), LD (≥ 160V), LP (≥ 160V), LT (≥ 160V), LU (≥ 160V), UB, UC, UD, UJ, UK, UL
		Screw terminal		RG, RH, RL, RM, RP, RU, RX

Table 7: Influence of the application current and the application voltage on CapXon high-voltage series

K_{Ripple}	$K_{Voltage}$	Product Type		CapXon series
$2^{\frac{\Delta T_R - \Delta T_A}{8°C}}$	$\left(\frac{V_R}{V_A}\right)^{2.5}$	Radial		FF, FR, FS, FT, FU, FW, FX

Table 8: Influence of the application current and application voltage on CapXon high voltage series for use in lig…

For further information please contact sales@capxon.org

CAPXON

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

Like all electronic components, electrolytic capacitors are not ideal components, but have losses that give off in the form of heat under load. For all electronic components, the cooler the component, the longer the expected lifetime.

For e-caps the ohmic losses are grouped under the term "ESR" for Equivalent Series Resistance. These include the ohmic losses resulting from the terminals of the capacitor, the contact connections of the terminals, the contact resistance of the electrode contacting and the dielectric losses, also referred to as dissipation factor tan δ.

(2) $P_V = I_A^2 \cdot ESR$

WITH

P_V Internal power losses (W)

I_A Ripple current flowing in the capacitor (A RMS)

ESR Equivalent series resistance (Ω)

(3) $P_T =$

WITH

P_T Thermal

ΔT_A Core tem… due to t…

R_{th} Thermal … (K/W)

β Radiation coefficient (W/cm² K)

A Surface of the capacitor (cm²)

(4) $\Delta T_A = \frac{I_A^2 \cdot ESR}{\beta \cdot A}$

DETERMINATION OF THE CORE TEMPERATURE INCREASE ΔT_A

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

This can be done in different ways

a.) 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.

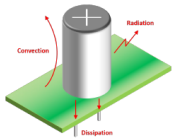


Fig. 3: Thermal output of the e-cap via convection, radiation and dissipation

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

If the thermal power P_V is now equal to the internal power losses P_V, the temperature increase caused by the alternating current flowing in the capacitor and in which heat generation and dissipation are in equilibrium can be determined.

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

For further information please contact sales@capxon.org

CAPXON — LIFETIME COMPENDIUM

The first step is to calculate the equivalent 120Hz values for the two application currents I_{A1} and I_{A2} as well the resulting RMS value I_{Total_RMS}.

WITH

(15) $I_{Equ} = \frac{I_A}{K_f}$

(16) $I_{Total\_RMS} = \sqrt{I_{Equ,1}^2 + I_{Equ,2}^2 + \dots + I_{Equ,n}^2}$

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

Frequency [Hz]	50 (60)	120	300	1k	≥ 3k
Ripple current correction factor K_f	0.8	1	1.2	1.3	1.4

Table 20: Ripple current correction factor for the CapXon RH series

Equiv. 120Hz current 1: $I_{Equ,1} = \frac{204}{1} = 204$

Equiv. 120Hz current 2: $I_{Equ,2} = \frac{144}{1.4} = 11.44$

RMS value: $I_{Total\_RMS} = \sqrt{(204)^2 + (11.44)^2} = 23.4$

In the second step, the ripple current ratio I_A/I_R can be calculated with

Ripple current ratio: $\frac{I_{Total\_RMS}}{I_R} = \frac{23.4}{12.8} = 2.5$

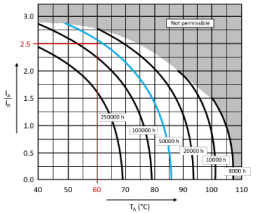


Fig. 9: Nomogram for the CapXon RH series with intersection point for the application example

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.

For further information please contact sales@capxon.org

Graphical estimation

CAPXON

CALCULATION EXAMPLE - OUTPUT FILTER

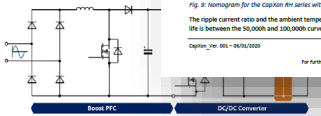


Fig. 7: Principal diagram for switching mode power supply with active PFC and galvanically isolated output

Output voltage: 24V
Expected life: 10 years = 87,600h
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		Stop / Standby	
Duration t_{Mode_1}: 300 s		Duration t_{Mode_2}: 180 s		Duration t_{Stop} and $t_{Standby}$: 120 s	
Ambient temperature T_A: 70°C		Ambient temperature T_A: 70°C		Ambient temperature T_A: 45°C	
Frequency f	I (RMS)	Frequency f	I (RMS)	Frequency f	I (RMS)
10kHz	1.5A	10kHz	1.8A	1kHz	0.05A
50kHz	1A	50kHz	1.2A		
120kHz	0.8A	120kHz	0.9A		
300kHz	0.6A	300kHz	0.7A		

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

Selected Type: GF561M035G250ETA

Rated capacitance C_R	Rated voltage V_R	Rated current I_R	Dimension Ø x L	Endurance
560µF	35V	2.04A at 100kHz/105°C	10mm x 25mm	5000h at 105°C

Table 17: Main parameter GF561M035G250ETA

For further information please contact sales@capxon.org

Technical background

Application example

CAPXON

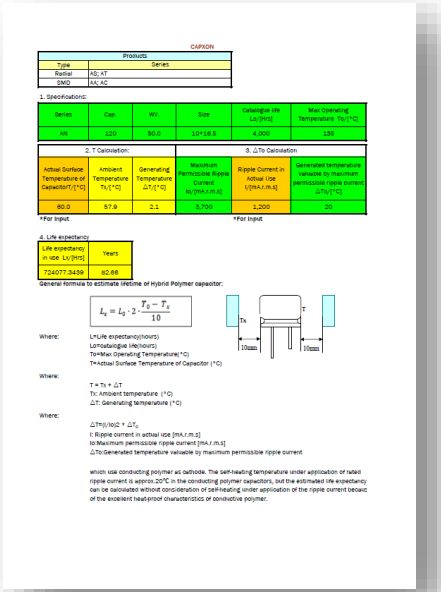
CapXon

CapXon

Lifetime Estimation

The Daily Reality

Hybrid Conductive Polymer



CAPXON

Products	
Type	Series
Radial	AS; AT
SMD	AA; AC

1. Specifications:

Series	Cap.	WV.	Size	Catalogue life Lo:[Hrs]	Max Operating Temperature To:[°C]
AN	120	60.0	10*18.5	4,000	135

2. T Calculation:			3. △To Calculation		
Actual Surface Temperature of Capacitor/T:[°C]	Ambient Temperature Ta:[°C]	Generating Temperature △T:[°C]	Maximum Permissible Ripple Current Io:[mA.r.m.s]	Ripple Current in Actual Use I:[mA.r.m.s]	Generated temperature valuable by maximum permissible ripple current △To:[°C]
60.0	57.9	2.1	8,700	1,200	20

*For Input *For Input

4. Life expectancy:

Life expectancy in use Lx:[Hrs]	Years
724077.3439	82.66

General formula to estimate lifetime of Hybrid Polymer capacitor:

$$L_x = L_0 \cdot 2^{\frac{T_0 - T_x}{10}}$$

Where: Lx=Life expectancy(Hours)
Lo=Catalogue Life(hours)
To=Max Operating Temperature(°C)
Tx=Actual Surface Temperature of Capacitor (°C)

Where:

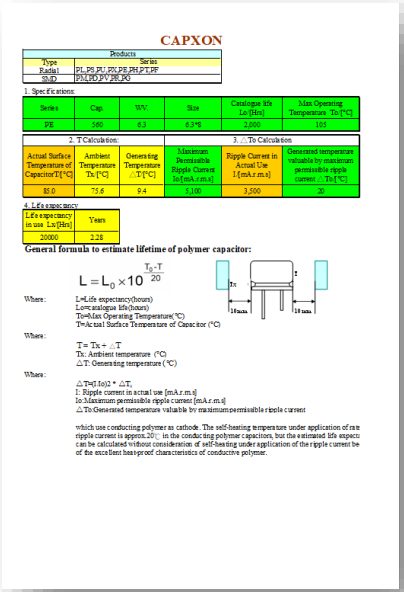
T = Tx + △T
Tx: Ambient temperature (°C)
△T: Generating temperature (°C)

Where:

△To(I/Io)2 * △T
I: Ripple current in actual use [mA.r.m.s]
Io:Maximum permissible ripple current [mA.r.m.s]
△To:Generated temperature valuable by maximum permissible ripple current

which use conducting polymer as cathode. The self-heating temperature under application of rated ripple current is approx.20℃ in the conducting polymer capacitors, but the estimated life expectancy can be calculated without consideration of self-heating under application of the ripple current because of the excellent heat-proof characteristics of conductive polymer.

Solid Conductive Polymer



CAPXON

Products	
Type	Series
Radial	PL,PS,PU,PV,PB,PH,PT,PF
SMD	PM,PD,PP,PR,PQ

1. Specifications:

Series	Cap.	WV.	Size	Catalogue life Lo:[Hrs]	Max Operating Temperature To:[°C]
PE	560	6.3	6.3*8	3,000	105

2. T Calculation:			3. △To Calculation	
Actual Surface Temperature of Capacitor/T:[°C]	Ambient Temperature Ta:[°C]	Generating Temperature △T:[°C]	Maximum Permissible Ripple Current Io:[mA.r.m.s]	Ripple Current in Actual Use I:[mA.r.m.s]	Generated temperature valuable by maximum permissible ripple current △To:[°C]
85.0	75.6	9.4	5,100	3,500	20

4. Life expectancy:

Life expectancy in use Lx:[Hrs]	Years
20000	2.28

General formula to estimate lifetime of polymer capacitor:

$$L = L_0 \times 10^{\frac{T_0 - T}{20}}$$

Where:
L=Life expectancy(hours)
Lo=Catalogue Life(hours)
To=Max.Operating Temperature(°C)
T=Actual Surface Temperature of Capacitor (°C)

Where:

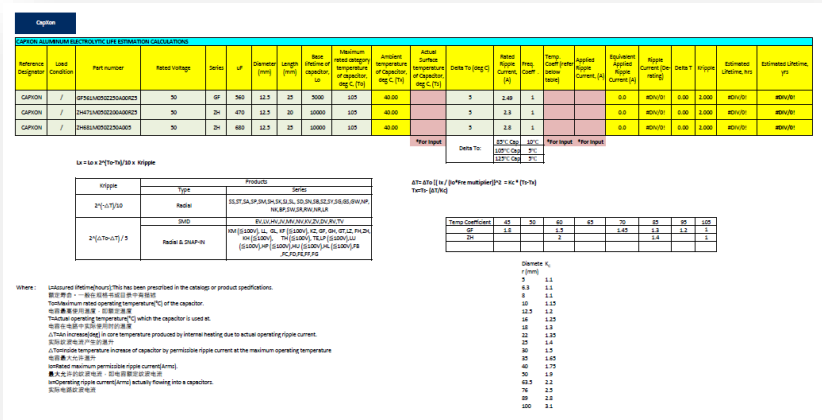
T= Tx + △T
Tx: Ambient temperature (°C)
△T: Generating temperature (°C)

Where:

△To=(Io)2 * △T
I: Ripple current in actual use [mA.r.m.s]
Io:Maximum permissible ripple current [mA.r.m.s]
△To:Generated temperature valuable by maximum permissible ripple current

which use conducting polymer as cathode. The self-heating temperature under application of rate ripple current is approx.20℃ in the conducting polymer capacitors, but the estimated life expectancy can be calculated without consideration of self-heating under application of the ripple current because of the excellent heat-proof characteristics of conductive polymer.

Aluminum Electrolytic



Capxon

CAPXON ALUMINUM ELECTROLYTIC LIFE ESTIMATION CALCULATIONS

Reference Designator	Load Condition	Part number	Rated Voltage	Series	Lif	Diameter (mm)	Length (mm)	Base Lifetime of capacitor, Lo	Maximum rated category temperature of capacitor, deg C, (To)	Ambient temperature of Capacitor deg C, (Ta)	Actual Surface temperature of Capacitor, deg C, (Ts)	Delta To: [deg C]	Rated Ripple Current, (A)	Freq. Coeff.	Temp Coeff (refer below table)	Applied Ripple Current, (A)	Equivalent Applied Ripple Current (A)	Ripple Current (De-rating)	Delta T	Irripple	Estimated Lifetime, hrs	Estimated Lifetime, yrs
CAPXON	/	GF561A0502250A00R25	50	GF	560	12.5	25	5000	105	40.00		5	2.49	1			0.0	#DIV/0!	0.00	2.000	#DIV/0!	#DIV/0!
CAPXON	/	EH471M050220X0A0R25	50	EH	470	12.5	20	10000	105	40.00		5	2.3	1			0.0	#DIV/0!	0.00	2.000	#DIV/0!	#DIV/0!
CAPXON	/	EH681M050250A0R5	50	EH	680	12.5	25	10000	105	40.00		5	2.8	1			0.0	#DIV/0!	0.00	2.000	#DIV/0!	#DIV/0!

*For Input

Delta To:		
	ΔT< Cap	10°C
	10°C< Cap	5°C
	12°C< Cap	5°C

*For Input *For Input

Lx = Lo x 2^[To-Ta)/10 x Kripple

Kripple	
Type	Series
2^[-△T)/10	Radial: SS,ST,SA,SP,SM,SH,SK,SI,SL, SD,SN,SB,SZ,SY,SG,GS,GW,NP, NX,NF,SW,SR,RW,NR,LR
2^[△To-△T) / 5	SMD: EV,LU,HU,VU,MV,HV,ZV,DV,RV,TV; Radial & SNAP-IN: KM [S.100V], LL, GL, KF [S.100V], KZ, GF, GH, GT,LZ, FH,ZH, KH [S.100V], TH [S.100V], TK,LP [S.100V],LU [S.100V],HP [S.100V],HU [S.100V],HL [S.100V],FB ,FC,FD,FE,FF,FG

ΔT= ΔTo [I /Io^Kre multiplier]^2 = Kc * (To-Ta)
To=To- [ΔT/Kc]

Temp Coefficient	45	50	60	65	70	85	95	105
GF	1.8		1.5		1.45	1.3	1.2	1
EH			2			1.4		1

Where : Lx(Assured lifetime(hours):This has been prescribed in the catalogs or product specifications.
額定壽命：一般在規格书或目录中有規定
To=Maximum rated operating temperature(℃) of the capacitor.
电容最高使用温度，即额定温度
Ta:Actual operating temperature(℃) which the capacitor is used at.
电容在电路中实际使用时的温度
△To(or Increase(rise)) in core temperature produced by internal heating due to actual operating ripple current.
实际纹波电流产生的温升
△To=Allow temperature increase of capacitor by permissible ripple current at the maximum operating temperature
电容最大允许温升
Io=Rated maximum permissible ripple current(Arms).
最大允许的纹波电流（即额定纹波电流
Io=Operating ripple current(Arms) actually flowing into a capacitors.
实际电路纹波电流

Diameter K_r	
r [mm]	
5	1.1
6.3	1.1
8	1.1
10	1.15
12.5	1.2
16	1.25
18	1.3
22	1.35
25	1.4
30	1.5
35	1.65
40	1.75
50	1.9
63.5	2.2
76	2.5
89	2.8
100	3.1

CAPXON

Lifetime Estimation

Application parameters

CAPXON — LIFETIME ESTIMATION

SPECIFICATIONS

Part Number		CV470M050F10SETR
Series		CV
Style		SMD
Capacitance	C_R	47 µF
Rated Voltage	V_R	50 V
Diameter	D	8 mm
Length	L	10.5 mm
Lifetime	L_R	7000 h at 105 °C
Ripple Current	I_R	350 mA at 105 °C and 120 Hz

Illustration for illustrative purpose only

APPLICATION CONDITIONS

Description	Operating Time	Application Temp.	Application Current	Frequency	Application Voltage
Ramp	t_1 2000 h	T_{A1} 125 °C	I_{A1} 15 mA	f_1 90000 Hz	V_{A1} 13.0 V
C2	t_2 6000 h	T_{A2} 100 °C	I_{A2} 5 mA	f_2 10 Hz	V_{A2} 12.0 V
Test	t_3 1000 h	T_{A3} 85 °C	I_{A3} 0 mA	f_3 0 Hz	V_{A3} 6.0 V
	t_4	T_{A4}	I_{A4}	f_4	V_{A4}
	t_5	T_{A5}	I_{A5}	f_5	V_{A5}
	t_6	T_{A6}	I_{A6}	f_6	V_{A6}
	t_7	T_{A7}	I_{A7}	f_7	V_{A7}
	t_8	T_{A8}	I_{A8}	f_8	V_{A8}
	t_9	T_{A9}	I_{A9}	f_9	V_{A9}
	t_{10}	T_{A10}	I_{A10}	f_{10}	V_{A10}

TOTAL t_{total} 6000 h

CALCULATION

Pos.	t_x	$T_{x,Max}$	T_x	T_R	ΔT_x	I_x	K_f	f_x	ΔT_{Cx}	V_x	K_{Vapp}	K_{RIPPLE}	$K_{VOLTAGE}$
1	2000 h	105 °C	125 °C	120 °C	3 °C	350 mA	1	10 mA	0 °C	12 V	0	1.00	1.00
2	2000 h	105 °C	100 °C	100 °C	3 °C	250 mA	0.53	3 mA	0 °C	12 V	1	1.00	1.00
3	1000 h	105 °C	85 °C	85 °C	5 °C	150 mA	0.53	0 mA	0 °C	6 V	4	1.00	1.00
4													
5													
6													
7													
8													
9													
10													

RESULT • EXPECTED LIFETIME

Lifetime under application conditions L_x

Total operating conditions L_{total}

Capacitance drift $\Delta C/C_R \geq$ 30% of the initial measured value

Dissipation factor tanδ ≥ 300% of the initial specified value

Leakage current $I_{LWA} \geq$ the initial specified value

ENDURANCE

4049 h = 0.5 y

6000 h = 0.7 y

JUDGMENT **FAIL**

Calculation basics

CAPXON — LIFETIME ESTIMATION

LEGEND

Item	Description	SI units
V_R	Rated voltage of the capacitor	V
t_R	Specified lifetime at max. capacitor temperature and rated voltage	h
L_R	Expected lifetime at application conditions	h
$T_{R,Max}$	Upper category temperature	°C
T_A	Application temperature, operating temperature	°C
T_C	Capacitor surface temperature	°C
ΔT_C	Core temperature increase by internal heating due to rated ripple current (see table page 3)	°C
ΔT_A	Core temperature increase by internal heating due to application ripple current	°C
I_R	Rated ripple current, rated alternating current	A (rms)
K_f	Multiplier for ripple current vs. frequency (see datasheet)	-
I_A	Application current, operating current	A (rms)
V_A	Application voltage	V
K_{VApp}	Temperature influence (Abbreviation in the calculation K_{C1} , K_{C2} ... K_{Cn})	-
K_{RIPPLE}	Ripple current influence (Abbreviation in the calculation K_{R1} , K_{R2} ... K_{Rn})	-
$K_{VOLTAGE}$	Operating voltage influence (Abbreviation in the calculation K_{V1} , K_{V2} ... K_{Vn})	-

CALCULATION BASE

Expected lifetime $L_A = L_R \cdot K_{TEMP} \cdot K_{RIPPLE} \cdot K_{VOLTAGE}$

Temperature influence $K_{TEMP} = 2^{\frac{T_{A,Max} - T_A}{10K}}$

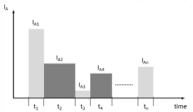
Ripple current influence: See table "Ripple current and voltage influence" on page 3

Voltage influence: See table "Ripple current and voltage influence" on page 3

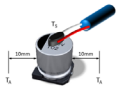
Core temperature increase $\Delta T_A = \Delta T_C \cdot \left(\frac{I_A}{I_R \cdot K_f}\right)^2$

Capacitor surface temperature $T_C = T_A + \Delta T_A$

Expected lifetime $L_A = L_R \cdot \frac{t_{total}}{\frac{t_1}{K_{T1} \cdot K_{R1} \cdot K_{V1}} + \frac{t_2}{K_{T2} \cdot K_{R2} \cdot K_{V2}} + \cdots + \frac{t_n}{K_{Tn} \cdot K_{Rn} \cdot K_{Vn}}}$



Example of alternating triple current in the application



Measurement of T_A and T_A

Calculation basics

CAPXON — LIFETIME ESTIMATION

MAXIMUM CORE TEMPERATURE RISE ΔT_0

Upper category temperature $T_{A,Max}$	85 °C	105 °C	125 °C	≥ 125°C
Core temperature rise ΔT_0	10 °C	5 °C	5 °C	5 °C

RIPPLE CURRENT AND VOLTAGE INFLUENCE

K_{RIPPLE}	$K_{VOLTAGE}$	Product Type	Product CapXon Series
$K_{RIPPLE} = 2^{\frac{\Delta T_A}{10K}}$	-	SMD	CV • DV • EV • HV • JV • KV • LV MV • NV • RV • SV • TV

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 proc related 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 performan 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.

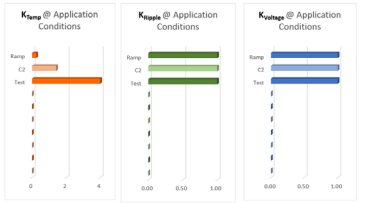
For aerospace or military application, life-saving, life-sustaining, safety-critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

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

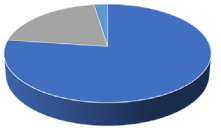
For further information, please visit our website www.capxongroup.com or contact Capxon directly.

Stress mode ratio of expected life

CAPXON — LIFETIME ESTIMATION



Stress Mode Ratio of Expected Life



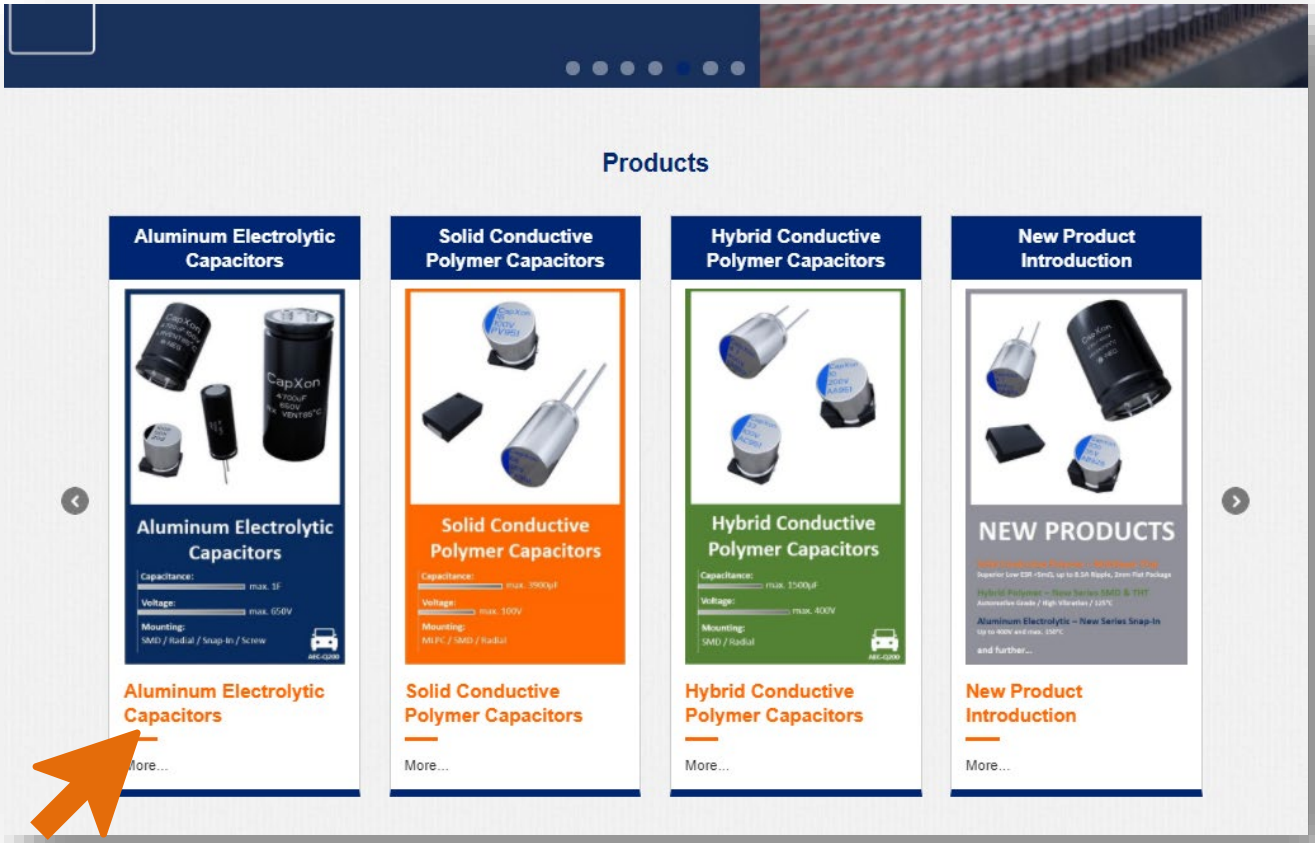
	Life Ratio per Condition	
Ramp	3123 h	77.14%
C2	828 h	20.45%
Test	98 h	2.41%
Sum:	4049 h	100.00%

CAPXON

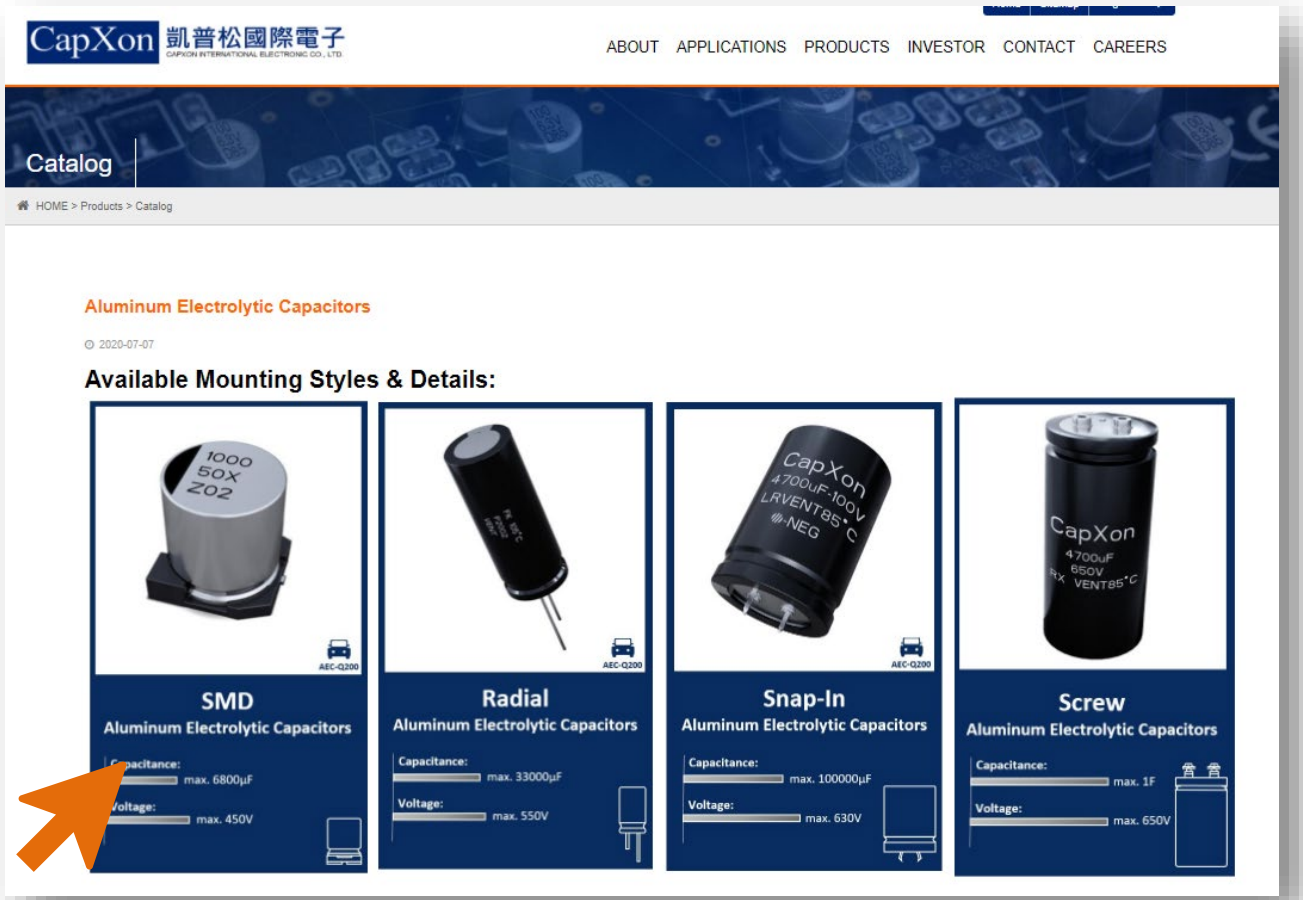
CapXon

Website

Product Overview



Styles

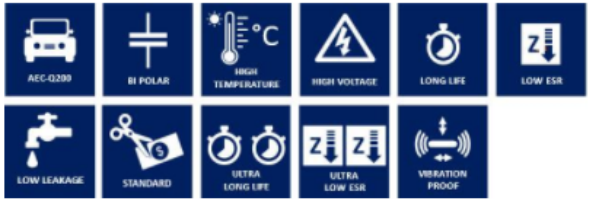

CapXon 凱普松國際電子
ABOUT APPLICATIONS PRODUCTS INVESTOR CONTACT CAREERS
Catalog
HOME > Products > Catalog
Aluminum Electrolytic Capacitors
2020-07-07
Available Mounting Styles & Details:
SMD
Aluminum Electrolytic Capacitors
Capacitance:
max. 6800μF
Voltage:
max. 450V
Radial
Aluminum Electrolytic Capacitors
Capacitance:
max. 33000μF
Voltage:
max. 550V
Snap-In
Aluminum Electrolytic Capacitors
Capacitance:
max. 100000μF
Voltage:
max. 630V
Screw
Aluminum Electrolytic Capacitors
Capacitance:
max. 1F
Voltage:
max. 650V

Selection Table

Aluminum Electrolytic Capacitors – SMD

2020-08-29

Features



Series	AEC-Q200	Bi-Polar	High Temperature	High Voltage	Long Life	Low ESR	Low Leakage	Standard	Ultra Long Life	Ultra Low ESR	Vibration Proof	Temperature Range (°C)		Voltage Range (V)		Capacitance Range (µF)		Endurance (hours)	Series Datasheet
KV							▪					-40	+85	6.3	50	0.1	330	1000	
NV		▪										-40	+85	6.3	50	0.1	560	2000	
LV	▪			▪				▪			▪	-40	+85	4	450	0.1	6800	2000	
EV	▪							▪			▪	-55	+105	6.3	50	0.1	1500	1000	
HV	▪			▪	▪						▪	-55 -40	+105	6.3 160	100 450	0.1 2.2	6800 68	2000	
JV	▪				▪						▪	-55	+105	6.3	50	0.1	1000	3000	
DV	▪					▪					▪	-55	+105	6.3	100	1	6800	2000 to 5000	
RV	▪									▪	▪	-55 -40	+105	6.3 160	100 450	1 2.2	6800 68	2000 to 5000	
MV									▪			-40	+105	6.3	50	0.1	1000	5000	
CV	▪								▪	▪	▪	-40	+105	6.3	50	22	1500	7000	
TV	▪		▪								▪	-40	+125	10	450	1	330	1000 to 2000	

CAPXON

The Result

CAPXON ALUMINUM ELECTROLYTIC CAPACITOR • LV SERIES

LV SERIES • HIGH VOLTAGE, AUTOMOTIVE 85°C TYPE

KEY FEATURES

- ALUMINUM ELECTROLYTIC CAPACITOR • SMD type
- Endurance: 85°C • 2 000 hours
- Low ESR and high ripple current
- Vibration-proof (VP) version (up to 30g) available upon request
- AEC-Q200 version available

SPECIFICATIONS

Items		Performance Characteristics	
Operating Temperature Range		-40 ~ +85°C	
Rated Voltage Range	V_R	4 ~ 100V DC	160 ~ 450V DC
Surge Voltage	V_S	($V_R \leq 315V$): $V_R \times 1.15$ V_R	($V_R > 315V$): $V_R \times 1.10$ V_R
Capacitance Range	C_R	0.1 ~ 6800μF	3.3 ~ 68μF
Cap. Tolerance	ΔC	±20% (120Hz • 20°C)	
Leakage Current (20°C • V_R applied)	I_{LEAK}	≤ 0.01 C_R·V_R or 3μA Whichever is greater • After 2 minutes	≤ 0.04 C_R·V_R + 100μA After 1 minute
		[I_{LEAK} (μA) ; C_R (μF) ; V_R (V)]	

Dissipation Factor % (20°C • 120Hz)	tanδ	V_R (V DC)	4	6.3	10	16	25	35	50	63	80	100	160 ~ 25
		ϕ 4 ~ 6.3	42	30	22	18	16	14	14	12	12	10	–
		ϕ 8 ~ 10	45	34	26	20	16	14	14	12	12	10	15
		≥ ϕ 12.5	45	40	36	24	18	15	14	12	12	10	15

Low Temperature Characteristics at 120Hz	Z ratio max.	V_R (V DC)	4	6.3	10	16	25	35	50	63	80	100	160 ~ 250
		Z-25°C/Z+20°C	7	4	3	2	2	2	2	3	3	3	3
		Z-40°C/Z+20°C	15	8	8	4	4	3	3	4	4	4	6

Lifetime Test		
Endurance 85°C (V_R applied)	Test	2 000 hours
	ΔC/C_R	≤ ±25% of initial measured value
	tanδ	≤ 200% of initial specified value
	I_{LEAK}	≤ the initial specified value
Shelf Life 85°C (V_R = 0)	Test	1 000 hours
	ΔC/C_R	≤ ±25% of initial measured value
	tanδ	≤ 200% 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	
Resistance to Soldering Heat	The capacitors shall be kept on a hot plate maintained at 250°C for 30 ±	
	onds. After removing from the hot plate and restored at room tempera	
	they meet the characteristic requirements listed below	
	ΔC/C_R	Within ±10% of initial value
	tanδ	Less than specified value
	I_{LEAK}	Less than specified value

CAPXON ALUMINUM ELECTROLYTIC CAPACITOR • LV SERIES

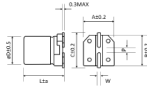
STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Blister tape	Vibration-proof	C_R (μF)	ϕ D (mm)	L (mm)	Ir - Max. Ripple Current +85°C • 120Hz (mA rms)	Capxon Part Number
450	•	•	4.7	12.5	14	115	LV4R7M450Q140ETR
	•	•	6.8	12.5	14	130	LV6R8M450Q140ETR
	•	•	8.2	12.5	14	140	LV8R2M450Q140ETR
	•	•	10	12.5	14	145	LV100M450Q140ETR
	•	•	10	16	17	160	LV100M450U170ETR
	•	•	12	16	17	175	LV120M450U170ETR
	•	•	15	16	17	170	LV150M450U170ETR
	•	•	18	16	17	195	LV180M450U170ETR
	•	•	22	16	17	235	LV220M450U170ETR

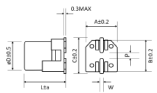
Enter blank for Standard package — Enter X for AEC-Q200
Enter W for Vibration proof version — Enter XW for AEC-Q200 and Vibration proof version

DIMENSIONS STANDARD PACKAGE • All dimensions in mm



ϕ D	L	a	A	B	C	W	P±0.2
4	5.5	Max	4.3	4.3	4.9	0.5 to 0.8	1
5	5.5	Max	5.3	5.3	5.9	0.5 to 0.8	1.4
6.3	5.5	0.2	6.6	6.6	7.2		
6.3	6.1	Max	6.6	6.6	7.2		
6.3	7.7	Max	6.6	6.6	7.2		
8	6.5	Max	8.3	8.3	9		
8	10.5	Max	8.3	8.3	9		
10	10.5	Max	10.3	10.3	11		
12.5	14	Max	13	13	13.5		
16	17	0.5	17	17	18		

DIMENSIONS VP PACKAGE (VIBRATION-PROOF) • All dimensions in mm



ϕ D	L	a	A	B	C
6.3	6.1	0.5	6.6	6.6	7.2
6.3	7.7	0.5	6.6	6.6	7.2
8	6.5	0.5	8.3	8.3	9
8	10.5	0.5	8.3	8.3	9
10	10.5	0.5	10.5	10.5	11.2
12.5	14	0.5	13	13	13.5
16	17	0.5	17	17	18

CAPXON ALUMINUM ELECTROLYTIC CAPACITOR • LV SERIES

STANDARD RATINGS

Part number shows blister tape on paper reel

V_R (V)	Blister tape	Vibration-proof	C_R (μF)	ϕ D (mm)	L (mm)	Ir - Max. Ripple Current +85°C • 120Hz (mA rms)	Capxon Part Number
4	•		47	4	5.5	28	LV470M004B055ETR
	•		100	5	5.5	54	LV101M004C055ETR
	•	•	150	6.3	6.1	50	LV151M004D061ETR
	•	•	220	6.3	5.5	61	LV221M004D055ETR
	•	•	330	6.3	7.7	135	LV331M004D077ETR
	•	•	330	8	6.5	145	LV331M004P065ETR
	•	*	470	8	6.5	180	LV471M004P065ETR
	•	•	470	8	10.5	220	LV471M004P105ETR
	•	•	560	8	10.5	242	LV561M004P105ETR
	•	•	680	8	10.5	285	LV681M004P105ETR
	•	•	1000	10	10.5	370	LV102M004Q105ETR
	•	•	1200	10	10.5	410	LV122M004Q105ETR
	•	•	1500	10	10.5	470	LV152M004Q105ETR
6.3	•		22	4	5.5	29	LV220M6R3B055ETR
	•		33	4	5.5	33	LV330M6R3B055ETR
	•		33	5	5.5	37	LV330M6R3C055ETR
	•		47	4	5.5	40	LV470M6R3B055ETR
	•		47	5	5.5	46	LV470M6R3C055ETR
	•		100	5	5.5	70	LV101M6R3C055ETR
	•	•	100	6.3	6.1	85	LV101M6R3D061ETR
	•	•	150	6.3	6.1	100	LV151M6R3D061ETR
	•	•	220	6.3	6.1	130	LV221M6R3D061ETR
	•	•	220	6.3	7.7	141	LV221M6R3D077ETR
	•	*	220	8	6.5	150	LV221M6R3P065ETR
	•	•	330	6.3	7.7	197	LV331M6R3D077ETR
	•	*	330	8	6.5	210	LV331M6R3P065ETR
	•		470	8	10.5	330	LV471M6R3P105ETR
	•	•	560	8	10.5	410	LV561M6R3P105ETR
	•	•	680	8	10.5	460	LV681M6R3P105ETR
	•	•	1000	8	10.5	480	LV102M6R3P105ETR
	•	•	1000	10	10.5	500	LV102M6R3Q105ETR
	•	•	1200	10	10.5	510	LV122M6R3Q105ETR
	•	•	1500	10	10.5	530	LV152M6R3Q105ETR
	•	•	3300	12.5	14	750	LV332M6R3Z140ETR
	•	•	6800	16	17	1330	LV682M6R3U170ETR
10	•		10	4	5.5	21	LV100M010B055ETR
	•		22	4	5.5	33	LV220M010B055ETR
	•		22	5	5.5	37	LV220M010C055ETR
	•		33	4	5.5	41	LV330M010B055ETR
	•		33	5	5.5	43	LV330M010C055ETR
	•		47	5	5.5	52	LV470M010C055ETR
	•		100	6.3	5.5	76	LV101M010D055ETR
	•	•	150	6.3	6.1	88	LV151M010D061ETR
	•	•	220	6.3	7.7	170	LV221M010D077ETR

*Consult capxon for availability — see description at end of standard ratings

CAPXON ALUMINUM ELECTROLYTIC CAPACITOR • LV SERIES

MULTIPLIER K_f for RIPPLE CURRENT vs. FREQUENCY

C_R (μF) / Frequency (Hz)	50/60	100/120	500	1k	≥ 10k
0.1 ≤ C_R ≤ 100	0.8	1	1.2	1.3	1.5
100 < C_R ≤ 6800	0.8	1	1.1	1.15	1.2

PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATON

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 links in the table.

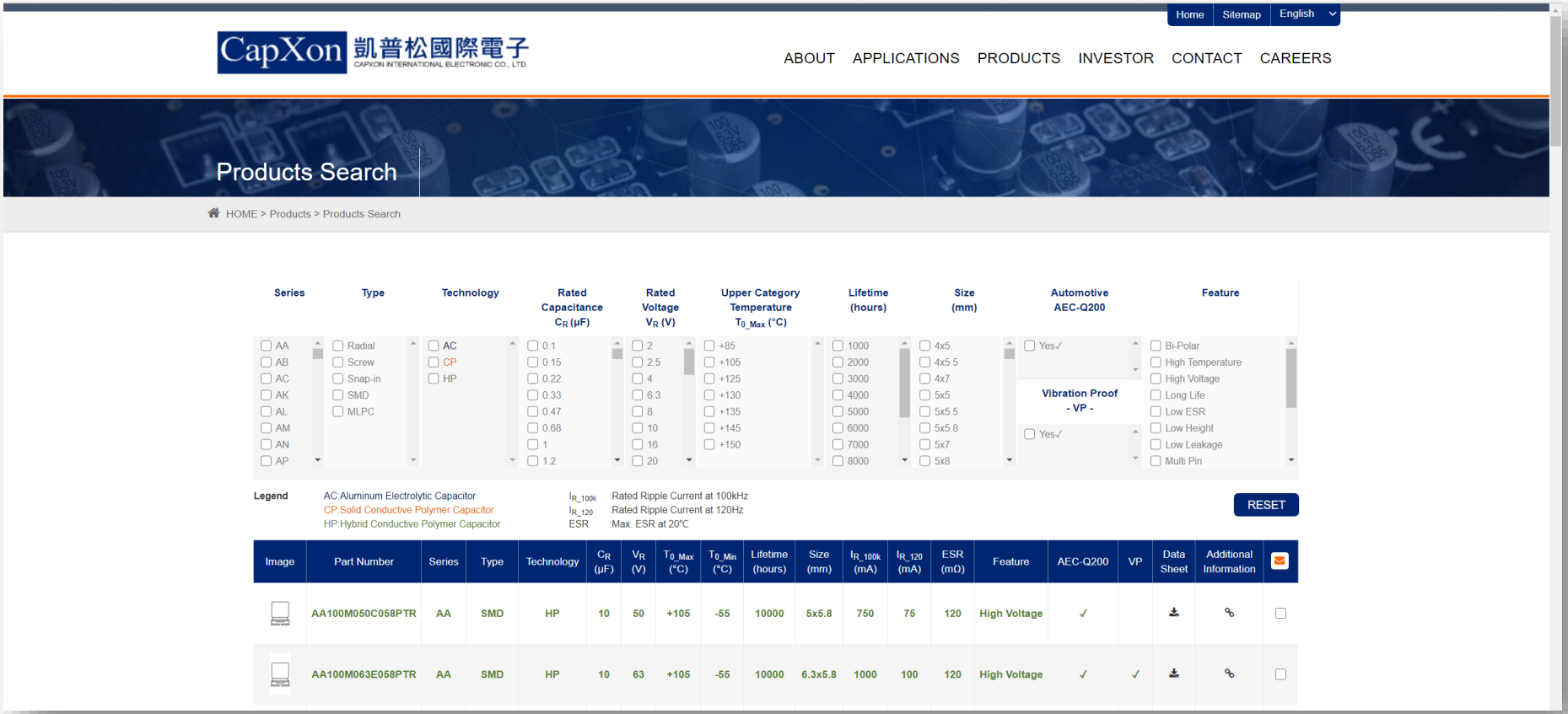
General Precautions & Guidelines	Packaging Information	Vibration Test Profiles	3D Models

CAPXON

Products Search

CAPXON

Products Search



CAPXON

Products Search ▪ Example

Series	Type	Technology	Rated Capacitance C_R (µF)	Rated Voltage V_R (V)	Upper Category Temperature T_{0_Max} (°C)	Lifetime (hours)	Size (mm)	Automotive AEC-Q200	Feature
☐ AA ☐ AC ☐ AN	☐ SMD	☑ HP	☑ 22	☑ 35	☐ +105 ☐ +125 ☐ +135	☐ 4000 ☐ 10000	☐ 5x5.8	☑ Yes✓ Vibration Proof - VP - ☐ Yes✓	☐ High Temperature ☐ High Voltage

Legend

AC:Aluminum Electrolytic Capacitor
CP:Solid Conductive Polymer Capacitor
HP:Hybrid Conductive Polymer Capacitor

I_{R_100k} :Rated Ripple Current at 100kHz
I_{R_120} :Rated Ripple Current at 120Hz
ESR :Max. ESR at 20℃

RESET

Image	Part Number	Series	Type	Technology	C_R (µF)	V_R (V)	T_{0_Max} (°C)	T_{0_Min} (°C)	Lifetime (hours)	Size (mm)	I_{R_100k} (mA)	I_{R_120} (mA)	ESR (mΩ)	Feature	AEC-Q200	VP	Data Sheet	Additional Information	✉
	AA220M035C058PTR	AA	SMD	HP	22	35	+105	-55	10000	5x5.8	900	90	100	High Voltage	✓				☐
	AC220M035C058PTR	AC	SMD	HP	22	35	+125	-55	4000	5x5.8	550	55	100	High Temperature	✓				☐
	AN220M035C058PTR new	AN	SMD	HP	22	35	+135	-55	4000	5x5.8	550	55	100	High Temperature	✓				☐

CAPXON

Products Search ▪ Example

Technology independent

Series	Type	Technology	Rated Capacitance C_R (µF)	Rated Voltage V_R (V)	Upper Category Temperature T_{0_Max} (°C)	Lifetime (hours)	Size (mm)	Automotive AEC-Q200	Feature
☐ AA ☐ CV ☐ DV ☐ EV ☐ HV ☐ JV ☐ MV ☐ PD	☑ SMD	☐ AC ☐ CP ☐ HP	☑ 100	☑ 25	☑ +105	☐ 1000 ☐ 2000 ☐ 3000 ☐ 5000 ☐ 7000 ☐ 10000	☐ 6.3x7.7 ☐ 8x6.5 ☐ 8x8.7 ☐ 8x10.5 ☐ 8x11.7 ☐ 10x8.7 ☐ 10x12.4	☐ Yes✓ Vibration Proof - VP - ☐ Yes✓	☐ High Voltage ☐ Long Life ☐ Low ESR ☐ Low Height ☐ Ultra Long Life ☐ Ultra Low ESR ☐ Standard

Legend

AC:Aluminum Electrolytic Capacitor
CP:Solid Conductive Polymer Capacitor
HP:Hybrid Conductive Polymer Capacitor

I_{R_100k} :Rated Ripple Current at 100kHz
I_{R_120} :Rated Ripple Current at 120Hz
ESR :Max. ESR at 20°C

RESET

Image	Part Number	Series	Type	Technology	C_R (µF)	V_R (V)	T_{0_Max} (°C)	T_{0_Min} (°C)	Lifetime (hours)	Size (mm)	I_{R_100k} (mA)	I_{R_120} (mA)	ESR (mΩ)	Feature	AEC-Q200	VP	Data Sheet	Additional Information	✉
	AA101M025E077PTR	AA	SMD	HP	100	25	+105	-55	10000	6.3x7.7	2000	200	30	High Voltage	✓	✓			
	CV101M025F105ETR	CV	SMD	AC	100	25	+105	-40	7000	8x10.5	280	188	700	Ultra Low ESR	✓	✓			☐
	PD101M025G124PTR	PD	SMD	CP	100	25	+105	-55	2000	10x12.4	4800	240	20	Standard					☐

CAPXON

Additional Information

Related technical documentation:

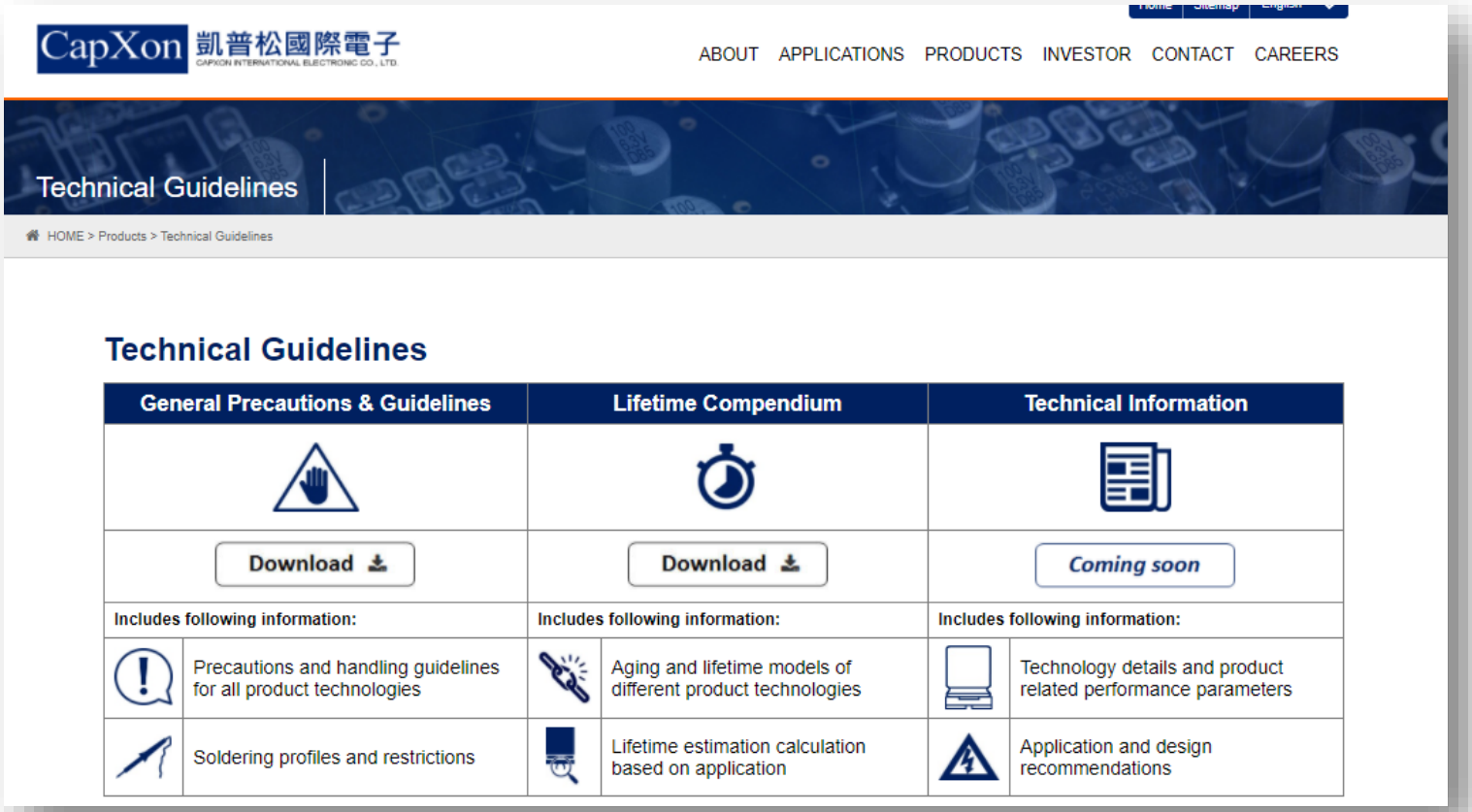
General Precautions & Guidelines	Packaging Information
Download	Download
Includes following information:	**Includes following information:**
Precautions and handling guidelines for all product technologies	Product code configuration and technical options
Soldering profiles and restrictions	Available packaging styles and packaging units

Vibration Specification	3D - Models
Download	Download
Includes following information:	**Includes following information:**
Vibration Test Profiles	Library of 3D STP-files

CapXon

Technical Guidelines

Technical Guidelines



CapXon

Technical Guidelines

CAPXON - Design Your Seminar -

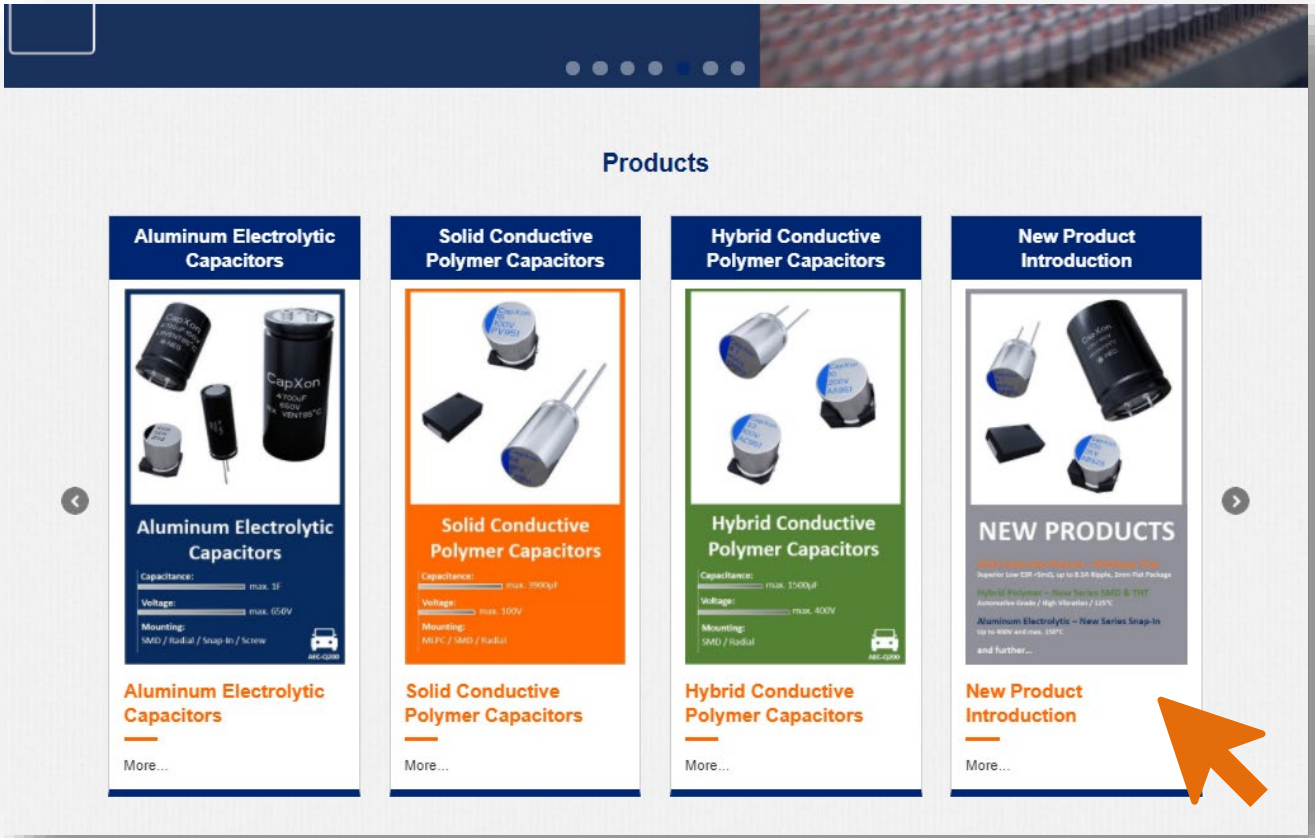
Select out of the below topics:

General & Commercial		Characteristics & Performance		Design & Application	
Capacitor Basics What is a Capacitor and how does it work? Parameters like ESR, Impedance, Leakage Current, …	25 min	**Component Limitations** What a cap can do and what you should avoid	30 min	**Design Rules** Taking care of design guidelines and optimizing your design for better performance	25 min
Aluminum Electrolytic Capacitors Technology overview and specific performance characteristics: - Aluminum Electrolytic Capacitors - Solid Conductive Polymer Capacitors - Hybrid Conductive Capacitors	20 min	**Failure Modes** If a failure occurs, what can happen and how to understand root causes	20 min	**Lifetime Estimation and Cap Dimensioning** Influence of ambient condition, operating voltage, ripple current, cooling, … - Examples of lifetime calculations - Aging and related challenges	35 min
Capacitor Technology Comparison Electrolytics vs. MLCC vs. Tantalum Caps - what you need to know and what are the pros and cons of each	25 min	**Cap Selection** Finding the right choice and what to take care of at dimensioning: - Dimensioning of used Capacitance / Voltage - How much ripple current can be applied - Setting of allowed drift limits	25 min	**DC-Link, PFC & Buffering Applications** Choosing the right cap for your topology and desired performance	25 min
Cost Ratio Potential How to drop costs and still achieving lifetime and performance targets	20 min			**Filter Design with Electrolytic Capacitors** Input and Output filter recommendations and proper cap technology selection	20 min

Looking for more? Get in touch with us to define customer specific topics and training content.

CAPXON Online Meetings

New Product Information



CapXon

New Product Information

CapXon 凱普松國際電子

ABOUT APPLICATIONS PRODUCTS INVESTOR CONTACT CAREERS

HOME > Products > Catalog

New Product Introduction

2020-08-18

Solid Conductive Polymer – Multilayer Chip

- **XA Series** - Flat Package, Ultra-Low ESR 5mΩ

Hybrid Conductive Polymer – New Series SMD & THT

- **AA Series** - High Voltage200V, Low ESR 100mΩ
- **AB Series** - High Ripple Current 2.8A, Ultra-Low ESR 20mΩ
- **AK Series** - High Temperature 135°C, Ultra-Low ESR 14mΩ
- **AL Series** - High Temperature 145°C, 2000h Endurance
- **AM Series** - Ultra-High Temperature 150°C, 1000h Endurance
- **AN Series** - High Temperature 135°C, Ultra-Low ESR 16mΩ
- **AP Series** - Ultra-High Temperature 150°C, 1000h Enduranc
- **AR Series** - High Temperature 145°C, 2000h Endurance
- **AS Series** - High Voltage 400V, Low ESR 150mΩ

Aluminum Electrolytic – New Series Snap-In

- **HC Series** - High Temperature 125°C, Low Voltage 25 to 63V
- **HH Series** - High Temperature 125°C, High Voltage 400 to 450V

CAPXON

New Product Information

NPI – New Product Information

Aluminum Electrolytic Capacitors

Series: HC

High Temperature 125°C, Low Voltage 25 to 63V

AEC-Q 200 · HIGH TEMPERATURE

Mounting: Radial type

Voltage Range: 25VDC up to 63VDC

Capacitance Range: 600µF up to 3300µF

Endurance: 4000h @ 135°C

Vibration: 30g • ref. IEC 60068-2-6

Applications:
- Aut
- Mo
- Airc
- Indu
- High
- 48V

Features:
- AEC-Q200 qualified
- High vibration resistance – Double Cramp Design
- Low ESR & high ripple current capability
- Resistance to high temperature max. 125°C
- 2-pin, 3-pin and Multipin terminals available

Com
- Ro
- Ha
- JIS

Looking for detailed Specification, Samples or Quote?

www.capxongroup.com

Asia: sales@capxon.com.tw phone: +886-2-8692-6611

Europe: sales@capxon-europe.com phone: +49-7121-1452701

Singapore: sales@capxon-as phone: +65-9826

NPI – New Product Information

Hybrid Conductive Polymer Capacitors

Series: AS

High Voltage 400V, Low ESR 150mΩ

Mounting: Radial type

Voltage Range: 16VDC up to 400VDC

Capacitance Range: 1.2µF up to 1500µF

Endurance: 2000h up to 10000h @ 135

Vibration: 30g • ref. IEC 60068-2-6

Features:
- AEC-Q200 qualified
- High breakdown voltage
- Downsizing of various applications
- Very high ripple current capability

Looking for detailed Specification, Samples or Quote?

www.capxongroup.com

Asia: sales@capxon.com.tw phone: +886-2-8692-6611

Europe: sales@capxon-europe phone: +49-7121-145

NPI – New Product Information

MLPC - Solid Conductive Polymer Capacitors

Series: XA

Flat Package, Ultra-Low ESR 5mΩ

LOW PROFILE

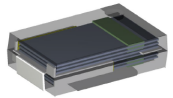
Mounting: MLPC - Multilayer Chip SMD

Voltage Range: 2VDC up to 25VDC

Capacitance Range: 10µF up to 470µF

Endurance: 2000h @ 105°C

Applications:
- Digital and high frequency devices
- Voltage stabilizing in LCD and LED panels
- Buffering of CPUs, FPGAs, graphical cards and sensor ICs
- Input and output smoothing in USB power supplies and power banks



Features:
- Only 1.9mm height
- No DC bias and piezzo-electric effect
- Stable capacitance across temperature range
- Miniaturization by substitution of existing MLCC bank designs
- No dry-out effect guarantees extremely long life

Compliance:
- RoHS & REACh
- Halogen Free
- JIS-C-5101-25

Production Status:
- Mass Production starts end of 2020
- Samples available

Looking for detailed Specification, Samples or Quote?

www.capxongroup.com

Asia: sales@capxon.com.tw phone: +886-2-8692-6611

Europe: sales@capxon-europe.com phone: +49-7121-1452701

Singapore: sales@capxon-asia.com phone: +65-9826-6589

USA: sales@capxon-usa.com phone: +1-315-920-7728

CAPXON

CAPXON