SAMXON®
Aluminum Electrolytic Capacitors

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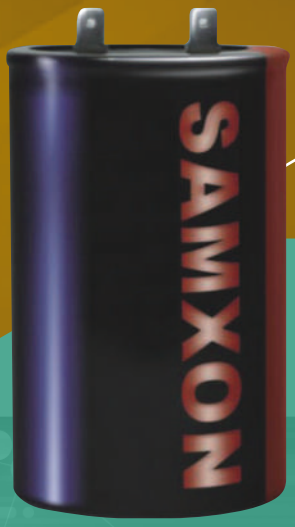
Aluminum Electrolytic Capacitors



RoHS Compliant

Halogen Free

PRODUCT CATALOGUE

QC 080000

IEC QUALITY ASSESSMENT SYSTEM (IECQ)
covering Electronic Components, Assemblies, Related Materials and Processes

IECQ Certificate of Conformity
Hazardous Substance Process Management

IECQ Certificate No.:	IECQ-H BSI 09.0011	Issue No.:	6	Status:	Current
Supersedes:	IECQ-H BSI 09.0011 Issue 5	Issue Date:	2018/08/06	Org Issue:	2009/07/28
CB Reference No.:	IN501657 IECQ	Expiration:	2021/07/25		

Applicable to:

- European Directive 2011/65/EU ("RoHS – Restriction of the use Of certain Hazardous Substances") in electrical and electronic equipment, including all published amendments
- European Directive 2012/19/EU ("WEEE – waste electrical and electronic equipment") recast
- European Regulation EC No. 1907/2006 ("REACH") and its amendments
- China – RoHS 2 2016-01-21 (Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products)

Samxon Electronics (Dongguan) Co., Ltd.
Xinxing Industrial Area, Xingfa South Road,
Wusha Community, Chang'an Town, Dongguan
Guangdong, 523860
China

The organization has developed and implemented Hazardous Substance Process Management processes and related processes which have been assessed and found to comply with the applicable requirements for IECQ HSPM organization approval which is in accordance with the Basic Rules IECQ 01 and Rules of Procedure IECQ 03-5 "IECQ Hazardous Substances Process Management" of the IEC Quality Assessment System for Electronic Components (IECQ), and with respect to the IECQ Specification:

- IECQ QC 080000:2017 - Hazardous Substance Process Management System Requirements

This Certificate is applicable to all electronic components, assemblies, related materials and processes for the following scope of activities:
Design and Manufacture of Aluminium Electrolytic Capacitors

Issued by the Certification Body: BSI
Kitemark Court, Davy Avenue
Knowlhill, Milton Keynes MK5 8PP
United Kingdom
Authorized person:
Paul Turner

bsi.

ISO 9001 ISO14001

bsi.
By Royal Charter

Certificate of Registration

质量管理体系 - ISO 9001:2015

兹证明:
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持有证书: **FM 76838**

并运行符合 ISO 9001:2015 要求的质量管理体系，认证范围如下：

铝电解电容器的设计与制造。

The design and manufacture of aluminium electrolytic capacitors including.

由以下代表:
Chris Cheung，亚太地区 合规风险主管

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IAF ANAB

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Certificate of Registration

环境管理体系 - ISO 14001:2015

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ACCREDITED

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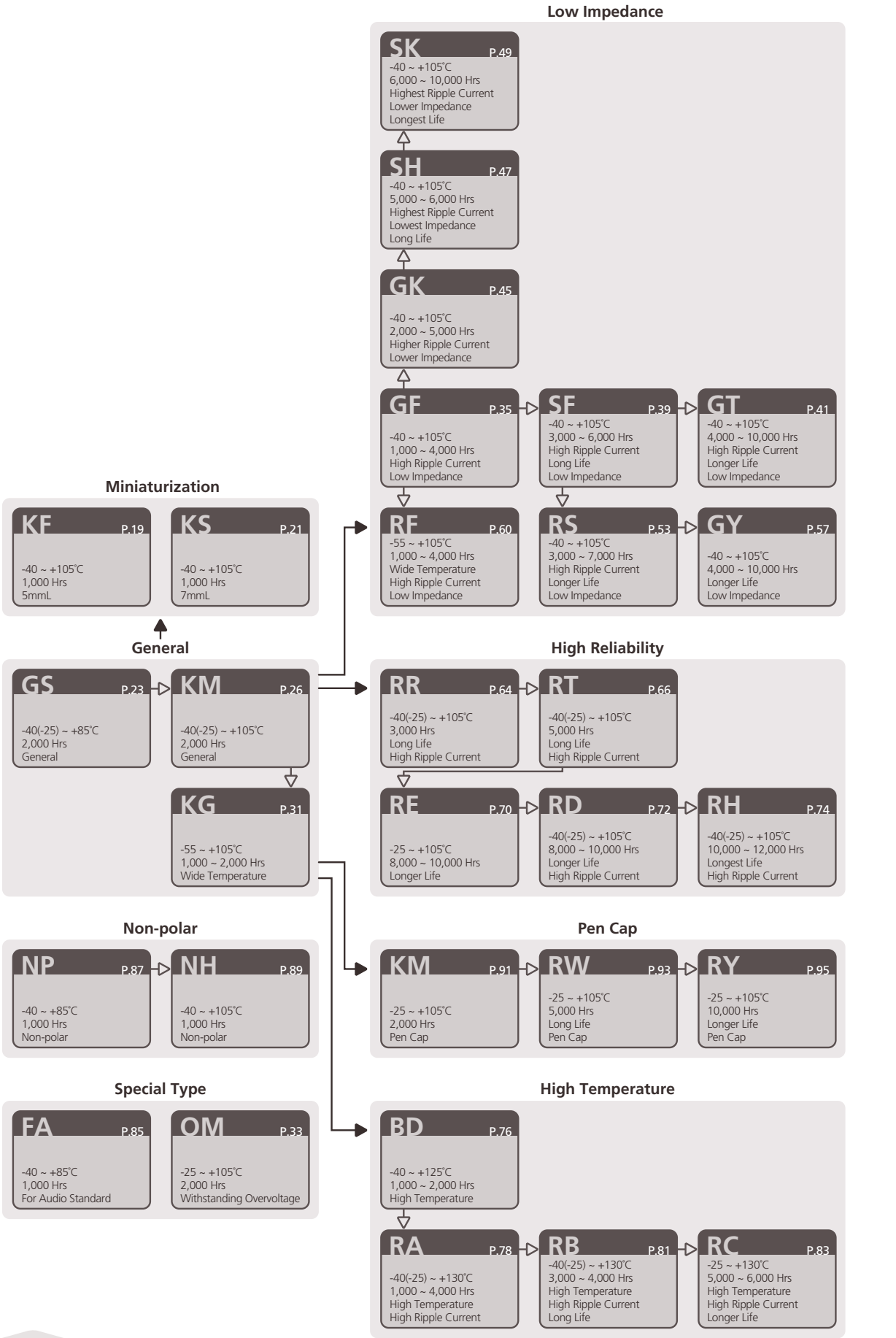
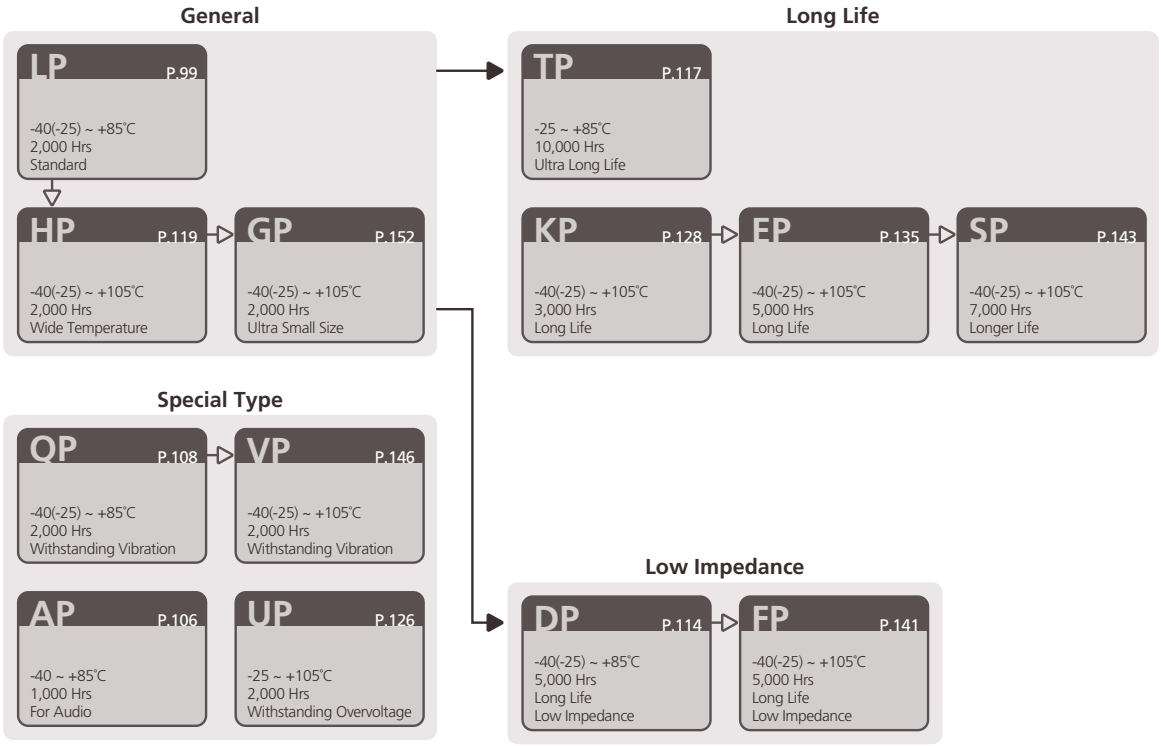
Series Chart (產品體系圖)

Radial Lead Type 導針型

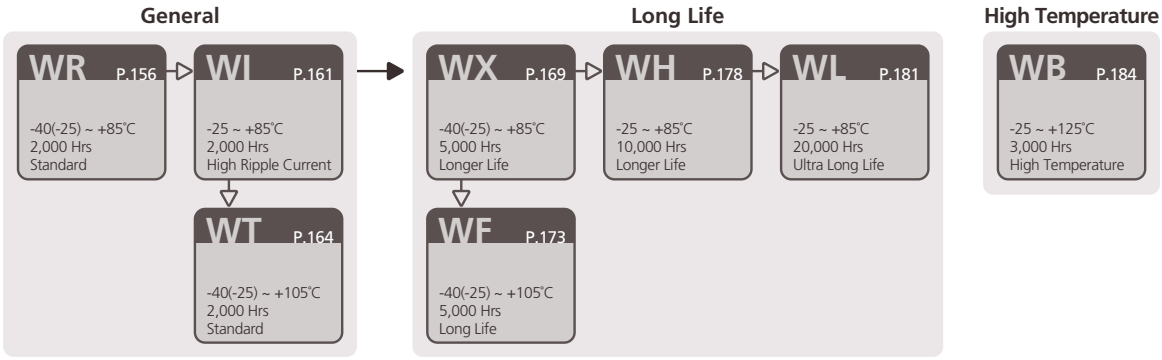


Series Chart (產品體系圖)

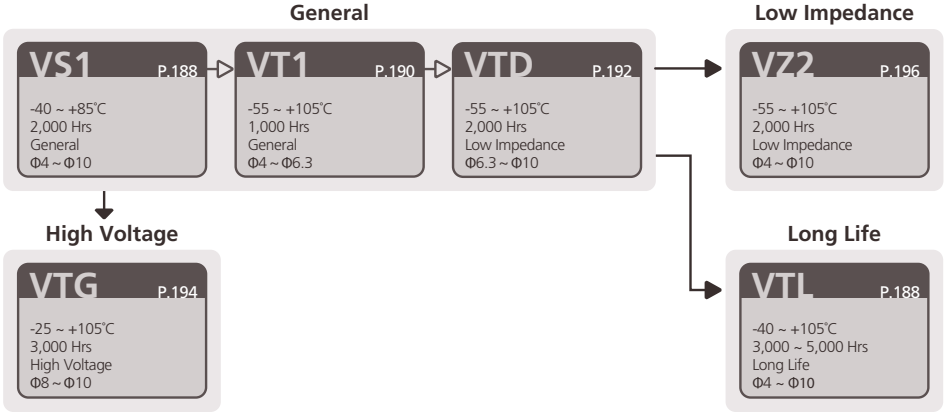
Lug / Snap-in Terminal Type 插入/自立型



Screw Terminal Type 螺釘型



Surface Mount Type 貼片型



Series Table (產品一覽表)

Series	Features (特點)	Letter Color	Sleeve Color	Temp. (℃)	Voltage (VDC)	Cap. (μF)	Load Life	Page
Miniature Aluminum Electrolytic Capacitors								小型鋁電解電容器
Miniature Type								小型品
KF	5mmL (高), +105˚C	White (白)	Black (黑)	-40 ~ +105	4 ~ 50	3.3 ~ 330	1,000 Hrs.	P.19
KS	7mmL (高), -40˚C ~ +105˚C	White (白)	Black (黑)	-40 ~ +105	6.3 ~ 50	3.3 ~ 330	1,000 Hrs.	P.21
General Purpose								普通品
GS	+85˚C, General (普通品)	White (白)	Dark Blue (深藍)	-40(-25) ~ +85	6.3 ~ 450	2.2 ~ 22000	2,000 Hrs.	P.23
KM	+105˚C, General (普通品)	White (白)	Black (黑)	-40(-25) ~ +105	6.3 ~ 550	0.47 ~ 33000	2,000 Hrs.	P.26
KG	-55 ~ +105˚C, Wide Temperature (寬溫度)	White (白)	Black (黑)	-55 ~ +105	6.3 ~ 100	2.2 ~ 22000	1,000 ~ 2,000 Hrs.	P.31
OM	+105˚C, Withstanding Overvoltage (耐過電壓品)	White (白)	Black (黑)	-25 ~ +105	200 & 400	22 ~ 330	2,000 Hrs.	P.33
Low Impedance Type								低阻抗品
GF	+105˚C, High Ripple Current, Low Impedance (高紋波, 低阻抗)	White (白)	Sea Green (海綠)	-40 ~ +105	6.3 ~ 100	3.3 ~ 4700	1,000 ~ 4,000 Hrs.	P.35
SF	+105˚C, High Ripple Current, Long Life Assurance, Low Impedance (高紋波, 長壽命, 低阻抗)	White (白)	Black (黑)	-40 ~ +105	6.3 ~ 100	15 ~ 3900	3,000 ~ 6,000 Hrs.	P.39
GT	+105˚C, High Ripple Current, Longer Life Assurance, Low Impedance (高紋波, 較長壽命, 低阻抗)	Silver (銀)	Black (黑)	-40 ~ +105	6.3 ~ 100	15 ~ 4700	4,000 ~ 10,000 Hrs.	P.41
GK	+105˚C, Higher Ripple Current, Lower Impedance (較高紋波, 較低阻抗)	White (白)	Sea Green (海綠)	-40 ~ +105	6.3 ~ 25	100 ~ 3900	2,000 ~ 5,000 Hrs.	P.45
SH	+105˚C, Highest Ripple Current, Lowest Impedance, Long Life Assurance (更高紋波, 更低阻抗, 長壽命)	White (白)	Black (黑)	-40 ~ +105	6.3 ~ 50	100 ~ 8200	5,000 ~ 6,000 Hrs.	P.47
SK	+105˚C, Highest Ripple Current, Longest Life Assurance, Lower Impedance (更高紋波, 更長壽命, 較低阻抗)	Silver（銀）	Black（黑）	–40 ~ +105	6.3 ~ 100	33 ~ 8200	6,000 ~ 10,000 Hrs	P.49
RS	+105˚C, High Ripple Current, Longer Life Assurance, Low Impedance (高紋波, 較長壽命, 低阻抗)	White (白)	Black (黑)	-40 ~ +105	6.3 ~ 100	15 ~ 4700	3,000 ~ 7,000 Hrs.	P.53
GY	+105˚C, Longer Life Assurance, Low Impedance (較長壽命, 低阻抗)	White (白)	Black (黑)	-40 ~ +105	6.3 ~ 100	2.2 ~ 15000	4,000 ~ 10,000 Hrs.	P.57
RF	-55 ~ +105˚C, Wide Temperature, High Ripple Current, Low Impedance (寬溫度, 高紋波, 低阻抗)	White (白)	Black (黑)	-55 ~ +105	6.3 ~ 100	22 ~ 4700	1,000 ~ 4,000 Hrs.	P.60
High Reliability Type								高可靠品
RR	Long Life Assurance, High Ripple Current (長壽命, 高紋波)	White (白)	Black (黑)	-40(-25) ~ +105	160 ~ 500	1 ~ 220	3,000 Hrs.	P.64
RT	Long Life Assurance, High Ripple Current (長壽命, 高紋波)	White (白)	Black (黑)	-40(-25) ~ +105	160 ~ 500	1 ~ 220	5,000 Hrs.	P.66
RE	Longer Life Assurance (較長壽命)	White (白)	Black (黑)	-25 ~ +105	160 ~ 450	1 ~ 220	8,000 ~ 10,000 Hrs.	P.70
RD	Longer Life Assurance, High Ripple Current (較長壽命, 高紋波)	White (白)	Black (黑)	-40(-25) ~ +105	160 ~ 500	1 ~ 330	8,000 ~ 10,000 Hrs.	P.72
RH	Longest Life Assurance, High Ripple Current (更長壽命, 高紋波)	White (白)	Black (黑)	-40(-25) ~ +105	160 ~ 500	1 ~ 220	10,000 ~ 12,000 Hrs.	P.74
High Temperature Type								高溫度品
BD	+125˚C, High Temperature (高溫度)	White (白)	Black (黑)	-40 ~ +125	10 ~ 50	3.3 ~ 3900	1,000 ~ 2,000 Hrs.	P.76
RA	+130˚C, High Temperature, High Ripple Current (高溫度, 高紋波)	White (白)	Black (黑)	-40(-25) ~ +130	10 ~ 450	1 ~ 4700	1,000 ~ 4,000 Hrs.	P.78
RB	+130˚C, High Temperature, High Ripple Current, Long Life Assurance (高溫度, 高紋波, 長壽命)	White (白)	Black (黑)	-40(-25) ~ +130	160 ~ 450	1.5 ~ 100	3,000 ~ 4,000 Hrs.	P.81
RC	+130˚C, High Temperature, High Ripple Current, Longer Life Assurance (高溫度, 高紋波, 較長壽命)	White (白)	Black (黑)	-25 ~ +130	160 ~ 450	1.5 ~ 100	5,000 ~ 6,000 Hrs.	P.83
For Audio Type								音響用品
FA	Standard, For Audio (標準品, 音響電容)	White (白)	Coffee (咖啡)	-40 ~ +85	6.3 ~ 100	2.2 ~ 10000	1,000 Hrs.	P.85
Non-polarized Type								無極性品
NP	+85˚C, Non-polar (無極性)	Black (黑)	Green (綠)	-40 ~ +85	6.3 ~ 100	2.2 ~ 6800	1,000 Hrs.	P.87
NH	+105˚C, Non-polar (無極性)	White (白)	Black (黑)	-40 ~ +105	6.3 ~ 100	2.2 ~ 1000	1,000 Hrs.	P.89
Pen Cap Type								筆型電容
KM	+105˚C, Pen Cap (筆型電容)	White (白)	Black (黑)	-25 ~ +105	200 ~ 450	22 ~ 270	2,000 Hrs.	P.91
RW	+105˚C, Pen Cap, Long Life Assurance (筆型電容, 長壽命)	White (白)	Black (黑)	-25 ~ +105	200 ~ 450	22 ~ 220	5,000 Hrs.	P.93
RY	+105˚C, Pen Cap, Longer Life Assurance (筆型電容, 較長壽命)	White (白)	Black (黑)	-25 ~ +105	200 ~ 450	22 ~ 220	10,000 Hrs.	P.95
Large Can Aluminum Electrolytic Capacitors								大型鋁電解電容器
Standard Type								標準品
LP	Lug / Snap-in Terminal Type, Standard (插入/自立型, 標準品)	White (白)	Black (黑)	-40(-25) ~ +85	10 ~ 700	56 ~ 82000	2,000 Hrs.	P.99
AP	Lug / Snap-in Terminal Type, For Audio (插入/自立型, 音響電容)	White (白)	Coffee (咖啡)	-40 ~ +85	16 ~ 100	680 ~ 10000	1,000 Hrs.	P.106
QP	Lug / Snap-in Terminal Type, Withstanding Vibration (插入/自立型, 耐振動)	White (白)	Black (黑)	-40(-25) ~ +85	10 ~ 500	56 ~ 82000	2,000 Hrs.	P.108
DP	Lug / Snap-in Terminal Type, Long Life Assurance, Low Impedance (插入/自立型, 長壽命, 低阻抗)	White (白)	Black (黑)	-40(-25) ~ +85	160 ~ 650	47 ~ 2200	5,000 Hrs.	P.114
TP	Lug / Snap-in Terminal Type, Ultra Long Life Assurance (插入/自立型, 超長壽命)	White (白)	Black (黑)	-25 ~ +85	200 ~ 450	56 ~ 2200	10,000 Hrs.	P.117

Series Table (產品一覽表)

Series	Features (特點)	Letter Color	Sleeve Color	Temp. (˚C)	Voltage (VDC)	Cap. (μF)	Load Life	Page
Large Can Aluminum Electrolytic Capacitors								大型鋁電解電容器
High Reliability Type								高可靠品
HP	Lug / Snap-in Terminal Type, Wide Temperature (插入/自立型, 寬溫度)	White (白)	Black (黑)	-40(-25) ~ +105	10 ~ 600	47 ~ 56000	2,000 Hrs.	P.119
UP	Lug / Snap-in Terminal Type, Withstanding Overvoltage (插入/自立型, 耐過電壓品)	White (白)	Black (黑)	-25 ~ +105	200 ~ 450	56 ~ 1200	2,000 Hrs.	P.126
KP	Lug / Snap-in Terminal Type, Long Life Assurance (插入/自立型, 長壽命)	White (白)	Black (黑) *Blue (藍)	-40(-25) ~ +105	10 ~ 600	47 ~ 56000	3,000 Hrs.	P.128
EP	Lug / Snap-in Terminal Type, Long Life Assurance (插入/自立型, 長壽命)	White (白)	Black (黑) *Blue (藍)	-40(-25) ~ +105	10 ~ 550	82 ~ 47000	5,000 Hrs.	P.135
FP	Lug / Snap-in Terminal Type, Long Life Assurance, Low Impedance (插入/自立型, 長壽命, 低阻抗)	Silver (銀)	Black (黑)	-40(-25) ~ +105	10 ~ 450	100 ~ 33000	5,000 Hrs.	P.141
SP	Lug / Snap-in Terminal Type, Longer Life Assurance (插入/自立型, 較長壽命)	White (白)	Black (黑)	-40(-25) ~ +105	160 ~ 450	39 ~ 2200	7,000 Hrs.	P.143
VP	Lug / Snap-in Terminal Type, Withstanding Vibration (插入/自立型, 耐振動)	White (白)	Black (黑)	-40(-25) ~ +105	10 ~ 500	39 ~ 56000	2,000 Hrs.	P.146
GP	Lug / Snap-in Terminal Type, Ultra Small Size (插入/自立型, 超小體積)	White (白)	Black (黑)	-40(-25) ~ +105	160 ~ 450	100 ~ 3300	2,000 Hrs.	P.152
Screw Terminal Type								螺釘型
WR	+85˚C, Screw Terminal Type, Standard (螺釘型, 標準品)	Silver (銀)	Black (黑)	-40(-25) ~ +85	10 ~ 630	100 ~ 680000	2,000 Hrs.	P.156
WI	+85˚C, Screw Terminal Type, High Ripple Current (螺釘型, 高紋波)	Silver (銀)	Black (黑)	-25 ~ +85	350 ~ 450	390 ~ 22000	2,000 Hrs.	P.161
WT	+105˚C, Screw Terminal Type, Standard (螺釘型, 標準品)	Silver (銀)	Black (黑)	-40(-25) ~ +105	10 ~ 500	180 ~ 680000	2,000 Hrs.	P.164
WX	+85˚C, Screw Terminal Type, Long Life Assurance (螺釘型, 長壽命)	Silver (銀)	Black (黑)	-40(-25) ~ +85	10 ~ 550	1000 ~ 1500000	5,000 Hrs.	P.169
WF	+105˚C, Screw Terminal Type, Long Life Assurance (螺釘型, 長壽命)	Silver (銀)	Black (黑)	-40(-25) ~ +105	10 ~ 500	330 ~ 390000	5,000 Hrs.	P.173
WH	+85˚C, Screw Terminal Type, Longer Life Assurance (螺釘型, 較長壽命)	Silver (銀)	Black (黑)	-25 ~ +85	350 ~ 500	470 ~ 22000	10,000 Hrs.	P.178
WL	+85˚C, Screw Terminal Type, Ultra Long Life Assurance (螺釘型, 超長壽命)	Silver (銀)	Black (黑)	-25 ~ +85	350 ~ 450	2200 ~ 12000	20,000 Hrs.	P.181
WB	+125˚C, Screw Terminal Type, High Temperature (螺釘型, 高溫度)	Silver (銀)	Black (黑)	-25 ~ +125	160 ~ 400	330 ~ 15000	3,000 Hrs.	P.184
V-Chip Aluminum Electrolytic Capacitors								貼片式鋁電解電容器
Surface Mount Type								貼片品
VS1	+85˚C, Surface Mount Type, General Purpose（貼片普通品）			–40 ~ +85	6.3 ~ 50	0.1 ~ 1500	2,000 Hrs.	P.188
VT1	+105˚C, Surface Mount Type, General Purpose, 1,000 Hours（貼片普通品）			–55 ~ +105	6.3 ~ 50	0.1 ~ 220	1,000 Hrs.	P.190
VTD	+105˚C, Surface Mount Type, General Purpose, 2,000 Hours（貼片普通品）			–55 ~ +105	25 ~ 100	4.7 ~ 1500	2,000 Hrs.	P.192
VTG	+105˚C, Surface Mount Type, High Voltage, 3,000 Hours（高壓貼片品）			–25 ~ +105	400	2.2 ~ 4.7	3,000 Hrs.	P.194
VZ2	+105˚C, Surface Mount Type, Low Impedance（低阻抗貼片品）			–55 ~ +105	6.3 ~ 100	1 ~ 1500	2,000 Hrs.	P.196
VTL	+105˚C, Surface Mount Type, Long Life, 3,000/5,000 Hours（長壽命貼片品）			–40 ~ +105	10 ~ 50	0.1 ~ 1000	3,000/5,000Hrs.	P.198

* Automative

Application Guidelines (應用指引)

1. Circuit Design

1.1 Please make sure the environment and mounting conditions to which the capacitor will be exposed are within the conditions specified in this catalog (or alternate SAMXON'S specifications, such as series drawings).

1.2 Operating temperature and applied ripple current must be within SAMXON'S specification.

- The capacitor must not be used in an ambient temperature which exceeds the operating temperature specified in this catalog.
- Do not apply excessive current which exceeds the allowable ripple current.

1.3 Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.

1.4 Aluminum electrolytic capacitors are polarized. Do not apply reverse voltage or AC voltage. Please use non-polar capacitors for a circuit that can possibly see reversed polarity. Note: Even non-polar capacitors cannot be used for AC voltage application.

1.5 Do not use aluminum electrolytic capacitors in a circuit that requires rapid and very frequent charge/discharge. In this type of circuit, it is necessary to use a special design capacitor with extended life characteristics.

1.6 Do not apply excess voltage.

- Please pay attention so that the peak voltage, which is DC voltage overlapped by ripple current, will not exceed the rated voltage.
- In the case where more than 2 aluminum electrolytic capacitors are used in series , please make sure that applied voltage will be lower than rated voltage and the voltage will be applied to each capacitor equally using a balancing resistor in parallel with the capacitor.

1.7 Outer sleeve of the capacitor is not guaranteed as an electrical insulator.

- Do not use a standard sleeve on a capacitor in applications that require the electrical insulation. When the application requires special insulation, please contact our sales office for details.
- Do not connect the blank terminal (reinforcing terminal) of a multi-terminal (three- or four-terminal) product of the snap-in type to another circuit it may cause a short circuit.

1.8 Capacitors must not be used under the following conditions:

- Capacitors must not be exposed to water (including condensation), brine or oil.
- Ambient conditions that include toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc.
- Ambient conditions that expose the capacitor to ozone, ultraviolet ray and radiation.
- Severe vibration and physical shock conditions that exceed SAMXON'S specifications.

1.9 When designing a circuit board, please pay attention to following:

- Make the hole spacing on the P.C. board match the lead spacing of the capacitor.
- There should not be any circuit pattern or circuit wire above the capacitor safety vent.
- Unless otherwise specified, following clearance should be mad above the safely vent.

Case Diameter	Gap Required
Φ6.3~16	2mm or more
Φ18~35	3mm or more
Φ40 or more	5mm or more

- In case the vent side is placed toward P.C. board (such as end seal vented parts), make a corresponding hole on the P.C. board to release the gas when vent is operated. The hole should be made to match the capacitor vent position.

- Do not install screw terminal capacitor with end seal side down. When you install a screw terminal capacitor in a horizontal mount, the positive terminal must be in the upper position.

1.10 The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible. The electrolyte is conductive. When it comes in contact with the P.C. board, there is a possibility of pattern corrosion or short circuit between the circuit pattern which could in result of smoking or catching fire. Do not locate any circuit pattern beneath the capacitor end seal.

1.11 Do not design a circuit board so that heat generating components such as resistor and transistors are placed near an aluminum capacitor or reverse side of P.C. board (under the capacitor).

1.12 Electrical characteristics may vary depending on changes in temperature and frequency. Please consider this variation when you design circuits.

1.13 When you are designing capacitors for use on double-sided P.C. boards, do not place capacitors on circuit patterns or over the unused holes.

1.14 The torque for terminal screw or brackets screws must be within the specified value on SAMXON's drawings.

1.15 When you install more than 2 capacitors in parallel, consider the balance of current flowing into the capacitors.

2. Mounting

2.1 Once a capacitor has been assembled in the set and power applied, do not attempt to reuse the capacitor in other circuits or application.

2.2 Electric potential between positive and negative terminal may exist as a result or returned electromotive force, so please discharge the capacitor using a 1kΩ resistor.

2.3 Leakage current of the parts that have been stored for more than 6 months may increase. When leakage current has increased, please perform a voltage treatment using 1kΩ resistor.

2.4 Please confirm ratings before installing capacitors on the P.C. board.

2.5 Please confirm polarity before installing capacitors on the P.C. board.

2.6 Do not drop capacitors on the floor, nor use a capacitor that was dropped.

2.7 Be careful not to deform the capacitor during installation.

2.8 Please confirm that the lead spacing of the capacitor matches the hole spacing of the P.C. board prior to installation.

2.9 Snap-in can type capacitor such as JIS configuration 692, 693, 694 and 695 type should be installed tightly to the P.C. board (allow no gap between the P.C. board and bottom of the capacitor).

2.10 Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine.

2.11 Please pay attention to that the mechanical shock to the capacitor by suction nozzle of the automatic insertion machine or automatic mounter, or by product checker, or by centering mechanism.

2.12 Soldering condition must be confirmed to be within SAMXON'S specification.

- Pb/Sn Type
  Flow Soldering: 235 ±5˚C ≤10 sec.
  Hand Soldering (Soldering iron tip): 350 ±10˚C ≤3 sec.

- Pb-free Type
  Flow Soldering: 260 ±5˚C ≤10 sec.
  Hand Soldering (Soldering iron tip): 400 ±10˚C ≤3 sec.

2.13 Do not tilt lay down or twist the capacitor body after the capacitor are soldered to the P.C. board.

2.14 Do not carry the P.C. board by grasping the soldered capacitor.

2.15 Please do not allow anything to touch the capacitor after soldering. If P.C. board are stored in stack, please make sure P.C. board or the other components do not touch the capacitor. The capacitors shall not be effected by any radiated heat from the soldered P.C. board or other components after soldering.

2.16 Do not clean capacitors with halogenated cleaning agent.

2.17 Precautions on fixing materials and coating materials.

- Do not use any ingredients which contain halogen.
- Please pay attention to remove flux and any contamination which remains in the gap between the end seal and P.C. board and dry that portion well before coating.
- Please do not apply any material all around the capacitor body but apply it partially.
- Please contact our sales office to make sure whether the curing condition of coating material would cause any problems.

2.18 Do not install screw terminal capacitor with end seal side down. When you install a screw terminal capacitor in a horizontal position, the positive terminal must be in the upper position.

3. Storage

3.1 The characteristics of aluminum electrolytic capacitors degrade when stored in a static condition for long period of time. The rate of deterioration depends upon temperature and humidity.

3.2 Capacitors should be stored at the temperature of 5˚C to 35˚C, the humidity of less than 75% RH and out of direct sunlight.

3.3 Capacitors that have been stored for long periods normally over one year should be subjected to a "voltage aging" treatment before use. This will reform and repair the oxide dielectric.

3.4 Suggested aging procedure is gradually applying the rated voltage to the capacitor(s) for 30 to 60 minutes. If the capacitance still exceeds the specified leakage current value, please do not use it.

4. Disposal

4.1 Dispose of capacitors as industrial waste.

4.2 Consignment to the waste disposal specialists to handle it professionally.

The above mentioned material according to EIAJ RCR-2367B (issued in March, 2002), titled "Guideline of notabilia for aluminum electrolyic capacitors for use in electronic equipment". Please refer to the book for details.

5. Printed Circuit Board Cleaning

5.1 Foreword

It had been generally accepted that halogen type organic solvents were hazardous to aluminum electrolytic capacitors. This is because an organic solvent can permeate the capacitor through the end seal. Then, the solvent dissolves and free chlorine ion (Cl^-ion), which can corrode the aluminum electrodes. The following measures were previously the only way to avoid this phenomenon.

- Use of cleaning agents, not hazardous to capacitors such as water or alcohol.
- Mount capacitors on PC boards cleaned with a halogen type solvent beforehand.
- Use of epoxy end seals

These measures have disadvantages with respect to working efficiency, cleaning capability, cost etc. Therefore, aluminum electrolytic capacitors which can withstand halogen type cleaning agents are desirable.

5.2 Types of Cleaning Agents

Generally there are three types of cleaning agents.

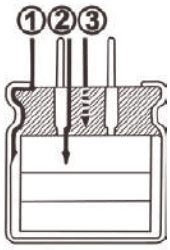
- Water type
- Alcohol type
- Halogen type

Of these, water and alcohol will have little effect even if they permeate the capacitor. However, halogens can cause corrosion of aluminum foil and tab. Common types of halogen cleaning agents are listed in Table below:

Chemical Name	Structural Formula	Representative Brand Name
Trichlorotrifluoroethane	$C_2Cl_3F_3$	Freon TF, Daiflon S-3
Fluorotrichloromethane	CCl_3F	Freon-11, Daiflon S-1
Trichloroethane	$C_2H_3Cl_3$	Chloroethene
Trichloroethylene	C_2HCl_3	Trichlene
Methyl Chloride	CH_3Cl	MC

The last four solvents listed above are particularly corrosive to aluminum and are not recommended to use as cleaning solvents.

5.3 Penetration Channel of Solvent and Corrosion Mechanism

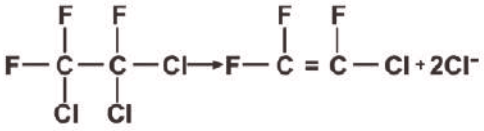


The three channels by which solvents can penetrate into the capacitor are illustrated:

- ① Penetration through a clearance between the rubber and the aluminum case (curled section)
- ② Penetration through a clearance between the rubber and the lead wires
- ③ Permeation through the rubber end seal

To reduce the possibility of solvents entering a capacitor, tight sealing is required to eliminate clearances between the rubber and the aluminum case/lead wires. A solvent resistant rubber material is also a necessity.

When a solvent, for example, trichlo-rotrifluoroethane gets inside a non anti-solvent capacitor, the chlorine ion is free as shown by the following reaction formula.



This chlorine ion reacts with aluminum as follows:

$$Al + 3Cl^- \longrightarrow AlCl_3 + 3e^-$$

Then $AlCl_3$ resolves in water, and it becomes:

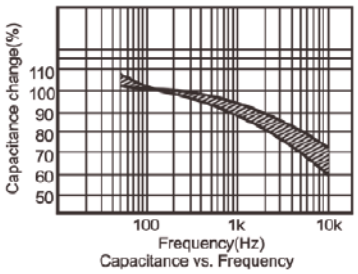
$$AlCl_3 + 3H_2O \longrightarrow Al(OH)_3 + 3H^+ + 3Cl^-$$

Thus, the Cl^-ion is free again and repeats the corrosion of aluminum. The degree of this reaction depends on the volume of solvent, the ambient temperature of the capacitor in service, the applied voltage and time etc.

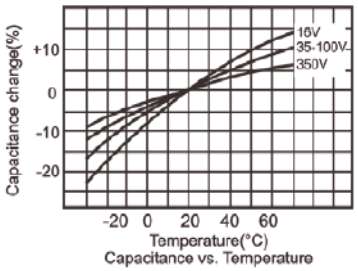
6. Basic Electrical Characteristics Capacitance:

The capacitance of capacitor is determined as AC capacitance by measuring its impedance. As the AC capacitance depends on frequency, voltage and other measuring methods, JIS C 5102 prescribes that the series capacitive component of an equivalent series circuit () shall be considered as the capacitance by measuring it at a frequency of 120Hz and a maximum AC voltage of 0.5Vrms with a DC bias voltage of 1.5 to 2.0V applied for aluminum electrolytic capacitors.

The capacitance of an aluminum electrolytic capacitor shows smaller values as a measuring frequency increases. See the typical behavior shown as right chart.



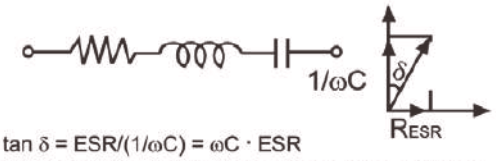
Measuring temperature as well as frequency effects the capacitance. As the measuring temperature decreases, the capacitance shows smaller values. See the typical behavior shown as right chart.



On one hand, DC capacitance, which can be determined by measuring the charge when a DC voltage is applied, shows a slightly larger value than the AC capacitance at a normal temperature and has the flatter characteristic over the temperature range.

Tan δ (tangent of loss angle or dissipation factor):

The tan δ is the ratio of the resistive component (ESR) to the capacitive reactance (1/ωC) in the equivalent series circuit, and its measuring conditions are the same as the capacitance.



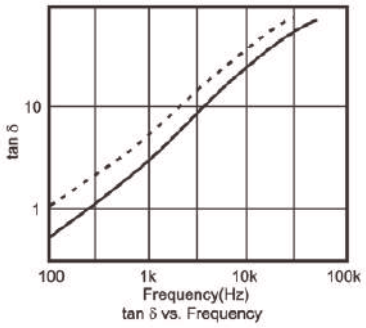
$\tan \delta = ESR/(1/\omega C) = \omega C \cdot ESR$

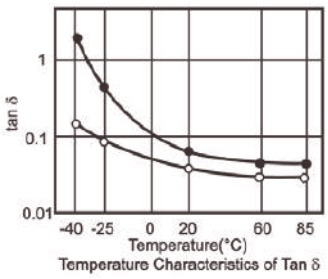
Where: ESR = Equivalent series resistor at 120Hz

$\omega = 2\pi f$

f = 120Hz

The tan δ show higher values as a measuring frequency increases and a measuring temperature decreases, as follows:





Equivalent Series Resistance (ESR)

The ESR is comprised of the resistance due to aluminum oxide layer and electrolyte/separator combination and other resistance effected with foil length, foil surface area, etc.

The ESR value depends on the temperature. Decreasing the temperature makes the resistivity of the electrolyte increase with the result of the ESR increasing.

As the measuring frequency increases, the ESR decreases and reaches an almost constant value that is mainly the frequency-independent resistance due to electrolyte/separator combination.

Impedance (Z):

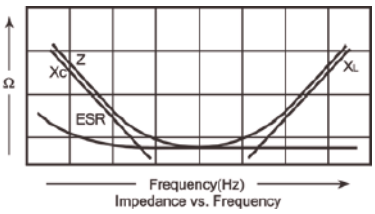
The impedance is the resistance which oppose the flow of alternating current at a specific frequency. It is related to capacitance (C) and inductance (L) in terms of capacitive and inductive reactance, and also related to the ESR. It is expressed as follows:

$$Z = \sqrt{ESR^2 + (XL - XC)^2}$$

Where: $Xc = 1/\omega C = 1/2\pi fC$

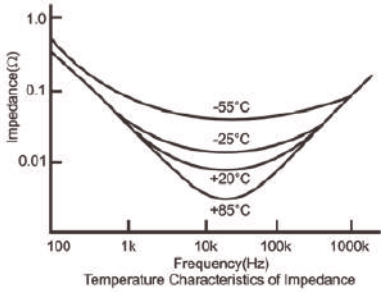
$X_L = \omega L = 2\pi fL$

As shown as right chart, the capacitive reactance (Xc) predominates at the range of low frequencies, and the impedance decreases with increasing frequency until it reaches the ESR in the middle frequency range. At the range of the higher frequencies the inductive reactance (X_L) comes to predominate, so that the impedance increases with increasing the measuring frequency.



Impedance vs. Frequency

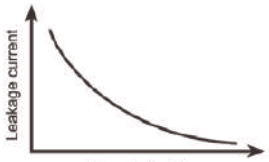
As shown as right chart, the impedance value varies with temperature, because the resistance of the electrolyte strongly changes with temperature.



Temperature Characteristics of Impedance

Leakage Current:

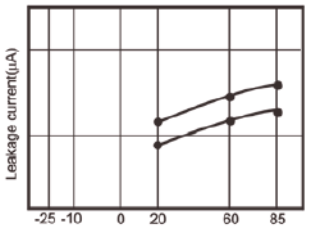
The dielectric of a capacitor has a very high resistance which prevents the flow of DC current. However, due to the characteristics of the aluminum oxide layer that functions as a dielectric in contact with electrolyte, a small amount of current, called leakage current, will flow to reform and repair the oxide layer while a voltage is being applied. As shown below, a high leakage current flows in the first minutes as a voltage is applied to the capacitor, and then the leakage current will decrease and reach an almost steady-state value with time.



Leakage Current vs Time

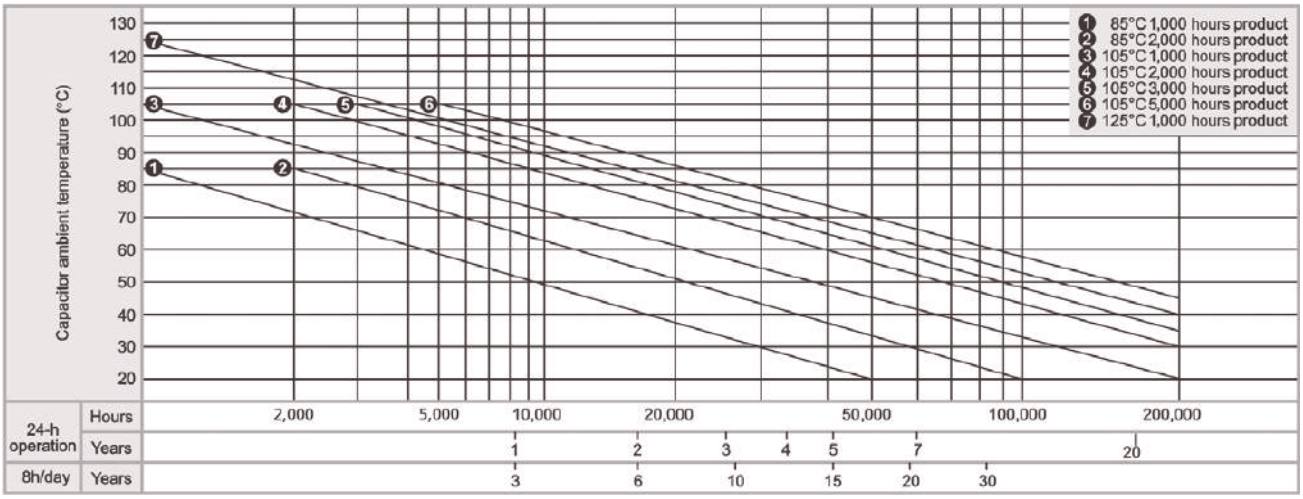
Measuring temperature and voltage effect the leakage current. The leakage current shows higher values as the temperature and voltage increase.

In general, the leakage current is measured at 20˚C by applying the rated voltage, which is applied through a resistor of 1,000Ω connected in series with the capacitor, and several minutes after the capacitor reached the rated voltage. The catalog prescribes the measuring temperature and time.



Typical Temperature Characteristics

LIFE ESTIMATION CHART



7. Quality Policy

7.1 General

Our basic corporate goals and commitment to total quality are set down in our quality policy. The quality of our products and services is an essential part of our corporate strategy, whose paramount aim is total customer satisfaction. Consistent application of quality management system results in flawless products and a high level of user benefit from our components. Our quality management system always reflects the most stringent international standards.

Our corporate goals is to play a leading role among the world's most competitive companies in electronic components. All quality management measures are geared to optimum customer benefit.

They include:

- Mastery of processes
- Continuous improvement programs to narrow process tolerances, and to increase quality and yield.
- Enhanced productivity
- Continuous optimization of material, capital and human resources.
- Promotion of innovation
- Putting customer benefit first in every product we design. Determining customer needs in partnership with customers, and rapid implementation of agreements.

The SAMXON quality management system, which is documented in the new edition of the company-wide SAMXON Quality Management Handbook, is designed to support this strategy.

7.2 Quality assurance

The required measures and regulations for quality assurance are documented in instructions on operations and procedures; the effectiveness and adequacy of the QA system are regularly checked in internal audits.

7.3 Quality programs

Project-oriented improvement programs pursuing the strategic objective of zero defects are set up and conducted by specialist teams.

7.4 Process assurance

Assurance of production processes starts as early as the planning and development phase. Quality tools like FMEA and SVP help detect and avoid potential errors, and safeguard process capability and product quality. Documentation of all production and testing steps as well as training of personnel are essential to flawless production. Statistical process control (SPC) is used wherever applicable. Permanent availability of plant is ensured by preventive maintenance.

7.5 Incoming inspection

Raw materials, parts and consumable undergo incoming inspection appropriate to their significance in the end product, unless this responsibility has been transferred to the supplier under a quality assurance agreement or similar.

7.6 In-process inspection

Wherever possible, in-process inspection in conducted to certify the conformity not only of intermediate products, but also of process supervision and control (e.g. SPC). It is generally integrated into the process steps and designed to be as preventive as possible, i.e. to avoid errors.

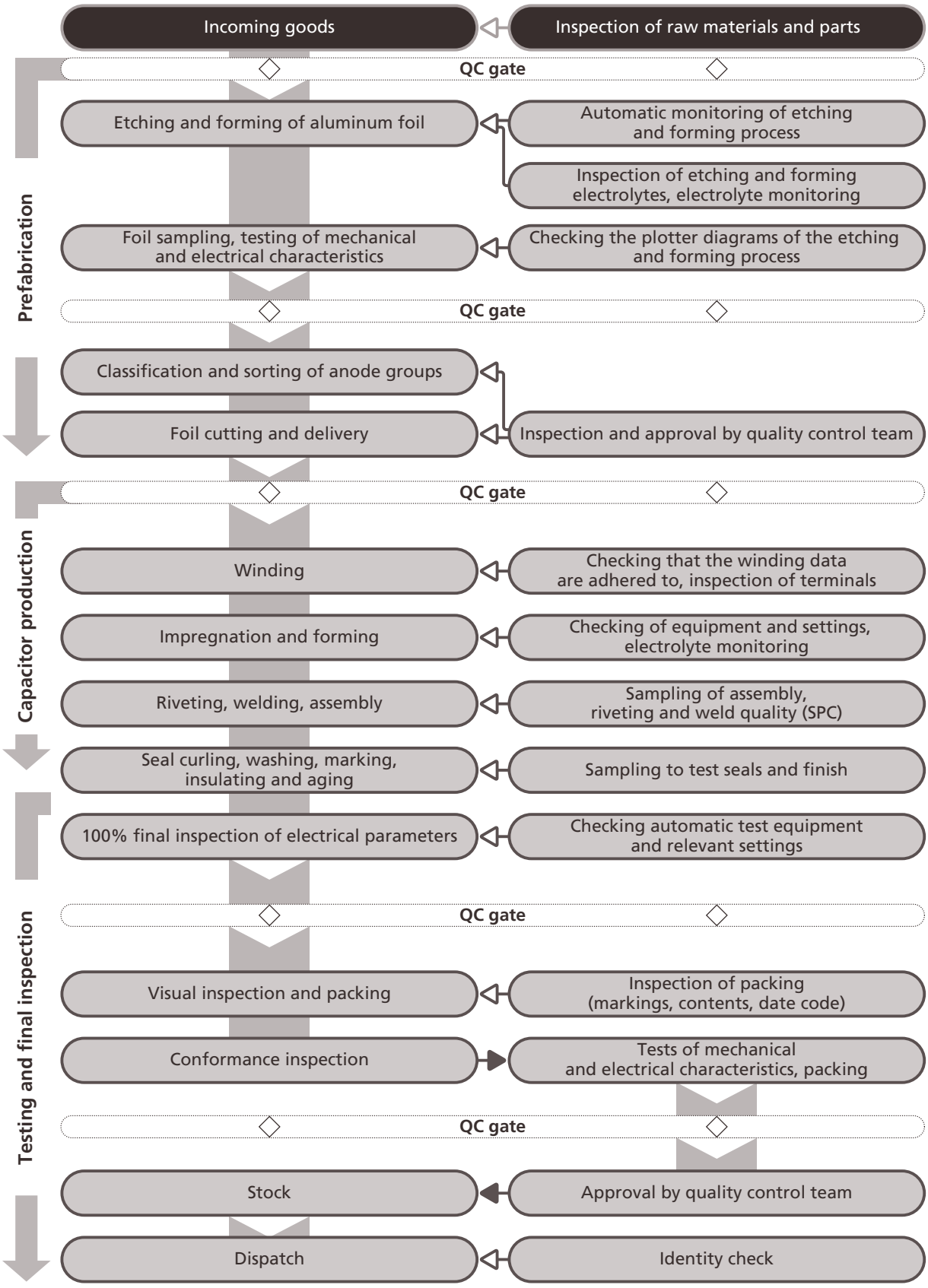
7.7 Final inspection/approval for shipment

Final inspection verifies the major properties of the end products batch by batch, usually by means of fully automated selection tests.

Approval for shipment helps certify that products shipped comply with specifications. It includes:

- Testing of principal parameter,
- Identification check and visual assessment,
- Examination of papers accompanying the batch.

8. Manufacturing and quality assurance procedures for Al electrolytic capacitors



9. Environmental

Environmental policy

Our fundamental commitment to protection of the environment is laid down in SAMXON environmental policy:

- We work continuously to lighten the burden on the environment and to reduce consumption of energy and resources beyond statutory requirements.
- We take all precautions to avoid environmental hazards and to prevent damage to the environment.
- Potential impact on the environment is assessed and flows into product and process planning at the earliest possible stage.
- Our environmental management system ensures that our environmental policy is effectively implemented. The technical and organizational procedures required are regularly monitored and constantly upgraded.
- Every employee is required to act in an environmentally conscious manner. It is a permanent task of management to promote awareness of responsibility for the environment at all levels.
- We seek to influence our business associates to follow environmental guidelines similar to ours. We supply our customers with information on environmentally friendly use of our products. We work in a spirit of cooperation with the authorities.
- We inform the public of the environmental impact of our activities and the environmental achievements of our company.

10. Compliance with RoHS Directive

The company is committed to compliance with the European Union Restriction of Hazardous Substance (RoHS) Directive. We hereby guarantee that our products do not contain following materials exceeding the RoHS Directive (2011/65/EU).

- Lead (Pb) and its compounds ≤1000ppm
- Mercury (Hg) and its compounds ≤1000ppm
- Cadmium (Cd) and its compounds ≤100ppm
- Hexavalent chromium, Cr^{6+}, Cr VI ≤1000ppm
- Polybrominated biphenyls, PBBs ≤1000ppm
- Polybrominated diphenyls, PBDEs ≤1000ppm

11. Halogen Free Compliant

The products identified in the catalogue, and their homogeneous subcomponents, do not contain any of the following substances in concentrations greater than the listed maximum limits.

Substance	Maximum Limit (ppm)
Bromine (Br)	900 ppm (0.09%)
Chlorine (Cl)	900 ppm (0.09%)
Total concentration of Chlorine (Cl) + Bromine (Br)	1500 ppm (0.15%)

Part Number System (產品編碼)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
E	G	S	1	0	5	M	1	H	D	1	1	T	C	S	A	P

CATEGORY | SERIES | CAPACITANCE | TOLERANCE | VOLTAGE | CASE SIZE | TYPE | SAMXON PRODUCT LINE | SLEEVE MATERIAL

Category	Code
ECap	E
* ECap	A
V-Chip	V

Series
KF
KS
GS
KM
KG
OM
GF
SF
GT
GK
SK
SH
SK
RS
GY
RF
RR
RT
RE
RD
RH
BD
RA
RB
RC
FA
NP
NH
RW
RY
LP
AP
QP
DP
TP
HP
UP
KP
PK
P
FP
SP
VP
GP
WR
WI
WT
WX
WF
WH
WL
WB
S1
T1
TD
TG
Z2
TL

Cap (uF)	Code
0.1	104
0.22	224
0.33	334
0.47	474
1	105
2.2	225
3.3	335
4.7	475
10	106
22	226
33	336
47	476
100	107
220	227
330	337
470	477
2200	228
22000	229
33000	339
47000	479
100000	10T
150000	15T
220000	22T
330000	33T
1000000	10M
1500000	15M
2200000	22M
3300000	33M

Tol. (%)	Code
±5	J
±10	K
±15	L
±20	M
±30	N
-40 0	W
-20 0	A
-20 +10	C
-20 +40	X
-20 +50	S
-10 0	B
-10 +20	V
-10 +30	Q
-10 +50	T
+13 +50	E
-5 +15	F
-5 +20	G
0 +20	R
0 +30	O
0 +50	I
+5 +15	Z
+5 +20	D
+10 +50	H

Vol. (W.V.)	Code
2	0D
2.5	0E
4	0G
6.3	0J
8	0K
10	1A
12.5	1B
16	1C
20	1D
25	1E
30	1I
32	13
35	1V
40	1G
42	1M
50	1H
57	1L
63	1J
71	1S
75	1T
80	1K
85	1R
90	19
100	2A
120	2O
125	2B
150	2Z
160	2C
180	2P
200	2D
215	22
220	2N
230	23
250	2E
275	2T
300	2I
310	2R
315	2F
330	2U
350	2V
360	2X
375	2Q
385	2Y
400	2G
420	2M
450	2W
500	2H
550	25
600	26
630	2J

Case Size	
Diameter(Φ)	Code
3	B
3.5	1
4	C
5	D
6.3	E
8	F
10	G
12.5	I
13	J
13.5	V
14	4
14.5	A
16	K
16.5	7
18	L
18.5	8
20	M
22	N
25	O
30	P
34	W
35	Q
40	R
42	4
45	6
51	S
63.5	T
76	U
80	8
90	X
100	Z
Len. (mm)	Code
4.5	45
5	05
5.4	54
7	07
7.7	77
10.2	T2
11	11
11.5	1A
12	12
12.5	1B
13	13
13.5	1C
20	20
25	25
29.5	2J
30	30
31.5	3A
35	35
35.5	3E
50	50
80	80
100	1L
105	1K
110	1M
120	1N
130	1P
140	1Q
150	1R
155	1E
160	1S
165	1F
170	1T
180	1U
190	1V
200	2L
215	2A
210	2M
220	2N
240	2Q
250	2R
260	2S
270	2T

Feature	Code
Radial bulk	RR
Ammo Taping	
2.0mm Pitch	TT
2.5mm Pitch	TU
3.5mm Pitch	TV
5.0mm Pitch	TC
Lead Cut & Form	
CB-Type	CB
CE-Type	CE
HE-Type	HE
KD-Type	KD
FD-Type	FD
EH-Type	EH
PCB Terminal	
Snap-in	SW
	SX
	SZ
Lug	SG
Screw	O5
	O6
	T5
	T6
	D5
	D6

SAMXON Product Line
For internal use only (The product lines we have H,A,B,C,D,E,M or 0,1,2,3,4,5,9).

Sleeve Material	Code
PET	P
PVC	If the sleeve material is PVC, there will be blank in seventeenth digit.

* Automative

Taping Specifications (編帶產品規格)

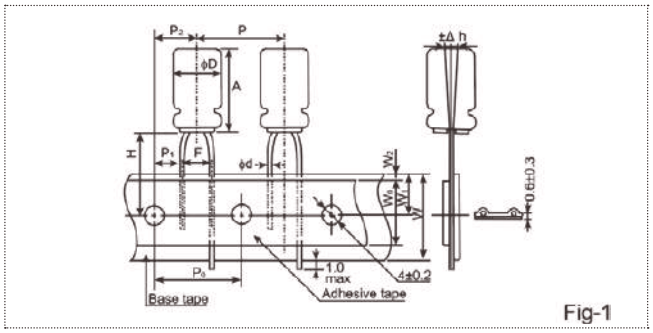


Fig-1

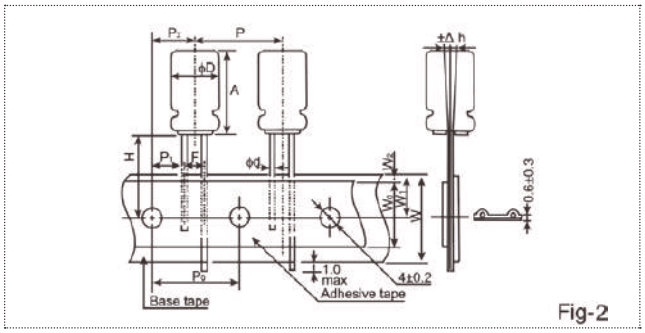


Fig-2

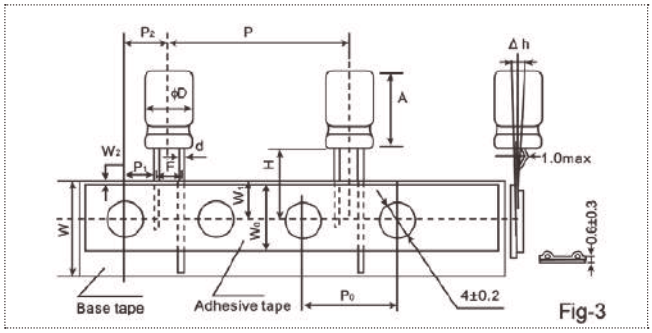


Fig-3

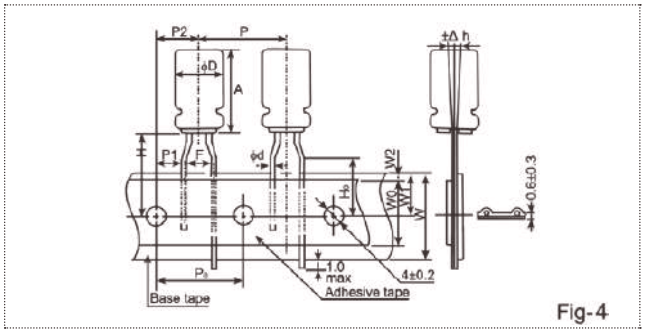
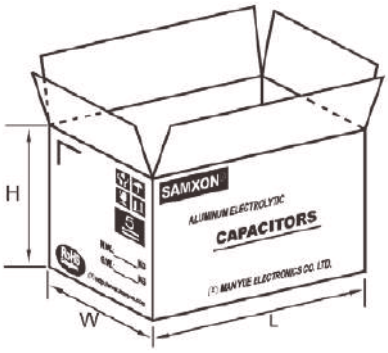


Fig-4

SPECIFICATIONS

Item		Dimensions (mm)														
Reference figure		Fig 1			Fig 2					Fig 3	Fig 4					Tol.
Diameter	D	3	4 ~ 5	5	6.3		8	10	12.5	16, 18	4, 5, 6.3	5, 6.3	8			
Height	A	5	5 ~ 7	9 ~ 15	5 ~ 7	9 ~ 15	11 ~ 20	9 ~ 21	15 ~ 35	15 ~ 40	5 ~ 7	9 ~ 15	5 ~ 9	11 ~ 20		
Lead Diameter	d	0.4	0.45	0.5	0.45	0.5	0.5	0.6	0.6	0.8	0.45	0.5	0.45	0.5		±0.05
Component Spacing	P	12.7			12.7		12.7	12.7	15	30	12.7		12.7			±1.0
Pitch of sprocket holes	P_0	12.7			12.7		12.7	12.7	15	15	12.7		12.7			±0.2
Distance between centres of component leads	F	2.5			2.5		3.5	5.0	5.0	7.5	5.0		5.0			$\pm^{0.8}_{0.5}$
Carrier tape width	W	18.0			18.0		18.0	18.0	18.0	18.0	18.0		18.0			±0.5
Distance between the center of upper edge of carrier tape and sprocket holes	W_1	9.0			9.0		9.0	9.0	9.0	9.0	9.0		9.0			±0.5
Distance between the abscissa and the bottom of the components body	H	18.5			18.5		18.5	18.5	18.5	18.5	17.5	18.5	17.5	20.0		$\pm^{0.75}_{0.5}$
Distance between the abscissa and the reference plane of the components with crimped leads	H_0	–			–		–	–	–	–	16.0		16.0			±0.5
Hold down tape width	W_0	7.0			7.0		7.0	7.0	12	12	7.0		7.0			Min.
Max. lateral deviation of the component body vertical to the tape plane	△h	0			0		0	0	0	0	0		0			±1.0
Distance between the upper edges of the carrier tape and the hold down tape	W_2	0 ~ 3			0 ~ 3		0 ~ 3	0 ~ 3	0 ~ 3	0 ~ 3	0 ~ 3		0 ~ 3			–
Distance between center of terminal and the sprocket holes	P_1	5.1			5.1		4.6	3.85	5.0	3.75	3.85		3.85			±0.5
Distance between center of the component and sprocket holes	P_2	6.35			6.35		6.35	6.35	7.5	7.5	6.35		6.35			±1.0

Packing Specifications (包裝規格)



PACKING QUANTITY (TAPING TYPE)

ΦD x L (mm)	L (mm)	W (mm)	H (mm)	Inner Box Quantity	Outer Box Quantity
3 x 5	330	229	51	3,000	30,000
4 x 5 ~ 7	330	229	51	2,500	25,000
5 x 5 ~ 11	330	229	51	2,000	20,000
6.3 x 5 ~ 12	330	229	51	1,500	15,000
8 x 5 ~ 12	330	229	51	1,000	10,000
8 x 14 ~ 20	330	229	64	1,000	8,000
10 x 12.5	330	191	51	500	5,000
10 x 16	330	191	56	500	5,000
10 x 20 ~ 25	323	191	64	500	4,000
10 x 30	330	191	69	500	4,000
12.5 x 20	325	267	58	500	2,000
12.5 x 25	325	270	63	500	2,000
12.5 x 35	325	270	74	500	2,000
16 x 25	315	221	63	250	1,000
16 x 30 ~ 35	315	221	76	250	1,500
18 x 20 ~ 25	343	275	63	250	1,000
18 x 30 ~ 35	343	275	73	250	500
18 x 40	343	275	73	250	500

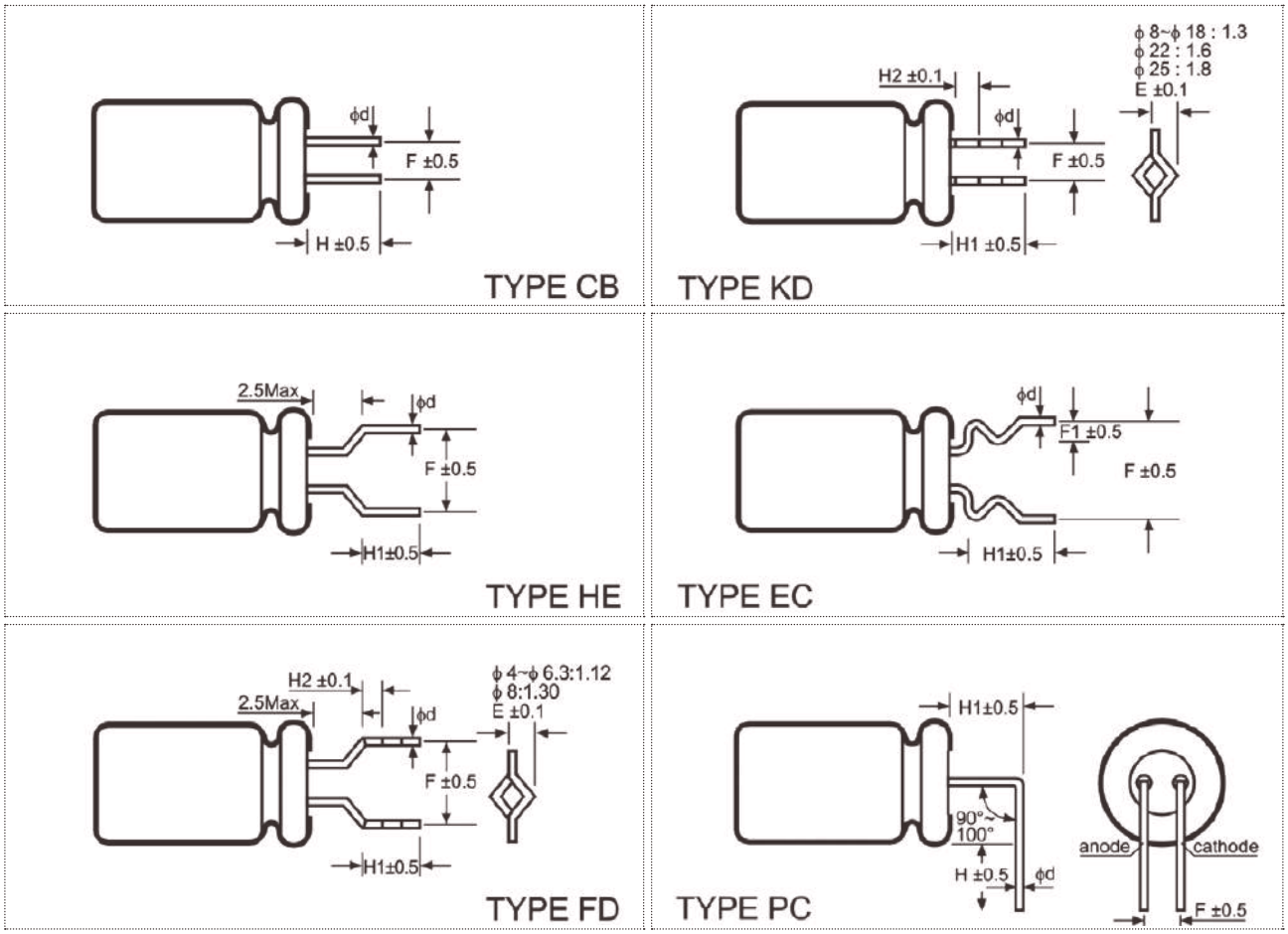
PACKING QUANTITY (BULK TYPE)

Long Lead Wire Product			
ΦD x L (mm)	Plastic Bag Quantity	Inner Box Quantity	Outer Box Quantity
3 x 5	1,000	24,000	96,000
4 x 5	1,000	16,000	64,000
4 x 7	1,000	14,000	56,000
5 x 5	1,000	12,000	48,000
5 x 7	1,000	10,000	40,000
5 x 11	1,000	8,000	32,000
6.3 x 5 ~ 7	1,000	8,000	32,000
6.3 x 11	1,000	6,000	24,000
8 x 5 ~ 7	1,000	6,000	24,000
8 x 9	500	4,000	16,000
8 x 10 ~ 16	500	3,000	12,000
8 x 20	200	1,600	6,400
8 x 25	200	1,200	4,800
10 x 12.5	400	2,400	9,600
10 x 15 ~ 20	200	1,200	7,200
10 x 25 ~ 30	200	1,200	4,800
12.5 x 20	150	1,200	4,800
12.5 x 25	150	900	3,600
12.5 x 30 ~ 35	100	600	2,400
12.5 x 40	–	300	1,800
16 x 20	–	200	2,000
16 x 25 ~ 30	–	200	1,600
16 x 35 ~ 40	–	200	1,200
18 x 15 ~ 20	–	150	1,500
18 x 25 ~ 30	–	150	1,200
18 x 35 ~ 50	–	150	900

PACKING QUANTITY (SNAP-IN)

Snap-in Terminal Product					
ΦD x L (mm)	Inner Box Quantity	Outer Box Quantity	ΦD x L (mm)	Inner Box Quantity	Outer Box Quantity
20 x 25	100	1,200	25 x 30 ~ 35	100	800
20 x 30 ~ 40	100	1,000	25 x 40 ~ 50	100	600
22 x 25	100	1,200	30 x 30 ~ 35	50	500
22 x 30 ~ 40	100	1,000	30 x 40 ~ 50	50	400
22 x 45 ~ 50	100	800	35 x 30 ~ 35	40	400
25 x 25	100	1,000	35 x 40 ~ 50	40	320

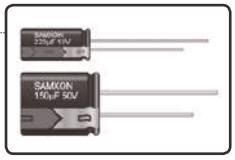
Lead Forming Specifications (成型產品規格)



SHAPE CODE	ΦD	4	5	6.3	8 (L >5mm)	10	13	16	18
CB	F	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5
	H	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	Φd ±0.05	0.45	0.5	0.5	0.5	0.6	0.6	0.8	0.8
HE	F	5.0	5.0	5.0	5.0	–	–	–	–
	H1	5.0	5.0	5.0	5.0	–	–	–	–
	Φd ±0.05	0.45	0.5	0.5	0.5	–	–	–	–
FD	F	5.0	5.0	5.0	5.0	–	–	–	–
	H1	4.5	4.5	4.5	4.5	–	–	–	–
	H2	1.8	1.8	1.8	1.8	–	–	–	–
	Φd ±0.05	0.45	0.5	0.5	0.5	–	–	–	–
	E	1.12	1.12	1.12	1.30	–	–	–	–
KD	F	–	–	–	–	5.0	5.0	7.5	7.5
	H1	–	–	–	–	4.5	4.5	4.5	4.5
	H2	–	–	–	–	2.0	2.0	2.0	2.0
	Φd ±0.05	–	–	–	–	0.6	0.6	0.8	0.8
	E	–	–	–	–	1.30	1.30	1.30	1.30
EC	F	5.0	5.0	5.0	5.0	–	–	–	–
	F1	1.2	1.2	1.2	1.2	–	–	–	–
	H1	4.0	4.0	4.0	4.0	–	–	–	–
	Φd ±0.05	0.45	0.5	0.5	0.5	–	–	–	–
PC	F	–	2.0	2.5	3.5	5.0	5.0	7.5	7.5
	H	–	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	H1	–	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Φd ±0.05	–	0.5	0.5	0.5	0.6	0.6	0.8	0.8

+105˚C, High Ripple Current (高紋波), Low Impendence (低阻抗品)

FEATURES

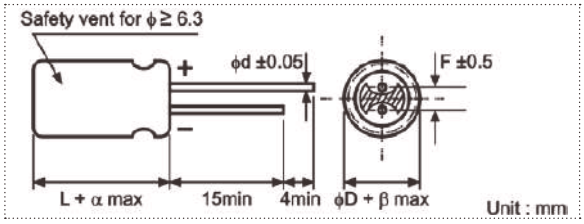


- Low impedance for high frequency.
- Life time: 1,000~4,000 hours at 105˚C.

SPECIFICATIONS

Item	Performance Characteristics
Operating Temperature Range	-40 to +105˚C
Rated Working Voltage Range	6.3 to 100V
Nominal Capacitance Range	3.3 to 4700μF
Capacitance Tolerance	±20% at 120Hz, +20˚C
Leakage Current	I ≤0.01CV or 3 (μA) whichever is greater measured after 2 minutes application of rated working voltage at +20˚C
tan δ (120Hz, +20˚C)	Working Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 tan δ (max.): 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08 For capacitance value >1000μF, add 0.02 per another 1000μF
Low Temperature Characteristics	Impedance ratio max. at 120Hz Working Voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 Z-25˚C / Z+20˚C: 4 / 3 / 2 / 2 / 2 / 2 / 2 / 2 Z-40˚C / Z+20˚C: 8 / 6 / 4 / 3 / 3 / 3 / 3 / 3
High Temperature Loading	Test time : L / ΦD: L≤7 / D5~6.3 / D8~10 / D12.5; Load life: 1,000h / 2,000h / 3,000h / 4,000h Test temperature : +105˚C Test conditions : Rated DC working voltage with rated ripple current Post test requirements at +20˚C Leakage current : ≤Initial specified value Cap. change : within ±25% of the initial measured value tan δ : ≤150% of the initial specified value
Shelf Life	At +105˚C no voltage applied after 1,000 hours and then being stabilized at +20˚C the capacitors shall meet the following limits Leakage current : ≤Initial specified value Cap. change : within ±25% of the initial measured value tan δ : ≤150% of the initial specified value
Industrial Standard	JIS C - 5101-4 (IEC 60384-4)

CASE SIZE TABLE



ΦD	4	5	6.3	8 (L <20)	8 (L ≥20)	10	12.5
F	1.5	2.0	2.5	3.5	3.5	5.0	5.0
Φd	0.45	(L ≤7) 0.45		(L ≥9) 0.50	0.6	0.6	0.6
α	(L ≤7) 1		(L ≤9 <20) 1.5		(L ≥20) 2.0		
β	(D <20) 0.5			(D ≥20) 1.0			

PART NUMBER SYSTEM (EXAMPLE : 6.3V 1000μF)

1	2 3	4 5 6	7	8 9	10	11 12	13 14
E	GF	108	M	0J	G	1B	RR

- 13 14: Type (Radial Bulk)
- 11 12: Case Length (12.5mm)
- 10: Diameter (10mm)
- 8 9: Voltage (6.3V)
- 7: Tolerance (±20%)
- 4 5 6: Capacitance (1000μF)
- 2 3: Series
- 1: E-CAP

STANDARD RATINGS

Voltage (Code)		6.3V (0J)			10V (1A)			16V (1C)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
10	106							4 x 5	5.000	50
15	156							4 x 7	3.300	70
								5 x 5	2.600	80
22	226	4 x 5	5.000	50	4 x 7	3.300	70	5 x 7	1.700	110
					5 x 5	2.600	80	5 x 5	2.600	80
33	336	5 x 5	2.600	80	5 x 5	2.600	80	6.3 x 5	1.300	115
		5 x 7	1.700	110	5 x 7	1.700	110	6.3 x 7	0.800	160
47	476	5 x 5	2.600	80	6.3 x 5	1.300	115	6.3 x 5	1.300	115
		5 x 7	1.700	110	6.3 x 7	0.800	160	6.3 x 7	0.800	160
68	686	6.3 x 5	1.300	115	6.3 x 7	0.800	160	8 x 7	0.500	200
		6.3 x 7	0.800	160						
100	107	6.3 x 5	1.300	115	8 x 7	0.500	200	6.3 x 11	0.220	340
		6.3 x 7	0.800	160				8 x 7	0.500	200
120	127							6.3 x 11	0.220	340
150	157	8 x 7	0.500	200	6.3 x 11	0.220	340	6.3 x 11	0.220	340
					8 x 7	0.500	200	8 x 12	0.130	640
180	187	6.3 x 11	0.220	340	6.3 x 11	0.220	340	6.3 x 11	0.220	340
								8 x 12	0.130	640
220	227	8 x 7	0.500	200	6.3 x 11	0.220	340	6.3 x 11	0.220	340
		6.3 x 11	0.220	340				8 x 12	0.130	640
270	277	6.3 x 11	0.220	340	6.3 x 11	0.220	340	8 x 12	0.130	640
					8 x 12	0.130	640			
330	337	6.3 x 11	0.220	340	6.3 x 11	0.220	340	6.3 x 11	0.220	340
		8 x 12	0.130	640	8 x 12	0.130	640	8 x 12	0.130	640
390	397	8 x 12	0.130	640	8 x 12	0.130	640	8 x 12	0.130	640
470	477	8 x 12	0.130	640	6.3 x 11	0.220	340	8 x 12	0.130	640
					8 x 12	0.130	640	10 x 12.5	0.080	865
560	567	8 x 12	0.130	640	8 x 12	0.130	640	10 x 12.5	0.080	865
680	687	8 x 12	0.130	640	8 x 12	0.130	640	8 x 16	0.087	840
								10 x 12.5	0.080	865
820	827	8 x 12	0.130	640	10 x 12.5	0.080	865	10 x 16	0.060	1210
		10 x 12.5	0.080	865						
1000	108	8 x 12	0.130	640	8 x 16	0.087	840	8 x 16	0.087	840
		10 x 12.5	0.080	865	10 x 16	0.060	1210	10 x 16	0.060	1210
1200	128	8 x 16	0.087	840	10 x 20	0.046	1400	10 x 20	0.046	1400
		10 x 12.5	0.080	865						
1500	158	8 x 20	0.069	1050	10 x 20	0.046	1400	10 x 20	0.046	1400
		10 x 16	0.060	1210						
1800	188	10 x 20	0.046	1400	10 x 20	0.046	1400	10 x 25	0.042	1650
								12.5 x 20	0.035	1900
2200	228	10 x 20	0.046	1400	10 x 20	0.046	1400	10 x 25	0.042	1650
								12.5 x 20	0.035	1900
2700	278	10 x 25	0.042	1650	10 x 25	0.042	1650	12.5 x 25	0.030	2124
		12.5 x 20	0.035	1900	12.5 x 20	0.035	1900			
3300	338	10 x 25	0.042	1650	12.5 x 25	0.030	2124	12.5 x 25	0.030	2124
		12.5 x 20	0.035	1900						
3900	398	12.5 x 20	0.035	1900						
4700	478	12.5 x 25	0.030	2124						

Maximum Allowable Ripple Current (mArms) at 105˚C 100kHz
Maximum Impedance (Ω) at 20˚C 100kHz

Case Size ΦD x L (mm)

STANDARD RATINGS

Voltage (Code)		25V (1E)			35V (1V)			50V (1H)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
3.3	335				4 x 5	5.000	50			
4.7	475	4 x 5	5.000	50	4 x 5	5.000	50			
6.8	685	4 x 5	5.000	50	4 x 7	3.300	70			
					5 x 5	2.600	80			
10	106	4 x 7	3.300	70	5 x 5	2.600	80			
		5 x 5	2.600	80	5 x 7	1.700	110			
15	156	5 x 7	1.700	110	6.3 x 5	1.300	115			
		6.3 x 5	1.300	115	6.3 x 7	0.800	160			
22	226	5 x 7	1.700	110	6.3 x 5	1.300	115			
		6.3 x 5	1.300	115	6.3 x 7	0.800	160			
33	336	6.3 x 5	1.300	115	8 x 7	0.500	200	6.3 x 11	0.300	295
		6.3 x 7	0.800	160						
39	396							6.3 x 11	0.300	295
47	476	8 x 7	0.500	200	6.3 x 11	0.220	340	6.3 x 11	0.300	295
56	566				6.3 x 11	0.220	340	8 x 12	0.170	555
68	686	8 x 7	0.500	200	6.3 x 11	0.220	340	8 x 12	0.170	555
82	826	6.3 x 11	0.220	340	8 x 12	0.130	640	8 x 12	0.170	555
100	107	6.3 x 11	0.220	340	6.3 x 11	0.220	340	10 x 12.5	0.120	760
					8 x 12	0.130	640			
120	127	8 x 12	0.130	640	8 x 12	0.130	640	8 x 16	0.120	730
								10 x 12.5	0.120	760
150	157	8 x 12	0.130	640	8 x 12	0.130	640	10 x 16	0.084	1050
180	187	8 x 12	0.130	640	10 x 12.5	0.080	865	8 x 20	0.091	910
								10 x 16	0.084	1050
220	227	8 x 12	0.130	640	8 x 12	0.130	640	8 x 20	0.091	910
					8 x 16	0.087	840			
					10 x 12.5	0.080	865	10 x 16	0.084	1050
270	277	8 x 12	0.130	640	10 x 16	0.060	1210	10 x 25	0.055	1440
		10 x 12.5	0.080	865						
330	337	8 x 12	0.130	640	8 x 16	0.087	840	12.5 x 20	0.045	1660
					8 x 20	0.069	1050			
		10 x 12.5	0.080	865	10 x 12.5	0.080	865			
					10 x 16	0.060	1210			
390	397	10 x 12.5	0.080	865	10 x 16	0.060	1210	12.5 x 20	0.045	1660
470	477	8 x 16	0.087	840	10 x 16	0.060	1210	12.5 x 25	0.034	1950
		10 x 12.5	0.080	865						
		10 x 16	0.060	1210	10 x 20	0.046	1400			
560	567	10 x 16	0.060	1210	10 x 20	0.046	1400	12.5 x 25	0.034	1950
680	687	10 x 16	0.060	1210	10 x 20	0.046	1400			
		10 x 20	0.046	1400	12.5 x 20	0.035	1900			
820	827	10 x 20	0.046	1400	10 x 25	0.042	1650			
					12.5 x 20	0.035	1900			
1000	108	10 x 20	0.046	1400	12.5 x 20	0.035	1900			
					12.5 x 25	0.030	2124			
1200	128	10 x 20	0.046	1400						
1500	158	10 x 25	0.042	1650						
		12.5 x 20	0.035	1900						
1800	188	12.5 x 25	0.030	2124						
2200	228	12.5 x 25	0.030	2124						

Maximum Allowable Ripple Current (mArms) at 105˚C 100kHz
Maximum Impedance (Ω) at 20˚C 100kHz

Case Size ΦD x L (mm)

SAMXON®
Aluminum Electrolytic Capacitors

+105˚C, High Ripple Current (高紋波), Low Impendence (低阻抗品)

STANDARD RATINGS

Voltage (Code)		63V (1J)			100V (2A)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
15	156				6.3 x 11	0.960	115
22	226	6.3 x 11	0.960	115			
27	276	6.3 x 11	0.960	115	8 x 12	0.504	232
33	336	6.3 x 11	0.960	115			
39	396	8 x 12	0.504	232	8 x 16	0.360	300
47	476	8 x 12	0.504	232	10 x 12.5	0.344	314
56	566	8 x 12	0.504	232	8 x 20	0.264	362
68	686	8 x 12	0.504	232	10 x 16	0.248	357
82	826	10 x 12.5	0.344	314	10 x 20	0.168	466
100	107	8 x 16	0.360	300	10 x 20	0.168	466
		10 x 12.5	0.344	314	12.5 x 20	0.128	690
120	127	8 x 16	0.360	300	12.5 x 20	0.128	690
		10 x 16	0.248	357			
150	157	8 x 20	0.264	362			
180	187	10 x 20	0.168	466	12.5 x 25	0.096	922
220	227	10 x 16	0.248	357	12.5 x 25	0.096	922
		10 x 20	0.168	466			
270	277	12.5 x 20	0.128	690			
330	337	12.5 x 20	0.128	690			
390	397	12.5 x 25	0.096	922			

Maximum Allowable Ripple Current (mArms) at 105˚C 100kHz
Maximum Impedance (Ω) at 20˚C 100kHz

Case Size ΦD x L (mm)

RIPPLE CURRENT MULTIPLIER

Frequency Coefficient

Coefficient / Freq. (Hz) / Cap (μF)	120	1k	10k	100k
≤180	0.40	0.75	0.90	1.00
220~560	0.50	0.85	0.94	1.00
680~1800	0.60	0.87	0.95	1.00
2200~3900	0.75	0.90	0.95	1.00
4700	0.85	0.95	0.98	1.00