DECON

Drive the Future with Innovation and Technology

High Quality

Electrolytic Capacitors

With Environmental Technologies

For Digital & Power Electronics

RoHS Compliant / IECQ / ISO 9001 / ISO 14001

Catalogue Version: 032

■Always read "Application & Guidelines" before using the product in order to enable you to use the product correctly and prevent any faults and accidents from occurring.

■Request the Product Specification on the product of DECON to refer to it as well as this brochure prior to the order of the products. Some specific notes on use of the ordered product may be described in the specifications.

■The products listed in this catalog are designed and manufactured for general electronics equipment use and are not intended for use in applications that can adversely affect human life; where the malfunction of equipment may cause damage to life or property. In addition, our products are not intended to be used in specific applications that may cause a major social impact. Please consult with us in advance of usage of our products in the following listed applications.
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■The circuits described as examples in this catalog and the "approved specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems. We are not in any case responsible for any failures or damage caused by the use of information contained herein. You should examine our products (includes customer specific non-standard products), of which the characteristics are described in the "approved specifications" and other documents, and determine whether or not our products (includes customer specific non-standard products) suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products. Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.

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Miniature Radial Lead Type Aluminum Electrolytic Capacitors 小型引线型铝电解电容器

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DECON

Large Can Type Aluminum Electrolytic Capacitors 大型铝电解电容器

1. Circuit Design

(1) Please make sure the application and mounting conditions to which the capacitor will be exposed to are within the conditions specified in catalog or alternate product specification (Referred as to specification here after).

(2) Operating temperature and applied ripple current shall be within the specification.

① The capacitor shall not be used in an ambient temperature which exceeds the operating temperature specified in the specification.

② Do not apply excessive current which exceeds the allowable ripple current.

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

(4) Aluminum electrolytic capacitors are polarized. Make sure that no reverse voltage or AC voltage is applied to the capacitors. Please use bi-polar capacitors for a circuit that can possibly see reversed polarity.

Note: Even bi-polar capacitors can not be used for AC voltage application.

(5) For a circuit that repeats rapid charging/discharging of electricity, an appropriate capacitor that is capable of enduring such a condition must be used. Welding machines and photo flash are a few examples of products that contain such a circuit. In addition, rapid charging/discharging may be repeated in control circuits for servomotors, In which the circuit voltage fluctuates substantially. For appropriate choice of capacitors for circuit that repeat rapid charging/discharging, please consult DECON.

(6) Make sure that no excess voltage (that is, higher than the rated voltage) is applied to the capacitor.

① Please pay attention so that the peak voltage, which is DC voltage overlapped by ripple current, will not exceed the rated voltage.

② 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 be will applied to each capacitor equally using a balancing resistor in parallel with the capacitors.

(7) Aluminum electrolytic capacitors must be electrically isolated as follows:

The aluminum case and the cathode foil are connected by the unstable resistance of a naturally formed oxide layer inside the aluminum case and the electrolyte.

① <a> Case and negative terminal

<b> Case and positive terminal

<c> Case and circuit pattern

② Auxiliary terminal of can type and negative and positive terminal, including the circuit pattern.

③ Case and both terminals of a bi-polarized capacitor.

(8) 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.

(9) Capacitors may fail if they are used under the following conditions:

① Environmental (climatic) conditions

<a> Being exposed to water, high temperature & high humidity atmosphere, or condensation of moisture.

<b> Being exposed to oil or an atmosphere that is filled with particles of oil.

<c> Being exposed to salty water or an atmosphere that is filled with particles of salt.

<d> In an atmosphere filled whith toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, ammonia, etc.)

<e> Being exposed to direct sunlight, ozone, ultraviolet ray, or radication

<f> Being exposed to acidic or alkaline solutions

② Under severe conditions where vibration and/or mechanical shock exceed the applicable ranges of the specifications.

(10) When designing a P.C. board, please pay attention to the following:

① Have the hole spacing on the P.C. board match the lead spacing of the capacitor.

② There should not be any circuit pattern or circuit wire above the capacitor pressure relief vent.

③ Unless otherwise specified, following clearance should be made above the pressure relief vent.

Case Diameter	Clearance Required
Φ 8~16	2mm or more
Φ 18~35	3mm or more
Φ 40 or more	5mm or more

④ 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.

⑤ Screw terminal capacitors must be installed with their end seal side facing up. When you install a screw terminal capacitor in a horizontal position, the positive terminal must be in the upper position.

(11) 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 result in smoking or catching fire. Do not locate any circuit pattern beneath the capacitor end seal.

(12) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reverse side of P.C. board (under the capacitor).

(13) Please refer to the pad size layout recommendations in our catalog when designing in surface mount capacitors.

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

(15) When you mount capacitors on the double-sided P.C. boards, do not place capacitors on circuit patterns or over on unused holes.

(16) The torque for terminal screw or brackets screws shall be within the specified value on DECON's drawings.

(17) When you install more than 2 capacitors in parallel, consider the balance of current flowing through the capacitors. Especially, When a solid conductive polymer aluminum electrolytic capacitor and a standard aluminum electrolytic capacitor are connected in parallel, special consideration must be given.

(18) If more than 2 aluminum electrolytic capacitors are used in series, make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each capacitor equally using a balancing resistor in parallel with each capacitor.

2. Mounting

(1) Once a capacitor has been assembled in the set and power applied, Even if a capacitor is discharged, an electric potential (restriking voltage) may exist between the terminals.

(2) Electric potential between positive and negative terminal may exist as a result of returned electromotive force, so please discharge the capacitor using a 1k ohm resistor.

(3) Leakage current of the parts that have been stored for more than 1/2 year may increase. When leakage current has increased, please perform a voltage treatment using 1k ohm resistor.

(4) Please confirm ratings before installing capacitors on the P.C. board.

(5) Please confirm polarity before in stalling capacitors on the P.C. board.

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

(7) Do not damage the capacitor while installing.

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

(9) Snap-in can type capacitor should be installed tightly to the P.C. board (allow no gap between the P.C. board an bottom of the capacitor).

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

(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.

(12) Hand soldering.

① Soldering condition shall be confirmed to be within the specification.

② If it is necessary that the leads must be formed due to a mismatch of the lead space to hole space on the board, bend the lead prior to soldering without applying too much stress to the capacitor.

③ If you need to remove parts which were soldered, please melt the solder enough so that stress is not applied to lead.

④ Please pay attention so that solder iron does not touch any portion of capacitor body.

(13) Flow soldering (Wave solder)

① Aluminum capacitor body must not be submerged into the solder bath. Aluminum capacitors must be mounted on the "top side" of the P.C. board and only allow the bottom side of the P.C. board to come in contact with the solder.

② Soldering condition must be confirmed to be within DECON specification.

③ Please avoid having flux adhere to any portion except the terminal.

④ Please avoid contact between other components and the aluminum capacitor.

(14) Reflow soldering (SMD only)

① Soldering condition must be confirmed to be within DECON specification.

② When an infrared heater is used, please pay attention to the extent of heating since the absorption rate of infrared, will vary due to difference in the color of the capacitor body, material of the sleeve and capacitor size.

(15) Soldeing flux

There are non-halogen types of flux that do not contain ionic halides, but contain many non-ionic halides. When these non-ionic halides infiltrate the capacitor, they cause a chemical reaction that is just as harmful as the use of cleaning agents. Use soldering flux that dose not contain non-ionic halides.

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

(17) Do not carry the P.C. board by grasping the soldered capacitor.

(18) Please do not allow anything to touch the capacitor after soldering. If P.C. board are stored in a 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.

(19) Recommended Cleaning Condition

Applicable : Any type, any ratings.

Cleaning Agents : Based Alcohol solvent cleaning agent

Isopropyl Alcohol

Based water solvent cleaning agent

·Premium Alcohol solvent type

Pine Alpha ST-100S

NEWPOL B-12

·Surfactant type

Clean Through 750HS, 750HN, 750K, 750J

Cleaning Conditions : Total cleaning time shall be no greater than 5 minutes by immersion, ultrasonic or other method.

(Temperature of the cleaning agent shall be 60℃ maximum.)

After cleaning, capacitors should be dried using hot air for minimum of 10 minutes along with the PC board with parts mounted.

Hot air temperature should be below the maximum operating temperature of the capacitor.

Insufficient dries after water rinse may cause appearance problems, such as sleeve shrinking, bottom plate bulging.

In addition, a monitoring of the contamination of cleaning agents (electric conductivity, pH, specific gravity, water content, etc.) must be implemented.

After the cleaning, do not keep the capacitors in an atmosphere containing the cleaning agent or in an air tight container.

Depending on the cleaning method, the marking on a capacitor may be erased or blurred.

Consult DECON before using a cleaning method or a cleaning agent other than those recommended.

(20) Fixing Material and Coating Material

① Do not use any affixing or coating materials, which contain halide substance.

② Remove flux and any contamination, which remains in the gap between the end seal and PC board.

③ Please dry the cleaning agent on the PC board before using affixing or coating materials.

④ Please do not apply any material all around the end seal when using affixing or coating materials.

There are variations of cleaning agents, fixing and coating materials, so please contact those manufacture or our sales office to make sure that the material would not cause any problems.

(21) Others

Wooden package material may be subjected to fumigation by a halogen (e.g. methyl bromide) before they are exported in order to protect them against pests. If devices with aluminum electrolytic capacitors or capacitors themselves are directly fumigated or packed with the pallet that is fumigated, the capacitors may internally corrode due to the halogen contents of fumigation agents.

3. In the equipment

(1) Do not directly touch terminal by hand.

(2) Do not short between terminals with conductor, nor spill conductible liquid such as alkaline or acidic solution on or near the capacitor.

(3) Please make sure that the ambient conditions where the set is installed will be free from spilling water or oil, direct sunlight, ultraviolet rays, radiation, poisonous gases, vibration or mechanical shock.

4. Maintenance Inspection

(1) Please periodically inspect the aluminum capacitors that are installed in industrial equipment. The following items should be checked:

① Appearance : Remarkable abnormality such as vent operation, leaking electrolyte etc.

② Electrical characteristic: Capacitance, dielectric loss tangent, leakage current, and items specified in the specification.

5. In an Emergency

(1) If you see smoke due to operation of safety vent, turn off the main switch or pull out the plug from the outlet.

(2) Do not bring your face near the capacitor when the pressure relief vent operates. The gasses emitted from that are over 100℃.
If the gas gets into your eyes, please flush your eyes immediately in pure water.
If you breathe the gas, immediately wash out your mouth and throat with water.
Do not ingest electrolyte. If your skin is exposed to electrolyte, please wash it away using soap and water.

6. Storage

(1) It is recommended to keep capacitors between the ambient temperatures of 5℃ to 35℃ and a relative humidity of 75% or below.

(2) Confirm that the environment does not have any of the following conditions:

① Where capacitors are exposed to water, high temperature & high humidity atmosphere, or condensation of moisture.

② Where capacitors are exposed to oil or an atmosphere that is filled with particles of oil.

③ Where capacitors are exposed to salty water, high temperature & high humidity atmosphere, or condensation of moisture.

④ The atmosphere is filled with toxic acid gasses (e.g. hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, etc.)

⑤ The atmosphere is filled with toxic alkaline gasses (e.g. ammonia)

⑥ Where capacitors are exposed to acidic or alkaline solutions.

(3) In order to maintain a good solderability of the parts, shelf life of parts should not exceed 1 year.

7. Disposal

(1) Take either of the following methods in disposing of capacitors.

① Make a hole in the capacitor body or crush capacitors and incinerate them.

② If incineration is not applicable, hand them over to a waste disposal agent and have them buried in a landfill.

(2) When removing a capacitor from the circuit board or when disposing of capacitor please ensure that the capacitor is properly discharged.

铝电解电容器的使用注意事项

1 电路设计中的注意事项

（1）使用电容器时，请在确认使用环境及安装环境之后，在电容器产品目录或规格书、图纸交付申请书（以下称为承认申请书）中规定的电容器额定性能的范围内进行使用。若使用条件超出额定性能，则会导致电容器损坏、冒烟、起火。

（2）使用温度及使用纹波电流不可超出产品目录或承认申请书中规定的范围。

① 不可在超出使用上限温度（最高使用温度）的温度下使用；

② 不可接通过电流（超过额定纹波电流的电流）。

（3）进行电路设计时，请选用与机器寿命相符的电容器。

（4）电容器为极性电容器，要确认有无连接反向电压或交流电压，在极性反转电路中请选用双极极性电容器，但是双极性电容器也不可以用于交流电路。

（5）在反复快速充放电的电路中请选择符合使用条件的电容器。

反复快速充放电的电路包括焊接机、闪光灯等。此外，电路电压变动较大、伺服马达等旋转设备的控制电路也会出现反复快速充放电的情况。关于在反复快速充放电的电路中使用的电容器相关事宜敬请咨询。

（6）请确认电容器上是否施加了过电压（超过额定电压的电压）。

① 请确保直流电压与纹波电压（交流成分）重叠时的峰值不要超过额定电压；

② 串联两个以上电容器时，请确保各电容器上施加的电压在额定电压以下。此时请并联分压电阻器，以备发生漏电流。

（7）电容器在以下情况要从电路中完全隔离开。

（电容器的铝壳和阴极端子之间由铝壳内侧的自然氧化皮膜和电解液的不稳定电阻部分连接在一起）

① 铝壳和阴极端子及阳极端子和电路板之间；

② 基板自立型空白端子和其他阳极端子及阴极端子和电路板之间；

③ 双极性电容器的两个端子与铝壳之间。

（8）电容器的封装套管非绝缘保证型，请勿用于需要绝缘功能的地方，需要外套具有绝缘功能时敬请咨询。

（9）电容器如果在以下环境中使用，有时可能会发生故障。

① 周围环境（耐气候性）条件

(a) 直接溅水的环境、高温高湿的环境及结露的环境

(b) 直接溅油的环境及充满油雾的环境

(c) 直接溅盐水的环境及充满盐分的环境

(d) 充满有毒气体（硫化氢、亚硫酸、氯气、溴气、溴甲烷、氨气等）的环境

(e) 有直射日光、臭氧、紫外线及放射线照射的环境

(f) 有酸性及碱性溶剂溅落的环境

② 振动或冲击条件超过承认申请书规定范围的苛刻环境。

（10）将电容器安装到印刷电路板上时，请事先确认以下内容再进行设计。

①将印刷电路板的孔间隔与电容器的端子间隔对合；

②设计时不可将配线及电路板靠近到电容器的压力阀部分；

③只要承认申请书中没有规定，电容器的压力阀部分上面均应保留出如下所述的间隔：

产品直径	间隔
8~16mm	2mm 以上
18~35mm	3mm 以上
40mm 以上	5mm 以上

④印刷电路板一侧装有电容器的压力阀时，请对准压力阀的位置，将压力阀工作时的排气孔打开；

⑤安装时请勿将螺栓端子型的封口部朝下，横向放置时，请勿使压力阀及阳极端子朝下。

（11）电容器封口部的下面如果有印刷线路，一旦发生电解液泄露时，可能会造成印刷线路短路，发生由漏电痕迹或电迁移引发的冒烟、起火，因此，请勿在电容器封口部的下面配置印刷线路。

（12）请勿在电容器的周围及印刷电路板的背面（电容器下面）配置发热部件。

（13）贴片型电容器用印刷电路板的焊盘图形要参照产品目录或承认申请书的推荐图形进行电路设计。

（14）电容器的电气特性会根据温度及频率的变动而变化，请在确认该变化量的基础上进行电路设计。

（15）在双面印刷电路板上安装电容器时，在进行电路设计时，请将电路设计成电容器下面没有多余的印刷电路板孔及正反面连接用贯通孔的样式。

（16）螺栓端子的紧固及电容器主体安装用螺丝的紧固扭矩不可超出承认申请书中规定的范围。

（17）并联两个以上的电容器时，需要充分考虑电流平衡。

（18）串联两个以上电容器时，要考虑电压平衡，并将分压电阻器插入，使其与电容器并联。

2 安装注意事项

（1）对组装到设备上已经通电的电容器，请勿再次使用。除了定期检修时为检测电气性能而拆卸的电容器外，均不能再次使用；

（2）即使将电容器放电后，端子间仍有可能产生电压（再闪击电压），此时请通过 1kΩ 的电阻器进行放电；

（3）存放达半年以上的电容器的漏电流有可能会增大，此时请通过 1kΩ 的电阻器进行电压处理；

（4）请确认电容器的额定值（静电容量及电压）后再进行安装；

（5）请确认电容器的极性后再进行安装；

（6）请勿将电容器跌落到地上，请勿使用跌落后的电容器；

（7）安装时请勿使电容器主体变形；

（8）请确认电容器的端子间隔和印刷电路板孔间隔一致后再进行安装；

（9）基板自立型电容器在安装时要推入到与其基板密合的程度（非浮起状态）；

（10）利用自动插入机扭结固定电容器引线的强度不可过大；

（11）请注意由自动插入机及装配机的吸附器、产品检验器及对中操作所引起的冲击力；

（12）利用烙铁进行的焊接：

①焊接条件（温度、时间）不可超出承认申请书中规定的范围；

②因端子间隔和印刷电路板孔间隔不一致而需要加工引线端子时，在进行焊接之前，加工时不可使电容器主体承受压力；

③利用烙铁进行修整时，如果需要先将焊接的电容器卸下，请将焊锡充分融化后再拆卸，以免使电容器的端子承受压力；

④请勿让烙铁的烙铁头接触到电容器的主体。

（13）流动焊

①进行焊接时，请勿将电容器主体浸入焊料中。插入印刷电路板，只有对电容器一侧的相反侧背面进行焊接；

②焊接条件（预热、焊接温度、端子浸渍时间）不可超出承认申请书中规定的范围；

③除端子部分以外，不可附着有焊剂；

④进行焊接时，要注意避免其他部件翻倒接触到电容器。

（14）回流焊

①焊接条件（预热、焊接温度、时间、回流次数）不可超出承认申请书中规定的范围；

②使用红外线加热器时，由于红外线吸收率根据电容器的颜色及材料的不同而不同，因此需要注意加热的程度。

（15）在无卤类焊剂中，有一些虽然不含离子性卤化合物，但却含有大量的非离子性卤化物，当这类化合物进入电容器时，将与电解液发生化学反应，可能产生与清洗后结果相同的不良影响。请选用不含有非离子性卤化合物的焊剂。

（16）焊接时以及因固定电容器用的树脂的硬化等而使电容器在150℃以上的环境大气中放置2分钟以上，或让高温气体、热射线直接接触电容器时，外装套管有时会发生收缩、膨胀、龟裂。

（17）将电容器焊接到印刷电路板上之后，不可将电容器主体倾斜、放倒或扭曲。

（18）将电容器焊接到印刷电路板上之后，不可将电容器当作把手来移动印刷电路板。

（19）将电容器焊接到印刷电路板上之后，不可让其他物体碰撞到电容器。此外，重叠放置印刷电路板时，不可使印刷电路板或其他部件等碰到电容器。

（20）清洗

清洗方法

对象：所有品种、所有规格

乙醇类清洗剂

异丙醇

水性清洗剂

高级乙醇类

Pine Alpha ST-100S

NEWPOL B-12

界面活性剂类

Clean Through 750HS、750HN、750K、750J

清洗条件：

使用浸债、超声波等方法、清洗时间总计不超过 5 分钟。（清洗液温度为 60℃以下）

清洗后，请将电容器和安装完毕的印刷电路板同时以热风干燥 10 分钟以上。另外，当洗涤液落入了外壳和套管之间时，如果热风的温度过高，套管就会变软、膨胀，所以热风的温度不要超过套管变软的温度（80℃）。

此外，水洗后如果干燥不充分，可能会引起套管二次收缩、底板膨胀等外观不良，需加以注意。

请充分做好清洗剂的污染管理工作（电导率、pH 值、比重、含水量等）。清洗后，请勿将其存放在清洗液的环境中或密封容器中。另外，在进行喷射洗净的时候，由于喷射角度和强度的不同，可能会造成外壳膨胀，需加以注意。对于别的洗净方法，也有可能造成产品标示信息消失或模糊褪色。

（21）固定剂、被膜剂

①请勿使用含卤素类溶剂等的固定剂、被膜剂；

②在使用固定剂、被膜剂之前，请将基板和电容器的封口部之间清扫干净，不可留有焊剂残渣及污垢；

③在使用固定剂、被膜剂之前，请对清洗剂等进行干燥；

④在使用固定剂、被膜剂时，请勿将电容器封口部的整个面堵塞；

固定剂、被膜剂的种类很多，使用时详情请咨询我们。

（22）关于熏蒸处理

如果熏蒸剂中所含的卤素侵入电容器内部，可能与电解液、电极箔等发生化学反应（主要是部分气体透过电容器的封口部，侵入电容器内部）。

这一化学反应的进行会导致内部的铝构件腐蚀，可能引起电容器漏电流不良、开路不良、压力阀动作等故障。

在出口时或者机器使用中的防虫对策中，有时会利用甲基溴等的卤素化合物进行熏蒸处理；对电容器及装配了电容器的机器进行熏蒸时，或者将经过熏蒸处理的托盘等用作包装材料时，请充分注意避免电容器暴露在卤素氛围中。

3 设备使用注意事项

（1）直接接触电容器的端子有导致触电的危险；

（2）不可以导电体使电容器端子之间短路；此外，不可使电容器接触酸或碱的水溶液等导电性溶液；

（3）要确认装配了电容器的设备的安装环境不属于以下环境：

①直接溅水的场所、高温高湿的场所、易结露的场所；

②直接溅油的场所及充满油雾的场所；

③直接溅落盐水的场所、充满盐分的部位；

④充满酸性有机气体（硫化氢及亚硫酸、亚硝酸、氯气、溴气、溴甲烷、氨气等）的场所；

⑤有酸性及碱性溶剂溅落的场所；

⑥结露环境有可能导致套管发生收缩、膨胀、破裂，因此在使用时请进行充分确认；此外，因温度剧烈变化、高温高湿试验等而结露时，也可能导致同样的套管异常。

4 保养检修

对于工业机器中使用的电容器要进行定期检修，检修项目包括如下内容：

①外观：有无压力阀的动作、液体泄漏等明显异常；

②电气性能：漏电流、静电容量、损失角正切值及产品目录或承认申请书中规定的项目。

5 紧急情况

（1）在使用装置的过程中，电容器的压力阀动作，出现蒸汽时，请切断装置的主电源或者将电源线插头从插座中拔出；

（2）电容器的压力阀工作时，将喷出超过 +100℃的高温气体，此时不可将脸部靠近，一旦喷出的气体进入眼睛或吸入时，应立即用水清洗眼部或漱口，不可舔食电容器的电解液，如果电解液溅到皮肤上，应使用肥皂进行冲洗。

6 存放条件

（1）关于电容器的存放，建议在室温 5~35℃、相对湿度 75% 的条件下进行存放；

（2）请确认存放场所不属于『1 项电路设计中的注意事项（9）』中记载的环境，为使电容器保持良好的焊接性，请遵守以下项目：

①在使用前，请用塑料袋密封存放；

②请在即将使用前将塑料袋开封，并将产品一次用完，如果不能一次用完，请将剩余产品放回包装袋并用胶带等密封；

③为保持良好的焊接性，请将产品存放期限控制在一年以内。

7 废弃处理

（1）在废弃电容器时，可采取以下任意一种方法：

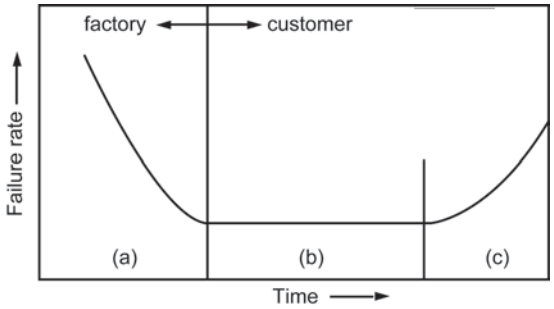
①在电容器上开孔或充分破碎后焚烧；

②不焚烧电容器时，应交与专业的工业废弃物处理厂，由其进行填埋等处理。

（2）废弃电容器时（从与之相连的基板上卸下），请确认其是否已被放电。

Failure rate

The failure rate of an aluminum electrolytic capacitor follows a bathtub curve.



(a) initial failure period (infant mortility)
(b) random failure period (useful life period)
(c) wear-out failure period

Expected life - (for reference*)**

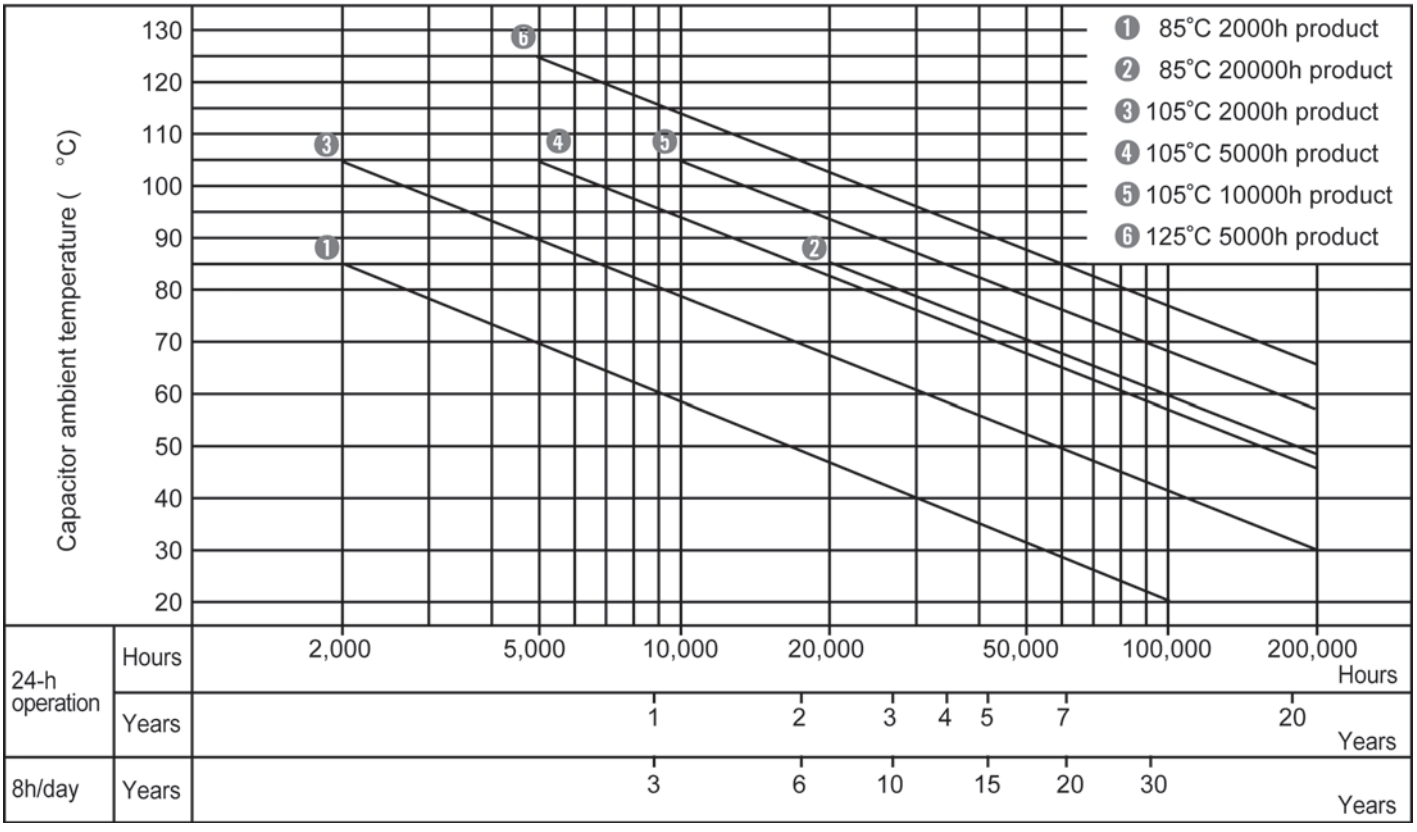
Temperature, humidity, ripple current and atmospheric pressure etc. have influence on the life of aluminum electrolytic capacitors. Among them, temperature has the greatest effect on life of capacitors. The relationship between ambient temperature and life of capacitor can be explained to so-called ARRHENIUS' equation, generally the life of capacitor is reduced approximately by one-half for each temperature increase of 10℃ . The life acceleration equation computes as shown below.

$$L = L0 \times 2^{\frac{T_0 - T}{10}}$$

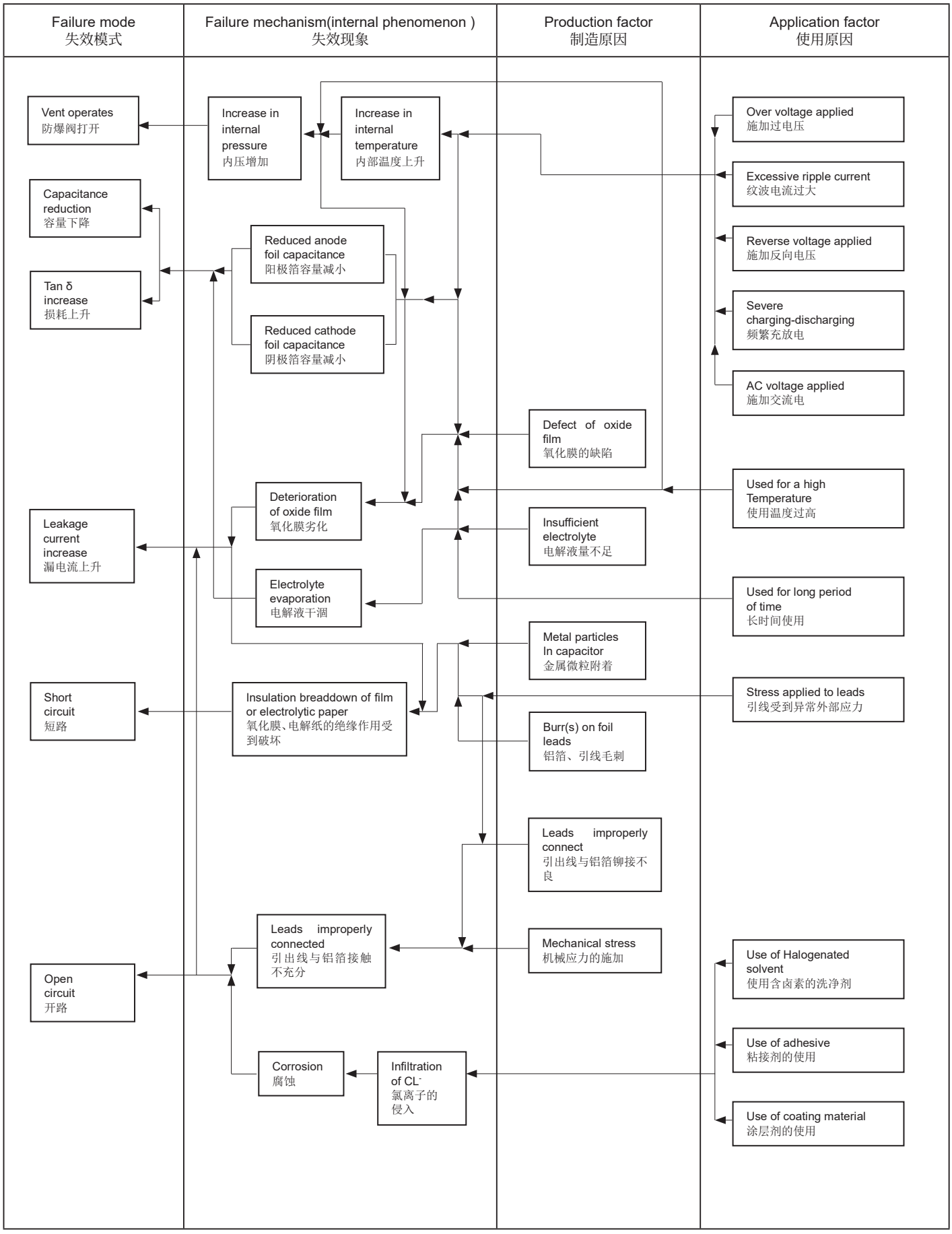
L : Expected life at operating temperature T℃ (h)

L0 : Load life at maximum operating temperature T0℃ (h)

Expected life chart - (*for reference)



TYPICAL FAILURE MODES AND FACTORS OF ALUMINUM ELECTROLYTIC CAPACITORS



PART NUMBER SYSTEM

For Example: 016 SH 102 M 1016 T50
(1) (2) (3) (4) (5) (6)

(1) Rated Working Voltage

WV	4	6.3	10	16	25	35	50	63	80	100	160	200	250	315
Code	004	006	010	016	025	035	050	063	080	100	160	200	250	315

WV	350	400	450	500	550	600	630	650
Code	350	400	450	500	550	600	630	650

(2) Series Name (Per DECON's Products Catalogue)

(3) Capacitance
ex)

uF	0.1	1	10	100	1000	10000	100000
Code	R10	1R0	100	101	102	103	104

(4) Capacitance Tolerance

Tolerance (%)	-10 ~ +10	-20 ~ +20	-10 ~ +20	-5 ~ +5	0 ~ +15	-5 ~ +20
Code	K	M	V	J	S	H

(5) Case Size (mm)

ΦD	3	4	5	6.3	8	10	12.5	16	18	22	25	30	35	40
Code	03	04	05	06	08	10	13	16	18	22	25	30	35	40

ΦD	51	64	76	90	100
Code	51	64	76	90	100

L	5~5.4	5.8~6.2	7	7.7	9	10.5~11	11.5	12.5	13.5~14	16	16.5
Code	05	06	07	08	09	11	12	13	14	16	17

L	20	25	31.5	35.5	40	45	50	~	100	236
Code	20	25	32	36	40	45	50	~	100	236

(6) Package & Lead Style

Blank=Bulk & Standard Long Lead Style Package

Txx=Ammo Taping Package(See Taping Specifications)

BL=Bending to Left

BR=Bending to Right

Cxx=Cutting xx Length

BCLxxxx=xx Length Bending to Left & Cutting xx Length

F=Forming 5mm Ptich

BCRxxxx=xx Length Bending to Right & Cutting xx Length

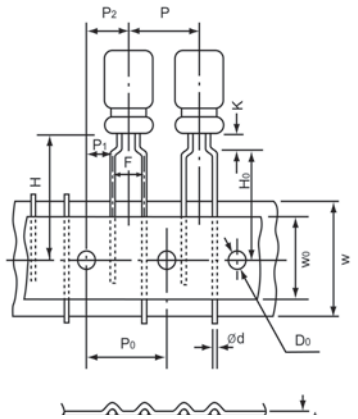
FCxx=Forming 5mm Ptich & Cutting xx Length

xx:

mm	3.0	3.5	4.0	4.5	~	10	15	~	20	25
Code	30	35	40	45	~	A0	A5	~	B0	B5

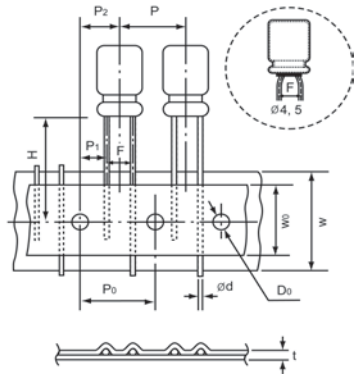
TAPING AND LEAD FORMING & CUTTING SPECIFICATIONS FOR CAPACITORS DECON

(Formed lead type)

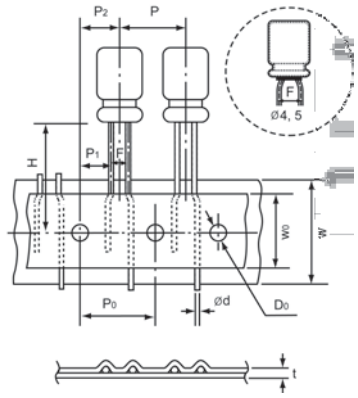


Item \ Case Size / Taping code	Tolerance	Formed Lead Type Case dia (Φ)×Length (L)	
		Φ6.3×11 Φ5×11 Φ6.3×15	Φ8×5 Φ8×7 Φ8×9 Φ8×11.5 Φ8×16 Φ8×20
		T50	T50
Φd Lead-wire diameter	±0.05	0.5	0.5
P Pitch of component	±1.0	12.7	12.7
P_0 Feed hole pitch	±0.2	12.7	12.7
P_1 Hole center to lead	±0.5	3.85	3.85
P_2 Feed hole center to component center	±1.0	6.35	6.35
F Lead-to-lead distance	+0.8 -0.2	5.0	5.0
K Clinch height	MAX	2.5	2.5
H Height of component from tape center	+0.75 -0.5	18.5	18.5
H_0 Lead-wire clinch height	±0.5	16.0	16.0
W Tape width	±0.5	18.0	18.0
W_0 Hold down tape width	MIN	7.0	7.0
$ΦD_0$ Feed hole diameter	±0.2	4.0	4.0
t Total tape thickness	±0.2	0.6	0.6

(Straight lead type)



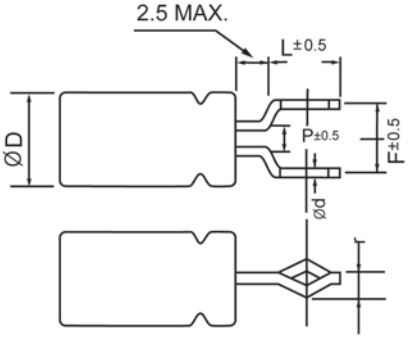
Φ5~Φ6.3:T25, Φ8:T35
(Straight lead type)



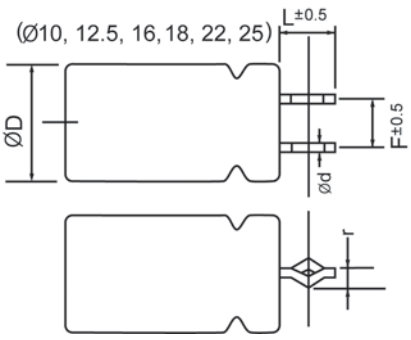
Item \ Case Size / Taping code	Tolerance	Straight Lead Type Case dia (Φ)×Length (L)						
		Φ5	Φ6.3	Φ8×7	Φ8	Φ10	Φ12.5	Φ16 Φ18
		T25	T25	T35	T35	T50	T50	T75
Φd Lead-wire diameter	±0.05	0.5	0.5	0.45	0.5	0.6	0.6	0.8
P Pitch of component	±1.0	12.7	12.7	12.7	12.7	12.7	15.0	30.0
P_0 Feed hole pitch	±0.2	12.7	12.7	12.7	12.7	12.7	15.0	15.0
P_1 Hole center to lead	±0.5	5.1	5.1	4.6	4.6	3.85	5.0	3.75
P_2 Feed hole center to component center	±1.0	6.35	6.35	6.35	6.35	6.35	7.5	7.5
F Lead-to-lead distance	+0.8 -0.2	2.5	2.5	3.5	3.5	5.0	5.0	7.5
H Height of component from tape center	+0.75 -0.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
W Tape width	±0.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0
W_0 Hold down tape width	MIN	7.0	7.0	7.0	7.0	7.0	12.5	12.5
$ΦD_0$ Feed hole diameter	±0.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0
t Total tape thickness	±0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6

(Lead Forming & Cutting)

Code: FC



Code: C



SAII Standard, For General Purposes Series

· Standard series for general purposes
· High voltage, high capacitance series
· Voltage range of 6.3~500V
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃ (6.3V~450V); -25 ~ +85℃ (500V)
Leakage current max.	WV ≤ 100: I = 0.01CV or 3μA whichever is greater (after 2 minutes); I = 0.03CV or 4μA whichever is greater (after 1 minute) WV > 100: I = 0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	100	160~250	350~500
Tanδ	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25	35	50~100	160	200~350	400~450	500
Z-25℃ /Z+20℃	5	4	3	2	2	2	4	6	10	12
Z-40℃ /Z+20℃	12	10	8	5	4	3	6	8	12	-

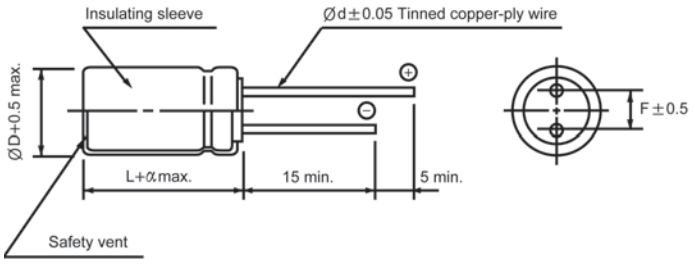
Load life (after application of the rated voltage for 2000 hours at 85℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value

Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18	22
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.5			0.6		0.8		
α	1.5			2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≤
6.3 ~ 100	~ 47	0.75	1.00	1.55	2.00	2.00	2.00
	68 ~ 680	0.80	1.00	1.35	1.50	1.62	1.75
	1000 ~	0.85	1.00	1.15	1.15	1.32	1.50
160 ~ 500	~ 220	0.80	1.00	1.40	1.60	1.70	1.80
	330 ~	0.90	1.00	1.13	1.15	1.32	1.50

SAII Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35	
47									5×11	131
68							5×11	144	6.3×11	182
100					5×11	162	5×11	181	6.3×11	220
150					5×11	198	6.3×11	246	8×11.5	318
220	5×11	201	5×11	218	6.3×11	276	6.3×11	327	8×11.5	386
330	6.3×11	283	6.3×11	307	6.3×11	359	8×11.5	431	10×12.5	549
470	6.3×11	338	6.3×11	366	8×11.5	476	10×12.5	550	10×16	740
680	8×11.5	480	8×11.5	520	8×11.5	600	10×16	754	10×20	947
1000	8×11.5	581	10×12.5	659	10×12.5	796	10×16	942	12.5×20	1306
2200	10×16	983	10×16	1051	10×20	1331	12.5×20	1542	16×25	2032
3300	10×20	1286	12.5×20	1545	12.5×20	1686	16×25	2194	16×31.5	2502
4700	12.5×20	1736	12.5×25	1903	12.5×25	2129	16×25	2448	16×35.5	2905
6800	12.5×25	2129	16×25	2332	16×25	2577	18×31.5	3114	18×40	3408
10000	16×25	2629	16×31.5	2830	16×31.5	3176	18×40	3544		
15000	16×35.5	2959	16×35.5	3284	18×35.5	3656				
22000	18×40	3733	18×40	3843	22×40	4012				

WV / μF	50		63		100		160		200	
1.0	5×11	21	5×11	23	5×11	23				
2.2	5×11	32	5×11	34	5×11	34				
3.3	5×11	39	5×11	42	5×11	42	6.3×11	45	6.3×11	45
4.7	5×11	46	5×11	50	5×11	50	6.3×11	53	6.3×11	57
6.8	5×11	56	5×11	60	5×11	60	8×11.5	76	8×11.5	76
10	5×11	68	5×11	72	5×11	76	8×11.5	96	8×11.5	96
22	5×11	101	5×11	108	6.3×11	124	10×12.5	156	10×16	173
33	5×11	123	6.3×11	151	8×11.5	178	10×16	209	10×20	232
47	6.3×11	169	6.3×11	181	8×11.5	222	10×20	293	10×20	293
68	6.3×11	203	8×11.5	256	10×12.5	293	12.5×20	391	12.5×25	426
100	8×11.5	291	8×11.5	311	10×16	388	12.5×25	516	16×25	516
150	10×12.5	414	10×12.5	422	10×20	528	16×20	632	16×25	691
220	10×12.5	501	10×16	586	12.5×20	737	16×25	873	18×31.5	962
330	10×16	672	10×20	784	12.5×25	1002	16×35.5	1152	18×35.5	1206
470	10×20	875	12.5×20	1098	16×25	1328	18×40	1434	22×40	1495
680	12.5×20	1235	12.5×25	1440	16×31.5	1643	22×40	1831		
1000	12.5×25	1633	16×25	1937	18×31.5	1965				
2200	16×31.5	2220	18×31.5	2445						
3300	18×31.5	2765	18×40	2987						
4700	18×40	3272								

Ripple current (mA rms) at 85℃, 120Hz
Case size ΦD×L(mm)

WV / μF	250		350		400		450		500	
1.0							8×11.5	26		
2.2							8×11.5	33		
3.3	6.3×11	48	8×11.5	53	8×11.5	56	8×11.5	50		
4.7	6.3×11	57	8×11.5	66	10×12.5	73	10×12.5	72	10×16	69
6.8	8×11.5	76	10×12.5	88	10×12.5	87	10×16	86	10×16	76
10	10×12.5	107	10×12.5	107	10×16	115	10×20	115	12.5×25	178
22	10×16	170	12.5×20	222	12.5×20	218	12.5×25	217	16×25	265
33	10×20	247	16×20	297	12.5×25	296	16×25	294	16×31.5	310
47	12.5×20	319	16×20	353	16×25	387	16×31.5	384	18×31.5	412
68	16×20	425	16×25	465	16×31.5	488	16×35.5	503	18×35.5	457
100	16×25	564	18×31.5	592	18×35.5	667	18×40	546		
150	16×31.5	726	18×40	845	18×40	863	22×45	1283		
220	18×35.5	988	22×40	1112	22×45	1183				
330	22×40	1495								

SH Wide Temperature Range Series

· Standard series for general purposes
· High CV value
· Wide operating temperature range of -40 ~ + 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (6.3V~450V); -25 ~ +105℃ (500V)
Leakage current max.	WV ≤ 100: I = 0.01CV or 3μA whichever is greater (after 2 minutes); I = 0.03CV or 4μA whichever is greater (after 1 minute) WV > 100: I = 0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	100	160~250	350~500
Tanδ	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25	35	50~100	160	200~350	400~450	500
Z-25℃ /Z+20℃	5	4	3	2	2	2	4	6	10	12
Z-40℃ /Z+20℃	12	10	8	5	4	3	6	8	12	-

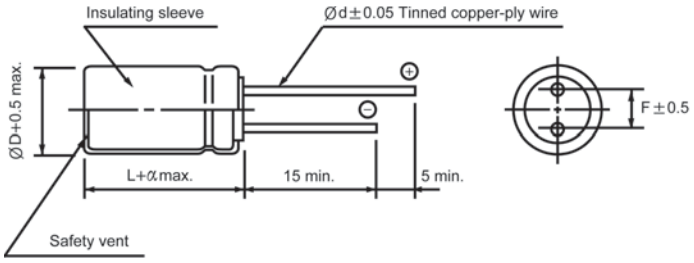
Load life (after application of the rated voltage for 2000 hours at 105℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18	22
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.5			0.6		0.8		
α	1.5			2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≤
6.3 ~ 100	~ 47	0.75	1.00	1.55	2.00	2.00	2.00
	68 ~ 680	0.80	1.00	1.35	1.50	1.62	1.75
	820 ~	0.85	1.00	1.15	1.15	1.32	1.50
160 ~ 500	~ 220	0.80	1.00	1.40	1.60	1.70	1.80
	330 ~	0.90	1.00	1.13	1.15	1.32	1.50

SH Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35	
47									5×11	98
68							5×11	108	6.3×11	136
100					5×11	121	5×11	135	6.3×11	165
150					5×11	148	6.3×11	184	8×11.5	238
220	5×11	150	5×11	163	6.3×11	207	6.3×11	245	8×11.5	289
330	6.3×11	212	6.3×11	230	6.3×11	269	8×11.5	323	10×12.5	411
470	6.3×11	253	6.3×11	274	8×11.5	357	10×12.5	412	10×16	555
680	8×11.5	360	8×11.5	390	8×11.5	450	10×16	565	10×20	710
1000	8×11.5	435	10×12.5	494	10×12.5	597	10×16	706	12.5×20	979
2200	10×16	737	10×16	788	10×20	998	12.5×20	1156	16×25	1524
3300	10×20	964	12.5×20	1158	12.5×20	1264	16×25	1645	16×31.5	1876
4700	12.5×20	1302	12.5×25	1427	12.5×25	1596	16×25	1836	16×35.5	2178
6800	12.5×25	1596	16×25	1749	16×25	1932	18×31.5	2335	18×40	2556
10000	16×25	1971	16×31.5	2122	16×31.5	2382	18×40	2658		
15000	16×35.5	2219	16×35.5	2463	18×35.5	2742				
22000	18×40	2799	18×40	2882	22×40	3009				

WV / μF	50		63		100		160		200	
1.0	5×11	15	5×11	17	5×11	17				
2.2	5×11	24	5×11	25	5×11	25				
3.3	5×11	29	5×11	31	5×11	31	6.3×11	33	6.3×11	33
4.7	5×11	34	5×11	37	5×11	37	6.3×11	39	6.3×11	42
6.8	5×11	42	5×11	45	5×11	45	8×11.5	57	8×11.5	57
10	5×11	51	5×11	54	5×11	57	8×11.5	72	8×11.5	72
22	5×11	75	5×11	81	6.3×11	93	10×12.5	117	10×16	129
33	5×11	92	6.3×11	113	8×11.5	133	10×16	156	10×20	174
47	6.3×11	126	6.3×11	135	8×11.5	166	10×20	219	10×20	219
68	6.3×11	152	8×11.5	192	10×12.5	219	12.5×20	293	12.5×25	319
100	8×11.5	218	8×11.5	233	10×16	291	12.5×25	387	16×25	387
150	10×12.5	310	10×12.5	316	10×20	396	16×20	474	16×25	518
220	10×12.5	375	10×16	439	12.5×20	552	16×25	654	18×31.5	721
330	10×16	504	10×20	588	12.5×25	751	16×35.5	864	18×35.5	904
470	10×20	656	12.5×20	823	16×25	996	18×40	1075	22×40	1121
680	12.5×20	926	12.5×25	1080	16×31.5	1232	22×40	1373		
1000	12.5×25	1224	16×25	1452	18×31.5	1473				
2200	16×31.5	1665	18×31.5	1833						
3300	18×31.5	2073	18×40	2240						
4700	18×40	2454								

Ripple current (mA rms) at 105℃, 120Hz
Case size ΦD×L(mm)

WV / μF	250		350		400		450		500	
1.0							8×11.5	19		
2.2							8×11.5	24		
3.3	6.3×11	36	8×11.5	39	8×11.5	42	8×11.5	37		
4.7	6.3×11	42	8×11.5	49	10×12.5	54	10×12.5	54	10×16	51
6.8	8×11.5	57	10×12.5	66	10×12.5	65	10×16	64	10×16	57
10	10×12.5	80	10×12.5	80	10×16	86	10×20	86	12.5×25	133
22	10×16	127	12.5×20	166	12.5×20	163	12.5×25	162	16×25	198
33	10×20	185	16×20	222	12.5×25	222	16×25	220	16×31.5	232
47	12.5×20	239	16×20	264	16×25	290	16×31.5	288	18×31.5	309
68	16×20	318	16×25	348	16×31.5	366	16×35.5	377	18×35.5	342
100	16×25	423	18×31.5	444	18×35.5	500	18×40	409		
150	16×31.5	544	18×40	633	18×40	647	22×45	962		
220	18×35.5	741	22×40	834	22×45	887				
330	22×40	1121								

SHK Low Impedance Series

· Operating temperature range of –40 ~ +105℃
· Low impedance at high frequency
· High reliability withstanding 5000 hours load life at 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (6.3V~450V); -25 ~ +105℃ (500V)
Leakage current max.	WV ≤ 100: I = 0.01CV or 3μA whichever is greater (after 2 minutes); I = 0.03CV or 4μA whichever is greater (after 1 minute) WV > 100: I = 0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	100	160~250	350~500
Tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25~100	160~250	350~450	500
Z-25℃ /Z+20℃	4	3	2	2	3	6	8
Z-40℃ /Z+20℃	8	6	4	3	4	10	-

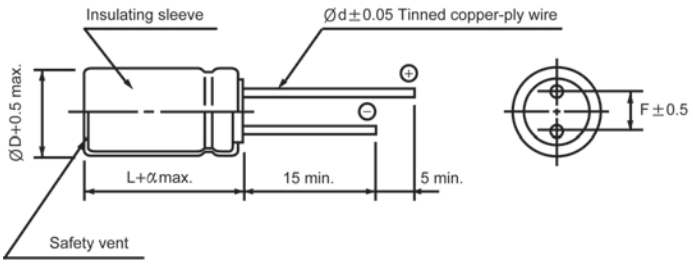
Load life (after application of the rated voltage for 5000 hours at 105℃)

Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
Tanδ	Less than 200% of specified value
WV≤100 : Φ5, Φ6.3 (2000 hours); Φ8 : 3000 hours; ≥ Φ10: 5000 hours; WV>100: 2000 hours.	

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18	22
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.5			0.6		0.8		
α	1.5			2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.40	0.65	0.82	0.91	1.00
39 ~ 270	0.50	0.70	0.84	0.92	1.00
330 ~ 680	0.55	0.75	0.86	0.93	1.00
820 ~ 1800	0.60	0.80	0.88	0.94	1.00
2200 ~	0.70	0.85	0.90	0.95	1.00

SHK Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25		
10							5×11	0.90	180	5×11	0.90	180
22	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
33	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
47	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180
100	5×11	0.65	180	5×11	0.65	180	6.3×11	0.30	280	6.3×11	0.30	280
150	6.3×11	0.30	280	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.20	450
220	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.20	450
330	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660
470	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660	10×16	0.08	850
680	10×12.5	0.10	660	10×12.5	0.10	660	10×16	0.08	850	10×20	0.054	1100
1000	10×12.5	0.10	660	10×16	0.08	850	10×20	0.054	1100	12.5×20	0.050	1400
1500	10×20	0.054	1100	10×20	0.054	1100	12.5×20	0.050	1400	16×20	0.030	2100
2200	12.5×20	0.050	1400	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100
3300	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100	16×31.5	0.025	2600
4700	16×25	0.030	2100	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000
6800	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000			
10000	16×31.5	0.025	2600	18×35.5	0.022	3000						
15000	18×35.5	0.022	3000									

WV / μF	35			50			63			100		
1.0				5×11	3.50	40						
2.2				5×11	3.00	55				5×11	2.50	52
3.3				5×11	2.60	65	5×11	2.00	64	5×11	2.50	64
4.7	5×11	0.90	180	5×11	2.30	90	5×11	2.00	76	5×11	2.50	76
10	5×11	0.90	180	5×11	1.40	120	5×11	2.00	111	6.3×11	1.00	128
22	5×11	0.70	180	5×11	1.20	150	6.3×11	0.60	190	8×11.5	0.60	224
33	5×11	0.65	180	6.3×11	0.60	200	6.3×11	0.60	233	10×12.5	0.40	319
47	6.3×11	0.30	280	6.3×11	0.43	250	8×11.5	0.50	328	10×16	0.30	417
100	8×11.5	0.20	450	8×11.5	0.24	340	10×16	0.12	456	12.5×20	0.15	570
150	8×11.5	0.14	450	10×12.5	0.17	490	10×20	0.10	610	12.5×25	0.12	762
220	10×12.5	0.10	660	10×16	0.12	650	10×25	0.09	809	16×25	0.07	1250
330	10×16	0.08	850	10×20	0.10	810	12.5×20	0.085	1036	16×31.5	0.05	1404
470	10×20	0.054	1100	12.5×20	0.085	1100	16×20	0.050	1411	18×40	0.03	1980
680	12.5×20	0.050	1400	12.5×25	0.065	1200	16×25	0.043	1843	18×40	0.03	2050
820	12.5×25	0.045	1500	16×25	0.055	1300	18×25	0.035	1900	18×40	0.03	2215
1000	12.5×25	0.038	1700	16×25	0.043	1600	16×35.5	0.025	1967			
1500	16×25	0.030	2100	16×31.5	0.038	2000						
2200	16×31.5	0.025	2600	18×35.5	0.034	2300						
3300	18×35.5	0.022	3000									

Ripple current (mA rms) at 105℃ , 100kHz
Impedance (Ω) max. at 20℃ , 100kHz
Case size ΦD×L(mm)

SHK Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350	
1.0	6.3×11	45						
10	10×12.5	230			10×16	300	10×16	180
22	10×16	440	10×20	440	10×20	480	12.5×20	270
33	10×16	560	12.5×20	590	12.5×20	630	16×20	600
47	10×20	725	12.5×20	780	12.5×25	630	16×25	700
68	12.5×25	950	12.5×25	950	16×25	1000	16×31.5	1100
82					16×25	1100	16×35.5	1130
100	16×25	1280	16×25	1280	16×31.5	1400	18×31.5	1170
120							18×35.5	1200
150	16×25	1300	16×25	1500	18×25 18×31.5	1450 1450	18×40	1250
220	16×31.5	1500	18×31.5	1700	18×35.5 18×40	1485 1485		
330	18×31.5	1700	18×35.5	1900				

WV / μF	400		450		500	
3.3			10×12.5	150		
4.7			10×16	200		
10	10×16	176	10×16	230	12.5×20	240
22	12.5×25	300	12.5×25	525	12.5×30	420
33	16×20	600	16×25	600	16×31.5	560
47	16×25	700	16×25 16×31.5 18×25	660 720 720	16×35.5 18×31.5 18×35.5	650 620 700
56			16×31.5 18×25	800 800	16×40	740
68	16×31.5	1100	16×35.5 18×31.5	900 900	16×45 18×40	820 900
82	16×35.5	1150	16×40 18×31.5 18×35.5	1115 1115 1200	16×50 18×40	1000 1000
100	18×35.5	1200	16×40 18×35.5	1300 1300	16×50 18×45 22×40	1250 1250 1250
120	18×40	1270	16×50 18×40	1500 1500	22×45	1370
150	22×40	1380	22×40	1600		

Ripple current (mA rms) at 105℃, 100kHz

Case size ΦD×L(mm)

SHF High Ripple Current, Extremely Low Impedance Series

· Operating temperature range of -40 ~ + 105℃
· Extremely low impedance at high frequency
· High reliability withstanding 10000 hours load life at 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

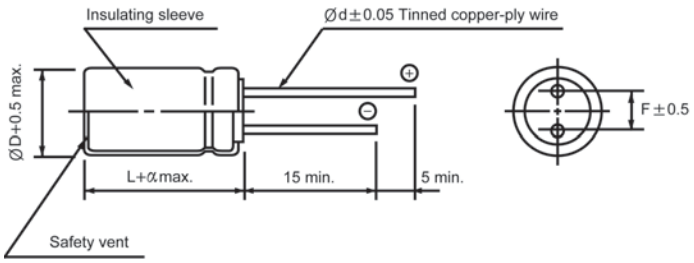
WV	6.3	10	16	25	35	50	63	100
Tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08

Low temperature characteristics (Impedance ratio at 120Hz)	WV	6.3	10	16	25 ~ 100
	Z-40℃ /Z+20℃	8	6	4	3

Load life (after application of the rated voltage for 10000 hours at 105℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±25% of initial value
	Tanδ	Less than 200% of specified value
	Φ5, Φ6.3 : 5000 hours; Φ8, Φ10 : 7000 hours; ≥ Φ12.5: 10000 hours.	
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.40	0.65	0.82	0.91	1.00
39 ~ 270	0.50	0.70	0.84	0.92	1.00
330 ~ 680	0.55	0.75	0.86	0.93	1.00
820 ~ 1800	0.60	0.80	0.88	0.94	1.00
2200 ~	0.70	0.85	0.90	0.95	1.00

SHF Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25		
33										5×11	0.90	150
47							5×11	0.90	150	5×11	0.90	150
100	5×11	0.90	150	5×11	0.90	150	6.3×11	0.40	250	6.3×11	0.40	250
220	6.3×11	0.40	250	6.3×11	0.40	250	8×11.5	0.25	400	8×11.5	0.25	400
330	6.3×11	0.40	250	8×11.5	0.25	400	8×11.5	0.25	400	10×12.5	0.16	580
470	8×11.5	0.25	400	8×11.5	0.25	400	10×12.5	0.16	580	10×16	0.12	770
1000	10×12.5	0.16	580	10×16	0.12	770	10×20	0.078	1050	12.5×20	0.062	1300
2200	12.5×20	0.062	1300	12.5×20	0.062	1300	12.5×25	0.048	1650	16×25	0.034	1850
3300	12.5×20	0.062	1300	12.5×25	0.048	1650	16×25	0.034	1850	16×31.5	0.029	2000
4700	16×25	0.034	1850	16×25	0.034	1850	16×31.5	0.029	2000	18×35.5	0.025	2200
6800	16×25	0.034	1850	16×31.5	0.029	2000	18×35.5	0.025	2200			
10000	16×31.5	0.029	2000	18×35.5	0.025	2200						
15000	18×35.5	0.025	2200									

WV / μF	35			50			63			100		
1.0				5×11	4.0	50				5×11	4.50	20
2.2				5×11	2.5	55				5×11	3.00	30
3.3				5×11	2.2	65				5×11	2.70	40
4.7				5×11	1.9	88				5×11	2.50	65
10				5×11	1.5	100	5×11	2.30	87	6.3×11	1.20	140
22				5×11	0.9	150	6.3×11	1.30	140	8×11.5	0.63	160
33	5×11	0.90	150	6.3×11	0.40	250	6.3×11	1.20	140	10×12.5	0.43	230
47	6.3×11	0.40	250	6.3×11	0.40	400	8×11.5	0.63	210	10×12.5 10×16	0.43 0.31	230 290
100	8×11.5	0.25	400	8×11.5	0.25	500	10×12.5	0.43	300	12.5×16 12.5×20	0.23 0.16	750 750
220	10×12.5	0.16	580	10×16	0.12	770	10×25	0.21	520	16×25	0.073	900
330	10×16	0.12	770	10×20	0.08	1050	12.5×20	0.16	660	16×25	0.073	900
390	10×20	0.095	900	10×20	0.075	1170	12.5×25	0.14	700	12.5×35.5	0.073	1650
470	10×20	0.078	1050	12.5×20	0.062	1300	12.5×25	0.12	750			
1000	12.5×25	0.048	1650	16×25	0.034	1850	16×31.5	0.054	1390			
2200	16×31.5	0.029	2000	18×35.5	0.025	2200						
3300	18×35.5	0.025	2200									

Ripple current (mA rms) at 105℃ , 100kHz

Impedance (Ω) max. at 20℃ , 100kHz

Case size ΦD×L(mm)

SHM High Ripple Current Series

· Enabled high ripple current by a reduction of impedance at high frequency
· High reliability withstanding 5000 hours load life at 105℃
(2000~3000 hours for smaller case sizes as specified below)
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.01CV or 3μA whichever is greater (after 2 minutes) I=0.03CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

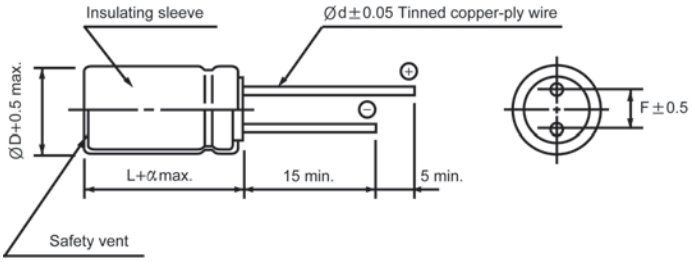
WV	6.3	10	16	25	35	50	63	100
Tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.08

Low temperature characteristics (Impedance ratio at 120Hz)	Z-40℃ /Z+20℃	Z-25℃ /Z+20℃
	3	2

Load life (after application of the rated voltage for 5000 hours at 105℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±25% of initial value
	Tanδ	Less than 200% of specified value
	Φ5, Φ6.3 : 2000 hours; Φ8: 3000 hours; ≥ Φ10: 5000 hours.	
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.40	0.65	0.82	0.94	1.00
39 ~ 270	0.50	0.70	0.84	0.96	1.00
330 ~ 680	0.55	0.75	0.86	0.96	1.00
820 ~ 1800	0.60	0.80	0.88	0.97	1.00
2200 ~	0.70	0.85	0.90	0.97	1.00

SHM Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25		
10							5×11	0.525	250	5×11	0.850	250
22	5×11	0.525	250	5×11	0.525	250	5×11	0.525	270	5×11	0.525	270
33	5×11	0.525	270	5×11	0.525	270	5×11	0.525	290	5×11	0.525	290
47	5×11	0.450	290	5×11	0.450	290	5×11	0.450	310	5×11	0.500	310
100	5×11	0.450	310	5×11	0.450	310	5×11 6.3×11	0.450 0.300	310 405	6.3×11	0.225	460
150	6.3×11	0.300	405	6.3×11	0.300	405	6.3×11	0.225	460	8×11.5	0.160	760
220	6.3×11	0.225	460	6.3×11	0.225	460	8×11.5	0.108	760	8×11.5	0.160	950
330	6.3×11	0.225	505	8×11.5	0.150	760	8×11.5	0.108	950	10×12.5	0.098	1280
390	8×11.5	0.108	550	8×11.5	0.150	760	8×16 10×12.5	0.098 0.098	1000 1000	8×16 10×12.5	0.098 0.098	1430 1430
470	8×11.5	0.108	950	8×11.5	0.150	950	8×11.5 8×16 10×12.5	0.108 0.098 0.088	950 1100 1280	10×12.5 10×16 10×20	0.098 0.065 0.060	1430 1785 1785
560	8×16 10×12.5	0.098 0.098	1000 1050	8×16 10×12.5	0.098 0.098	1100 1100	8×20 10×16	0.088 0.088	1280 1280	8×20 10×16	0.088 0.088	1900 1900
680	10×12.5	0.088	1280	8×16 10×12.5	0.098 0.088	1280 1280	10×16	0.065	1785	10×16 10×20	0.065 0.050	1900 2270
820	10×16	0.075	1300	10×12.5	0.088	1400	10×16	0.065	1785	10×20	0.050	2300
1000	10×16	0.065	1785	8×20 10×12.5 10×16	0.088 0.088 0.065	1600 1600 1785	8×20 10×16 10×20	0.088 0.065 0.050	2000 2000 2270	10×20 10×25 12.5×20	0.050 0.045 0.043	2400 2560 2950
1200				10×16	0.065	2200				12.5×20	0.043	3100
1500	10×20	0.050	2270	10×20	0.050	2270	10×25 12.5×20	0.043 0.043	2450 2450	12.5×25 16×20	0.029 0.029	3470 3600
1800	10×20	0.050	2300	12.5×20	0.043	2350	12.5×25	0.029	2950	12.5×25	0.029	3650
2200	12.5×20	0.043	2950	10×20 10×25 12.5×20	0.050 0.048 0.043	2650 2950 2950	10×30 12.5×25	0.029 0.029	3460 3460	12.5×25 16×25	0.029 0.024	3700 3890
3300	12.5×20	0.040	3000	12.5×25 16×20	0.029 0.029	3140 3140	16×25	0.024	3500	16×31.5	0.024	3900
4700	16×25	0.024	3114	16×25	0.024	3200	16×31.5	0.024	3600	18×35.5	0.022	3950
6800	16×25	0.024	3114	16×31.5	0.024	3312	18×35.5	0.022	3700			
10000	16×31.5	0.024	3312	18×35.5	0.022	3420						
15000	18×35.5	0.022	3420									

WV / μF	35			50			63			100		
1.0				5×11	3.000	250						
2.2				5×11	3.000	250				5×11	3.000	125
3.3				5×11	1.500	250	5×11	2.000	165	5×11	2.000	125
4.7	5×11	0.525	250	5×11	1.500	270	5×11	2.000	165	5×11	2.000	125
10	5×11	0.525	270	5×11	0.750	290	5×11	0.800	165	6.3×11	1.200	205
22	5×11	0.525	290	5×11	0.500	310	6.3×11	0.500	265	8×11.5	0.600	355
33	5×11	0.450	310	6.3×11	0.300	405	6.3×11	0.500	265	10×12.5	0.250	450
47	6.3×11	0.330	460	6.3×11	0.300	460	8×11.5	0.300	500	8×16 10×16	0.300 0.200	500 580
56	6.3×11	0.330	460	8×11.5	0.160	580	10×12.5	0.160	680	10×16	0.160	750
100	8×11.5	0.160	760	8×11.5 8×16	0.160 0.108	950 960	10×16	0.100	945	10×20 12.5×20	0.150 0.100	800 1045
150	8×11.5	0.160	950	10×12.5	0.088	1280	10×20	0.080	1100	12.5×25	0.080	1195
220	8×16 10×12.5	0.098 0.088	1030 1280	10×16	0.065	1785	10×25	0.070	1300	16×25	0.060	1600
330	10×16	0.065	1785	10×20	0.050	2270	12.5×20	0.050	1495	16×31.5	0.040	1750
390	8×20	0.088	1830	10×20	0.050	2270	12.5×25	0.039	1600	16×31.5	0.040	1750
470	8×20 10×16 10×20	0.088 0.065 0.050	1930 1930 2270	12.5×20	0.043	2950	16×20	0.035	1990	18×40	0.030	2060
680	10×20 12.5×20	0.050 0.043	2400 2950	12.5×25	0.029	3460	16×25	0.030	2780			
1000	12.5×20 12.5×25	0.043 0.032	3100 3460	16×25	0.027	3890	16×35.5	0.020	2835			
1500	12.5×25 16×20 16×25	0.029 0.027 0.024	3500 3600 3890	16×31.5	0.024	3900						
2200	16×31.5	0.024	3900	18×35.5	0.022	3950						
3300	18×35.5	0.022	3950									

Case size ΦD×L(mm)
Ripple current (mA rms) at 105℃, 100kHz
Impedance (Ω) max. at 20℃, 100kHz

SHY Ultra Low Impedance Series

· Enabled high ripple current by a reduction of impedance at high frequency
· High reliability withstanding 5000 hours load life at 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.01CV or 3μA whichever is greater (after 2 minutes) I=0.03CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

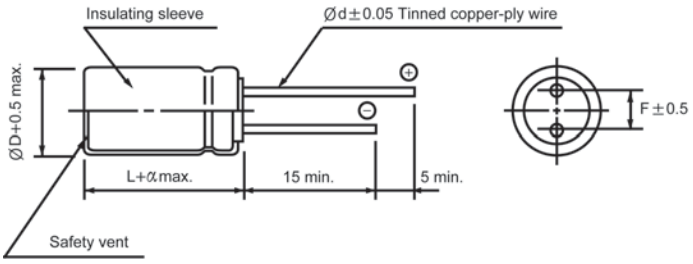
WV	6.3	10	16	25	35	50	63	100
Tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08

Low temperature characteristics (Impedance ratio at 120Hz)	Z-40℃ /Z+20℃	Z-25℃ /Z+20℃
	3	2

Load life (after application of the rated voltage for 5000 hours at 105℃)	
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
Tanδ	Less than 200% of specified value
Φ5, Φ6.3 : 2000 hours; Φ8 : 3000 hours; ≥Φ10: 5000 hours.	
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
1000 ~ 1500	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

SHY Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25		
4.7										5×11	0.35	250
10							5×11	0.35	250	5×11	0.35	250
22	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250
33	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250
47	5×11	0.30	250	5×11	0.30	250	5×11	0.30	250	5×11	0.30	250
100	5×11	0.30	250	5×11	0.30	250	6.3×11	0.15	405	6.3×11	0.15	405
150	6.3×11	0.15	405	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.10	760
220	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.085	760	8×11.5	0.10	760
330	6.3×11	0.15	405	8×11.5	0.12	760	8×11.5	0.085	760	10×12.5	0.08	1030
470	8×11.5	0.072	760	8×11.5	0.10	760	10×12.5	0.053	1030	10×16	0.045	1430
680	10×12.5	0.053	1030	10×12.5	0.053	1030	10×16	0.038	1430	10×20	0.032	1820
1000	10×12.5	0.053	1030	10×16	0.038	1430	10×20	0.027	1820	12.5×20	0.025	2360
1500	10×20	0.027	1820	10×20	0.032	1820	12.5×20	0.025	2360	16×20	0.020	3460
2200	12.5×20	0.025	2360	12.5×20	0.025	2360	12.5×25	0.018	2770	16×25	0.015	3460
3300	12.5×20	0.025	2360	12.5×25	0.024	2770	16×25	0.015	3460	16×31.5	0.015	3680
4700	16×25	0.015	3460	16×25	0.015	3460	16×31.5	0.015	3680	18×35.5	0.014	3800
6800	16×25	0.015	3460	16×31.5	0.015	3680	18×35.5	0.014	3800			
10000	16×31.5	0.015	3680	18×35.5	0.014	3800						
15000	18×35.5	0.014	3800									

WV / μF	35			50			63			100		
1.0				5×11	2.00	250						
2.2				5×11	2.00	250				5×11	2.00	125
3.3				5×11	1.00	250	5×11	2.00	165	5×11	2.00	125
4.7	5×11	0.35	250	5×11	1.00	250	5×11	2.00	165	5×11	2.00	125
10	5×11	0.35	250	5×11	0.55	250	5×11	0.80	165	6.3×11	0.50	205
22	5×11	0.35	250	5×11	0.45	250	6.3×11	0.50	265	8×11.5	0.30	355
33	5×11	0.30	250	6.3×11	0.25	405	6.3×11	0.50	265	10×12.5	0.25	450
47	6.3×11	0.15	405	6.3×11	0.20	405	8×11.5	0.30	500	10×16	0.20	580
100	8×11.5	0.072	760	8×11.5	0.105	760	10×16	0.10	945	12.5×20	0.10	1045
150	8×11.5	0.072	760	10×12.5	0.061	1030	10×20	0.08	1100	12.5×25	0.07	1195
220	10×12.5	0.065	1030	10×20	0.038	1430	10×25	0.07	1300	16×25	0.06	1600
330	10×16	0.038	1430	10×20	0.032	1820	12.5×20	0.04	1495	16×31.5	0.04	1750
470	10×20	0.027	1820	12.5×20	0.027	2360	16×20	0.035	1990	18×40	0.03	2060
680	12.5×20	0.025	2360	12.5×25	0.022	2770	16×25	0.030	2780			
1000	12.5×25	0.022	2770	16×25	0.018	3460	16×35.5	0.020	2835			
1500	16×25	0.018	3460	16×31.5	0.015	3680						
2200	16×31.5	0.015	3680	18×35.5	0.014	3800						
3300	18×35.5	0.014	3800									

Case size ΦD×L(mm)
Ripple current (mA rms) at 105℃, 100kHz
Impedance (Ω) max. at 20℃, 100kHz

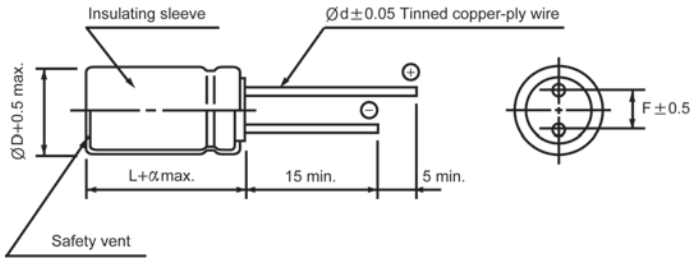
SHE High Ripple Current, Ultra Low Impedance Series

· Enabled high ripple current by a reduction of impedance at high frequency range
· High reliability withstanding 5000 hours load life at 105℃
· Complied to the RoHS directive

Items	**Performance** characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.01CV or 3μA whichever is greater (after 2 minutes) I=0.03CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value. WV: 10 / 16 / 25 / 35 / 50 Tanδ: 0.19 / 0.16 / 0.14 / 0.12 / 0.10
Low temperature characteristics (Impedance ratio at 120Hz)	Z-40℃ /Z+20℃: 3 Z-25℃ /Z+20℃: 2
Load life (after application of the rated voltage for 5000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value Tanδ: Less than 200% of specified value Φ5, Φ6.3 : 2000 hours; Φ8 : 3000 hours; ≥Φ10: 5000 hours.
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5
F	2.0	2.5	3.5	5.0	5.0
Φd	0.5			0.6	
α	1.5			2.0	

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
22 ~ 47	0.18	0.70	0.90	0.94	1.00
56 ~ 100	0.27	0.73	0.92	0.95	1.00
120 ~ 270	0.49	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1500	0.60	0.80	0.96	0.98	1.00
2200 ~ 3900	0.70	0.85	0.98	0.99	1.00

SHE Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10			16		
56				5×11	0.150	405
100	5×11	0.150	405	6.3×11	0.065	760
220	6.3×11	0.065	760	8×11.5	0.060	850
330	8×11.5	0.060	850	8×11.5	0.036	1000
470	8×11.5	0.036	1000	8×16 10×12.5	0.028 0.027	1250 1430
680	8×16 10×12.5	0.028 0.027	1250 1430	8×20 10×16	0.020 0.020	1600 1820
820	10×12.5	0.025	1500	10×16	0.018	2000
1000	8×20 10×16	0.020 0.020	1600 1820	10×20 12.5×16	0.014 0.018	2180 2200
1200	10×20 12.5×16	0.014 0.018	2180 2200	10×25	0.013	2360
1500	10×25	0.013	2360	12.5×20	0.013	2480
2200	12.5×20	0.013	2480	12.5×25	0.012	2900
3300	12.5×25	0.012	3200			

WV / μF	25			35			50		
33				5×11	0.150	405			
47	5×11	0.150	405	6.3×11	0.100	550	6.3×11	0.140	405
56	6.3×11	0.065	760	6.3×11	0.065	760	6.3×11	0.140	580
100	8×11.5	0.060	850	8*11.5	0.050	850	8×11.5	0.072	760
150				8×11.5	0.036	1000	10×12.5	0.061	1030
220	8×11.5	0.036	1000	8×16 10×12.5	0.028 0.027	1250 1430	10×16	0.042	1430
270				8×20	0.020	1600	12.5×16	0.042	1700
330	8×16 10×12.5	0.028 0.027	1250 1430	10×16	0.020	1820	10×20	0.030	1820
470	8×20 10×16	0.020 0.020	1600 1820	10×20 12.5×16	0.014 0.018	2180 2200	12.5×20	0.027	2360
560				10×25	0.015	2360	12.5×25	0.020	2500
680	10×20 12.5×16	0.014 0.018	2180 2200	12.5×20	0.015	2480			
820	10×25	0.013	2360						
1000	12.5×20	0.013	2480	12.5×25	0.015	2900			
1200	12.5×20	0.013	2600						
1500	12.5×25	0.012	2900						

Ripple current (mA rms) at 105℃ , 100kHz

Impedance (Ω) max. at 20℃ , 100kHz

Case size ΦD×L(mm)

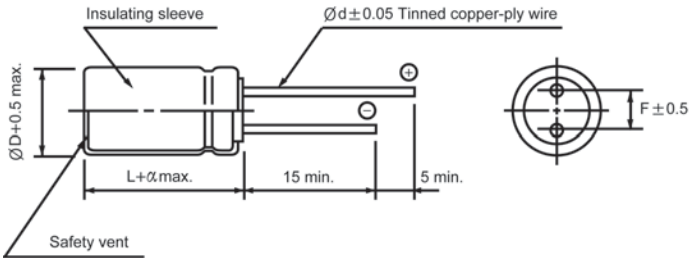
SHX Ultra Low Impedance Long Life Series

· Enabled high ripple current by a reduction of impedance at high frequency
· High reliability withstanding 10000 hours load life at 105℃
(6000/8000 hours for as specified below)
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.01CV or 3μA whichever is greater (after 2 minutes) I=0.03CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value. WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 Tanδ: 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08
Low temperature characteristics (Impedance ratio at 120Hz)	Z-40℃ /Z+20℃: 3 Z-25℃ /Z+20℃: 2
Load life (after application of the rated voltage for 10000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value Tanδ: Less than 200% of specified value Φ5, Φ6.3 : 6000 hours; Φ8 : 8000 hours; ≥Φ10: 10000 hours.
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.42	0.70	0.90	0.95	1.00
39 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

SHX Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25		
10							5×11	0.45	250	5×11	0.65	250
22	5×11	0.35	250	5×11	0.35	250	5×11	0.45	250	5×11	0.50	250
33	5×11	0.35	250	5×11	0.35	250	5×11	0.45	250	5×11	0.45	250
47	5×11	0.30	250	5×11	0.30	250	5×11	0.45	250	5×11	0.40	250
100	5×11	0.30	250	5×11	0.30	250	6.3×11	0.25	405	6.3×11	0.20	405
150	6.3×11	0.15	405	6.3×11	0.15	405	6.3×11	0.20	405	8×11.5	0.14	760
220	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.15	760	8×11.5	0.12	760
330	6.3×11	0.15	405	8×11.5	0.13	760	8×11.5	0.10	760	10×12.5	0.055	1030
390	6.3×11	0.15	405	8×11.5	0.11	760	8×11.5	0.10	760	8×16	0.072	1250
470	8×11.5	0.11	630	8×11.5	0.11	760	10×12.5	0.053	1030	10×12.5	0.055	1330
560	8×11.5	0.11	760	10×12.5	0.053	900	10×12.5	0.053	1100	8×20	0.072	1800
680	10×12.5	0.053	1030	10×12.5	0.053	1030	10×16	0.038	1430	10×16	0.040	1760
1000	10×12.5	0.053	1030	10×12.5	0.053	1330	10×16	0.038	1760	10×20	0.033	1960
1500	10×20	0.027	1820	10×20	0.030	1820	10×20	0.030	1960	12.5×20	0.029	2550
2200	12.5×20	0.025	2360	12.5×20	0.027	2360	12.5×25	0.023	2770	16×20	0.022	3250
3300	12.5×20	0.025	2360	12.5×20	0.027	2480	16×20	0.020	3250	16×25	0.018	3630
4700	16×25	0.015	3460	16×20	0.022	3250	16×25	0.018	3630			
6800	16×25	0.015	3460	16×25	0.018	3630						
10000	16×31.5	0.015	3680	18×31.5	0.015	3700						

WV / μF	35			50			63			100		
10	5×11	0.55	250	5×11	0.60	250	5×11	1.00	165	6.3×11	0.80	205
22	5×11	0.50	250	5×11	0.45	250	6.3×11	0.53	265	8×11.5	0.45	355
33	5×11	0.45	250	6.3×11	0.25	405	6.3×11	0.45	265	10×12.5	0.25	450
47	6.3×11	0.30	405	6.3×11	0.20	405	8×11.5	0.20	500	10×12.5	0.20	580
56	6.3×11	0.20	405	6.3×11	0.20	405	8×11.5	0.17	540	10×16	0.20	630
68	8×11.5	0.10	540	8×11.5	0.15	540	10×12.5	0.15	760	10×16	0.20	700
100	8×11.5	0.10	760	8×11.5	0.12	760	10×12.5	0.16	825	10×20 12.5×16	0.18 0.11	800 975
150	8×11.5	0.10	760	10×12.5	0.061	1030	8×20 10×20	0.120 0.080	1200 1200	12.5×20	0.090	1195
220	10×12.5	0.053	1030	10×16	0.038	1430	10×25	0.070	1300	16×25	0.060	1600
330	10×12.5	0.053	1330	10×20	0.032	1820	12.5×20	0.050	1495	16×25	0.040	1750
470	8×20 10×16	0.038 0.041	1600 1760	12.5×20	0.030	2360	12.5×25	0.040	1990	18×31.5	0.035	2060
680	12.5×20	0.026	2360	12.5×25	0.022	2770	16×25	0.030	2780			
1000	12.5×20	0.026	2480	16×25	0.018	3460	16×35.5	0.020	2835			
1500	16×20	0.022	3250	16×31.5	0.015	3680						
2200	16×25	0.018	3630				18×40	0.020	3500			

Case size ΦD×L(mm)
Ripple current (mA rms) at 105℃, 100kHz
Impedance (Ω) max. at 20℃, 100kHz

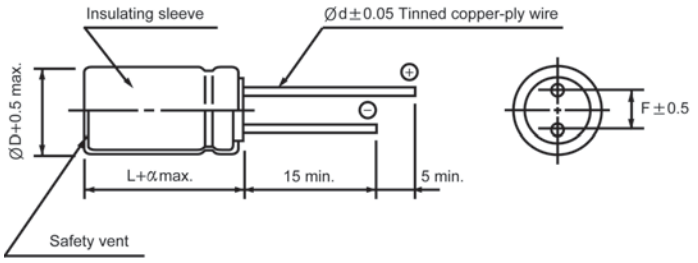
SHJ Low Impedance Long Life Series

· High reliability withstanding 12000 hours load life at 105℃
(7000/9000 hours for as specified below)
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.01CV or 3μA whichever is greater (after 2 minutes) I=0.03CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value. WV 6.3 10 16 25 35 50 Tanδ 0.22 0.19 0.16 0.14 0.12 0.10
Low temperature characteristics (Impedance ratio at 120Hz)	Z-40℃ /Z+20℃ 3 ; Z-25℃ /Z+20℃ 2
Load life (after application of the rated voltage for 12000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value Tanδ: Less than 200% of specified value Φ5, Φ6.3 :7000 hours; Φ8 :9000 hours; ≥Φ10: 12000 hours.
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

SHJ Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16		
10							5×11	0.35	250
22	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250
33	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250
47	5×11	0.30	250	5×11	0.30	250	5×11	0.30	250
100	5×11	0.30	250	5×11	0.30	250	6.3×11	0.25	405
150	6.3×11	0.15	405	6.3×11	0.15	405	6.3×11	0.20	405
220	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.15	760
330	6.3×11	0.15	405	8×11.5	0.13	760	8×11.5	0.10	760
390	6.3×11	0.15	405	8×11.5	0.11	760	8×11.5	0.10	760
470	8×11.5	0.11	630	8×11.5	0.11	760	10×12.5	0.053	1030
560	8×11.5	0.11	760	10×12.5	0.053	760	10×12.5	0.053	1100
680	10×12.5	0.053	1030	10×12.5	0.053	1030	10×16	0.038	1430
1000	10×12.5	0.053	1030	10×12.5	0.053	1330	10×16	0.038	1760
1500	10×20	0.027	1820	10×20	0.030	1820	10×20	0.030	1960
2200	12.5×20	0.025	2360	12.5×20	0.027	2360	12.5×25	0.023	2770
3300	12.5×20	0.025	2360	12.5×20	0.027	2480	16×20	0.020	3250
4700	16×25	0.015	3460	16×25	0.022	3250	16×25	0.018	3630
6800	16×25	0.015	3460	16×25	0.018	3630			
10000	16×31.5	0.015	3680	18×31.5	0.015	3700			

WV / μF	25			35			50		
10	5×11	0.35	250	5×11	0.55	250	5×11	0.60	250
22	5×11	0.35	250	5×11	0.50	250	5×11	0.45	250
33	5×11	0.35	250	5×11	0.45	250	6.3×11	0.25	405
47	5×11	0.30	250	6.3×11	0.30	405	6.3×11	0.20	405
56	6.3×11	0.27	405	6.3×11	0.20	405	6.3×11	0.20	405
68	6.3×11	0.27	405	8×11.5	0.10	540	8×11.5	0.15	540
100	6.3×11	0.20	405	8×11.5	0.10	760	8×11.5	0.12	760
150	8×11.5	0.14	760	8×11.5	0.10	760	10×12.5	0.061	1030
220	8×11.5	0.12	760	10×12.5	0.053	1030	10×16	0.038	1430
330	10×12.5	0.053	1030	10×12.5	0.053	1330	10×20	0.032	1820
390	10×12.5	0.053	1250	10×16	0.048	1550	12.5×20	0.031	2000
470	10×12.5	0.050	1330	10×16	0.041	1760	12.5×20	0.030	2360
560	10×16	0.050	1760	10×20	0.037	2100	12.5×25	0.027	2450
680	10×16	0.040	1800	12.5×20	0.026	2360	12.5×25	0.022	2770
1000	10×20	0.033	1960	12.5×20	0.026	2480	16×25	0.018	3460
1500	12.5×20	0.029	2550	16×20	0.022	3250	16×31.5	0.015	3680
2200	16×20	0.022	3250	16×25	0.018	3630			
3300	16×25	0.018	3630						

Ripple current (mA rms) at 105℃, 100kHz
Impedance (Ω) max. at 20℃, 100kHz
Case size ΦD×L(mm)

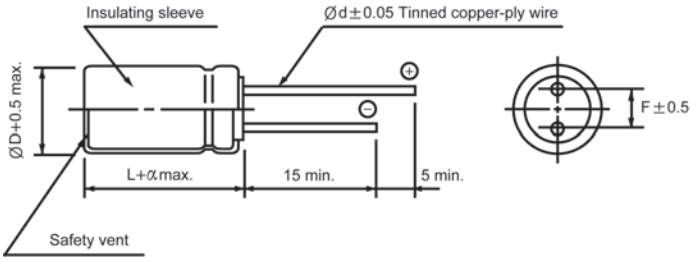
SG Long Life Series

· Load life
· For LED Lighting
· High reliability withstanding 20000 hours load life at 105℃
· Complied to the RoHS directive

Items	Performance characteristics				
Operating temperature range	-40 ~ +105℃				
Leakage current max.	I = 0.03CV or 4μA whichever is greater (after 1 minute)				
Capacitance tolerance	±20% at 120Hz, 20℃				
Dissipation factor max. (at 120Hz,20℃)	WV	10	16	25	35
	Tanδ	0.20	0.16	0.14	0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV	10	16	25	35
	Z-25℃ /Z+20℃	3	2	2	2
	Z-40℃ /Z+20℃	3	3	3	3
Load life (after application of the rated voltage for 20000 hours at 105℃)	Leakage current	Less than specified value			
	Capacitance change	Within ±30% of initial value			
	Tanδ	Less than 300% of specified value			
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.				

● DRAWING

Unit : mm



ΦD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
Φd	0.6		0.8	
α	2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
100 ~ 4700	0.75	0.80	0.90	0.95	1.00

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10		16		25		35	
100					10×12.5	420	10×16	672
220			10×12.5	504	10×12.5	840	10×20	1008
330	10×12.5	504	10×16	672	10×16	1008	12.5×20	1344
470	10×12.5	672	10×20	806	10×20	1344	12.5×20	1680
680	10×16	806	12.5×20	1008	12.5×20	1008	12.5×25	1879
1000	10×20	1008	12.5×25	1680	12.5×25	1680	16×25	2184
2200	12.5×25	1680	16×25	2016	Case size ΦD×L(mm)			
3300	16×25	2016	16×31.5	2184	Ripple current (mA rms) at 105℃ , 100kHz			
4700	16×31.5	2184						

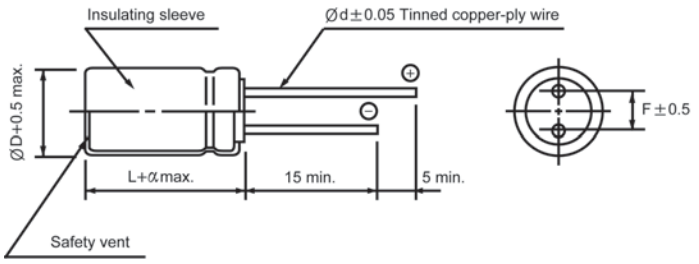
SY Miniature, Long Life, For LED Lighting Series

· Miniature,long life
· For LED Lighting
· High reliability withstanding 10000 hours load life at 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-25 ~ +105℃
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	WV: 10 / 16 / 25 / 35 / 50 / 63 / 100 Tanδ: 0.45 / 0.35 / 0.30 / 0.22 / 0.19 / 0.17 / 0.15
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 / 63 / 100 Z-25℃ /Z+20℃: 8 / 6 / 4 / 4 / 3 / 4 / 4
Load life (after application of the rated voltage for 10000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8
F	2.0	2.5	3.5
Φd	0.5		
α	1.5		

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~	0.55	0.73	0.92	0.96	1.00

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	10		16		25		35		50		63		100	
1.0									5×11	32				
2.2									5×11	42				
3.3									5×11	84				
4.7									5×11	96				
10									5×11	108			6.3×11	205
22									5×11	132	6.3×11	265	8×11.5	240
33					5×11	156	5×11	175	6.3×11	228	6.3×11	265	8×11.5	240
47			5×11	175	5×11	175	6.3×11	252	6.3×11	228	8×11.5	270		
100	5×11	175	6.3×11	252	6.3×11	252	8×11.5	396	8×11.5	324				
220	6.3×11	252	8×11.5	396	8×11.5	396	8×16	430	← Ripple current (mA rms) at 105℃ , 100kHz					
330	8×11.5	396	8×11.5	396					← Case size ΦD×L(mm)					

SQ Low Impedance, High Ripple Current Series

· For LED Lighting
· High reliability withstanding 10000 hours load life at 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.01CV or 3μA wichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃

Dissipation factor max. (at 120Hz,20℃)

Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	80	100	120
Tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	0.08

Low temperature characteristics (Impedance ratio at 120Hz)

Z-25℃ /Z+20℃	2
Z-40℃ /Z+20℃	3

Load life (after application of the rated voltage for 10000 hours at 105℃)

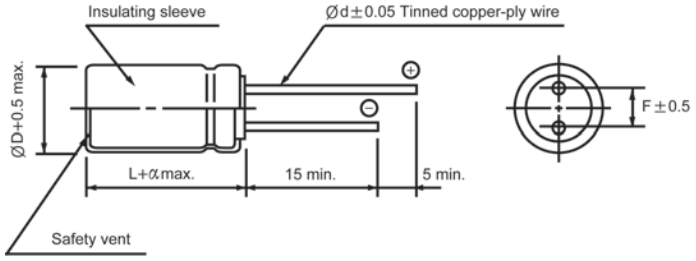
WV	6.3 ~ 10	16 ~ 120
Leakage current	Less than specified value	
Capacitance change	Within ±30% of initial value	Within ±25% of initial value
Tanδ	Less than 200% of specified value	

ΦD \ WV	6.3	10 ~ 50	63 ~ 120
Φ5 ~ Φ6.3	6000	7000	6000
Φ8×11.5	8000	9000	8000
Φ8×16 ~ 20	9000	10000	9000
Φ10×12.5	9000		
Φ10×16 ~ 25	10000		
Φ12.5 ~			

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

SQ Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25			35		
100										5×11	0.40	450	6.3×11	0.17	700
120							5×11	0.40	450						
150				5×11	0.40	450				6.3×11	0.17	700			
180													8×11.5	0.075	1200
220	5×11	0.40	345										8×16	0.065	1600
270													10×12.5	0.053	1700
330				6.3×11	0.17	700				8×11.5	0.090	1200	8×20	0.041	1960
390										8×16	0.065	1600	10×16	0.038	2000
470	6.3×11	0.17	540							10×12.5	0.053	1700	10×16	0.038	2100
560				8×11.5	0.110	1200	8×16	0.059	1600	8×20	0.041	1960	10×20	0.030	2500
680				8×16	0.059	1600	10×12.5	0.053	1700	10×16	0.039	2000	10×25	0.027	2600
820	8×11.5	0.075	945	10×12.5	0.053	1700	8×20	0.041	1960				12.5×20	0.025	2900
1000	8×16	0.059	1250	10×16	0.041	1960	10×16	0.036	2000	10×20	0.030	2500	12.5×20	0.025	2900
1200	10×12.5	0.053	1500	10×16	0.036	2000				10×25	0.028	2900	12.5×25	0.022	3200
1500	8×20	0.041	1500				10×20	0.027	2500	12.5×20	0.026	2900	12.5×30 16×20	0.018 0.021	3660 3330
1800	10×16	0.036	1760	10×20	0.027	2500	10×25	0.024	2600	12.5×25	0.024	3200	12.5×35.5 16×25	0.016 0.017	4120 3810
2200				10×25	0.027	2600	12.5×20	0.023	2900	12.5×30 16×20	0.017 0.020	3660 3330			
2700	10×20	0.027	1960	10×25	0.024	2900	12.5×25	0.018	3200	12.5×35.5	0.015	4120			
3300	10×25	0.023	2250	12.5×25	0.018	3200	12.5×30 16×20	0.017 0.020	3660 3300	16×25	0.016	3810			
3900	12.5×20	0.024	2480				12.5×35.5	0.015	4120						
4700	12.5×25	0.018	2900	12.5×30 16×25	0.018 0.016	3660 3300	16×25	0.016	3810						
5600	12.5×30	0.017	3450	16×25	0.016	3810	← Ripple current (mA rms) at 105℃, 100kHz								
6800	12.5×35.5 16×20	0.015 0.020	3570 3250												
8200	16×25	0.016	3630												

Impedance (Ω) max. at 20℃, 100kHz
Case size ΦD×L(mm)

SQ Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	50			63			80			100			120		
27	5×11	0.48	310				6.3×11	0.46	370						
33										8×11.5	0.45	620	8×16	0.20	780
47	6.3×11	0.38	400	6.3×11	0.35	420	8×11.5	0.29	620	8×16 10×12.5	0.35 0.25	780 780	8×20 10×16	0.16 0.11	1040 1040
56	6.3×11	0.22	500				8×16	0.20	780	10×12.5	0.25	780			
68							10×12.5	0.17	780	8×20 10×16	0.25 0.13	1040 1040	10×20 12.5×16	0.084 0.110	1430 1430
82				8×11.5	0.240	720	8×20	0.160	1040	10×16	0.13	1140			
100	8×11.5	0.12	950	8×16	0.180	990	10×16	0.140	1040	10×20 12.5×16	0.105 0.105	1430 1430	10×25 12.5×20	0.069 0.062	1620 1750
120	8×16	0.082	1230	10×12.5	0.110	990				10×25	0.075	1620	12.5×25	0.047	2210
150	10×12.5	0.073	1280	8×20	0.096	1200	10×20 12.5×16	0.084 0.110	1430 1430	12.5×20	0.070	1750	12.5×30 16×20	0.042 0.048	2400 1950
180	8×20	0.065	1580	10×16	0.076	1200	10×25	0.069	1620						
220	10×16	0.050	1650				12.5×20	0.062	1750	12.5×25	0.060	2210	16×25	0.038	2430
270				10×20	0.070	1570	12.5×25	0.047	2210	12.5×30 16×20	0.040 0.046	2400 1950	16×31.5 18×25	0.032 0.036	2640 2500
330	10×20	0.036	2060	10×25	0.060	1990	12.5×30 16×20	0.042 0.048	2400 1950	12.5×35.5	0.038	2600	16×35.5	0.029	2860
390	10×25	0.030	2240	12.5×20	0.050	1990	12.5×35.5	0.036	2600	12.5×40 16×25 18×20	0.030 0.036 0.045	2860 2430 2270	16×40 18×31.5	0.027 0.030	3510 2860
470	12.5×20	0.030	2300	12.5×25	0.039	2460	12.5×40 16×25 18×20	0.032 0.038 0.045	2860 2430 2270	16×31.5 18×25	0.030 0.034	2640 2500	18×35.5	0.027	3510
560				12.5×30 16×20	0.035 0.032	2760 2380	16×31.5	0.032	2640	16×35.5 18×31.5	0.028 0.029	2860 2860	18×40	0.026	3860
680	12.5×25	0.024	2800	12.5×35.5	0.024	3040	16×35.5 18×25	0.029 0.036	2860 2500	16×40 18×35.5	0.026 0.026	3510 3510			
820	12.5×30 16×20	0.022 0.025	3370 3070	16×25	0.025	2890	16×40 18×31.5	0.027 0.030	3510 2860	18×40	0.025	3860			
1000	12.5×35.5 16×25	0.020 0.021	3810 3510	16×31.5	0.023	2950	18×35.5	0.027	3510						
1200							18×40	0.026	3860	← Ripple current (mA rms) at 105℃ , 100kHz					
2200				18×40	0.020	3200				← Impedance (Ω) max. at 20℃ , 100kHz					

Case size ΦD×L(mm)

BS
Upgrade

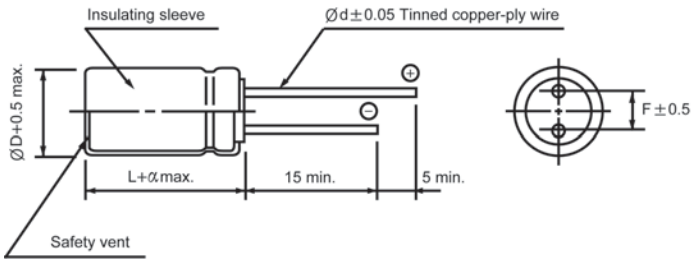
For PSU, High Ripple Current, Long Life Series

· High ripple current
· High reliability withstanding 5000 hours load life at 105℃
· Suited for ballast application
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (160V~450V); -25 ~ +105℃ (500V)
Leakage current max.	I=0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	WV: 160 / 200 / 250 / 350 / 400~500 Tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 450 / 500 Z-25℃ /Z+20℃: 3 / 3 / 3 / 4 / 6 / 6 / 6 Z-40℃ /Z+20℃: 4 / 4 / 4 / 8 / 10 / 10 / -
Load life (after application of the rated voltage for 5000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	10	12.5	16	18	22
F	5.0	5.0	7.5	7.5	10.0
Φd	0.6		0.8		
α	2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 4.7	0.25	0.30	0.60	0.80	0.90	1.00
6.8 ~ 15	0.30	0.40	0.70	0.90	0.95	1.00
22 ~	0.40	0.50	0.80	0.90	0.95	1.00

BS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350	
4.7							10×16	200
6.8			10×12.5	120	10×12.5	120	10×16	200
10	10×16	250	10×16	300	10×20	300	10×20	280
15					10×12.5	260		
22	10×16 10×20	360 500	10×16 10×20	360 500	12.5×20	600	12.5×20	350
33	10×20	500	10×20 12.5×20	500 600	12.5×20	600	16×20	500
47	12.5×20	600	12.5×20	660	12.5×25	720	16×25	660
68	12.5×25	600	12.5×25	760	16×25	920	16×31.5	800
82	16×20	760	16×20	880	16×25	1120	18×31.5	920
100	16×25	1100	16×25	1120	16×31.5	1200	18×31.5	1020
120	16×25	1180	16×31.5	1200	18×25	1200	18×31.5	1150
150	16×31.5	1300	16×31.5	1300	18×25 18×31.5	1250 1250	18×40	1250
220					18×35.5	1600		

WV / μF	400		420		450		500	
1.0	10×12.5	90						
2.2	10×12.5	100	10×12.5	100	10×12.5	100		
3.3	10×12.5	128	10×12.5	128	10×12.5	128		
4.7	10×12.5	180	10×12.5	180	10×16	180		
6.8	10×16	200	10×16	200	10×16	200		
10	10×20	280	10×20	280	10×20	300	12.5×20 12.5×25	300 360
15	12.5×16	280					12.5×25	360
22	12.5×25	430	12.5×25	430	12.5×20 16×25	430 550	16×25	420
33	16×25	640	16×25	660	16×31.5	700	16×31.5	560
47	16×31.5	750	16×31.5	750	16×31.5	700	18×35.5	700
56			18×25	750	18×25	750	18×35.5	740
68	16×31.5	880	16×31.5	900	18×25 18×31.5	900 1000	18×35.5	900
82	16×35.5	1000	16×35.5	1000	18×31.5 18×35.5	1035 1100	18×40	1030
100	18×35.5	1120	18×35.5	1170	18×35.5	1500	18×45 22×40	1100 1200
120	18×40	1250	18×40	1280	18×40	1500		
150	22×40	1380	22×40	1500	22×40	1796		
180	22×40	1450	22×40	1600	22×45	1800		

Ripple current (mA rms) at 105℃ , 100kHz
Case size ΦD×L(mm)

BT For PSU, High Ripple Current, Long Life Series

· High ripple current
· Operating temperature range of -40~ +105℃
· For power supply and adapter
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (160V~450V); -25 ~ +105℃ (500V)
Leakage current max.	I=0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃

Dissipation factor max. (at 120Hz,20℃)

WV	160	200	250	350	400	420	450	500
Tanδ	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.24

Low temperature characteristics (Impedance ratio at 120Hz)

WV	160	200	250	350	400	420	450	500
Z-25℃ /Z+20℃	3	3	3	4	6	6	6	6
Z-40℃ /Z+20℃	4	4	4	6	6	6	6	-

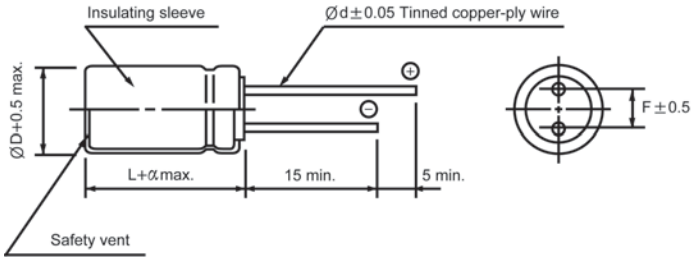
Load life (after application of the rated voltage for 10000 hours at 105℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	8	10	12.5	16	18	22
F	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.5	0.6		0.8		
α	1.5	2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≤
Coefficient	0.35	0.50	0.80	0.90	0.95	1.00

BT Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350	
4.7					8×11.5	193		
6.8					8×11.5 10×12.5	220 230	10×16	264
10	10×16	320	10×16	320	10×16	320	8×20 10×20	315 340
22	10×16	500	10×16	500	10×20	500	12.5×20	424
33	10×20	650	10×20	650	12.5×20	770	16×20	605
47	10×20	750	12.5×20	840	12.5×20	980	16×25	800
68	12.5×20	970	12.5×25	970	16×20	1080	18×25	1020
82	12.5×25	1250	16×20	1125	16×20	1190	18×31.5	1090
100	12.5×25	1250	16×20	1230	18×25	1425		
150	16×25	1610	18×25	1740	18×25	2000		

WV / μF	400		420		450		500	
1.0	8×11.5	72			8×11.5	100		
2.2	8×11.5	99			8×11.5	110		
3.3	8×11.5	160			8×11.5	160		
3.9	8×11.5	170			8×16	180		
4.7	8×16 10×12.5	175 230			8×20 10×16	240 240		
6.8	8×20 10×16	230 265			10×16	265		
10	10×20	340	10×20	360	10×20	385	12.5×25	385
15					10×20	385		
22	12.5×25	520	12.5×25 16×20	520 520	12.5×20 12.5×25 16×25	485 485 675	16×25 16×31.5	675 820
33	16×25	775	16×25	825	18×25	845	18×35.5	870
47	18×25	1020	18×31.5	1015	18×31.5	1060	18×35.5	1000
68	18×31.5	1050	18×25 18×31.5	1090 1125	18×25 18×31.5	1200 1200	18×35.5 18×40	1200 1300
82	18×35.5	1150	18×31.5	1210	18×35.5	1270	16×50	1350
100	18×40	1210	18×35.5 18×40	1270 1330	18×35.5 18×40	1330 1400		
120	Ripple current (mA rms) at 105℃ , 100kHz				18×40	1450		
150	Case size ΦD×L(mm)				22×40	1550		

BD For PSU, High Ripple, Long Life Series

· High reliability withstanding 12000 hours load life at 105℃
· Suitable for CFL, adapter and power supply
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (160V~450V); -25 ~ +105℃ (500V)
Leakage current max.	I=0.04CV + 100μA (after 1 minute) I=0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃

Dissipation factor max. (at 120Hz,20℃)

WV	160	200	250	350	400	420	450	500
Tanδ	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.24

Low temperature characteristics (Impedance ratio at 120Hz)

WV	160	200	250	350	400	420	450	500
Z-25℃ /Z+20℃	3	3	3	6	6	6	6	6
Z-40℃ /Z+20℃	4	4	4	10	10	10	10	-

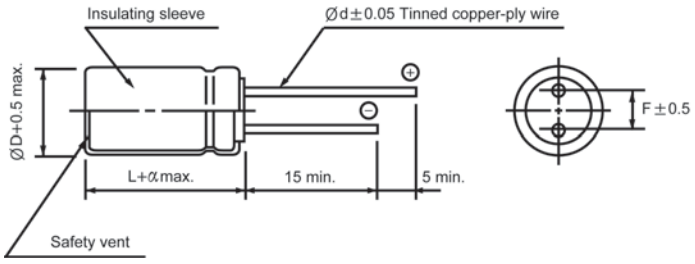
Load life (after application of the rated voltage for 12000 hours at 105℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	8	10	12.5	16	18	22
F	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.5	0.6		0.8		
α	1.5	2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	120Hz	300Hz	1kHz	10kHz	50kHz	100kHz≤
160 ~ 450	~ 15	0.30	0.50	0.60	0.90	0.95	1.00
	22 ~ 47	0.40	0.50	0.70	0.90	0.95	1.00
	68 ~	0.50	0.60	0.80	0.90	0.95	1.00
500	~ 39	0.40	0.50	0.70	0.90	0.95	1.00
	47 ~	0.50	0.60	0.80	0.90	0.95	1.00

BD Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350	
4.7					8×11.5	193	10×12.5	198
6.8					8×11.5 10×12.5	220 319	10×16	308
10	10×16	358	10×16	407	8×16 10×16	292 407	8×20 10×20	424 462
22	10×16	572	10×20	638	10×20	580	12.5×20	743
27	10×16	611	10×20	638	10×20	660	12.5×20	784
33	10×16	690	10×20	825	12.5×20	853	16×20	858
39	10×20	759	12.5×20	839	12.5×20	886	16×20	880
47	10×20	924	12.5×20	1100	12.5×20	1100	16×25	1130
68	12.5×20	924	12.5×25 16×20	1188 1210	16×20	1210	18×25	1220
82	12.5×25	1040	16×25	1232	16×20	1340	18×25	1380
100	12.5×25 16×20	1210 1210	16×25	1434	16×25 18×20	1540 1540	18×31.5	1617
120	16×25	1325	16×25	1571	18×25	1645	18×35.5	1848
150	16×25	1645	18×25	1727	18×25	1914	18×40	2072
180	16×25	1782	18×25	1760	18×31.5	2024	22×40	2310
220	18×25	2090	18×31.5	2222	18×35.5	2200		
270	16×35.5	2200	18×35.5	2530				
330	16×40	2508	18×40	2750				
470	18×45	3084						

Ripple current (mA rms) at 105℃, 100kHz
Case size ΦD×L(mm)

WV / μF	400		420		450		500	
1.0	8×11.5	72			8×11.5	90		
2.2	8×11.5	99			8×11.5	105		
3.3	8×11.5	160			8×11.5	145		
3.9	8×11.5	171			8×16	165		
4.7	8×16 10×12.5	176 242			8×20 10×12.5	242 242		
6.8	8×20 10×16	231 308			10×16 10×20	363 440		
10	10×20	462	10×20	462	10×20 12.5×20	440 528	12.5×20	413
15	12.5×20	528	12.5×20	528	12.5×20 12.5×25	528 660	12.5×25	440
22	12.5×25	792	12.5×25 16×20	745 780	12.5×25 16×20	890 900	16×20 16×25	500 675
27	16×20	803	16×20	875	16×20	950	16×25	823
33	16×20	960	12.5×30 16×25	980 1035	16×25 18×20	1095 1095	16×31.5 18×25	880 880
39	16×20	1000	16×25	1050	16×25	1100	16×31.5	1033
47	16×25 18×20	1188 1188	16×25	1125	18×25	1150	18×25 18×31.5	1000 1033
68	16×31.5	1309	18×25	1265	18×31.5	1180	18×35.5 18×40	1100 1200
82	18×31.5	1639	18×31.5	1450	18×35.5	1430	18×35.5 18×40	1250 1340
100	18×35.5	1810	18×35.5	1700	18×35.5 18×40	1740 1740	18×45 22×40	1400 1600
120	18×40	2006	18×40	1700	18×45	1740		
150	22×40	2244	22×40	2000				

BB For PSU, 15000 hours at 105℃ Series

· High reliability withstanding 15000 hours load life at 105℃
· For power supply and adapter
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=0.04CV + 100μA (after 1 minute); I=0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃

Dissipation factor max. (at 120Hz,20℃)

WV	160	200	250	350	400	420	450	500
Tanδ	0.20	0.20	0.20	0.24	0.24	0.24	0.24	0.24

Low temperature characteristics (Impedance ratio at 120Hz)

WV	160	200	250	350	400	420	450	500
Z-25℃ /Z+20℃	3	3	3	3	6	6	6	6
Z-40℃ /Z+20℃	4	4	4	6	6	6	6	6

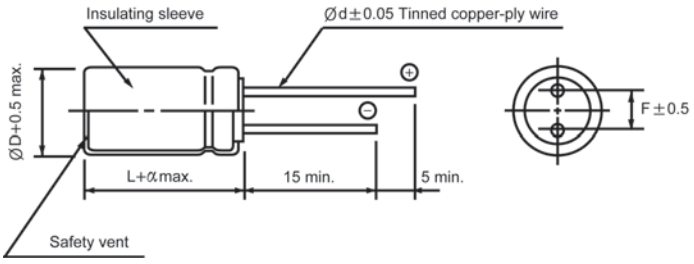
Load life (after application of the rated voltage for 15000 hours at 105℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value
Φ10:12000hours; ≥Φ12.5: 15000 hours.	

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	10	12.5	16	18	22
F	5.0	5.0	7.5	7.5	10.0
Φd	0.6		0.8		
α	2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
10 ~ 82	1.00	1.75	2.25	2.35	2.50
100 ~ 470	1.00	1.67	2.05	2.15	2.25

BB Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350	
10	10×12.5	110	10×12.5	110	10×12.5	160	10×16	149
15	10×12.5	150	10×12.5	150	10×16	220	10×20	197
22	10×12.5	243	10×16	243	10×20	240	12.5×20	297
27	10×16	264	10×20	280	10×20	270	12.5×20	314
33	10×16	270	10×20	308	12.5×20	323	12.5×25	325
39	10×20	320	10×25	350	12.5×20	354	12.5×30	352
47	10×20	369	12.5×20	440	12.5×25	460	16×20	451
68	12.5×20	480	12.5×25	594	12.5×30	610	16×31.5	623
82	12.5×25	525	16×20	616	16×25	680	18×25	688
100	12.5×25	575	16×25	717	16×31.5	717	18×31.5	817
120	12.5×30 16×25	670 670	16×25	785	16×31.5	804	18×35.5	924
150	16×25	825	16×31.5	813	16×35.5	902	18×40	1083
180	16×25	891	16×35.5	951	18×35.5	1012	18×45	1230
220	16×31.5 18×25	968 968	18×31.5	1100	18×40	1121		
270	16×35.5	1100	18×40	1290				
330	16×40 18×31.5	1231 1231	18×45	1390				
470	18×45	1626						

Ripple current (mA rms) at 105℃ , 120Hz
Case size ΦD×L(mm)

WV / μF	400		420		450		500	
10	10×16	145	10×20	135	10×20	135	12.5×20	165
22	12.5×20	297	12.5×25	250	12.5×25	296	16×20	260
27	12.5×25	330	12.5×25	265	12.5×25	305	16×25	329
33	12.5×30	355	16×20	345	16×20	364	16×31.5	380
39	16×25	400	16×25	400	16×31.5	423	16×35.5	434
47	16×25	480	16×25	450	16×31.5	478	18×31.5	468
68	16×35.5	627	18×31.5	580	18×31.5	590	18×40	630
82	16×40	770	18×31.5	650	18×31.5	670	18×40	670
100	18×35.5	875	18×35.5	770	18×40	794	18×45	800
120	18×40	1000	18×45	900	18×45	940	18×50	920
150	18×45	1150						

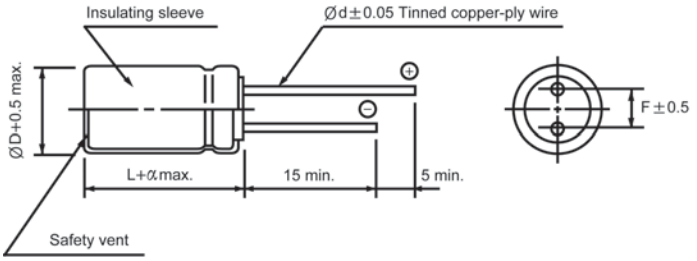
BC For PSU, High Ripple, 20000 hours at 105℃ Series

· High reliability withstanding 20000 hours load life at 105℃
· For power supply and adapter
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (160V~450V); -25 ~ +105℃ (500V)
Leakage current max.	I=0.04CV + 100μA (after 1 minute) I=0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Tanδ: 0.20 / 0.20 / 0.20 / 0.24 / 0.24 / 0.24 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25℃ /Z+20℃: 3 / 3 / 3 / 3 / 6 / 6 / 6 / 6 Z-40℃ /Z+20℃: 4 / 4 / 4 / 6 / 6 / 6 / 6 / -
Load life (after application of the rated voltage for 20000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value Φ10:15000 hours.
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	10	12.5	16	18	22
F	5.0	5.0	7.5	7.5	10.0
Φd	0.6		0.8		
α	2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
3.3 ~ 82	1.00	1.75	2.25	2.35	2.50
100 ~ 470	1.00	1.67	2.05	2.15	2.25

BC Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350	
6.8					10×12.5	119	10×12.5	105
10					10×12.5	160	10×16	149
15			10×12.5	150	10×16	220	10×20	197
22	10×12.5 10×16	221 243	10×16	243	10×20	240	12.5×20	297
27	10×16	264	10×20	280	10×20	270	12.5×20	314
33	10×16	270	10×20	308	12.5×20	323	12.5×25	325
39	10×20	320	10×25	350	12.5×20	354	12.5×25	352
47	10×20	369	12.5×20	440	12.5×25	460	12.5×30	451
68	12.5×25	480	12.5×25	594	12.5×30	610	16×31.5	623
82	12.5×25	525	12.5×30 16×20	640 616	16×25	680	18×25	688
100	12.5×25	575	16×25	717	16×25	717	18×31.5	817
120	12.5×30	670	16×25	785	16×31.5	804	18×35.5	924
150	16×25	825	16×31.5	813	16×35.5	902	18×40	1083
180	16×25	891	16×35.5	951	18×31.5	1012	18×45	1230
220	16×31.5 18×25	968 968	18×31.5	1100	18×35.5	1121		
270	16×35.5	1100	18×40	1290				
330	18×31.5	1231	18×45	1390				
470	18×45	1626						

Ripple current (mA rms) at 105℃, 120Hz
Case size ΦD×L(mm)

WV / μF	400		420		450		500	
3.3							10×12.5	63
4.7					10×12.5	76	10×16	83
6.8	10×16	85			10×16	110	10×20	119
8.2	10×16	140	10×16	113	10×20	122	10×20	141
10	10×16	145	10×20	135	10×20	135	12.5×20	165
22	12.5×20	297	12.5×25	250	12.5×25	296	16×25	260
27	12.5×25	330	12.5×25	265	12.5×30	305	16×25	329
33	12.5×30	355	12.5×30 16×20	340 345	16×25	364	16×31.5	380
39	16×25	400	16×25	400	16×31.5	423	16×35.5	434
47	16×25	480	16×25	450	16×31.5	478	18×31.5	468
68	16×35.5	627	18×31.5	580	18×31.5	590	18×40	630
82	16×40	770	16×40	620	18×35.5	670	18×45	685
100	18×35.5	875	18×35.5	770	18×40	794	22×40	800
120	18×40	1003	18×45	900	18×50	940	22×50	960
150	18×50	1192						

SHT High Temperature, For 125℃ Use Series

· Load life of 2000 hours at 125℃
· For Electronic Control unit and other high temperature applications
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +125℃
Leakage current max.	WV ≤ 50: I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV ≥ 63: I = 0.03CV + 10μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

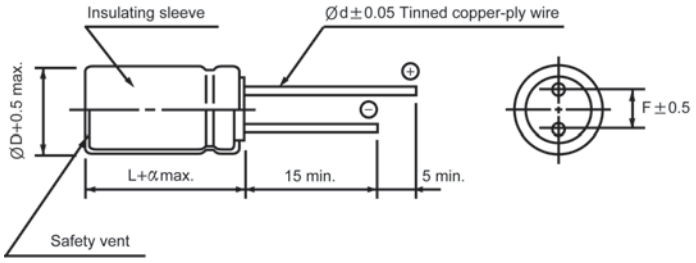
WV	6.3	10	16	25	35	50	63~100	160~250
Tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.15

Low temperature characteristics (Impedance ratio at 120Hz)	WV	6.3 ~ 10	16 ~ 250
	Z-25℃ /Z+20℃	3	2
	Z-40℃ /Z+20℃	5	4

Load life (after application of the rated voltage for 2000 hours at 125℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	Tanδ	Less than 300% of specified value
	Φ5,Φ6.3 and WV≥100:1000 hours.	
Shelf life (at 125℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.5			0.6		0.8	
α	1.5			2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≤
6.3 ~ 100	~ 47	0.38	0.50	0.78	1.00	1.00	1.00
	68 ~ 680	0.46	0.57	0.77	0.86	0.93	1.00
	1000 ~	0.57	0.67	0.77	0.77	0.88	1.00
160 ~ 250	0.47 ~ 220	0.44	0.56	0.78	0.89	0.94	1.00
	330 ~	0.60	0.67	0.75	0.77	0.88	1.00

SHT Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35	
22									5×11	170
33							5×11	165	6.3×11	240
47					5×11	165	6.3×11	220	6.3×11	285
68			5×11	165	6.3×11	230	6.3×11	275	8×11.5	405
100	5×11	160	6.3×11	220	6.3×11	280	8×11.5	405	8×11.5	485
150	6.3×11	240	6.3×11	280	8×11.5	410	8×11.5	485	10×12.5	660
220	6.3×11	300	8×11.5	410	8×11.5	485	10×12.5	635	10×16	815
330	8×11.5	310	8×11.5	485	10×12.5	660	10×16	790	10×20	1120
470	10×12.5	605	10×12.5	635	10×16	815	10×20	1075	12.5×20	1480
680	10×16	740	10×16	815	10×20	1075	12.5×20	1470	12.5×25	1755
1000	10×20	1005	10×20	1120	12.5×20	1490	12.5×25	1755	16×20	1870
1500	10×25	1290	12.5×20	1495	12.5×25	1755	16×20	1870	16×31.5	2520
2200	12.5×20	1520	12.5×25	1805	16×20	1900	16×25	2165	16×35.5	2830
3300	12.5×25	1805	16×20	1955	16×25	2210	16×35.5	2830	18×40	3210
4700	16×25	2045	16×31.5	2555	16×35.5	2830	18×40	3125		
6800	16×31.5	2505	16×35.5	2830	18×35.5	3060				
10000	16×40	2905	18×40	3210			Ripple current (mA rms) at 125℃ , 100kHz			
15000	18×40	3125					Case size ΦD×L(mm)			

WV / μF	50		63		100		160	
1.0	5×11	40			8×11.5	25	10×12.5	20
1.5	5×11	50						
2.2	5×11	55			8×11.5	45	10×16	32
3.3	5×11	70			10×16	60	10×16	42
4.7	5×11	85			10×16	70	10×20	50
6.8	5×11	95						
10	5×11	120	8×11.5	80	10×20	110	12.5×20	85
15	5×11	155						
22	6.3×11	205	10×16	150	12.5×25	205	16×25	155
33	6.3×11	255	10×20	200	16×25	280	16×31.5	210
47	8×11.5	365	12.5×20	280	16×31.5	370		
68	8×11.5	435						
100	10×16	615	12.5×25	445				
150	10×20	865						
220	10×25	1100						
330	12.5×20	1330						
470	12.5×25	1585						
680	16×20	1720						
1000	16×31.5	2240						
1500	16×40	2545						
2200	18×40	2705						

WV / μF	200		250	
1.0	10×12.5	20	10×12.5	18
2.2	10×16	32	10×16	32
3.3	10×20	42	10×20	42
4.7	10×20	50	12.5×20	60
10	12.5×20	95	16×25	105
22	16×31.5	170		

SHW High Temperature, For 125℃ Use Long Life Series

· Load life of 5000 hours at 125℃
· Low impedance at high frequency
· For Electronic Control Unit and other high temperature applications
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +125℃
Leakage current max.	I = 0.03CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	100
Tanδ	0.22	0.20	0.16	0.14	0.12	0.10	0.10	0.08

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25	35	50	63	100
Z-25℃ /Z+20℃	3	3	3	2	2	2	2	2
Z-40℃ /Z+20℃	6	6	4	3	3	3	3	3

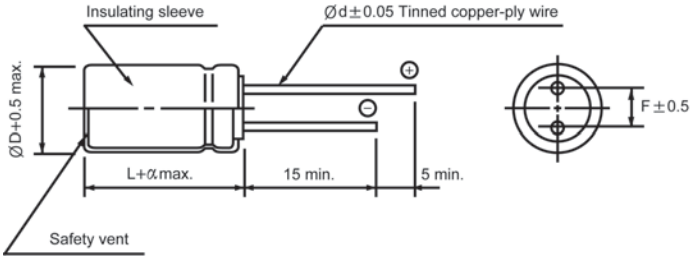
Load life (after application of the rated voltage for 5000 hours at 125℃)

Leakage current	Less than specified value
Capacitance change	Within ±30% of initial value
Tanδ	Less than 300% of specified value
Φ5,Φ6.3:2000 hours; Φ8:3000 hours; ≥Φ10: 5000 hours.	

Shelf life (at 125℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
Φd	0.5			0.6		0.8
α	1.5			2.0		

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≤
~ 33	0.20	0.50	0.80	0.90	1.00
47 ~ 100	0.25	0.60	0.90	0.95	1.00
150 ~ 220	0.35	0.70	0.92	0.96	1.00
330 ~ 680	0.45	0.75	0.95	0.97	1.00
1000 ~ 1500	0.50	0.80	0.96	0.98	1.00
2200 ~	0.55	0.85	0.98	0.99	1.00

SHW Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3			10			16			25		
47										5×11	0.80	250
68				5×11	0.80	250	5×11	0.80	250	6.3×11	0.34	405
100	5×11	0.80	250	6.3×11	0.34	405	6.3×11	0.34	405	6.3×11	0.34	405
150	6.3×11	0.34	405	6.3×11	0.34	405	6.3×11	0.34	405	8×11.5	0.28	760
220	6.3×11	0.34	405	8×11.5	0.30	760	8×11.5	0.28	760	10×12.5	0.14	1030
330	8×11.5	0.28	760	8×11.5	0.28	760	10×12.5	0.14	1030	10×16	0.10	1430
470	10×12.5	0.14	1030	10×12.5	0.14	1030	10×16	0.10	1430	10×20	0.08	1500
680	10×16	0.10	1430	10×16	0.10	1430	10×20	0.06	1500	12.5×20	0.06	1720
1000	10×20	0.06	1500	10×20	0.06	1500	12.5×20	0.06	1720	12.5×25	0.05	1900
1500	10×25	0.06	1620	12.5×20	0.06	1720	12.5×25	0.05	1900			
2200	12.5×20	0.06	1720	12.5×25	0.05	1900						
3300	12.5×25	0.05	1900									

WV / μF	35			50			63			100		
22	5×11	0.80	250							10×12.5	0.80	480
33	6.3×11	0.34	405	8×11.5	0.70	300	8×11.5	1.50	150	10×12.5	0.80	480
47	6.3×11	0.34	405	8×11.5	0.70	440	10×12.5	0.59	530	10×16	0.65	630
68	8×11.5	0.28	760									
100	8×11.5	0.19	760	10×12.5	0.40	555	10×16	0.41	690	12.5×20	0.25	990
150	10×12.5	0.14	1030									
220	10×16	0.10	1430	10×20	0.15	930	12.5×20	0.16	1050	16×25	0.11	1500
330	10×25	0.06	1620	12.5×20	0.13	1330	12.5×25	0.12	1290	16×31.5	0.08	1790
470	12.5×20	0.06	1720	12.5×25	0.10	1650	12.5×35.5	0.10	1460			
680	12.5×25	0.05	1900	16×31.5	0.05	2430						

Ripple current (mA rms) at 125℃, 100kHz
Impedance (Ω) max. at 20℃, 100kHz
Case size ΦD×L(mm)

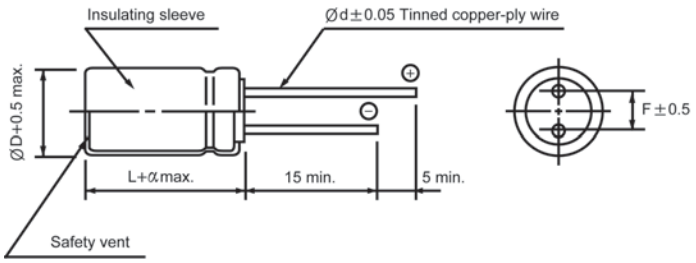
BK For PSU, High Temperature Series

· High reliability withstanding 5000 hours load life at 125℃
· Suitable for compact energy saving lamp
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-25 ~ +125℃
Leakage current max.	I=0.03CV + 15μA (CV ≤ 1000) I=0.02CV + 25μA (CV > 1000) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	WV: 160 / 200 / 250 / 350 / 400 / 450 Tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350~450 Z-25℃ /Z+20℃: 3 / 3 / 3 / 6
Load life (after application of the rated voltage for 5000 hours at 125℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value 450WV:2000 hours.
Shelf life (at 125℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	10	12.5	16
F	5.0	5.0	7.5
Φd	0.6		0.8
α	2.0		

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≤
Coefficient	0.30	0.40	0.70	0.90	0.95	1.00

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250		350		400		450	
2.2							10×12.5	135	10×12.5	135		
3.3					10×12.5	135	10×16	180	10×16	150		
4.7	10×12.5	135	10×12.5	150	10×12.5 10×16	150 180	10×16 10×20	195 255	10×20	255	10×25	156
10	10×12.5 10×16	165 210	10×12.5 10×16	195 240	10×16 10×20	210 255	12.5×20	375	12.5×20	375	12.5×20	232
22	10×20	420	10×20	420	12.5×20	450					16×25	415
33	12.5×20	600	12.5×20	600	12.5×25	675	← Ripple current (mA rms) at 125℃, 100kHz				16×31.5	548
47	12.5×25	780	12.5×25	780	↑	↑	↑ Case size ΦD×L(mm)					

BW High Temperature Range, For +135℃ Use Series

· Highly dependable reliability withstanding load life of 1000 to 3000 hours at 135℃
· Suited for automobile electronics where heavy duty services are indispensable
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-55 ~ +135℃
Leakage current max.	I = 0.03CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF: tanδ increases by 0.02 for each 1000μF from below value.

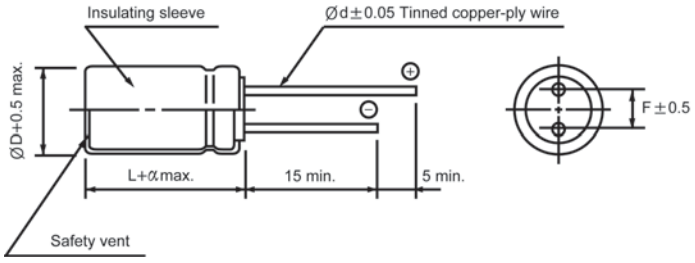
WV	10	16	25	35	50	63	80	100
Tanδ	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08

Low temperature characteristics (Impedance ratio at 120Hz)	WV	10	16	25	35	50	63	80	100
	Z-25℃ /Z+20℃	3	2	2	2	2	2	2	2
	Z-40℃ /Z+20℃	4	4	4	4	4	4	4	4

Load life (after application of the rated voltage for 3000 hours at 135℃)		
	Leakage current	Less than specified value
	Capacitance change	Within ±30% of initial value
	Tanδ	Less than 300% of specified value
	Φ8:1000 hours; Φ10:2000 hours; ≥Φ12.5:3000 hours.	
Shelf life (at 135℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

● DRAWING

Unit : mm



ΦD	8	10	12.5	16
F	3.5	5.0	5.0	7.5
Φd	0.5	0.6		0.8
α	1.5	2.0		

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / CV	120Hz	300Hz	1kHz	10kHz≤
10 ~ 100	1000>CV	0.50	0.64	0.83	1.00
	1000≤CV	0.67	0.79	0.91	1.00

BW Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10			16			25			35		
100				8×11.5	0.32	340	8×11.5	0.13	500	10×12.5	0.150	620
220	8×11.5	0.26	340	10×12.5	0.15	620	10×12.5	0.10	680	10×16	0.094	790
330	10×12.5	0.15	620	10×12.5	0.10	680	10×16	0.075	945	10×20	0.075	950
470	10×12.5	0.10	680	10×16	0.075	945	10×20	0.057	1100	12.5×20	0.058	1330
1000	10×20	0.057	1100	12.5×20	0.042	1490	12.5×25	0.033	1750	16×25	0.031	2010
2200	12.5×25	0.033	1750	16×25	0.024	2300	16×31.5	0.020	2710			
3300	16×25	0.024	2300	16×31.5	0.020	2710						
4700	16×31.5	0.020	2710									

WV / μF	50			63			80			100		
4.7	8×11.5	1.15	85									
10	8×11.5	0.75	180							8×11.5	1.50	150
22	8×11.5	0.50	250	8×11.5	2.00	130	8×11.5	1.50	150	10×12.5	0.80	480
33	8×11.5	0.45	300	8×11.5	1.50	150	10×12.5	0.80	480	10×12.5	0.80	480
47	8×11.5	0.35	440	10×12.5	0.59	530	10×12.5	0.80	480	10×16	0.55	630
100	10×12.5	0.18	555	10×16	0.41	690	10×20	0.39	790	12.5×20	0.25	990
220	10×20	0.098	930	12.5×20	0.16	1050	12.5×25	0.18	1240	16×25	0.11	1500
330	12.5×20	0.070	1330	12.5×25	0.12	1290	12.5×31.5	0.16	1390	16×31.5	0.079	1790
470	12.5×25	0.055	1650	12.5×31.5	0.097	1460	16×25	0.11	1500			
1000	16×31.5	0.031	2430	16×31.5	0.055	1900						

Ripple current (mA rms) at 135℃, 100kHz
Impedance (Ω) max. at 20℃, 100kHz
Case size ΦD×L(mm)

BX High Temperature Range, For +150℃ Use Series

· Laminated case series
· Suited for automobile electronics where heavy duty services are indispensable
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-55 ~ +150℃ (10V ~ 100V), –40 to +150°C (160V,200V), –25 to +150°C (350V,400V)
Leakage current max.	WV ≤ 100: I = 0.03CV or 4μA whichever is greater (after 1 minute) WV > 100: I = 0.04CV + 100μA (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF: tanδ increases by 0.02 for each 1000μF from below value.

WV	10	16	25	35	50	63	80	100	160,200	350,400
Tanδ	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.20	0.24

Low temperature characteristics (Impedance ratio at 120Hz)

WV	10	16	25	35	50	63	80	100	160,200	350,400
Z-25℃ /Z+20℃	3	2	2	2	2	2	2	2	3	6
Z-40℃ /Z+20℃	4	4	4	4	4	4	4	4	6	-

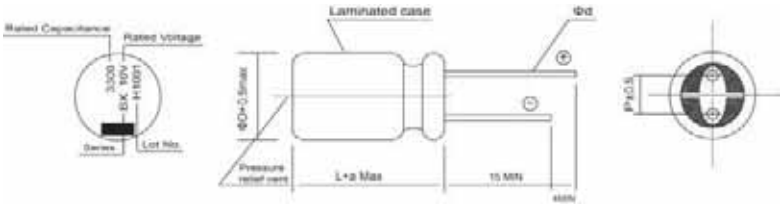
Load life (after application of the rated voltage for 2000 hours at 150℃)

WV	10 ~ 100	160 ~ 400
Leakage current	Less than specified value	
Capacitance change	Within ±30% of initial value	Within ±20% of initial value
Tanδ	Less than 300% of specified value	Less than 200% of specified value
Φ10,Φ12.5:1000 hours.		

Shelf life (at 150℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
Φd	0.6		0.8	
α	2.0			

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

V	Frequency / CV	120Hz	300Hz	1kHz	10kHz≤
10 ~ 100	1000>CV	0.50	0.64	0.83	1.00
	1000≤CV	0.67	0.79	0.91	1.00

V	Frequency / Cap.(μF)	50Hz	120Hz	300Hz	1kHz	10kHz	100kHz≤
160 ~ 400	4.7 ~ 33	0.75	1.00	1.25	1.50	1.75	1.80
	47 ~ 100	0.80	1.00	1.15	1.30	1.40	1.50

BX Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10		16		25		35	
2.2							10×12.5	50
3.3							10×12.5	60
4.7							10×12.5	85
10							10×12.5	175
22							10×12.5	200
33							10×12.5	225
47							10×12.5	250
100					10×12.5	250	10×20	400
220			10×16	300	12.5×20	500	12.5×25	600
330	10×16	300	10×20	400	12.5×25	600	16×25	800
470	10×20	400	12.5×20	600	16×25	800	16×31.5	1000
1000	12.5×25	600	16×25	800	16×31.5	1000	18×40	1300
2200	16×31.5	1000	18×35.5	1200	Case size ΦD×L(mm)			
3300	18×35.5	1200	18×40	1300	Ripple current (mA rms) at 150℃, 100kHz			
4700	18×40	1300						

WV / μF	50		63		80		100	
22							10×12.5	390
33					10×12.5	420	10×16	510
47					10×16	550	10×20	640
56			10×12.5	430	10×20	690	10×20	640
68			10×16	560	10×20	690	12.5×20	760
100	10×12.5	380	10×20	710	12.5×20	820	12.5×25	950
220	10×20	640	12.5×25	1040	16×25	1250	16×31.5	1380
330	12.5×20	770	12.5×31.5	1170	16×31.5	1480	18×31.5	1430
470	12.5×25	960	16×25	1280	18×31.5	1530		
560	12.5×31.5	1080	16×31.5	1520	Case size ΦD×L(mm)			
680	16×25	1190	16×35.5	1520	Ripple current (mA rms) at 150℃, 100kHz			
1000	16×31.5	1420						

WV / μF	160		200		350		400	
4.7					10×16	77	10×20	83
6.8			10×12.5	83	10×20	110	12.5×20	88
10	10×12.5	110	10×12.5	83	12.5×20	120	12.5×25	105
15	10×12.5	110	10×16	130	12.5×25	130	12.5×25	105
22	10×16	160	10×20	170	Case size ΦD×L(mm)			
33	12.5×20	230	12.5×20	210	Ripple current (mA rms) at 150℃, 120Hz			
47	12.5×20	250	12.5×25	250				
56	12.5×25	270	16×20	270				
68	16×20	290	16×25	290				
100	16×25	300						

SBP Non-polarized Series

· Standard non-polarized series
· Designed for use in circuits with reversing polarity
· Higher voltage ratings available up to 250V
· Load life of 2000 hours at 85℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃
Leakage current max.	I=0.03CV or 3μA whichever is greater (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz,20℃)	Capacitance > 1000μF:tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	80	100	160	200,250
Tanδ	0.25	0.23	0.20	0.15	0.15	0.12	0.12	0.12	0.12	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25~100	160~250
Z-25℃ /Z+20℃	4	3	2	2	3
Z-40℃ /Z+20℃	10	8	6	4	5

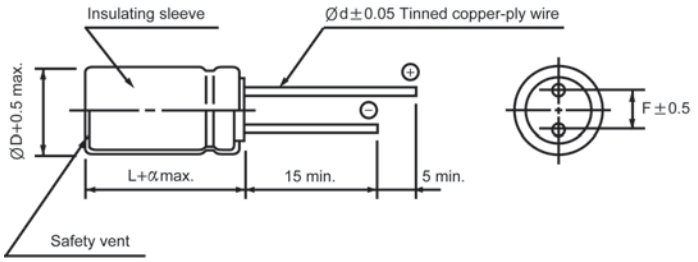
Load life (after application of the rated voltage for 2000 hours at 85℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value
Test method	Polarity reverse each 250 hours

Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16	18	22
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.5			0.6		0.8		
α	1.5			2.0				3.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / μF	50Hz	120Hz	1kHz	10kHz≤
~ 47	0.75	1.00	1.55	2.00
68 ~ 680	0.80	1.00	1.34	1.50
1000 ~	0.85	1.00	1.13	1.15

SBP Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35		50		63	
1.0											5×11	18	5×11	18
1.5											5×11	21	5×11	21
2.2											5×11	26	5×11	26
3.3											5×11	32	5×11	32
4.7											5×11	38	5×11	38
6.8											5×11	46	5×11	46
10											5×11	55	6.3×11	64
15									5×11	61	6.3×11	78	6.3×11	78
22							5×11	73	6.3×11	84	6.3×11	94	8×11.5	111
33					5×11	78	6.3×11	103	6.3×11	103	8×11.5	136	10×12.5	158
47			5×11	87	6.3×11	107	6.3×11	123	8×11.5	145	10×12.5	189	10×16	207
68	5×11	100	6.3×11	120	6.3×11	129	8×11.5	175	10×12.5	203	10×16	249	10×20	272
100	6.3×11	139	6.3×11	145	8×11.5	184	10×12.5	247	10×16	270	10×20	329	10×20	329
150	6.3×11	171	8×11.5	210	10×12.5	262	10×16	331	10×20	361	10×20	404	12.5×20	474
220	8×11.5	244	10×12.5	295	10×16	347	10×20	437	10×20	437	12.5×20	574	12.5×25	625
330	10×12.5	347	10×16	396	10×20	464	10×20	535	12.5×20	628	16×25	850	16×25	850
470	10×16	454	10×20	516	10×20	553	12.5×20	750	12.5×25	818	16×31.5	1110	16×35.5	1164
680	10×20	595	12.5×20	729	12.5×20	781	12.5×25	984	16×25	1091	18×35.5	1503	18×40	1577
1000	12.5×20	847	12.5×20	883	12.5×25	1033	16×25	1323	16×35.5	1519	18×40	1912	22×40	2105
1500	12.5×20	999	12.5×25	1132	16×25	1338	16×35.5	1748	18×40	1968	22×40	2386		
2200	12.5×25	1272	16×25	1463	16×35.5	1781	18×40	2254	22×40	2481				
3300	16×25	1672	16×35.5	1985	18×40	2360	22×40	2890						
4700	16×35.5	2221	18×40	2579	22×40	2987								
6800	18×40	2840	22×40	3214										
10000	22×40	3516												

WV / μF	80		100		160		200		250	
1.0	5×11	18	5×11	18						
1.5	5×11	21	5×11	21						
2.2	5×11	26	5×11	26						
3.3	5×11	32	5×11	32	10×16	49	10×16	42	10×20	46
4.7	5×11	38	6.3×11	44	10×16	59	10×20	55	12.5×20	63
6.8	6.3×11	52	8×11.5	62	10×20	77	12.5×20	78	12.5×20	78
10	6.3×11	64	8×11.5	75	12.5×20	109	12.5×20	95	12.5×25	103
15	8×11.5	92	10×12.5	107	12.5×20	134	12.5×25	127	16×25	140
22	10×12.5	129	10×16	142	12.5×25	177	16×25	170	16×31.5	186
33	10×16	173	10×20	189	16×25	240	16×35.5	239	18×35.5	256
47	10×20	226	12.5×20	265	16×35.5	329	18×40	321		
68	12.5×20	319	12.5×25	348	18×35.5	425				
100	12.5×20	387	16×25	468						
150	12.5×25	516	16×25	573						
220	16×25	694	16×35.5	797						
330	16×35.5	976	18×40	1098						
470	18×40	1311	22×40	1443						
680	22×40	1736								

Case size Φ D×L (mm)
Ripple current (mA rms) at 85℃ , 120Hz

ES Bi-Polarized, For Audio Equipment Series

· Suited for audio signal circuits

· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃
Leakage current max.	I = 0.03CV or 3μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20℃

Dissipation factor max. (at 120Hz,20℃)

WV	6.3	10	16	25	35	50
Tanδ	0.24	0.20	0.16	0.16	0.14	0.12

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25	35	50
Z-25℃ /Z+20℃	4	3	2	2	2	2
Z-40℃ /Z+20℃	8	6	4	4	4	4

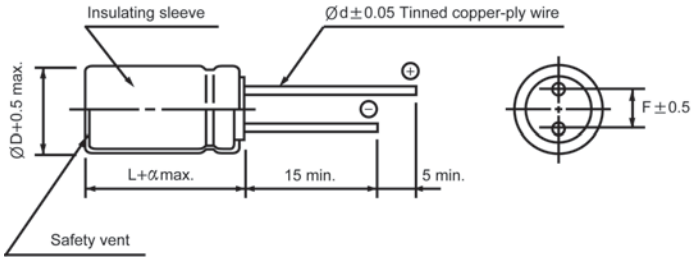
Load life (after application of the rated voltage for 1000 hours at 85℃)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 150% of specified value
Test method	Polarity reverse each 250 hours

Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

Unit : mm



ΦD	5	6.3	8	10	12.5	16
F	2.0	2.5	3.5	5.0	5.0	7.5
Φd	0.5			0.6		0.8
α	1.5			2.0		

● DIMENSIONS

μF \ WV	6.3	10	16	25	35	50
1.0						5×11
2.2						5×11
3.3						5×11
4.7				5×11	5×11	6.3×11
10			5×11	5×11	6.3×11	8×11.5
22		5×11	6.3×11	6.3×11	8×11.5	10×12.5
33	5×11	6.3×11	6.3×11	8×11.5	10×12.5	10×16
47	6.3×11	6.3×11	8×11.5	10×12.5	10×12.5	10×20
100	8×11.5	10×12.5	10×12.5	10×16	10×20	12.5×25
220	10×12.5	10×16	10×20	12.5×25	12.5×25	16×25
330	10×16	10×20	12.5×20	12.5×25	16×25	16×31.5
470	10×20	12.5×20	12.5×25	16×25	16×25	
1000	12.5×25	16×25	16×25	16×31.5	◄ Case size ΦD×L(mm)	

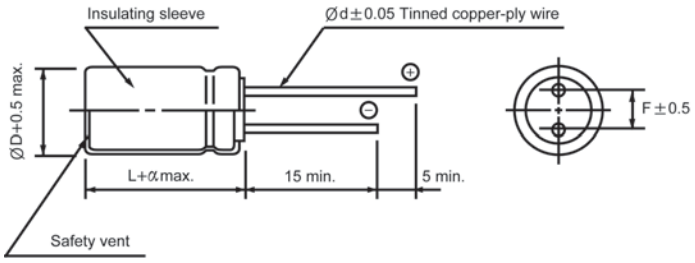
DB Bi-Polarized, For Speaker Netowrk Series

· Bi-polarized series
· Designd specifically for crossover networks in Hi-Fi sound systems
· Complied to the RoHS directive

Items	Performance characteristics	
Operating temperature range	-40 ~ +85℃	
Leakage current max.	I = 0.03CV or 3μA whichever is greater (after 5 minutes)	
Capacitance tolerance	±20% at 1kHz, 20℃	
Dissipation factor max. (at 20℃)	Frequency	50V
	1kHz	0.10
	5kHz	0.15

● DRAWING

Unit : mm



ΦD	8	10	12.5	16	18
F	3.5	5.0	5.0	7.5	7.5
Φd	0.5	0.6		0.8	
α	1.5	2.0			

● DIMENSIONS & ALLOWABLE CONTINUOUS CURRENT

μF \ WV	50		
	Case size ΦD×L(mm)	Allowable Continuous Current (8Ω-fc)	
		Frequency (Hz)	Rated Ripple (mA rms)
1.0	8×11.5	20K	205
1.5	8×11.5	13K	245
2.2	10×12.5	9K	320
3.3	10×16	6K	400
4.7	10×20	4.2K	480
6.8	12.5×20	2.9K	540
10	12.5×25	2K	600
15	12.5×25	1.3K	660
22	16×25	900	740
33	16×31.5	600	800
47	18×35.5	420	1020

LS Snap-in Terminal Type, Standard Series

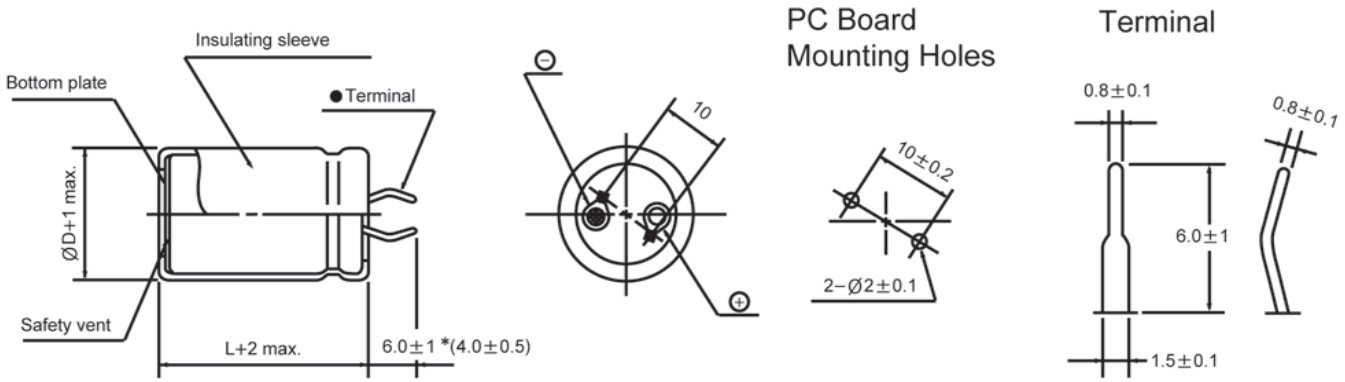
· Standard snap-in terminal type
· Including 550WV products
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃ (6.3V~315V); -25 ~ +85℃ (350V~550V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80,100 / 160~400 / 450~550 Tanδ: 0.60 / 0.55 / 0.50 / 0.40 / 0.35 / 0.30 / 0.25 / 0.20 / 0.15 / 0.20
Load life (after application of the rated voltage for 2000 hours at 85℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

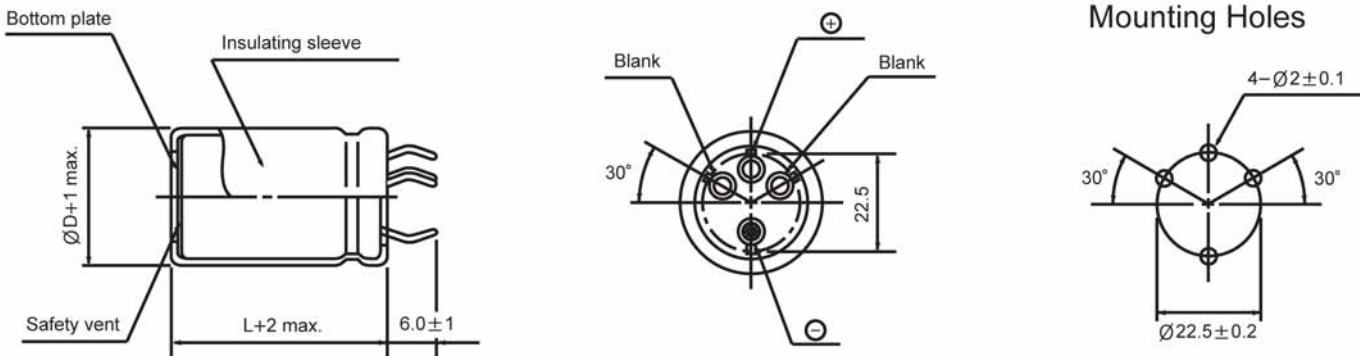
Unit : mm

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
315 ~	0.85	1.00	1.15	1.20	1.40

LS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35		50	
3300											22×30 25×25	2.97 3.06
4700									22×30 25×25	3.06 2.98	22×40 25×35 30×25 35×25	3.83 3.98 3.86 4.19
5600							22×25	2.65	22×35 25×30	3.28 3.39	22×45 25×40 30×30 35×25	4.26 4.44 4.35 4.44
6800							22×30 25×25	3.06 3.15	22×40 25×30 30×25	3.73 3.67 3.76	22×50 25×40 30×35 35×30	4.77 4.76 4.92 5.04
8200							22×35 25×30	3.45 3.57	22×45 25×35 30×30	4.13 4.10 4.22	25×50 30×40 35×30	5.43 5.38 5.26
10000					22×25	3.32	22×40 25×30 30×25	3.95 3.89 3.99	22×50 25×40 30×30	4.68 4.68 4.58	30×45 35×35	6.07 5.97
12000			22×25	3.31	22×30 25×25	3.55 3.89	22×45 25×35 30×30	4.41 4.37 4.50	25×45 30×35 35×30	5.18 5.11 5.24	30×50 35×40	6.62 6.55
15000	22×25	3.39	22×30 25×25	3.42 3.39	22×35 25×30 30×25	4.29 4.45 4.56	22×50 25×40 30×35	4.94 4.94 5.10	30×40 35×35	5.72 5.88	35×45	7.20
18000	22×30 25×25	3.85 3.96	22×35 25×25	4.28 4.17	22×40 25×35 30×30	4.77 4.96 5.10	25×45 30×35 35×30	5.45 5.38 5.51	30×45 35×40	6.28 6.46	35×50 40×40	7.74 7.62
22000	22×35 25×25	4.34 4.22	22×40 25×30 30×25	4.79 4.71 4.83	22×50 25×40 30×30	5.51 5.51 5.39	30×45 35×35	6.22 6.12	35×45 40×40	7.07 7.20	40×50	8.54
27000	22×40 25×30 30×25	4.85 4.77 4.89	22×45 25×35 30×30	5.30 5.26 5.41	25×45 30×35 35×25	6.06 5.98 5.80	30×50 35×40	6.82 6.74	40×50	8.14	40×60	9.45
33000	22×45 25×35 30×30	5.36 5.32 5.47	22×50 25×40 30×30 35×25	5.82 5.81 5.69 5.81	30×40 35×30	6.56 6.41	35×45 40×40	7.35 7.48	40×50	8.46		
39000	22×50 25×40 30×30 35×25	5.83 5.82 5.70 5.82	25×45 30×35 35×30	6.31 6.22 6.38	30×45 35×35	7.08 6.96						
47000	25×45 30×35 35×30	6.35 6.26 6.41	25×50 30×40 35×30	6.83 6.78 6.62	30×50 35×40	7.62 7.54						
56000	25×50 30×40 35×30	6.85 6.80 6.64	30×45 35×35	7.31 7.18	35×45 40×40	8.08 8.23						
68000	30×45 35×35	7.35 7.23	35×40	7.76	35×50 40×50	8.63 9.13						
100000	35×45 40×40	8.34 8.49	40×50	9.35	40×60	10.20						

Ripple current (A rms) at 85℃, 120Hz
Case size ΦD×L (mm)

LS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	63		80		100		160		200		250	
150											22×25 25×20	0.90 0.92
180									22×20	0.91	22×25 25×20	0.90 1.01
220							22×20	1.01	22×25 25×20	1.09 1.11	22×25 25×25 30×20	1.09 1.19 1.22
270							22×25 25×20	1.20 1.32	22×25 25×25 30×20	1.20 1.32 1.35	22×30 25×25 30×20	1.28 1.32 1.35
330							22×25 25×20	1.33 1.36	22×30 25×25 30×20	1.42 1.46 1.49	22×30 25×30 30×20	1.42 1.56 1.49
390							22×25 25×25 30×20	1.45 1.59 1.62	22×30 25×25 30×25	1.54 1.59 1.74	22×35 25×30 30×25	1.63 1.69 1.73
470							22×30 25×25 30×20	1.69 1.75 1.78	22×35 25×30 30×25	1.79 1.86 1.90	22×40 25×30 30×25 35×25	1.89 1.84 1.90 2.06
560							22×35 25×30 30×25	1.96 2.03 2.08	22×40 25×35 30×25 35×25	2.06 2.14 2.08 2.25	22×50 25×40 30×30 35×25	2.26 2.25 2.20 2.25
680							22×40 25×30 30×25	2.27 2.23 2.29	22×45 25×40 30×30 35×25	2.38 2.48 2.43 2.48	25×45 30×35 35×30	2.60 2.56 2.62
820							22×45 25×35 30×30 35×25	2.61 2.59 2.67 2.73	22×50 25×45 30×35 35×30	2.73 2.85 2.81 2.88	25×45 30×40 35×30	2.82 2.95 2.88
1000							22×50 25×40 30×30 35×25	3.01 3.01 2.95 3.01	30×40 35×30	3.26 3.18	30×45 35×35	3.40 3.35
1200			22×25	2.24	22×30 25×25	2.39 2.46	25×45 30×35 35×30	3.23 3.18 3.26	30×45 35×35	3.49 3.43	35×40 40×40	3.59 3.81
1500			22×30	2.67	22×35 25×30 30×25	2.83 2.93 3.00	30×40 35×35	3.73 3.83	30×50 35×40	4.06 4.01	35×50 40×50	4.35 4.60
1800	22×25	2.20	22×30 25×25	2.92 3.01	22×40 25×35 30×30	3.26 3.39 3.49	35×40 40×40	4.39 4.66	35×45 40×40	4.58 4.66	40×60	5.39
2200	22×30 25×25	2.50 2.58	22×35 25×30 30×25	3.25 3.36 3.45	22×45 25×40 30×30	3.58 3.74 3.66	↑ Case size ΦD×L (mm) ← Ripple current (A rms) at 85℃ , 120Hz					
2700	22×35 25×30	2.94 3.04	22×40 25×35 30×30	3.79 3.94 4.05	25×45 30×35 35×30	4.33 4.27 4.37						
3300	22×35 25×30 30×25	3.14 3.26 3.34	22×45 25×40 30×30	4.18 4.36 4.27	25×50 30×40 35×35	4.76 4.72 4.85						
3900	22×40 25×35 30×30	3.60 3.74 3.85	22×50 25×45 30×35	4.75 4.96 4.89	30×45 35×35	5.36 5.27						
4700	22×50 25×40 30×35 35×30	4.19 4.19 4.10 4.19	25×50 30×40 35×30	5.44 5.39 5.27	30×50 35×40	5.86 5.80						
5600	25×45 30×35 35×30	4.65 4.58 4.70	30×45 35×35	5.91 5.81	35×45 40×40	6.34 6.45						
6800	25×50 30×40 35×30	5.20 5.16 5.04	35×40	6.45	40×50	7.40						
8200	30×45 35×35	5.62 5.53	35×45 40×40	6.91 7.04	40×50	7.60						
10000	30×50 35×40	6.32 6.25	40×50	8.14								
12000	35×45 40×40	6.83 6.95										

LS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	315		350		400		450		500		550	
47											22×30 25×25 30×20	0.41 0.42 0.43
56							22×20	0.51			22×30 25×30 30×25	0.45 0.49 0.50
68					22×20 25×20	0.56 0.61	22×25 25×20	0.60 0.61	22×25	0.64	22×35 25×30 30×25	0.52 0.53 0.55
82			22×20	0.62	22×25 25×20	0.66 0.68	22×30 25×25 30×20	0.71 0.72 0.74	22×30 25×25	0.76 0.77	22×40 25×35 30×30 35×25	0.60 0.62 0.64 0.66
100	22×20	0.68	22×25 25×20	0.73 0.75	22×25 25×25 30×20	0.74 0.81 0.82	22×30 25×30 30×25	0.78 0.85 0.88	22×40 25×30 30×25	0.92 0.92 0.94	22×45 25×40 30×30 35×25	0.70 0.72 0.71 0.73
120	22×25 25×20	0.80 0.82	22×25 25×25 30×20	0.81 0.88 0.90	22×30 25×25 30×20	0.86 0.88 0.90	22×35 25×30 30×25	0.91 0.93 0.96	25×40 30×30	1.09 1.09	25×45 30×35 35×30	0.83 0.82 0.84
150	22×25 25×25 30×20	0.89 0.99 1.01	22×30 25×25 30×20	0.96 0.97 1.01	22×30 25×30 30×25	0.96 1.05 1.08	22×40 25×35 30×30 35×25	1.07 1.10 1.14 1.16	30×30	1.10	25×50 30×40 35×35	0.96 0.96 0.99
180	22×30 25×25 30×20	1.05 1.07 1.10	22×35 25×30 30×25	1.12 1.14 1.18	22×40 25×35 30×25 35×25	1.17 1.21 1.18 1.28	25×35 30×30 35×25	1.20 1.25 1.28	30×35	1.26	30×45 35×35	1.10 1.08
220	22×35 25×30 30×25	1.23 1.27 1.30	22×40 25×30 30×25 35×25	1.29 1.26 1.30 1.41	22×45 25×40 30×30 35×25	1.35 1.41 1.38 1.41	25×40 30×35 35×30	1.40 1.45 1.49	30×40 35×30	1.46 1.75	35×45 40×40	1.31 1.33
270	22×40 25×30 30×25 35×25	1.43 1.40 1.44 1.56	25×35 30×30 35×25	1.47 1.53 1.65	25×40 30×30 35×25	1.55 1.55 1.56	30×40 35×30	1.62 1.65	35×35	1.83	35×50 40×50	1.51 1.59
330	22×50 25×35 30×30 35×25	1.73 1.63 1.69 1.73	25×40 30×35 35×30	1.71 1.78 1.83	25×45 30×35 35×30	1.80 1.78 1.83	30×45 35×35	1.94 1.94	35×40	1.94	40×50	1.76
390	25×40 30×35 35×30	1.86 1.94 1.99	30×40 35×30	2.03 1.98	30×40 35×30	2.03 1.98	30×50 35×35	2.21 2.09	35×45	2.16	40×60	2.05
470	30×35 35×30	2.13 2.18	30×40 35×35	2.23 2.30	30×45 35×35	2.30 2.30	30×50 35×40 40×40	2.42 2.42 2.55	35×50 40×50	2.23 2.94	40×60	2.25
560	30×40 35×35	2.44 2.50	30×45 35×40	2.55 2.62	35×40 40×40	2.62 2.78	35×50 40×50	2.84 3.00	40×60	3.43		
680	30×45 35×40	2.80 2.88	30×50 35×45 40×40	2.92 3.01 3.06	35×50 40×50	3.13 3.31	40×60	3.54	40×60	3.78		
820	30×50 35×50 40×40	3.21 3.44 3.37	35×50 40×50	3.44 3.63	40×60	3.89						

Ripple current (A rms) at 85℃, 120Hz
Case size ΦD×L (mm)

LJ Snap-in Terminal Type Series

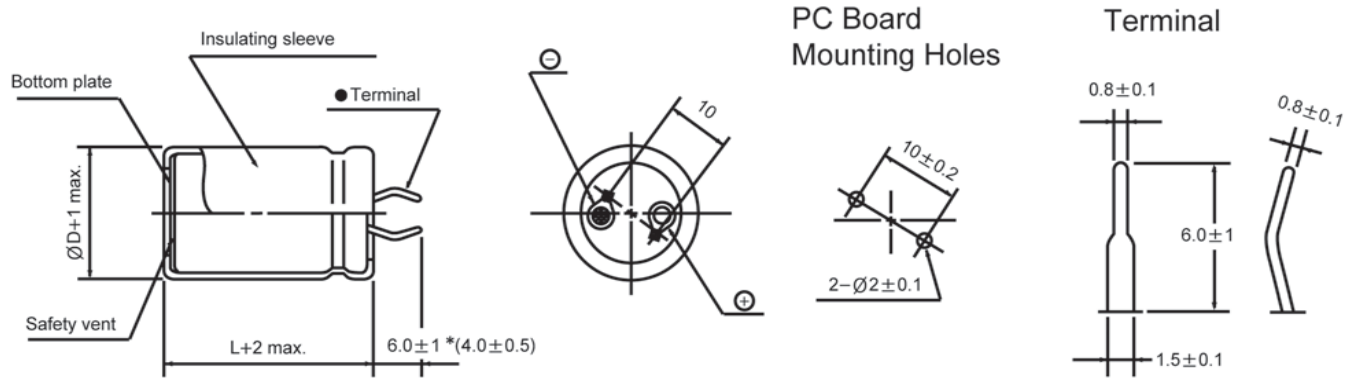
· High voltage,high capacitance series
· Load life of 3000 hours at 85℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃ (10V~250V); -25 ~ +85℃ (350V~500V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 10 / 16 / 25 / 35 / 50 / 63 / 80,100 / 160~400 / 450,500 Tanδ: 0.55 / 0.50 / 0.40 / 0.35 / 0.30 / 0.25 / 0.20 / 0.15 / 0.20
Load life (after application of the rated voltage for 3000 hours at 85℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

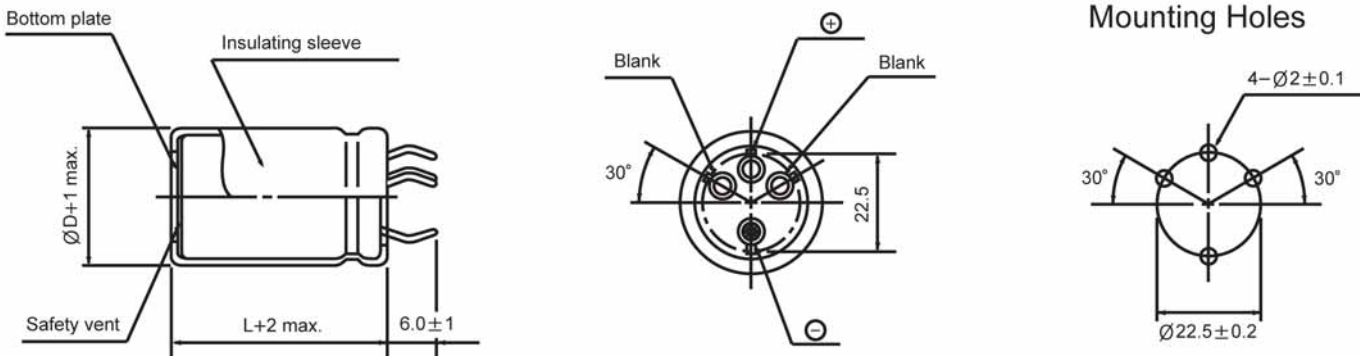
Unit : mm

ØD≤40



* Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
350 ~	0.85	1.00	1.15	1.20	1.40

LJ Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10		16		25		35		50	
2700									22×25	1.95
3300									22×30 25×25	2.40 2.35
3900							22×25	1.89	22×30 25×25	2.50 2.50
4700							22×30 25×25	2.29 2.26	22×35 25×30 30×25	2.91 2.98 3.01
5600							22×30 25×25	2.42 2.42	22×40 25×35 30×30	3.31 3.44 3.42
6800					22×25	2.24	22×35 25×30 30×25	2.82 2.89 2.89	22×45 25×40 30×35 35×25	3.70 3.81 3.93 3.80
8200					22×30	2.61	22×40 25×35 30×25	3.26 3.30 3.19	25×45 30×40 35×30	4.32 4.51 4.41
10000			22×30	2.68	22×35 25×30 30×25	3.24 3.14 3.25	22×45 25×40 30×30 35×25	3.57 3.65 3.60 3.60	25×50 30×45 35×35	4.83 5.04 4.88
12000	22×25	2.39	22×35 25×25	3.12 3.00	22×40 25×35 30×25	3.70 3.63 3.56	25×45 30×35 35×30	4.15 4.13 4.23	30×45 35×40	5.44 5.60
15000	22×30	2.86	22×40 25×30 30×25	3.67 3.58 3.70	25×40 30×30 35×25	4.09 4.00 4.07	25×50 30×40 35×35	4.76 4.76 4.90	35×45	6.53
18000	22×35 25×25	3.21 3.05	22×45 25×35 30×25	4.15 4.13 3.93	25×45 30×35 35×30	4.62 4.60 4.64	30×45 35×40	5.22 5.44	35×45	7.04
22000	22×40 25×30	3.74 3.64	25×40 30×30	4.44 4.38	25×50 30×40 35×30	5.14 5.17 5.05	35×45	6.28		
27000	22×45 25×35 30×25	4.06 3.98 3.57	25×45 30×35 35×25	4.89 4.84 4.71	30×45 35×35	5.98 5.88	35×50	6.90		
33000	25×40 30×30 35×25	4.50 3.99 4.57	30×40 35×30	5.50 5.41	35×40	6.59				
39000	25×45 30×30 35×30	5.17 4.55 5.18	30×45 35×35	6.19 6.09						
47000	30×35 35×35	5.15 5.76	30×50 35×40	6.80 6.75						
56000	30×40 35×40	5.61 6.45								

Ripple current (A rms) at 85℃ , 120Hz
Case size ΦD×L (mm)

LJ Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	63		80		100		160		200	
220									22×20	1.18
270							22×20	1.30	22×25 25×20	1.37 1.35
330							22×25	1.50	22×25 25×20	1.51 1.49
390							22×25 25×20	1.63 1.62	22×25 25×25 30×20	1.73 1.71 1.71
470							22×30 25×20	1.86 1.86	22×30 25×25 30×20	1.97 1.95 1.88
560							22×30 25×25 30×20	2.15 2.15 2.05	22×35 25×30 30×25	2.18 2.15 2.15
680							22×35 25×30 30×25	2.35 2.33 2.33	22×40 25×30 30×25 35×25	2.48 2.48 2.48 2.33
820							22×40 25×30 30×25	2.68 2.65 2.64	22×45 25×35 30×30 35×25	2.81 2.79 2.80 2.83
1000							22×45 25×35 30×30 35×25	3.02 3.00 2.96 3.13	22×50 25×40 30×35 35×30	3.28 3.28 3.15 3.26
1200			22×25	1.77	22×30 25×25	2.02 2.06	22×50 25×40 30×30 35×25	3.47 3.43 3.41 3.40	25×45 30×35 35×30	3.61 3.61 3.57
1500			22×30 25×25	2.00 2.02	22×35 25×30	2.40 2.45	25×45 30×35 35×30	3.96 3.96 3.94	30×45 35×35	4.13 4.06
1800			22×35 25×30	2.35 2.35	22×40 25×35 30×30	2.76 2.81 2.84	30×40 35×35	4.31 4.28	30×50 35×40	4.60 4.59
2200	22×30	2.15	22×40 25×30 30×25	2.86 2.79 2.85	22×45 25×40 30×30 35×25	3.00 3.10 3.06 3.13	30×50 35×40	4.96 4.96	35×45	5.25
2700	22×30 25×25	2.38 2.42	22×45 25×35 30×30	3.23 3.05 3.17	25×45 30×35 35×30	3.59 3.57 3.66				
3300	22×35 25×30	2.72 2.74	22×50 25×40 30×30	3.18 3.28 3.24	30×40 35×35	4.15 4.18				
3900	22×40 25×35 30×25	3.07 3.16 3.00	25×45 30×35	3.62 3.60	30×45 35×35	4.58 4.51				
4700	22×45 25×40 30×30	3.44 3.55 3.51	25×50 30×40 35×30	4.22 4.23 4.12	35×40	5.18				
5600	22×50 25×45 30×35 35×30	3.92 4.01 3.98 3.93	30×45 35×35	4.66 4.59	35×50	5.91				
6800	25×50 30×40 35×30	4.47 4.48 4.38	35×40	5.20						
8200	30×45 35×35	5.07 4.99	35×45	5.86						
10000	30×50 35×40	5.75 5.68	35×50	6.61						
12000	35×45	6.47								

Ripple current (A rms) at 85℃ , 120Hz
Case size ΦD×L (mm)

LJ Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	250		350		400		450		500	
56									22×20	0.50
68					22×20	0.65	22×20	0.71	22×25 25×20	0.59 0.59
82					22×20	0.85	22×25 25×20	0.86 0.84	22×30 25×25	0.68 0.65
100			22×20	0.80	22×25 25×20	0.99 0.82	22×25 25×25	0.95 0.97	22×35 25×30 30×25	0.79 0.82 0.82
120			22×25 25×20	1.04 1.05	22×25 25×20	1.09 1.13	22×30 25×25 30×20	1.07 1.09 1.12	22×40 25×35 30×25	0.94 0.94 0.95
150			22×25 25×25	1.20 1.22	22×30 25×25 30×20	1.24 1.27 1.20	22×35 25×30 30×25	1.18 1.25 1.29	22×45 25×35 30×30	1.09 1.10 1.13
180			22×30 25×25	1.34 1.37	22×30 25×25 30×25	1.41 1.44 1.52	22×35 25×35 30×25	1.32 1.40 1.45	22×50 25×40 30×35 35×25	1.27 1.30 1.30 1.27
220	22×25 25×20	1.24 1.22	22×30 25×30 30×25	1.47 1.53 1.54	22×35 25×30 30×25	1.58 1.64 1.66	22×40 25×35 30×25 35×25	1.48 1.59 1.59 1.64	25×45 30×40 35×30	1.50 1.50 1.48
270	22×25 25×25	1.50 1.32	22×35 25×30 30×25	1.70 1.73 1.80	22×40 25×35 30×30 35×25	1.65 1.79 1.82 1.63	22×50 25×40 30×30 35×25	1.88 1.87 1.89 1.90	30×45 35×35	1.81 1.72
330	22×30 25×25 30×20	1.66 1.61 1.58	22×45 25×35 30×30 35×25	1.87 1.97 2.03 1.80	22×50 25×40 30×30 35×25	1.95 2.00 2.05 2.05	25×45 30×35 35×30	2.12 2.12 2.15	35×40	1.99
390	22×35 25×30 30×25	1.88 1.88 1.86	22×50 25×40 30×30 35×25	2.08 2.14 2.23 2.30	25×45 30×35 35×30	2.12 2.26 2.28	30×40 35×35	2.30 2.35	35×45	2.34
470	22×35 25×35 30×25	2.15 2.15 2.04	25×45 30×35 35×30	2.55 2.53 2.55	25×50 30×40 35×30	2.46 2.51 2.51	30×45 35×35	2.68 2.68	35×50	2.81
560	22×40 25×35 30×25 35×25	2.48 2.35 2.35 2.35	25×50 30×40 35×35	2.70 2.73 2.75	30×45 35×35	2.85 2.85	35×40	2.88		
680	22×50 25×40 30×30 35×25	2.61 2.67 2.71 2.58	30×45 35×35	3.15 3.15	30×50 35×40	3.01 3.01	35×50	3.44		
820	25×45 30×35 35×30	3.01 2.98 2.96	35×40	3.47	Ripple current (A rms) at 85℃, 120Hz Case size ΦD×L (mm)					
1000	30×40 35×35	3.56 3.48								
1200	30×45 35×35	3.99 3.84								
1500	30×50 35×40	4.33 4.33								
1800	35×50	4.76								

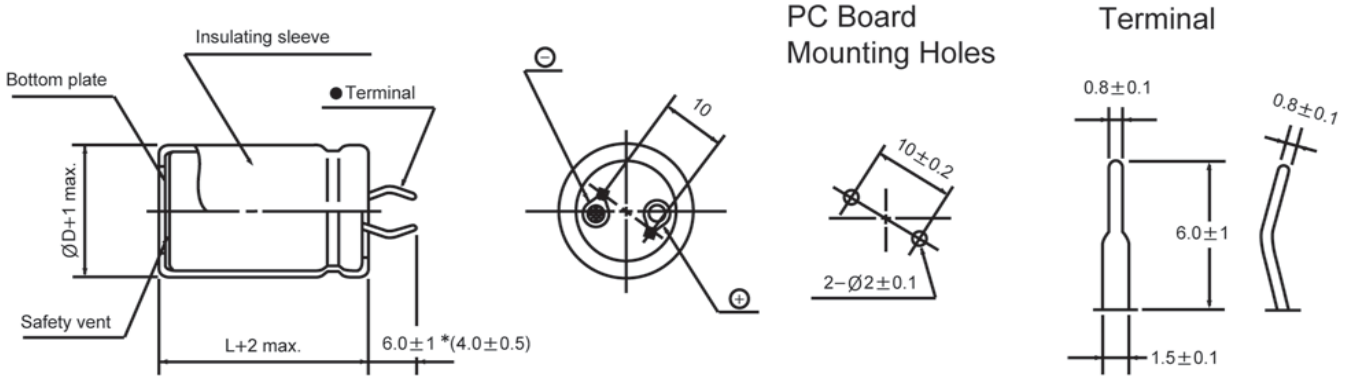
LN Snap-in Terminal Type, Ultra High Voltage Series

· Ultra high voltage
· High ripple current
· Suit for use in industrial power supplies for inverter, erc.
· Complied to the RoHS directive

Items	Performance characteristics			
Operating temperature range	-25 ~ +85℃			
Leakage current max.	I= $3\sqrt{CV}$ (μA) (after 5 minutes)			
Capacitance tolerance	±20% at 120Hz, 20℃			
Dissipation factor max. (at 120Hz, 20℃)	WV	575	600	630
	Tanδ	0.20	0.20	0.20
Load life (after application of the rated voltage for 3000 hours at 85℃)	Leakage current	Less than specified value		
	Capacitance change	Within ±20% of initial value		
	Tanδ	Less than 200% of specified value		
Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.			

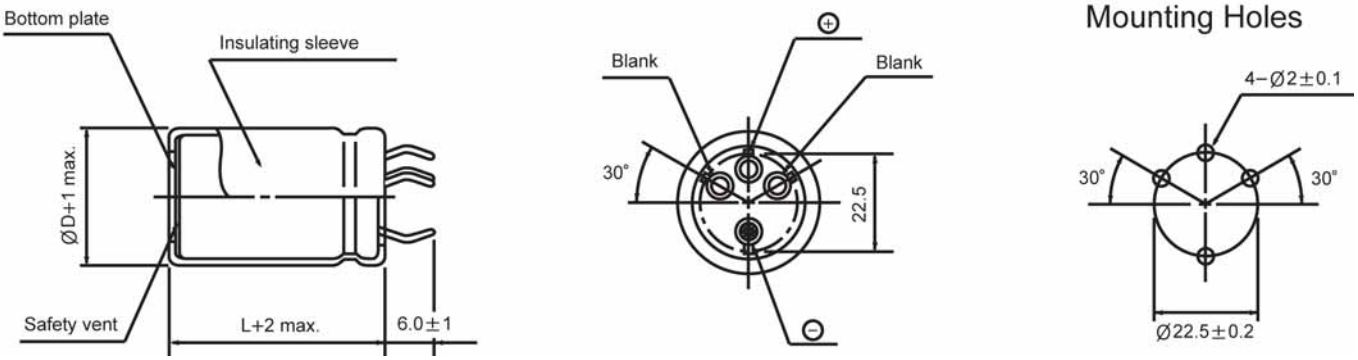
● DRAWING

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / WV	50Hz	120Hz	300Hz	1kHz	10kHz	≥50kHz
575 ~ 630	0.80	1.00	1.16	1.30	1.41	1.45

LN Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	575		600		630	
150			30×45	0.95	30×45	0.93
180	30×45	1.15	30×50	1.10	30×50	1.00
220	30×50	1.30	30×60	1.22	30×60	1.10
270	30×60 35×45	1.55 1.55	30×70	1.25	30×70	1.20
330	30×70 35×50 40×45	1.75 1.75 1.75	30×80 40×50	1.35 1.35	30×85 40×50	1.32 1.32
390	30×85 35×60 40×55	1.95 1.95 1.95	40×60	1.48	40×60	1.45
470	35×70 40×60	2.15 2.15	40×70	1.65	40×70	1.60
560	35×80 40×70	2.40 2.40	40×80	1.75	40×80	1.70
680	35×95 40×80	2.72 2.72	40×90	1.83	40×95	1.80
820	40×100	3.05				

Ripple current (A rms) at 85℃ , 120Hz

Case size Φ D×L (mm)

JA Snap-in Terminal Type, Long life Series

· Load life at 5000 hours at 85℃

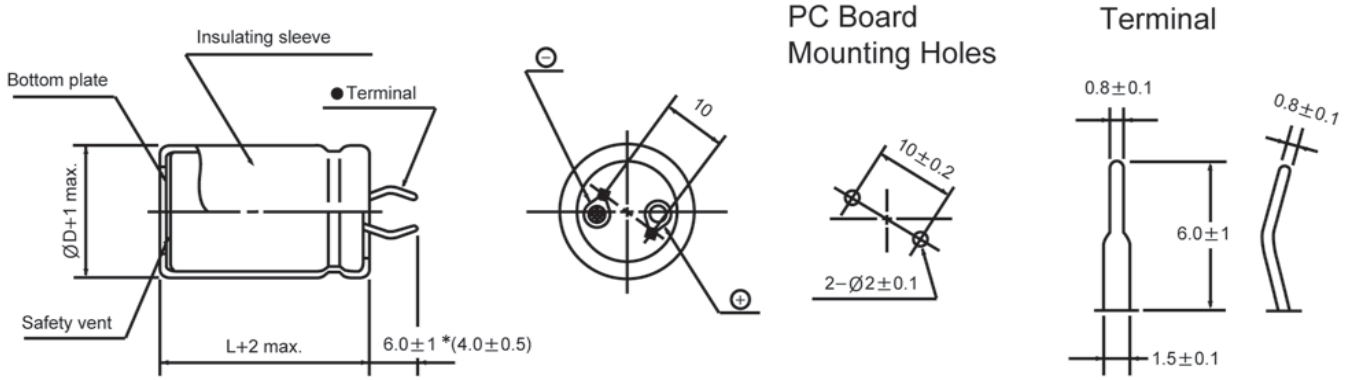
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃ (160V~250V); -25 ~ +85℃ (350V~450V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 160 / 200 / 250 / 350 / 400 / 450 Tanδ: 0.15 / 0.15 / 0.15 / 0.15 / 0.15 / 0.20
Load life (after application of the rated voltage for 5000 hours at 85℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 85℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

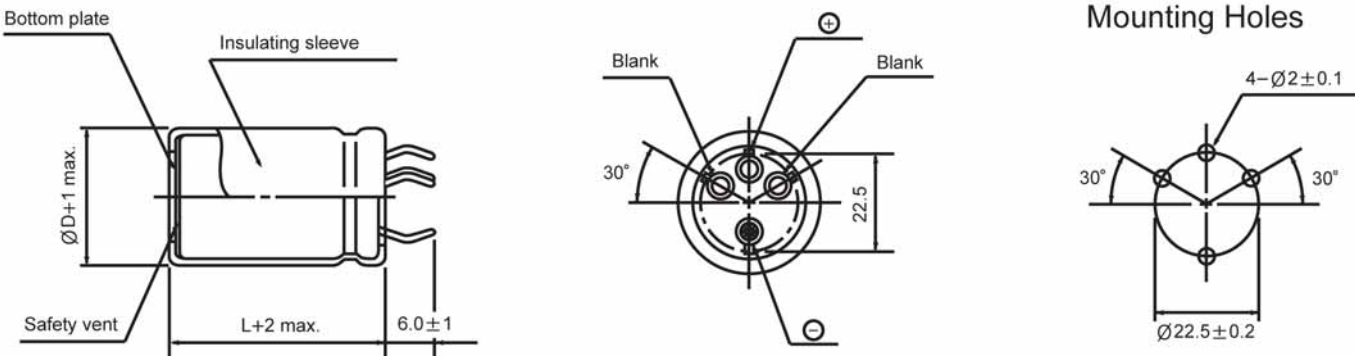
Unit : mm

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
160 ~ 250	0.85	1.00	1.20	1.25	1.45
350 ~	0.85	1.00	1.15	1.20	1.40

JA Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250	
150					22×20	0.97
180			22×20	0.91	22×20	1.06
220			22×20	1.18	22×25 25×20	1.24 1.22
270	22×20	1.30	22×25 25×20	1.37 1.35	22×25 25×25	1.50 1.32
330	22×25	1.50	22×25 25×20	1.51 1.49	22×30 25×25 30×20	1.66 1.61 1.58
390	22×25 25×20	1.63 1.62	22×25 25×25 30×20	1.73 1.71 1.71	22×35 25×30 30×25	1.88 1.88 1.86
470	22×30 25×20	1.86 1.86	22×30 25×25 30×20	1.97 1.95 1.88	22×35 25×35 30×25	2.15 2.15 2.04
560	22×30 25×25 30×20	2.15 2.15 2.05	22×35 25×30 30×25	2.18 2.15 2.15	22×40 25×35 30×25 35×25	2.48 2.35 2.35 2.35
680	22×35 25×30 30×25	2.35 2.33 2.33	22×40 25×30 30×25 35×25	2.48 2.48 2.48 2.33	22×50 25×40 30×30 35×25	2.61 2.67 2.71 2.58
820	22×40 25×30 30×25	2.68 2.65 2.64	22×45 25×35 30×30 35×25	2.81 2.79 2.80 2.83	25×45 30×35 35×30	3.01 2.98 2.96
1000	22×45 25×35 30×30 35×25	3.02 3.00 2.96 3.13	22×50 25×40 30×35 35×30	3.28 3.28 3.15 3.26	30×40 35×35	3.56 3.48
1200	22×50 25×40 30×30 35×25	3.47 3.43 3.41 3.40	25×45 30×35 35×30	3.61 3.61 3.57	30×45 35×35	3.99 3.84
1500	25×45 30×35 35×30	3.96 3.96 3.94	30×45 35×35	4.13 4.06	30×50 35×40	4.33 4.33
1800	30×40 35×35	4.31 4.28	30×50 35×40	4.60 4.59	35×50	4.76
2200	30×50 35×40	4.96 4.96	35×45	5.25		
2700	35×45	5.57				
3300	35×50	6.21				

Ripple current (A rms) at 85℃ , 120Hz
Case size ΦD×L (mm)

JA Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	350		400		450	
56					22×20	0.61
68			22×20	0.65	22×20	0.71
82			22×20	0.85	22×25 25×20	0.86 0.84
100	22×20	0.80	22×25 25×20	0.99 0.82	22×25 25×25	0.95 0.97
120	22×25 25×20	1.04 0.90	22×25 25×20	1.09 1.13	22×30 25×25 30×20	1.07 1.09 1.12
150	22×25 25×25	1.20 1.22	22×30 25×25 30×20	1.24 1.27 1.20	22×35 25×30 30×25	1.18 1.25 1.29
180	22×30 25×25	1.34 1.37	22×30 25×25 30×25	1.41 1.44 1.52	22×35 25×35 30×25	1.32 1.40 1.45
220	22×30 25×30 30×25	1.47 1.53 1.54	22×35 25×30 30×25	1.58 1.64 1.66	22×40 25×35 30×25 35×25	1.48 1.59 1.64 1.59
270	22×35 25×30 30×25	1.70 1.73 1.80	22×40 25×35 30×30 35×25	1.65 1.79 1.82 1.63	22×50 25×40 30×30 35×25	1.88 1.87 1.89 1.90
330	22×45 25×35 30×30 35×25	1.87 1.97 2.03 1.80	22×50 25×40 30×30 35×25	1.95 2.00 2.05 2.05	25×45 30×35 35×30	2.12 2.12 2.15
390	22×50 25×40 30×30 35×25	2.08 2.14 2.23 2.30	25×45 30×35 35×30	2.12 2.26 2.28	30×40 35×35	2.23 2.29
470	25×45 30×35 35×30	2.55 2.53 2.55	25×50 30×40 35×30	2.46 2.51 2.51	30×45 35×35	2.68 2.68
560	25×50 30×40 35×35	2.64 2.73 2.75	30×45 35×35	2.85 2.85	35×40	2.88
680	30×45 35×35	3.15 3.15	30×50 35×40	3.01 3.01	35×50	3.44
820	35×40	3.47	35×50	3.31		
1000	35×45	3.65				

Ripple current (A rms) at 85℃, 120Hz
Case size ΦD×L (mm)

LT Wide Temperature Range, Standard Series

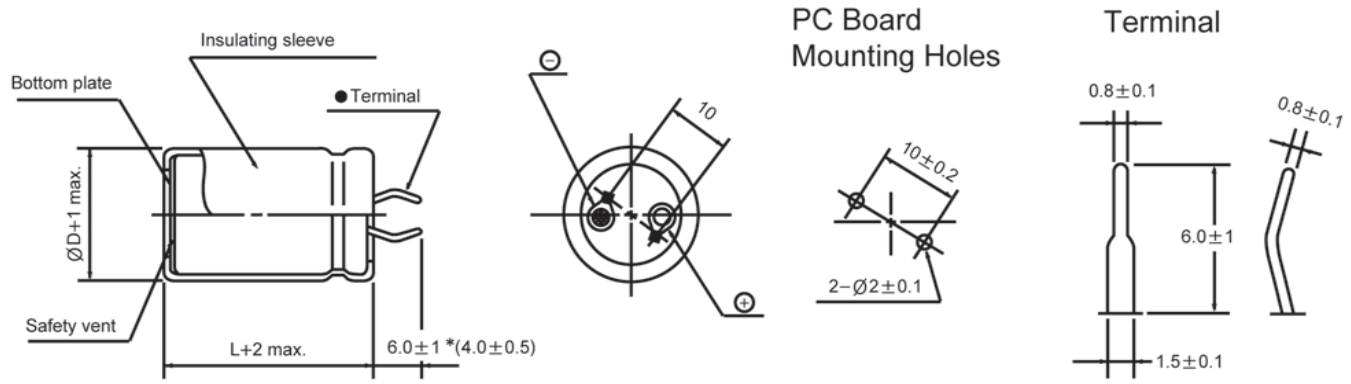
· Wide temperature range of –40(-25)~+105℃
· Standard snap-in terminal type
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (6.3V~315V); -25 ~ +105℃ (350V~550V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80,100 / 160~400 / 450~550 Tanδ: 0.60 / 0.55 / 0.50 / 0.40 / 0.35 / 0.30 / 0.25 / 0.20 / 0.15 / 0.20
Load life (after application of the rated voltage for 2000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

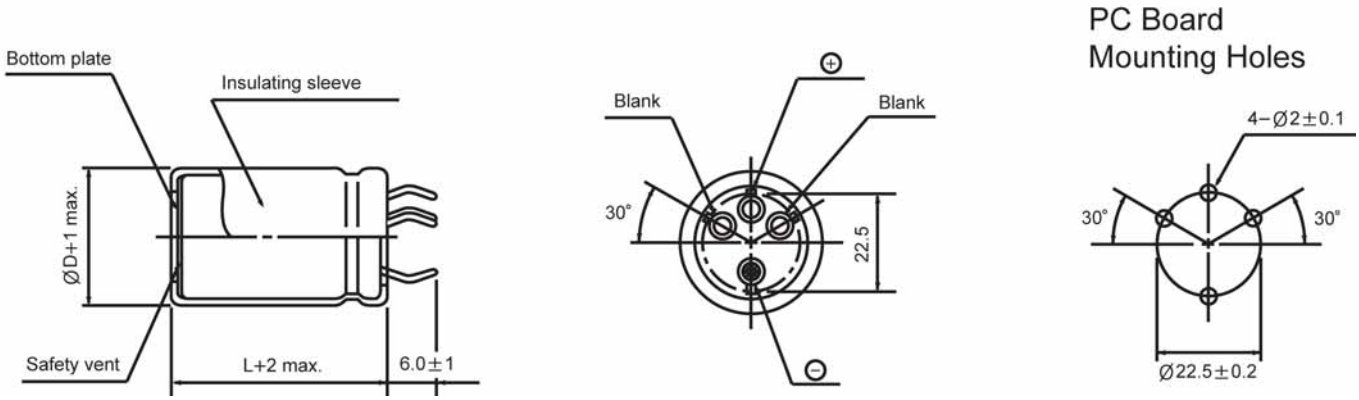
Unit : mm

ØD≤40



* Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
315 ~	0.85	1.00	1.15	1.20	1.40

LT Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35		50	
3300											22×30 25×25	2.23 2.29
4700									22×30 25×25	2.29 2.23	22×40 25×35 30×25 35×25	2.87 2.98 2.89 3.14
5600							22×25	1.99	22×35 25×30	2.46 2.54	22×45 25×40 30×30 35×25	3.19 3.33 3.26 3.33
6800							22×30 25×25	2.29 2.36	22×40 25×30 30×25	2.80 2.75 2.82	22×50 25×40 30×35 35×30	3.58 3.57 3.69 3.78
8200							22×35 25×30	2.59 2.68	22×45 25×35 30×30	3.10 3.07 3.16	25×50 30×40 35×30	4.07 4.03 3.94
10000					22×25	2.49	22×40 25×30 30×25	2.96 2.92 2.99	22×50 25×40 30×30	3.51 3.51 3.43	30×45 35×35	4.55 4.48
12000			22×25	2.48	22×30 25×25	2.66 2.92	22×45 25×35 30×30	3.31 3.28 3.37	25×45 30×35 35×30	3.88 3.83 3.93	30×50 35×40	4.96 4.91
15000	22×25	2.54	22×30 25×25	2.56 2.54	22×35 25×30 30×25	3.22 3.34 3.42	22×50 25×40 30×35	3.70 3.70 3.82	30×40 35×35	4.29 4.41	35×45	5.40
18000	22×30 25×25	2.89 2.97	22×35 25×25	3.21 3.13	22×40 25×35 30×30	3.58 3.72 3.82	25×45 30×35 35×30	4.09 4.03 4.13	30×45 35×40	4.71 4.84	35×50 40×40	5.80 5.71
22000	22×35 25×25	3.25 3.16	22×40 25×30 30×25	3.59 3.53 3.62	22×50 25×40 30×30	4.13 4.13 4.04	30×45 35×35	4.66 4.59	35×45 40×40	5.30 5.40	40×50	6.40
27000	22×40 25×30 30×25	3.64 3.58 3.66	22×45 25×35 30×30	3.97 3.94 4.06	25×45 30×35 35×25	4.54 4.48 4.35	30×50 35×40	5.11 5.05	40×50	6.10	40×60	7.09
33000	22×45 25×35 30×30	4.02 3.99 4.10	22×50 25×40 30×30 35×25	4.36 4.36 4.27 4.36	30×40 35×30	4.92 4.81	35×45 40×40	5.51 5.61	40×50	6.34		
39000	22×50 25×40 30×30 35×25	4.37 4.36 4.28 4.36	25×45 30×35 35×30	4.73 4.66 4.78	30×45 35×35	5.31 5.22						
47000	25×45 30×35 35×30	4.76 4.70 4.81	25×50 30×40 35×30	5.12 5.08 4.96	30×50 35×40	5.71 5.65						
56000	25×50 30×40 35×30	5.14 5.10 4.98	30×45 35×35	5.48 5.38	35×45 40×40	6.06 6.17						
68000	30×45 35×35	5.51 5.42	35×40	5.82	35×50 40×50	6.47 6.85						
100000	35×45 40×40	6.25 6.37	40×50	7.01	40×60	7.65						

Ripple current (A rms) at 105℃ , 120Hz
Case size ΦD×L (mm)

LT Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	63		80		100		160		200		250	
150											22×25 25×20	0.67 0.69
180									22×20	0.68	22×25 25×20	0.67 0.76
220							22×20	0.76	22×25 25×20	0.82 0.83	22×25 25×25 30×20	0.82 0.89 0.91
270							22×25 25×20	0.90 0.99	22×25 25×25 30×20	0.90 0.99 1.01	22×30 25×25 30×20	0.96 0.99 1.01
330							22×25 25×20	1.00 1.02	22×30 25×25 30×20	1.06 1.09 1.12	22×30 25×30 30×20	1.06 1.17 1.12
390							22×25 25×25 30×20	1.09 1.19 1.21	22×30 25×25 30×25	1.15 1.19 1.30	22×35 25×30 30×25	1.22 1.27 1.30
470							22×30 25×25 30×20	1.27 1.31 1.33	22×35 25×30 30×25	1.34 1.39 1.42	22×40 25×30 30×25 35×25	1.42 1.38 1.42 1.54
560							22×35 25×30 30×25	1.47 1.52 1.56	22×40 25×35 30×25 35×25	1.54 1.60 1.56 1.69	22×50 25×40 30×30 35×25	1.69 1.69 1.65 1.69
680							22×40 25×30 30×25	1.70 1.67 1.72	22×45 25×40 30×30 35×25	1.78 1.86 1.82 1.86	25×45 30×35 35×30	1.95 1.92 1.96
820							22×45 25×35 30×30 35×25	1.96 1.94 2.00 2.05	22×50 25×45 30×35 35×30	2.05 2.14 2.11 2.16	25×45 30×40 35×30	2.11 2.21 2.16
1000							22×50 25×40 30×30 35×25	2.26 2.26 2.21 2.26	30×40 35×30	2.44 2.38	30×45 35×35	2.55 2.51
1200			22×25	1.68	22×30 25×25	1.79 1.85	25×45 30×35 35×30	2.42 2.38 2.44	30×45 35×35	2.62 2.57	35×40 40×40	2.69 2.86
1500			22×30	2.00	22×35 25×30 30×25	2.12 2.20 2.25	30×40 35×35	2.80 2.87	30×50 35×40	3.04 3.01	35×50 40×50	3.26 3.45
1800	22×25	1.65	22×30 25×25	2.19 2.26	22×40 25×35 30×30	2.45 2.54 2.62	35×40 40×40	3.29 3.49	35×45 40×40	3.43 3.49	40×60	4.04
2200	22×30 25×25	1.88 1.94	22×35 25×30 30×25	2.44 2.52 2.59	22×45 25×40 30×30	2.68 2.80 2.74						
2700	22×35 25×30	2.20 2.28	22×40 25×35 30×30	2.84 2.95 3.04	25×45 30×35 35×30	3.25 3.20 3.28						
3300	22×35 25×30 30×25	2.35 2.44 2.50	22×45 25×40 30×30	3.13 3.27 3.20	25×50 30×40 35×35	3.57 3.54 3.64						
3900	22×40 25×35 30×30	2.70 2.80 2.89	22×50 25×45 30×35	3.56 3.72 3.67	30×45 35×35	4.02 3.95						
4700	22×50 25×40 30×35 35×30	3.14 3.14 3.07 3.14	25×50 30×40 35×30	4.08 4.04 3.95	30×50 35×40	4.39 4.35						
5600	25×45 30×35 35×30	3.49 3.43 3.52	30×45 35×35	4.43 4.36	35×45 40×40	4.75 4.84						
6800	25×50 30×40 35×30	3.90 3.87 3.78	35×40	4.84	40×50	5.55						
8200	30×45 35×35	4.21 4.15	35×45 40×40	5.18 5.28	40×50	5.70						
10000	30×50 35×40	4.74 4.69	40×50	6.10								
12000	35×45 40×40	5.12 5.21	Case size ΦD×L (mm) Ripple current (A rms) at 105℃ , 120Hz									

LT Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	315		350		400		450		500		550	
47											22×30 25×25 30×20	0.31 0.31 0.32
56							22×20	0.38			22×30 25×30 30×25	0.34 0.37 0.37
68					22×20 25×20	0.42 0.46	22×25 25×20	0.45 0.46	22×25	0.48	22×35 25×30 30×25	0.39 0.40 0.41
82			22×20	0.46	22×25 25×20	0.49 0.51	22×30 25×25 30×20	0.53 0.54 0.55	22×30 25×25	0.57 0.58	22×40 25×35 30×30 35×25	0.45 0.46 0.48 0.49
100	22×20	0.51	22×25 25×20	0.55 0.56	22×25 25×25 30×20	0.55 0.61 0.61	22×30 25×30 30×25	0.58 0.64 0.66	22×40 25×30 30×25	0.69 0.69 0.70	22×45 25×40 30×30 35×25	0.52 0.54 0.53 0.55
120	22×25 25×20	0.60 0.61	22×25 25×25 30×20	0.61 0.66 0.67	22×30 25×25 30×20	0.64 0.66 0.67	22×35 25×30 30×25	0.68 0.70 0.72	25×40 30×30	0.82 0.82	25×45 30×35 35×30	0.62 0.61 0.63
150	22×25 25×25 30×20	0.67 0.74 0.76	22×30 25×25 30×20	0.72 0.73 0.76	22×30 25×30 30×25	0.72 0.79 0.81	22×40 25×35 30×30 35×25	0.80 0.82 0.85 0.87	30×30	0.83	25×50 30×40 35×35	0.72 0.72 0.74
180	22×30 25×25 30×20	0.79 0.80 0.82	22×35 25×30 30×25	0.84 0.85 0.88	22×40 25×35 30×25 35×25	0.88 0.91 0.88 0.96	25×35 30×30 35×25	0.90 0.94 0.96	30×35	0.94	30×45 35×35	0.82 0.81
220	22×35 25×30 30×25	0.92 0.95 0.97	22×40 25×30 30×25 35×25	0.97 0.94 0.97 1.06	22×45 25×40 30×30 35×25	1.01 1.06 1.03 1.06	25×40 30×35 35×30	1.05 1.09 1.12	30×40 35×40	1.09 1.31	35×45 40×40	0.98 1.00
270	22×40 25×30 30×25 35×25	1.07 1.05 1.08 1.17	25×35 30×30 35×25	1.10 1.15 1.24	25×40 30×30 35×25	1.16 1.16 1.17	30×40 35×30	1.21 1.24	35×35	1.37	35×50 40×50	1.13 1.19
330	22×50 25×35 30×30 35×25	1.30 1.22 1.27 1.30	25×40 30×35 35×30	1.28 1.33 1.37	25×45 30×35 35×30	1.35 1.33 1.37	30×45 35×35	1.45 1.45	35×40	1.45	40×50	1.32
390	25×40 30×35 35×30	1.40 1.45 1.49	30×40 35×30	1.52 1.48	30×40 35×30	1.52 1.48	30×50 35×35	1.66 1.57	35×45	1.62	40×60	1.54
470	30×35 35×30	1.60 1.63	30×40 35×35	1.67 1.72	30×45 35×35	1.72 1.72	30×50 35×40 40×40	1.81 1.81 1.91	35×50 40×50	1.67 2.20	40×60	1.69
560	30×40 35×35	1.83 1.87	30×45 35×40	1.91 1.96	35×40 40×40	1.96 2.08	35×50 40×50	2.13 2.25	40×60	2.57		
680	30×45 35×40	2.10 2.16	30×50 35×45 40×40	2.19 2.26 2.29	35×50 40×50	2.35 2.48	40×60	2.65	40×60	2.83		
820	30×50 35×50 40×40	2.41 2.58 2.53	35×50 40×50	2.58 2.72	40×60	2.92						

Ripple current (A rms) at 105℃, 120Hz
Case size ΦD×L (mm)

LM Miniaturized Series

· Load life of 3000 hours at 105℃

· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (6.3V~250V); -25 ~ +105℃ (350V~500V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃

Dissipation factor max. (at 120Hz, 20℃)

WV	6.3	10	16	25	35	50	63	80,100	160~400	450~500
Tanδ	0.60	0.55	0.50	0.40	0.35	0.30	0.25	0.20	0.15	0.20

Load life (after application of the rated voltage for 3000 hours at 105℃)

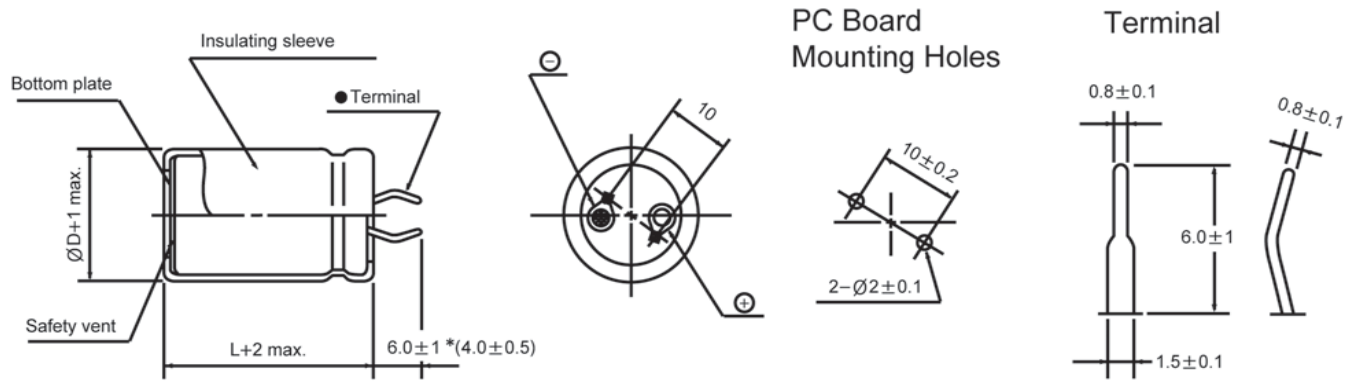
Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
Tanδ	Less than 200% of specified value

Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

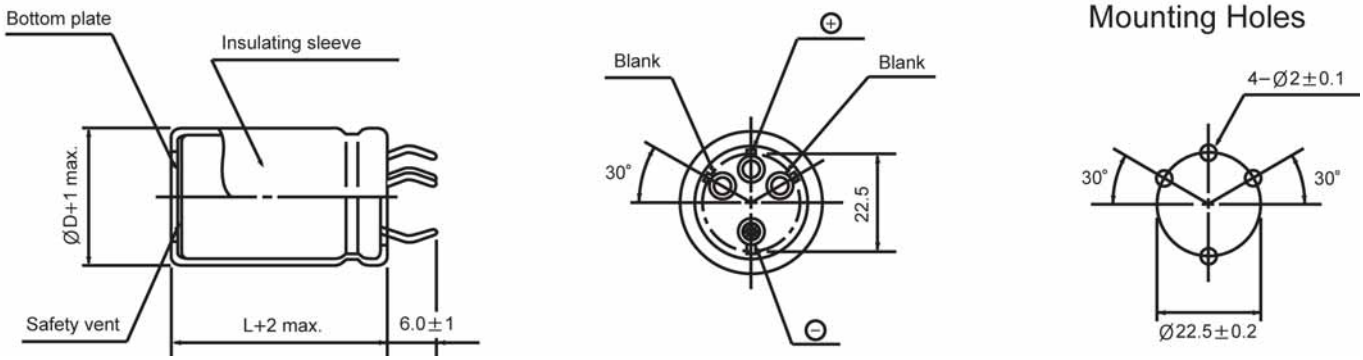
Unit : mm

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / WV	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
350 ~	0.85	1.00	1.15	1.20	1.40

LM Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3		10		16		25		35		50	
2700											22×30	1.94
3300									22×25	1.62	22×35	2.20
3900									22×30	1.88	22×40 25×35 30×25	2.52 2.62 2.54
4700							22×25	1.73	22×35 25×25	2.14 2.09	22×45 25×40 30×30	2.81 2.93 2.87
5600							22×30	1.98	22×35 25×30 30×25	2.29 2.37 2.43	22×50 25×40 30×35	3.11 3.11 3.21
6800							22×30	2.14	22×40 25×35 30×30	2.61 2.71 2.79	25×50 30×40 35×30	3.64 3.61 3.53
8200					22×25	2.14	22×35 25×30	2.42 2.50	22×50 25×40 30×30	3.02 3.02 2.95	30×45 35×35	3.94 3.87
10000			22×25	2.17	22×30 25×25	2.48 2.56	22×40 25×35	2.77 2.88	25×45 30×35	3.43 3.38	30×50 35×40	4.42 4.37
12000	22×25	2.19	22×30	2.48	22×35 25×30 30×25	2.80 2.90 2.97	22×45 25×40 30×30	3.09 3.22 3.15	25×50 30×40 35×30	3.78 3.75 3.67	35×45	4.78
15000	22×30	2.53	22×35 25×25	2.83 2.75	22×40 25×35 30×30	3.17 3.29 3.38	25×45 30×35 35×30	3.62 3.57 3.65	30×45 35×35	4.19 4.12	35×50 40×40	5.24 5.13
18000	22×35 25×25	2.85 2.77	22×35 25×30	3.00 3.11	22×45 25×40 30×30	3.50 3.65 3.57	25×50 30×40 35×35	3.98 3.95 4.06	35×40	4.52	40×50	5.76
22000	22×35 25×30	3.04 3.15	22×40 25×35 30×25	3.35 3.48 3.38	25×45 30×35	4.03 3.98	30×45 35×35	4.36 4.28	35×45 40×40	4.95 5.04	40×50	5.98
27000	22×40 25×35 30×25	3.40 3.53 3.42	22×50 25×40 30×30	3.88 3.87 3.79	25×50 30×40 35×30	4.42 4.39 4.29	35×45 40×40	4.92 5.01	40×50	5.92	40×60	6.61
33000	22×50 25×40 30×30	3.92 3.91 3.83	25×45 30×35	4.26 4.20	30×45 35×35	4.79 4.71						
39000	25×45 30×35	4.26 4.20	25×50 30×40 35×30	4.60 4.57 4.46	30×50 35×40	5.16 5.10						
47000	25×50 30×40 35×30	4.63 4.60 4.50	30×45 35×35	4.95 4.87	35×45 40×40	5.50 5.60						
56000	30×50 35×40	5.17 5.12	35×45 40×40	5.49 5.59	40×50	6.22						
68000	35×45 40×40	5.52 5.62	40×50	6.22	40×60	6.83						

Ripple current (A rms) at 105℃, 120Hz
Case size ΦD×L (mm)

LM Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	63		80		100		160		200		250	
220											22×25	0.90
270									22×25	1.05	22×25	1.11
330							22×25	1.01	22×25	1.23	22×30 25×25	1.31 1.36
390							22×25	1.09	22×30 25×25	1.55 1.59	22×35 25×25	1.50 1.55
470							22×25	1.47	22×30 25×25	1.56 1.61	22×40 25×30 30×25	1.65 1.63 1.68
560							22×30 25×25	1.70 1.76	22×35 25×25 30×25	1.79 1.76 1.81	22×45 25×35 30×25	1.80 1.87 1.84
680							22×35 25×25	1.89 1.86	22×40 25×30 30×25	2.07 2.06 2.12	25×40 30×30 35×25	2.05 2.12 2.21
820			22×25	1.37	22×30 25×25	1.46 1.51	22×40 25×30	2.18 2.16	25×35 30×30 35×25	2.20 2.22 2.27	30×35 35×30	2.34 2.44
1000			22×30 25×25	1.62 1.67	22×35 25×30	1.71 1.77	22×45 25×35 30×25	2.51 2.51 2.45	25×40 30×30 35×25	2.55 2.60 2.67	30×40 35×30	2.68 2.70
1200	22×25	1.37	22×30 25×25	1.67 1.72	22×40 25×35 30×25	1.86 1.94 1.88	25×40 30×30 35×25	2.72 2.69 2.76	30×35 35×30	2.88 2.96	30×45 35×35	3.00 3.00
1500	22×30 25×25	1.50 1.54	22×35 25×30	1.98 2.05	22×45 25×40 30×30	2.18 2.28 2.23	25×45 30×35 35×30	3.18 3.15 3.08	30×40 35×35	3.32 3.41	35×40	3.50
1800	22×30 25×25	1.64 1.69	22×40 25×35 30×25	2.28 2.37 2.30	25×45 30×35	2.61 2.57	30×40 35×30	3.60 3.65	30×50 35×40	3.82 3.92		
2200	22×35 25×30	1.86 1.92	22×45 25×35 30×30	2.51 2.49 2.56	25×50 30×40 35×30	2.85 2.83 2.76	30×45 35×35	4.13 4.10	35×45	4.35		
2700	22×40 25×30 30×25	2.17 2.13 2.18	25×45 30×35	3.03 2.99	30×45 35×35	3.27 3.22	35×40	4.61				
3300	22×50 25×40 30×30	2.53 2.53 2.48	25×50 30×40 35×30	3.33 3.30 3.23	30×50 35×40	3.59 3.55						
3900	25×45 30×35	2.88 2.84	30×45 35×35	3.75 3.69	35×45	4.03						
4700	25×50 30×40 35×30	3.20 3.17 3.10	30×50 35×40	4.10 4.06	35×50 40×40	4.40 4.31						
5600	30×45 35×35	3.51 3.46	35×45	4.44	40×50	4.88						
6800	30×50 35×40	3.92 3.88	35×50 40×40	4.90 4.80	40×50	5.18						
8200	35×45	4.22	40×50	5.32								
10000	35×50 40×40	4.74 4.64										

Ripple current (A rms) at 105℃ , 120Hz
Case size ΦD×L (mm)

LM Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	350		400		450		500	
68					22×20	0.47		
82			22×20	0.62	22×25	0.55	22×35 25×30	0.72 0.75
100	22×25	0.58	22×25	0.74	22×25	0.72	22×40 25×35 30×25	0.83 0.82 0.84
120	22×25	0.68	22×25	0.79	22×30 25×25	0.83 0.82	22×45 25×35 30×30 35×25	0.93 0.93 0.91 0.82
150	22×25 25×25	0.76 0.81	22×30 25×25	0.94 0.91	22×35 25×25	0.92 0.90	25×40 30×35 35×25	1.08 1.04 1.04
180	22×30 25×25	0.78 0.80	22×35 25×25	1.07 1.06	22×40 25×35 30×25	1.12 1.05 1.09	25×45 30×40 35×30	1.20 1.20 1.12
220	22×35 25×30 30×25	0.93 0.95 0.98	22×40 25×30 30×25	1.18 1.18 1.20	25×35 30×30	1.18 1.20	30×45 35×35	1.33 1.26
270	22×40 25×30 30×25	1.06 1.04 1.08	25×35 30×25	1.37 1.35	25×40 30×30 35×25	1.35 1.37 1.40	30×50 35×40	1.50 1.42
330	22×45 25×30 30×30 35×25	1.23 1.23 1.25 1.29	25×40 30×30 35×25	1.51 1.50 1.46	30×35 35×30	1.56 1.54	30×55 35×45	1.59 1.60
390	25×40 30×30 35×25	1.43 1.39 1.43	30×35 35×25	1.63 1.67	30×40 35×30	1.69 1.67	35×50	1.80
470	25×45 30×35 35×30	1.64 1.63 1.66	30×40 35×30	1.85 1.88	35×35	1.90	35×60	2.06
560	30×40 35×35	1.85 1.90	35×35	2.08	35×40	2.06		
680	30×45 35×35	2.11 2.09	35×40	2.38	35×50	2.45		
820	35×40	2.38	35×45	2.65				
1000	35×45	2.71						

Ripple current (A rms) at 105℃ , 120Hz
Case size ΦD×L (mm)

JB Wide Temperature, High Ripple Series

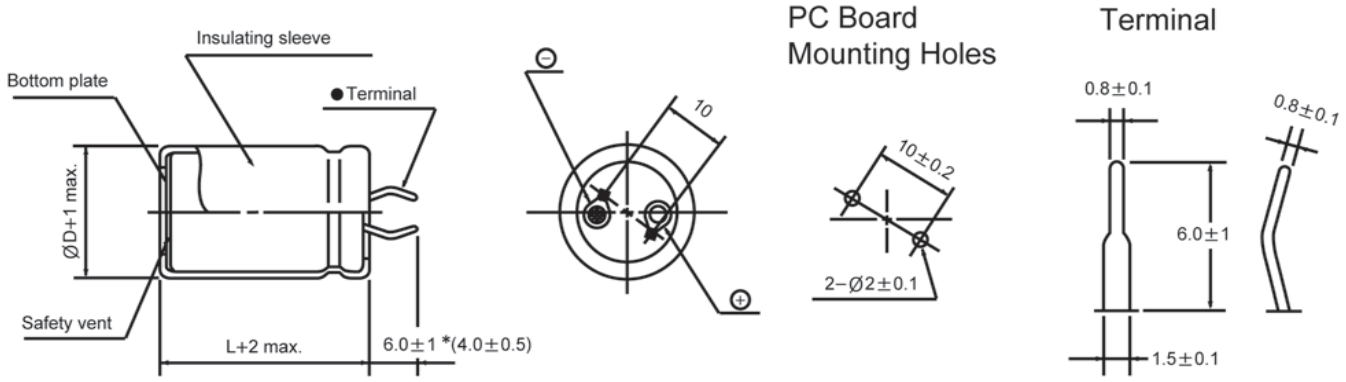
· High ripple current compared with LM series
· Load life of 3000 hours at 105℃
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 400 / 420 / 450 / 500 Tanδ: 0.15 / 0.20 / 0.20 / 0.20
Load life (after application of the rated voltage for 3000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

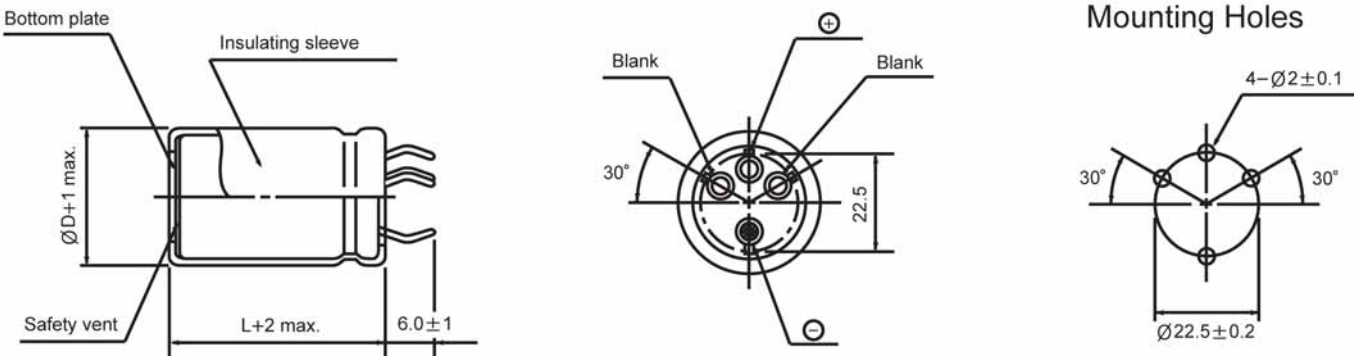
Unit : mm

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / WV	60Hz	120Hz	300Hz	1kHz	10kHz≤
400 ~ 500	0.85	1.00	1.15	1.20	1.40

JB Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	400		420		450		500	
68							22×25	0.67
82							22×30 25×25	0.77 0.79
100			22×30 25×25	0.77 0.75	22×30 25×25	0.77 0.98	22×35 25×30	0.87 0.90
120	22×30 25×25	0.90 0.86	22×30 25×25	0.86 0.84	22×35 25×25	0.95 1.07	22×40 25×30 30×25	0.98 0.98 0.99
150	22×35 25×25	1.05 1.01	22×35 25×30 30×25	1.07 1.06 1.14	22×40 25×30 30×25	1.16 1.16 1.09	22×45 25×35 30×30	1.11 1.14 1.19
180	22×40 25×30 30×25	1.32 1.31 1.35	22×40 25×35 30×25	1.27 1.28 1.24	22×45 25×35 30×30	1.39 1.39 1.36	22×50 25×40 30×30 35×25	1.24 1.28 1.22 1.19
220	22×45 25×35 30×30	1.53 1.54 1.50	22×50 25×40 30×30 35×25	1.58 1.52 1.50 1.39	25×40 30×30 35×25	1.60 1.58 1.53	25×50 30×35 35×30	1.46 1.39 1.34
270	22×50 25×40 30×30 35×25	1.78 1.71 1.81 1.63	25×45 30×35 35×30	1.77 1.67 1.69	25×50 30×35 35×30	2.02 1.80 2.04	30×40 35×35	1.58 1.51
330	25×50 30×35 35×30	2.05 2.03 1.98	30×40 35×30	2.06 1.81	30×45 35×35	2.13 2.33	30×50 35×40	1.83 1.73
390	30×40 35×35	2.14 2.21	30×45 35×35	2.33 2.10	30×50 35×40	2.40 2.61	35×45	1.91
470	30×50 35×40	2.54 2.60	30×50 35×45	2.63 2.57	35×45	2.92	35×50	2.15

Ripple current (A rms) at 105℃ , 120Hz
Case size ΦD×L (mm)

LL Long life Series

· Load life of 5000 hours at 105℃

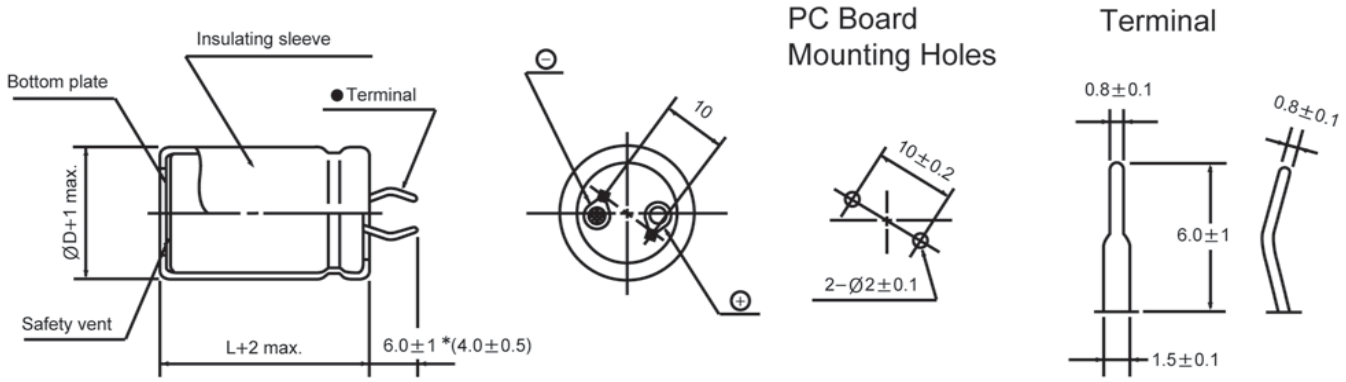
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (10V~250V); -25 ~ +105℃ (350V~500V)
Leakage current max.	$I=3\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 10 / 16 / 25 / 35 / 50 / 63 / 80,100 / 160~400 / 450,500 Tanδ: 0.55 / 0.50 / 0.40 / 0.35 / 0.30 / 0.25 / 0.20 / 0.15 / 0.20
Load life (after application of the rated voltage for 5000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±25% of initial value Tanδ: Less than 250% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

DRAWING

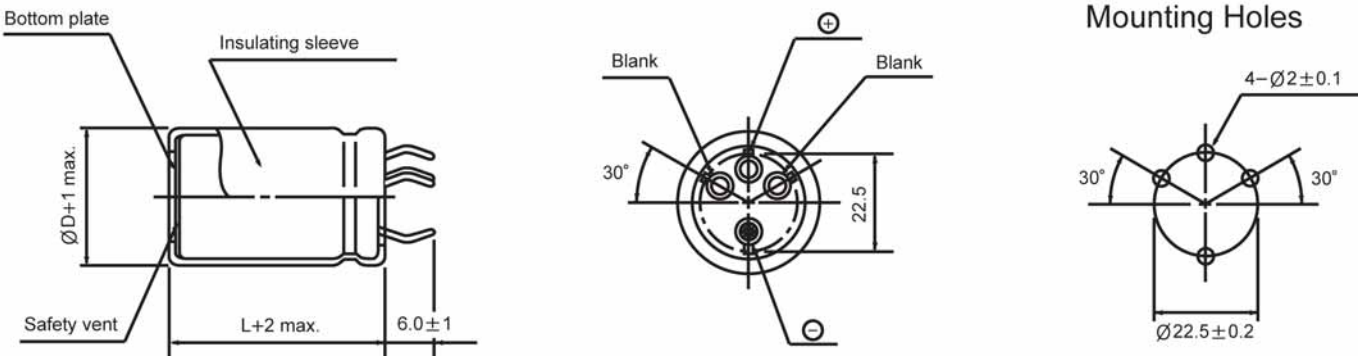
Unit : mm

ØD≤40



* Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / WV	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
350 ~	0.85	1.00	1.15	1.20	1.40

LL Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10		16		25		35		50		63	
1200											22×25	1.30
1500											22×30 25×25	1.50 1.50
1800									22×25	1.30	22×35 25×30 30×25	1.60 1.60 1.60
2200									22×30	1.40	22×40 25×30 30×30	1.80 1.80 1.80
2700									22×30 25×25	1.60 1.60	22×45 25×35 30×30	2.00 2.00 2.00
3300							22×25	1.50	22×35 25×30	1.80 1.80	22×50 25×40 30×35 35×25	2.20 2.20 2.20 2.20
3900							22×30	1.60	22×40 25×30 30×25	1.90 1.90 1.90	25×45 30×35 35×30	2.40 2.40 2.40
4700							22×35 25×25	1.80 1.80	22×40 25×35 30×30 35×25	2.00 2.10 2.10 2.10	25×50 30×40 35×35	2.60 2.60 2.60
5600					22×25	1.50	22×35 25×30	2.00 2.00	22×45 25×40 30×35 35×25	2.20 2.30 2.30 2.30	30×45 35×35	2.80 2.80
6800					22×30 25×25	1.90 1.90	22×40 25×35 30×25	2.20 2.20 2.20	22×50 25×45 30×35 35×30	2.40 2.50 2.50 2.50	35×40	3.10
8200			22×25	1.80	22×35 25×30 30×25	2.10 2.10 2.10	22×45 25×35 30×30 35×25	2.30 2.30 2.40 2.40	30×40 35×30	2.80 2.70	35×45	3.40
10000			22×30 25×25	2.20 2.20	22×40 25×35 30×25	2.30 2.30 2.20	25×40 30×35 35×25	2.50 2.60 2.50	30×45 35×35	3.00 3.00	35×50	3.80
12000	22×30	2.10	22×35 25×30	2.40 2.40	22×40 25×35 30×30	2.50 2.50 2.60	25×45 30×35 35×30	2.80 2.80 2.90	35×40	3.30		
15000	22×30 25×25	2.30 2.30	22×40 25×35 30×30	2.70 2.70 2.70	25×40 30×35 35×30	2.80 2.90 2.90	30×40 35×35	3.10 3.20	35×45	3.70		
18000	22×35 25×30	2.70 2.70	22×45 25×40 30×30 35×25	2.80 3.00 3.00 3.00	25×50 30×40 35×30	3.10 3.10 3.10	30×45 35×40	3.30 3.50				
22000	22×40 25×35 30×30	2.90 2.90 2.90	25×40 30×35 35×30	3.10 3.30 3.30	30×45 35×35	3.50 3.50	35×45	3.70				
27000	22×45 25×40 30×30 35×25	3.30 3.30 3.30 3.30	30×40 35×30	3.60 3.60	30×50 35×40	3.80 3.70						
33000	25×45 30×35 35×30	3.50 3.50 3.50	30×45 35×35	4.00 4.00	35×45	4.10						
39000	30×40 35×30	3.80 3.70	30×50 35×40	4.30 4.30	35×50	4.40						
47000	30×45 35×35	4.00 3.90	35×45	4.60								
56000	35×40	4.50										

Ripple current (A rms) at 105℃ , 120Hz
Case size ΦD×L (mm)

LL Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	80		100		160		200		250	
150							22×20	0.63	22×25 25×20	0.68 0.69
180							22×20 25×20	0.69 0.76	22×25 25×20	0.74 0.76
220					22×20	0.76	22×25 25×20	0.82 0.84	22×25 25×25 30×20	0.82 0.90 0.92
270					22×25 25×20	0.91 0.93	22×25 25×25 30×20	0.91 1.00 1.02	22×30 25×25 30×20	0.97 1.00 1.02
330					22×25 25×20	1.01 1.03	22×30 25×25 30×20	1.07 1.11 1.13	22×35 25×30 30×25	1.14 1.18 1.21
390					22×25 25×25 30×20	1.09 1.20 1.23	22×30 25×25 30×25	1.17 1.20 1.31	22×40 25×35 30×25 35×25	1.30 1.35 1.31 1.42
470					22×30 25×25 30×20	1.28 1.32 1.35	22×35 25×30 30×25	1.36 1.40 1.44	22×45 25×35 30×30 35×25	1.50 1.48 1.53 1.56
560					22×35 25×30 30×25	1.48 1.53 1.57	22×40 25×30 30×25 35×25	1.56 1.53 1.57 1.70	22×50 25×40 30×30 35×25	1.71 1.70 1.67 1.70
680			22×25	1.10	22×40 25×30 30×25	1.72 1.69 1.73	22×45 25×35 30×30 35×25	1.80 1.79 1.84 1.88	25×50 30×35 35×30	2.05 1.94 1.98
820	22×25	1.20	22×30 25×25	1.30 1.30	22×45 25×35 30×30 35×25	1.98 1.96 2.02 2.06	25×45 30×30 35×25	2.16 2.02 2.06	30×40 35×35	2.23 2.29
1000	22×30 25×25	1.30 1.30	22×35 25×30	1.50 1.50	22×50 25×40 30×30 35×25	2.28 2.28 2.23 2.28	25×50 30×35 35×30	2.48 2.35 2.41	30×50 35×40	2.68 2.65
1200	22×35 25×25	1.50 1.50	22×40 25×35 30×25	1.60 1.60 1.60	25×45 30×35 35×30	2.41 2.38 2.44	30×40 35×35	2.50 2.57	35×45	2.80
1500	22×40 25×30 30×25	1.60 1.60 1.60	22×45 25×40 30×30	1.80 1.80 1.80	25×50 30×40 35×35	2.81 2.79 2.73	30×50 35×40	3.04 3.00	35×50	3.25
1800	22×45 25×35 30×30	1.80 1.80 1.80	25×45 30×35 35×25	2.00 2.00 2.00						
2200	22×50 25×40 30×30 35×25	2.00 2.00 2.00 2.00	25×50 30×40 35×30	2.20 2.20 2.20						
2700	25×45 30×35 35×30	2.20 2.20 2.20	30×45 35×35	2.40 2.40						
3300	30×40 35×35	2.40 2.40	35×40	2.70						
3900	30×45 35×40	2.60 2.60	35×45	2.90						
4700	35×45	3.00								
5600	35×50	3.30								

Ripple current (A rms) at 105℃, 120Hz
Case size ΦD×L (mm)

LL Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	350		400		450		500	
68	22×20 25×20	0.41 0.45	22×20	0.58			22×30	0.73
82	22×25 25×20	0.48 0.49	22×25 25×20	0.62 0.69	22×25 25×25	0.67 0.69	22×35 25×25	0.83 0.83
100	22×25 25×25 30×20	0.53 0.58 0.60	22×25 25×25	0.74 0.75	22×25 25×25 30×20	0.79 0.81 0.84	22×40 25×30 30×25	0.94 0.94 0.91
120	22×30 25×25 30×20	0.62 0.64 0.65	22×30 25×25 30×20	0.86 0.84 0.92	22×30 25×25 30×25 35×20	0.90 0.89 0.92 0.99	22×50 25×30 30×25 35×25	1.08 1.02 1.04 1.01
150	22×35 25×30 30×25	0.74 0.76 0.78	22×35 25×30 30×25	1.02 0.99 1.02	22×35 25×30 30×25 35×25	1.06 1.11 1.20 1.11	22×55 25×35 30×30 35×25	1.24 1.21 1.19 1.18
180	22×40 25×30 30×25	0.85 0.83 0.86	22×40 25×30 30×25	1.16 1.15 1.20	22×40 25×30 30×25 35×25	1.22 1.22 1.20 1.22	22×60 25×40 30×35 35×30	1.38 1.36 1.34 1.25
220	22×45 25×35 30×30 35×25	0.98 0.98 1.00 1.03	22×45 25×35 30×30 35×25	1.35 1.35 1.32 1.35	22×45 25×35 30×30 35×25	1.35 1.40 1.39 1.35	25×50 30×40 35×30	1.52 1.51 1.51
270	22×50 25×40 30×30 35×25	1.14 1.14 1.11 1.14	22×50 25×40 30×30 35×25	1.58 1.56 1.53 1.58	25×40 30×35 35×30	1.54 1.62 1.56	30×45 35×35	1.69 1.62
330	25×45 30×35 35×30	1.31 1.30 1.33	25×45 30×35 35×30	1.80 1.78 1.75	30×40 35×35	2.03 1.80	30×50 35×40	1.89 1.81
390	25×50 30×40 35×35	1.49 1.48 1.52	30×40 35×35	2.02 2.00	30×45 35×40	2.12 2.08	35×45	2.08
470	30×45 35×35	1.69 1.67	30×45 35×35	2.31 2.29	30×50 35×40	2.14 2.14	35×50	2.28
560	30×50 35×40	1.92 1.90	30×50 35×40	2.33 2.33	35×45	2.26		
680			35×45	2.37	35×50	2.51		

Ripple current (A rms) at 105℃ , 120Hz

Case size ΦD×L (mm)

LX Snap-in Terminal, Long life Series

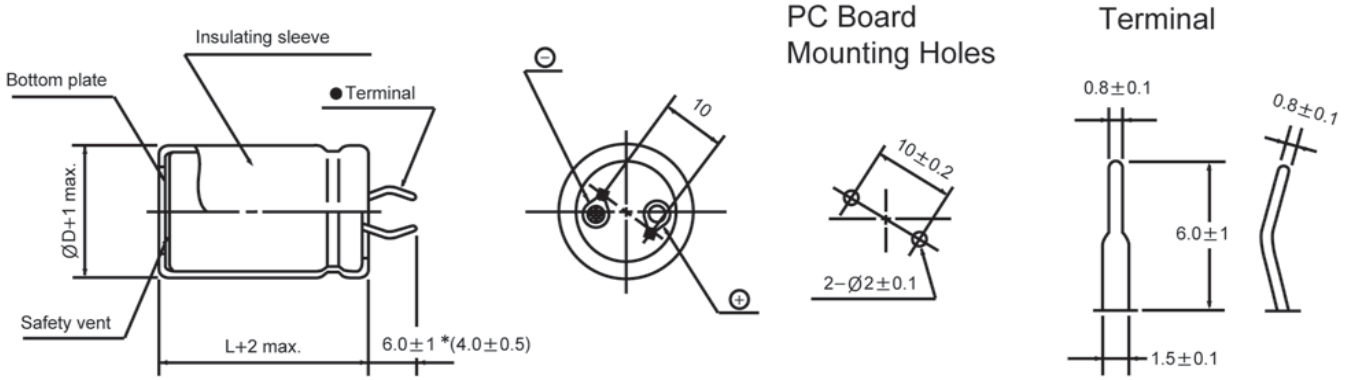
· Load life of 7000 hours at 105℃
· Voltage range of 160V ~ 500V
· Suited for use in industrial power supplies where high reliability
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (160V~250V); -25 ~ +105℃ (350V~500V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 160 / 200 / 250 / 350 / 400 / 450 / 500 Tanδ: 0.15 / 0.15 / 0.15 / 0.15 / 0.15 / 0.20 / 0.20
Load life (after application of the rated voltage for 7000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value Tanδ: Less than 300% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

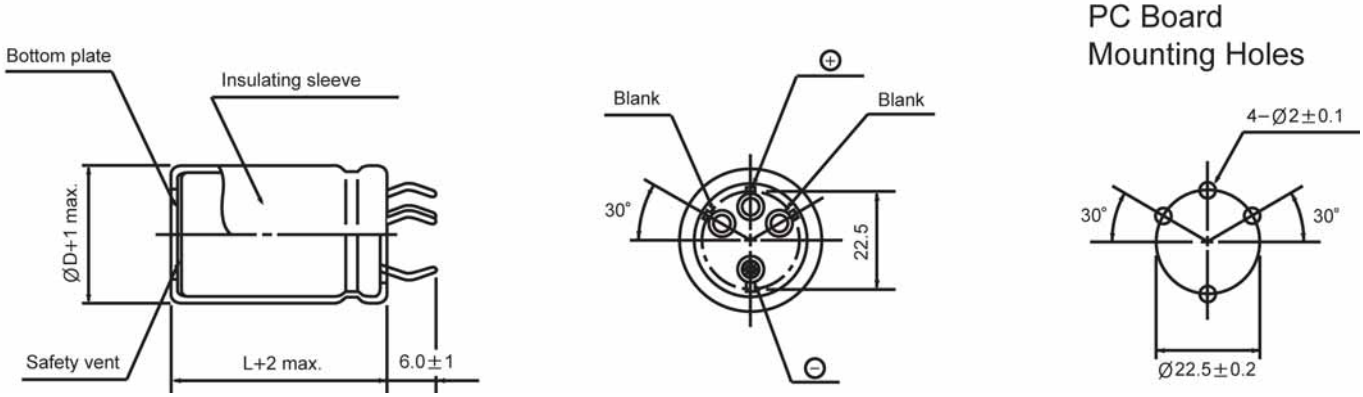
Unit : mm

ØD≤40



* Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency / WV	50Hz	120Hz	300Hz	1kHz	10kHz≤
160 ~ 250	0.85	1.00	1.20	1.25	1.45
350 ~	0.85	1.00	1.15	1.20	1.40

LX Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	160		200		250	
330	22×25	1.11	22×30 25×25	1.16 1.16	22×40 25×35 30×25	1.19 1.24 1.20
390	22×30 25×25	1.26 1.35	22×35 25×30 30×25	1.29 1.29 1.31	22×45 25×35 30×30	1.36 1.35 1.39
470	22×30 25×30	1.39 1.40	22×40 25×35 30×30	1.42 1.48 1.52	25×45 30×35 35×30	1.63 1.61 1.64
560	22×40 25×30 30×25	1.55 1.55 1.57	22×45 25×35 30×30	1.63 1.62 1.67	25×50 30×35 35×30	1.85 1.75 1.80
680	22×45 25×35 30×30	1.80 1.78 1.93	25×40 30×35	1.87 1.93	30×45 35×35	2.12 2.08
820	25×40 30×30	2.06 2.01	25×50 30×40 35×30	2.24 2.23 2.17	30×50 35×40	2.42 2.39
1000	25×45 30×35	2.38 2.34	30×45 35×35	2.57 2.52	35×45	2.76
1200	25×50 30×40 35×35	2.54 2.56 2.56	30×50 35×40	2.71 2.68	35×50	2.90
1500	30×45 35×35	2.96 2.89	35×50	3.25		
1800	30×50 35×40	3.32 3.30	Case size ΦD×L (mm) Ripple current (A rms) at 105℃ , 120Hz			

WV / μF	350		400		450		500	
56			22×20	0.48	22×30 25×20	0.52 0.52		
68			22×25 25×20	0.55 0.55	22×30 25×25	0.58 0.58	22×35 25×30	0.41 0.39
82	22×25	0.58	22×30 25×25	0.63 0.63	22×35 25×30 30×20	0.65 0.65 0.65	22×40 25×30	0.47 0.46
100	22×25 25×25	0.67 0.67	22×30 25×25	0.70 0.70	22×40 25×30 30×25	0.74 0.72 0.73	22×40 25×35 30×25	0.55 0.54 0.53
120	22×30 25×25	0.77 0.76	22×35 25×30 30×25	0.79 0.79 0.79	25×35 30×30	0.82 0.82	22×45 25×40 30×30 35×25	0.61 0.62 0.61 0.56
150	22×35 25×30	0.88 0.88	22×40 25×30 30×25	0.90 0.88 0.90	25×40 30×35 35×25	0.94 0.96 0.94	25×45 30×35 35×30	0.69 0.72 0.70
180	22×40 25×30	0.99 0.96	25×35 30×30 35×25	1.01 1.01 1.01	30×35 35×30	1.05 1.07	30×40 35×35	0.84 0.83
220	22×45 25×35 30×30	1.12 1.11 1.11	25×40 30×35 35×25	1.14 1.16 1.14	30×40 35×35	1.20 1.21	30×45 35×40	0.97 0.97
270	25×40 30×35 35×25	1.26 1.28 1.26	30×40 35×30	1.33 1.31	35×40	1.40	30×50 35×40	1.17 1.18
330	30×35 35×30	1.42 1.45	30×45 35×35	1.52 1.48	35×45	1.60	35×50	1.32
390	30×40 35×35	1.60 1.61	35×40	1.68	35×50	1.79	35×55	1.48
470	35×40	1.85	35×45	1.91			35×60	1.60
560	35×45	2.06	35×50	2.14				

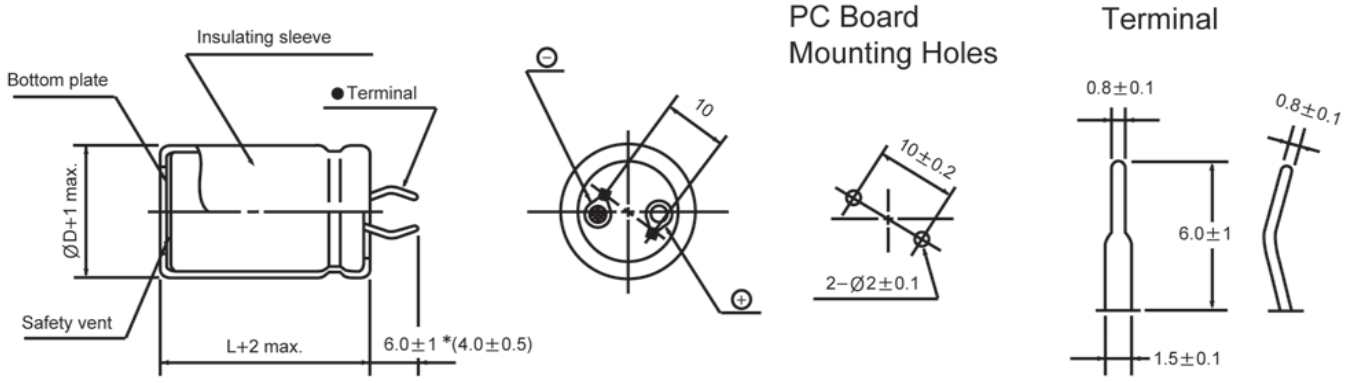
LY Snap-in Terminal Type, Long life Series

· Load life of 10000 hours at 105℃
· Voltage range of 400 ~ 500V
· Suited for use in industrial power supplies where high reliability
· Complied to the RoHS directive

Items	Performance characteristics			
Operating temperature range	-25 ~ +105℃			
Leakage current max.	I=3$\sqrt{CV}$(μA) (after 5 minutes)			
Capacitance tolerance	±20% at 120Hz, 20℃			
Dissipation factor max. (at 120Hz, 20℃)	WV	400	450	500
	Tanδ	0.15	0.20	0.20
Load life (after application of the rated voltage for 10000 hours at 105℃)	Leakage current	Less than specified value		
	Capacitance change	Within ±30% of initial value		
	Tanδ	Less than 300% of specified value		
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.			

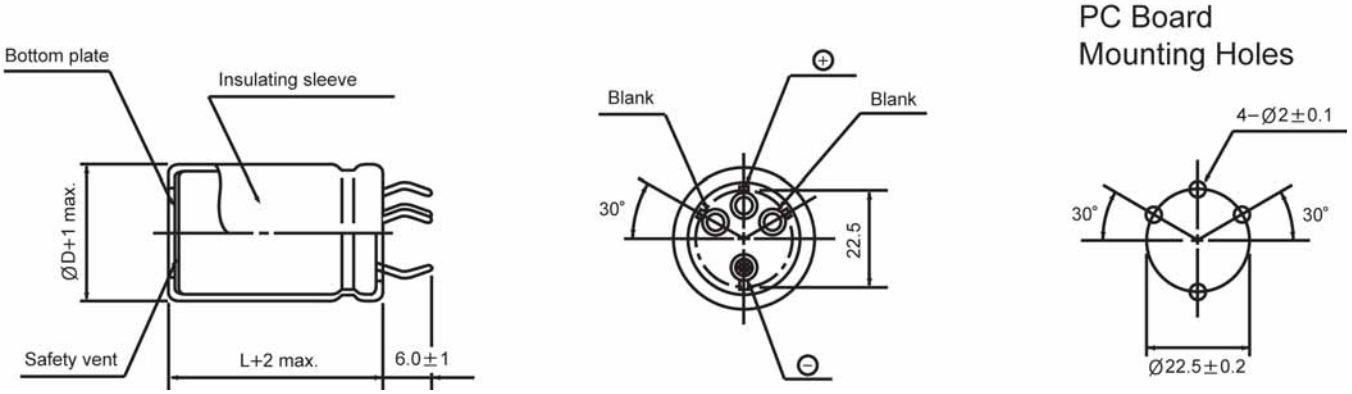
● DRAWING

ØD≤40



* Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
400 ~ 500	0.85	1.00	1.15	1.20	1.40

LY Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	400		450		500	
47			22×20	0.38		
56	22×20	0.39	22×20 25×20	0.45 0.43		
68	22×25 25×20	0.46 0.48	22×25 25×25	0.52 0.51	22×35 25×30	0.41 0.39
82	22×30 25×25	0.54 0.53	22×30 25×30 30×20	0.60 0.59 0.57	22×40 25×35	0.47 0.46
100	22×30 25×25	0.60 0.62	22×30 25×30 30×25	0.69 0.69 0.67	22×40 25×40 30×30	0.55 0.52 0.56
120	22×35 25×30 30×25	0.69 0.72 0.69	25×35 30×30	0.79 0.74	22×45 25×45 30×35	0.61 0.59 0.62
150	22×40 25×30 30×25	0.84 0.84 0.82	25×40 30×35 35×25	0.92 0.91 0.89	30×40 35×30	0.65 0.66
180	25×35 30×30 35×25	0.97 0.95 0.92	30×35 35×30	1.04 1.03	30×45 35×35	0.72 0.73
220	25×40 30×35 35×25	1.11 1.11 1.08	30×40 35×35	1.20 1.19	35×40	0.84
270	30×40 35×30	1.28 1.26	35×40	1.37	35×50	0.92
330	30×45 35×35	1.47 1.46	35×45	1.58		
390	35×40	1.65				
470	35×45	1.88				

Ripple current (A rms) at 105℃, 120Hz
Case size ΦD×L (mm)

LC

Snap-in Terminal Type, 105℃ Permissible Overvoltage

· Withstanding 2000 hours application of rated ripple current at 105℃

· Reduction of short incidence when overvoltage (rated voltage x 1.5) is applied to a capacitor

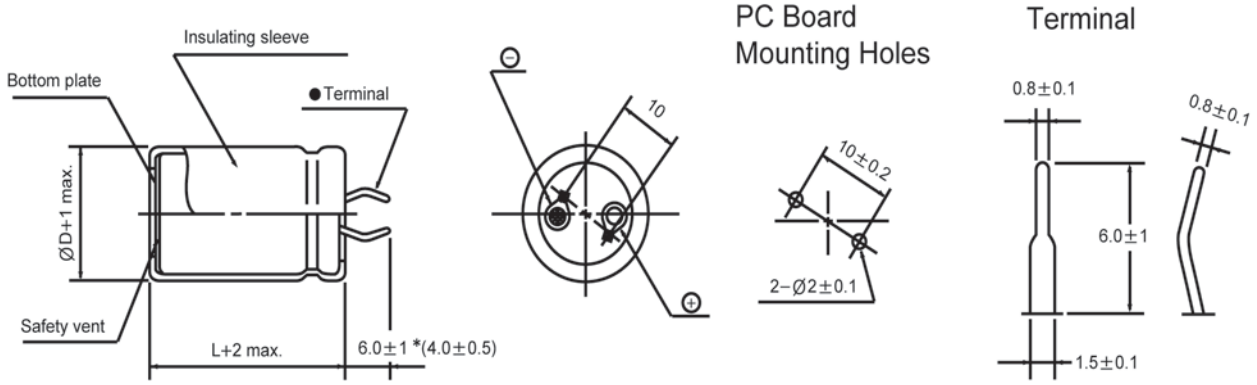
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (200V,250V), -25 ~ +105℃ (400V,450V)
Leakage current max.	I=3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 200 / 250 / 400 / 450 Tanδ: 0.15 / 0.15 / 0.15 / 0.20
Load life (after application of the rated voltage for 2000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (after leaving capacitors under no load at 105℃ for 1000 hours)	Leakage current: Less than specified value Capacitance change: Within ±15% of initial value Tanδ: Less than 150% of specified value

● DRAWING

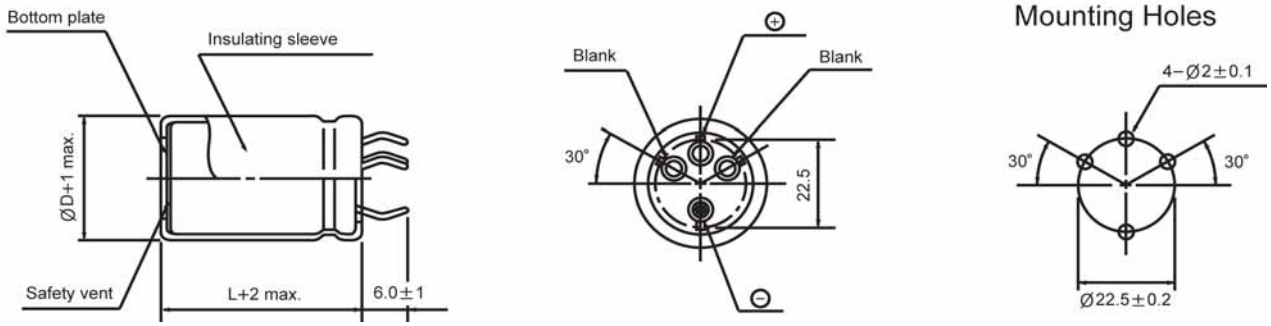
Unit : mm

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	60Hz	120Hz	300Hz	1kHz	10KHZ	50kHz≤
200,250	0.81	0.85	1.00	1.17	1.32	1.45	1.50
400,450	0.77	0.82	1.00	1.16	1.30	1.41	1.43

LC Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	200		250	
270			22×25	1.10
330			22×30 25×25	1.20 1.20
390	22×25	1.31	22×35 25×30	1.30 1.30
470	22×30 25×25	1.48 1.48	22×40 25×35 30×25	1.40 1.40 1.40
560	22×35	1.60	22×45 25×35 30×30	1.50 1.50 1.50
680	22×40 25×30 30×25	1.75 1.75 1.75	22×50 25×40 30×30 35×25	1.70 1.70 1.70 1.70
820	22×45 25×35	2.04 2.04	25×45 30×35 35×30	2.00 2.00 2.00
1000	22×50 25×45 30×30 35×25	2.30 2.30 2.30 2.30	30×40 35×35	2.20 2.20
1200	25×50 30×35 35×30	2.65 2.65 2.65	30×45 35×40	2.30 2.30
1500	30×40 35×35	2.80 2.80	35×45	2.50
1800	30×50 35×40	3.08 3.08	35×50	2.70
2200	35×45	3.48		

Ripple current (A rms) at 105℃, 120Hz
Case size ΦD×L (mm)

WV / μF	400		450	
82			22×25	0.34
100	22×25	0.68	22×30 25×25	0.69 0.69
120	22×30	0.73	22×35 25×30	0.72 0.72
150			22×40 25×30 30×25	0.79 0.79 0.79
180	22×35 25×30 30×25	0.95 0.95 0.95	22×45 25×35 30×30	0.87 0.87 0.87
220	22×45 25×35 30×25	1.10 1.10 1.10	25×40 30×30 35×25	1.05 1.05 1.05
270	22×50 25×40 30×30 35×25	1.22 1.22 1.22 1.22	25×50 30×35 35×30	1.23 1.23 1.23
330	25×45 30×35	1.44 1.44	30×40 35×35	1.38 1.38
390	25×50 30×40 35×30	1.55 1.55 1.55	30×50 35×40	1.61 1.61
470	30×45 35×35	1.68 1.68	35×45	1.78
560	30×50 35×40	1.90 1.90	35×50	1.99
680	35×45	2.12		

LD

Snap-in Terminal type, 105℃ High speed charge-discharge

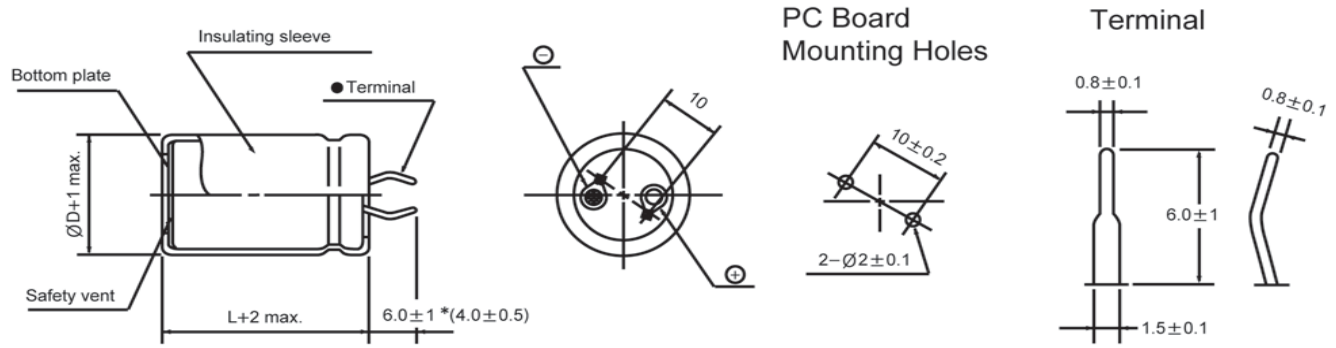
· Suited for high frequency regenerative voltage for AC servomotor, general inverter.
· Suited for equipment used at voltage fluctuating area.
· Suited for rectifier circuit of voltage doubler.
· Complied to the RoHS directive.

Items	Performance characteristics
Operating temperature range	-25 ~ +105℃
Leakage current max.	I≤3$\sqrt{CV}$ (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 350 / 400 / 420 / 450 Tanδ: 0.15 / 0.15 / 0.20 / 0.20
Endurance of charge-discharge behavior	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 300% of specified value
Load life (after application of the rated voltage for 3000 hours at 105℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 105℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

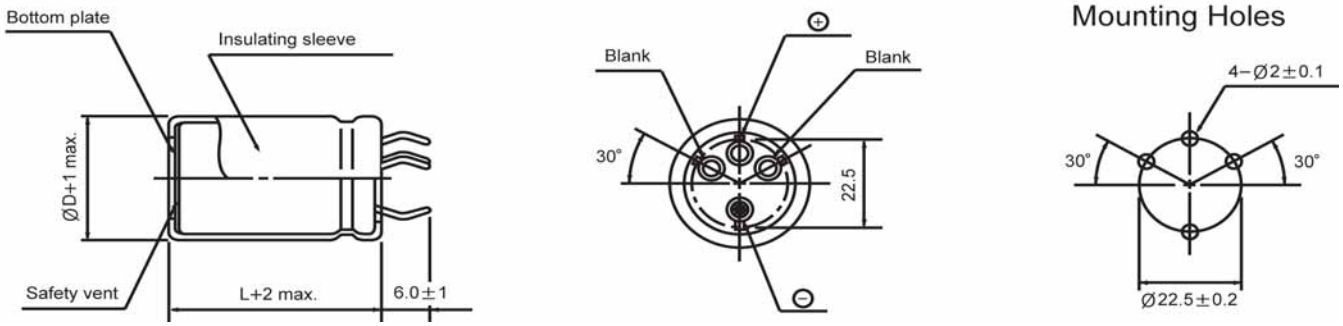
Unit : mm

ØD≤40



∗ Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



LD Series

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	60Hz	120Hz	300Hz	1kHz	10kHz	50kHz≤
350 ~ 450	0.77	0.82	1.00	1.16	1.30	1.41	1.43

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	350		400		420		450	
82							22×25	0.64
100			22×25	0.68	22×25	0.66	22×30 25×25	0.69 0.69
120	22×25	0.75	22×30	0.73	22×30 25×25	0.81 0.81	22×35 25×30	0.72 0.72
150	22×30	0.82	22×35	0.85	22×35 25×30	0.84 0.84	22×40 25×30 30×25	0.79 0.79 0.79
180	22×30 25×25	0.90 0.90	22×35 25×30 30×25	0.95 0.95 0.95	22×40 25×30 30×25	0.91 0.91 0.91	22×45 25×35 30×30	0.87 0.87 0.87
220	22×35 25×30	1.00 1.00	22×45 25×35 30×25	1.10 1.10 1.10	22×45 25×35 30×30	1.05 1.05 1.05	25×40 30×30 35×25	1.05 1.05 1.05
270	22×40 25×35 30×25	1.10 1.10 1.10	22×50 25×40 30×30 35×25	1.22 1.22 1.22 1.22	25×40 30×30 35×25	1.25 1.25 1.25	25×50 30×35 35×30	1.23 1.23 1.23
330	22×45 25×40 30×30	1.20 1.20 1.20	25×45 30×35	1.44 1.44	25×50 30×35 35×30	1.42 1.42 1.42	30×40 35×35	1.38 1.38
390	25×45 30×35	1.30 1.30	25×50 30×40 35×30	1.55 1.55 1.55	30×40 35×35	1.61 1.61	30×50 35×40	1.61 1.61
470	25×50 30×40 35×30	1.40 1.40 1.40	30×45 35×35	1.68 1.68	30×45 35×40	1.86 1.86	35×45	1.78
560	30×45 35×35	1.50 1.50	30×50 35×40	1.90 1.90	35×45	2.10	35×50	1.99
680	30×50 35×40	1.70 1.70	35×45	2.12	35×50	2.20		
820	35×45	1.90						

Ripple current (A rms) at 105℃ , 120Hz

Case size ΦD×L (mm)

LB High Temperature Range, For 125℃ Use Series

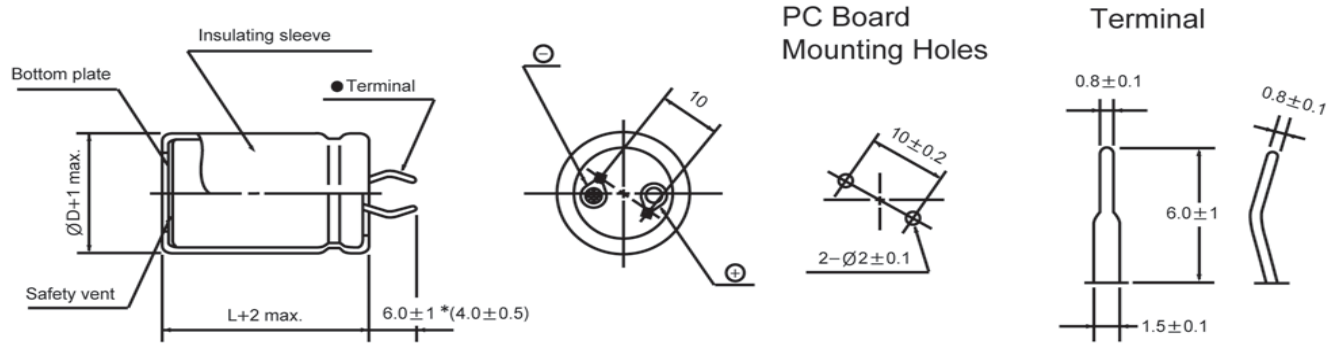
· Wide operating temperature range of -40 ~ +125℃
· With a guaranteed useful life of 10 years at 60℃
· Ideal for industrial applications requiring continuous operation
· Complied to the RoHS directive.

Items	Performance characteristics
Operating temperature range	-40 ~ +125℃
Leakage current max.	I=3√CV (μA) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV: 10 / 16 / 25 / 35 / 50 / 63 / 80,100 / 160~250 Tanδ: 0.55 / 0.50 / 0.40 / 0.35 / 0.30 / 0.25 / 0.20 / 0.15
Load life (after application of the rated voltage for 1000 hours at 125℃)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value Tanδ: Less than 200% of specified value
Shelf life (at 125℃)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.

● DRAWING

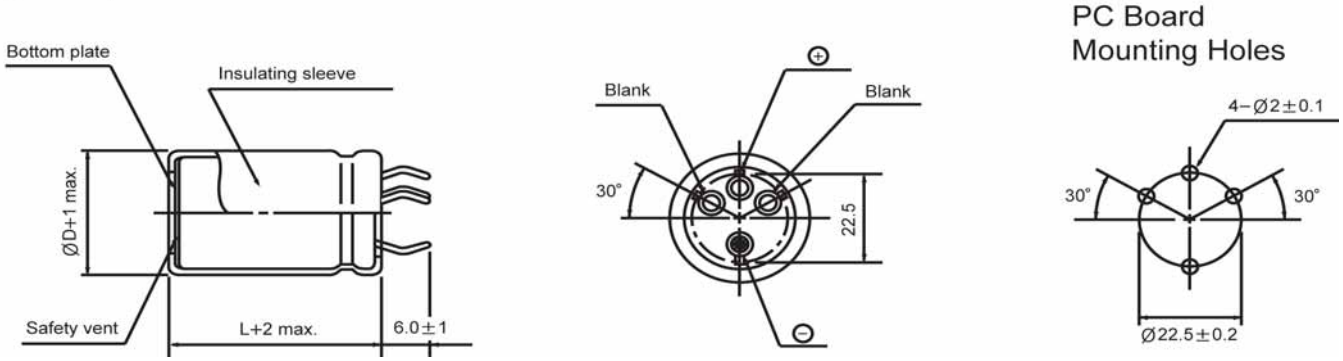
Unit : mm

ØD≤40



* Shorter terminal(4.0±0.5) is also available upon request.
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

ØD=35, 40



● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~	0.85	1.00	1.20	1.25	1.45

LB Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	10		16		25		35		50		63	
470											22×35 25×30	0.69 0.71
680									22×30	0.78	22×40 25×35 30×30	0.87 0.91 0.93
1000							22×30	0.85	22×40 25×30	1.06 1.04	25×45 30×35 35×30	1.21 1.19 1.22
1500					22×30	0.95	22×40 25×30	1.16 1.14	22×50 25×40 30×30	1.42 1.42 1.39	30×45 35×40	1.60 1.65
2200			22×30	1.00	22×40 25×30	1.28 1.26	22×50 25×40 30×30	1.54 1.54 1.50	30×40 35×35	1.86 1.91	35×50	2.16
3300	22×30	1.09	22×40 25×35	1.36 1.41	22×50 25×40 30×30	1.72 1.72 1.68	30×40 35×35	2.04 2.09	35×40	2.45		
4700	22×40 25×35	1.45 1.51	22×50 25×40 30×30	1.78 1.77 1.74	25×50 30×40 35×30	2.23 2.22 2.17	35×40	2.61				
6800	22×50 25×40 30×35	1.91 1.91 1.97	30×40 35×30	2.31 2.26	30×50 35×40	2.90 2.87						
10000	30×45 35×35	2.62 2.57	35×45	3.14								
15000	35×45	3.44										

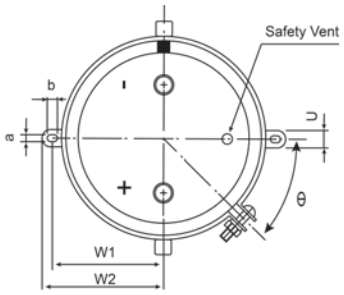
WV / μF	80		100		160		200		250	
100									22×30	0.32
150					22×30	0.37	22×35	0.42	22×40 25×30	0.44 0.43
220			22×30	0.48	22×40 25×30	0.50 0.49	22×45 25×40 30×30	0.56 0.58 0.57	22×50 25×40 30×35 35×30	0.58 0.58 0.60 0.61
330	22×30	0.59	22×40 25×30	0.66 0.65	22×50 25×40 30×30	0.67 0.67 0.65	25×50 30×40 35×30	0.77 0.77 0.75	30×45 35×35	0.80 0.79
470	22×40 25×35	0.79 0.82	22×50 25×40 30×35	0.86 0.86 0.89	25×50 30×40 35×30	0.87 0.86 0.84	30×50 35×40	0.99 0.98	35×45	1.03
680	25×40 30×35	1.04 1.07	30×40 35×30	1.12 1.09	30×50 35×40	1.12 1.11	35×50	1.28		
1000	30×45 35×35	1.42 1.40	35×40	1.46	35×50	1.46				
1500	35×45	1.86								

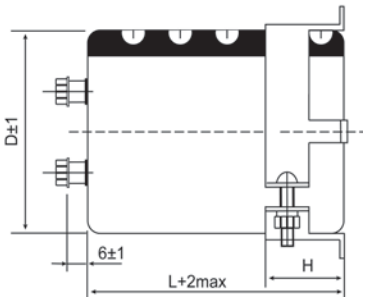
Case size ΦD×L (mm)

Ripple current (A rms) at 125℃ , 120Hz

■ Accessories: Bracket Mounting/mm

◆ 2-legs Bracket

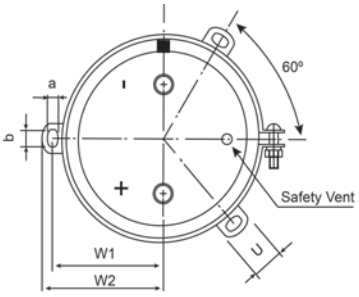


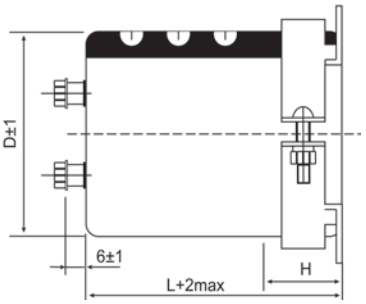


ΦD	W1	W2	a	b	U	H
36	48	58	3.8	7	10	15
51	68	80	5	7	14	30
64	81	93	5	7	14	30
77	93.5	106	5	7	14	30
90	108	120.5	5	7	14	30

*θ is optional for 45° or 30°

◆ 3-legs Bracket





ΦD	W1	W2	a	b	U	H
51	31.8	36.5	5	7	14	30
64	38.1	42.6	5	7	14	30
77	44.5	49.2	5	7	14	30
90	50.8	55.6	5	7	14	30
101	57.5	63.5	5.5	8	20	35

*Bracket will be delivered separately If necessary

■ Terminal Dimensions/mm

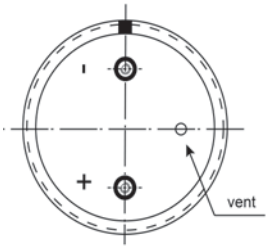


Fig.1-Terminal A

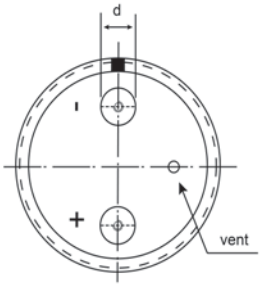


Fig.2-Terminal B,C

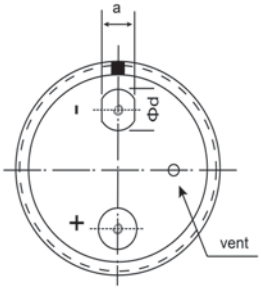
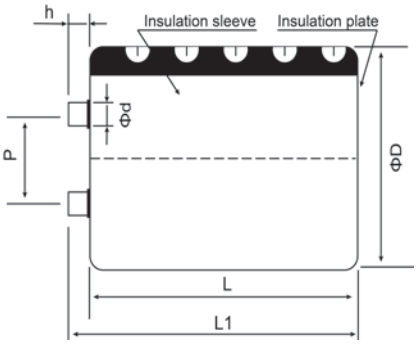


Fig.3-Terminal D



Terminal Code	Can Diameter ΦD±1mm	Thread	Φd±0.3mm	Thread Depth	h±0.5mm	L1±2.0mm	Drawing
A	51~90	M5	10	9	6.0	L+h	Fig.1
B	77~90	M6	17	11	6.0	L+h	Fig.2
C	64	M5	13	9	6.0	L+h	Fig.2
	77~90	M5	17	11	6.0	L+h	Fig.2
D	51	M5	13(a=10)	9	5.0	L+h	Fig.3
	64	M5	15(a=13)	9	6.0	L+h	Fig.3
	77	M6	15(a=13)	9	6.0	L+h	Fig.3

*Screws will be delivered separately.

*Special Terminals (Low post h=3.2,1/4-28,10-32 thread) are available on request.

*Hex head M5×10 and M6×12 are standard screws. Longer screws (M5×20 e.g) are available on request.

*Max tightening torque for screw terminal M5:3Nm, M6:6Nm.

*Max ripple current for screw terminal M5:60 Arms, M6:100 Arms.

Note: Generally, screw terminal capacitors should mount upright with terminal side face upwards.
If the capacitors is mounted horizontally, safety vent should located in 12, 9 o' clock position.
Safety ventin 6 o' clock position or downwards is not allowed.

WS
Upgrade

Screw Terminal Type, Standard Series

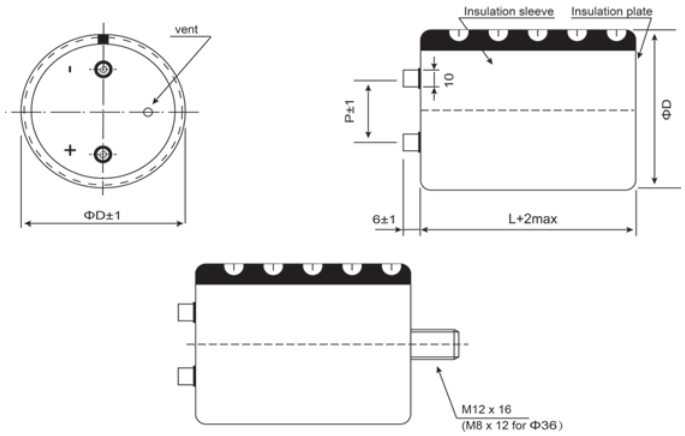
· Standard at 85℃
· UPS
· High Professional Inverters and Power Supplies
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃ (10V~250V); -25 ~ +85℃ (350V~650V);
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Less than values shown in the standard ratings

	Useful Life		Load Life	Endurance Test	Shelf Life	
Life Time	>4000h	>65000h	2000h	2000h	1000h	
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value	
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value	
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value	
Condition:						After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0	U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0	for 60min>24h
Applied Temperature	85℃	40℃	85℃	85℃	85℃	before measurement

DRAWING

Unit: mm



ΦD/mm	36	51	64	77	90	101
P/mm	12.7	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

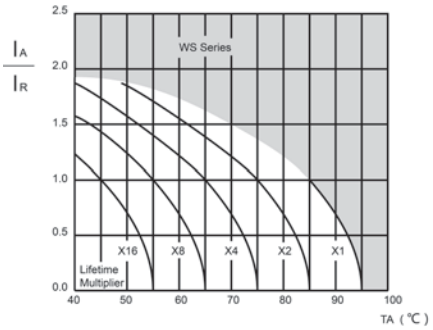
Ripple Current Coefficient

Frequency(Hz) / WV	50/60	120	300	1k	>10k
10~50	0.95	1.00	1.04	1.10	1.15
63~100	0.95	1.00	1.06	1.16	1.30
160~500	0.80	1.00	1.10	1.25	1.50
600,630	0.80	1.00	1.10	1.30	1.40

Ambient Temp(℃) / WV	40	60	70	85
10~500	2.70	2.00	1.70	1.00
600,630	1.89	1.67	1.41	1.00

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature)and by appropriate cooling measures.
It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life .

Lifetime Diagram



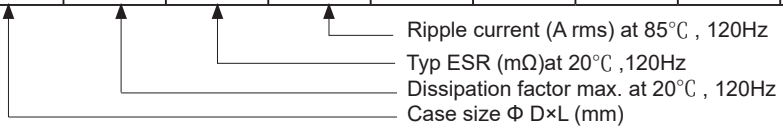
I_A=actual ripple current at 120Hz,
I_R=rated ripple current at 120Hz,85℃
Multiplier of Useful Life as a function of ambient temperature and ripple current load.

WS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	10 (13)				16 (20)				25 (32)			
15000									36×53	0.50	22	3.7
18000									36×53	0.50	18	4.1
22000					36×53	0.60	22	4.1	36×53	0.50	16	4.5
27000					36×53	0.60	19	4.5	36×65	0.50	13	5.0
33000	36×53	0.80	21	4.3	36×53	0.60	16	5.0	36×83	0.50	11	5.9
39000	36×53	0.80	18	4.7	36×65	0.60	13	5.9	36×83	0.50	9	6.7
47000	36×65	0.80	15	5.2	36×83	0.60	11	6.4	36×100	0.50	8	7.7
56000	36×83	0.80	13	6.1	36×83	0.60	10	7.3	36×100	0.60	7	7.9
68000	36×83	0.80	10	6.7	36×100	0.60	8	8.4	36×121	0.60	6	9.1
82000	36×100	0.80	9	7.7	36×100	0.80	7	8.3	36×121	0.60	5	10.4
100000	36×100	0.80	8	8.8	36×121	0.80	6	9.5	51×96	0.80	4	10.3
120000	36×121	0.80	7	10.0	36×121	0.80	5	10.9	51×115	0.80	4	11.7
150000	36×121	1.00	7	10.8	51×96	1.00	4	11.3	51×130	0.80	3	14.1
180000	51×96	1.00	6	12.0	51×115	1.00	3	12.8	64×96	0.80	3	15.7
220000	51×121	1.50	5	11.2	51×130	1.00	3	15.3	64×115	1.00	3	16.1
270000	51×121	1.50	4	12.8	64×96	1.00	3	17.6	64×130	1.00	3	18.6
330000	64×96	1.50	4	15.3	64×115	1.50	3	16.8	64×155	1.00	2	21.9
390000	64×115	1.50	3	17.3	64×130	1.50	3	18.3	77×115	1.20	2	22.0
470000	64×130	2.00	3	16.7	77×115	1.50	2	21.3	77×155	1.20	2	25.6
560000	77×115	2.00	3	19.0	77×130	1.50	2	23.6	90×131	1.20	2	27.9
680000	77×130	2.00	3	21.7	77×155	1.50	2	27.6	90×157	1.20	2	32.5
820000	77×155	2.00	2	24.7	90×157	2.00	2	27.1				

WV(SV) / μF	35 (44)				50 (63)				63 (79)			
3900									36×53	0.25	47	2.7
4700									36×53	0.25	39	3.0
5600					36×53	0.30	46	3.0	36×53	0.25	38	3.3
6800					36×53	0.30	38	3.3	36×65	0.25	32	3.6
8200					36×53	0.30	31	3.6	36×83	0.25	26	4.3
10000	36×53	0.40	24	3.4	36×65	0.30	26	4.0	36×83	0.25	23	4.9
12000	36×53	0.40	20	3.7	36×83	0.30	22	4.7	36×100	0.25	18	5.6
15000	36×65	0.40	17	4.2	36×83	0.30	15	5.5	36×100	0.30	16	5.9
18000	36×83	0.40	14	4.9	36×100	0.30	12	6.2	36×121	0.30	15	6.7
22000	36×83	0.40	12	5.7	36×121	0.40	11	6.3	36×121	0.30	13	7.8
27000	36×100	0.40	9	6.3	36×121	0.40	10	7.1	51×96	0.40	12	7.4
33000	36×100	0.40	9	7.2	51×96	0.40	9	8.2	51×96	0.40	8	8.4
39000	36×121	0.50	8	7.3	51×96	0.50	8	8.1	51×115	0.40	7	9.5
47000	51×96	0.50	8	8.7	51×115	0.50	8	9.3	51×130	0.40	6	11.3
56000	51×96	0.60	8	8.6	64×96	0.50	6	10.5	64×115	0.40	6	12.8
68000	51×115	0.60	6	9.8	64×96	0.50	5	12.0	64×121	0.50	5	12.7
82000	64×96	0.60	5	11.6	64×115	0.50	4	13.7	64×130	0.50	4	14.5
100000	64×115	0.60	4	13.3	77×115	0.60	4	14.7	77×115	0.50	4	16.7
120000	64×121	0.60	4	14.8	77×115	0.60	3	16.7	77×130	0.50	3	18.9
150000	64×130	0.80	4	14.9	77×130	0.60	3	19.3	77×155	0.50	2	22.4
180000	77×115	0.80	3	17.0	77×155	0.60	3	21.9	90×131	0.60	2	22.4
220000	77×130	0.80	3	20.0	90×131	0.60	2	21.4	90×157	0.60	2	26.2
270000	77×155	1.00	3	20.3	90×157	0.60	2	24.6				
330000	90×131	1.00	2	23.5								
390000	90×157	1.00	2	26.4								
470000	90×157	1.00	2	29.6								

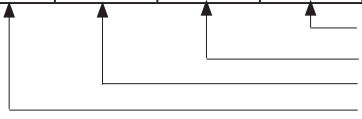


WS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	80 (100)				100 (125)				160 (200)			
1800					36×53	0.25	48	1.9				
2200					36×53	0.25	44	2.1				
2700					36×53	0.25	39	2.3				
3300	36×53	0.25	54	2.5	36×65	0.25	35	2.6	36×121	0.25	31	5.2
3900	36×53	0.25	46	2.8	36×83	0.25	28	3.0				
4700	36×65	0.25	38	3.0	36×83	0.25	26	3.5	51×75	0.25	21	5.9
5600	36×83	0.25	32	3.6	36×100	0.25	23	3.9	51×96	0.25	19	7.0
6800	36×83	0.25	26	3.9	36×100	0.25	22	4.5	51×96	0.25	16	7.8
8200	36×83	0.25	22	4.5	36×121	0.25	20	5.1				
10000	36×100	0.25	17	5.2	36×121	0.25	19	5.9	64×96	0.25	13	10.4
12000	36×100	0.25	15	5.9	51×75	0.25	16	6.4	51×120	0.25	10	11.3
15000	36×121	0.25	12	6.8	51×96	0.25	12	7.0	64×130	0.25	9	14.3
18000	36×121	0.25	10	7.8	51×115	0.25	10	8.3	64×130	0.25	8	15.6
22000	51×96	0.30	10	8.0	51×130	0.25	8	10.0	77×130	0.25	6	18.3
27000	51×96	0.30	8	9.2	64×115	0.25	7	11.5				
33000	51×115	0.30	7	10.5	64×130	0.25	6	11.9	90×131	0.25	4	23.8
39000	51×130	0.30	6	12.0	77×115	0.25	5	13.4	90×157	0.25	2	27.9
47000	64×115	0.30	5	13.6	77×130	0.35	5	14.2				
56000	64×130	0.40	4	13.4	77×155	0.35	4	16.0				
68000	77×115	0.40	4	15.4	90×131	0.35	3	18.8				
82000	77×130	0.40	4	17.5	90×157	0.35	3	20.5				
100000	77×155	0.40	3	20.5	90×171	0.35	3	24.0				
120000	90×131	0.40	2	22.4								
150000	90×157	0.40	2	26.5								

WV(SV) / μF	200 (250)				250 (300)				350 (400)			
470									36×83	0.20	228	2.2
680									36×83	0.20	152	2.6
1000									36×100	0.20	104	3.4
1500					36×100	0.25	49	3.2	51×75	0.20	72	4.3
1800									51×96	0.20	58	5.1
2200	36×100	0.25	38	3.9	51×75	0.25	33	4.0	51×96	0.20	48	5.7
2700									51×130	0.20	39	7.1
3300	51×75	0.25	24	4.9	51×96	0.25	23	5.4	51×130	0.20	32	7.9
3900									64×115	0.20	28	9.0
4700	51×96	0.25	20	6.4	64×96	0.25	17	7.1	64×130	0.20	25	10.3
5600	51×115	0.25	18	7.6					77×115	0.20	22	11.4
6800	51×130	0.25	14	8.8	64×115	0.25	12	9.1	77×130	0.20	17	13.1
8200	64×96	0.25	11	9.4	64×115	0.25	11	10.0	77×155	0.20	14	15.4
10000	64×96	0.25	9	10.4	64×130	0.25	11	11.7	90×157	0.20	12	18.1
12000									90×157	0.20	10	20.0
15000	77×96	0.25	7	14.4	77×130	0.25	7	15.1	90×196	0.20	8	24.5
18000	77×130	0.25	6	16.5	77×155	0.25	6	17.7	90×236	0.20	6	28.8
22000	77×155	0.25	4	19.6	90×157	0.25	3	20.9				
33000	90×157	0.25	3	25.3								



WS Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	400 (450)				450 (500)				500 (550)			
470	36×83	0.20	178	2.2	36×83	0.20	200	2.2				
680	36×100	0.20	119	2.8	36×100	0.20	140	2.8				
820					51×75	0.20	96	3.2				
1000	51×75	0.20	82	3.5	51×75	0.20	82	3.5	51×115	0.25	85	4.6
1200	51×75	0.20	68	3.8	51×96	0.20	72	4.2				
1500	51×96	0.20	58	4.7	51×115	0.20	58	5.1	64×96	0.25	60	5.7
1800	51×96	0.20	47	5.2	51×130	0.20	46	5.9				
2200	51×120	0.20	35	6.4	64×96	0.20	33	6.3	64×130	0.25	41	6.9
2700	64×96	0.20	33	7.0	64×115	0.20	32	7.5	77×115	0.25	36	8.1
3300	64×115	0.20	31	8.2	64×130	0.20	30	8.7	77×130	0.25	32	9.6
3900	64×130	0.20	25	9.4	77×115	0.20	29	9.5	77×130	0.25	30	10.8
4700	77×115	0.20	24	10.4	77×130	0.20	24	10.9	77×155	0.25	27	12.1
5600	77×130	0.20	19	11.9	77×155	0.20	16	12.8	90×157	0.25	21	13.8
6800	77×155	0.20	16	14.1	90×157	0.20	14	15.0	90×171	0.25	18	15.8
8200	90×157	0.20	14	16.4	90×157	0.20	12	16.5	77×220	0.25	14	17.2
10000	90×157	0.20	11	18.3	90×196	0.20	10	20.0	90×236	0.25	10	22.1
12000	90×196	0.20	10	21.8	90×236	0.20	8	23.6				
15000	90×236	0.20	8	26.3								

Ripple current (A rms) at 85℃ , 120Hz
Typ ESR (mΩ)at 20℃ ,120Hz
Dissipation factor max. at 20℃ , 120Hz
Case size Φ D×L (mm)

WV(SV) / μF	600 (650)					650 (700)				
1000						64×130	0.25	300	150	6.0
1200	64×96	0.25	242	121	7.7	77×115	0.25	266	133	6.7
1500	64×115	0.25	224	112	9.3	77×130	0.25	212	106	8.1
1800	77×96	0.25	194	97	10.1	77×155	0.25	176	88	9.8
2200	77×115	0.25	162	81	12.0	90×131	0.25	144	72	10.7
2700	77×130	0.25	132	66	14.0	90×157	0.25	128	64	12.8
3300	77×155 90×131	0.25 0.25	88 88	44 44	16.4 16.4	90×171	0.25	106	53	14.7
3900	90×131	0.25	74	37	17.8	90×196	0.25	94	47	17.9
4700	90×157	0.25	62	31	21.0	90×196	0.25	78	39	21.6
5600	90×196	0.25	56	28	24.5	101×220	0.25	70	35	24.9

Ripple current (A rms) at 85℃ , 120Hz
Typ ESR (mΩ) at 20℃ ,120Hz
Max.ESR (mΩ) at 20℃ 120Hz
Dissipation factor max. at 20℃ , 120Hz
Case size Φ D×L (mm)

WJ

Screw Terminal Type, Long Life Series

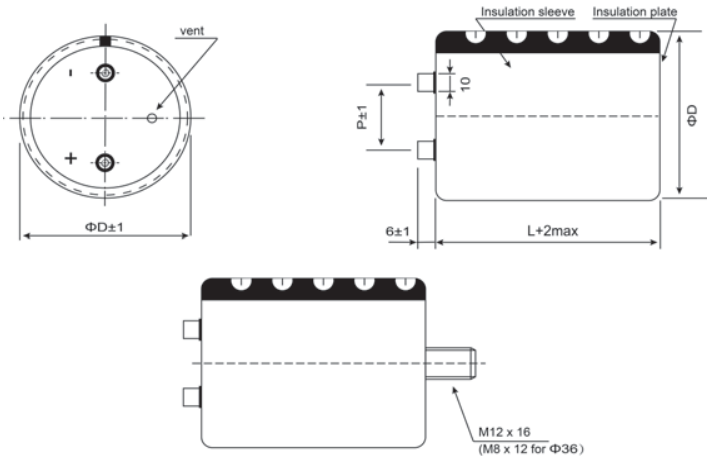
· Long Life
· High Reliability
· High Currents for High Professional
· Power Application and Inverters
· Complied to the RoHS directive

Items	Performance characteristics			
Operating temperature range	-40 ~ +85℃			
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)			
Capacitance tolerance	±20% at 120Hz, 20℃			
Dissipation factor max. (at 120Hz, 20℃)	WV	350	400	450
	Tanδ	0.15	0.15	0.15
Low temperature characteristics (capacitance ratio at 120Hz)	WV	350	400	450
	C-25℃ /C+20℃	≥0.7	≥0.7	≥0.7

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	>10000h	>100000h	5000h	5000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0 U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0 for 60min>24h
Applied Temperature	85℃	40℃	85℃	85℃	85℃ before measurement

DRAWING

Unit: mm



ΦD/mm	51	64	77	90	101
P/mm	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

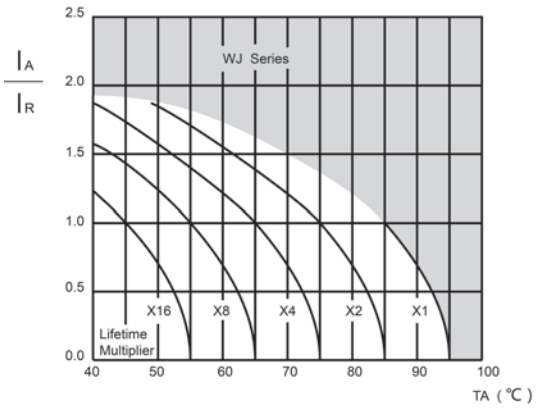
Frequency(Hz)	50/60	120	300	1k	>10k
Coefficient	0.80	1.00	1.10	1.30	1.40

Ambient Temp(℃)	40	60	85
Coefficient	1.89	1.67	1.00

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature） and by appropriate cooling measures.
It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

WJ Series

Lifetime Diagram

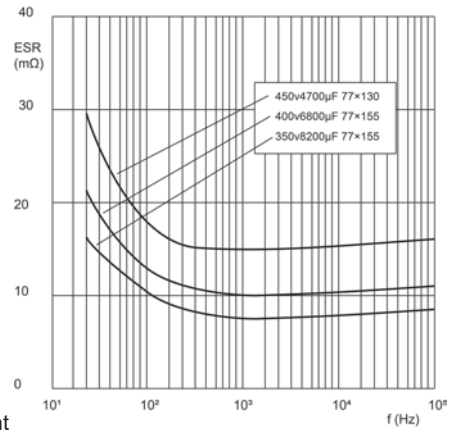


I_A=actual ripple current at 120Hz,I_R=rated ripple current at 120Hz,85℃

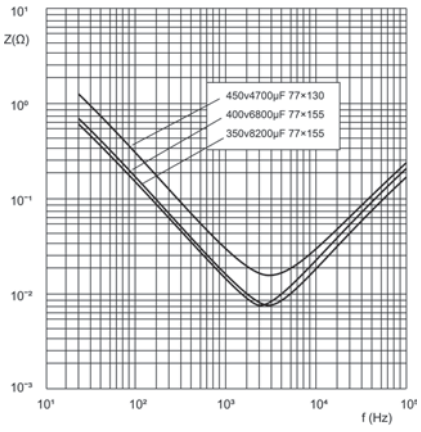
Multiplier of Useful Life as a function of ambient temperature and ripple current load.

Typical Curves

ESR ~ Frequency at 20℃



Impedance Z ~ Frequency at 20℃



● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	350 (400)				400 (450)				450 (500)			
1000					51×83	215	82	5.0	51×83	215	93	5.0
1200	51×83	215	67	5.5	51×83	179	70	5.5	51×96	179	69	6.0
1500	51×83	172	55	6.1	51×96	143	50	6.7	51×115	143	56	7.2
1800	51×96	143	43	7.4	51×96	119	40	7.4	51×130	119	45	8.3
2200	51×96	117	30	8.2	51×130	98	28	9.2	64×96	98	35	9.0
2700	51×130	96	27	10.2	64×96	80	23	9.9	64×115	80	30	10.7
3300	51×130	78	23	11.3	64×115	65	21	11.8	64×130	65	24	12.4
3900	64×115	66	19	12.8	64×130	55	19	13.5	77×115	55	20	13.6
4700	64×130	55	16	14.8	77×115	46	15	14.9	77×130	46	16	15.6
5600	77×115	46	14	16.3	77×130	39	14	17.0	77×155	38	13	18.3
6800	77×130	38	13	18.8	77×155	32	13	20.2	90×157	32	11	21.4
8200	77×155	31	11	22.1	90×157	26	12	23.5	90×157	26	10	23.5
10000	90×157	26	10	25.9	90×157	22	10	25.9	90×196	22	9	28.3
12000	90×157	22	8	28.4	90×196	18	8	31.0	90×236	18	8	33.6
15000	90×196	17	6	34.6	90×236	14	6	37.5				
18000	90×236	14	4	41.4								

Ripple current (A rms) at 85℃ , 120Hz
Typ ESR (mΩ) at 20℃ ,120Hz
Max.ESR (mΩ) at 20℃ , 120Hz
Case size Φ D×L (mm)

WM

Screw Terminal Type, Long Life Series

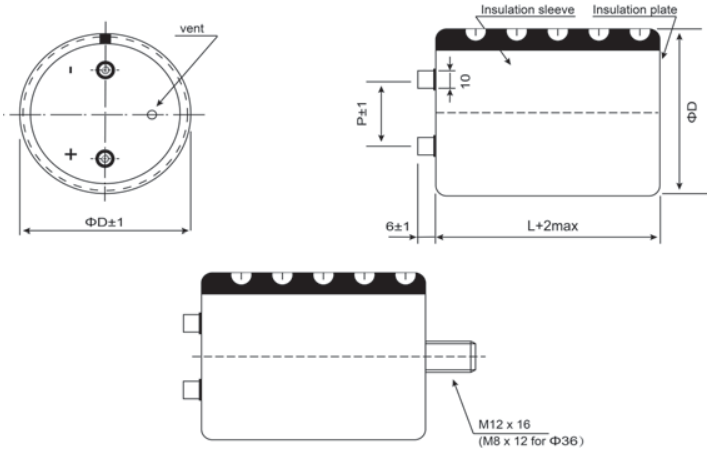
· High Reliability at High Voltage
· Long Life at Copmact Size
· Professional Inverters and Power Supplies
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +85℃ (400V~550V); -25 ~ +85℃ (600V)
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	WV 400 450 500 550 600 Tanδ 0.15 0.15 0.20 0.20 0.25

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	>10000h	>100000h	5000h	5000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0 U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0 for 60min>24h
Applied Temperature	85℃	40℃	85℃	85℃	85℃ before measurement

DRAWING

Unit: mm



ΦD/mm	51	64	77	90	101
P/mm	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

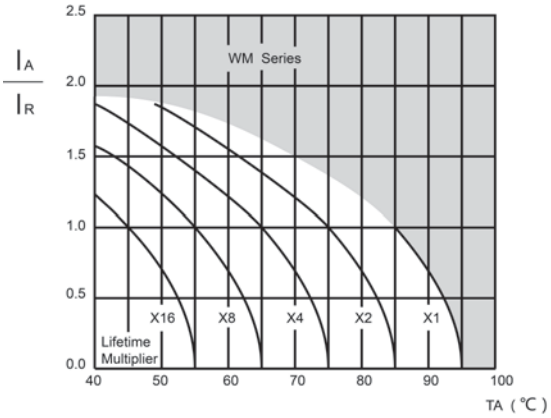
Frequency(Hz)	50/60	120	300	1k	>10k
Coefficient	0.80	1.00	1.10	1.30	1.40

Ambient Temp(℃)	40	60	85
Coefficient	1.89	1.67	1.00

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature) and by appropriate cooling measures.
It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

WM Series

Lifetime Diagram

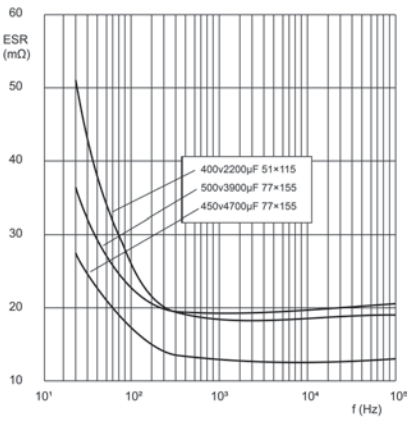


I_A=actual ripple current at 120Hz,I_R=rated ripple current at 120Hz,85℃

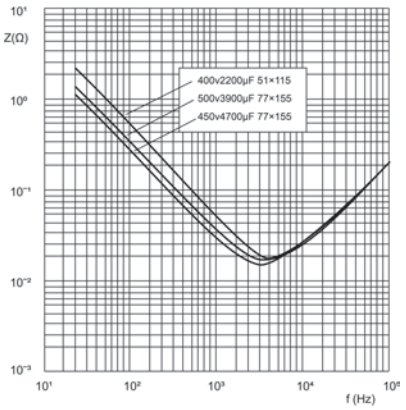
Multiplier of Useful Life as a function of ambient temperature and ripple current load.

Typical Curves

ESR ~ Frequency at 20℃



Impedance Z ~ Frequency at 20℃



● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	400 (450)				450 (500)				500 (550)			
1200									51×115 64×96	215 215	94 94	6.2 6.3
1500									51×130 64×96	172 172	72 72	7.3 7.1
1800					51×115	119	45	7.6	64×115	143	51	8.3
2200	51×115	98	28	8.8	51×130	98	35	8.8	64×130	117	40	9.6
2700	51×130	80	24	10.2	64×96	80	30	9.5	77×115	96	35	10.7
3300	64×96	65	21	11.0	64×115	65	24	11.2	77×130	78	35	12.4
3900	64×115	55	19	12.8	64×130	55	20	12.8	77×155	66	25	14.4
4700	64×130	46	15	14.8	77×115	46	16	14.1	77×171 90×131	55 55	24 24	16.5 15.8
5600	77×115	38	14	16.2	77×130	38	13	16.2	77×195 90×157	46 46	22 22	19.0 18.6
6800	77×130	32	13	18.7	77×155	32	11	19.1	90×171	38	19	21.2
8200	77×155	26	12	22.0	77×195 90×131	26 26	10 10	23.0 21.0	90×196 101×175	31 31	14 14	24.5 24.2
10000	77×195 90×131	22 22	10 10	26.7 24.2	90×171	22	9	25.7	90×236 101×195	26 26	12 12	29.3 27.9
12000	90×157	18	8	28.5	90×196 101×175	18 18	8 8	29.7 29.3	101×237	22	11	33.1
15000	90×196	14	6	34.8	90×236 101×195	14 14	7 7	35.9 34.2				
18000	90×236	12	5	41.2	101×237	12	6	40.5				
22000	101×237	10	5	47.0								

Case size Φ D×L (mm)

Ripple current (A rms) at 85℃ , 120Hz

Typ ESR (mΩ)at 20℃ ,120Hz

Max.ESR (mΩ)at 20℃ , 120Hz

WV(SV) / μF	550 (600)				600 (650)			
1000	51×130	258	110	5.9	64×130	210	105	5.4
1200	64×115	215	95	6.8	77×115	188	94	6.1
1500	64×130	172	74	8.0	77×130	150	75	7.3
1800	77×115	143	72	8.7	77×150	124	62	8.9
2200	77×130	117	50	10.1	90×131	102	51	9.7
2700	77×155	96	40	12.0	90×157	90	45	11.6
3300	77×155	78	36	13.3	90×171	76	38	13.4
3900	90×157	66	30	15.5	90×196	66	33	16.2
4700	90×171	55	24	17.6	90×196	56	28	19.5
5600	90×196	46	20	20.3	101×220	50	25	22.5
6800	90×236	38	16	24.1				

WH

Screw Terminal Type, High Reliability Long Life Series

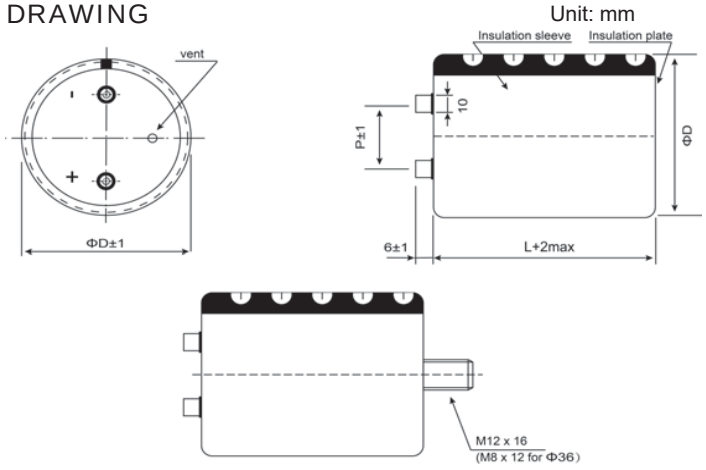
· Higher ripple current
· Long useful life & High Reliability
· For Professional Power application and Inverters
· Complied to the RoHS directive

Items	Performance characteristics				
Operating temperature range	-40 ~ +85℃				
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)				
Capacitance tolerance	±20% at 120Hz, 20℃				
Dissipation factor max. (at 120Hz, 20℃)	WV	350	400	450	500
	Tanδ	0.15	0.15	0.15	0.15
Low temperature characteristics (Capacitance ratio at 120Hz)	WV	350	400	450	500
	C-25℃ /C+20℃	≥0.7	≥0.7	≥0.7	≥0.7

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	>15000h	>250000h	10000h	12000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0 U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0 for 60min>24h
Applied Temperature	85℃	40℃	85℃	85℃	85℃ before measurement

DRAWING

Unit: mm



ΦD/mm	51	64	77	90	101
P/mm	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

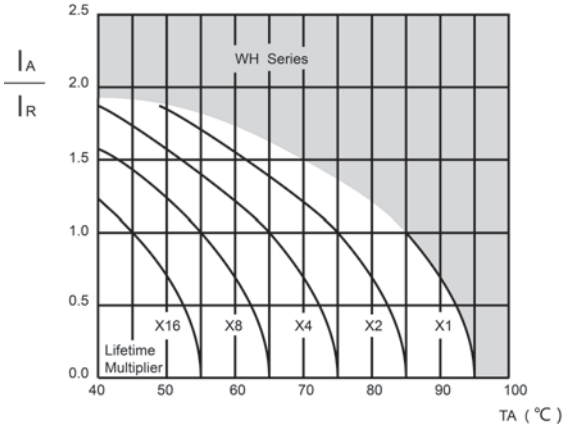
Frequency(Hz)	50/60	120	300	1k	>10k
Coefficient	0.80	1.00	1.10	1.30	1.40

Ambient Temp(℃)	40	60	85
Coefficient	1.89	1.67	1.00

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature) and by appropriate cooling measures.
It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

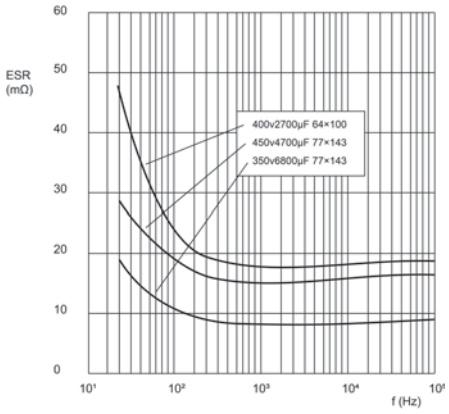
WH Series

Lifetime Diagram

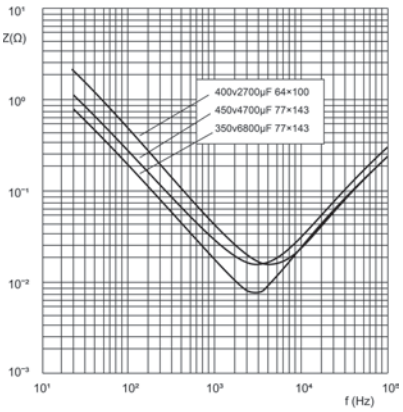


Typical Curves

ESR ~ Frequency at 20℃



Impedance Z ~ Frequency at 20℃



I_A=actual ripple current at 120Hz,I_R=rated ripple current at 120Hz,85℃

Multiplier of Useful Life as a function of ambient temperature and ripple current load.

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	350 (400)				400 (450)				450 (500)			
2200									64×96 77×80	92 92	46 46	10.4 11.5
2700					64×96	76	38	11.5	64×115	76	38	12.8
3300					64×115	60	30	14.2	64×130 77×105	60 60	30 30	15.2 15.8
3900	64×96	50	25	14.6	64×115 77×105	52 52	26 26	16.5 17.2	64×130 77×115	54 54	27 27	16.5 18.0
4700	64×115	40	20	16.9	64×130 77×115	42 42	21 21	18.1 20.8	77×143 90×105	42 42	21 21	20.8 21.8
5600	64×130 77×115	34 34	17 17	19.8 21.6	77×130 90×105	36 36	18 18	22.7 23.8	77×143 90×130	36 36	18 18	24.2 24.9
6800	77×143 90×105	28 28	14 14	25.0 26.2	77×155 90×130	30 30	15 15	26.6 27.4	90×157	30	15	29.4
8200	77×143 77×155	24 24	12 12	29.3 30.1	90×157	24	12	32.2	90×157	24	12	32.2
10000	90×157	18	9	35.7	90×157	20	10	35.7	90×171	20	10	36.9
12000	90×157	16	8	39.1								

WV(SV) / μF	500 (550)			
1500	64×96	148	74	8.6
1800	64×115	132	62	10.0
2200	64×130	102	51	11.7
2700	77×115	82	41	15.0
3300	77×130	68	34	17.5
3900	77×143	58	29	20.2
4700	90×130	48	24	21.8
5600	90×157	40	20	25.3
6800	90×171	32	16	29.0

Ripple current (A rms) at 85℃,120Hz
Typ ESR (mΩ)at 20℃,120Hz
Max.ESR (mΩ)at 20℃,120Hz
Case size Φ D×L (mm)

WL

Screw Terminal Type,Longest Useful Life Series

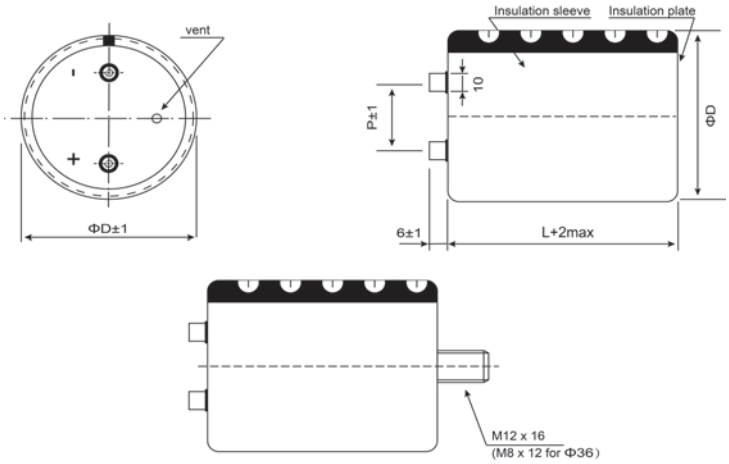
· Highest Professional Power
· Longest useful life & High Reliability
· Complied to the RoHS directive

Items	Performance characteristics			
Operating temperature range	-40 ~ +85℃			
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)			
Capacitance tolerance	±20% at 120Hz, 20℃			
Dissipation factor max. (at 120Hz, 20℃)	WV	350	400	450
	Tanδ	0.15	0.15	0.15
Low temperature characteristics (Capacitance ratio at 120Hz)	WV	350	400	450
	C-25℃ /C+20℃	≥0.7	≥0.7	≥0.7

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	>25000h	>250000h	20000h	20000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0 U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0 for 60min>24h
Applied Temperature	85℃	40℃	85℃	85℃	85℃ before measurement

DRAWING

Unit: mm



ΦD/mm	51	64	77	90	101
P/mm	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

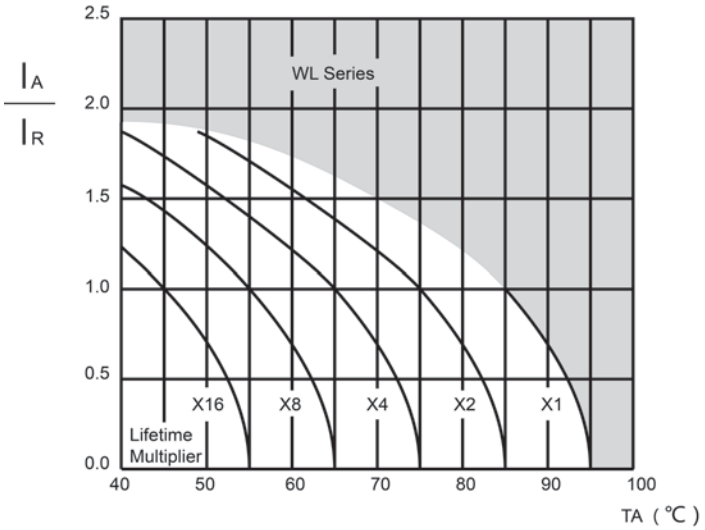
Frequency(Hz)	50/60	120	300	1k	>10k
Coefficient	0.80	1.00	1.10	1.30	1.40

Ambient Temp(℃)	40	60	85
Coefficient	1.89	1.67	1.00

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature） and by appropriate cooling measures.
It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

WL Series

Lifetime Diagram



I_A=actual ripple current at 120Hz, I_R=rated ripple current at 120Hz,85℃
Multiplier of Useful Life as a function of ambient temperature and ripple current load.

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	350 (400)				400 (450)				450 (500)			
1000	51×75	259	69	3.9	51×75	215	70	3.9	51×96	215	70	4.2
1200	51×75	215	65	4.2	51×96	179	64	4.6	51×115	179	66	5.0
1500	51×96	172	55	5.2	51×115	143	54	5.6	51×130	143	54	5.9
1800	51×96	143	43	5.7	51×130	119	43	6.4	64×96	119	44	6.3
2200	51×130	117	30	7.1	64×96	98	41	6.9	64×115	98	42	7.4
2700	64×96	96	27	7.7	64×115	80	38	8.2	64×130 77×115	80 80	40 42	8.6 8.7
3300	64×115	78	23	9.1	64×130	65	29	9.5	64×155 77×130	65 65	31 35	10.2 10.1
3900	64×130	66	19	10.4	64×155 77×115	55 55	26 28	11.1 10.4	64×195	55	28	12.3
4700	64×155 77×115	55 55	15 16	12.2 11.5	64×195 77×130	46 46	20 22	13.4 12.0	77×155	46	25	12.9
5600	64×195 77×130	46 46	13 14	14.6 13.1	64×195 77×155	39 39	19 19	14.6 14.0	77×195 90×157	38 38	22 24	15.4 14.9
6800	77×155	38	13	15.5	90×157	32	17	16.5	90×196	32	21	18.0
8200	90×157	31	11	18.1	90×157	26	15	18.1	90×196	27	18	19.8
10000	90×157	26	10	19.9	90×196	22	12	21.7	90×236	22	16	23.6
12000	90×196	22	8	23.8	90×236	18	8	25.8				
15000	90×236	17	6	28.8								

Ripple current (A rms) at 85℃ , 120Hz
Typ ESR(mΩ)at 20℃ ,120Hz
Max.ESR(mΩ)at 20℃ ,120Hz
Case size Φ D×L (mm)

WT

Screw Terminal Type, Wide Temperature Range Series

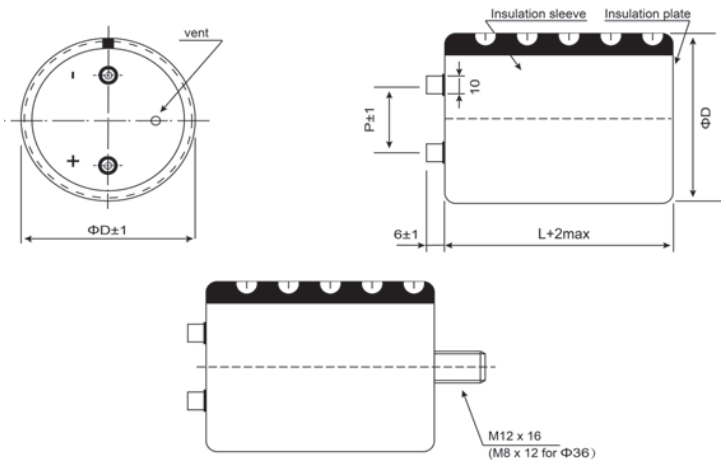
· Standard at 105℃
· Professional Inverters and Power Supplies
· Complied to the RoHS directive

Items	Performance characteristics
Operating temperature range	-40 ~ +105℃ (25V~100V); -25 ~ +105℃ (160V~450V)
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20℃
Dissipation factor max. (at 120Hz, 20℃)	Less than values shown in the standard ratings

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	>4000h	>200000h	2000h	2000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0 U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0 for 60min>24h
Applied Temperature	105℃	40℃	105℃	105℃	105℃ before measurement

DRAWING

Unit: mm



ΦD/mm	36	51	64	77	90
P/mm	12.7	22.0	28.2	31.4	31.4

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

Frequency(Hz) / Rated Voltage(V)	50/60	120	300	1k	>10k
25~100	0.95	1.00	1.04	1.10	1.15
160~250	0.90	1.00	1.08	1.15	1.20
350~450	0.80	1.00	1.18	1.35	1.40

Ambient Temp(℃)		40	55	70	85	105
Coefficient	25~100V	4.9	3.9	3.0	1.8	1.0
	160~250V	3.8	3.3	2.5	2.0	1.0
	350~450V	2.44	2.28	2.12	2.0	1.0

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature） and by appropriate cooling measures.
It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

WT Series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	25 (32)				35 (44)				50 (63)			
3300									36×53	0.20	50	2.2
4700									36×53	0.25	36	3.3
6800					36×53	0.30	25	2.6	36×83	0.25	32	3.4
10000	36×53	0.35	25	2.9	36×83	0.30	20	3.7	36×83	0.25	22	4.1
15000	36×83	0.35	20	4.2	36×83	0.30	13	4.5	36×100	0.30	14	4.9
22000	36×83	0.40	13	5.1	36×100	0.35	10	5.5	51×75	0.35	10	5.9
33000	36×100	0.40	10	6.3	51×75	0.40	7	6.7	51×115	0.40	7	7.8
47000	51×75	0.40	7	8.0	51×96	0.45	6	8.1	64×96	0.40	6	9.5
68000	51×115	0.50	6	10.0	51×115	0.50	5	10.0	64×115	0.45	5	11.6
100000	64×96	0.60	5	11.3	64×115	0.60	4	12.1	77×115	0.50	4	14.1
150000	64×115	0.80	4	12.9	77×115	0.70	3	13.8	90×131	0.50	3	18.9
220000	77×115	1.00	3	14.8	90×131	0.70	2	17.6				
330000	90×131	1.00	2	19.9								

WV(SV) / μF	63 (79)				80 (100)				100 (125)			
1000									36×53	0.15	70	1.4
1500									36×53	0.15	55	1.7
2200	36×53	0.15	70	2.1	36×53	0.15	57	2.1	36×83	0.15	38	2.5
3300	36×53	0.20	50	2.2	36×83	0.15	38	3.0	36×83	0.15	25	3.0
4700	36×83	0.20	36	3.1	36×83	0.15	27	3.6	36×100	0.15	21	3.9
6800	36×83	0.20	25	3.7	36×100	0.20	19	4.0	51×75	0.15	19	5.0
10000	36×100	0.25	20	4.4	51×75	0.20	17	5.2	51×96	0.15	13	6.5
15000	51×75	0.25	14	5.7	51×96	0.25	11	6.2	64×96	0.20	9	7.6
22000	51×96	0.30	10	6.8	64×96	0.25	8	8.2	77×96	0.20	7	9.7
33000	64×96	0.30	7	9.2	77×96	0.30	7	9.7	77×130	0.25	6	11.8
47000	64×115	0.35	6	10.9	77×115	0.30	6	12.5	90×131	0.25	5	15.0
68000	77×115	0.40	5	13.0	90×131	0.30	5	16.4				
100000	90×131	0.40	4	17.2								

WV(SV) / μF	160 (200)				200 (250)				250 (300)			
330					36×53	0.15	375	0.8	36×53	0.15	160	0.8
470	36×53	0.15	265	1.0	36×53	0.15	262	1.0	36×53	0.15	120	1
680	36×53	0.15	186	1.1	36×53	0.15	180	1.1	36×83	0.15	85	1.4
1000	36×83	0.15	125	1.7	36×83	0.15	125	1.7	36×100	0.15	55	1.9
1500	36×83	0.15	85	2.0	36×100	0.15	75	2.2	51×75	0.15	40	2.3
2200	36×100	0.15	55	2.7	51×75	0.15	50	2.8	51×96	0.15	28	3.1
3300	51×83	0.15	38	3.5	51×96	0.15	36	3.7	64×96	0.15	20	4.2
4700	51×96	0.15	35	4.4	64×96	0.15	24	4.9	64×115	0.15	15	5.4
6800	64×96	0.15	25	5.9	64×115	0.15	16	6.3	64×115	0.15	10	6.9
10000	77×96	0.15	15	7.6	77×115	0.15	12	8.1	77×155	0.15	8	9.3
15000	77×130	0.15	11	10.3	90×131	0.15	6	10.9	90×157	0.15	6	12.2
22000	90×131	0.15	6	13.2								

WV(SV) / μF	400 (450)				450 (500)			
220					36×53	0.15	415	1.1
330					36×100	0.15	277	1.5
470					51×83	0.15	195	2.1
680					51×96	0.15	135	2.7
1000	51×75	0.15	82	2.5	51×100	0.15	90	4.2
1200	51×96	0.15	70	3				
1500	51×115	0.15	49	3.6	51×130	0.15	54	5.7
1800	51×130	0.15	39	4.1				
2200	64×96	0.15	30	4.5	64×115	0.15	33	7.3
2700	64×115	0.15	22	5.3				
3300	64×130	0.15	20	6.2	77×130	0.15	22	10.1
3900	64×155 77×115	0.15 0.15	18 18	7.2 6.8				
4700	64×195 77×130	0.15 0.15	13 13	8.7 7.8	77×155	0.15	15	12.6
5600	64×195 77×155	0.15 0.15	12 12	9.6 9.2	90×157	0.15	11	15.8
6800	90×157	0.15	11	10.7				
8200	90×157	0.15	10	11.8				
10000	90×196	0.15	9	14.1				

Typ ESR(mΩ)at 20℃ ,120Hz
Ripple current (A rms) at 105℃ , 120Hz

Dissipation Factor max at 20℃ ,120Hz
Case size Φ D×L (mm)

WP

Screw Terminal Type, Long Useful Life Series

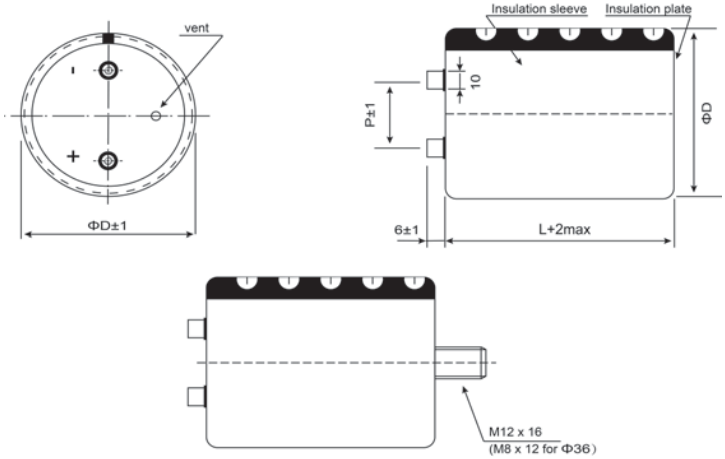
· Long Useful Life at 105℃
· Highest Professional Power
· Complied to the RoHS directive

Items	Performance characteristics			
Operating temperature range	-40 ~ +105℃			
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)			
Capacitance tolerance	±20% at 120Hz, 20℃			
Dissipation factor max. (at 120Hz, 20℃)	WV	350	400	450
	Tanδ	0.15	0.15	0.15
Low temperature characteristics (Capacitance ratio at 120Hz)	WV	350	400	450
	C-25℃ /C+20℃	≥0.7	≥0.7	≥0.7

	Useful Life		Load Life	Endurance Test	Shelf Life	
Life Time	>9000h	>200000h	5000h	5000h	1000h	
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value	
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value	
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value	
Condition:						After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0	U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0	for 60min>24h
Applied Temperature	105℃	40℃	105℃	105℃	105℃	before measurement

DRAWING

Unit: mm



ΦD/mm	51	64	77	90	101
P/mm	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

Frequency(Hz)	50/60	120	300	1k	>10k
Coefficient	0.80	1.00	1.10	1.30	1.40

Ambient Temp(℃)	40	60	85	105
Coefficient	2.44	2.16	2.00	1.00

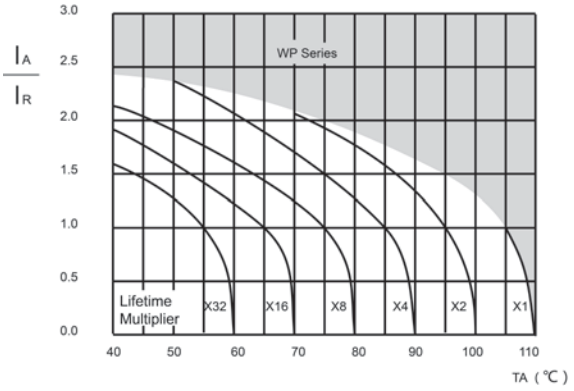
The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature） and by appropriate cooling measures.

It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

WP Series

Typical Curves

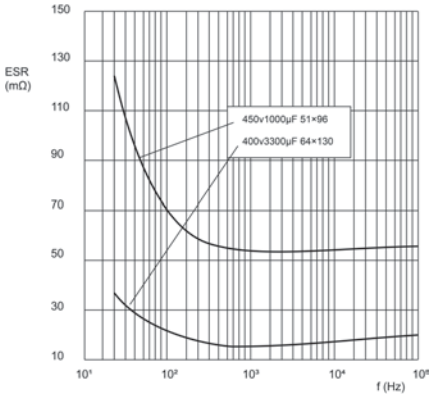
Lifetime Diagram



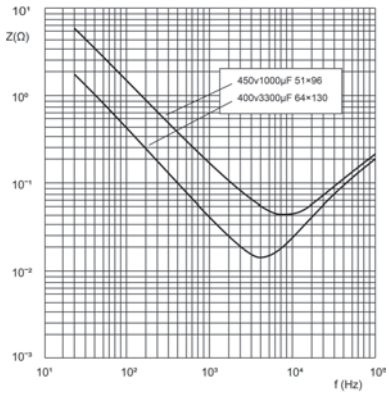
I_A=actual ripple current at 120Hz,I_R=rated ripple current at 120Hz,105℃

Multiplier of Useful Life as a function of ambient temperature and ripple current load.

ESR ~ Frequency at 20℃



Impedance Z ~ Frequency at 20℃



● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	350 (400)				400 (450)				450 (500)			
1000	51×75	259	69	3.9	51×75	215	70	3.9	51×96	215	70	4.2
1200	51×75	215	65	4.2	51×96	179	64	4.6	51×115	179	66	5.0
1500	51×96	172	55	5.2	51×115	143	54	5.6	51×130	143	54	5.9
1800	51×96	143	43	5.7	51×130	119	43	6.4	64×96	119	44	6.3
2200	51×130	117	30	7.1	64×96	98	41	6.9	64×115	98	42	7.4
2700	64×96	96	27	7.7	64×115	80	38	8.2	64×130 77×115	80 80	40 42	8.6 8.7
3300	64×115	78	23	9.1	64×130	65	29	9.5	64×155 77×130	65 65	31 35	10.2 10.1
3900	64×130	66	19	10.4	64×155 77×115	55 55	26 28	11.1 10.4	64×195	55	28	12.3
4700	64×155 77×115	55 55	15 16	12.2 11.5	64×195 77×130	46 46	20 22	13.4 12.0	77×155	46	25	12.9
5600	64×195 77×130	46 46	13 14	14.6 13.1	64×195 77×155	39 39	19 19	14.6 14.0	77×195 90×157	38 38	22 24	15.4 14.9
6800	77×155	38	13	15.5	90×157	32	17	16.5	90×196	32	21	18.0
8200	90×157	31	11	18.1	90×157	26	15	18.1	90×196	27	18	19.8
10000	90×157	26	10	19.9	90×196	22	12	21.7	90×236	22	16	23.6
12000	90×196	22	8	23.8	90×236	18	8	25.8				
15000	90×236	17	6	28.8								

Ripple current (A rms) at 105℃ , 120Hz
Typ ESR(mΩ)at 20℃ ,120Hz
Max.ESR(mΩ)at 20℃ ,120Hz
Case size Φ D×L (mm)

WR

Screw Terminal Type, Higher Current,Long Life Series

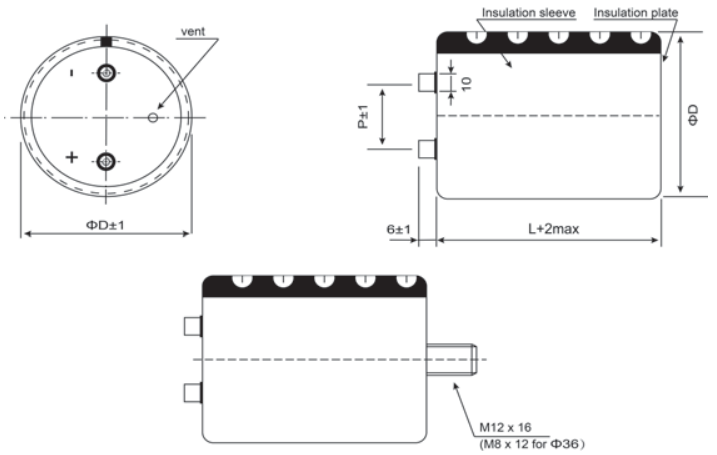
· Long Useful Life at 105℃
· Higher current and High Reliability
· Highest Professional Power
· Complied to the RoHS directive

Items	Performance characteristics			
Operating temperature range	-40 ~ +105℃			
Leakage current max.	I=0.01CV or 5mA whichever is smaller (after 5 minutes)			
Capacitance tolerance	±20% at 120Hz, 20℃			
Dissipation factor max. (at 120Hz, 20℃)	WV	350	400	450
	Tanδ	0.15	0.15	0.15
Low temperature characteristics (Capacitance ratio at 120Hz)	WV	350	400	450
	C-25℃ /C+20℃	≥0.7	≥0.7	≥0.7

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	>9000h	>200000h	5000h	5000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					After test
Applied Voltage	U_R	U_R	U_R	U_R	U_R=0 U_R to be applied
Applied Current	I_R	1.2×I_R	I_R	I_R=0	I_R=0 for 60min>24h
Applied Temperature	105℃	40℃	105℃	105℃	105℃ before measurement

DRAWING

Unit: mm



ΦD/mm	51	64	77	90	101
P/mm	22.0	28.2	31.4	31.4	41.5

*Hex head screw M5×10 and M6×12 are standard screws.
Longer screws are available on request.
*Max tightening torque for screw terminanl M5:3Nm,M6:4Nm.
Max troque for bolt mounting M12:12.5Nm.
*Screws, Bracket and cap nut will be delivered separately if necessary.

Ripple Current Coefficient

Frequency(Hz)	50/60	120	300	1k	>10k
Coefficient	0.80	1.00	1.10	1.30	1.40

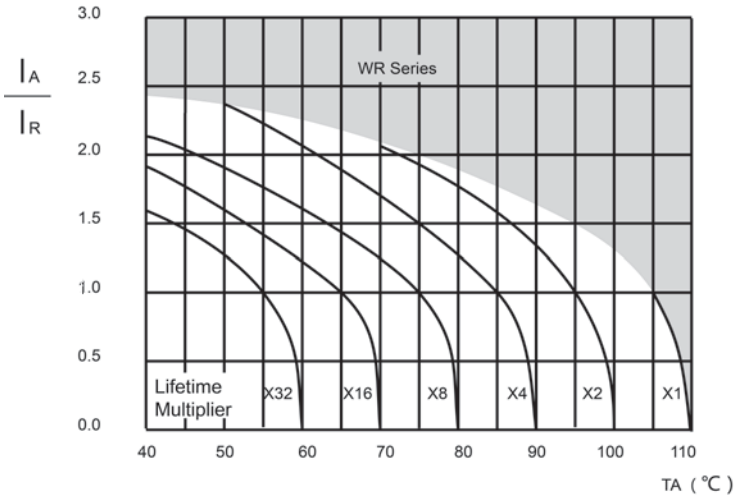
Ambient Temp(℃)	40	60	85	105
Coefficient	2.44	2.16	2.00	1.00

The useful life can be prolonged by operating capacitor at loads below the rated values (e.g.lower operating voltage, Rms ripple current or ambient temperature） and by appropriate cooling measures.

It is advisable not to apply a ripple current exeeding the rated ripple current without any cooling measures as this will shorten capacitor's life.

WR Series

Lifetime Diagram



I_A=actual ripple current at 120Hz, I_R=rated ripple current at 120Hz,105℃
Multiplier of Useful Life as a function of ambient temperature and ripple current load.

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV(SV) / μF	350 (400)				400 (450)				450 (500)			
2200									64×115	69	38	11.8
2700					64×115	56	28	13.1	64×130 77×115	56 56	31 31	13.7 14.5
3300	64×115	55	23	14.4	64×130	46	23	15.2	64×155 77×130	46 46	23 25	16.5 16.9
3900	64×130	46	19	16.6	64×155 77×115	39 39	21 21	17.9 18.2				
4700	64×155 77×115	39 39	17 17	19.8 19.1	77×130	32	17	20.1	77×155	32	18	21.7
5600	77×130	32	14	21.9	77×155	27	15	23.8	77×195 90×157	27 27	16 16	26.4 24.2
6800	77×155	27	12	26.2	90×157	22	13	26.7	90×196	22	14	29.5
8200	90×157	22	11	29.3	90×157	18	11	29.3	90×196	19	12	32.4
10000	90×157	18	10	32.3	90×196	15	9	35.6				
12000	90×196	15	8	39.0								

Ripple current (A rms) at 105℃ , 120Hz
Typ ESR(mΩ)at 20℃ ,120Hz
Max.ESR(mΩ)at 20℃ ,120Hz
Case size Φ D×L (mm)

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