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Caution for safety:
安全注意事項:


- To use Fujicon product correctly and safety, please read "General Information for Application" very carefully.
- The products are designed and manufactured chiefly for general electronic appliances. In case that you are going to apply them for medical equipment, aircraft, space equipment, or the same kind that requires high safety, you are required to confirm application through your own testing and own judgment.
- All design and specifications in this catalogue are for reference only. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.
- 為了正確安全地使用產品，請在使用前仔細閱讀“鋁電解電容器使用注意事項”；
- 本產品目錄中所登載的產品是為一般電子設備用而設計和製造的，如果要用於醫療設備、宇航設備等需要高度安全性的設備，必須事先對適合性做充分的測試；
- 本產品目錄中所提供的設計及特性參數僅供參考。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

SERIES TABLE 產品系列表

■ Chip Type Aluminum Electrolytic Capacitors 貼片式鋁電解電容器

Type 類型	Series 系列	Features 特性	Standard Type 標準型	Miniature 超小型	Low Impedance 低阻抗	Long Life 長壽命	Operating Temperature Range (°C) 使用溫度範圍	Rate Voltage Range (V.D.C.) 額定工作電壓範圍	Capacitance Range (μF) 靜電容量範圍	Load Life (Hours) 負荷壽命(小時)
Surface Mount Type 貼片式	General Purpose 普通型	CS	Standard 標準品	●			-40 ~ +85	4 ~ 100	0.1 ~ 6800	2000
		CK	Standard, wide temperature range 寬溫標準品	●			-40 ~ +105	4 ~ 100	0.1 ~ 6800	1000 ~ 2000
	Low Leakage Current 低漏電流型	SC	Low leakage current 低漏電流品	●			-40 ~ +85	6.3 ~ 50	0.1 ~ 220	2000
	Non-polarized 無極性型	CN	Bi-polarized 雙極性品	●			-40 ~ +85	6.3 ~ 50	0.1 ~ 100	1000
		KP	Bi-polarized, wide temperature range 雙極性寬溫品	●			-55 ~ +105	6.3 ~ 50	0.1 ~ 47	1000
	Low Impedance 低阻抗型	LZ	Low impedance 低阻抗品		●		-55 ~ +105	6.3 ~ 50	1 ~ 4700	1000 ~ 2000
		KZ	Extra low impedance 極低阻抗品		●		-55 ~ +105	6.3 ~ 50	4.7 ~ 4700	1000 ~ 3000
	Long Life 長壽命型	FZ	Long life, extra low impedance 長壽命, 極低阻抗品		●	●	-55 ~ +105	6.3 ~ 100	3.3 ~ 4700	2000 ~ 5000
		EL	Long life assurance 寬溫長壽命品			●	-55 ~ +105	6.3 ~ 50	0.1 ~ 3300	2000 ~ 3000
		KL	5000 hours load life 5000小時長壽命品			●	-55 ~ +105	6.3 ~ 100	0.1 ~ 3300	3000 ~ 5000
	High Reliability 高可靠型	KH	High reliability 高可靠品			●	-40 ~ +125	10 ~ 450	3.3 ~ 2200	1000 ~ 5000
	High Voltage 高壓型	HU	Mid-to-high voltage 中高壓品			●	-40 ~ +105	160 ~ 450	3.3 ~ 47	5000

■ Radial Lead Type Aluminum Electrolytic Capacitors 引線式鋁電解電容器

Radial Lead Type 引線式	General Purpose 普通型	RA	For general purpose, standard size 標準品	●			-40 ~ +85	6.3 ~ 100	0.1 ~ 22000	2000
							-25 ~ +85	160 ~ 450	0.47 ~ 680	
		RK	Standard size, wide temperature range 寬溫標準品	●			-40 ~ +105	6.3 ~ 100	0.47 ~ 15000	1000 ~ 2000
							-25 ~ +105	160 ~ 450	0.47 ~ 330	
		RE	Standard size, wide temperature range 寬溫標準品	●			-40 ~ +105	6.3 ~ 100	0.47 ~ 1000	2000
							-25 ~ +105	160 ~ 450	0.47 ~ 6.8	
	Low Leakage Current 低漏電流型	RM	Height 7(9)mm, wide temperature range 7(9)mm高, 寬溫品	●			-40 ~ +105	4 ~ 63	0.1 ~ 1000	1000
		RS	Height 5mm, wide temperature range 5mm高, 寬溫品	●			-40 ~ +105	4 ~ 63	0.1 ~ 470	1000
	Low Leakage Current 低漏電流型	LA	Low leakage current, standard size 低漏電流標準品	●			-40 ~ +85	10 ~ 100	1 ~ 4700	2000
		LK	Low leakage current, standard size, wide temperature range 低漏電流寬溫品	●			-40 ~ +105	10 ~ 50	0.1 ~ 330	1000

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SERIES TABLE 產品系列表

■ Radial Lead Type Aluminum Electrolytic Capacitors 引線式鋁電解電容器

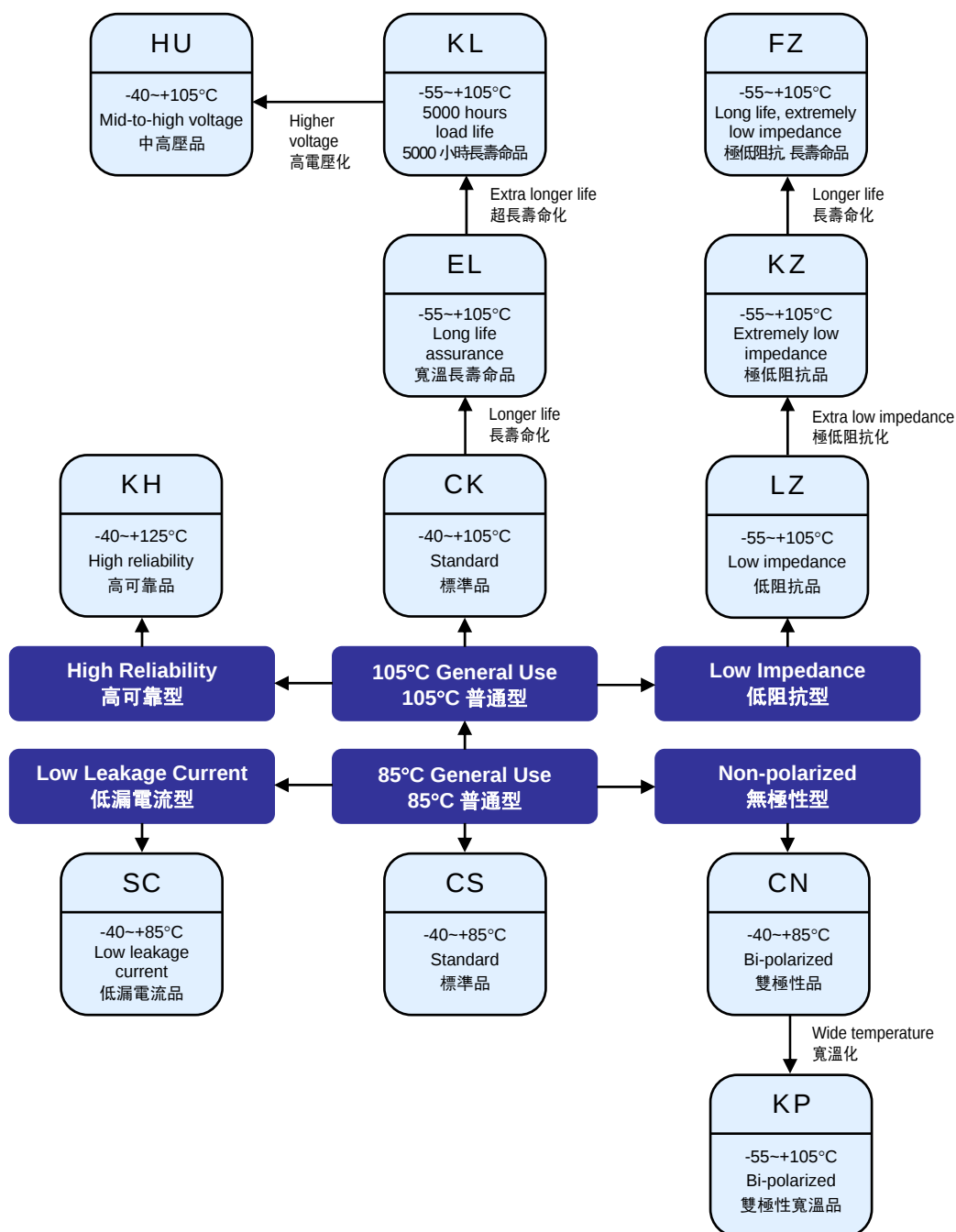
Type 類型	Series 系列	Features 特性	Standard Type 標準型	Miniature 超小型	Low Impedance 低阻抗	Long Life 長壽命	Operating Temperature Range (°C) 使用溫度範圍	Rate Voltage Range (V.D.C.) 額定工作電壓範圍	Capacitance Range (μF) 靜電容量範圍	Load Life (Hours) 負荷壽命(小時)
Radial Lead Type 引線式	Low Leakage Current 低漏電流型	LM	Low leakage current, height 7mm 7mm高, 低漏電流品	●			-40 ~ +105	6.3 ~ 63	0.1 ~ 220	1000
		LS	Low leakage current, height 5mm 5mm高, 低漏電流品	●			-40 ~ +105	4 ~ 50	0.1 ~ 100	1000
	Non-polarized 無極性型	NP	Non-polarized, standard size 無極性標準品	●			-40 ~ +85	6.3 ~ 250	0.47 ~ 10000	2000
		NK	Non-polarized, standard size, wide temperature range 無極性寬溫標準品	●			-40 ~ +105	6.3 ~ 100	0.1 ~ 10000	1000
		NM	Non-polarized, height 7mm 7mm高, 無極性品	●			-40 ~ +105	6.3 ~ 63	0.1 ~ 220	1000
		NS	Non-polarized, height 5mm 5mm高, 無極性品	●			-40 ~ +105	6.3 ~ 50	0.1 ~ 47	1000
		BP	For horizontal deflection correction, bi-polarized 水平垂直偏轉校正用, 雙極性品	●			-40 ~ +85	25 ~ 50	2.2 ~ 10	1000
		BH	For horizontal deflection correction, bi-polarized, wide temperature range 水平垂直偏轉校正用, 雙極性寬溫品	●			-40 ~ +105	25 ~ 50	2.2 ~ 10	1000
	Low Impedance 低阻抗型	TM	Low impedance, standard 低阻抗標準品	●	●		-40 ~ +105	6.3 ~ 100	1 ~ 15000	2000
		TN	Extremely low impedance, high reliability 極低阻抗, 高可靠品		●	●	-40 ~ +105	6.3 ~ 63	1 ~ 15000	2000 ~ 5000
		TZ	Extremely low impedance, high reliability 極低阻抗, 高可靠品		●	●	-40 ~ +105 -25 ~ +105	6.3 ~ 100 160 ~ 450	0.22 ~ 15000 3.3 ~ 330	2000 ~ 5000
		NEW TL	Extremely low impedance, long life 極低阻抗, 長壽命品		●	●	-40 ~ +105	6.3 ~ 63	0.47 ~ 18000	4000 ~ 10000
		TW	High temperature range for 125°C use 125°C高溫品	●			-55 ~ +125	10 ~ 50	0.47 ~ 470	2000
							-40 ~ +125	63 ~ 250	0.47 ~ 100	
	High Reliability 高可靠型	TY	High frequency, high ripple current, low impedance, long life 高频, 高紋波, 低阻抗長壽命品		●	●	-40 ~ +105	6.3 ~ 50	47 ~ 18000	2000 ~ 7000
		TB	High ripple current, for ballast 高紋波, 鎮流器專用品			●	-22 ~ +105	160 ~ 450	1 ~ 22	2000 ~ 5000
		NEW TX	High ripple current, long life assurance 高紋波, 長壽命品			●	-25 ~ +105	160 ~ 450	2.2 ~ 330	8000 ~ 10000
		NEW PL	High ripple current, for SMPS 高紋波, 開關式電源專用品			●	-25 ~ +105	400	33 ~ 150	5000
							-40 ~ +105	450	33 ~ 150	
	Special Used 特別用途型	RF	For photo flash 閃光燈專用品	●			-22 ~ +55	330	50 ~ 240	5000 (times 次)

■ Snap-in Type Aluminum Electrolytic Capacitors 導箔式鋁電解電容器

Snap-in Type 導箔式	General Purpose 普通型	SM	Snap-in terminal, standard 導箔型標準品	●			-40 ~ +85	6.3 ~ 350	68 ~ 10000	2000
							-25 ~ +85	400 ~ 450	56 ~ 820	
		SK	Snap-in terminal, wide temperature range 導箔型寬溫品	●			-40 ~ +105	6.3 ~ 400	56 ~ 68000	2000
							-25 ~ +105	450	47 ~ 470	

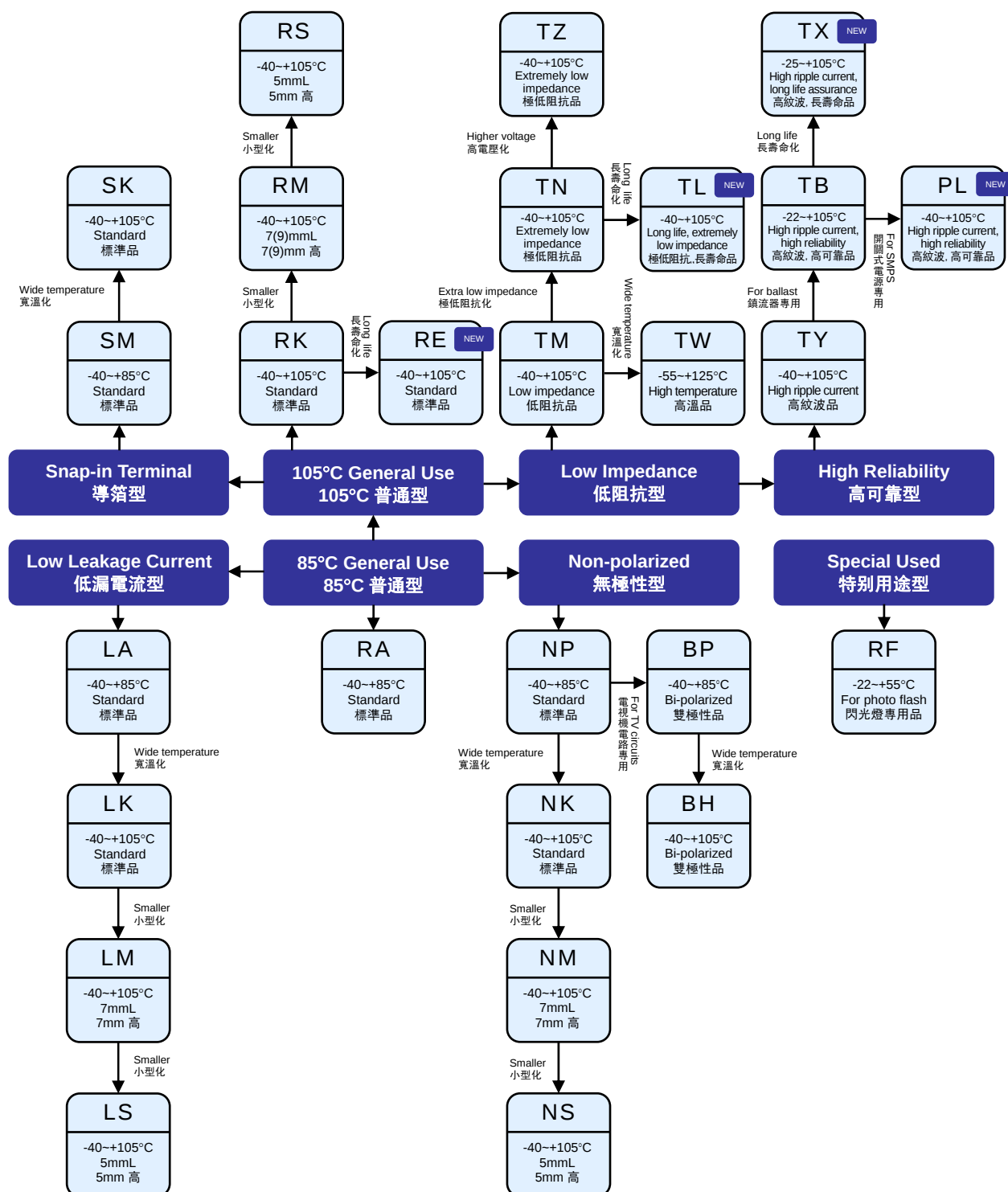
SERIES CHART 產品體系圖

■ Chip Type Aluminum Electrolytic Capacitors 貼片式鋁電解電容器



SERIES CHART 產品體系圖

■ Radial Lead and Snap-in Type Aluminum Electrolytic Capacitors 引線式及導箔式鋁電解電容器



PROPOSAL ON DELETION OF OLD SERIES FROM CATALOGUE

舊系列產品從產品目錄中刪除的建議

The Licon brand series listed below have been removed from the catalogue.

On designing, please select from the new series and new brand for your applications.

以下的 Licon 品牌系列產品現已從產品目錄中刪除。當您在進行新的設計時，請選用新的系列和新的品牌產品。

Type 類型	Features 特性	Discontinued Series 停止使用系列	New Series 新系列
Chip Type 貼片式	Standard 標準品	LCS	CS
	Standard, wide temperature range 寬溫標準品	LCK	CK
Radial Lead Type 引線式	For general purpose, 85°C, standard size 標準品	LRA	RA
	Height 7(9)mm, 85°C 7(9)mm高, 85°C	---	RN (discontinued 停止供應) → RM
	Height 5mm, 85°C 5mm高, 85°C	---	RT (discontinued 停止供應) → RS
	Standard size, wide temperature range 寬溫標準品	LRK	RK
	Height 7(9)mm, wide temperature range 7(9)mm高, 寬溫品	LRM	RM
	Height 5mm, wide temperature range 5mm高, 寬溫品	LRS	RS
	Low leakage current, standard size 低漏電標準品	LLA	LA
	Low leakage current, standard size, wide temperature range 低漏電寬溫品	LLK	LK
	Low leakage current, height 7mm 7mm高, 低漏電品	LLM	LM
	Low leakage current, height 5mm 5mm高, 低漏電品	LLS	LS
	Non-polarized, standard size 無極性標準品	LNP	NP
	Non-polarized, standard size, wide temperature range 無極性寬溫標準品	LNK	NK
	Non-polarized, height 7mm 7mm高, 無極性品	LNM	NM
	Non-polarized, height 5mm 5mm高, 無極性品	LNS	NS
	For horizontal deflection correction, bi-polarized 水平垂直偏轉校正用, 雙極性品	LBP	BP
	Low impedance, standard 低阻抗標準品	LTM	TM
	Extremely low impedance, high reliability 極低阻抗, 高可靠品	LTN	TN
	High temperature range for 125°C use 125°C高溫品	LTW	TW
	For photo flash 閃光燈品	LRF	RF
Snap-in Terminal Type 導箔式	Snap-in terminal, standard 導箔型標準品	LSM	SM
	Snap-in terminal, wide temperature range 導箔型寬溫品	LSK	SK

- It is greatly appreciated that you would understand and accept the proposal stated in above.
- Please contact our sales office for details information.
- 對於以上的建議，請貴公司予以諒解。
- 請向我們的銷售部門諮詢詳情。



GENERAL INFORMATION FOR APPLICATION

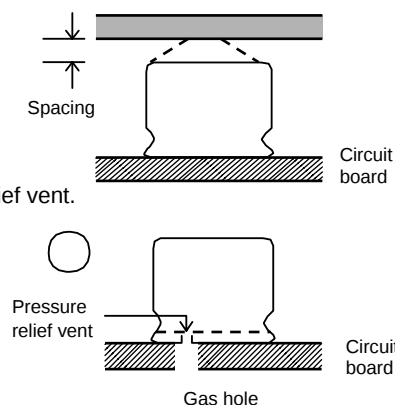
The following precautions must be observed when using electrolytic capacitors.

1. Circuit Design

- 1) Please make sure that the environmental and mounting conditions to which the capacitor to be exposed are within the conditions specified in this catalogue.
- 2) Operating temperature and applied ripple must be within the specifications.
 - 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 non-polarized capacitors for a circuit that can possibly see reserved polarity.
Note: Even non-polarizes capacitors cannot 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.
For appropriate choice of capacitors for circuit that repeat rapid charging/discharging, please consult us.
- 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, should not exceed the rated voltage.
 - ② In the case where more than two aluminum electrolytic capacitors are used in series, please make sure that applied voltage should be lower than rated voltage should be applied to each capacitor equally using a balancing resistor in parallel with the capacitor.
- 7) Outer sleeve of the capacitor is not guarantee as an electrical insulator. Do not use standard sleeve on a capacitor in applications that require electrical insulation. When the application requires special insulation, please contact our sales office for details.
- 8) 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 with 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 radiation.
 - (f) Being exposed to acidic or alkaline solutions.
 - ② Severe vibration and physical shock conditions that exceed our specification.
Vibration test condition:
 Vibration frequency range: 10~55~10Hz
 Sweep rate: 10~55~10Hz per minute
 Sweep method: logarithmic
 Amplitude or acceleration: 1.5mm (maximum acceleration is 10G)
 Direction of vibration: X, Y, Z direction
 Testing time: 2 hours per each direction
 Shock is not applicable normally.
 If a particular condition is required, please contact our sales office.
- 9) When designing a circuit 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 safety vent.
 - ③ Unless otherwise specified, following clearance should be made above the pressure relief vent.

Case Diameter	Clearance Required
Ø6.3 to 16	2mm or more
Ø18 to 35	3mm or more
Ø40 or more	5mm or more

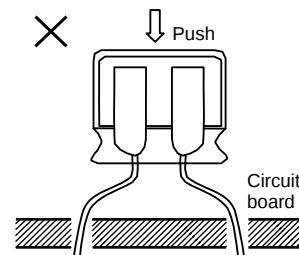
 - ④ In case the vent side is placed toward P.C. board (such as end seal vented parts), make a corresponding hole on the P.C. board to release the gas when vent is operated. The hole should be made to match the capacitor vent position.
- 10) The main chemical solution of the electrolyte and the separator paper in the capacitor are combustible. The electrolyte is conductive. When it comes in contact with the P.C. board, there is a possibility of pattern or short circuit between the circuit pattern, which could result in smoking or fire. Do not locate any circuit pattern beneath the capacitor end seal.
- 11) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reserve side of P.C. board (under the capacitor).



- 12) Please refer to the recommended land size in this catalogue when you design in surface mount capacitors.
- 13) Electrical characteristics may vary depending on changes in temperature and frequency. Please consider the variation when you design circuits.
- 14) When you install more than 2 capacitors in parallel, consider the balance of current following in to the capacitor.
- 15) While mounting capacitors on double side P.C. board, the capacitors should be away from those unnecessary base plate holes and connection holes.

2. Mounting

- 1) Once a capacitor has been assembled in the set and power applied, do not attempt to re-use the capacitor in other circuits or application.
- 2) Electric potential between positive and negative terminal may exist as a result of returned electromotive force, so please discharge the capacitor using 1KΩ resistor.
- 3) Leakage current of the parts that have stored for more than 2 years may increase. When leakage current has increased, please perform a voltage treatment using a 1KΩ resistor.
- 4) Please confirm rating and polarity before installing capacitor on the P.C. board.
- 5) Do not drop the capacitors on the floor, nor use a capacitors that was dropped.
- 6) Be careful not to deform the capacitor during installation.
- 7) Please confirm that the lead spacing of the capacitor matches the pad spacing of the P.C. board prior to installation.
- 8) Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine.
- 9) Please pay attention to the mechanical shock to the capacitor by suction nozzle of the automatic insertion machine or automatic mounted, or by product checker, or by centering mechanism.
- 10) Hand soldering:
 - ① Soldering condition shall be confirmed to be within the specifications.
 - 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.
- 11) Flow soldering (wave solder):
 - ① Aluminum capacitor body must not be submerged into the solder bath.
 - ② Soldering condition must be confirmed to be within specification.
 - ③ Please avoid having flux adhere to any portion except the terminal.
 - ④ Please avoid contact between other components and the aluminum capacitor.
- 12) Reflow soldering (SMD only):
 - ① Please follow "Reflow Soldering Conditions" in this catalogue.
 - 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 and size of the capacitor.
- 13) Do not tilt lay down or twist the capacitor body after the capacitor are soldered to the P.C. board.
- 14) Do not carry the P.C. board by grasping the soldered capacitor.
- 15) Please do not allow anytime to touch the capacitor after soldering. If P.C. board are stored in stack, please make sure P.C. board or the other components do not touch the capacitor. The capacitors shall not be effected by any radiated heat from the soldered P.C. board or other components after soldering.
- 16) Cleaning
 - ① Do not clean capacitors with halogenated cleaning agent. However, if it is necessary to clean with halogenated cleaning agent, please contact our sales office.
 - ② Recommended cleaning method:
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, Techno Care FRW14~17, Sanelek B-12
Surfactant type: cleaning through 750H/750L/710M
Alkaline saponification agent: Aqua Cleaner 210SEP
Cleaning conditions:
Total cleaning time shall be within 5 minutes by immersion, ultrasonic or other method. Temperature of the cleaning agent shall be 60°C or lower. After cleaning, capacitors should be dried using hot air for minimum of 10 minutes along with the P.C. board. Hot air temperature should be below the maximum operating temperature of the capacitor. Insufficient dry after water rinse may cause appearance problems, sleeve shirk, bottom- plate bulge and such.
 - ③ Avoid using ozone destructive substance for cleaning agents to concern about global environment.
- 17) 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 P.C. board.
 - ③ Please dry the cleaning agent on the P.C. 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.

18) Other

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 terminal by 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 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.
 - ⑦ Since shrinkage, bulging and/or crack could be seen on outer sleeve of capacitor when capacitors are used in atmosphere where condensation of moisture occurs, please confirm their adaptation before the use. The condensation of moisture could occur when temperature cycling test/rapid change of temperature test is performed, in this case, aforementioned sleeve problem could be seen.

4. Maintenance and Inspection

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 etc., which are specified in this catalogue.

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 draw your face to the safety vent since gas over 100°C will be emitted when the safety vent operates. If the gas has entered your eyes, please flush your eyes immediately in pure water. If you breathed the gas immediately wash out your mouth and throat with water.
- 3) Do not ingest electrolyte. If your skin is exposed to electrolyte, please wash it away using soap and water.

6. Storage

- 1) Do not keep capacitor in high temperature and high humidity.
Storage conditions should be:
Temperature: +5°C ~ +35°C
Humidity: Lower than 75%
Place: Indoor
- 2) Avoid ambient conditions where capacitors can be covered with water, brine or oil.
- 3) Avoid ambient conditions where capacitors are exposed to poisonous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium etc.
- 4) Do not keep capacitor in conditions that expose the capacitor to ozone, ultraviolet ray or radiation.
- 5) Store capacitors in a packed condition as much as possible.
- 6) In order to maintain a good solderability of the parts, shelf life of parts should not exceed 1 year.

7. Disposal

- 1) Please dispose capacitors in either of the following ways:
 - ① Incinerate (at a temperature of 800°C or higher) capacitors after crushing parts or making a hole on the capacitor body.
 - 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.

8. Others

- 1) Fujicon's products meet or exceed quality standards specified by JIS-C-5141 and with the reliability requirements refer to JIS-C-5102.
- 2) None of ozone depleting chemicals (ODC) under the Montreal Protocol is used in our manufacturing process.



鋁電解電容器使用注意事項

使用鋁電解電容器需留意事項：

1. 電路設計

- 1) 確保電容器使用和安裝條件在本產品目錄的規定範圍內。
- 2) 工作溫度和施加的紋波電流應在本產品目錄的規定範圍內。
 - ① 不可在超出最高使用溫度的溫度下使用。
 - ② 不可接通超過最大允許的額定紋波電流。
- 3) 在設計電路時，應選擇符合壽命要求的產品。
- 4) 鋁電解電容器分正負極，不應加反向電壓或交流電壓。對可能出現反向電壓的電路，應選擇無極性電容器。注意：即使無極性電容器，也不能直接用於交流電路。
- 5) 對需要快速充放電的電路，請選用與使用條件相符的鋁電解電容器。作為快速充放電電路的產品有電焊機、相機閃光燈等。對於選擇使用於快速充放電電路的鋁電解電容器，可以向我們諮詢。
- 6) 請確認不要有超載電壓（超過額定電壓的電壓）通過電容器。
 - ① 直流電壓和紋波電流疊加後的峰值電壓不應超過額定工作電壓。
 - ② 若兩個以上電容器串聯，應確保施加電壓低於額定值，而且要並聯一個平衡電阻，以使每個電容器所加電壓相等。
- 7) 電容器的膠管不能保證絕緣，不能將電容器上的膠管當絕緣用途。若有絕緣要求，請與我們銷售部門聯繫。
- 8) 如果在以下環境中使用，可能會導致電容器故障：
 - ① 周圍環境（耐氣候性）條件
 - (a) 直與水接觸、高溫高濕或結露的環境；
 - (b) 直與油接觸或充滿油霧的環境。
 - (c) 直接與鹽水接觸或充滿鹽分的環境。
 - (d) 充滿有毒氣體（如硫化氫、亞硫酸、氯氣、溴氣、溴甲烷、氨氣等）的環境。
 - (e) 置於日照、臭氣、紫外線或放射線照射的環境。
 - (f) 直接與酸性或鹼性溶劑接觸的環境。
 - ② 嚴重的振動及機械衝擊超過本產品目錄的規定範圍。

振動的測試條件如下：

振動頻率範圍：10~55~10Hz

振動環境頻率：10~55~10Hz/分鐘

振動迴圈頻率：對數

振幅或加速度：1.5mm（最大加速度為 10G）

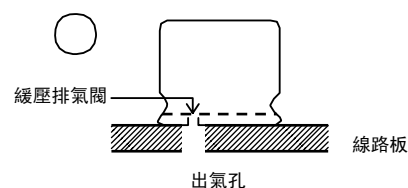
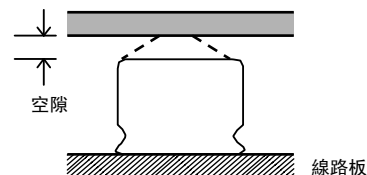
振動方向：X, Y, Z 方向

測試時間：每個方向 2 小時

衝擊一般不適用。

如有特殊要求，請與我們銷售部門聯繫。
- 9) 設計線路板時，應注意下列事項：
 - ① 確保 PC 板上的焊點間距與電容器引線間距相符。
 - ② 電容器的防爆閥上端儘量避免配線及安裝其他元件。
 - ③ 除非另有說明，電容器的防爆閥上端應留有如下的間距：

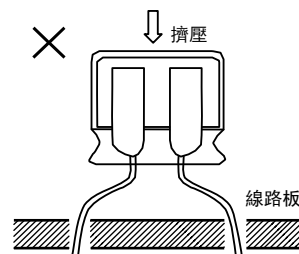
鋁殼直徑	留出空隙
Ø6.3 ~ 16	2mm 或以上
Ø18 ~ 35	3mm 或以上
Ø40 或以上	5mm 或以上
 - ④ 當排氣閥對著 PC 板時（如膠蓋的排氣閥），應在 PC 板上與電容器排氣閥相對應的位置開一小孔，以釋放當排氣閥打開之後所流出的氣體。
- 10) 電解液主要化學溶劑及電解紙為易燃物，且電解液導電。當電解液與 PC 板接觸時，可能會腐蝕 PC 板上的電路，或造成短路，以致生煙或着火。因此在電容器封口下端不應有任何的線路。
- 11) 設計線路板向背應確保發熱元器件不靠近鋁電解電容器或 PC 板的另一面（電容器下端）。
- 12) 當使用貼片式電容器進行設計時，請參考本產品目錄中的推薦安裝尺寸。



- 13) 設計線路板時應考慮到電性能隨溫度和頻率變化而變化。
- 14) 當兩個以上電容器並聯時，應考慮到通過這些電容器的電流平衡。
- 15) 在雙面線路板上安裝電容器時，電容器的安裝位置應避開多餘的基板孔和過孔。

2. 安裝

- 1) 一旦電容器經過安裝及加載，不要再試圖用於其他線路板或其他用途。
- 2) 當電容器產生再生電壓時，需通過 1KΩ 左右的電阻進行放電。
- 3) 對儲存較長時間（超過 2 年）的電容器，其漏電流可能會增大。若漏電流增大，請使用 1KΩ 左右的電阻做充電處理。
- 4) 將電容器安裝在 PC 板上之前，請確認其規格（靜電容量及額定電壓等）與極性。
- 5) 請不要將電容器掉在地上，或不要使用掉在地上的電容器。
- 6) 安裝時請不要損傷電容器。
- 7) 安裝前，請確認電容器引線與 PC 板上的孔距相吻合。
- 8) 請留意自動插入機的機械手力量不宜過大。
- 9) 請確認貼片機的吸頭、產品檢測夾具或對中裝置對電容器的機械衝擊。
- 10) 手工焊接：
 - ① 焊接條件（溫度、時間）不可超過規格書所規定的範圍。
 - ② 如果因引線間距和線路板的孔距不一致而需要對引線加工時，在焊接前不可使用過大的力度來扭動電容器的引線。
 - ③ 如果要卸下焊接好的電容器，請將焊劑充分溶化後再拆卸，以免電容器的端子受到拉力。
 - ④ 請勿將烙鐵接觸到電容器的本體。



- 11) 波峰焊：
 - ① 不要將電容器本身浸入到焊錫溶液中。
 - ② 焊接條件（溫度、時間、次數）必須按規定說明執行。
 - ③ 注意不要將焊錫附著在端子以外。
 - ④ 焊接時，不要讓其他產品倒下碰到電容器上。
- 12) 回流焊（只適用於表面貼裝）：
 - ① 請遵守本產品目錄中的“回流焊條件”。
 - ② 當使用紅外線加熱時，請注意加熱程度，因為紅外線吸收率會隨著電容器顏色和大小的不同而改變。
- 13) 電容器焊接在 PC 板後，不要傾斜或扭動電容器。
- 14) 不要抓住焊接後的電容器搬動 PC 板。
- 15) 請在焊接後不要讓任何物品與電容器接觸。如 PC 板堆放儲存，請確保 PC 板或其他零部件不與電容器接觸。焊接後的電容器不應受到任何已焊接 PC 板或其他零件熱輻射的影響。
- 16) 清洗
 - ① 不要用鹵化物清洗劑清洗電容器。
 - ② 推薦清洗方法：

使用範圍：任何類型及規格

清洗劑：

乙醇類清洗劑：Isopropyl Alcohol（異丙醇）

水性清洗劑：

高級乙醇類：Pine Alpha ST-100S, Techno Care FRW14~17, Sanelek B-12

介面活性劑類：cleaning through 750H/750L/710M

鹼性皂化類：Aqua Cleaner 210SEP

清洗方法：浸泡、超聲波或其他方法的總清洗時間應在 5 分鐘內。清洗劑溫度應在 60°C 或以下。清洗後，應將電容器與板一起用熱風吹至少 10 分鐘至吹乾。熱風溫度應低於電容器工作溫度。水洗後若不充分吹乾，可能導致外觀不良，如膠管收縮、座板凸起等。
 - ③ 避免使用破壞臭氧層的清洗劑以保護環境。
- 17) 固定劑、塗層劑
 - ① 請勿使用任何含有鹵素的固定劑或塗層劑。
 - ② 線路板和電容器封口膠之間，不可留有焊劑殘渣及污垢。
 - ③ 在使用固定劑或塗層劑之前，盡可能不殘留洗淨成份，進行乾燥處理，使印刷孔不堵塞。
 - ④ 在使用固定劑或塗層劑時，請勿將之塗滿整個電容器的封口膠部分。

固定劑和塗層劑的種類很多，為避免發生問題，可向相關材料廠家或聯繫我們的銷售部門諮詢詳情。
- 18) 薰蒸處理

作為出口時的防蟲措施，有時會使用鹵化物（如甲基溴）進行薰蒸處理。將鋁電解電容器及裝配有鋁電解電容器的電子產品直接薰蒸或將進行薰蒸處理的木材用於托架時，由於薰蒸劑中含有鹵素，可能會導致電容器的內部引起腐蝕反應。

3. 安裝後

- 1) 不要直接用手接觸電容器正負極。
- 2) 不要在正負極之間用導體短接，也不要將電容器上或附近濺撒導電液體，如酸鹼溶液等。
- 3) 請確認所安裝的電容器不要處於以下環境：
 - ① 直接與水接觸、高溫高濕或易結露的環境。
 - ② 直接與油接觸及充滿油霧的環境。
 - ③ 直接與鹽水接觸、高溫高濕或易結露的環境。
 - ④ 充滿鹽酸有機氣體（如硫化氫及亞硫酸、亞硝酸、氯氣、溴氣、溴甲烷等）的環境。
 - ⑤ 充滿有毒的鹼性氣體（如氨氣等）的環境。
 - ⑥ 直接與酸性或鹼性接觸的環境。
 - ⑦ 結露環境有可能導致膠管發生收縮、膨脹、破裂，因此在使用時請充分進行確認。此外，因溫度劇烈變化，高溫高濕試驗等而結露時，也可能會導致同樣的膠管異常。

4. 維護和檢驗

請定期檢驗安裝在工業設備上的電容器，檢驗項目如下：

- 1) 外觀：明顯缺陷，如防爆閥裂開、漏液等。
- 2) 電性能：電容量、損耗角正切、漏電流等，具體請參閱本產品目錄中的詳細規格資料。

5. 緊急情況

- 1) 如看到防爆閥開啟冒煙，要立即關掉總開關或拔掉插頭。
- 2) 不要將臉朝向防爆閥，因當防爆閥開啟時，將有超過 100°C 的氣體泄出。若氣體進入眼中，應立即用清水沖洗眼睛。若吸入氣體，應立即用水清洗口腔和喉嚨。
- 3) 不要吞食電解液。若皮膚沾上電解液，請用肥皂和水清洗乾淨。

6. 儲存

- 1) 不要將電容器儲存在高溫和高濕度的地方。儲存環境應為：
溫度：+5°C ~ +35°C
相對濕度：低於 75%
儲存場所：室內
- 2) 避免儲存在有水、鹽水或油的環境中。
- 3) 避免儲存在有毒氣體（如硫化氫、亞硫酸、亞硝酸、氯及氨等）的環境中。
- 4) 避免電容器接觸氧層、紫外線或輻射。
- 5) 盡可能的把電容器保存在原來的封裝袋裏。
- 6) 為確保良好的焊接性，請將電容器的保存期限控制在 1 年以內。

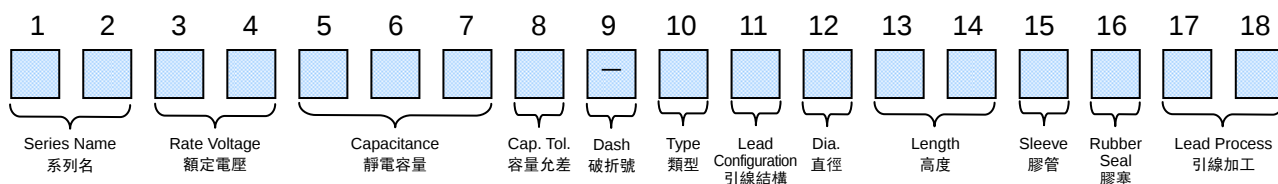
7. 處置

- 1) 請用下列任何一種方法處理電容器：
 - ① 在電容器的殼體上開孔後或完全解體破開後置於火中焚毀（用 800°C 或更高的溫度）。
 - ② 電容器不作焚毀時，交給工業垃圾處理機構進行填埋處理。
- 2) 當廢棄電容器或從線路板上卸下時，請確認電容器已經放電。

8. 其他

- 1) 本公司之產品品質依據 JIS-C-5141 標準考核，其信賴性試驗方法依據 JIS-C-5102 之規範為標準。
- 2) 本公司依據蒙特利爾協議書之規定，於生產過程中不使用破壞臭氧層之藥品。

EXPLANATION OF PART NUMBERS 產品編碼規則



(1, 2)		(3, 4)		(5~7)		(8)		(10)			(12)			(13, 14)	
Series 系列	Voltage (W.V.) 電壓	Code 代碼	Capacitance (μF) 靜電容量	Code 代碼	Cap. Tolerance (%) 容量允差	Code 代碼	Type 類型	Code 代碼	Diameter (∅) 直徑	Code 代碼	Length (mm) 高度	Code 代碼			
CS	4	0G	0.1	0R1	+10	K	Chip 貼片	C	3	S	5	05			
CK	6.3	0J	0.22	R22	-10		Radial 引線	R	4	C	5.4	54			
SC	10	1A	0.33	R33	+20	M	Radial Taping 引線編帶	T	5	D	5.8	58			
CN	16	1C	0.47	R47	-20		Snap-in 導箔	S	6.3	E	6.2	62			
KP	25	1E	1	0I0	+20	V	(11)			8	F	7	07		
LZ	35	1V	2.2	2R2	-10		Type 類型	Lead Configuration 引線結構	Code 代碼	10	G	7.7	77		
KZ	40	1G	3.3	3R3	Radial 引線		Chip 貼片	Taping & Reel 編帶與卷盤	R	12	H	9	09		
FZ	50	1H	4.7	4R7			Bulk 散裝	Taping (Forming) 編帶 (成型)	A	12.5	I	10.5	10		
EL	63	1J	10	100		Taping (Straight) 編帶 (直腳)		S	13	J	11(11.5)	11			
KL	75	1T	22	220		Lead Cutting 剪腳		C	13.5	V	12	12			
KH	80	1K	33	330		Lead Forming Cut 成型剪腳		F	14.5	A	13.5	13			
HU	85	1R	47	470		Lead Forming Only 引線成型		M	16	K	14	14			
RA	100	2A	68	680		Kinked Forming Cut 彎曲成型剪腳		K	18	L	16(16.5)	16			
RK	125	2B	100	101		Kinked Straight Cut 彎曲直腳剪腳		Y	20	M	20	20			
RE	160	2C	150	151		Cutting & Bending (Left) 左向臥式成型剪腳		L	22	N	21	21			
RM	180	2Z	220	221		Cutting & Bending (Right) 右向臥式成型剪腳		R	25	O	25	25			
RS	200	2D	330	331		Snap-in 導箔		Lead Snap-in 導箔線	W	30	P	26	26		
LA	220	2N	470	471					35	Q	31	31			
LK	250	2E	680	681					40	R	35	35			
LM	315	2F	1000	102						36	36				
LS	330	2U	1500	152						40	40				
NP	350	2V	3300	332						45	45				
NK	360	2X	4700	472						50	50				
NM	400	2G	6800	682											
NS	420	2M	10000	103											
BP	450	2W	15000	153											
BH			22000	223											
TM	(15)				(16)				(17, 18)						
TN	Sleeve 膠管				Rubber Seal 膠塞				Lead Process 引線加工						
TZ	PVC sleeve (White printing) PVC 膠管 (白字)				Plane 平台				Standard 標準						
TL	PVC sleeve (Black printing) PVC 膠管 (黑字)				Convexity 凸台				Non-standard 非標準						
TW	PVC sleeve (Golden printing) PVC 膠管 (金字)								Lead length after cut is 3mm 剪腳腳長 3mm						
TY	PVC sleeve (Silver printing) PVC 膠管 (銀字)								Lead length after cut is 4.5mm 剪腳腳長 4.5mm						
TB	PET sleeve (Green colour/white printing) PET 膠管 (綠色白字)								Lead length after cut is 5mm 剪腳腳長 5mm						
TX	PET sleeve (Purple blue colour/white printing) PET 膠管 (藍紫色白字)								Lead length after cut is 7.5mm 剪腳腳長 7.5mm						
PL	PET sleeve (Yellow colour/black printing) PET 膠管 (黃色黑字)								Lead length after cut is 10mm 剪腳腳長 10mm						
RF	PET sleeve (Black colour/white printing) PET 膠管 (黑色白字)								Lead length after cut is 12mm 剪腳腳長 12mm						
SM	PET sleeve (Brown colour/white printing) PET 膠管 (褐色白字)														
SK															
												CAT 2019			

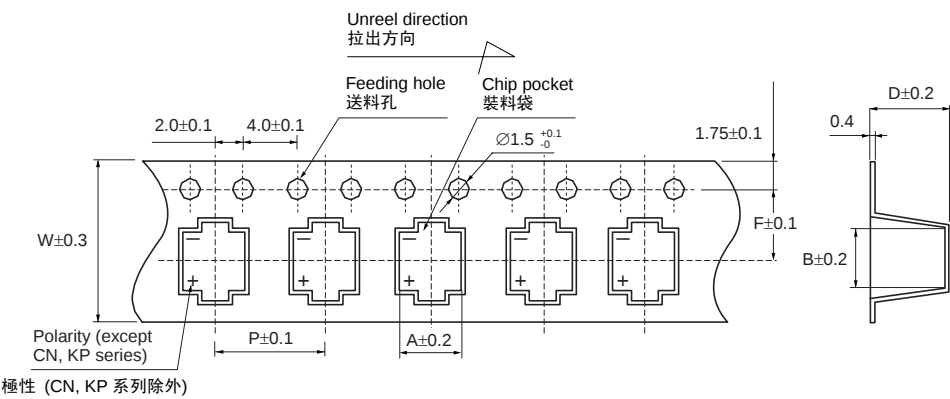
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TAPING SPECIFICATIONS 編帶標準

□ For Chip Type Aluminum Electrolytic Capacitors 貼片式鋁電解電容器

■ Carrier Tape 載帶

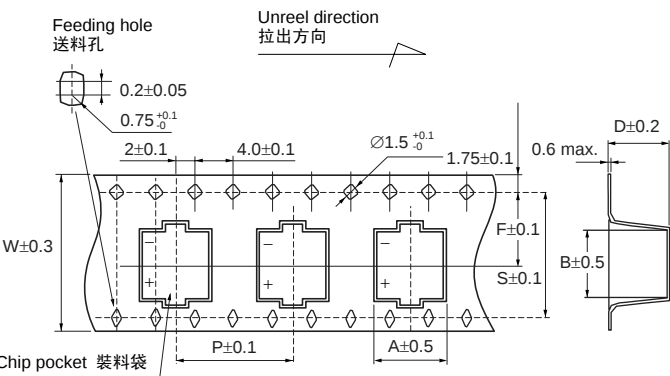
●Drawing 1 (for Ø4 ~ Ø10) 外形圖 1



Dimension 尺寸表 (Unit: mm)

ØD×L	4×5.4/5.8	5×5.4/5.8	6.3×5.4/5.8	6.3×7.7	8×6.2	8×10.5	10×10.5/13.5
W	12.0	12.0	16.0	16.0	16.0	24.0	24.0
P	8.0	12.0	12.0	12.0	12.0	16.0	16.0
F	5.5	5.5	7.5	7.5	7.5	11.5	11.5
A	5.0	6.0	7.0	7.0	8.7	8.7	10.7
B	5.0	6.0	7.0	7.0	8.7	8.7	10.7
D	5.8/6.3	5.8/6.3	5.8/6.3	8.4	6.8	11.0	11.0/14.0

●Drawing 2 (for Ø12.5 ~ Ø16) 外形圖 2

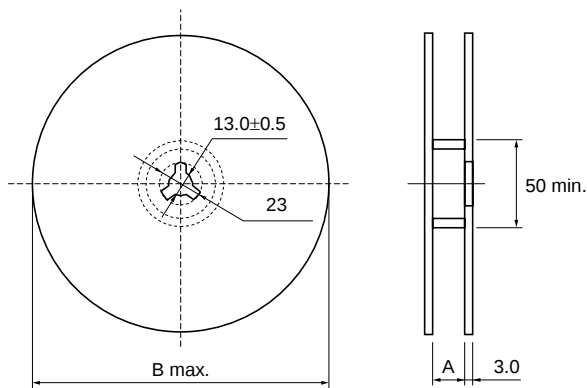


Dimension 尺寸表 (Unit: mm)

ØD×L	12.5×13.5	12.5×16
W	32.0	32.0
P	24.0	24.0
F	14.2	14.2
A	14.0	14.0
B	14.0	14.0
D	14.0	16.5
S	28.4	28.4

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■ Reel 卷盤

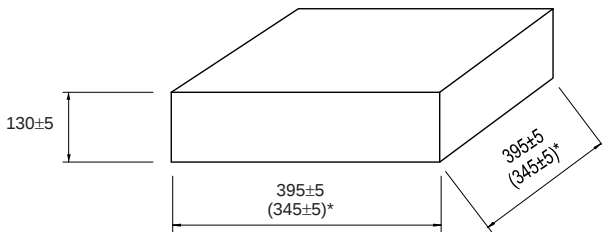


(Unit: mm)

∅D × L	4×5.4/5.8	5×5.4/5.8	6.3×5.4/5.8/7.7	8×6.2/10.5	10×10.5	10×13.5	12.5×13.5/16	16×16.5
A	14	14	18	26	26	26	34	46
B	382	382	382	382	382	382/332*	382/332*	332*

*For a small package *為小盤包裝

■ In-box 內盒



■ Package Quantity 包裝數量

Size ∅D×L (mm) 尺寸	Reel (pcs) 卷盤 (個)	In-box (reels) 內盒 (卷)	Quantity/In-box (pcs) 數量/內盒 (個)	4 In-boxes/Carton (pcs) 4 個內盒/箱 (個)
4 × 5.4/5.8	2,000	6	12,000	48,000
5 × 5.4/5.8	1,000	6	6,000	24,000
6.3 × 5.4/5.8	1,000	5	5,000	20,000
6.3 × 7.7	1,000	5	5,000	20,000
8 × 6.2	1,000	5	5,000	20,000
8 × 10.5	500	4	2,000	8,000
10 × 10.5	500	4	2,000	8,000
10 × 13.5	300/250*	4	1,200/1,000*	4,800/4000*
12.5 × 13.5	200/150*	3	600/450*	2,400/1,800*
12.5 × 16	200/150*	3	600/450*	2,400/1,800*
16 × 16.5	125*	2	250*	1,000*

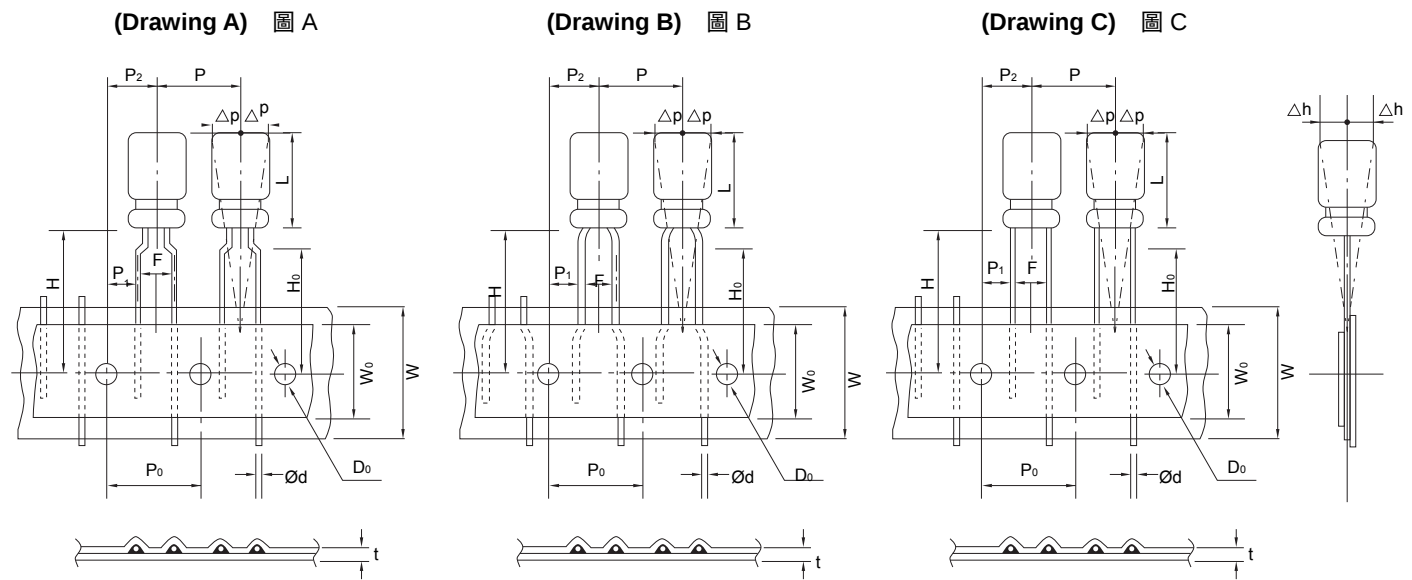
*For a small package *為小盤包裝

- Please order by minimum package quantity.
- 請以最小包裝數量訂購。

TAPING SPECIFICATIONS 編帶標準

□ Lead Taping Capacitors for Automatic Insertion 自動插件用引線式鋁電解電容器

■ Drawing (Unit: mm) 外形圖



■ Dimensions (Unit: mm) 尺寸表

Application To Drawing 對應外形圖			B				C				A				C			
Descriptions 內容	Symbol 符號	Tolerance 允差	Ø3	Ø4	Ø5	Ø6.3	Ø8	Ø4	Ø5	Ø6.3	Ø8	Ø4	Ø5	Ø6.3	Ø8	Ø10	Ø12.5	Ø16, Ø18
Case Height 鋁殼高度	L	※Note	5	5, 7	5, 7, 11	5, 7, 11.5	5, 7~14, 16, 20	5, 7	5, 7, 11	5, 7, 11.5	5, 7~14, 16, 20	5, 7	5, 7, 11	5, 7, 11.5	5, 7~14, 16, 20	20 (max.)	25 (max.)	35, 40 (max.)
Lead Wire Diameter 引線直徑	Ød	±0.05	0.45	0.45	0.45	0.5	0.45	0.5	0.6	0.45	0.45	0.5	0.45	0.5	0.45	0.5	0.6	0.8
Body Pitch 電容器本體間距	P	±1.0	12.7				12.7	12.7				12.7				12.7	15.0	30.0
Feeding Hole Pitch 運送孔間距	P0	±0.2	12.7				12.7	12.7				12.7				12.7	15.0	15.0
Feeding Hole Center to Lead 運送孔至引線寬度	P1	±0.7	5.1				5.1	5.1				3.85				3.85	5.0	3.75
Feeding Hole Alignment 運送孔至電容器本體寬度	P2	±1.0	6.35				6.35	6.35				6.35				6.35	7.5	7.5
Lead Center Spacing 引線間距	F	+0.8 -0.2	2.5				2.5	3.5				5.0				5.0	5.0	7.5
Tape Width 紙帶寬度	W	±0.5	18.0				18.0	18.0				18.0				18.0	18.0	18.0
Adhesive Tape Width 熱熔膠帶寬度	W0	Min.	9.5				9.5	9.5				9.5				12.5	12.5	12.5
Length from Seating Plane 電容器本體至紙帶中心高度	H	±0.75	18.0				17.5	18.5				18.5 (5, 7L=17.5)				17.5	20.0	18.5
Lead Clinch Height 引線彎曲至運送孔高度	H0	±0.5	17.0				--	--				16.0				16.0	16.0	--
Feeding Hole Diameter 運送孔直徑	ØD0	±0.2	4.0				4.0	4.0				4.0				4.0	4.0	4.0
Total Tape Thickness 紙帶與膠帶的總厚度	t	±0.3	0.7				0.7	0.7				0.7				0.7	0.7	0.7
Body Inclination 電容器本體傾斜度	Δh	Max.	1.0				1.0	1.0				1.0				1.0	1.0	1.0
Body Inclination 電容器本體傾斜度	Δp	Max.	1.0				1.0	1.0				1.0				1.0	1.0	1.0
Taping Code 編帶代碼			TS				TS	TS				TA				TA	TA	TS

※ Please refer to the drawing of each series for tolerance ※ 請參閱相應系列外形圖的允許誤差

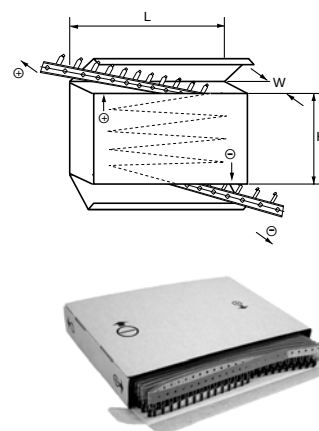
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PACKAGING SPECIFICATIONS 包裝標準

□ For Radial Lead Type Aluminum Electrolytic Capacitors 適用於引線式鋁電解電容器

■ Taping Type (Ammo pack) 編帶品 (折疊式包裝)

Diameter (mm) 直徑	In-box Size 內盒尺寸			Quantity/In-box (pcs) 數量/內盒 (個)	Quantity/Carton (pcs) 數量/箱 (個)
	L (mm)	H (mm)	W (mm)		
Ø3	337	234	50	2,500*	25,000
Ø4	337	234	50	2,500*	25,000
Ø5	337	234	50	2,000*	20,000
Ø6.3	340	305	53	2,000*	10,000
Ø8	337	234	50	1,000*	10,000
Ø8 (20L)	337	234	55	1000*	8,000
Ø10 (12L/16L)	337	234	50	500*	5,000
Ø10 (20L)	337	234	55	500*	4,000
Ø10 (25L)	340	305	65	500*	2,000
Ø12.5 (21L/25L)	340	305	65	500*	2,000
Ø16 (25L)	340	320	65	300*	1,200
Ø18 (25L)	340	320	65	250*	1,000



■ Bulk Type 散裝品

Case Size ØD×L (mm) 尺寸		Vinyl Bag Quantity 膠袋數量	Small Box Quantity 內箱數量		Carton Box Quantity 外箱數量		Small Box Size 內箱尺寸			Carton Box Size 外箱尺寸		
		pcs/Bag 個/膠袋	Vinyl Bag/ Small Box 膠袋/內箱	pcs/ Small Box 個/內箱	Small Box/ Carton Box 內箱/外箱	pcs/ Carton Box 個/外箱	L (mm)	H (mm)	W (mm)	L (mm)	H (mm)	W (mm)
Radial Lead Type 引線式	3 × 5	1000*	50	50,000	2	100,000	300	290	220	470	310	310
	4 × 5, 7	1000*	25	25,000		50,000						
	5 × 5, 7	1000*	25	25,000		50,000						
	5 × 11	1000*	20	20,000		40,000						
	6.3 × 5	1000*	25	25,000		50,000						
	6.3 × 7	1000*	20	20,000		40,000						
	6.3 × 11.5	500*	30	15,000		30,000						
	8 × 5, 7, 9	500*	20	10,000		20,000						
	8 × 11.5	500*	20	10,000		20,000						
	8 × 13~16	250*	30	7,500		15,000						
	8 × 20	200*	25	5,000		10,000						
	10 × 12~20	200*	25	5,000		10,000						
	12.5 × 20~25	100*	25	2,500		5,000						
	16 × 25	100*	15	1,500		3,000						
	16 × 31	50*	20	1,000		2,000						
	18 × 31~40	50*	14	700		1,400						
Snap-in Type 封鎖式	22 × 20~50	--	--	135*	10	1,350	340	235	53	490	350	280
	25 × 20~50	--	--	104*		1,040						
	30 × 20~50	--	--	80*	3	240	340	305	65	355	315	280
	35 × 20~50	--	--	72*		216						

* Minimum package quantity *最小包裝數量

- There are some differences between actual package quantity and above list. Please confirm before you order.
- Please order by minimum package quantity.
- 以上包裝標準可能會與實際的包裝數量有所不同，請在訂購前確認。
- 請以最小包裝數量訂購。

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CAT.2011/V5

LEAD FORMING & CUTTING 引線成型與剪腳

□ For Radial Lead Type Aluminum Electrolytic Capacitors 適用於引線式鋁電解電容器

(Unit: mm)

Configurations 結構類型	Code 代碼	Case dia. 直徑	Shape 外形圖	Configurations 結構類型	Code 代碼	Case dia. 直徑	Shape 外形圖
Forming Cut 成型剪腳 (Forming Only 成型不剪腳)	RF (RM)	Ø5~Ø8		Kinked Forming Cut 彎曲成型剪腳	RK	Ø5~Ø8	
Cutting 剪腳	RC	Ø10~ Ø18		Kinked Straight Cut 彎曲直腳剪腳	RY	Ø10~ Ø18	
Cutting & Bending (Left) 左向臥式 成型剪腳	RL	Ø4~ Ø6.3		Cutting & Bending (Right) 右向臥式 成型剪腳	RR	Ø4~ Ø6.3	

● Lead diameter (Ød) and lead pitch (P) are subject to capacitor specifications.

● 引線的直徑(Ød)和腳距(P)請參閱各系列的詳細規格。

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CAT.2011/V5

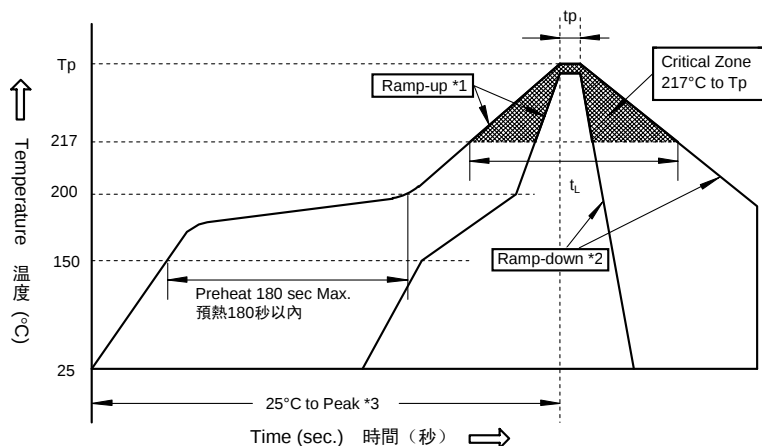
LEAD FREE REFLOW SOLDERING CONDITIONS 無鉛回流焊條件

□ Applicable to Chip Type Aluminum Electrolytic Capacitors 適用於貼片式鋁電解電容器

■ Recommended Conditions for Reflow Soldering 推薦回流焊條件

- (1) A thermal condition system such as infrared radiation (IR) or hot blast should be adopted, and vapor heat transfer systems (VPS) are not recommended.
應採用紅外線或熱風回流焊接，而不宜採用汽相加熱回流焊接。
- (2) Reflow soldering should be within 2 cycles. Please make sure that the parts have enough cooling time.
回流焊次數最多 2 次，請確保在第 1 次和第 2 次之間產品有足夠的冷卻時間。
- (3) ■ The time of preheating from 150°C to 200°C shall be within maximum 180 seconds;
從 150°C 到 200°C 的預熱時間應在 180 秒以內；
■ The time of soldering temperature at 217°C measured on capacitors' top shall not exceed t_L (second);
電容器頂部溫度超過 217°C 的焊接時間不得超過 t_L (秒)；
■ The peak temperature on capacitors' top shall not exceed T_p (°C), and the time within 5°C of actual peak temperature shall not exceed t_p (second).
電容器頂部的峰值溫度不得超過 T_p (°C)，在 5°C 範圍內的實際峰值溫度時間不得超過 t_p (秒)。

■ Classification Reflow Profile 回流焊曲線圖



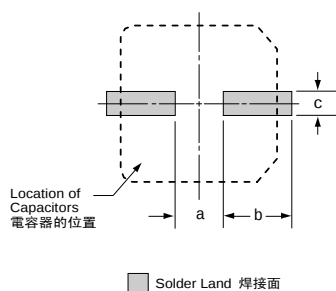
- *1. Average ramp-up rate is 3°C/second max.
*2. Ramp-down rate is 6°C/second max.
*3. Time from 25°C to peak temperature is 8 minutes max.
- *1. 溫度上升平均每秒鐘最多 3°C;
*2. 溫度下降平均每秒鐘最多 6°C;
*3. 從 25°C 上升到峰值溫度的時間最多 8 分鐘。

■ Classified at Temperature and Time Only for Standard Size without () 溫度和時間分類只適用於沒有 () 的標準尺寸產品

Size 尺寸	Thickness (mm) 厚度	T_p (°C)	t_L (second 秒)	t_p (second 秒)
Ø4~Ø6.3, Ø8×6.2L	≥2.5	250±0	60	5
Ø8×10.5L	≥2.5	240±0	60	5
Ø10×10.5L/13.5L	≥2.5	235±0	60	5
Ø12.5, Ø16	≥2.5	230±0	30 (20*)	5

Re: (20*) is special for mid-to-high voltage which is HU series. 注: (20*)為針對中高壓 HU 系列產品

■ Recommended Solder Land Size on PC Board (Unit: mm) 推薦安裝尺寸



Size 尺寸	a	b	c
Ø4	1.0	2.6	1.6
Ø5	1.4	3.0	1.6
Ø6.3	2.1	3.5	1.6
Ø8×6.2L	2.1	4.5	1.6
Ø8×10.5L	3.0	3.5	2.5
Ø10	4.0	4.0	2.5
Ø12.5	4.0	5.7	3.0
Ø16	6.0	6.5	3.5

CORRESPONDING TO RoHS DIRECTIVE 對應RoHS指令

Aluminum electrolytic capacitors 鋁電解電容器		Chip type 貼片式	Radial lead type 引線式	Snap-in terminal type 導箔式
RoHS compliant RoHS符合性		Yes 符合	Yes 符合	Yes 符合
RoHS restricted substances 限制有害物質	The portion of the components 產品的部分特性	Change plating from Sn-Pb to Sn 將鍍鉛錫合金變更為鍍錫		
Lead (Pb) 鉛	Plating on terminals 引線鍍層			
	Construction of terminals 引線結構	Fe/Cu/Sn 鍍錫銅包鐵線		
		● Plating thickness 12μm ● Plating type matte ● No heat treatment after plating ● 鍍錫層厚度12μm ● 鍍錫層類型不光滑 ● 鍍錫後無熱處理 ● Plating thickness 10μm ● Plating type matte ● No heat treatment after plating ● 鍍錫層厚度10μm ● 鍍錫層類型不光滑 ● 鍍錫後無熱處理		
	Insulating sleeve 膠管	No used 不使用	Replace PVC with PET (where customer designated) 將PVC更換為PET（若客戶指定）	
	Resistance to soldering heat 耐焊接熱	Please refer to "Reflow Soldering Conditions" for chip type aluminum electrolytic capacitors 請參閱貼片式鋁電解電容器的“回流焊條件”	No change 無變更	
	Solderability 可焊性	No difference with Sn-Pb 與鉛錫線相同		
	Tensile strength 抗拉强度	No difference with Sn-Pb 與鉛錫線相同		
Whisker 晶鬚	<u>No difference with Sn-Pb plating</u> ● 60°C / 90% 2000 hours ● -55 / +85°C 2000 cycles ● Room temp.: 2000 hours <u>與鉛錫線相同</u> ● 60°C / 90% 2000小時 ● -55 / +85°C 2000次循環 ● 室溫: 2000小時		<u>Whisker is not observed</u> ● 60°C / 90% 2000 hours ● -55 / +85°C 2000 cycles ● Room temp.: 2000 hours <u>沒有晶鬚</u> ● 60°C / 90% 2000小時 ● -55 / +85°C 2000次循環 ● 室溫: 2000小時	
	Hexavalent chromium (Cr VI) 六價鉻		Not detected 未檢出	
Mercury (Hg) 汞		Not detected 未檢出		
Cadmium (Cd) 鎘		Not detected 未檢出		
Polybrominated biphenyls (PBBs) 多溴聯苯		Not detected 未檢出		
Polybrominated diphenyl ethers (PBDEs) 多溴二苯醚		Not detected 未檢出		
Identification for RoHS compliance products RoHS符合性產品識別		Add "Pb free" and "RoHS" marking on inner and outer carton label 外箱和內箱上貼有“PB free”和“RoHS”標籤標識		
MSL Level 濕度敏感水平 (IPC/JEDEC J-STD-020C)		Not applicable, no need dry package 不適用，無需吸濕管理		

COMPLIANCE TO EU REACH REGULATION 遵循歐盟REACH法規

According to the content of REACH handbook (Guidance on requirements of substances in articles which is published on May 2008), our products are "articles without any intended release". Therefore they are not applicable for "Registration" for EU REACH Regulation Article 7 (1).

根據 REACH 法規手冊內容(2008 年 5 月公佈的物品中物質的要求) 我們的產品是“沒有任何有意釋放的物品”。因此 我們的產品不適用於歐盟 REACH 法規的第 7(1) 條的“Registration”。

LIFE OF ALUMINUM ELECTROLYTIC CAPACITORS

鋁電解電容器的壽命

The life of aluminum electrolytic capacitors is mainly dependent on environmental conditions (e.g. ambient temperature, humidity etc.) and electrical factors (e.g. operating temperature, ripple current etc.). Generally, the wear-out mechanism of aluminum electrolytic capacitors is based on evaporation of electrolyte through the rubber seal. Consequently, the factor of temperature (ambient temperature and internal heating due to ripple current) is the most critical to electrolytic capacitors life. The effect of voltage on capacitor life is negligible, especially for low voltage electrolytic capacitors. The lifetime of aluminum electrolytic capacitors can be expressed as following equations:

鋁電解電容器的壽命主要依賴於其適用的環境條件（如環境溫度，濕度等）和電負荷情況（如工作電壓，紋波電流等）。通常而言，鋁電解電容器的失效機理被認為是電解液通過膠塞逐漸揮發所導致。因此，溫度因素（環境溫度和由於紋波電流所引致的內熱）對電容器壽命的影響最大，而電壓對電容器壽命的影響可以忽略，尤其對低電壓鋁電解電容器更是如此。鋁電解電容器的壽命可用下列公式來估算：

$$L_e = L_o \cdot K_t \cdot K_r$$

Where: 其中：

L_e = Expected life at operating temperature T_e (h) 在工作溫度 T_e (h) 下的預期壽命

L_o = Specified life at temperature operating temperature T_o (h) 在最大工作溫度 T_o (h) 下的壽命

K_t = Ambient temperature acceleration term 環境溫度影響因子

K_r = Ripple current acceleration term 紋波電流影響因子

$$K_t = L_o \cdot A^{(T_o - T_e)/10}$$

Where: 其中：

T_o = Maximum rated operating temperature (°C) 最大額定工作電壓(°C)

T_e = Actual ambient temperature (°C) 實際環境適用溫度(°C)

A = Acceleration coefficient (for the range from 35°C to the maximum operating temperature, $A \approx 2$)
加速系數（對於從 35°C 到最高工作溫度的範圍， $A \approx 2$ ）

$$K_r = 2^{(-\Delta T/5)}$$

Where: 其中：

ΔT = An increase in core temperature by internal heating due to ripple current 由於紋波電流引起的內熱造成電容器芯子的升溫
(ΔT = core temperature – ambient temperature) (ΔT = 芯子溫度 – 環境溫度)

ΔT can be estimated as follows: ΔT 可用以下公式估算：

$$\Delta T = (I^2 \cdot R) / (\beta \cdot S)$$

Where: 其中：

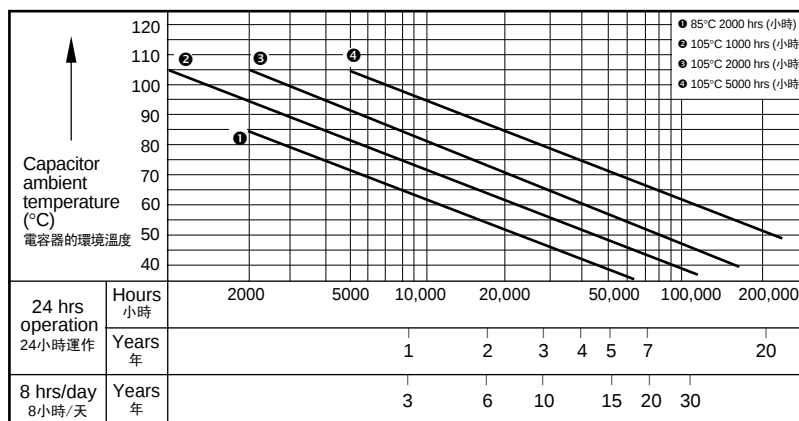
I = Ripple current of the capacitor (A rms) 通過電容器的紋波電流(A rms)

R = Equivalent series resistance of the capacitor (Ω) 電容器的等效串聯電阻(Ω)

β = Heat radiation coefficient of the aluminum can ($W/^\circ C \cdot cm^2$) 鋁殼的熱輻射系數($W/^\circ C \cdot cm^2$)

S = Surface area of the capacitor (cm^2) 電容器的表面積(cm^2)

Life Estimation Table 預期壽命參考圖



Example: When a 2000 hours/105°C guaranteed product is used continuously at 60°C, it can be expected to have a life of 5 years.

例：對於 105°C 2000 小時的產品，如果在 60°C 環境中連續使用，它的預期壽命約 5 年。

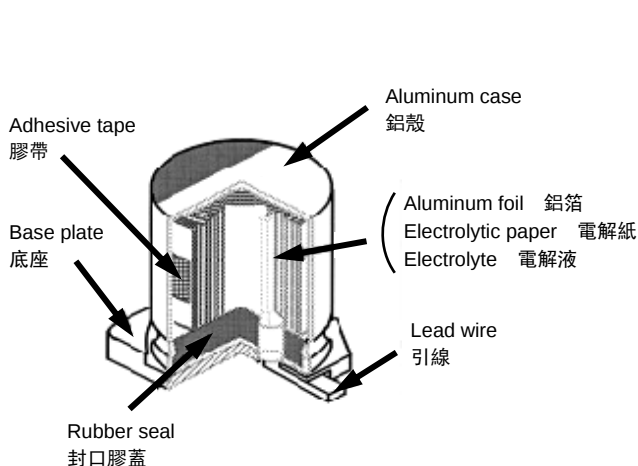
CONSTRUCTION OF ALUMINUM ELECTROLYTIC CAPACITORS

鋁電解電容器的結構

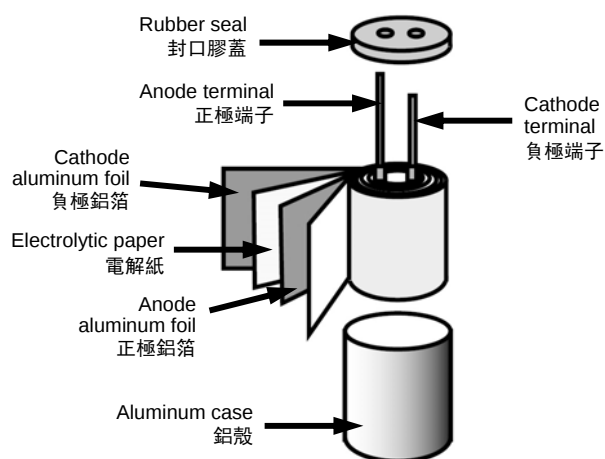
The aluminum electrolytic capacitors contains an internal element of an anode foil, a cathode foil and electrolytic paper rolled together, impregnated with an electrolyte, then attached to external terminals connecting the tabs with the anode or the cathode foils, and sealed in a can case.

鋁電解電容器是由正極與負極鋁箔鋸上正極與負極端子，再和電解紙一起捲繞成芯子，浸漬電解液後用鋁殼封裝而成。

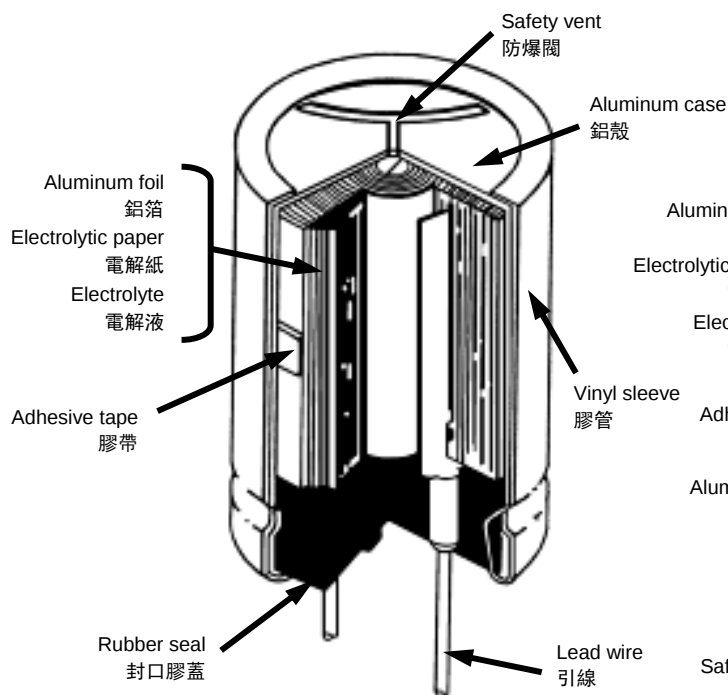
● Internal Structure 內部結構



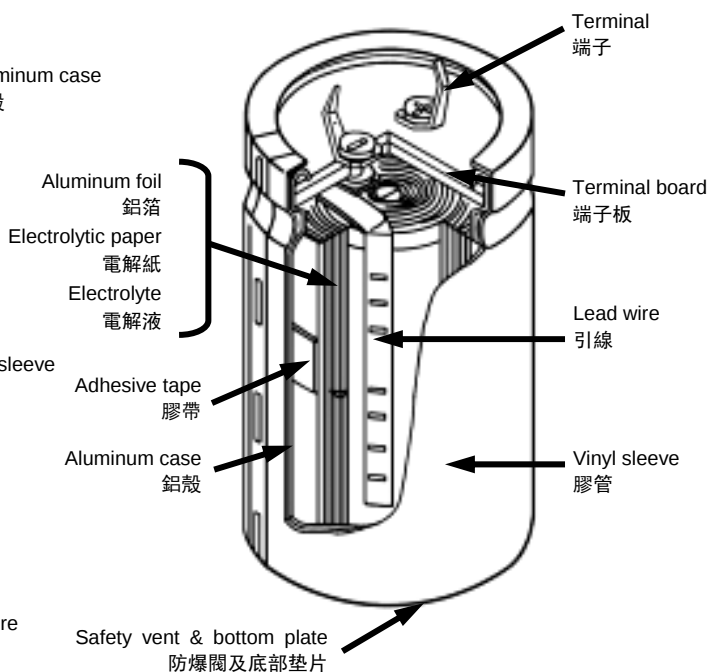
(Chip type 貼片式)



(Basic construction 基本結構)



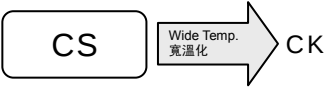
(Radial lead type 引線式)



(Snap-in type 導箔式)

STANDARD
標準品

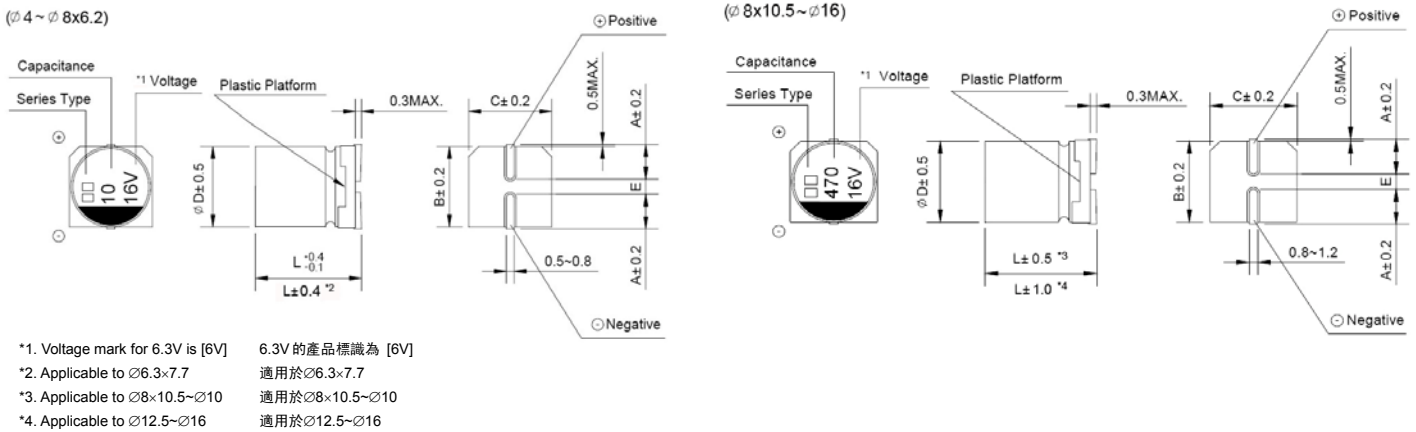
- Operating with general temperature range -40 ~ +85°C
適用於 -40 ~ +85°C 的常規溫度範圍
- Load life of 2000 hours
負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																																												
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C																																																												
Voltage Range 額定工作電壓範圍	4 ~ 100V																																																												
Capacitance Range 靜電容量範圍	0.1 ~ 6800μF																																																												
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																																												
Leakage Current 漏電流	Leakage current (Ø4~Ø10) ≦ 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (Ø12.5~Ø16) ≦ 0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (Ø4~Ø10) ≦ 0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (Ø12.5~Ø16) ≦ 0.03CV 或 4μA, 取較大值 (施加額定工作電壓 1 分鐘後)																																																												
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td rowspan="2">tan δ (max.) 最大損耗角正切</td><td>Ø4~Ø10</td><td>0.35</td><td>0.26</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td><td>0.10</td><td>0.10</td></tr><tr><td>Ø12.5~Ø16</td><td>0.42</td><td>0.38</td><td>0.34</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.14</td><td>0.10</td></tr></table>										Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50	63	100	tan δ (max.) 最大損耗角正切	Ø4~Ø10	0.35	0.26	0.20	0.16	0.14	0.12	0.12	0.10	0.10	Ø12.5~Ø16	0.42	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10																			
Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50	63	100																																																			
tan δ (max.) 最大損耗角正切	Ø4~Ø10	0.35	0.26	0.20	0.16	0.14	0.12	0.12	0.10	0.10																																																			
	Ø12.5~Ø16	0.42	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10																																																			
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td colspan="3">50~100</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比</td><td rowspan="2">Ø4~Ø10</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td colspan="2">2</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td>15</td><td>8</td><td>6</td><td>4</td><td>4</td><td>3</td><td colspan="2">3</td></tr><tr><td rowspan="2">ZT/Z20 (max.)</td><td rowspan="2">Ø12.5~Ø16</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td colspan="2">2</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td>17</td><td>12</td><td>10</td><td>8</td><td>5</td><td>4</td><td colspan="2">3</td></tr></table>										Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50~100			Impedance Ratio 阻抗比	Ø4~Ø10	Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2		Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3		ZT/Z20 (max.)	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	7	5	4	3	2	2	2		Z(-40°C) / Z(20°C)	17	12	10	8	5	4	3	
Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50~100																																																					
Impedance Ratio 阻抗比	Ø4~Ø10	Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2																																																				
		Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3																																																				
ZT/Z20 (max.)	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	7	5	4	3	2	2	2																																																				
		Z(-40°C) / Z(20°C)	17	12	10	8	5	4	3																																																				
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 2000 小時後，電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial value (Within ±30% of initial value for 4V) 初始值的±20%以內 (4V 為±30%以內)</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>										Capacitance Change 靜電容量變化率	Within ±20% of initial value (Within ±30% of initial value for 4V) 初始值的±20%以內 (4V 為±30%以內)	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值																																													
Capacitance Change 靜電容量變化率	Within ±20% of initial value (Within ±30% of initial value for 4V) 初始值的±20%以內 (4V 為±30%以內)																																																												
Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%																																																												
Leakage Current 漏電流	initial specified value or less 不大於規範值																																																												
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 85°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。																																																												
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>										Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																																													
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內																																																												
Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值																																																												
Leakage Current 漏電流	initial specified value or less 不大於規範值																																																												
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																																												

□ DRAWING (Unit: mm) 外形圖



□ DIMENSIONS (Unit: mm) 尺寸表

∅D x L	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.4	5.4	5.4	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	4		6.3		10		16		25	
		0G		0J		1A		1C		1E	
4.7	4R7									4 x 5.4	19
10	100							4 x 5.4	25	5 x 5.4 (4 x 5.4)	28 (20)
15	150							4 x 5.4	28	5 x 5.4	34
22	220			4 x 5.4	31	5 x 5.4 (4 x 5.4)	35 (28)	5 x 5.4 (4 x 5.4)	39 (28)	6.3 x 5.4 (5 x 5.4)	52 (35)
33	330	4 x 5.4	26	5 x 5.4 (4 x 5.4)	39 (31)	5 x 5.4 (4 x 5.4)	43 (32)	6.3 x 5.4 (5 x 5.4)	57 (40)	6.3 x 5.4 (5 x 5.4)	63 (42)
47	470	4 x 5.4	34	5 x 5.4 (4 x 5.4)	47 (36)	6.3 x 5.4 (5 x 5.4)	59 (43)	6.3 x 5.4 (5 x 5.4)	68 (44)	6.3 x 5.4	68
56	560	4 x 5.4	39	5 x 5.4	46	6.3 x 5.4	57	6.3 x 5.4	74	6.3 x 5.4	82
68	680	5 x 5.4	45	6.3 x 5.4 (5 x 5.4)	62 (52)	6.3 x 5.4	72	6.3 x 5.4	80	6.3 x 5.4	94
100	101	5 x 5.4	61	6.3 x 5.4 (5 x 5.4)	71 (55)	6.3 x 5.4	76	6.3 x 5.4 (8 x 6.2)	86 (200)	6.3 x 7.7 (8 x 6.2)	130 (91)
150	151	6.3 x 5.4	74	6.3 x 5.4	78	6.3 x 5.4	88	6.3 x 7.7	135	8 x 10.5 (6.3 x 7.7)	200 (130)
220	221	6.3 x 5.4	82	6.3 x 5.4	95	6.3 x 7.7 (8 x 6.2)	150 (250)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	215 (150) (135)	8 x 10.5	250
330	331	6.3 x 7.7	150	6.3 x 7.7 (8 x 6.2)	150 (300)	8 x 10.5	280	8 x 10.5	280	10 x 10.5 (8 x 10.5)	340 (310)
470	471	6.3 x 7.7	150	8 x 10.5 (6.3 x 7.7)	300 (150)	10 x 10.5 (8 x 10.5)	320 (300)	10 x 10.5 (8 x 10.5)	420 (330)	10 x 10.5	400
680	681	8 x 10.5	300	8 x 10.5	300	10 x 10.5	380	10 x 10.5	450	10 x 13.5	550
1000	102	8 x 10.5	330	10 x 10.5 (8 x 10.5)	430 (330)	10 x 10.5	450	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	710 (550) (490)	12.5 x 13.5	820
1500	152	10 x 10.5	450	10 x 13.5 (10 x 10.5)	650 (450)	10 x 13.5	650	12.5 x 13.5	750	12.5 x 16	1000
2200	222	10 x 13.5 (10 x 10.5)	620 (480)	12.5 x 13.5 (10 x 13.5)	890 (720)	12.5 x 13.5	960	16 x 16.5 (12.5 x 16)	1150 (1000)	16 x 16.5	1250
3300	332	10 x 13.5	700	12.5 x 16 (12.5 x 13.5)	1000 (900)	16 x 16.5 (12.5 x 16)	1300 (1050)	16 x 16.5	1350		
4700	472	12.5 x 13.5	850	16 x 16.5	1400	16 x 16.5	1450			Case size 尺寸	Ripple current 紋波電流
6800	682	16 x 16.5 (12.5 x 16)	1350 (900)								

WV Code 代碼	μF	35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4 x 5.4	1.0	4 x 5.4	1.0		
0.22	R22			4 x 5.4	2.3	4 x 5.4	2.3		
0.33	R33			4 x 5.4	3.5	4 x 5.4	3.5		
0.47	R47			4 x 5.4	5.0	4 x 5.4	5.0		
1	010			4 x 5.4	10	4 x 5.4	10	4 x 5.4	10
1.5	1R5			4 x 5.4	12	4 x 5.4	12	6.3 x 5.4	15
2.2	2R2			4 x 5.4	15	4 x 5.4	15	6.3 x 5.4	20
3.3	3R3	4 x 5.4	18	4 x 5.4	18	5 x 5.4	20	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	45 (28) (50)
4.7	4R7	4 x 5.4	20	5 x 5.4 (4 x 5.4)	23 (19)	6.3 x 5.4 (5 x 5.4)	30 (23)	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	50 (30) (50)
10	100	5 x 5.4 (4 x 5.4)	30 (20)	6.3 x 5.4 (5 x 5.4)	34 (27)	6.3 x 7.7 (6.3 x 5.4)	55 (34)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	110 (50) (50)
22	220	6.3 x 5.4	54	6.3 x 5.4 (8 x 6.2)	60 (120)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	140 (70) (35)	10 x 10.5 (8 x 10.5)	180 (120)
33	330	6.3 x 5.4 (8 x 6.2)	60 (130)	6.3 x 7.7 (8 x 6.2)	85 (65)	8 x 10.5 (6.3 x 7.7)	160 (85)	10 x 10.5	190
47	470	6.3 x 5.4 (8 x 6.2)	70 (165)	10 x 10.5 (8 x 10.5) (6.3 x 7.7)	130 (110) (90)	10 x 10.5 (8 x 10.5)	230 (170)	Case size 尺寸	Ripple current 紋波電流

• Case size ∅D x L (mm), ripple current (mA rms) at 85°C 120Hz • 尺寸 ∅D x L (mm), 紋波電流 (mA rms) 於 85°C 120Hz

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2011/V5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	35		50		63		100	
		1V		1H		1J		2A	
56	560	6.3 × 7.7	80	6.3 × 7.7	110	10 × 10.5	250		
68	680	6.3 × 7.7	110	8 × 10.5	170	10 × 10.5	260		
100	101	8 × 10.5 (6.3 × 7.7)	175 (120)	10 × 10.5 (8 × 10.5)	240 (200)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	380 (290) (280)	12.5 × 13.5	440
150	151	8 × 10.5	220	10 × 10.5	240	10 × 13.5	310		
220	221	10 × 10.5 (8 × 10.5)	310 (270)	10 × 13.5 (10 × 10.5)	400 (320)	12.5 × 13.5 (10 × 13.5)	580 (330)	16 × 16.5	700
330	331	10 × 10.5	350	12.5 × 13.5 (10 × 13.5)	600 (420)	16 × 16.5 (12.5 × 16)	820 (720)		
470	471	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	600 (530) (400)	16 × 16.5 (12.5 × 16)	850 (740)	16 × 16.5	950		
680	681	12.5 × 13.5 (10 × 13.5)	750 (560)	16 × 16.5	950			Case size 尺寸	Ripple current 紋波電流
1000	102	16 × 16.5 (12.5 × 16)	1100 (800)						

•Case size ØD×L(mm), ripple current (mA rms) at 85°C 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 85°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	Ø4 ~ Ø10	0.1 ~ 68μF	0.70	1.00	1.17	1.36	1.50
		100 ~ 3300μF	0.85	1.00	1.08	1.20	1.30
	Ø12.5 ~ Ø16	~ 68μF	0.75	1.00	1.35	1.57	2.00
		100 ~ 680μF	0.80	1.00	1.23	1.34	1.50
		1000 ~ 6800μF	0.85	1.00	1.10	1.13	1.15

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

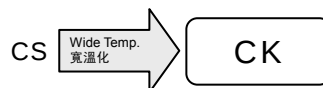
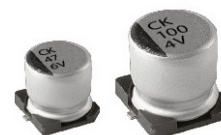
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WIDE TEMPERATURE

寬溫品

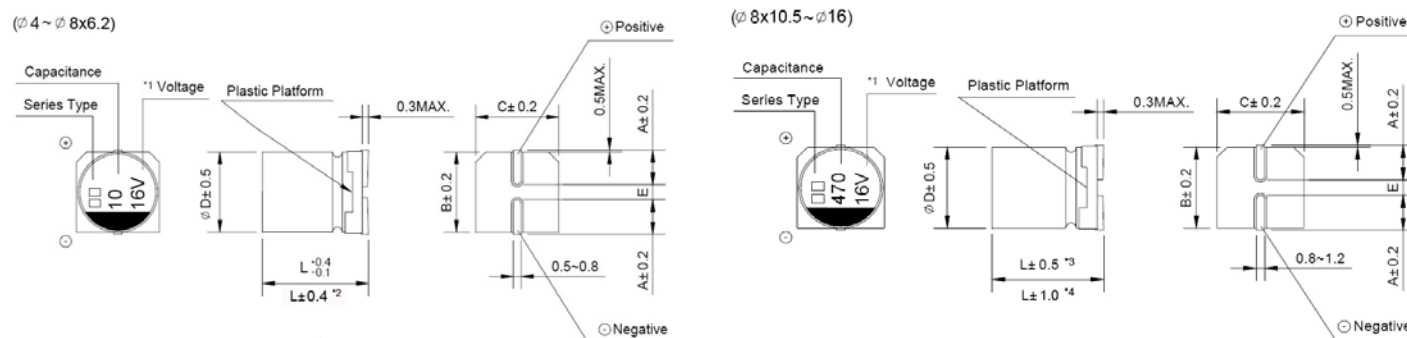
- Operating with wide temperature range -40 ~ +105°C
適用於 -40 ~ +105°C 的寬溫範圍
- Load life of 1000~2000 hours
負荷壽命 1000~2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																																										
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C																																																										
Voltage Range 額定工作電壓範圍	4 ~ 100V																																																										
Capacitance Range 靜電容量範圍	0.1 ~ 6800μF																																																										
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																																										
Leakage Current 漏電流	Leakage current (Ø4~Ø10) ≦0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (Ø12.5~Ø16) ≦0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (Ø4~Ø10) ≦0.01CV 或 3μA，取較大值（施加額定工作電壓 2 分鐘後） 漏電流 (Ø12.5~Ø16) ≦0.03CV 或 4μA，取較大值（施加額定工作電壓 1 分鐘後）																																																										
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>tan δ (max.)</td><td>Ø4~Ø10</td><td>0.35</td><td>0.26</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td><td>0.12</td><td>0.12</td></tr><tr><td>最大損耗角正切</td><td>Ø12.5~Ø16</td><td>0.42</td><td>0.38</td><td>0.34</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.14</td><td>0.12</td></tr></table>										Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50	63	100	tan δ (max.)	Ø4~Ø10	0.35	0.26	0.20	0.16	0.14	0.12	0.12	0.12	0.12	最大損耗角正切	Ø12.5~Ø16	0.42	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.12																
Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50	63	100																																																	
tan δ (max.)	Ø4~Ø10	0.35	0.26	0.20	0.16	0.14	0.12	0.12	0.12	0.12																																																	
最大損耗角正切	Ø12.5~Ø16	0.42	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.12																																																	
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50~63</td><td>100</td></tr><tr><td rowspan="3">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td rowspan="2">Ø4~Ø10</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td>15</td><td>8</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td><td>4</td></tr><tr><td rowspan="2">Ø12.5~Ø16</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40°C) / Z(20°C)</td><td>17</td><td>12</td><td>10</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td></tr></table>										Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50~63	100	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2	3	Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	4	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	7	5	4	3	2	2	2	2	Z(-40°C) / Z(20°C)	17	12	10	8	5	4	3	3
Rated Voltage (V) 額定工作電壓		4	6.3	10	16	25	35	50~63	100																																																		
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2	3																																																	
		Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	4																																																	
	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	7	5	4	3	2	2	2	2																																																	
Z(-40°C) / Z(20°C)		17	12	10	8	5	4	3	3																																																		
Load Life 高溫負荷特性	After 2000 hrs. (1000 hrs. for Ø4~Ø6.3×5.4) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時（Ø4~Ø6.3×5.4 為 1000 小時）後，電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial value for capacitors of 10V or more (Within ±30% of initial value for capacitors of 4V or less) ≥10V 為初始值的±20%以內（≤4V 為初始值的±30%以內）</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>										Capacitance Change 靜電容量變化率	Within ±20% of initial value for capacitors of 10V or more (Within ±30% of initial value for capacitors of 4V or less) ≥10V 為初始值的±20%以內（≤4V 為初始值的±30%以內）	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值																																											
Capacitance Change 靜電容量變化率	Within ±20% of initial value for capacitors of 10V or more (Within ±30% of initial value for capacitors of 4V or less) ≥10V 為初始值的±20%以內（≤4V 為初始值的±30%以內）																																																										
Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%																																																										
Leakage Current 漏電流	initial specified value or less 不大於規範值																																																										
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。																																																										
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>										Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																																											
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內																																																										
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Leakage Current 漏電流	initial specified value or less 不大於規範值																																																										
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																																										

DRAWING (Unit: mm) 外形圖



- *1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to Ø6.3~7.7 適用於 Ø6.3~7.7
 *3. Applicable to Ø8~10.5~Ø10 適用於 Ø8~10.5~Ø10
 *4. Applicable to Ø12.5~Ø16 適用於 Ø12.5~Ø16

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□ DIMENSIONS (Unit: mm) 尺寸表

ØD x L	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.4	5.4	5.4	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV µF Code 代碼		4		6.3		10		16		25	
		0G		0J		1A		1C		1E	
4.7	4R7									4 x 5.4	13
10	100							4 x 5.4	18	5 x 5.4 (4 x 5.4)	20 (14)
22	220			4 x 5.4	22	5 x 5.4 (4 x 5.4)	25 (20)	5 x 5.4 (4 x 5.4)	27 (20)	6.3 x 5.4 (5 x 5.4)	36 (25)
33	330	5 x 5.4 (4 x 5.4)	30 (18)	5 x 5.4 (4 x 5.4)	27 (22)	5 x 5.4 (4 x 5.4)	30 (22)	6.3 x 5.4 (5 x 5.4)	40 (28)	6.3 x 5.4 (5 x 5.4)	44 (29)
47	470	5 x 5.4 (4 x 5.4)	36 (24)	5 x 5.4 (4 x 5.4)	33 (25)	6.3 x 5.4 (5 x 5.4)	41 (30)	6.3 x 5.4 (5 x 5.4)	48 (31)	6.3 x 5.4 (8 x 6.2)	48 (91)
100	101	6.3 x 5.4 (5 x 5.4)	60 (43)	6.3 x 5.4 (5 x 5.4)	50 (39)	6.3 x 5.4 (8 x 6.2)	53 (110)	6.3 x 5.4 (8 x 6.2)	60 (120)	6.3 x 7.7	91
150	151	6.3 x 5.4	52	6.3 x 5.4	55	6.3 x 5.4	62	6.3 x 7.7	95	8 x 10.5 (6.3 x 7.7)	140 (100)
220	221	6.3 x 5.4	57	6.3 x 7.7 (6.3 x 5.4)	105 (67)	6.3 x 7.7 (8 x 6.2)	105 (105)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	150 (105) (85)	8 x 10.5	175
330	331	6.3 x 7.7	100	6.3 x 7.7	105	8 x 10.5	196	8 x 10.5	195	10 x 10.5 (8 x 10.5)	240 (220)
470	471	6.3 x 7.7	105	8 x 10.5 (6.3 x 7.7)	210 (120)	10 x 10.5 (8 x 10.5)	260 (210)	10 x 10.5 (8 x 10.5)	295 (230)	10 x 10.5	280
680	681	8 x 10.5	210	8 x 10.5	210	10 x 10.5	270	10 x 10.5	315	10 x 13.5	400
1000	102	8 x 10.5	230	10 x 10.5 (8 x 10.5)	300 (230)	10 x 10.5	315	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	500 (390) (340)	12.5 x 13.5	580
1500	152	10 x 10.5	315	10 x 13.5 (10 x 10.5)	450 (315)	10 x 13.5	460	12.5 x 13.5	550	12.5 x 16	850
2200	222	10 x 13.5 (10 x 10.5)	440 (340)	12.5 x 13.5 (10 x 13.5)	620 (500)	12.5 x 13.5	680	16 x 16.5 (12.5 x 16)	950 (750)	16 x 16.5	1050
3300	332	10 x 13.5	490	12.5 x 16 (12.5 x 13.5)	700 (660)	16 x 16.5	1000	16 x 16.5	1000		
4700	472	12.5 x 13.5	600	16 x 16.5	1000					Case size 尺寸	Ripple current 紋波電流
6800	682	16 x 16.5 (12.5 x 16)	950 (650)								

WV µF Code 代碼		35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4 x 5.4	0.7	4 x 5.4	0.7		
0.22	R22			4 x 5.4	1.6	4 x 5.4	1.6		
0.33	R33			4 x 5.4	2.5	4 x 5.4	2.5		
0.47	R47			4 x 5.4	3.5	4 x 5.4	3.5		
1	010			4 x 5.4	7	4 x 5.4	7	4 x 5.4	7
2.2	2R2			4 x 5.4	11	4 x 5.4	11	6.3 x 5.4	14
3.3	3R3	4 x 5.4	13	4 x 5.4	13	5 x 5.4	13	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	32 (20) (30)
4.7	4R7	4 x 5.4	14	5 x 5.4 (4 x 5.4)	16 (13)	5 x 5.4	16	6.3 x 7.7 (6.3 x 5.4)	35 (21)
10	100	5 x 5.4 (4 x 5.4)	21 (14)	6.3 x 5.4	24	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	39 (24) (25)	8 x 10.5 (6.3 x 7.7)	77 (35)
22	220	6.3 x 5.4	38	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	51 (42) (70)	8 x 10.5 (6.3 x 7.7)	98 (49)	10 x 10.5 (8 x 10.5)	126 (84)
33	330	6.3 x 5.4 (8 x 6.2)	42 (84)	6.3 x 7.7	60	8 x 10.5	112	10 x 10.5	133
47	470	6.3 x 7.7 (6.3 x 5.4)	70 (50)	8 x 10.5 (6.3 x 7.7)	120 (63)	10 x 10.5 (8 x 10.5)	160 (119)	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	250 (160) (140)
68	680					Case size 尺寸	Ripple current 紋波電流	12.5 x 13.5 (10 x 13.5)	300 (180)

•Case size ØDxL(mm), ripple current (mA rms) at 105°C 120Hz •尺寸ØDxL(mm), 紋波電流(mA rms)於 105°C 120Hz

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code μF 代碼		35		50		63		100	
		1V		1H		1J		2A	
100	101	8 × 10.5 (6.3 × 7.7)	120 (84)	10 × 10.5 (8 × 10.5)	170 (140)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	270 (210) (196)	16 × 16.5 (12.5 × 13.5)	450 (380)
150	151	8 × 10.5	155	10 × 10.5	170	10 × 13.5	225		
220	221	10 × 10.5 (8 × 10.5)	220 (190)	10 × 13.5 (10 × 10.5)	280 (220)	16 × 16.5 (12.5 × 13.5) (10 × 13.5)	560 (470) (235)	16 × 16.5	550
330	331	10 × 10.5	245	16 × 16.5 (12.5 × 13.5) (10 × 13.5)	600 (420) (295)	16 × 16.5 (12.5 × 16)	700 (510)		
470	471	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	520 (375) (280)	16 × 16.5 (12.5 × 16)	700 (520)	16 × 16.5	750		
680	681	12.5 × 13.5 (10 × 13.5)	530 (395)	16 × 16.5	750			Case size 尺寸	Ripple current 紋波電流
1000	102	16 × 16.5 (12.5 × 16)	750 (600)						

• Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz • 尺寸 $\varnothing D \times L$ (mm), 紋波電流 (mA rms) 於 105°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	Ø4 ~ Ø10	0.1 ~ 68μF	0.70	1.00	1.17	1.36	1.50
		100 ~ 3300μF	0.85	1.00	1.08	1.20	1.30
	Ø12.5 ~ Ø16	~ 68μF	0.75	1.00	1.35	1.57	2.00
		100 ~ 680μF	0.80	1.00	1.23	1.34	1.50
		1000 ~ 6800μF	0.85	1.00	1.10	1.13	1.15

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

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LOW LEAKAGE CURRENT

低漏電品

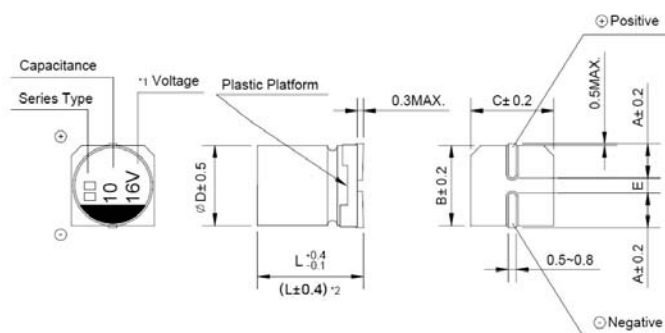
- Low leakage current (0.5 ~ 3.3 μ A max.)
低漏電流 (0.5 ~ 3.3 μ A 最大值)
- Low cost for replacement of some tantalum applications
可替換價格較高的鉭電容器
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性						
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C						
Voltage Range 額定工作電壓範圍	6.3 ~ 50V						
Capacitance Range 靜電容量範圍	0.1 ~ 220μF						
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C						
Leakage Current 漏電流	Leakage current ≤ 0.002CV or 0.5μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 ≤ 0.002CV 或 0.5μA，取較大值（施加額定工作電壓 2 分鐘後）						
Surge Voltage & Dissipation Factor (tan δ) 浪湧電壓和損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C						
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50
	Surge voltage 浪湧電壓	8.0	13	20	32	44	63
	tan δ (max.) 最大損耗角正切	0.24	0.20	0.16	0.14	0.12	0.10
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz						
	Rated Voltage (V) 額定工作電壓	6.3	10	16, 25	35	50	
	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(-25°C) / Z(20°C)	4	3	2	2	
		Z(-40°C) / Z(20°C)	8	6	4	3	
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 2000 小時後，電容器的特性符合下表的要求。						
	Capacitance Change 靜電容量變化率	Within ±25% of initial value 初始值的±25%以內					
	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%					
	Leakage Current 漏電流	initial specified value or less 不大於規範值					
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。						
	Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內					
	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值					
	Leakage Current 漏電流	initial specified value or less 不大於規範值					
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。						

□ DRAWING (Unit: mm) 外形圖



*1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to $\varnothing 6.3 \times 7.7$ 適用於 $\varnothing 6.3 \times 7.7$

□ DIMENSIONS (Unit: mm) 尺寸表

$\varnothing D \times L$	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7
A	1.8	2.1	2.4	2.4
B	4.3	5.3	6.6	6.6
C	4.3	5.3	6.6	6.6
E ± 0.2	1.0	1.3	2.2	2.2
L	5.4	5.4	5.4	7.7

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DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR 規格尺寸及最大允許紋波電流及 ESR 值

WV Parameter 參數 μF		6.3 (0J)			10 (1A)			16 (1C)		
		Case size ØD×L (mm) 尺寸	E.S.R. (Ω) 20°C 120Hz E.S.R.值	Ripple current (mA rms) at 85°C 120Hz 紋波電流	Case size ØD×L (mm) 尺寸	E.S.R. (Ω) 20°C 120Hz E.S.R.值	Ripple current (mA rms) at 85°C 120Hz 紋波電流	Case size ØD×L (mm) 尺寸	E.S.R. (Ω) 20°C 120Hz E.S.R.值	Ripple current (mA rms) at 85°C 120Hz 紋波電流
10	100							4 × 5.4	34.5	25
22	220	4 × 5.4	23.5	31	5 × 5.4	19.6	35	5 × 5.4	15.7	39
33	330	5 × 5.4	15.7	39	5 × 5.4	13.1	43	6.3 × 5.4	10.5	57
47	470	5 × 5.4	11.0	47	6.3 × 5.4	9.2	59	6.3 × 5.4	7.3	68
100	101	6.3 × 5.4	5.2	75	6.3 × 5.4	4.3	76	6.3 × 7.7	3.5	96
220	221	6.3 × 7.7	2.4	85						

WV Parameter 參數 μF		25 (1E)			35 (1V)			50 (1H)		
		Case size ØD×L (mm) 尺寸	E.S.R. (Ω) 20°C 120Hz E.S.R.值	Ripple current (mA rms) at 85°C 120Hz 紋波電流	Case size ØD×L (mm) 尺寸	E.S.R. (Ω) 20°C 120Hz E.S.R.值	Ripple current (mA rms) at 85°C 120Hz 紋波電流	Case size ØD×L (mm) 尺寸	E.S.R. (Ω) 20°C 120Hz E.S.R.值	Ripple current (mA rms) at 85°C 120Hz 紋波電流
0.1	0R1							4 × 5.4	2156	1.0
0.22	R22							4 × 5.4	980	2.3
0.33	R33							4 × 5.4	653	3.5
0.47	R47							4 × 5.4	459	5
1	010							4 × 5.4	216	10
2.2	2R2							4 × 5.4	98	15
3.3	3R3							4 × 5.4	65	18
4.7	4R7	4 × 5.4	64.2	19	4 × 5.4	55.1	20	5 × 5.4	46	23
10	100	5 × 5.4	30.2	28	5 × 5.4	25.9	30	6.3 × 5.4	22	34
22	220	6.3 × 5.4	13.7	52	6.3 × 5.4	11.8	54	6.3 × 7.7	9.8	85
33	330	6.3 × 5.4	9.1	63	6.3 × 7.7	7.8	105			
47	470	6.3 × 7.7	6.4	100	6.3 × 7.7	5.5	110			

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率	~50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	0.70	1.00	1.17	1.36	1.50

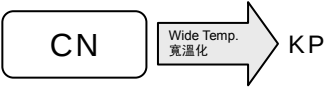
- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

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BI-POLARIZED
雙極性品

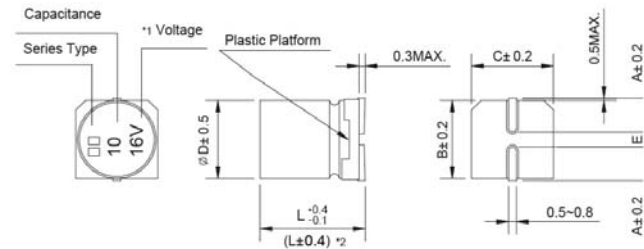
- Bi-polarized with general temperature +85°C
雙極性和適用於 +85°C 的常規溫度
- Load life of 1000 hours
負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性				
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C				
Voltage Range 額定工作電壓範圍	6.3 ~ 50V				
Capacitance Range 靜電容量範圍	0.1 ~ 100μF				
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C				
Leakage Current 漏電流	Leakage current ≤ 0.05CV or 10μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 ≤ 0.05CV 或 10μA，取較大值（施加額定工作電壓 2 分鐘後）				
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C				
	Rated Voltage (V) 額定工作電壓	6.3	10	16, 25	35, 50
	tan δ (max.) 最大損耗角正切	0.24	0.20	0.17	0.15
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz				
	Rated Voltage (V) 額定工作電壓	6.3	10	16, 25	35, 50
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2
	ZT/Z20 (max.)	Z(-40°C) / Z(20°C)	8	6	4
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 85°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，電容器的特性符合下表的要求。				
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內			
	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%			
	Leakage Current 漏電流	initial specified value or less 不大於規範值			
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 85°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。				
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。				
	Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內			
	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值			
	Leakage Current 漏電流	initial specified value or less 不大於規範值			
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。				

DRAWING (Unit: mm) 外形圖



*1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
*2. Applicable to Ø6.3×7.7 適用於 Ø6.3×7.7

DIMENSIONS (Unit: mm) 尺寸表

ØD x L	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7
A	1.8	2.1	2.4	2.4
B	4.3	5.3	6.6	6.6
C	4.3	5.3	6.6	6.6
E ± 0.2	1.0	1.3	2.2	2.2
L	5.4	5.4	5.4	7.7

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4 × 5.4	1.0
0.22	R22											4 × 5.4	2.0
0.33	R33											4 × 5.4	2.8
0.47	R47											4 × 5.4	4.0
1	010											4 × 5.4	8.4
2.2	2R2									4 × 5.4	8.4	5 × 5.4	13
3.3	3R3							5 × 5.4	12	5 × 5.4	16	5 × 5.4	17
4.7	4R7					4 × 5.4	12	5 × 5.4	16	5 × 5.4	18	6.3 × 5.4	20
10	100			4 × 5.4	17	5 × 5.4	23	6.3 × 5.4	27	6.3 × 5.4	29	6.3 × 7.7	36
22	220	5 × 5.4	28	6.3 × 5.4	33	6.3 × 5.4	37	6.3 × 7.7	50	6.3 × 7.7	54		
33	330	6.3 × 5.4	37	6.3 × 5.4	41	6.3 × 5.4	49	6.3 × 7.7	61				
47	470	6.3 × 5.4	45	6.3 × 7.7	61	6.3 × 7.7	75					Case size 尺寸	Ripple current 紋波電流
100	101	6.3 × 7.7	82	6.3 × 7.7	85								

•Case size ∅D×L(mm), ripple current (mA rms) at 85°C 120Hz •尺寸∅D×L(mm), 紋波電流(mA rms)於 85°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率	50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	0.70	1.00	1.17	1.36	1.50

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

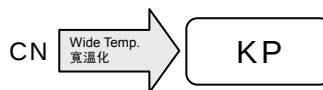
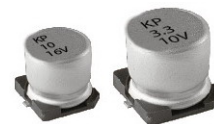
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BI-POLARIZED, WIDE TEMPERATURE

雙極性寬溫品

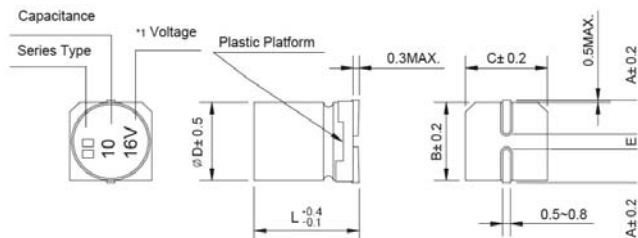
- Bi-polarized with wide temperature range -55°C ~ +105°C
雙極性和適用於 -55°C ~ +105°C 的寬溫範圍
- Load life of 1000 hours
負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																					
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C																					
Voltage Range 額定工作電壓範圍	6.3 ~ 50V																					
Capacitance Range 靜電容量範圍	0.1 ~ 47μF																					
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																					
Leakage Current 漏電流	Leakage current ≦ 0.05CV or 10μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 ≦ 0.05CV 或 10μA, 取較大值 (施加額定工作電壓 2 分鐘後)																					
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.17</td><td>0.15</td></tr></table>					Rated Voltage (V) 額定工作電壓	6.3	10	16, 25	35, 50	tan δ (max.) 最大損耗角正切	0.24	0.20	0.17	0.15							
Rated Voltage (V) 額定工作電壓	6.3	10	16, 25	35, 50																		
tan δ (max.) 最大損耗角正切	0.24	0.20	0.17	0.15																		
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16, 25</td><td>35, 50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>					Rated Voltage (V) 額定工作電壓		6.3	10	16, 25	35, 50	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(-25°C) / Z(20°C)	4	3	2	2	Z(-55°C) / Z(20°C)	8	6	4	3
Rated Voltage (V) 額定工作電壓		6.3	10	16, 25	35, 50																	
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(-25°C) / Z(20°C)	4	3	2	2																	
	Z(-55°C) / Z(20°C)	8	6	4	3																	
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時 (每 250 小時必須轉換一次極性) 後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>					Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值											
Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內																					
Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%																					
Leakage Current 漏電流	initial specified value or less 不大於規範值																					
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																					
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>					Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值											
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內																					
Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值																					
Leakage Current 漏電流	initial specified value or less 不大於規範值																					
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																					

□ DRAWING (Unit: mm) 外形圖



*1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to Ø6.3×7.7 適用於 Ø6.3×7.7

□ DIMENSIONS (Unit: mm) 尺寸表

ØD x L	4 x 5.4	5 x 5.4	6.3 x 5.4
A	1.8	2.1	2.4
B	4.3	5.3	6.6
C	4.3	5.3	6.6
E ± 0.2	1.0	1.3	2.2
L	5.4	5.4	5.4

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4 × 5.4	1.0
0.22	R22											4 × 5.4	2.0
0.33	R33											4 × 5.4	2.8
0.47	R47											4 × 5.4	4.0
1	010											4 × 5.4	8.4
2.2	2R2									4 × 5.4	8.4	5 × 5.4	13
3.3	3R3							5 × 5.4	12	5 × 5.4	16	5 × 5.4	17
4.7	4R7					4 × 5.4	12	5 × 5.4	16	5 × 5.4	18	6.3 × 5.4	20
10	100			4 × 5.4	17	5 × 5.4	23	6.3 × 5.4	27	6.3 × 5.4	29		
22	220	5 × 5.4	28	6.3 × 5.4	33	6.3 × 5.4	37						
33	330	6.3 × 5.4	37	6.3 × 5.4	41	6.3 × 5.4	49					Case size 尺寸	Ripple current 紋波電流
47	470	6.3 × 5.4	45										

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率	50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	0.70	1.00	1.17	1.36	1.50

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

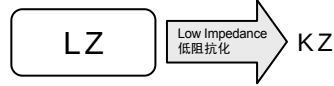
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LOW IMPEDANCE

低阻抗品

- Low impedance with temperature range -55 ~ +105°C
低阻抗和適用於 -55 ~ +105°C 的溫度範圍
- Load life of 1000 ~ 2000 hours
負荷壽命 1000 ~ 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令

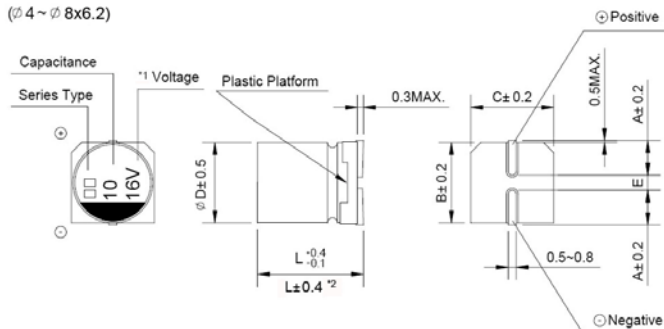


SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																													
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C																																													
Voltage Range 額定工作電壓範圍	6.3 ~ 50V																																													
Capacitance Range 靜電容量範圍	1 ~ 4700μF																																													
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																													
Leakage Current 漏電流	Leakage current (Ø4~Ø10) ≦0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (Ø12.5~Ø16) ≦0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (Ø4~Ø10) ≦0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (Ø12.5~Ø16) ≦0.03CV 或 4μA, 取較大值 (施加額定工作電壓 1 分鐘後)																																													
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">tan δ (max.) 最大損耗角正切</td><td>Ø4~Ø10</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td></tr><tr><td>Ø12.5~Ø16</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>							Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50	tan δ (max.) 最大損耗角正切	Ø4~Ø10	0.22	0.19	0.16	0.14	0.12	0.12	Ø12.5~Ø16	0.26	0.22	0.18	0.16	0.14	0.12																
Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50																																							
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Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td rowspan="2">Ø4~Ø10</td><td>Z(-25°C) / Z(20°C)</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>5</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr><tr><td rowspan="2"></td><td rowspan="2">Ø12.5~Ø16</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td></tr></table>							Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	2	2	2	2	2	Z(-55°C) / Z(20°C)	5	4	4	3	3	3		Ø12.5~Ø16	Z(-25°C) / Z(20°C)	3	3	2	2	2	2	Z(-55°C) / Z(20°C)	10	8	6	4	3	3
Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50																																							
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	2	2	2	2	2																																							
		Z(-55°C) / Z(20°C)	5	4	4	3	3	3																																						
	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	3	3	2	2	2	2																																						
		Z(-55°C) / Z(20°C)	10	8	6	4	3	3																																						
Load Life 高溫負荷特性	After 2000 hrs. (1000 hrs. for Ø4~Ø6.3×5.4) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時 (Ø4~Ø6.3×5.4 為 1000 小時) 後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±20% of initial value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值																																	
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Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%																																													
Leakage Current 漏電流	initial specified value or less 不大於規範值																																													
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																													
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																																	
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Leakage Current 漏電流	initial specified value or less 不大於規範值																																													
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																													

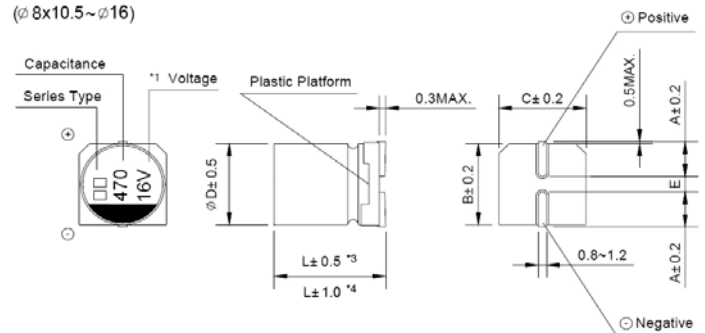
DRAWING (Unit: mm) 外形圖

(∅4 ~ ∅8x6.2)



- *1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to ∅6.3×7.7 適用於 ∅6.3×7.7
 *3. Applicable to ∅8×10.5~∅10 適用於 ∅8×10.5~∅10
 *4. Applicable to ∅12.5~∅16 適用於 ∅12.5~∅16

(∅8x10.5~∅16)



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□ DIMENSIONS (Unit: mm) 尺寸表

∅D x L	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.4	5.4	5.4	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Code μF 代碼	6.3			10			16		
	0J			1A			1C		
10 100							4 x 5.4	3.0	60
15 150							5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)
22 220	4 x 5.4	3.0	60	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)
33 330	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)
47 470	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)
68 680	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4	1.0	140	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)
100 101	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)
150 151	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7	0.6	230
220 221	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7	0.6	230	8 x 10.5 (6.3 x 7.7)	0.30 (0.6)	450 (230)
330 331	6.3 x 7.7	0.6	230	8 x 10.5	0.30	450	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)
470 471	8 x 10.5	0.30	450	8 x 10.5	0.30	450	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)
680 681	8 x 10.5	0.30	450	10 x 10.5	0.15	670	10x 10.5	0.15	670
1000 102	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)	10 x 10.5	0.15	670	10 x 10.5	0.15	670
1500 152	10 x 13.5 (10 x 10.5)	0.13 (0.15)	750 (670)	12.5 x 13.5 (10 x 13.5)	0.11 (0.13)	820 (750)	12.5 x 13.5	0.11	820
2200 222	12.5 x 13.5 (10 x 13.5)	0.11 (0.13)	820 (750)	12.5 x 16	0.09	950	16 x 16.5 (12.5 x 16)	0.08 (0.09)	1260 (950)
3300 332	12.5 x 16 (12.5 x 13.5)	0.09 (0.11)	950 (820)	16 x 16.5	0.08	1260	16 x 16.5	0.08	1260
4700 472	16 x 16.5	0.08	1260	16 x 16.5	0.08	1260			

WV Code μF 代碼	25			35			50		
	1E			1V			1H		
1 010				4 x 5.4	3.0	60	4 x 5.4	5.0	30
1.5 1R5				4 x 5.4	3.0	60	4 x 5.4	5.0	30
2.2 2R2				4 x 5.4	3.0	60	4 x 5.4	5.0	30
3.3 3R3				4 x 5.4	3.0	60	4 x 5.4	5.0	30
4.7 4R7	4 x 5.4	3.0	60	4 x 5.4	3.0	60	5 x 5.4	3.0	50
6.8 6R8	4 x 5.4	3.0	60	5 x 5.4	1.8	95	6.3 x 5.4	2.0	70
10 100	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	5 x 5.4 (4 x 5.4)	1.8 (3.0)	95 (60)	6.3 x 5.4	2.0	70
15 150	6.3 x 5.4	1.8	95	5 x 5.4	1.8	95	6.3 x 5.4	2.0	70
22 220	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 7.7 (6.3 x 5.4)	1.0 (2.0)	120 (70)
33 330	6.3 x 5.4 (5 x 5.4)	1.0 (1.8)	140 (95)	6.3 x 5.4	1.0	140	6.3 x 7.7	1.0	120
47 470	6.3 x 7.7 (6.3 x 5.4)	0.6 (1.0)	230 (140)	6.3 x 7.7 (6.3 x 5.4)	0.60 (1.0)	230 (140)	6.3 x 7.7	1.0	120
68 680	6.3 x 7.7	0.6	230	6.3 x 7.7	0.60	230	8 x 10.5	0.60	300
100 101	6.3 x 7.7	0.6	230	8 x 10.5	0.30	450	8 x 10.5	0.60	300
150 151	8 x 10.5 (6.3 x 7.7)	0.30 (0.6)	450 (230)	8 x 10.5	0.30	450	10 x 10.5	0.30	500
							Case size ∅D x L (mm) 尺寸	Impedance (Ω) at 20°C 100KHz 阻抗值	Ripple current (mA rms) at 105°C 100KHz 紋波電流

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CAT.2011/V5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Code μF 代碼	25				35			50		
	1E				1V			1H		
220	221	8 x 10.5	0.30	450	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)	10 x 10.5	0.30	500
330	331	10 x 10.5 (8 x 10.5)	0.15 (0.30)	670 (450)	10 x 10.5	0.15	670	16 x 16.5 (12.5 x 13.5) (10 x 13.5)	0.12 (0.20) (0.25)	1060 (650) (580)
470	471	10 x 10.5	0.15	670	10 x 10.5	0.15	670	16 x 16.5 (12.5 x 16)	0.12 (0.15)	1060 (700)
680	681	10 x 13.5	0.13	750	12.5 x 13.5 (10 x 13.5)	0.11 (0.13)	820 (750)	16 x 16.5	0.12	1060
1000	102	16 x 16.5 (12.5 x 13.5)	0.08 (0.11)	1260 (820)	16 x 16.5 (12.5 x 16)	0.08 (0.09)	1260 (950)			
1500	152	12.5 x 16	0.09	950	16 x 16.5	0.08	1260	Case size ∅D×L(mm) 尺寸	Impedance (Ω) at 20°C 100KHz 阻抗值	Ripple current (mA rms) at 105°C 100KHz 紋波電流
2200	222	16 x 16.5	0.08	1260						

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	∅4 ~ ∅10	1 ~ 68μF	0.35	0.50	0.64	0.83	1.00
		100 ~ 2200μF	0.40	0.55	0.70	0.85	1.00
	∅12.5 ~ ∅16	~ 680μF	0.45	0.65	0.80	0.90	1.00
		1000 ~ 4700μF	0.65	0.85	0.95	1.00	1.00

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

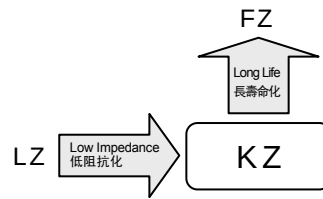
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EXTRA LOWER IMPEDANCE

極低阻抗品

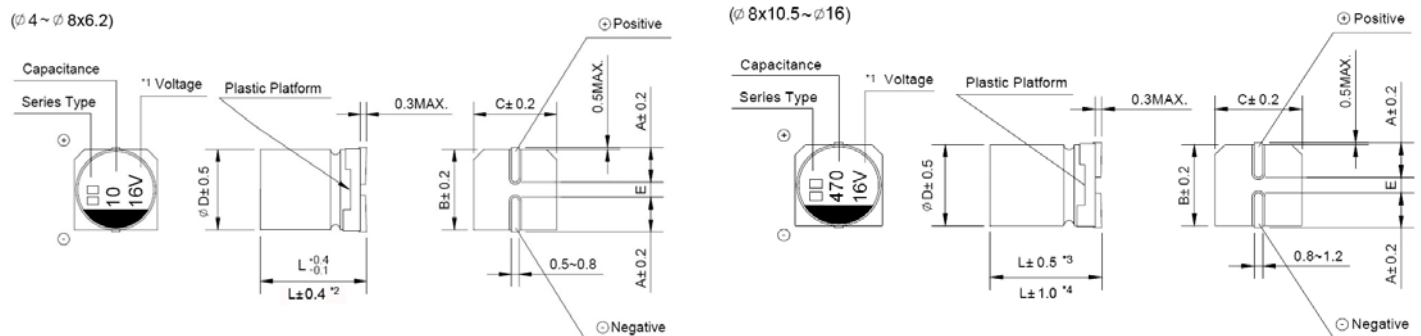
- Extra low impedance with temperature range -55 ~ +105°C
極低阻抗和適用於 -55 ~ +105°C 的溫度範圍
- Impedance 40~60% less than LZ series
阻抗值比 LZ 系列低 40~60%
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																										
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C																																										
Voltage Range 額定工作電壓範圍	6.3 ~ 50V																																										
Capacitance Range 靜電容量範圍	4.7 ~ 4700μF																																										
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																										
Leakage Current 漏電流	Leakage current (Ø4~Ø10) ≦0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (Ø12.5~Ø16) ≦0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (Ø4~Ø10) ≦0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (Ø12.5~Ø16) ≦0.03CV 或 4μA, 取較大值 (施加額定工作電壓 1 分鐘後)																																										
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">tan δ (max.) 最大損耗角正切</td><td>Ø4~Ø10</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td></tr><tr><td>Ø12.5~Ø16</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td></tr></table>							Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50	tan δ (max.) 最大損耗角正切	Ø4~Ø10	0.22	0.19	0.16	0.14	0.12	0.12	Ø12.5~Ø16	0.26	0.22	0.18	0.16	0.14	0.12													
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	Ø12.5~Ø16	0.26	0.22	0.18	0.16	0.14	0.12																																				
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td rowspan="2">Ø4~Ø10</td><td>Z(-25°C) / Z(20°C)</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>5</td><td>4</td><td>4</td><td>3</td><td>3</td></tr><tr><td rowspan="2"></td><td rowspan="2">Ø12.5~Ø16</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>							Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	2	2	2	2	2	Z(-55°C) / Z(20°C)	5	4	4	3	3		Ø12.5~Ø16	Z(-25°C) / Z(20°C)	3	3	2	2	2	Z(-55°C) / Z(20°C)	10	8	6	4	3
Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50																																				
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	2	2	2	2	2																																				
		Z(-55°C) / Z(20°C)	5	4	4	3	3																																				
	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	3	3	2	2	2																																				
		Z(-55°C) / Z(20°C)	10	8	6	4	3																																				
Load Life 高溫負荷特性	After 3000 hrs. (1000 hrs. for Ø4~Ø6.3×5.8, 2000 hrs. for Ø6.3×7.7 & Ø8) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 3000 小時(Ø4~Ø6.3×5.8 為 1000 小時 Ø6.3×7.7 和 Ø8 為 2000 小時) 後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±25% of initial value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±25% of initial value 初始值的±25%以內	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值																														
Capacitance Change 靜電容量變化率	Within ±25% of initial value 初始值的±25%以內																																										
Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%																																										
Leakage Current 漏電流	initial specified value or less 不大於規範值																																										
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																										
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																														
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Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值																																										
Leakage Current 漏電流	initial specified value or less 不大於規範值																																										
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																										

DRAWING (Unit: mm) 外形圖



- *1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to Ø6.3×7.7 適用於 Ø6.3×7.7
 *3. Applicable to Ø8×10.5~Ø10 適用於 Ø8×10.5~Ø10
 *4. Applicable to Ø12.5~Ø16 適用於 Ø12.5~Ø16

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□ DIMENSIONS (Unit: mm) 尺寸表

∅D x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Code μF 代碼	6.3			10			16		
	0J			1A			1C		
10 100							4 x 5.8	1.8	80
15 150							4 x 5.8	1.8	80
22 220	4 x 5.8	1.8	80	4 x 5.8	1.8	80	5 x 5.8 (4 x 5.8)	0.76 (1.8)	150 (80)
33 330	5 x 5.8 (4 x 5.8)	0.76 (1.8)	150 (80)	5 x 5.8 (4 x 5.8)	0.76 (1.8)	150 (80)	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)
47 470	5 x 5.8 (4 x 5.8)	0.76 (1.8)	150 (80)	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)
56 560	5 x 5.8	0.76	150	6.3 x 5.8	0.44	230	6.3 x 5.8	0.44	230
68 680	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)	6.3 x 5.8	0.44	230	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.34 (0.44) (0.34)	280 (230) (280)
100 101	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.34 (0.44) (0.34)	280 (230) (280)	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.34 (0.44) (0.34)	280 (230) (280)
150 151	6.3 x 5.8	0.44	230	6.3 x 7.7	0.34	280	6.3 x 7.7	0.34	280
220 221	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.34 (0.44) (0.34)	280 (230) (280)	6.3 x 7.7 (8 x 6.2)	0.34 (0.34)	280 (280)	8 x 10.5 (6.3 x 7.7)	0.17 (0.34)	450 (280)
330 331	6.3 x 7.7 (8 x 6.2)	0.34 (0.34)	280 (280)	8 x 10.5	0.17	450	10 x 10.5 (8 x 10.5)	0.09 (0.17)	670 (450)
470 471	8 x 10.5	0.17	450	8 x 10.5	0.17	450	10 x 10.5 (8 x 10.5)	0.09 (0.17)	670 (450)
680 681	10 x 10.5 (8 x 10.5)	0.09 (0.17)	670 (450)	10 x 10.5	0.09	670	10 x 13.5 (10 x 10.5)	0.075 (0.09)	800 (670)
1000 102	10 x 10.5 (8 x 10.5)	0.09 (0.17)	670 (450)	10 x 10.5	0.09	670	16 x 16.5 (12.5 x 16) (12.5 x 13.5)	0.055 (0.06) (0.065)	1350 (1050) (900)
1500 152	10 x 13.5 (10 x 10.5)	0.075 (0.09)	800 (670)	12.5 x 13.5	0.065	900	16 x 16.5	0.055	1350
2200 222	12.5 x 13.5	0.065	900	12.5 x 16	0.060	1050	16 x 16.5	0.055	1350
3300 332	12.5 x 16	0.060	1050	16 x 16.5	0.055	1350			
4700 472	16 x 16.5	0.055	1350						

WV Code μF 代碼	25			35			50		
	1E			1V			1H		
4.7 4R7				4 x 5.8	1.8	80	5 x 5.8 (4 x 5.8)	1.52 (3.0)	85 (60)
10 100	4 x 5.8	1.8	80	5 x 5.8 (4 x 5.8)	0.76 (1.8)	150 (80)	6.3 x 5.8 (5 x 5.8)	0.88 (1.52)	165 (85)
15 150	5 x 5.8	0.76	150	5 x 5.8	0.76	150	6.3 x 5.8	0.88	165
22 220	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.68 (0.88) (0.68)	185 (165) (185)
33 330	6.3 x 5.8 (5 x 5.8)	0.44 (0.76)	230 (150)	6.3 x 5.8 (8 x 6.2)	0.44 (0.34)	230 (280)	6.3 x 7.7 (8 x 6.2)	0.68 (0.68)	185 (185)
47 470	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.34 (0.44) (0.34)	280 (230) (280)	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.34 (0.44) (0.34)	280 (230) (280)	6.3 x 7.7 (8 x 6.2)	0.68 (0.68)	185 (185)
56 560	6.3 x 7.7 (6.3 x 5.8)	0.34 (0.44)	280 (230)	6.3 x 7.7	0.34	280	8 x 10.5 (6.3 x 7.7)	0.34 (0.68)	350 (185)
68 680	6.3 x 7.7	0.34	280	6.3 x 7.7	0.34	280	8 x 10.5	0.34	350
100 101	6.3 x 7.7 (8 x 6.2)	0.34 (0.34)	280 (280)	8 x 10.5	0.17	450	10 x 10.5 (8 x 10.5)	0.18 (0.34)	670 (350)
150 151	8 x 10.5 (6.3 x 7.7)	0.17 (0.34)	450 (280)	10 x 10.5	0.09	670	10 x 10.5	0.18	670
							Case size ∅D x L (mm) 尺寸	Impedance (Ω) at 20°C 100KHz 阻抗值	Ripple current (mA rms) at 105°C 紋波電流

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Code μF 代碼		25			35			50		
		1E			1V			1H		
220	221	8 × 10.5	0.17	450	10 × 10.5	0.09	670	10 × 13.5 (10 × 10.5)	0.16 (0.18)	750 (670)
330	331	10 × 10.5 (8 × 10.5)	0.09 (0.17)	670 (450)	10 × 10.5	0.09	670	12.5 × 13.5	0.14	800
470	471	10 × 13.5 (10 × 10.5)	0.075 (0.09)	800 (670)	12.5 × 13.5 (10 × 13.5)	0.065 (0.075)	900 (800)	16 × 16.5 (12.5 × 16)	0.10 (0.12)	1150 (900)
680	681	12.5×13.5	0.065	900	12.5 × 16 (12.5 × 13.5)	0.060 (0.065)	1050 (900)			
1000	102	16 × 16.5 (12.5 × 16)	0.055 (0.060)	1350 (1050)	16 × 16.5	0.055	1350	Case size ∅D×L(mm) 尺寸	Impedance (Ω) at 20°C 100KHz 阻抗值	Ripple current (mA rms) at 105°C 100KHz 紋波電流
1500	152	16 × 16.5	0.055	1350						

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	∅4 ~ ∅10	4.7 ~ 68μF	0.35	0.50	0.64	0.83	1.00
		100 ~ 1500μF	0.40	0.55	0.70	0.85	1.00
	∅12.5 ~ ∅16	~ 680μF	0.45	0.65	0.80	0.90	1.00
		1000 ~ 4700μF	0.65	0.85	0.95	1.00	1.00

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

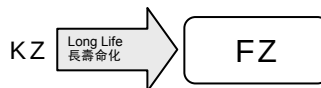
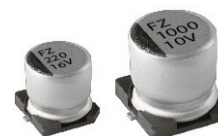
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LONG LIFE WITH EXTRA LOWER IMPEDANCE

長壽命極低阻抗品

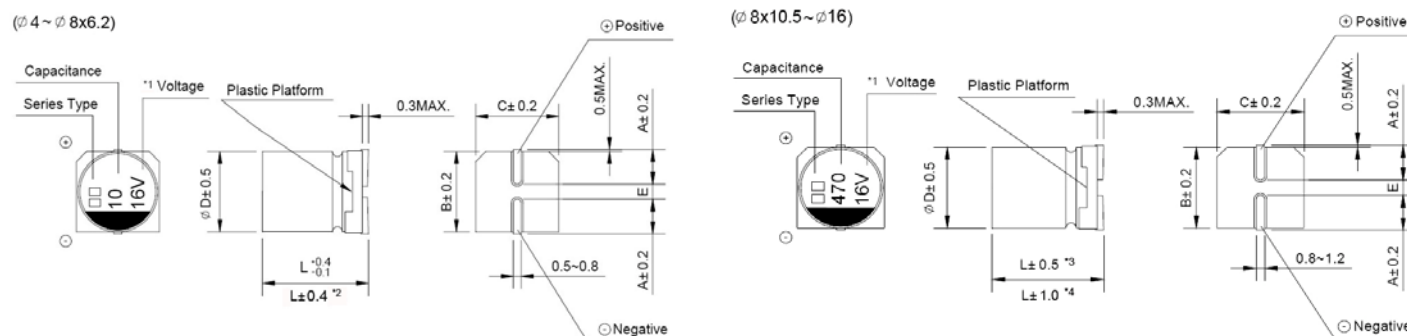
- Extra lower impedance with temperature range -55 ~ +105°C
極低阻抗和適用於 -55 ~ +105°C 的溫度範圍
- Load life of 2000~5000 hours
負荷壽命 2000~5000 小時
- Impedance 5~25% less than KZ series
阻抗值比 KZ 系列低 5~25%
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																																								
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C																																																								
Voltage Range 額定工作電壓範圍	6.3 ~ 100V																																																								
Capacitance Range 靜電容量範圍	3.3 ~ 4700μF																																																								
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																																								
Leakage Current 漏電流	Leakage current (∅4~∅10) ≦ 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (∅12.5~∅16) ≦ 0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (∅4~∅10) ≦ 0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (∅12.5~∅16) ≦ 0.03CV 或 4μA, 取較大值 (施加額定工作電壓 1 分鐘後)																																																								
Dissipation Factor (tan δ) 損耗角正切	<table><tr><td colspan="10">Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C</td></tr><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63~80</td><td>100</td><td></td></tr><tr><td>tan δ (max.)</td><td>∅4~∅10</td><td>0.26</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td><td>0.07</td></tr><tr><td>最大損耗角正切</td><td>∅12.5~∅16</td><td>0.26</td><td>0.19</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.10</td><td>0.08</td><td>0.07</td></tr></table>									Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C										Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	63~80	100		tan δ (max.)	∅4~∅10	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.07	最大損耗角正切	∅12.5~∅16	0.26	0.19	0.18	0.16	0.14	0.10	0.08	0.07								
Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C																																																									
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tan δ (max.)	∅4~∅10	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.07																																																
最大損耗角正切	∅12.5~∅16	0.26	0.19	0.18	0.16	0.14	0.10	0.08	0.07																																																
Stability at Low Temperature 低溫特性	<table><tr><td colspan="10">Measurement frequency 測試頻率: 120Hz</td></tr><tr><td colspan="3">Rated Voltage (V) 額定工作電壓</td><td colspan="3">6.3 ~ 16</td><td colspan="4">25 ~ 100</td></tr><tr><td rowspan="3">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td colspan="2">Z(-25°C) / Z(20°C)</td><td colspan="3">2</td><td colspan="4">2</td></tr><tr><td colspan="2">Z(-40°C) / Z(20°C)</td><td colspan="3">3</td><td colspan="4">3</td></tr><tr><td colspan="2">Z(-55°C) / Z(20°C)</td><td colspan="3">4</td><td colspan="4">3</td></tr></table>									Measurement frequency 測試頻率: 120Hz										Rated Voltage (V) 額定工作電壓			6.3 ~ 16			25 ~ 100				Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(-25°C) / Z(20°C)		2			2				Z(-40°C) / Z(20°C)		3			3				Z(-55°C) / Z(20°C)		4			3			
Measurement frequency 測試頻率: 120Hz																																																									
Rated Voltage (V) 額定工作電壓			6.3 ~ 16			25 ~ 100																																																			
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(-25°C) / Z(20°C)		2			2																																																			
	Z(-40°C) / Z(20°C)		3			3																																																			
	Z(-55°C) / Z(20°C)		4			3																																																			
Load Life 高溫負荷特性	After 5000 hrs. (2000 hrs. for ∅4~∅6.3×5.8 & ∅8×6.2) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時 (∅4~∅6.3×5.8 和 ∅8×6.2 為 2000 小時為) 後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>									Capacitance Change 靜電容量變化率	Within ±30% of initial value 初始值的±30%以內	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值																																										
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Leakage Current 漏電流	initial specified value or less 不大於規範值																																																								
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																																								
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>									Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																																										
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內																																																								
Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值																																																								
Leakage Current 漏電流	initial specified value or less 不大於規範值																																																								
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																																								

DRAWING (Unit: mm) 外形圖



- *1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to ∅6.3×7.7 適用於 ∅6.3×7.7
 *3. Applicable to ∅8×10.5~∅10 適用於 ∅8×10.5~∅10
 *4. Applicable to ∅12.5~∅16 適用於 ∅12.5~∅16

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□ DIMENSIONS (Unit: mm) 尺寸表

∅D x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Code μF 代碼	6.3			10			16		
	0J			1A			1C		
10 100							4 x 5.8	1.35	90
15 150							4 x 5.8	1.35	90
22 220	4 x 5.8	1.35	90	4 x 5.8	1.35	90	5 x 5.8 (4 x 5.8)	0.70 (1.35)	160 (90)
33 330	5 x 5.8 (4 x 5.8)	0.70 (1.35)	160 (90)	5 x 5.8 (4 x 5.8)	0.70 (1.35)	160 (90)	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)
47 470	5 x 5.8 (4 x 5.8)	0.70 (1.35)	160 (90)	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)
56 560	5 x 5.8	0.70	160	6.3 x 5.8	0.36	240	6.3 x 5.8	0.36	240
68 680	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)	6.3 x 5.8	0.36	240	6.3 x 7.7 (6.3 x 5.8)	0.26 (0.36)	300 (240)
100 101	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)	6.3 x 7.7 (6.3 x 5.8)	0.26 (0.36)	300 (240)	6.3 x 7.7 (6.3 x 5.8)	0.26 (0.36)	300 (240)
150 151	6.3 x 5.8	0.36	240	6.3 x 7.7	0.26	300	6.3 x 7.7	0.26	300
220 221	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.26 (0.36) (0.26)	300 (240) (300)	6.3 x 7.7 (8 x 6.2)	0.26 (0.26)	300 (300)	8 x 10.5 (6.3 x 7.7)	0.16 (0.26)	600 (300)
330 331	6.3 x 7.7 (8 x 6.2)	0.26 (0.26)	300 (300)	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)
470 471	8 x 10.5	0.16	600	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)
680 681	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 10.5	0.08	850	10 x 13.5 (10 x 10.5)	0.07 (0.08)	950 (850)
1000 102	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 13.5 (10 x 10.5)	0.07 (0.08)	950 (850)	16 x 16.5 (12.5 x 16) (12.5 x 13.5)	0.05 (0.055) (0.06)	1450 (1200) (1100)
1500 152	10 x 13.5 (10 x 10.5)	0.07 (0.08)	950 (850)	12.5 x 13.5	0.06	1100	16 x 16.5	0.05	1450
2200 222	12.5 x 13.5	0.06	1100	12.5 x 16	0.055	1200			
3300 332	12.5 x 16	0.055	1200	16 x 16.5	0.05	1450			
4700 472	16 x 16.5	0.05	1450				Case size 尺寸	Impedance 阻抗值	Ripple current 紋波電流

WV Code μF 代碼	25			35			50		
	1E			1V			1H		
4.7 4R7				4 x 5.8	1.35	90	5 x 5.8 (4 x 5.8)	1.52 (2.9)	85 (60)
10 100	4 x 5.8	1.35	90	5 x 5.8 (4 x 5.8)	0.70 (1.35)	160 (90)	6.3 x 5.8 (5 x 5.8)	0.88 (1.52)	165 (85)
15 150	5 x 5.8	0.70	160	5 x 5.8	0.70	160	6.3 x 5.8	0.88	165
22 220	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.68 (0.88) (0.68)	195 (165) (195)
33 330	6.3 x 5.8 (5 x 5.8)	0.36 (0.70)	240 (160)	6.3 x 5.8 (8 x 6.2)	0.36 (0.26)	240 (300)	6.3 x 7.7 (6.3 x 6.2)	0.68 (0.68)	195 (195)
47 470	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.26 (0.36) (0.26)	300 (240) (300)	6.3 x 7.7 (6.3 x 5.8) (8 x 6.2)	0.26 (0.36) (0.26)	300 (240) (300)	6.3 x 7.7 (8 x 6.2)	0.68 (0.68)	195 (195)
56 560	6.3 x 7.7 (6.3 x 5.8)	0.26 (0.36)	300 (240)	6.3 x 7.7	0.26	300	8 x 10.5	0.34	350
68 680	6.3 x 7.7	0.26	300	6.3 x 7.7	0.26	300	8 x 10.5	0.34	350
100 101	6.3 x 7.7 (8 x 6.2)	0.26 (0.26)	300 (300)	8 x 10.5	0.16	600	10 x 10.5 (8 x 10.5)	0.18 (0.34)	670 (350)
150 151	8 x 10.5 (6.3 x 7.7)	0.16 (0.26)	600 (300)	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 10.5	0.18	670
220 221	8 x 10.5	0.16	600	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 13.5 (10 x 10.5)	0.14 (0.18)	780 (670)
330 331	10 x 10.5 (8 x 10.5)	0.08 (0.16)	850 (600)	10 x 10.5	0.08	850	12.5 x 13.5	0.12	900
470 471	10 x 13.5 (10 x 10.5)	0.07 (0.08)	950 (850)	12.5 x 13.5 (10 x 13.5)	0.06 (0.07)	1100 (950)	16 x 16.5 (12.5 x 16)	0.08 (0.10)	1250 (1050)
680 681	12.5 x 13.5	0.06	1100	12.5 x 16	0.055	1200			
1000 102	16 x 16.5 (12.5 x 16)	0.05 (0.055)	1450 (1200)	16 x 16.5	0.05	1450			
1500 152	16 x 16.5	0.05	1450				Case size 尺寸	Impedance 阻抗值	Ripple current 紋波電流

•Case size 尺寸 ∅D×L(mm), impedance 阻抗值 (Ω) at 20°C 100KHz, ripple current 紋波電流 (mA rms) at 105°C 100KHz

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DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Code μF 代碼		63			80			100		
		1J			1K			2A		
3.3	3R3				5 × 5.8	5.0	25			
4.7	4R7	5 × 5.8	3.0	50	6.3 × 5.8	3.0	40			
10	100	6.3 × 7.7 (6.3 × 5.8)	1.2 (1.5)	120 (80)	6.3 × 7.7 (8 × 6.2)	2.4 (2.4)	60 (60)	8 × 10.5	1.3	130
22	220	8 × 10.5 (6.3 × 7.7) (8 × 6.2)	0.65 (1.2) (1.2)	250 (120) (120)	8 × 10.5	1.3	130	10 × 10.5 (8 × 10.5)	0.7 (1.3)	200 (130)
33	330	8 × 10.5	0.65	250	8 × 10.5	1.3	130	10 × 10.5	0.7	200
47	470	8 × 10.5	0.65	250	10 × 10.5	0.7	200	12.5 × 13.5 (10 × 13.5)	0.32 (0.60)	500 (250)
68	680	12.5 × 13.5 (8 × 10.5)	0.16 (0.65)	800 (250)	12.5 × 13.5	0.32	500	12.5 × 13.5	0.32	500
100	101	12.5 × 13.5 (10 × 10.5)	0.16 (0.35)	800 (400)	12.5 × 13.5	0.32	500	16 × 16.5 (12.5 × 16)	0.17 (0.26)	795 (550)
150	151	12.5 × 13.5 (10 × 13.5)	0.16 (0.25)	800 (650)	12.5 × 13.5	0.32	500			
220	221	12.5 × 13.5 (10 × 13.5)	0.16 (0.25)	800 (650)	12.5 × 16	0.26	550			
330	331	16 × 16.5	0.082	1400	16 × 16.5	0.17	795	Case size 尺寸	Impedance 阻抗值	Ripple current 紋波電流

• Case size 尺寸 ØD×L(mm), impedance 阻抗值 (Ω) at 20°C 100KHz, ripple current 紋波電流 (mA rms) at 105°C 100KHz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	Ø4 ~ Ø10	4.7 ~ 68μF	0.35	0.50	0.64	0.83	1.00
		100 ~ 1500μF	0.40	0.55	0.70	0.85	1.00
	Ø12.5 ~ Ø16	~ 68μF	0.40	0.55	0.70	0.85	1.00
		100 ~ 680μF	0.45	0.65	0.80	0.90	1.00
		1000 ~ 4700μF	0.65	0.85	0.95	1.00	1.00

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

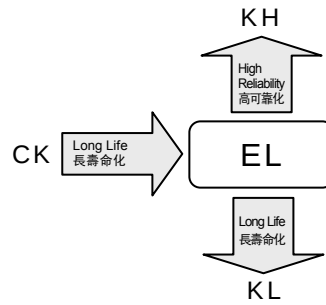
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LONG LIFE ASSURANCE

寬溫長壽命品

- Wide temperature range -55 ~ +105°C
適用於 -55 ~ +105°C 的寬溫範圍
- Load life of 2000~3000 hours
負荷壽命 2000~3000 小時
- Comply with the RoHS directive
符合 RoHS 指令

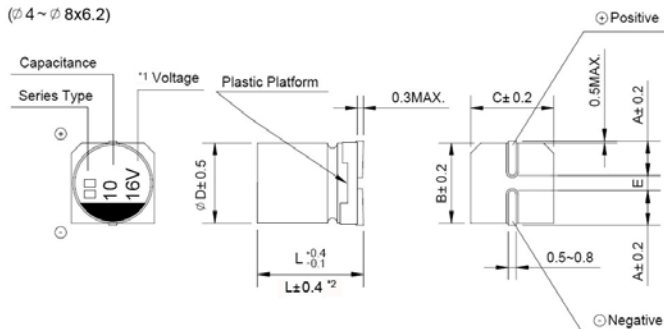


□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																													
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C																																													
Voltage Range 額定工作電壓範圍	6.3 ~ 50V																																													
Capacitance Range 靜電容量範圍	0.1 ~ 1500μF																																													
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																													
Leakage Current 漏電流	Leakage current (Ø4~Ø10) ≦0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (Ø12.5~Ø16) ≦0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (Ø4~Ø10) ≦0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (Ø12.5~Ø16) ≦0.03CV 或 4μA, 取較大值 (施加額定工作電壓 1 分鐘後)																																													
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">tan δ (max.) 最大損耗角正切</td><td>Ø4~Ø10</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.13</td><td>0.12</td></tr><tr><td>Ø12.5~Ø16</td><td>0.38</td><td>0.34</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.18</td></tr></table>							Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50	tan δ (max.) 最大損耗角正切	Ø4~Ø10	0.28	0.24	0.20	0.16	0.13	0.12	Ø12.5~Ø16	0.38	0.34	0.30	0.26	0.22	0.18																
Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50																																							
tan δ (max.) 最大損耗角正切	Ø4~Ø10	0.28	0.24	0.20	0.16	0.13	0.12																																							
	Ø12.5~Ø16	0.38	0.34	0.30	0.26	0.22	0.18																																							
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td>Ø4~Ø10</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td rowspan="2">Ø12.5~Ø16</td><td>Z(-55°C) / Z(20°C)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td></tr><tr><td rowspan="2"></td><td>Z(-25°C) / Z(20°C)</td><td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-55°C) / Z(20°C)</td><td>12</td><td>10</td><td>8</td><td>5</td><td>4</td><td>3</td></tr></table>							Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	3	3	2	2	2	Ø12.5~Ø16	Z(-55°C) / Z(20°C)	8	5	4	3	3		Z(-25°C) / Z(20°C)	5	4	3	2	2	2		Z(-55°C) / Z(20°C)	12	10	8	5	4	3
Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50																																							
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	3	3	2	2	2																																							
	Ø12.5~Ø16	Z(-55°C) / Z(20°C)	8	5	4	3	3																																							
		Z(-25°C) / Z(20°C)	5	4	3	2	2	2																																						
		Z(-55°C) / Z(20°C)	12	10	8	5	4	3																																						
Load Life 高溫負荷特性	After 3000 hrs. (2000 hrs. for Ø4~Ø6.3×5.8 & Ø8×6.2) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 3000 小時 (Ø4~Ø6.3×5.8 和 Ø8×6.2 為 2000 小時) 後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±25% of initial value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>200% or less of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±25% of initial value 初始值的±25%以內	Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	initial specified value or less 不大於規範值																																	
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Dissipation Factor 損耗角正切	200% or less of initial specified value 不大於規範值的 200%																																													
Leakage Current 漏電流	initial specified value or less 不大於規範值																																													
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																													
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																																	
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Leakage Current 漏電流	initial specified value or less 不大於規範值																																													
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																													

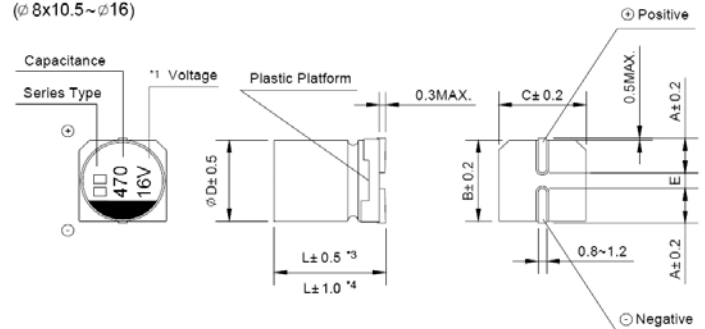
□ DRAWING (Unit: mm) 外形圖

(Ø4 ~ Ø8x6.2)



- *1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to Ø6.3x7.7 適用於 Ø6.3x7.7
 *3. Applicable to Ø8x10.5~Ø10 適用於 Ø8x10.5~Ø10
 *4. Applicable to Ø12.5~Ø16 適用於 Ø12.5~Ø16

(Ø8x10.5~Ø16)



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□ DIMENSIONS (Unit: mm) 尺寸表

∅D × L	4 × 5.8	5 × 5.8	6.3 × 5.8	6.3 × 7.7	8 × 6.2	8 × 10.5	10 × 10.5	10 × 13.5	12.5 × 13.5	12.5 × 16	16 × 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code μF 代碼		6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4 × 5.8	1
0.22	R22											4 × 5.8	2
0.33	R33											4 × 5.8	3
0.47	R47											4 × 5.8	5
1	010											4 × 5.8	10
2.2	2R2											4 × 5.8	16
3.3	3R3											4 × 5.8	16
4.7	4R7							4 × 5.8	13	4 × 5.8	14	5 × 5.8	23
10	100					4 × 5.8	18	5 × 5.8	20	5 × 5.8	21	6.3 × 5.8	35
22	220	4 × 5.8	22	5 × 5.8	25	5 × 5.8	27	6.3 × 5.8	36	6.3 × 5.8	38	6.3 × 7.7 (8 × 6.2)	70 (70)
33	330	5 × 5.8	27	5 × 5.8	30	6.3 × 5.8	40	6.3 × 5.8	60	6.3 × 7.7 (8 × 6.2)	84 (84)	8 × 10.5	90
47	470	5 × 5.8	33	6.3 × 5.8	41	6.3 × 5.8	48	6.3 × 7.7 (8 × 6.2)	90 (91)	8 × 10.5	98	8 × 10.5	90
100	101	6.3 × 5.8	50	6.3 × 5.8 (8 × 6.2)	53 (110)	6.3 × 5.8	60	8 × 10.5	130	8 × 10.5	130	10 × 10.5	100
150	151	6.3 × 5.8	55	6.3 × 7.7	105	6.3 × 7.7	95	8 × 10.5	140	10 × 10.5	315	10 × 10.5	100
220	221	6.3 × 7.7	100	8 × 10.5	210	8 × 10.5	210	10 × 10.5	190	10 × 10.5	315	10 × 13.5 (10 × 10.5)	250 (100)
330	331	8 × 10.5	210	8 × 10.5	210	8 × 10.5	210	10 × 10.5	315	10 × 10.5	315	12.5 × 13.5	400
470	471	8 × 10.5	210	10 × 10.5	315	10 × 10.5	315	10 × 10.5	315	12.5 × 13.5 (10 × 13.5)	500 (360)	16 × 16.5 (12.5 × 16)	650 (500)
680	681	8 × 10.5	210	10 × 10.5	315	10 × 10.5	315	10 × 13.5	380	12.5 × 13.5	500		
1000	102	10 × 10.5	315	10 × 13.5 (10 × 10.5)	360 (315)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	450 (350) (315)	12.5 × 13.5	550	16 × 16.5 (12.5 × 16)	700 (550)		
1500	152	10 × 13.5 (10 × 10.5)	450 (315)	12.5 × 13.5	500	12.5 × 13.5	500	12.5 × 16	800				
2200	222	12.5 × 13.5	620	12.5 × 16 (12.5 × 13.5)	650 (600)	16 × 16.5	900	16 × 16.5	1000			Case size 尺寸	Ripple current 紋波電流
3300	332	12.5 × 16	750	16 × 16.5	950								

• Case size ∅D×L(mm), ripple current (mA rms) at 105°C 120Hz • 尺寸∅D×L(mm), 紋波電流(mA rms)於 105°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	∅4 ~ ∅10	0.1 ~ 100μF	0.70	1.00	1.17	1.36	1.50
		150 ~ 1500μF	0.85	1.00	1.08	1.20	1.30
	∅12.5 ~ ∅16	~ 470μF	0.75	1.00	1.35	1.57	2.00
		680 ~ 3300μF	0.85	1.00	1.23	1.34	1.50

● Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。

● Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

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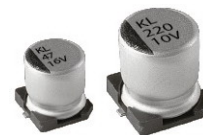
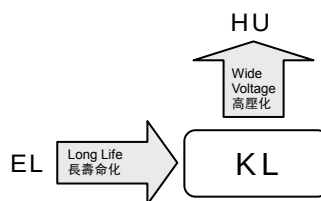
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CAT.2011/V5

5000 HOURS LONG LIFE ASSURANCE

5000 小時長壽命品

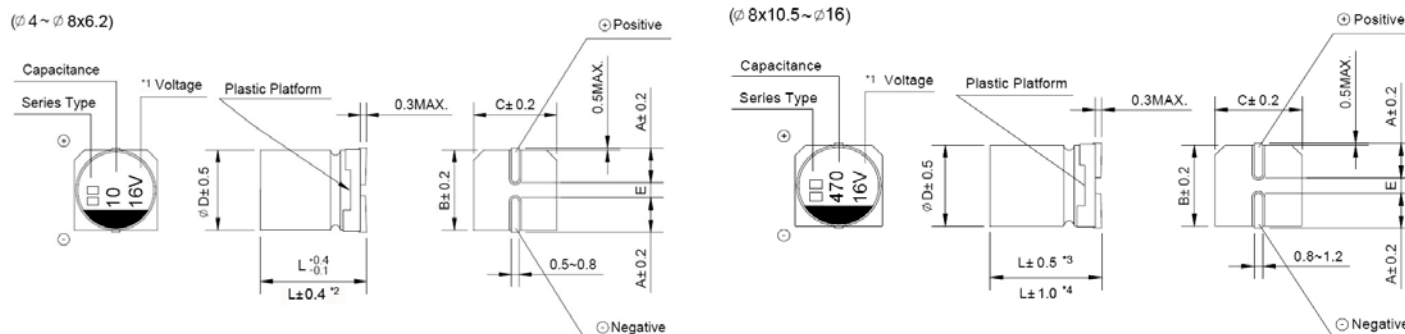
- Wide temperature range -55 ~ +105°C
適用於 -55 ~ +105°C 的寬溫範圍
- Load life of 3000~5000 hours
負荷壽命 3000~5000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																																			
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C																																																			
Voltage Range 額定工作電壓範圍	6.3 ~ 100V																																																			
Capacitance Range 靜電容量範圍	0.1 ~ 1500μF																																																			
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																																			
Leakage Current 漏電流	Leakage current (Ø4~Ø10) ≦ 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (Ø12.5~Ø16) ≦ 0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) 漏電流 (Ø4~Ø10) ≦ 0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (Ø12.5~Ø16) ≦ 0.03CV 或 4μA, 取較大值 (施加額定工作電壓 1 分鐘後)																																																			
Dissipation Factor (tan δ) 損耗角正切	<table><tr><td colspan="2">Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C</td></tr><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50~100</td></tr><tr><td>tan δ (max.)</td><td>Ø4~Ø10</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.13</td><td>0.12</td></tr><tr><td>最大損耗角正切</td><td>Ø12.5~Ø16</td><td>0.38</td><td>0.34</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.18</td></tr></table>								Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C		Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50~100	tan δ (max.)	Ø4~Ø10	0.28	0.24	0.20	0.16	0.13	0.12	最大損耗角正切	Ø12.5~Ø16	0.38	0.34	0.30	0.26	0.22	0.18																			
Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C																																																				
Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50~100																																														
tan δ (max.)	Ø4~Ø10	0.28	0.24	0.20	0.16	0.13	0.12																																													
最大損耗角正切	Ø12.5~Ø16	0.38	0.34	0.30	0.26	0.22	0.18																																													
Stability at Low Temperature 低溫特性	<table><tr><td colspan="8">Measurement frequency 測試頻率: 120Hz</td></tr><tr><td colspan="2">Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50~100</td></tr><tr><td rowspan="4">Impedance Ratio 阻抗比 ZT/Z20 (max.)</td><td rowspan="2">Ø4~Ø10</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td></tr><tr><td rowspan="2">Ø12.5~Ø16</td><td>Z(-25°C) / Z(20°C)</td><td>5</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td>Z(-55°C) / Z(20°C)</td><td>12</td><td>10</td><td>8</td><td>5</td><td>4</td><td>3</td></tr></table>								Measurement frequency 測試頻率: 120Hz								Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50~100	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	3	3	2	2	2	Z(-55°C) / Z(20°C)	8	5	4	3	3	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	5	4	3	2	2	Z(-55°C) / Z(20°C)	12	10	8	5	4	3
Measurement frequency 測試頻率: 120Hz																																																				
Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50~100																																													
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	3	3	2	2	2																																													
		Z(-55°C) / Z(20°C)	8	5	4	3	3																																													
	Ø12.5~Ø16	Z(-25°C) / Z(20°C)	5	4	3	2	2																																													
		Z(-55°C) / Z(20°C)	12	10	8	5	4	3																																												
Load Life 高溫負荷特性	After 5000 hrs. (3000 hrs. for Ø4~Ø6.3×5.8 & Ø8×6.2) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時 (Ø4~Ø6.3×5.8 和 Ø8×6.2 為 3000 小時) 後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±30% of initial value 初始值的±30%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>300% or less of initial specified value 不大於規範值的 300%</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>								Capacitance Change 靜電容量變化率	Within ±30% of initial value 初始值的±30%以內	Dissipation Factor 損耗角正切	300% or less of initial specified value 不大於規範值的 300%	Leakage Current 漏電流	initial specified value or less 不大於規範值																																						
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Dissipation Factor 損耗角正切	300% or less of initial specified value 不大於規範值的 300%																																																			
Leakage Current 漏電流	initial specified value or less 不大於規範值																																																			
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																																			
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>initial specified value or less 不大於規範值</td></tr><tr><td>Leakage Current 漏電流</td><td>initial specified value or less 不大於規範值</td></tr></table>								Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																																						
Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內																																																			
Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值																																																			
Leakage Current 漏電流	initial specified value or less 不大於規範值																																																			
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																																			

DRAWING (Unit: mm) 外形圖



- *1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]
 *2. Applicable to Ø6.3x7.7 適用於 Ø6.3x7.7
 *3. Applicable to Ø8x10.5~Ø10 適用於 Ø8x10.5~Ø10
 *4. Applicable to Ø12.5~Ø16 適用於 Ø12.5~Ø16

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□ DIMENSIONS (Unit: mm) 尺寸表

∅D x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code μF 代碼		6.3		10		16		25	
		0J		1A		1C		1E	
10	100					4 x 5.8	18	5 x 5.8	27
22	220	4 x 5.8	22	5 x 5.8	30	5 x 5.8	30	6.3 x 5.8	44
33	330	5 x 5.8	35	5 x 5.8	36	6.3 x 5.8	48	6.3 x 5.8	50
47	470	5 x 5.8	38	6.3 x 5.8	50	6.3 x 5.8	50	6.3 x 7.7 (8 x 6.2)	63 (63)
100	101	6.3 x 5.8	69	6.3 x 7.7 (8 x 6.2)	81 (81)	6.3 x 7.7 (8 x 6.2)	81 (81)	8 x 10.5	116
150	151	6.3 x 7.7 (8 x 6.2)	85 (85)	8 x 10.5	125	8 x 10.5	125	10 x 10.5	320
220	221	6.3 x 7.7 (8 x 6.2)	120 (120)	8 x 10.5	141	10 x 10.5	216	10 x 10.5	320
330	331	8 x 10.5	290	10 x 10.5	290	10 x 10.5	290	10 x 10.5	320
470	471	10 x 10.5	320	10 x 10.5	320	10 x 10.5	320	12.5 x 13.5 (10 x 13.5)	400 (350)
680	681	10 x 10.5	320	10 x 10.5	320	10 x 13.5	420	12.5 x 13.5	415
1000	102	10 x 10.5	410	10 x 13.5	390	12.5 x 13.5	550	12.5 x 13.5	460
1500	152	10 x 13.5	450	12.5 x 13.5	480	12.5 x 13.5	650	12.5 x 16	700
2200	222	12.5 x 13.5	680	12.5 x 16 (12.5 x 13.5)	750 (510)	16 x 16.5	800		
3300	332	12.5 x 16 (12.5 x 13.5)	850 (800)	16 x 16.5	800			Case size 尺寸	Ripple current 紋波電流

WV Code μF 代碼		35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4 x 5.8	1.0				
0.22	R22			4 x 5.8	2.6				
0.33	R33			4 x 5.8	3.2				
0.47	R47			4 x 5.8	5				
1	010			4 x 5.8	8				
2.2	2R2			4 x 5.8	12				
3.3	3R3			4 x 5.8	17			6.3 x 7.7 (8 x 6.2)	30 (30)
4.7	4R7	4 x 5.8	16	5 x 5.8	22			8 x 10.5	50
10	100	5 x 5.8	27	6.3 x 5.8	32	6.3 x 7.7 (8 x 6.2)	45 (45)	8 x 10.5	55
22	220	6.3 x 5.8	44	6.3 x 7.7 (8 x 6.2)	58 (58)	8 x 10.5	65	10 x 10.5	70
33	330	6.3 x 7.7 (8 x 6.2)	57 (57)	8 x 10.5	140	10 x 10.5	80	10 x 10.5	80
47	470	8 x 10.5	92	10 x 10.5	310	10 x 10.5	90	12.5 x 13.5 (10 x 13.5)	250 (150)
100	101	10 x 10.5	151	10 x 10.5	310	10 x 13.5	150	12.5 x 13.5	300
150	151	10 x 10.5	290	10 x 10.5	310			16 x 16.5 (12.5 x 16) (12.5 x 13.5)	600 (420) (380)
220	221	10 x 10.5	375	12.5 x 13.5 (10 x 13.5)	340 (320)	12.5 x 13.5	470		
330	331	12.5 x 13.5 (10 x 13.5)	380 (375)	12.5 x 16 (12.5 x 13.5)	600 (500)	16 x 16.5 (12.5 x 16)	650 (550)		
470	471	12.5 x 13.5	520	16 x 16.5	700				
680	681	12.5 x 13.5	550						
1000	102	16 x 16.5 (12.5 x 16)	750 (600)					Case size 尺寸	Ripple current 紋波電流

• Case size ∅D x L (mm), ripple current (mA rms) at 105°C 120Hz • 尺寸 ∅D x L (mm), 紋波電流 (mA rms) 於 105°C 120Hz

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

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□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

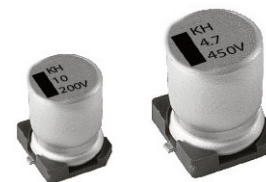
Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	Ø4 ~ Ø10		0.70	1.00	1.17	1.36	1.50
	Ø12.5 ~ Ø16	~ 68µF	0.75	1.00	1.35	1.57	2.00
		100 ~ 470µF	0.80	1.00	1.23	1.34	1.50
		680 ~ 3300µF	0.85	1.00	1.10	1.13	1.15

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

HIGH RELIABILITY

高可靠品

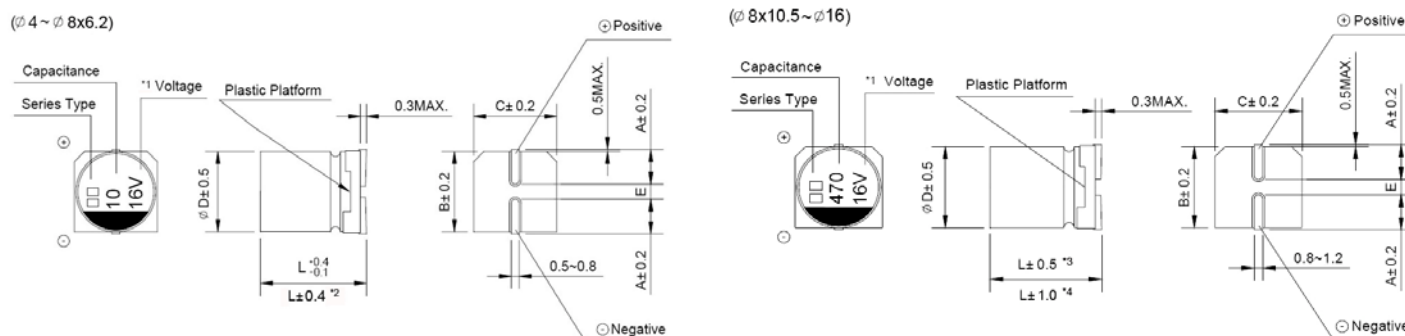
- High temperature range up to +125°C
適用於+125°C 的高溫範圍
- Suitable for automotive equipment
適用於汽車電子裝備
- Load life of 1000~5000 hours
負荷壽命 1000~5000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性										
Operation Temperature Range 使用溫度範圍	-40 ~ +125°C										
Voltage Range 額定工作電壓範圍	10 ~ 450V										
Capacitance Range 靜電容量範圍	3.3 ~ 2200μF										
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C										
Leakage Current 漏電流	Leakage current (10V~100V) ≦ 0.03CV or 4μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (160V~450V) ≦ 0.04CV + 100μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 (10V~100V) ≦ 0.03CV 或 4μA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (160V~450V) ≦ 0.04CV + 100μA, 取較大值 (施加額定工作電壓 2 分鐘後)										
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C										
	Rated Voltage (V) 額定工作電壓		10	16	25	35	50	63	100	160~250	400,450
	tan δ (max.)		0.24	0.20	0.16	0.14	0.14	0.18	0.18	—	—
	最大損耗角正切		0.22	0.18	0.16	0.14	0.12	0.14	0.10	0.20	0.20
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz										
	Rated Voltage (V) 額定工作電壓			10	16	25	35~100	160~250	400,450		
	Impedance Ratio 阻抗比 ZT/Z20 (max.)	Ø4~Ø10	Z(-25°C) / Z(20°C)	4	3	2	2	—	—		
			Z(-40°C) / Z(20°C)	10	8	6	4	—	—		
		Ø12.5~Ø16	Z(-25°C) / Z(20°C)	4	3	2	2	3	6		
Z(-40°C) / Z(20°C)			8	6	4	3	6	10			
Load Life 高溫負荷特性	After 5000 hrs. application of the rated voltage for Ø12.5~16 (10~100V), and 2000 hrs. for Ø8×10.5~Ø10 (10~100V), and 1000 hrs. for Ø8×6.2~Ø6.3, as well as 2000 hrs. application of rated voltage for Ø12.5~16 (160~450V) at 125°C, they meet the characteristics listed below. 在 125°C 環境中施加額定工作電壓 5000 小時於Ø12.5~16 (10~100V), 2000 小時於Ø8×10.5~Ø10 (10~100V), 1000 小時於Ø8×6.2~Ø6.3, 以及施加額定工作電壓 2000 小時於Ø12.5~16 (160~450V)後, 電容器的特性符合下表的要求。										
	Capacitance Change 靜電容量變化率			Within ±30% of initial value 初始值的±30%以內							
	Dissipation Factor 損耗角正切			300% or less of initial specified value 不大於規範值的 300%							
	Leakage Current 漏電流			initial specified value or less 不大於規範值							
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 125°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 125°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。										
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。										
	Capacitance Change 靜電容量變化率			Within ±10% of initial value 初始值的±10%以內							
	Dissipation Factor 損耗角正切			initial specified value or less 不大於規範值							
	Leakage Current 漏電流			initial specified value or less 不大於規範值							
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。										

DRAWING (Unit: mm) 外形圖



*1. Voltage mark for 6.3V is [6V] 6.3V 的產品標識為 [6V]

*2. Applicable to Ø6.3x7.7 適用於 Ø6.3x7.7

*3. Applicable to Ø8x10.5~Ø10 適用於 Ø8x10.5~Ø10

*4. Applicable to Ø12.5~Ø16 適用於 Ø12.5~Ø16

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□ DIMENSIONS (Unit: mm) 尺寸表

∅D x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR 規格尺寸及最大允許紋波電流及 ESR 值

WV Parameter 參數 μF		10 (1A)				16 (1C)				25 (1E)			
		Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流	Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流	Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流
33	330									6.3 × 5.8	3.3	66	45
47	470					6.3 × 5.8	3.3	66	43	6.3 × 7.7 (8 × 6.2)	2.3 (2.3)	46 (46)	68 (68)
100	101	6.3 × 7.7 (8 × 6.2)	2.3 (2.3)	46 (46)	72 (72)	8 × 10.5	1.0	20	115	8 × 10.5	1.0	20	126
220	221	8 × 10.5	1.0	20	136	10 × 10.5	0.7	13.4	175	10 × 10.5	0.7	13.4	211
330	331	10 × 10.5	0.7	13.4	188	10 × 13.5	0.5	9.5	280	12.5 × 13.5 (10 × 13.5)	0.14 (0.5)	2.1 (9.5)	750 (270)
470	471	10 × 13.5	0.5	9.5	300	12.5 × 13.5	0.14	2.1	750	12.5 × 13.5	0.14	2.1	750
680	681					16 × 16.5 (12.5 × 13.5)	0.10 (0.14)	1.5 (2.1)	1000 (750)	16 × 16.5	0.10	1.5	1000
1000	102	12.5 × 16 (12.5 × 13.5)	0.11 (0.14)	1.5 (2.1)	900 (750)								
2200	222	16 × 16.5	0.10	1.5	1000								

WV Parameter 參數 μF		35 (1V)				50 (1H)			
		Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流	Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流
10	100	6.3 × 5.8	3.3	66	38	6.3 × 7.7 (6.3 × 5.8)	2.3 (3.3)	46 (66)	50 (38)
22	220	6.3 × 5.8	3.3	66	39	6.3 × 7.7 (8 × 6.2)	2.3 (2.3)	46 (46)	50 (50)
33	330	6.3 × 7.7 (8 × 6.2)	2.3 (2.3)	46 (46)	62 (62)	8 × 10.5	1.0	20	83
47	470	8 × 10.5	1.0	20	92	10 × 10.5	0.7	13.4	111
100	101	10 × 10.5	0.7	13.4	151	12.5 × 13.5	0.23	3.5	550
220	221	12.5 × 13.5 (10 × 13.5)	0.14 (0.5)	2.1 (9.5)	750 (260)	16 × 16.5 (12.5 × 13.5)	0.15 (0.23)	2.3 (3.5)	850 (550)
330	331	12.5 × 13.5	0.14	2.1	750	16 × 16.5 (12.5 × 16)	0.15 (0.18)	2.3 (2.7)	850 (700)
470	471	16 × 16.5 (12.5 × 16)	0.10 (0.11)	1.5 (1.5)	1000 (900)				

WV Parameter 參數 μF		63 (1J)				100 (2A)			
		Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流	Case size ∅DxL (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C 100KHz 紋波電流
10	100	6.3 × 7.7 (8 × 6.2)	2.3 (2.3)	115 (115)	42 (42)	8 × 10.5	1.00	50	53
22	220	8 × 10.5	1.0	50	56	10 × 10.5	0.70	35	63
33	330	10 × 10.5	0.7	35	77	10 × 13.5	0.45	22.5	130
47	470	10 × 13.5	0.45	22.5	150	12.5 × 13.5	0.33	16.5	450
68	680					12.5 × 16	0.26	13	550
100	101	12.5 × 13.5	0.25	12.5	500	16 × 16.5	0.24	12	650
220	221	12.5 × 16	0.20	10	600				
330	331	16 × 16.5	0.18	9	820				

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

μF	WV Code 代碼	160		200		250		400		450	
		2C		2D		2E		2G		2W	
3.3	3R3									12.5 × 16	65
4.7	4R7							12.5 × 13.5	70	16 × 16.5	85
6.8	6R8							16 × 16.5	100		
10	100	12.5 × 13.5	100	12.5 × 13.5	100	12.5 × 16	110			Case size 尺寸	Ripple current 紋波電流
22	220	16 × 16.5	180	16 × 16.5	180						

• Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 125°C 120Hz • 尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 125°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率			50Hz	120Hz	1KHz	10KHz~	100KHz~
Coefficient 系數	10~100V	10 ~ 100 μF	0.35	0.40	0.75	0.90	1.00
		220 ~ 470 μF	0.35	0.50	0.85	0.94	1.00
		680 ~ 2200 μF	0.40	0.60	0.85	0.95	1.00

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz	100KHz~
Coefficient 系數	160~450V	0.75	1.00	1.25	1.50	1.75	1.80

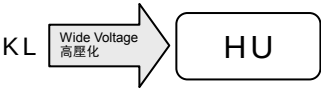
- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

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MID-TO-HIGH VOLTAGE
中高壓品

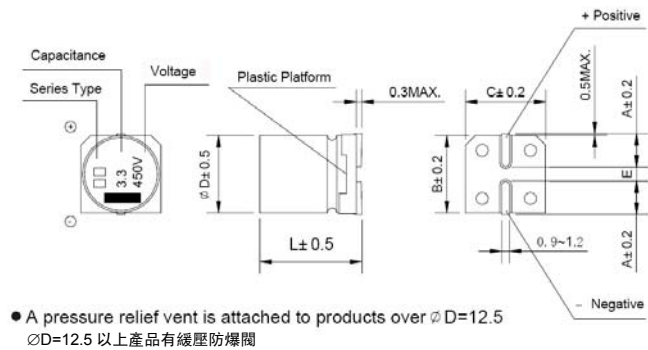
- Operating with wide temperature range -40 ~ +105°C
適用於 -40 ~ +105°C 的寬溫範圍
- Load life of 5000 hours
負荷壽命 5000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性			
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C			
Voltage Range 額定工作電壓範圍	160 ~ 450V			
Capacitance Range 靜電容量範圍	3.3 ~ 47μF			
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C			
Leakage Current 漏電流	Leakage current ≤ 0.04CV + 100μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 ≤ 0.04CV + 100μA, 取較大值 (施加額定工作電壓 2 分鐘後)			
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C			
	Rated Voltage (V) 額定工作電壓	160 ~ 250	400, 500	
	tan δ (max.) 最大損耗角正切	0.15	0.20	
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz			
	Rated Voltage (V) 額定工作電壓	160 ~ 250	400, 500	
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	3	6
	ZT/Z20 (max.)	Z(-40°C) / Z(20°C)	6	10
Load Life 高溫負荷特性	After 5000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時後，電容器的特性符合下表的要求。			
	Capacitance Change 靜電容量變化率		Within ±20% of initial value 初始值的±20%以內	
	Dissipation Factor 損耗角正切		200% or less of initial specified value 不大於規範值的 200%	
	Leakage Current 漏電流		initial specified value or less 不大於規範值	
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。			
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。			
	Capacitance Change 靜電容量變化率		Within ±10% of initial value 初始值的±10%以內	
	Dissipation Factor 損耗角正切		initial specified value or less 不大於規範值	
	Leakage Current 漏電流		initial specified value or less 不大於規範值	
Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。			

DRAWING (Unit: mm) 外形圖



DIMENSIONS (Unit: mm) 尺寸表

ØD x L	12.5 x 13.5	12.5 x 16	16 x 16.5
A	4.7	4.7	5.5
B	13.0	13.0	17.0
C	13.0	13.0	17.0
E ± 0.2	4.6	4.6	6.7
L	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	160		200		250		400		450	
		2C		2D		2E		2G		2W	
3.3	3R3									12.5 × 13.5	40
4.7	4R7					12.5 × 13.5	65	12.5 × 16	50	12.5 × 16	50
10	100			12.5 × 13.5	80	12.5 × 16	105	16 × 16.5	85	16 × 16.5	85
22	220	12.5 × 13.5	85	12.5 × 16	110	16 × 16.5	180				
33	330	12.5 × 13.5	95	16 × 16.5	220					Case size 尺寸	Ripple current 紋波電流
47	470	16 × 16.5	260								

•Case size ØD×L(mm), ripple current (mA rms) at 105°C 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率	50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	0.80	1.00	1.25	1.40	1.60

- Taping specifications are given in page 14. 編帶標準請參閱第 14 頁。
- Please refer to page 15 for the minimum package quantity. 最小包裝數量請參閱第 15 頁。

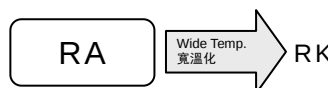
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STANDARD

標準品

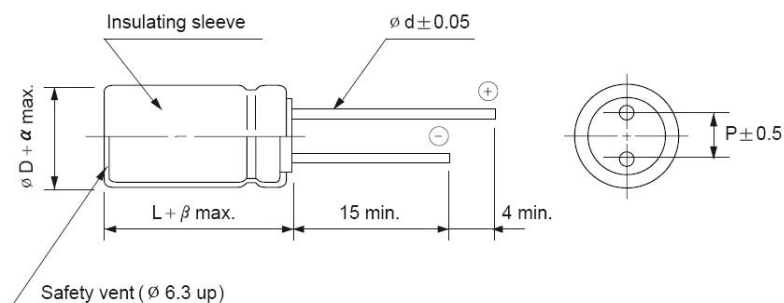
- Standard series for general purpose
標準品通用型
- High performance and high reliability
高性能與高可靠
- Load life of 2000 hours at 85°C
在 85°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																															
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C						-25 ~ +85°C																																									
Voltage Range 額定工作電壓範圍	6.3 ~ 100V						160 ~ 450V																																									
Capacitance Range 靜電容量範圍	0.1 ~ 22000μF						0.47 ~ 470μF																																									
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																															
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後)						Leakage current = 0.02CV + 15μA (after 5 minutes application of rated voltage) 漏電流 = 0.02CV + 15μA (施加額定工作電壓 5 分鐘後)																																									
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160~250</td><td>350~450</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td><td>0.15</td><td>0.20</td></tr></table>												Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	63	100	160~250	350~450	tan δ (max.) 最大損耗角正切	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20														
Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	63	100	160~250	350~450																																						
tan δ (max.) 最大損耗角正切	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20																																						
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35~100</td><td>160</td><td>200~350</td><td>400,450</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>4</td><td>8</td><td>16</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>8</td><td>12</td><td>—</td></tr></table>												Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35~100	160	200~350	400,450	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2	2	2	4	8	16		Z(-40°C) / Z(20°C)	10	8	6	4	3	8	12	—							
Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35~100	160	200~350	400,450																																								
Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2	2	2	4	8	16																																							
	Z(-40°C) / Z(20°C)	10	8	6	4	3	8	12	—																																							
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 2000 小時後, 電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="11">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="11">≦ 200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="11">≦ initial specified value 不大於規範值</td></tr></table>												Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內											Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%											Leakage Current 漏電流	≦ initial specified value 不大於規範值										
Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內																																															
Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%																																															
Leakage Current 漏電流	≦ initial specified value 不大於規範值																																															
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 85°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																															
Marking 標識	Printed with white colour on navy blue sleeve (PVC) or printed with white colour on green sleeve (PET). 深藍色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。																																															

□ DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0		7.5		10.0	12.5
Ød	0.5			0.6		0.8			
β	1.5				2.0				
α	0.5							1.0	

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	0.1 ~ 47μF	0.75	1.0	1.35	1.55	2.0
	68 ~ 680μF	0.80	1.0	1.25	1.34	1.5
	1000 ~ 22000μF	0.85	1.0	1.10	1.13	1.15

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼 μF		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.1	0R1											5 × 11	6.4	5 × 11	7
0.22	R22											5 × 11	9.5	5 × 11	11
0.33	R33											5 × 11	11	5 × 11	13
0.47	R47											5 × 11	14	5 × 11	15
0.68	R68											5 × 11	17	5 × 11	19
1	010											5 × 11	20	5 × 11	22
2.2	2R2											5 × 11	25	5 × 11	34
3.3	3R3											5 × 11	35	5 × 11	40
4.7	4R7											5 × 11	42	5 × 11	48
6.8	6R8											5 × 11	50	5 × 11	60
10	100					5 × 11	50	5 × 11	65	5 × 11	60	5 × 11	65	5 × 11	65
22	220			5 × 11	50	5 × 11	55	5 × 11	90	5 × 11	95	5 × 11	100	5 × 11	120
33	330			5 × 11	65	5 × 11	85	5 × 11	95	5 × 11	110	5 × 11 (6.3×11.5)	112 (120)	6.3 × 11.5	145
47	470			5 × 11	80	5 × 11	90	5 × 11	105	5 × 11	120	6.3 × 11.5	148	6.3 × 11.5	155
68	680			5 × 11	80	5 × 11	104	5 × 11	120	6.3 × 11.5	162	6.3 × 11.5	175	8 × 11.5	200
100	101	5 × 11	134	5 × 11	140	5 × 11	180	5 × 11	190	6.3 × 11.5	207	8 × 11.5	225	8 × 11.5	370
220	221	5 × 11	200	5 × 11	210	6.3 × 11.5	260	6.3 × 11.5	327	8 × 11.5	375	8 × 16 (10×12)	425 (482)	10 × 16	470
330	331	6.3 × 11.5	240	6.3 × 11.5	245	6.3 × 11.5 (8×11.5)	300 (340)	8 × 11.5	400	10 × 12	490	10 × 16	560	10 × 20	565
470	471	6.3 × 11.5	340	6.3 × 11.5 (8×11.5)	290 (366)	8 × 11.5	440	8 × 11.5 (8×16)	470 (510)	10 × 16	600	10 × 20	720	12.5 × 20	745
680	681	8 × 11.5	468	8 × 11.5	390	8 × 16	560	10 × 16	600	10 × 20	730	12.5 × 20	786	12.5 × 25	880
1000	102	8 × 11.5	580	8 × 16 (10×12)	630 (680)	8 × 16 (10×16)	770 (845)	10 × 16 (10×20)	860 (900)	12.5 × 21	960	12.5 × 25	1150	16 × 25 (16×31)	1300 (1450)
2200	222	10 × 16	950	10 × 20	1000	10 × 20	1210	12.5 × 20 (12.5×25)	1300 (1400)	16 × 25	1400	16 × 31 (18×35)	1700 (1990)	18 × 35	1950
3300	332	10 × 20	1100	12.5 × 20	1200	12.5 × 25	1400	12.5 × 20 (16×25)	1500 (1600)	16 × 31	1900	18 × 35	2000	22 × 40	2240
4700	472	12.5 × 20	1300	12.5 × 25	1500	16 × 25	1700	16 × 31	1900	16 × 31 (18×35)	2000 (2100)	22 × 40	2240	25 × 40	3200
6800	682	12.5 × 25	1600	16 × 25	1700	16 × 31	2000	18 × 35	2100	22 × 35	2235	25 × 40	2840		
10000	103	16 × 31	1800	16 × 35	1900	18 × 35	2200	22 × 40	2300						
15000	153	18 × 31	2152	18 × 35	2820	22 × 40	2850								
22000	223	22 × 40	3140												

WV Code 代碼 μF		100		160		200		250		350		400		450	
		2A		2C		2D		2E		2V		2G		2W	
0.1	0R1	5 × 11	7.2												
0.22	R22	5 × 11	11												
0.33	R33	5 × 11	13												
0.47	R47	5 × 11	16	5 × 11	12	5 × 11	12	5 × 11	12	6.3 × 11.5	16	6.3 × 11.5	17		
0.68	R68	5 × 11	20	5 × 11	15	5 × 11	15	5 × 11	15	6.3 × 11.5	20	6.3 × 11.5	20		
1	010	5 × 11	25	5 × 11	18	5 × 11	18	6.3 × 11.5	18	6.3 × 11.5	24	6.3 × 11.5	24	8 × 11.5	24
2.2	2R2	5 × 11	30	6.3 × 11.5	25	6.3 × 11.5	25	6.3 × 11.5	28	6.3 × 11.5	37	8 × 11.5	37	8 × 11.5 (10×12)	37 (48)
3.3	3R3	5 × 11	38	6.3 × 11.5	35	6.3 × 11.5	35	6.3 × 11.5	40	8 × 11.5	45	8 × 11.5	45	10 × 12	50
4.7	4R7	5 × 11	44	6.3 × 11.5	42	6.3 × 11.5	45	8 × 11.5	45	8 × 11.5	52	10 × 12	56	10 × 16	60
6.8	6R8	5 × 11	55	8 × 11.5	58	8 × 11.5	58	8 × 11.5	58	10 × 12	70	10 × 16	76	10 × 20	76
10	100	5 × 11	80	10 × 12	71	10 × 12	80	10 × 12	80	10 × 16	92	10 × 20	108	12.5 × 20	108
22	220	6.3 × 11.5	124	10 × 16	124	10 × 16	124	10 × 20	139	12.5 × 20	170	12.5 × 20	170	12.5 × 25	190
33	330	8 × 11.5	177	10 × 16	170	10 × 20	170	12.5 × 20	186	12.5 × 25	210	12.5 × 25	232	16 × 25	254
47	470	10 × 12	230	12.5 × 20	210	12.5 × 20	225	12.5 × 20	246	16 × 25	270	16 × 25	312	16 × 31	312
68	680	10 × 16	278	12.5 × 20	265	12.5 × 25	310	16 × 25	310	16 × 31	376	16 × 35	403	16 × 35	424
100	101	10 × 20	405	12.5 × 25	380	16 × 25	380	16 × 25	416	18 × 35	520	18 × 35	586	18 × 40	603
220	221	12.5 × 25	580	16 × 31	700	16 × 35 (18×31)	720 (740)	18 × 35	780						
330	331	12.5 × 25	675	18 × 31	900	18 × 35	925								
470	471	16 × 25	850	18 × 40	1020										
680	681	16 × 31	1100												
1000	102	18 × 40	1400											Case size 尺寸	Ripple current 紋波電流

•Case size ∅D×L(mm), ripple current (mA rms) at 85°C 120Hz •尺寸∅D×L(mm), 紋波電流(mA rms)於85°C 120Hz

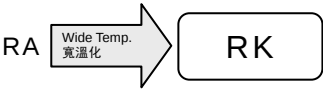
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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WIDE TEMPERATURE
寬溫品

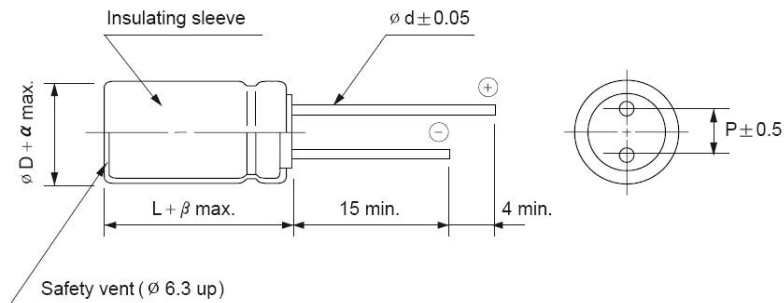
- Wide temperature range of $-40 \sim +105^{\circ}\text{C}$
適用於 $-40 \sim +105^{\circ}\text{C}$ 的寬溫範圍
- Standard series for general purposes
標準品通用型
- Load life of 2000 hours at 105°C
在 105°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性	
Operation Temperature Range 使用溫度範圍	$-40 \sim +105^{\circ}\text{C}$	$-25 \sim +105^{\circ}\text{C}$
Voltage Range 額定工作電壓範圍	6.3 ~ 100V	160 ~ 450V
Capacitance Range 靜電容量範圍	0.47 ~ 15000 μF	0.47 ~ 470 μF
Capacitance Tolerance 靜電容量允許偏差	$\pm 20\%$ at 120Hz, 20°C	
Leakage Current 漏電流	Leakage current = 0.01CV or 3 μA , whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3 μA , 取較大值 (施加額定工作電壓 2 分鐘後)	Leakage current = 0.02CV + 15 μA (after 5 minutes application of rated voltage) 漏電流 = 0.02CV + 15 μA (施加額定工作電壓 5 分鐘後)
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000 μF , tan δ shall be added 0.02 to the listed value with increase of every 1000 μF . 當標稱靜電容量大於 1000 μF , 其標稱靜電容量每增加 1000 μF , 損耗角正切增加 0.02. Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C	
Stability at Low Temperature 低溫特性	Rated Voltage (V) 額定工作電壓	6.3 10 16 25 35 50 63 100 160~250 350~450
	Impedance Ratio $Z(-25^{\circ}\text{C}) / Z(20^{\circ}\text{C})$	4 3 2 2 3 8
	tan δ (max.) 最大損耗角正切	0.24 0.20 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20
Load Life 高溫負荷特性	Measurement frequency 測試頻率: 120Hz	
	Rated Voltage (V) 額定工作電壓	6.3 10 16 25~100 160~350 400,450
	Impedance Ratio $Z(-40^{\circ}\text{C}) / Z(20^{\circ}\text{C})$	8 6 4 3 4 —
Shelf Life 高溫貯存特性	After 2000 hours ($\varnothing 5 \sim \varnothing 8$ products are for 1000 hours) application of the rated voltage at 105°C , they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時 ($\varnothing 5 \sim \varnothing 8$ 產品為 1000 小時) 後, 電容器的特性符合下表的要求。	
	Capacitance Change 靜電容量變化率	Within $\pm 20\%$ of initial measured value 初始值的 $\pm 20\%$ 以內
	Dissipation Factor 損耗角正切	$\leq 200\%$ of initial specified value 不大於規範值的 200%
Marking 標識	Leakage Current 漏電流	$\leq$ initial specified value 不大於規範值
	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。	
	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。	

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0		7.5		10.0	12.5
Ød	0.5			0.6		0.8			
β	1.5				2.0				
α	0.5							1.0	

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	0.47 ~ 47 μF	0.75	1.00	1.35	1.55	2.00
	68 ~ 680 μF	0.80	1.00	1.25	1.34	1.50
	1000 ~ 15000 μF	0.85	1.00	1.10	1.13	1.15

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼 μF		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.47	R47											5 x 11	8	5 x 11	8
0.68	R68											5 x 11	9	5 x 11	9
1	010											5 x 11	11	5 x 11	13
2.2	2R2											5 x 11	14	5 x 11	15
3.3	3R3											5 x 11	17	5 x 11	19
4.7	4R7											5 x 11	20	5 x 11	22
6.8	6R8											5 x 11	25	5 x 11	34
10	100					5 x 11	50	5 x 11	38	5 x 11	41	5 x 11	46	5 x 11	50
22	220			5 x 11	50	5 x 11	54	5 x 11	57	5 x 11	61	5 x 11 (6.3x11.5)	68 (75)	6.3 x 11.5	82
33	330			5 x 11	60	5 x 11	64	5 x 11	69	5 x 11	75	6.3 x 11.5	90	6.3 x 11.5	85
47	470	5 x 11	62	5 x 11	71	5 x 11	80	5 x 11	106	5 x 11 (6.3x11.5)	106 (110)	6.3 x 11.5	125	6.3 x 11.5	90
68	680	5 x 11	80	5 x 11	83	5 x 11	85	5 x 11	114	6.3 x 11.5	121	8 x 11.5	144	8 x 11.5	128
100	101	5 x 11	95	5 x 11	100	5 x 11 (6.3x11.5)	120 (135)	5 x 11 (6.3x11.5)	120 (145)	6.3 x 11.5 (8x11.5)	165 (210)	8 x 11.5 (10x12)	180 (200)	8 x 11.5 (10x12)	200 (295)
220	221	5 x 11	150	5 x 11 (6.3x11.5)	155 (165)	6.3 x 11.5	175	6.3 x 11.5 (8x11.5)	175 (185)	8 x 11.5	250	10 x 12 (10x16)	345 (370)	10 x 12	390
330	331	6.3 x 11.5	170	6.3 x 11.5	180	8 x 11.5	195	8 x 11.5 (10x12)	245 (265)	10 x 12 (8x16)	395 (455)	10 x 16 (10x20)	420 (460)	10 x 20 (12.5x20)	450 (500)
470	471	6.3 x 11.5	205	6.3 x 11.5 (8x11.5)	260 (275)	8 x 11.5	305	8 x 11.5 (8x16) (10x12)	270 (320) (330)	10 x 16 (10x20)	520 (550)	10 x 20	560	12.5 x 20 (12.5x25)	650 (700)
680	681	8 x 11.5	314	8 x 11.5 (8x16)	345 (390)	8 x 16 (10x16)	480 (520)	10 x 16	520	10 x 16 (10x20)	550 (590)	12.5 x 25	720	12.5 x 25 (16x25)	780 (800)
1000	102	8 x 11.5	380	8 x 11.5 (8x16) (10x12)	400 (425) (585)	10 x 16 (10x20)	645 (700)	10 x 16 (10x20) (12.5x20)	705 (775) (845)	12.5 x 20 (12.5x25)	800 (930)	12.5 x 25 (16x25)	830 (960)	16 x 25	870
2200	222	10 x 12 (10x16)	630 (630)	10 x 20 (12.5x20)	560 (715)	10 x 20 (12.5x20)	735 (760)	12.5 x 20 (12.5x25)	890 (920)	16 x 25	1120	16 x 35 (18x35)	1230 (1300)	16 x 31 (18x35)	1145 (1340)
3300	332	10 x 20 (12.5x20)	845 (920)	12.5 x 25	1030	12.5 x 25	1080	16 x 25	1300	16 x 31 (16x35)	1280 (1410)	18 x 35	1560	22 x 40	1712
4700	472	12.5 x 25	1240	12.5 x 25	1280	16 x 25	1320	16 x 31	1380	18 x 35	1800	22 x 40	1925	25 x 40	1940
6800	682	16 x 25	1370	16 x 31	1510	16 x 31	1560	18 x 35	1680	22 x 40	2016	25 x 40	2200		
10000	103	16 x 31	1620	16 x 35	1820	18 x 35	1860								
15000	153	18 x 31	2030												

WV Code 代碼 μF		100		160		200		250		350		400		450	
		2A		2C		2D		2E		2V		2G		2W	
0.47	R47	5 x 11	14	5 x 11	12	5 x 11	12	5 x 11	12	6.3 x 11.5	12	6.3 x 11.5	12	6.3 x 11.5	12
0.68	R68	5 x 11	15	5 x 11	13	5 x 11	13	5 x 11	13	6.3 x 11.5	13	6.3 x 11.5	13	8 x 11.5	13
1	010	5 x 11	19	5 x 11	16	5 x 11	16	6.3 x 11.5	16	6.3 x 11.5	16	6.3 x 11.5 (8x11.5)	16 (20)	8 x 11.5	17
2.2	2R2	5 x 11	25	6.3 x 11.5	23	6.3 x 11.5	23	6.3 x 11.5	24	8 x 11.5	24	6.3 x 11.5 (8x11.5)	20 (26)	8 x 11.5	30
3.3	3R3	5 x 11	32	6.3 x 11.5	34	6.3 x 11.5	34	8 x 11.5	34	8 x 11.5	34	6.3 x 11.5 (8x11.5)	25 (30)	8 x 11.5	40
4.7	4R7	5 x 11	38	6.3 x 11.5	40	8 x 11.5	40	8 x 11.5	40	10 x 12	47	8 x 11.5 (10x12)	40 (47)	10 x 12	48
6.8	6R8	5 x 11	52	8 x 11.5	48	8 x 11.5	52	10 x 12	57	10 x 16	62	8 x 16 (10x16)	57 (62)	10 x 16	62
10	100	5 x 11 (6.3x11.5)	66 (73)	8 x 11.5 (10x12)	55 (60)	8 x 11.5 (10x12)	55 (60)	10 x 12	70	10 x 16	75	10 x 16 (10x20)	78 (82)	12.5 x 20	88
22	220	6.3 x 11.5	104	10 x 16	96	10 x 16	105	10 x 17 (10x20)	120 (121)	12.5 x 20	143	12.5 x 20 (12.5x25)	145 (155)	12.5 x 25	167
33	330	8 x 11.5	150	10 x 20	140	10 x 20	140	12.5 x 20	175	12.5 x 25	190	16 x 25	211	16 x 25	234
47	470	10 x 12	190	12.5 x 20	160	12.5 x 20	170	12.5 x 25	227	16 x 25	252	16 x 25 (16x31)	250 (276)	16 x 31	313
68	680	10 x 16	239	12.5 x 20	220	12.5 x 25	227	16 x 25	303	16 x 31	332	16 x 35	373	16 x 35	422
100	101	10 x 20	320	12.5 x 25	255	16 x 25	360	16 x 31	402	18 x 35	425	18 x 35	428	18 x 35 (18x40)	450 (484)
220	221	12.5 x 25	450	16 x 31	493	16 x 35	520	18 x 35	554						
330	331	12.5 x 25	625	18 x 35	647	18 x 40	671								
470	471	16 x 25	780	18 x 40	820										
680	681	16 x 35	1021												
1000	102	18 x 40	1344											Case size 尺寸	Ripple current 紋波電流

•Case size ØD×L(mm), ripple current (mA rms) at 105°C 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C 120Hz

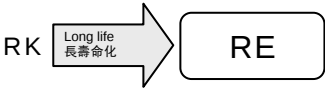
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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WIDE TEMPERATURE
寬溫品

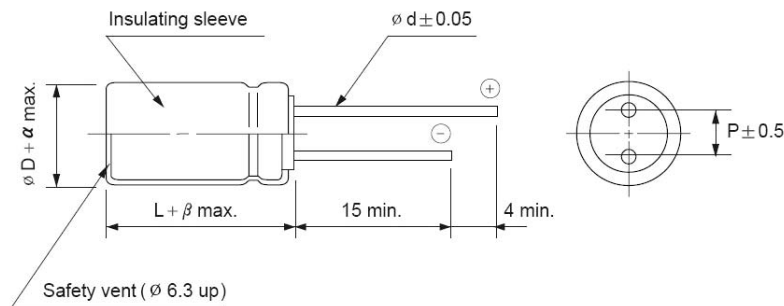
- Wide temperature range of -40 ~ +105°C
適用於 -40 ~ +105°C 的寬溫範圍
- Standard series for general purposes
標準品通用型
- Load life of 2000 hours at 105°C
在 105°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性	
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C	-25 ~ +105°C
Voltage Range 額定工作電壓範圍	6.3 ~ 100V	160 ~ 450V
Capacitance Range 靜電容量範圍	0.47 ~ 1000μF	0.47 ~ 33μF
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C	
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後)	Leakage current = 0.02CV + 15μA (after 5 minutes application of rated voltage) 漏電流 = 0.02CV + 15μA (施加額定工作電壓 5 分鐘後)
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C	
Stability at Low Temperature 低溫特性	Rated Voltage (V) 額定工作電壓	6.3 10 16 25 35 50 63 100 160~250 350~450
	tan δ (max.) 最大損耗角正切	0.24 0.20 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20
	Measurement frequency 測試頻率: 120Hz	
Load Life 高溫負荷特性	Rated Voltage (V) 額定工作電壓	6.3 10 16 25~100 160~350 400,450
	Impedance Ratio Z(-25°C) / Z(20°C) 阻抗比	4 3 2 2 3 8
	Z(-40°C) / Z(20°C)	8 6 4 3 4 —
Shelf Life 高溫貯存特性	After 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時後, 電容器的特性符合下表的要求。	
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。	

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8
P	2.0	2.5	3.5
Ød	0.5		
β	1.5		
α	0.5		

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 係數	0.47 ~ 47μF	0.75	1.00	1.35	1.55	2.00
	68 ~ 680μF	0.80	1.00	1.25	1.34	1.50
	1000μF	0.85	1.00	1.10	1.13	1.15

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼 μF		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.47	R47											5 x 11	8	5 x 11	8
0.68	R68											5 x 11	9	5 x 11	9
1	010											5 x 11	11	5 x 11	13
2.2	2R2											5 x 11	14	5 x 11	15
3.3	3R3											5 x 11	17	5 x 11	19
4.7	4R7											5 x 11	20	5 x 11	22
6.8	6R8											5 x 11	25	5 x 11	34
10	100					5 x 11	50	5 x 11	38	5 x 11	41	5 x 11	46	5 x 11	50
22	220			5 x 11	50	5 x 11	54	5 x 11	57	5 x 11	61	5 x 11 (6.3x11.5)	68 (75)	6.3 x 11.5	82
33	330			5 x 11	60	5 x 11	64	5 x 11	69	5 x 11	75	6.3 x 11.5	90	6.3 x 11.5	85
47	470	5 x 11	62	5 x 11	71	5 x 11	80	5 x 11	106	5 x 11 (6.3x11.5)	106 (110)	6.3 x 11.5	125	6.3 x 11.5	90
68	680	5 x 11	80	5 x 11	83	5 x 11	85	5 x 11	114	6.3 x 11.5	121	8 x 11.5	144	8 x 11.5	128
100	101	5 x 11	95	5 x 11	100	5 x 11 (6.3x11.5)	120 (135)	5 x 11 (6.3x11.5)	120 (145)	6.3 x 11.5 (8x11.5)	165 (210)	8 x 11.5	180	8 x 16	210
220	221	5 x 11	150	5 x 11 (6.3x11.5)	155 (165)	6.3 x 11.5	175	6.3 x 11.5 (8x11.5)	175 (185)	8 x 11.5	250				
330	331	6.3 x 11.5	170	6.3 x 11.5	180	8 x 11.5	195	8 x 11.5	245						
470	471	6.3 x 11.5	205	6.3 x 11.5 (8x11.5)	260 275	8 x 11.5	305	8 x 11.5 (8x16)	270 (320)						
680	681	8 x 11.5	314	8 x 11.5 (8x16)	345 (390)	8 x 16	480								
1000	102	8 x 11.5	380	8 x 11.5 (8x16)	400 (425)										

WV Code 代碼 μF		100		160		200		250		350		400		450	
		2A		2C		2D		2E		2V		2G		2W	
0.47	R47	5 x 11	14	5 x 11	12	5 x 11	12	5 x 11	12	6.3 x 11.5	12	6.3 x 11.5	12	6.3 x 11.5	12
0.68	R68	5 x 11	15	5 x 11	13	5 x 11	13	5 x 11	13	6.3 x 11.5	13	6.3 x 11.5	13	8 x 11.5	13
1	010	5 x 11	19	5 x 11	16	5 x 11	16	6.3 x 11.5	16	6.3 x 11.5	16	6.3 x 11.5 (8x11.5)	16 (20)	8 x 11.5	17
2.2	2R2	5 x 11	25	6.3 x 11.5	23	6.3 x 11.5	23	6.3 x 11.5	24	8 x 11.5	24	8 x 11.5	26		
3.3	3R3	5 x 11	32	6.3 x 11.5	34	6.3 x 11.5	34	8 x 11.5	34	8 x 11.5	34	8 x 11.5	30		
4.7	4R7	5 x 11	38	6.3 x 11.5	40	8 x 11.5	40	8 x 11.5	40						
6.8	6R8	5 x 11	52	8 x 11.5	48	8 x 11.5	52								
10	100	5 x 11 (6.3x11.5)	66 (73)												
22	220	6.3 x 11.5	104												
33	330	8 x 11.5	150											Case size 尺寸	Ripple current 紋波電流

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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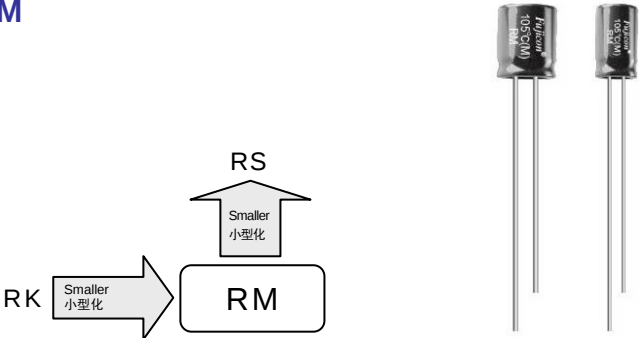
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CAT.2011/V5

WIDE TEMPERATURE RANGE, HEIGHT 7(9)MM

7(9)MM 高，寬溫品

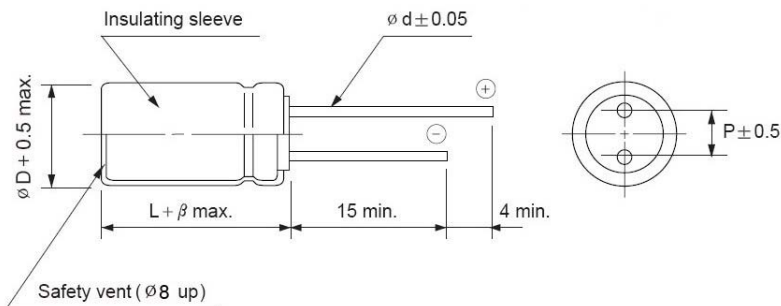
- Super miniature series with 7(9)mm height
7(9)mm 高，超小型系列
- High performance and excellent temperature characteristics
高性能和卓越的温度特性
- Load life of 1000 hours at 105°C
在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性							
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C							
Voltage Range 額定工作電壓範圍	4 ~ 63V							
Capacitance Range 靜電容量範圍	0.1 ~ 1000μF							
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C							
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA，取較大值（施加額定工作電壓 2 分鐘後）							
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C							
	Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35	50, 63
	tan δ (max.) 最大損耗角正切	0.35	0.24	0.20	0.16	0.14	0.12	0.10
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz							
	Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25, 35	50, 63	
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	6	4	3	2	2	2
		Z(-40°C) / Z(20°C)	12	10	8	6	4	3
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。							
	Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內						
	Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%						
	Leakage Current 漏電流	≦ initial specified value 不大於規範值						
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。							
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。							

DRAWING (Unit: mm) 外形圖



□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

μF	WV Code 代碼	4		6.3		10		16		25		35		50		63	
		0G		0J		1A		1C		1E		1V		1H		1J	
0.1	0R1													4 x 7	1	4 x 7	2.4
0.22	R22													4 x 7	2.3	4 x 7	3.2
0.33	R33													4 x 7	3.5	4 x 7	4
0.47	R47													4 x 7	5	4 x 7	6
0.68	R68													4 x 7	10	4 x 7	11
1	010													4 x 7	16	4 x 7	18
2.2	2R2													4 x 7	24	4 x 7	26
3.3	3R3													4 x 7	29	4 x 7	30
4.7	4R7													4 x 7	32	5 x 7	33
6.8	6R8											4 x 7	28	4 x 7	34	5 x 7	35
10	100							4 x 7	28	4 x 7	28	4 x 7	32	4 x 7 (5 x 7)	34 (44)	6.3 x 7	45
22	220					4 x 7	36	4 x 7	45	4 x 7 (5 x 7)	48 (50)	5 x 7	53	6.3 x 7	65	6.3 x 7	68
33	330					4 x 7	45	4 x 7	48	5 x 7	52	5 x 7	67	6.3 x 7	100	8 x 7	110
47	470			4 x 7	45	4 x 7	48	4 x 7 (5 x 7)	70 (80)	5 x 7 (6.3 x 7)	80 (85)	6.3 x 7	90	8 x 7	140		
68	680			4 x 7	45	5 x 7	80	5 x 7	85	6.3 x 7	105	6.3 x 7	120				
100	101	4 x 7	28	4 x 7 (5 x 7)	55 (85)	5 x 7	90	5 x 7 (6.3 x 7)	105 (125)	6.3 x 7 (8 x 7) (8 x 9)	125 (135) (170)	8 x 7	165				
220	221	5 x 7	65	6.3 x 7	110	6.3 x 7	125	6.3 x 7 (8 x 7) (8 x 9)	138 (145) (168)	8 x 9	179						
330	331	6.3 x 7	120	6.3 x 7	130	8 x 7 (8 x 9)	150 (170)	8 x 7	182								
470	471	6.3 x 7	150	6.3 x 7 (8 x 7) (8 x 9)	140 (160) (180)	8 x 9	190	8 x 9	200							Case size 尺寸	Ripple current 紋波電流
1000	102	8 x 9	215														

•Case size ØD×L(mm), ripple current (mA rms) at 105°C 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C 120Hz

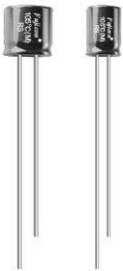
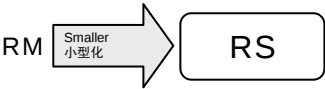
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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WIDE TEMPERATURE RANGE, HEIGHT 5MM
5MM 高，寬溫品

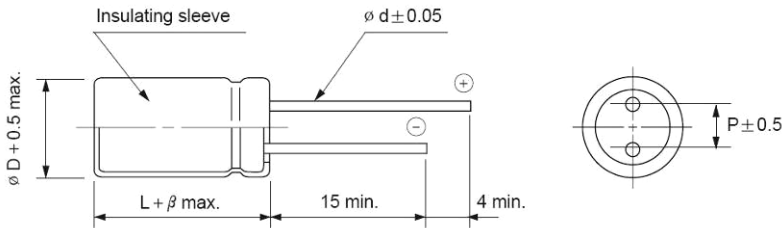
- Super miniature series with 5mm height
5mm 高，超小型系列
- Suitable to replace tantalum capacitors at low cost
可替換價格較高的鉭電容器
- Load life of 1000 hours at 105°C
在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																															
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C																															
Voltage Range 額定工作電壓範圍	4 ~ 63V																															
Capacitance Range 靜電容量範圍	0.1 ~ 470μF																															
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																															
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA，取較大值（施加額定工作電壓 2 分鐘後）																															
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.35</td><td>0.27</td><td>0.23</td><td>0.19</td><td>0.15</td><td>0.13</td><td>0.11</td></tr></table>								Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35	50	tan δ (max.) 最大損耗角正切	0.35	0.27	0.23	0.19	0.15	0.13	0.11								
Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35	50																									
tan δ (max.) 最大損耗角正切	0.35	0.27	0.23	0.19	0.15	0.13	0.11																									
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td colspan="3">25-50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>3</td><td>3</td><td>2</td><td colspan="2">2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>12</td><td>8</td><td>5</td><td>4</td><td colspan="2">3</td></tr></table>								Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25-50			Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	7	3	3	2	2			Z(-40°C) / Z(20°C)	12	8	5	4	3	
Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25-50																											
Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	7	3	3	2	2																										
	Z(-40°C) / Z(20°C)	12	8	5	4	3																										
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="7">Within ±25% of initial measured value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="7">≦ 200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="7">≦ initial specified value 不大於規範值</td></tr></table>								Capacitance Change 靜電容量變化率	Within ±25% of initial measured value 初始值的±25%以內							Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%							Leakage Current 漏電流	≦ initial specified value 不大於規範值						
Capacitance Change 靜電容量變化率	Within ±25% of initial measured value 初始值的±25%以內																															
Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%																															
Leakage Current 漏電流	≦ initial specified value 不大於規範值																															
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。																															
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green and brown (Ø3x5) sleeve (PET). 黑色膠管白字印刷（PVC）或綠色和褐色（Ø3x5）膠管白字印刷（PET）。																															

DRAWING (Unit: mm) 外形圖



ØD	3	4	5	6.3	8
p	1.0	1.5	2.0	2.5	3.5
Ød	0.45				
β	1.0				

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code μF 代碼		4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													3 x 5 (4 x 5)	2.0 (2.4)
0.22	R22													3 x 5 (4 x 5)	3.0 (3.6)
0.33	R33													3 x 5 (4 x 5)	3.7 (4.4)
0.47	R47													3 x 5 (4 x 5)	4.4 (5.2)
0.68	R68													3 x 5 (4 x 5)	5.3 (6.3)
1	010													3 x 5 (4 x 5)	6.4 (7.7)
2.2	2R2													3 x 5 (4 x 5)	9.5 (11)
3.3	3R3											3 x 5 (4 x 5)	9 (11)	4 x 5	14
4.7	4R7									3 x 5 (4 x 5)	10 (12)	4 x 5	13	4 x 5 (5 x 5)	16 (19)
6.8	6R8					3 x 5	11	3 x 5	14	4 x 5	15	4 x 5	17	5 x 5	23
10	100			3 x 5 (4 x 5)	13 (15)	3 x 5 (4 x 5)	14 (17)	3 x 5 (4 x 5)	16 (16)	4 x 5	19	5 x 5	22	6.3 x 5	33
22	220	3 x 5 (4 x 5)	16 (16)	4 x 5	19	3 x 5 (4 x 5)	20 (22)	4 x 5	29	5 x 5	34	5 x 5	36	6.3 x 5	40
33	330	4 x 5	20	4 x 5	23	4 x 5	29	5 x 5	37	5 x 5	45	6.3 x 5	50	8 x 5	58
47	470	4 x 5	24	4 x 5	28	5 x 5	35	5 x 5	46	6.3 x 5	54	6.3 x 5	62	8 x 5	71
68	680	5 x 5	36	5 x 5	46	5 x 5	47	6.3 x 5	52	6.3 x 5	63	8 x 5	105		
100	101	5 x 5	41	5 x 5	50	6.3 x 5	52	6.3 x 5	58	8 x 5	90				
220	221	6.3 x 5	56	6.3 x 5	60	8 x 5	78	8 x 5	86						
330	331	8 x 5	80	8 x 5	86	8 x 5	90							Case size 尺寸	Ripple current 紋波電流
470	471	8 x 5	88	8 x 5	96										

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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LOW LEAKAGE CURRENT
低漏電品

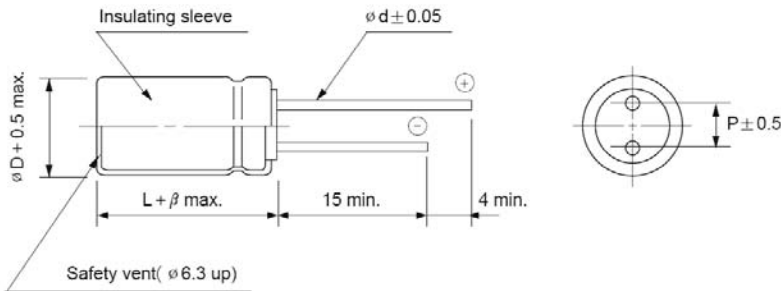
- Standard low leakage current series
低漏電標準型系列
- Suitable for high gain audio coupling applications
適用於高增益音頻耦合器材
- Stable leakage current characteristics for a long period
使漏電流特性處於長週期穩定
- Load life of 2000 hours at 85°C
在 85°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性				
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C				
Voltage Range 額定工作電壓範圍	10 ~ 100V				
Capacitance Range 靜電容量範圍	1 ~ 4700μF				
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C				
Leakage Current 漏電流	Leakage current = 0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.002CV 或 0.4μA，取較大值（施加額定工作電壓 2 分鐘後）				
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C				
	Rated Voltage (V) 額定工作電壓	10	16	25, 35	50 63
	tan δ (max.) 最大損耗角正切	0.17	0.15	0.12	0.10 0.09
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz				
	Rated Voltage (V) 額定工作電壓	10, 25		35	50~63
	Impedance Ratio	Z(-25°C) / Z(20°C)		2	1.75 1.5
	阻抗比	Z(-40°C) / Z(20°C)		4	4 2
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 2000 小時後，電容器的特性符合下表的要求。				
	Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內			
	Dissipation Factor 損耗角正切	≤ 200% of initial specified value 不大於規範值的 200%			
	Leakage Current 漏電流	≤ initial specified value 不大於規範值			
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 85°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。				
Marking 標識	Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET). 桔紅色膠管黑字印刷（PVC）或綠色膠管白字印刷（PET）。				

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16
P	2.0	2.5	3.5	5.0	7.5	
Ød	0.5			0.6	0.8	
β	1.5				2.0	

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	10		16		25		35		50		63		100	
		1A		1C		1E		1V		1H		1J		2A	
1	010											5 x 11	22	5 x 11	18
1.5	1R5											5 x 11	25	5 x 11	22
2.2	2R2											5 x 11	30	5 x 11	26
3.3	3R3									5 x 11	35	5 x 11	37	5 x 11	32
4.7	4R7									5 x 11	42	5 x 11	44	5 x 11	38
6.8	6R8							5 x 11	46	5 x 11	50	5 x 11	53	6.3 x 11.5	53
10	100					5 x 11	55	5 x 11	55	6.3 x 11.5	70	6.3 x 11.5	73	8 x 11.5	76
15	150			5 x 11	61	5 x 11	68	5 x 11	68	6.3 x 11.5	85	8 x 11.5	106	8 x 11.5	93
22	220	5 x 11	69	5 x 11	73	5 x 11	82	6.3 x 11.5	94	8 x 11.5	122	8 x 11.5	129	10 x 12	130
33	330	5 x 11	84	5 x 11	90	6.3 x 11.5	116	6.3 x 11.5	116	8 x 11.5	149	10 x 12	183	10 x 16	175
47	470	5 x 11	101	6.3 x 11.5	123	8 x 11.5	163	8 x 11.5	163	10 x 12	207	10 x 16	239	10 x 20	227
68	680	6.3 x 11.5	139	6.3 x 11.5	148	8 x 11.5	196	10 x 12	227	10 x 16	273	10 x 20	314	12.5 x 20	313
100	101	6.3 x 11.5	169	8 x 11.5	212	10 x 12	276	10 x 16	302	10 x 20	361	12.5 x 20	447	12.5 x 25	380
150	151	8 x 11.5	244	10 x 12	302	10 x 16	370	10 x 20	404	12.5 x 20	519	12.5 x 25	596	16 x 25	508
220	221	10 x 12	344	10 x 16	401	10 x 20	489	12.5 x 20	574	12.5 x 25	685	16 x 25	801	16 x 31	699
330	331	10 x 16	461	10 x 20	535	12.5 x 20	703	12.5 x 25	766	16 x 25	931	16 x 31	1074	16 x 35	983
470	471	10 x 20	600	12.5 x 20	750	12.5 x 25	914	12.5 x 25	914	16 x 31	1216	16 x 35	1345	18 x 40	1320
680	681	12.5 x 20	847	12.5 x 20	902	12.5 x 25	1100	16 x 25	1220	18 x 35	1534	18 x 40	1821		
1000	102	12.5 x 20	1028	12.5 x 25	1193	16 x 25	1480	16 x 31	1619	18 x 40	2095				
1500	152	12.5 x 25	1298	16 x 25	1522	16 x 31	1835	18 x 35	2066						
2200	222	16 x 25	1659	16 x 31	1908	18 x 35	2341								
3300	332	16 x 31	2124	18 x 35	2502										
4700	472	18 x 35	2737											Case size 尺寸	Ripple current 紋波電流

• Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 85°C 120Hz • 尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 85°C 120Hz

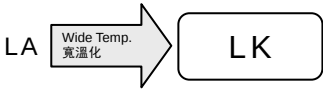
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
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LOW LEAKAGE CURRENT, WIDE TEMPERATURE RANGE
低漏電寬溫品

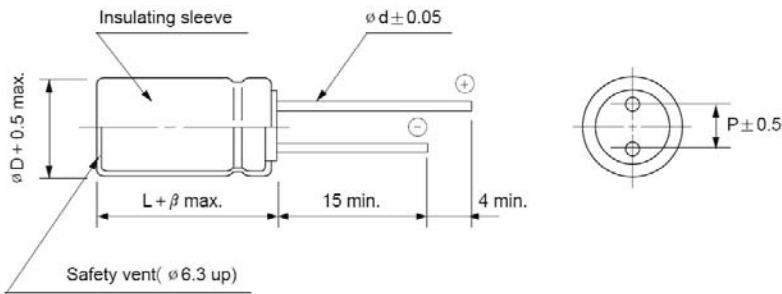
- Wide operating temperature range of -40 ~ +105°C
適用於 -40 ~ +105°C 的寬溫範圍
- Low leakage current series
低漏電系列
- For Hi-Fi sound audio systems
適用於高保真音響設備
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性					
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C					
Voltage Range 額定工作電壓範圍	10 ~50V					
Capacitance Range 靜電容量範圍	0.1 ~ 330μF					
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C					
Leakage Current 漏電流	Leakage current = 0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.002CV 或 0.4μA，取較大值（施加額定工作電壓 2 分鐘後）					
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C					
	Rated Voltage (V) 額定工作電壓	10	16	25	35	50
	tan δ (max.) 最大損耗角正切	0.15	0.12	0.08	0.08	0.08
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz					
	Rated Voltage (V) 額定工作電壓	10	16	25~50		
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	2	2	1.5	
		Z(-40°C) / Z(20°C)	4	3	2	
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。					
	Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內				
	Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%				
	Leakage Current 漏電流	≦ initial specified value 不大於規範值				
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。					
Marking 標識	Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET). 桔紅色膠管黑字印刷（PVC）或綠色膠管白字印刷（PET）。					

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10
P	2.0	2.5	3.5	5.0
Ød	0.5			0.6
β	1.5			

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	10	16	25	35	50
μF	1A	1C	1E	1V	1H
0.1	0R1				5 x 11
0.15	R15				5 x 11
0.22	R22				5 x 11
0.33	R33				5 x 11
0.47	R47				5 x 11
0.68	R68				5 x 11
1	010				5 x 11
1.5	1R5				5 x 11
2.2	2R2				5 x 11
3.3	3R3				5 x 11
4.7	4R7				5 x 11
6.8	6R8				5 x 11
10	100				6.3 x 11.5
15	150			5 x 11	54
22	220		5 x 11	65	75
33	330	5 x 11	65	6.3 x 11.5	92
47	470	5 x 11	70	6.3 x 11.5	90
68	680	6.3 x 11.5	96	6.3 x 11.5	108
100	101	6.3 x 11.5	117	8 x 11.5	156
150	151	8 x 11.5	169	8 x 11.5	156
220	221	8 x 11.5	205	10 x 12	219
330	331	10 x 12	291		

• Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz • 尺寸 $\varnothing D \times L$ (mm), 紋波電流 (mA rms) 於 105°C 120Hz

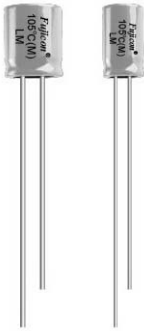
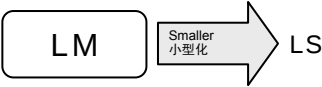
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LOW LEAKAGE CURRENT, HEIGHT 7MM
7MM 高，低漏電品

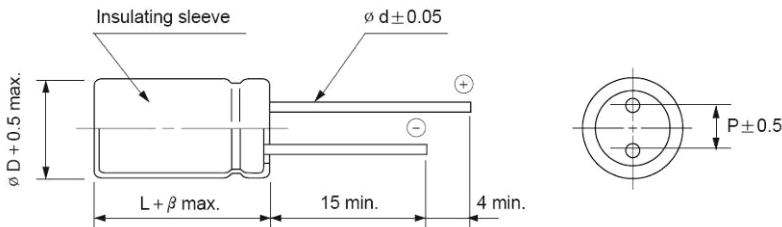
- Low leakage current series with 7mm height
7mm 高，低漏電品系列
- Load life of 1000 hours at 105°C
在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性						
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C						
Voltage Range 額定工作電壓範圍	6.3 ~ 63V						
Capacitance Range 靜電容量範圍	0.1 ~ 220μF						
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C						
Leakage Current 漏電流	Leakage current = 0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.002CV 或 0.4μA，取較大值（施加額定工作電壓 2 分鐘後）						
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C						
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50, 63
	tan δ (max.) 最大損耗角正切	0.24	0.20	0.16	0.14	0.12	0.10
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz						
	Rated Voltage (V) 額定工作電壓	6.3	10	16~25	35~63		
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2	2	
		Z(-40°C) / Z(20°C)	10	6	4	3	
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。						
	Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內					
	Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%					
	Leakage Current 漏電流	≦ initial specified value 不大於規範值					
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。						
Marking 標識	Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET). 桔紅色膠管黑字印刷（PVC）或綠色膠管白字印刷（PET）。						

DRAWING (Unit: mm) 外形圖



ØD	4	5	6.3
p	1.5	2.0	2.5
Ød	0.45		
β	1.0		

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code μF 代碼		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.1	0R1											4 x 7	1	4 x 7	2.4
0.22	R22											4 x 7	2	4 x 7	3.2
0.33	R33											4 x 7	3.5	4 x 7	4
0.47	R47											4 x 7	5	4 x 7	6
0.68	R68											4 x 7	7	4 x 7	9
1	010											4 x 7	10	4 x 7	16
2.2	2R2											4 x 7	15	4 x 7	18
3.3	3R3									4 x 7	16	4 x 7	18	4 x 7	20
4.7	4R7									4 x 7	18	4 x 7	22	4 x 7	26
6.8	6R8							4 x 7	18	4 x 7	24	4 x 7	28	5 x 7	32
10	100					4 x 7	29	4 x 7	33	5 x 7	36	5 x 7	44	6.3 x 7	48
22	220	4 x 7	34	4 x 7	38	4 x 7	44	5 x 7	51	5 x 7	57	6.3 x 7	65	8 x 7	74
33	330	4 x 7	42	4 x 7	47	4 x 7	57	5 x 7	63	6.3 x 7	72	8 x 7	85		
47	470	4 x 7	50	5 x 7	59	5 x 7	68	6.3 x 7	78	8 x 7	85				
68	680	5 x 7	72	6.3 x 7	78	6.3 x 7	82	8 x 7	95						
100	101	6.3 x 7	76	8 x 7	96	8 x 7	105								
220	221	8 x 7	130											Case size 尺寸	Ripple current 紋波電流

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

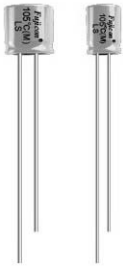
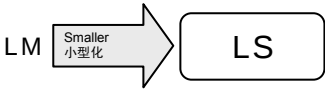
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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LOW LEAKAGE CURRENT, HEIGHT 5MM
5MM 高，低漏電品

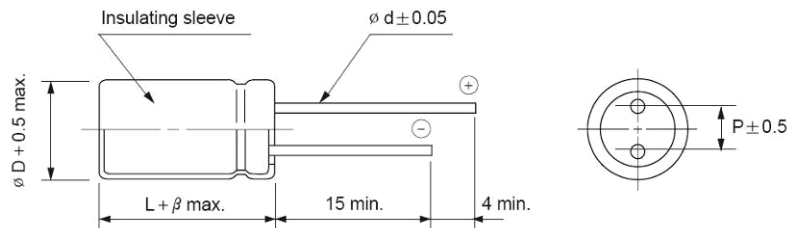
- Low leakage current series with 5mm height
5mm 高，低漏電品系列
- Designed for use in lightweight and portable equipment
適用於小型及便攜器材
- Load life of 1000 hours at 105°C
在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																															
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C																															
Voltage Range 額定工作電壓範圍	4 ~ 50V																															
Capacitance Range 靜電容量範圍	0.1 ~ 100μF																															
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																															
Leakage Current 漏電流	Leakage current = 0.002CV or 0.4μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.002CV 或 0.4μA，取較大值（施加額定工作電壓 2 分鐘後）																															
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.35</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>								Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35	50	tan δ (max.) 最大損耗角正切	0.35	0.24	0.20	0.16	0.14	0.12	0.10								
Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35	50																									
tan δ (max.) 最大損耗角正切	0.35	0.24	0.20	0.16	0.14	0.12	0.10																									
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td colspan="2">35, 50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>7</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>15</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>								Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35, 50		Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	7	4	3	2	2	2		Z(-40°C) / Z(20°C)	15	10	8	6	4	3
Rated Voltage (V) 額定工作電壓	4	6.3	10	16	25	35, 50																										
Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	7	4	3	2	2	2																									
	Z(-40°C) / Z(20°C)	15	10	8	6	4	3																									
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="7">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="7">≦ 200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="7">≦ initial specified value 不大於規範值</td></tr></table>								Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內							Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%							Leakage Current 漏電流	≦ initial specified value 不大於規範值						
Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內																															
Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%																															
Leakage Current 漏電流	≦ initial specified value 不大於規範值																															
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。																															
Marking 標識	Printed with black colour on orange sleeve (PVC) or printed with white colour on green sleeve (PET). 桔紅色膠管黑字印刷（PVC）或綠色膠管白字印刷（PET）。																															

DRAWING (Unit: mm) 外形圖



ØD	4	5	6.3
p	1.5	2.0	2.5
Ød	0.45		
β	1.0		

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	4		6.3		10		16		25		35		50	
		0G		0J		1A		1C		1E		1V		1H	
0.1	0R1													4 x 5	1
0.22	R22													4 x 5	2
0.33	R33													4 x 5	2.8
0.47	R47													4 x 5	4
0.68	R68													4 x 5	8.3
1	010													4 x 5	9
2.2	2R2													4 x 5	13
3.3	3R3													4 x 5	17
4.7	4R7											4 x 5	18	5 x 5	20
6.8	6R8									4 x 5	21	5 x 5	24	6.3 x 5	28
10	100							4 x 5	23	5 x 5	27	5 x 5	29	6.3 x 5	33
22	220			4 x 5	28	5 x 5	30	5 x 5	37	6.3 x 5	42	6.3 x 5	46		
33	330	5 x 5	25	5 x 5	35	5 x 5	41	6.3 x 5	49	6.3 x 5	52				
47	470	5 x 5	33	5 x 5	45	6.3 x 5	52	6.3 x 5	58						
68	680	6.3 x 5	45	6.3 x 5	55										
100	101	6.3 x 5	56	6.3 x 5	70									Case size 尺寸	Ripple current 紋波電流

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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NON-POLARIZED
無極性品

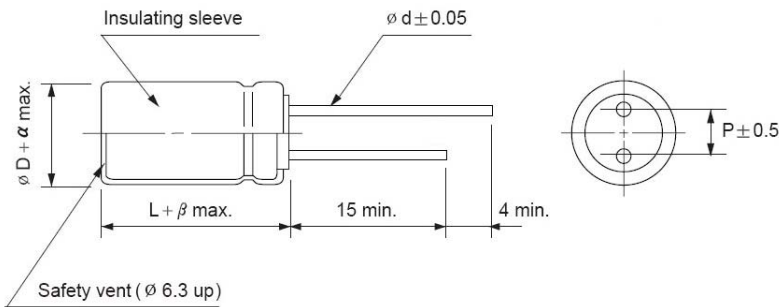
- Standard non-polarized series
無極性標準型系列
- Designed for use in circuits with reversing polarity
適用於極性變換電路
- Load life of 2000 hours at 85°C
在 85°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性											
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C											
Voltage Range 額定工作電壓範圍	6.3 ~ 250V											
Capacitance Range 靜電容量範圍	0.47 ~ 10000μF											
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C											
Leakage Current 漏電流	Leakage current = 0.03CV or 3μA, whichever is greater (after 5 minutes application of rated voltage) 漏電流 = 0.03CV 或 3μA, 取較大值 (施加額定工作電壓 5 分鐘後)											
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C											
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50~100	160	200~250			
	tan δ (max.) 最大損耗角正切	0.25	0.23	0.20	0.15	0.15	0.12	0.15	0.20			
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz											
	Rated Voltage (V) 額定工作電壓	6.3		10		16		25~100		160~250		
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)		4		3		2		2		3
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 2000 小時後, 電容器的特性符合下表的要求。											
	Capacitance Change 靜電容量變化率				Within ±20% of initial measured value 初始值的±20%以內							
	Dissipation Factor 損耗角正切				≦ 200% of initial specified value 不大於規範值的 200%							
	Leakage Current 漏電流				≦ initial specified value 不大於規範值							
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 85°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。											
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。											

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0	7.5	10.0	12.5		
Ød	0.5			0.6	0.8				
β	1.5				2.0				
α	0.5							1.0	

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1kHz	10kHz~
Coefficient 系數	0.1 ~ 47μF	0.75	1.00	1.35	1.55	2.0
	68 ~ 680μF	0.80	1.00	1.25	1.34	1.5
	1000 ~ 10000μF	0.85	1.00	1.10	1.13	1.15

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼 μF		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.47	R47											5 x 11	12	5 x 11	12
0.68	R68											5 x 11	14	5 x 11	14
1	010											5 x 11	18	5 x 11	18
1.5	1R5											5 x 11	21	5 x 11	21
2.2	2R2											5 x 11	26	5 x 11	26
3.3	3R3											5 x 11	32	5 x 11	32
4.7	4R7											5 x 11	38	5 x 11	38
6.8	6R8											5 x 11	46	5 x 11	46
10	100											5 x 11	55	6.3 x 11.5	64
15	150									5 x 11	61	6.3 x 11.5	78	6.3 x 11.5	78
22	220							5 x 11	73	6.3 x 11.5	84	6.3 x 11.5	94	8 x 11.5	111
33	330					5 x 11	78	6.3 x 11.5	103	6.3 x 11.5	103	8 x 11.5	136	10 x 12	158
47	470			5 x 11	87	5 x 11 (6.3x11.5)	92 (107)	6.3 x 11.5	123	8 x 11.5	145	10 x 12	189	10 x 16	207
68	680	5 x 11	100	6.3 x 11.5	120	6.3 x 11.5	129	8 x 11.5	175	10 x 12	203	10 x 16	249	10 x 20	272
100	101	6.3 x 11.5	139	6.3 x 11.5	145	8 x 11.5	184	10 x 12	247	10 x 16	270	10 x 20	329	10 x 20	329
150	151	6.3 x 11.5	171	8 x 11.5	210	10 x 12	262	10 x 12 (10x16)	300 (331)	10 x 20	361	10 x 20	404	12.5 x 20	474
220	221	8 x 11.5	244	10 x 12	295	10 x 16	347	10 x 12 (10x20)	310 (437)	10 x 20	437	12.5 x 20	574	12.5 x 25	625
330	331	10 x 12	347	10 x 16	396	10 x 20	464	10 x 20	535	12.5 x 20	628	16 x 25	850	16 x 25	850
470	471	10 x 16	454	10 x 20	516	10 x 20	553	12.5 x 20	750	12.5 x 20	818	16 x 31	1110	16 x 35	1164
680	681	10 x 20	595	12.5 x 20	729	12.5 x 20	781	12.5 x 25	984	16 x 25	1091	18 x 35	1503	18 x 40	1577
1000	102	12.5 x 20	847	12.5 x 20	883	12.5 x 25	1033	16 x 25	1323	16 x 35	1519	18 x 40	1912	22 x 40	2105
1500	152	12.5 x 20	999	12.5 x 25	1132	16 x 25	1338	16 x 35	1748	18 x 40	1968	22 x 40	2368	25 x 40	2607
2200	222	12.5 x 25	1272	16 x 25	1463	16 x 35	1781	18 x 40	2254	22 x 40	2481	25 x 50	3221		
3300	332	16 x 25	1672	16 x 35	1985	18 x 40	2890	22 x 40	2890	25 x 40	3157				
4700	472	16 x 35	2221	18 x 40	2579	22 x 40	2987	25 x 50	3927						
6800	682	18 x 40	2840	22 x 40	3214	25 x 50	4004								
10000	103	22 x 40	3516	25 x 50	4290										

WV Code 代碼 μF		100		160		200		250	
		2A		2C		2D		2E	
0.47	R47	5 x 11	12						
0.68	R68	5 x 11	14						
1	010	5 x 11	18						
1.5	1R5	5 x 11	21						
2.2	2R2	5 x 11	26						
3.3	3R3	5 x 11	32	8 x 11.5	49	8 x 11.5	42	10 x 12	46
4.7	4R7	6.3 x 11.5	44	8 x 11.5	59	10 x 12	55	10 x 12	65
6.8	6R8	8 x 11.5	62	10 x 20	77	12.5 x 20	78	12.5 x 20	78
10	100	8 x 11.5 (8 x 16)	75 (80)	12.5 x 20	109	12.5 x 20	95	12.5 x 25	103
15	150	10 x 12	107	12.5 x 20	134	12.5 x 25	127	16 x 25	140
22	220	10 x 12 (10 x 16)	130 (142)	12.5 x 25	177	16 x 25	170	16 x 31	186
33	330	10 x 20	189	16 x 25	240	16 x 35	239	18 x 35	256
47	470	12.5 x 20	265	16 x 35	329	18 x 40	321		
68	680	12.5 x 25	348	18 x 35	425				
100	101	16 x 25	468						
150	151	16 x 25	573						
220	221	16 x 35	797						
330	331	18 x 40	1098						
470	471	22 x 40	1443						
680	681	25 x 40	1896					Case size 尺寸	Ripple current 紋波電流

• Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 85°C 120Hz • 尺寸 $\varnothing D \times L$ (mm), 紋波電流 (mA rms) 於 85°C 120Hz

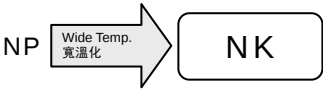
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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NON-POLARIZED, WIDE TEMPERATURE RANGE
無極性寬溫品

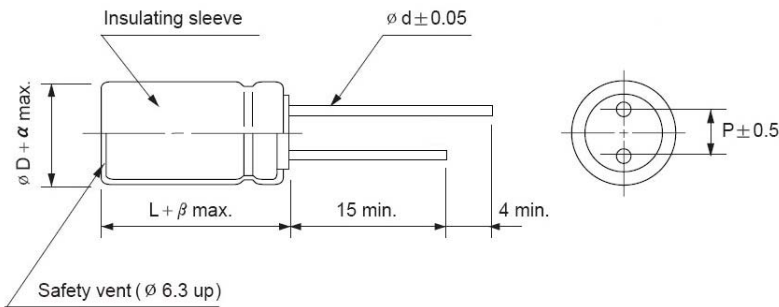
- Wide operating temperature range of -40 ~ +105°C
適用於 -40 ~ +105°C 的寬溫範圍
- Designed for use in circuits with reversing polarity
適用於極性變換電路
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性							
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C							
Voltage Range 額定工作電壓範圍	6.3 ~ 100V							
Capacitance Range 靜電容量範圍	0.1 ~ 10000μF							
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C							
Leakage Current 漏電流	Leakage current = 0.03CV or 3μA, whichever is greater (after 5 minutes application of rated voltage) 漏電流 = 0.03CV 或 3μA，取較大值（施加額定工作電壓 5 分鐘後）							
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C							
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50~100	
	tan δ (max.) 最大損耗角正切	0.24	0.20	0.16	0.16	0.14	0.12	
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz							
	Rated Voltage (V) 額定工作電壓	6.3		10		16		25~100
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)		4		3		2
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。							
	Capacitance Change 靜電容量變化率			Within ±20% of initial measured value 初始值的±20%以內				
	Dissipation Factor 損耗角正切			≤ 200% of initial specified value 不大於規範值的 200%				
Shelf Life 高溫貯存特性	Leakage Current 漏電流			≤ initial specified value 不大於規範值				
	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。							
	Marking 標識							
Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。								

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0		7.5		10.0	12.5
Ød	0.5			0.6		0.8			
β	1.5					2.0			
α	0.5								1.0

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1kHz	10kHz~
Coefficient 系數	0.1 ~ 47µF	0.75	1.00	1.35	1.55	2.00
	68 ~ 680µF	0.80	1.00	1.25	1.34	1.50
	1000 ~ 6800µF	0.85	1.00	1.10	1.13	1.15

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	6.3		10		16		25		35		50		63		100	
		0J		1A		1C		1E		1V		1H		1J		2A	
0.1	0R1											5 x 11	3.6	5 x 11	3.9	5 x 11	4.2
0.15	R15											5 x 11	4.4	5 x 11	4.8	5 x 11	5.1
0.22	R22											5 x 11	5.3	5 x 11	5.8	5 x 11	6.2
0.33	R33											5 x 11	6.5	5 x 11	7.2	5 x 11	7.5
0.47	R47											5 x 11	7.8	5 x 11	8.5	5 x 11	9.2
0.68	R68											5 x 11	9.4	5 x 11	10	5 x 11	11
1	010											5 x 11	11	5 x 11	12	5 x 11	13
1.5	1R5											5 x 11	14	5 x 11	15	5 x 11	16
2.2	2R2											5 x 11	17	5 x 11	18	5 x 11	19
3.3	3R3											5 x 11	21	5 x 11	23	6.3 x 11.5	27
4.7	4R7									5 x 11	23	5 x 11	25	6.3 x 11.5	31	8 x 11.5	39
6.8	6R8							5 x 11	26	5 x 11	27	6.3 x 11.5	34	6.3 x 11.5	37	10 x 12	54
10	100					5 x 11	31	5 x 11	31	6.3 x 11.5	38	6.3 x 11.5	41	6.3 x 11.5	53	10 x 12	65
15	150			5 x 11	34	5 x 11	38	6.3 x 11.5	44	8 x 11.5	55	8 x 11.5	60	10 x 12	76	10 x 16	88
22	220	5 x 11	38	5 x 11	41	6.3 x 11.5	53	8 x 11.5	63	8 x 11.5	67	8 x 11.5	84	10 x 16	101		
33	330	5 x 11	46	6.3 x 11.5	58	8 x 11.5	77	8 x 11.5	77	10 x 12	95	10 x 16	113	10 x 16	124		
47	470	6.3 x 11.5	63	6.3 x 11.5	69	8 x 11.5	92	10 x 12	106	10 x 16	125	10 x 20	147	10 x 20	161		
68	680	6.3 x 11.5	76	8 x 11.5	98	10 x 12	128	10 x 16	140	10 x 20	164	10 x 20	177	12.5 x 20	227		
100	101	8 x 11.5	109	10 x 12	139	10 x 16	170	10 x 20	185	10 x 20	198	12.5 x 20	251	12.5 x 25	300		
150	151	10 x 12	155	10 x 16	186	10 x 20	227	12.5 x 20	267	12.5 x 20	285	12.5 x 25	336	16 x 25	408		
220	221	10 x 12	188	10 x 20	246	12.5 x 20	323	12.5 x 20	323	12.5 x 25	376	16 x 25	451	16 x 35	567		
330	331	10 x 16	252	12.5 x 20	354	12.5 x 20	396	12.5 x 25	431	16 x 25	511	16 x 35	634	18 x 35	745		
470	471	10 x 20	328	12.5 x 20	422	12.5 x 25	515	16 x 25	571	16 x 35	701	18 x 35	812	18 x 40	933		
680	681	12.5 x 20	464	12.5 x 25	554	16 x 25	687	16 x 35	788	18 x 35	904	18 x 40	1025	22 x 40	1236		
1000	102	12.5 x 25	613	16 x 25	745	16 x 35	956	18 x 35	1026	18 x 40	1151	22 x 40	1368	25 x 40	1637		
1500	152	16 x 25	800	16 x 35	999	18 x 35	1184	18 x 40	1243	22 x 40	1451	25 x 40	1694				
2200	222	16 x 35	1072	18 x 35	1242	18 x 40	1428	22 x 40	1572	25 x 50	1974						
3300	332	18 x 35	1361	18 x 40	1534	22 x 40	1835	25 x 40	2005								
4700	472	18 x 40	1650	22 x 40	1942	25 x 50	2498										
6800	682	18 x 35	2060	25 x 50	2603											Case size 尺寸	Ripple current 紋波電流
10000	103	25 x 50	2755														

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

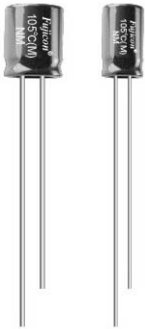
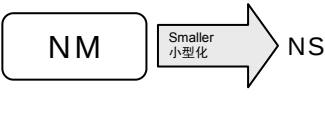
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NON-POLARIZED, HEIGHT 7MM

7MM 高，無極性品

- Non-polarized series with 7mm height
7mm 高，無極性品系列
- Load life of 1000 hours at 105°C
在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



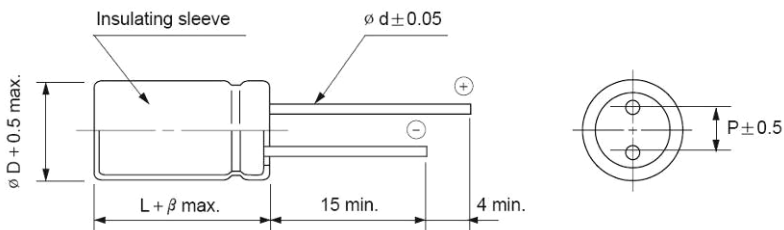
SPECIFICATIONS

特性表

Items 項目	Characteristics 主要特性						
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C						
Voltage Range 額定工作電壓範圍	6.3 ~ 63V						
Capacitance Range 靜電容量範圍	0.1 ~ 220μF						
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C						
Leakage Current 漏電流	Leakage current = 0.05CV or 10μA, whichever is greater (after 5 minutes application of rated voltage) 漏電流 = 0.05CV 或 10μA，取較大值（施加額定工作電壓 5 分鐘後）						
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C						
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50, 63
	tan δ (max.) 最大損耗角正切	0.24	0.20	0.16	0.14	0.12	0.10
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz						
	Rated Voltage (V) 額定工作電壓	6.3		10		16~63	
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)		4		3	
		Z(-40°C) / Z(20°C)		8		6	
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。						
	Capacitance Change 靜電容量變化率		Within ±20% of initial measured value 初始值的±20%以內				
	Dissipation Factor 損耗角正切		≤ 200% of initial specified value 不大於規範值的 200%				
	Leakage Current 漏電流		≤ initial specified value 不大於規範值				
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。						
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。						

DRAWING (Unit: mm)

外形圖



ØD	4	5	6.3
p	1.5	2.0	2.5
Ød	0.45		
β	1.0		

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code μF 代碼		6.3		10		16		25		35		50		63	
		0J		1A		1C		1E		1V		1H		1J	
0.1	0R1											4 x 7	1	4 x 7	2.4
0.22	R22											4 x 7	2	4 x 7	3.2
0.33	R33											4 x 7	3.5	4 x 7	4
0.47	R47											4 x 7	5	4 x 7	6
0.68	R68											4 x 7	7	4 x 7	9
1	010											4 x 7	10	4 x 7	16
2.2	2R2											4 x 7	15	4 x 7	18
3.3	3R3									4 x 7	16	4 x 7	18	5 x 7	20
4.7	4R7									4 x 7	18	5 x 7	22	6.3 x 7	26
6.8	6R8							4 x 7	18	5 x 7	22	5 x 7	28	6.3 x 7	32
10	100	4 x 7	16	4 x 7	18	4 x 7	20	5 x 7	28	5 x 7	32	6.3 x 7	36	8 x 7	42
22	220	4 x 7	20	4 x 7	32	5 x 7	36	6.3 x 7	44	6.3 x 7	48	8 x 7	53		
33	330	4 x 7	26	5 x 7	36	5 x 7	42	6.3 x 7	52	8 x 7	67				
47	470	5 x 7	45	5 x 7	60	6.3 x 7	78	8 x 7	85						
68	680	6.3 x 7	45	6.3 x 7	78	6.3 x 7	82	8 x 7	95						
100	101	6.3 x 7	76	8 x 7	102	8 x 7	105							Case size 尺寸	Ripple current 紋波電流
220	221	8 x 7	115												

•Case size ØD×L(mm), ripple current (mA rms) at 105°C 120Hz •尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C 120Hz

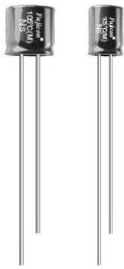
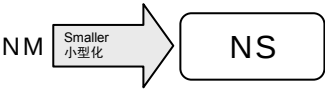
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
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NON-POLARIZED, HEIGHT 5MM
5MM 高，無極性品

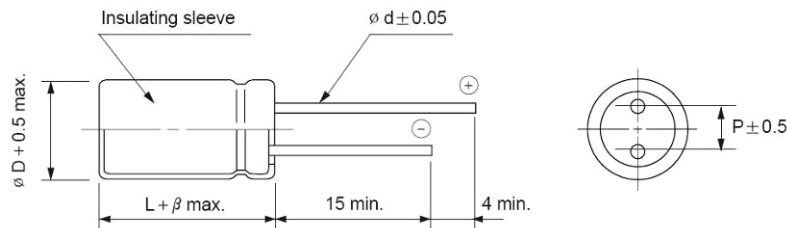
- Non-polarized series with 5mm height
5mm 高，無極性品系列
- Uniquely designed for use in lightweight and portable equipment
適用於小型及便攜器材
- Load life of 1000 hours at 105°C
在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性						
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C						
Voltage Range 額定工作電壓範圍	6.3 ~ 50V						
Capacitance Range 靜電容量範圍	0.1 ~ 47μF						
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C						
Leakage Current 漏電流	Leakage current = 0.05CV or 10μA, whichever is greater (after 5 minutes application of rated voltage) 漏電流 = 0.05CV 或 10μA，取較大值（施加額定工作電壓 5 分鐘後）						
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C						
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50
	tan δ (max.) 最大損耗角正切	0.24	0.20	0.17	0.17	0.15	0.15
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz						
	Rated Voltage (V) 額定工作電壓	6.3	10	16, 25	35~50		
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2	2	
		Z(-40°C) / Z(20°C)	8	6	4	3	
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時後，電容器的特性符合下表的要求。						
	Capacitance Change 靜電容量變化率		Within ±20% of initial measured value 初始值的±20%以內				
	Dissipation Factor 損耗角正切		≤ 200% of initial specified value 不大於規範值的 200%				
	Leakage Current 漏電流		≤ initial specified value 不大於規範值				
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。						
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。						

DRAWING (Unit: mm) 外形圖



ØD	4	5	6.3
p	1.5	2.0	2.5
Ød	0.45		
β	1.0		

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

μF	WV Code 代碼	6.3		10		16		25		35		50	
		0J		1A		1C		1E		1V		1H	
0.1	0R1											4 x 5	3.2
0.22	R22											4 x 5	4.7
0.33	R33											4 x 5	5.8
0.47	R47											4 x 5	6.9
0.68	R68											4 x 5	8.3
1	010											4 x 5	10
2.2	2R2							4 x 5	10	4 x 5	11	5 x 5	12
3.3	3R3							4 x 5	14	4 x 5	16	5 x 5	21
4.7	4R7					4 x 5	12	4 x 5	16	4 x 5	18	6.3 x 5	24
6.8	6R8					4 x 5	18	5 x 5	20	5 x 5	24	6.3 x 5	32
10	100	4 x 5	14	4 x 5	18	4 x 5	20	5 x 5	21	6.3 x 5	28		
22	220	5 x 5	25	5 x 5	30	5 x 5	32	6.3 x 5	34				
33	330	5 x 5	35	6.3 x 5	37	6.3 x 5	42					Case size 尺寸	Ripple current 紋波電流
47	470	6.3 x 5	40										

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C 120Hz •尺寸 $\varnothing D \times L$ (mm), 紋波電流(mA rms)於 105°C 120Hz

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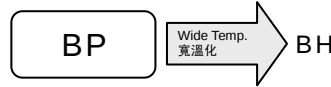
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BI-POLARIZED, HIGH RIPPLE CURRENT

雙極性，高紋波電

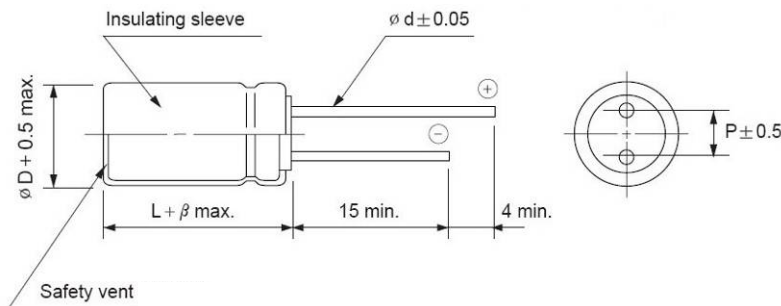
- High frequency and high ripple current characteristics
高頻及高紋波特性
- Suitable for equalizing of horizontal deflection of TV sets
適用於電視機水平垂直偏轉校正
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性		
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C		
Voltage Range 額定工作電壓範圍	25 & 50V		
Capacitance Range 靜電容量範圍	2.2 ~ 10μF		
Capacitance Tolerance 靜電容量允許偏差	±10% at 120Hz, 20°C		
Leakage Current 漏電流	Leakage current = 0.03CV+50μA (max.) after 5 minutes application of rated voltage 漏電流 = 0.03CV+50μA (max.) 施加額定工作電壓 5 分鐘後		
Dissipation Factor (tan δ) 損耗角正切	(Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C) Less than 0.05 不大於 0.05		
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz		
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	1.5
		Z(-40°C) / Z(20°C)	3.0
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 85°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，電容器的特性符合下表的要求。		
	Capacitance Change 靜電容量變化率	Within ±15% of initial measured value 初始值的±15%以內	
	Dissipation Factor 損耗角正切	≅ 200% of initial specified value 不大於規範值的 200%	
	Leakage Current 漏電流	≅ initial specified value 不大於規範值	
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 85°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 85°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。		
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。		

DRAWING (Unit: mm) 外形圖



ØD	12.5	16	18
P	5.0	7.5	
Ød	0.6	0.8	
β	2.0		

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV μF	Parameter Code 代碼	25 (1E)		50 (1H)	
		Case size ØD×L (mm) 尺寸	Ripple current (Ap-p) at 85°C 15.75KHz 紋波電流	Case size ØD×L (mm) 尺寸	Ripple current (Ap-p) at 85°C 15.75KHz 紋波電流
2.2	2R2	12.5 × 25	5.0	12.5 × 25	5.0
3.3	3R3	16 × 25	6.0	16 × 25	6.0
4.7	4R7	16 × 32	7.0	16 × 32	7.0
5.6	5R6	16 × 32	7.5	16 × 32	7.5
6.8	6R8	16 × 35	8.0	16 × 35	8.0
8.2	8R2	16 × 35	9.0	16 × 35	9.0
10	100	18 × 35	10.0	18 × 35	10.0

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

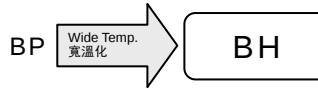
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BI-POLARIZED, HIGH RIPPLE CURRENT

雙極性，高紋波電

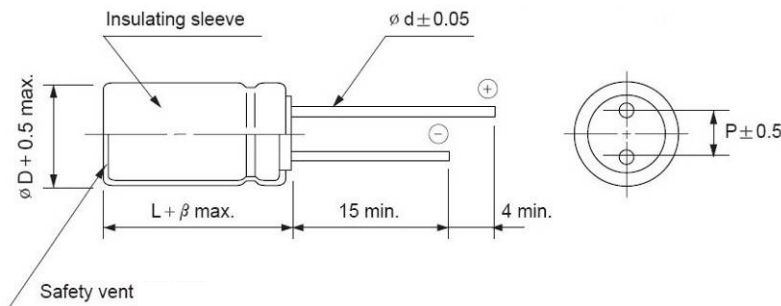
- High frequency and high ripple current characteristics
高頻及高紋波特性
- Suitable for equalizing of horizontal deflection of TV sets
適用於電視機水平垂直偏轉校正
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性		
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C		
Voltage Range 額定工作電壓範圍	25 & 50V		
Capacitance Range 靜電容量範圍	2.2 ~ 10μF		
Capacitance Tolerance 靜電容量允許偏差	±10% at 120Hz, 20°C		
Leakage Current 漏電流	Leakage current = 0.03CV+50μA (max.) after 5 minutes application of rated voltage 漏電流 = 0.03CV+50μA (max.) 施加額定工作電壓 5 分鐘後		
Dissipation Factor (tan δ) 損耗角正切	(Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C) Less than 0.05 不大於 0.05		
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz		
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	1.5
		Z(-40°C) / Z(20°C)	3.0
Load Life 高溫負荷特性	After 1000 hours application of the rated voltage at 105°C (the polarity needs to exchange every 250 hours), they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 1000 小時（每 250 小時必須轉換一次極性）後，電容器的特性符合下表的要求。		
	Capacitance Change 靜電容量變化率	Within ±15% of initial measured value 初始值的±15%以內	
	Dissipation Factor 損耗角正切	≅ 200% of initial specified value 不大於規範值的 200%	
	Leakage Current 漏電流	≅ initial specified value 不大於規範值	
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。		
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。		

DRAWING (Unit: mm) 外形圖



ØD	12.5	16	18
P	5.0	7.5	
Ød	0.6	0.8	
β	2.0		

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV μF	Parameter Code 代碼	25 (1E)		50 (1H)	
		Case size ØD×L (mm) 尺寸	Ripple current (Ap-p) at 105°C 15.75KHz 紋波電流	Case size ØD×L (mm) 尺寸	Ripple current (Ap-p) at 105°C 15.75KHz 紋波電流
2.2	2R2	12.5 × 25	3.0	12.5 × 25	3.0
3.3	3R3	16 × 25	3.6	16 × 25	3.6
4.7	4R7	16 × 32	4.2	16 × 32	4.2
5.6	5R6	16 × 32	4.5	16 × 32	4.5
6.8	6R8	16 × 35	4.8	16 × 35	4.8
8.2	8R2	16 × 35	5.0	16 × 35	5.0
10	100	18 × 35	6.0	18 × 35	6.0

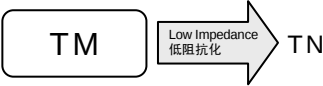
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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LOW IMPEDANCE
低阻抗品

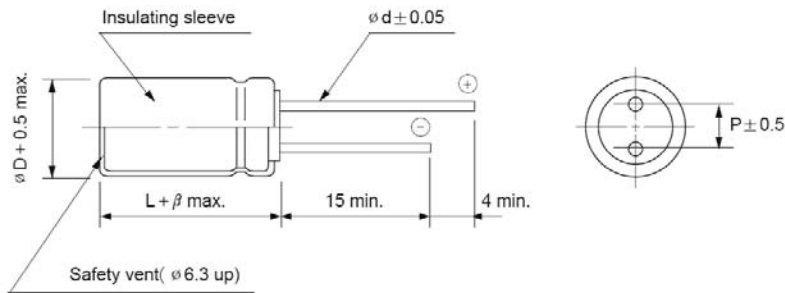
- Low impedance at high frequency
高頻率低阻抗
- Ideally suited for use of switching power supplies
適用於開關電源
- Load life of 2000 hours at 105°C
在 105°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性					
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C					
Voltage Range 額定工作電壓範圍	6.3 ~ 100V					
Capacitance Range 靜電容量範圍	1 ~ 15000μF					
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C					
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後)					
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C					
	Rated Voltage (V) 額定工作電壓	6.3	10	16~35	50, 63	100
	tan δ (max.) 最大損耗角正切	0.14	0.12	0.10	0.08	0.07
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz					
	Rated Voltage (V) 額定工作電壓		6.3 ~ 16		25 ~ 100	
	Impedance Ratio 阻抗比	Z(-40°C) / Z(20°C)		4		3
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 2000 小時後, 電容器的特性符合下表的要求。					
	Capacitance Change 靜電容量變化率		Within ±20% of initial measured value 初始值的±20%以內			
	Dissipation Factor 損耗角正切		≅ 200% of initial specified value 不大於規範值的 200%			
	Leakage Current 漏電流		≅ initial specified value 不大於規範值			
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。					
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。					

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	7.5		
Ød	0.5	0.6	0.8				
β	1.5	2.0					

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	1 ~ 47μF	0.75	1.00	1.35	1.55	2.0
	68 ~ 680μF	0.80	1.00	1.25	1.34	1.5
	1000 ~ 15000μF	0.85	1.00	1.10	1.13	1.15

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		6.3 (0J)				10 (1A)			
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
				105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz
33	330					5 × 11	2.10	74	111
47	470	5 × 11	2.10	56	117	5 × 11	1.90	88	132
68	680	5 × 11	1.90	74	140	5 × 11	1.74	106	156
100	101	5 × 11	1.70	113	170	5 × 11	1.30	147	221
220	221	6.3 × 11.5	0.92	158	260	6.3 × 11.5	0.59	185	280
330	331	6.3 × 11.5	0.83	195	300	6.3 × 11.5	0.33	215	410
470	471	8 × 11.5	0.62	385	578	8 × 11.5	0.29	443	563
680	681	8 × 11.5	0.44	483	627	8 × 11.5	0.13	482	697
1000	102	8 × 11.5	0.36	505	645	8 × 16	0.10	816	928
1200	122	8 × 16	0.18	525	685	10 × 16	0.095	835	969
1500	152	10 × 12 (10 × 16)	0.16 (0.16)	787 (787)	964 (964)	10 × 20	0.092	1029	1208
2200	222	10 × 20	0.095	1002	1195	10 × 20 (12.5 × 20)	0.08 (0.08)	1006 (1103)	1200 (1315)
3300	332	10 × 20 (12.5 × 20)	0.093 (0.087)	1100 (1189)	1225 (1391)	12.5 × 25	0.065	1573	1812
4700	472	12.5 × 25	0.068	1608	1875	16 × 25	0.060	1971	2262
6800	682	12.5 × 25 (16 × 25)	0.067 (0.065)	1680 (1776)	1905 (2076)	16 × 31	0.048	2390	2650
10000	103	16 × 31	0.050	2169	2404	18 × 31	0.035	2590	2730
15000	153	18 × 31	0.040	2380	2850				

WV Parameter 參數 μF		16 (1C)				25 (1E)			
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
				105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz
22	220	5 × 11	2	66	132	5 × 11	1.90	65	130
33	330	5 × 11	1.8	81	163	5 × 11	1.60	78	156
47	470	5 × 11	1.4	97	194	5 × 11	1.30	106	198
68	580	5 × 11	0.93	134	201	6.3 × 11.5	0.82	152	228
100	101	6.3 × 11.5	0.85	163	244	6.3 × 11.5	0.71	198	265
220	221	6.3 × 11.5 (8 × 11.5)	0.50 (0.45)	320 (358)	400 (430)	8 × 11.5	0.38	356	480
330	331	8 × 11.5	0.41	425	565	8 × 11.5	0.36	434	656
470	471	8 × 11.5 (10 × 12)	0.35 (0.30)	503 (600)	707 (845)	8 × 16 (10 × 12)	0.23 (0.20)	600 (700)	949 (970)
680	681	8 × 16 (10 × 12)	0.26 (0.24)	768 (815)	1024 (1038)	10 × 16	0.10	924	1387
1000	102	10 × 16 (10 × 20)	0.12 (0.14)	982 (1000)	1126 (1207)	10 × 16 (10 × 20)	0.09 (0.068)	1179 (1179)	1386 (1386)
1200	122	10 × 20	0.15	1035	1268	12.5 × 20	0.065	1280	1515
1500	152	10 × 20 (12.5 × 20)	0.096 (0.072)	1100 (1182)	1270 (1355)	12.5 × 25	0.062	1403	1621
2200	222	12.5 × 25	0.063	1453	1674	12.5 × 25 (16 × 25)	0.063 (0.055)	1500 (1567)	1774 (1839)
3300	332	12.5 × 30	0.056	1619	1816	16 × 31	0.050	2003	2391
4700	472	16 × 25	0.050	2173	2403	16 × 35	0.040	2420	2840
6800	682	16 × 35	0.040	2440	2797	18 × 35	0.035	2840	3250
10000	103	18 × 35	0.038	2850	3230				

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		35 (1V)				50 (1H)			
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
				105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz
1	010					5 × 11	4.2	16	32
2.2	2R2					5 × 11	4.0	18	36
3.3	3R3					5 × 11	3.8	20	40
4.7	4R7					5 × 11	2.5	29	58
6.8	6R8					5 × 11	2.2	38	76
10	100	5 × 11	1.80	55	100	5 × 11	2.0	52	104
22	220	5 × 11	1.50	67	134	5 × 11 (6.3 × 11.5)	1.6 (1.0)	68 (76)	136 (150)
33	330	5 × 11	1.20	81	163	6.3 × 11.5	0.8	85	175
47	470	6.3 × 11.5	1.10	114	229	6.3 × 11.5	0.71	125	225
68	680	6.3 × 11.5	0.85	137	273	8 × 11.5	0.65	215	385
100	101	8 × 11.5	0.50	273	409	8 × 11.5	0.4	380	480
220	221	8 × 11.5 (8 × 16)	0.27 (0.25)	484 (510)	725 (750)	8 × 16 (10 × 12)	0.25 (0.20)	580 (600)	760 (805)
330	331	8 × 16	0.16	540	795	10 × 20	0.10	900	1045
470	470	10 × 16	0.12	810	1020	10 × 25	0.09	1050	1120
680	681	10 × 25 (12.5 × 20)	0.072 (0.068)	1089 (1300)	1433 (1460)	12.5 × 25	0.078	1275	1464
1000	102	12.5 × 20	0.065	1350	1490	16 × 25	0.065	1460	1700
1500	152	12.5 × 25	0.060	1580	1715	16 × 31	0.050	1710	1990
2200	222	16 × 25	0.055	1759	2069	16 × 35	0.045	2076	2326
3300	332	16 × 35	0.045	2300	2520				
4700	472	18 × 35	0.038	2450	2875				

WV Parameter 參數 μF		63 (1J)				100 (2A)			
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
				105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz
1	010					5 × 11	7	47	66
2.2	2R2					5 × 11	6	66	72
3.3	3R3					5 × 11	5	68	78
4.7	4R7	5 × 11	2.5	45	71	5 × 11	4	72	88
10	100	5 × 11	1.5	50	81	6.3 × 11.5	1.2	100	180
22	220	5 × 11	1.2	110	165	8 × 11.5	0.66	196	282
33	330	6.3 × 11.5	0.85	135	210	8 × 11.5	0.5	310	380
47	470	8 × 11.5	0.56	210	330	8 × 16 (10 × 12)	0.32 (0.25)	405 (460)	500 (630)
68	680	8 × 11.5	0.56	210	330	10 × 16	0.25	515	780
100	101	8 × 16	0.5	370	581	10 × 20	0.16	650	890
220	221	10 × 20 (12.5 × 20)	0.27 (0.23)	710 (800)	1000 (1085)	12.5 × 25	0.13	920	1280
330	331	12.5 × 20	0.16	950	1200	16 × 25	0.09	1200	1440
470	471	12.5 × 25	0.14	1100	1300	16 × 31	0.06	1560	1790
680	681	16 × 25	0.08	1215	1450	18 × 35	0.055	1650	1850
1000	102	16 × 31	0.06	1350	1600	18 × 40	0.051	1700	2040
2200	222	18 × 40	0.045	1500	1800				

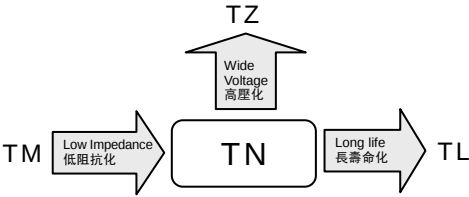
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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EXTREMELY LOW IMPEDANCE
極低阻抗品

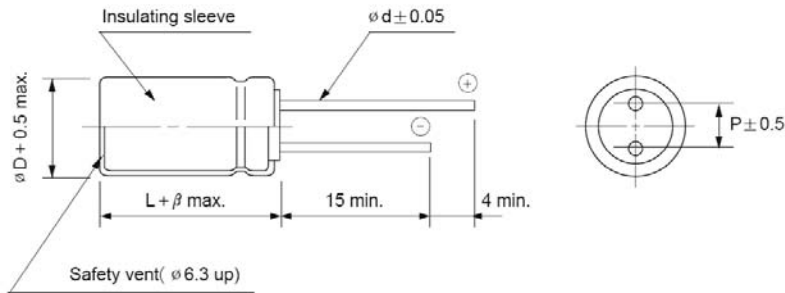
- Extremely low impedance at high frequency
高頻率極低阻抗
- Ideally suited for use of switching power supplies
適用於開關電源
- High reliability withstanding 5000 hours load life at 105°C
(2000~3000 hours for smaller case sizes as specified below)
高可靠性可在 105°C 環境中負荷壽命 5000 小時
(小尺寸為 2000~3000 小時，請參閱以下說明)
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性							
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C							
Voltage Range 額定工作電壓範圍	6.3 ~ 63V							
Capacitance Range 靜電容量範圍	1 ~ 15000μF							
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C							
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA，取較大值（施加額定工作電壓 2 分鐘後）							
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C							
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	63
	tan δ (max.) 最大損耗角正切	0.22	0.19	0.16	0.14	0.12	0.10	0.08
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz							
	Rated Voltage (V) 額定工作電壓		6.3, 10		16 ~ 35		50, 63	
	Impedance Ratio 阻抗比	Z(-40°C) / Z(20°C)		4		3		2
Load Life 高溫負荷特性	After 5000 hours (Ø5, 6.3 products are for 2000 hours, Ø8 products are for 3000 hours) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時 (Ø5, 6.3 產品為 2000 小時，Ø8 產品為 3000 小時) 後，電容器的特性符合下表的要求。							
	Capacitance Change 靜電容量變化率			Within ±20% of initial measured value 初始值的±20%以內				
	Dissipation Factor 損耗角正切			≦ 200% of initial specified value 不大於規範值的 200%				
	Leakage Current 漏電流			≦ initial specified value 不大於規範值				
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。							
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。							

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0		7.5	
Ød	0.5			0.6	0.8		
β	1.5				2.0		

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		6.3 (0J)				10 (1A)				16 (1C)				25 (1E)			
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
				105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz
33	330													5 × 11	0.80	88	155
47	470									5 × 11	0.80	92	155	6.3 × 11.5	0.55	125	210
68	680					5 × 11	0.80	97	155	6.3 × 11.5	0.50	135	220	6.3 × 11.5	0.36	160	260
100	101	5 × 11	0.85	99	150	5 × 11 (6.3×11.5)	0.70 (0.55)	115 (135)	185 (210)	6.3 × 11.5	0.35	175	265	6.3 × 11.5 (8×11.5)	0.32 (0.24)	195 (254)	312 (383)
150	151	6.3 × 11.5	0.49	155	225	6.3 × 11.5	0.35	185	265	8 × 11.5	0.23	270	388	8 × 11.5	0.16	320	460
220	221	6.3 × 11.5	0.30	205	285	8 × 11.5	0.24	283	387	8 × 11.5	0.16	335	460	8 × 11.5 (10×12)	0.14 (0.13)	370 (435)	500 (600)
330	331	8 × 11.5	0.20	223	292	8 × 11.5	0.16	350	460	8 × 11.5 (10×12)	0.14 (0.12)	400 (480)	520 (625)	8 × 16 (10×16)	0.12 (0.095)	450 (575)	545 (750)
470	471	10 × 12	0.14	455	575	10 × 12	0.13	475	600	10 × 12 (10×16)	0.10 (0.09)	520 (615)	680 (770)	10 × 16 (10×20)	0.084 (0.065)	680 (810)	890 (1020)
680	681	10 × 16	0.11	580	700	10 × 12 (10×16)	0.11 (0.09)	545 (635)	650 (770)	10 × 20	0.065	845	1020	12.5 × 20	0.046	1160	1392
1000	102	10 × 20	0.075	820	950	10 × 20	0.060	915	1060	10 × 20 (12.5×20)	0.055 (0.047)	950 (1206)	1185 (1411)	12.5 × 20 (12.5×25)	0.043 (0.036)	1200 (1430)	1475 (1660)
1500	152	10 × 25	0.055	1090	1220	10 × 20 (12.5×20)	0.058 (0.045)	1020 (1266)	1245 (1417)	10 × 20 (12.5×25)	0.050 (0.036)	1050 (1490)	1245 (1660)	16 × 20	0.034	1590	1770
2200	222	12.5 × 20	0.043	1296	1438	12.5 × 25	0.034	1530	1710	12.5 × 25 (16×20)	0.035 (0.033)	1545 (1620)	1705 (1800)	16 × 25	0.028	1848	2051
3300	332	12.5 × 25	0.034	1530	1710	16 × 20	0.031	1660	1850	12.5 × 25 (16×25)	0.034 (0.027)	1700 (1888)	1725 (2095)	16 × 35	0.020	2410	2680
4700	472	16 × 25	0.032	1728	1935	16 × 31	0.023	2170	2420	16 × 35	0.020	2410	2680	18 × 40	0.018	2660	2960
6800	682	16 × 31	0.024	2130	2370	16 × 35	0.020	2410	2680	18 × 35	0.018	2610	2900				
10000	103	16 × 40	0.020	2470	2750	18 × 40	0.017	2730	3040								
15000	153	18 × 40	0.018	2660	2960												

WV Parameter 參數 μF		35V (1V)				50V (1H)				63V (1J)			
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 紋波電流	
				105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz			105°C 120Hz	105°C 100KHz
1	101					5 × 11	4.0	18	36				
1.5	1R5					5 × 11	3.8	22	45				
2.2	2R2					5 × 11	3.5	27	54				
3.3	3R3					5 × 11	3.0	33	66				
4.7	4R7					5 × 11	2.2	40	81				
6.8	6R8					5 × 11	1.8	45	91				
10	100					5 × 11	1.4	57	115	5 × 11	1.06	67	135
15	150					5 × 11	0.93	72	145	6.3 × 11.5	0.73	92	185
22	220	5 × 11	0.75	85	160	5 × 11 (6.3×11.5)	0.86 (0.65)	85 (100)	165 (195)	6.3 × 11.5	0.52	110	215
33	330	6.3 × 11.5	0.49	125	225	6.3 × 11.5	0.43	135	240	8 × 11.5	0.35	179	320
47	470	6.3 × 11.5	0.34	160	270	6.3 × 11.5 (8×11.5)	0.10 (0.30)	170 (204)	300 (344)	8 × 11.5	0.25	215	365
68	680	8 × 11.5	0.24	239	384	8 × 11.5	0.20	255	410	10 × 12	0.19	310	495
100	101	8 × 11.5	0.16	305	460	8 × 16 (10×16)	0.18 (0.16)	315 (385)	490 (581)	10 × 20	0.12	495	750
150	151	10 × 12	0.12	435	625	10 × 20	0.10	570	820	10 × 25	0.09	665	950
220	221	8 × 16 (10×16)	0.12 (0.09)	485 (560)	700 (770)	10 × 20 (10×25)	0.09 (0.075)	650 (760)	900 (1040)	12.5 × 20	0.065	835	1140
330	331	10 × 20	0.060	810	1060	12.5 × 20	0.055	978	1281	12.5 × 25	0.049	1090	1420
470	471	12.5 × 20	0.046	1112	1401	12.5 × 20 (12.5×25)	0.050 (0.044)	1085 (1190)	1385 (1500)	16 × 25	0.042	1350	1700
680	681	12.5 × 25	0.036	1370	1660	16 × 20	0.040	1350	1630	16 × 31	0.032	1700	2050
1000	102	16 × 20	0.034	1330	1770	16 × 31	0.030	1830	2120	16 × 31 (18×35)	0.032 (0.029)	1840 (1970)	2180 (2280)
1500	152	16 × 31	0.028	2149	2385	16 × 40	0.026	2170	2410				
2200	222	16 × 35	0.020	2410	2680	18 × 40	0.024	2300	2560				
3300	332	18 × 40	0.017	2730	3040								

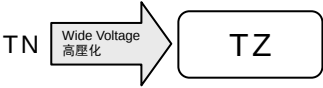
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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EXTREMELY LOW IMPEDANCE
極低阻抗品

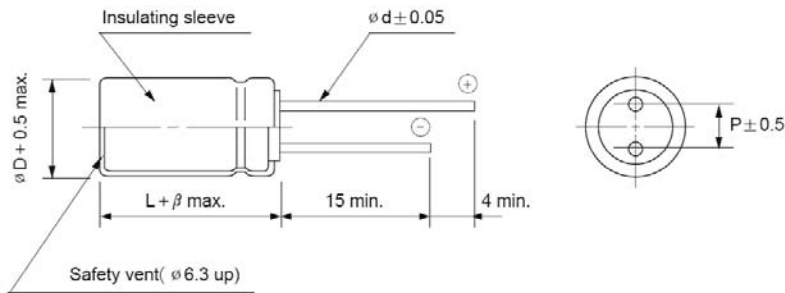
- Wide voltage compared with TN series
與 TN 系列相比高電壓化
- Extremely low impedance at high frequency
高頻率極低阻抗
- High reliability withstanding 5000 hours load life at 105°C
(2000~3000 hours for smaller case sizes as specified below)
高可靠性可在 105°C 環境中負荷壽命 5000 小時
(小尺寸為 2000~3000 小時，請參閱以下說明)
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性	
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C	-25 ~ +105°C
Voltage Range 額定工作電壓範圍	6.3 ~ 100V	160 ~ 450V
Capacitance Range 靜電容量範圍	0.22 ~ 15000μF	3.3 ~ 330μF
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C	
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV 或 3μA，取較大值（施加額定工作電壓 2 分鐘後）	
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C	
Stability at Low Temperature 低溫特性	Rated Voltage (V) 額定工作電壓	6.3 10 16 25 35 50 63 100 160~250 350~450
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C) 4 3 2 2 3 8
		Z(-40°C) / Z(20°C) 8 6 4 3 4 —
Load Life 高溫負荷特性	After 5000 hours (Ø5, Ø6.3 and WV≤100 products are for 2000 hours, Ø8 and WV≤100 products are for 3000 hours, Ø≥10 and WV≤100 products are for 5000 hours, WV>100 products are for 2000 hours) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 5000 小時 (Ø5, Ø6.3 及 WV≤100 產品為 2000 小時, Ø8 及 WV≤100 產品為 3000 小時, Ø≥10 及 WV≤100 產品為 5000 小時, WV>100 產品為 2000 小時) 後，電容器的特性符合下表的要求。	
	Capacitance Change 靜電容量變化率	Within ±25% of initial value 初始值的±25%以內
	Dissipation Factor 損耗角正切	Less than 200% of specified value 不大於規範值的 200%
	Leakage Current 漏電流	Less than specified value 不大於規範值
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。	
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。	

DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0		7.5	
Ød	0.5			0.6		0.8	
β	1.5				2.0		

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		6.3 (0J)			10 (1A)			16 (1C)			25 (1E)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)
4.7	4R7										5 × 11	0.70	180
10	100							5 × 11	0.70	180	5 × 11	0.70	180
22	200	5 × 11	0.70	180	5 × 11	0.70	180	5 × 11	0.70	180	5 × 11	0.70	180
33	330	5 × 11	0.70	180	5 × 11	0.70	180	5 × 11	0.70	180	5 × 11	0.70	180
47	470	5 × 11	0.65	180	5 × 11	0.65	180	5 × 11	0.65	180	5 × 11	0.65	180
100	101	5 × 11	0.65	180	5 × 11	0.65	180	6.3 × 11.5	0.30	280	6.3 × 11.5	0.30	280
150	151	6.3 × 11.5	0.30	280	6.3 × 11.5	0.30	280	6.3 × 11.5	0.30	280	8 × 11.5	0.14	450
220	221	6.3 × 11.5	0.30	280	6.3 × 11.5	0.30	280	8 × 11.5	0.14	450	8 × 11.5	0.14	450
330	331	6.3 × 11.5	0.30	280	8 × 11.5	0.14	450	8 × 11.5	0.14	450	10 × 12	0.10	660
470	471	8 × 11.5	0.14	450	8 × 11.5	0.14	450	10 × 12	0.10	660	10 × 16	0.080	850
680	681	10 × 12	0.10	660	10 × 12	0.10	660	10 × 16	0.080	850	10 × 20	0.054	1100
1000	102	10 × 12	0.10	660	10 × 16	0.080	850	10 × 20	0.054	1100	12.5 × 20	0.030	2100
1500	152	10 × 20	0.054	1100	10 × 20	0.054	1100	12.5 × 20	0.050	1400	16 × 20	0.030	2100
2200	222	12.5 × 20	0.050	1400	12.5 × 20	0.050	1400	12.5 × 25	0.038	1700	16 × 31	0.250	2600
3300	332	12.5 × 20	0.050	1400	12.5 × 25	0.038	1700	16 × 25	0.030	2100	18 × 35	0.022	3000
4700	472	16 × 25	0.030	2100	16 × 25	0.030	2100	16 × 31	0.250	2600			
6800	682	16 × 25	0.030	2100	16 × 31	0.250	2600	18 × 35	0.022	3000			
10000	103	16 × 31	0.025	2600	18 × 35	0.022	3000						
15000	153	18 × 35	0.022	3000									

WV Parameter 參數 μF		35 (1V)			50 (1G)			63 (1J)			100 (2A)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)
0.22	R22				5 × 11	8.0	18						
0.47	R47				5 × 11	5.0	25						
1	010				5 × 11	3.5	40						
2.2	2R2				5 × 11	3.0	55				5 × 11	2.5	52
3.3	3R3				5 × 11	2.6	65	5 × 11	2.0	64	5 × 11	2.5	64
4.7	4R7	5 × 11	0.70	180	5 × 11	2.3	90	5 × 11	2.0	76	5 × 11	2.5	76
10	100	5 × 11	0.70	180	5 × 11	1.4	120	5 × 11	2.0	111	6.3 × 11	1.0	128
22	200	5 × 11	0.70	180	5 × 11	1.2	150	6.3 × 11	0.60	190	8 × 11.5	0.60	224
33	330	5 × 11	0.65	180	6.3 × 11	0.60	200	6.3 × 11	0.60	233	10 × 12	0.40	319
47	470	6.3 × 11	0.30	280	6.3 × 11	0.43	250	8 × 11.5	0.50	328	10 × 16	0.30	417
100	101	8 × 11.5	0.14	450	8 × 11.5	0.24	340	10 × 16	0.12	456	12.5 × 20	0.15	570
150	151	8 × 11.5	0.14	450	10 × 12	0.17	490	10 × 20	0.10	610	12.5 × 25	0.12	762
220	221	10 × 12	0.10	660	10 × 16	0.12	650	10 × 25	0.090	809	16 × 25	0.07	1250
330	331	10 × 16	0.080	850	10 × 20	0.10	810	12.5 × 20	0.085	1036	16 × 31	0.05	1404
470	471	10 × 20	0.054	1100	12.5 × 20	0.085	1100	16 × 20	0.050	1411	18 × 40	0.03	1980
680	681	12.5 × 20	0.050	1400	12.5 × 25	0.065	1200	16 × 25	0.043	1843			
1000	102	12.5 × 25	0.038	1700	16 × 25	0.043	1600	18 × 35	0.025	1967			
1500	152	16 × 25	0.030	2100	16 × 31	0.038	2000						
2200	222	16 × 31	0.250	2600	18 × 35	0.034	2300						
3300	332	18 × 35	0.022	3000									

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WV Parameter 參數 μF		160 (2C)			200 (2D)			250 (2E)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)
10	100							10 × 20	3.5	300
22	220	10 × 20	1.3	440	10 × 20	1.5	440	12.5 × 20	2.3	480
33	330	10 × 20	1.3	565	12.5 × 20	0.91	590	12.5 × 25	1.7	630
47	470	12.5 × 20	0.91	725	12.5 × 20	0.91	780	12.5 × 25	1.7	630
68	680	12.5 × 25	0.63	950	12.5 × 25	0.63	950	16 × 25	0.78	1000
100	101	16 × 25	0.27	1280	16 × 25	0.27	1280	16 × 31	0.63	1400
150	151	16 × 31	0.22	1300	18 × 25	0.27	1500	18 × 31	0.42	1450
220	221	16 × 31	0.22	1300	18 × 31	0.22	1700	18 × 40	0.35	1485
330	331	18 × 31	0.22	1700						

WV Parameter 參數 μF		350 (2V)			400 (2G)			450 (2W)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)
3.3	3R3							10 × 20	6.5	150
4.7	4R7							12.5 × 20	3.6	200
10	100	10 × 20	2.9	180	10 × 20	2.9	180	12.5 × 25	2.5	315
22	220	12.5 × 20	2.1	270	12.5 × 25	1.3	300	16 × 25	1.7	570
33	330	16 × 20	0.91	600	16 × 20	0.91	600	16 × 31	1.1	620
47	470	16 × 25	0.73	700	16 × 25	0.73	700	18 × 31	0.93	900
68	680	16 × 31	0.49	1100	16 × 31	0.49	1100	18 × 35	0.71	980
100	101	18 × 31	0.40	1170	18 × 40	0.34	1250			

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

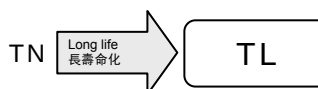
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EXTREMELY LOW IMPEDANCE, LONG LIFE

極低阻抗，長壽命品

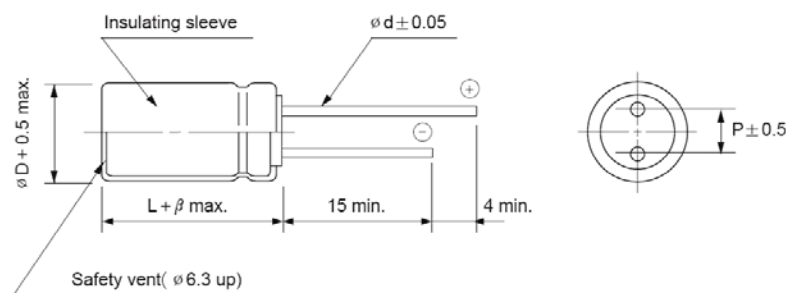
- 4000~10000 hours load life at 105°C
在 105°C 環境中負荷壽命 4000~10000 小時
- Suitable for long life applications
適用於長壽命應用
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性							
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C							
Voltage Range 額定工作電壓範圍	6.3 ~ 63V							
Capacitance Range 靜電容量範圍	0.47 ~ 18000μF							
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C							
Leakage Current 漏電流	Leakage current = 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 = 0.01CV or 3μA, 取較大值（施加額定工作電壓 2 分鐘後）							
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C							
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	63
	tan δ (max.) 最大損耗角正切	0.22	0.19	0.16	0.14	0.12	0.10	0.09
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz							
	Rated Voltage (V) 額定工作電壓		6.3		10		16	
	Impedance Ratio 阻抗比		Z(-25°C) / Z(20°C)		4		3	
Load Life 高溫負荷特性	After 10000 hours [Ø5×15mm for 5000 hours, Ø5~Ø6.3 and WV≤10 products are for 4000 hours, Ø8~Ø10 and WV≤10 products are for 6000 hours, Ø≥13 and WV≤10 products are for 8000 hours, Ø8~Ø10 and WV≥16 products are for 7000 hours, Ø≥13 and WV≥16 products are for 10000 hours] application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 10000 小時 [Ø5×15mm 產品為 5000 小時，Ø5~Ø6.3 及 WV≤10 產品為 4000 小時，Ø8~Ø10 及 WV≤10 產品為 6000 小時，Ø≥13 及 WV≤10 產品為 8000 小時，Ø8~Ø10 及 WV≥16 產品為 7000 小時，Ø≥13 及 WV≥16 產品為 10000 小時] 後，電容器的特性符合下表的要求。							
	Capacitance Change 靜電容量變化率			Within ±25% of initial measured value 初始值的±25%以內				
	Dissipation Factor 損耗角正切			≦ 200% of initial specified value 不大於規範值的 200%				
	Leakage Current 漏電流			≦ initial specified value 不大於規範值				
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。							
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。							

□ DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0		7.5	
Ød	0.5			0.6	0.8		
β	1.5				2.0		

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		60Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	< 33μF	0.20	0.42	0.52	0.70	0.90
	39 ~ 270μF	0.26	0.50	0.55	0.73	0.92
	330 ~ 680μF	0.28	0.55	0.60	0.77	0.94
	820~ 1800μF	0.35	0.60	0.70	0.80	0.96
	2200 ~ 18000μF	0.42	0.70	0.77	0.85	0.98

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		6.3 (0J)			10 (1A)			16 (1C)			25 (1E)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)
47	470										5 x 11 (5 x 15)	0.58 (0.55)	210 (230)
56	560							5 x 11	0.58	210			
100	101				5 x 11 (5 x 15)	0.58 (0.52)	210 (230)				6.3 x 11.5	0.22	340
150	151	5 x 11 (5 x 15)	0.58 (0.52)	210 (230)				6.3 x 11.5	0.22	340			
220	221				6.3 x 11.5	0.22	340	8 x 11.5	0.16	430	8 x 11.5	0.11	640
330	331	6.3 x 11.5	0.22	340				8 x 11.5	0.11	640	8 x 16 (10 x 12)	0.083 (0.080)	840 (865)
470	471				8 x 11.5	0.11	640	8 x 16 (10 x 12)	0.083 (0.080)	840 (865)	8 x 20 (10 x 16)	0.064 (0.060)	1050 (1210)
680	681	8 x 11.5	0.13	640	8 x 16 (10 x 12)	0.083 (0.080)	840 (865)	8 x 20 (10 x 16)	0.064 (0.060)	1050 (1210)	10 x 20 (12.5 x 20)	0.046 (0.049)	1400 (1450)
820	82	10 x 12	0.080	865							10 x 25	0.042	1650
1000	102	8 x 16	0.087	840	8 x 20 (10 x 16)	0.064 (0.060)	1050 (1210)	10 x 20 (12.5 x 20)	0.046 (0.049)	1400 (1450)	10 x 30 (12.5 x 20) (16 x 20)	0.031 (0.035) (0.042)	1910 (1900) (1940)
1200	122	8 x 20 (10 x 16)	0.069 (0.060)	1050 (1210)	10 x 20	0.046	1400	10 x 25	0.042	1650	12.5 x 25	0.043	2210
1500	152	12.5 x 20	0.046	1400	10 x 25 (12.5 x 20)	0.042 (0.049)	1650 (1450)	12.5 x 20	0.035	1900	12.5 x 25	0.027	2230
1800	182	12.5 x 20	0.049	1450							12.5 x 30 (16 x 25)	0.024 (0.027)	2650 (2530)
2200	222	12.5 x 20	0.042	1650	10 x 30 (12.5 x 20) (16 x 20)	0.031 (0.035) (0.042)	1910 (1900) (1940)	12.5 x 25 (18 x 20)	0.027 (0.043)	2230 (2210)	12.5 x 35 (16 x 25)	0.020 (0.026)	2880 (2860)
2700	272	12.5 x 25	0.042	1940	12.5 x 25	0.043	2210	12.5 x 30 (16 x 25)	0.024 (0.027)	2650 (2530)	16 x 31	0.017	3350
3300	332	12.5 x 25	0.035	1900	12.5 x 25	0.027	2230	12.5 x 35	0.020	2880	16 x 35 (18 x 31)	0.017 (0.019)	3450 (3140)
3900	392	12.5 x 25 (18 x 16)	0.027 (0.043)	2230 (2210)	12.5 x 30 (16 x 25)	0.024 (0.027)	2650 (2530)	16 x 35 (18 x 31)	0.021 (0.026)	2930 (2860)	16 x 40 (18 x 31)	0.015 (0.015)	3610 (4170)
4700	472	12.5 x 30	0.024	2650	12.5 x 35	0.020	2880	16 x 35 (18 x 31)	0.017 (0.019)	3450 (3140)	16 x 40 (18 x 35)	0.013 (0.014)	4080 (4220)
5600	562	12.5 x 35 (16 x 20)	0.020 (0.027)	2880 (2530)	16 x 31 (18 x 25)	0.021 (0.026)	2930 (2860)	16 x 35 (18 x 31)	0.015 (0.015)	3610 (4170)	18 x 40	0.012	4280
6800	682	16 x 31 (18 x 25)	0.021 (0.026)	2930 (2860)	16 x 31 (18 x 25)	0.017 (0.019)	3450 (3140)	18 x 35	0.013	4080			
8200	822	16 x 31	0.017	3450	16 x 35 (18 x 31)	0.015 (0.015)	3610 (4170)	18 x 35	0.014	4220			
10000	103	16 x 35 (18 x 31)	0.015 (0.019)	3610 (3140)	16 x 40 (18 x 35)	0.013 (0.014)	4080 (4220)	18 x 40	0.012	4280			
12000	123	16 x 40 (18 x 31)	0.013 (0.015)	4080 (4170)	18 x 40	0.012	4280						
15000	153	18 x 35	0.014	4220									
18000	183	18 x 40	0.012	4280									

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		35 (1V)			50 (1G)			63 (1J)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current 紋波電流 (mA rms, 105°C 100KHz)
0.47	R47				5 x 11	7.2	17			
1	010				5 x 11 (5 x 11.5)	5.2 (5.0)	30 (33)			
2.2	2R2				5 x 11 (5 x 11.5)	3.3 (3.0)	43 (48)			
3.3	3R3				5 x 11 (5 x 11.5)	2.9 (2.6)	53 (56)			
4.7	4R7				5 x 11 (5 x 11.5)	2.5 (2.2)	95 (100)			
10	100				6.3 x 11.5	2.0	130			
15	150							6.3 x 11.5	1.2	165
22	220				6.3 x 11.5	0.91	180			
33	330	5 x 11 (5 x 11.5)	0.58 (0.55)	210 (235)				6.3 x 11.5	0.49	265
47	470	6.3 x 11.5	0.22	340	8 x 11.5	0.39	295			
56	560	6.3 x 11.5	0.22	340				8 x 11.5	0.31	500
82	820							8 x 16 (10 x 12)	0.22 (0.15)	665 (690)
100	101				10 x 12	0.22	555			
120	121				10 x 16	0.154	730	8 x 20 (10 x 16)	0.17 (0.11)	820 (950)
150	151	8 x 11.5	0.11	640	10 x 16	0.16	760			
180	181				10 x 16	0.118	910	10 x 20 (12.5 x 20)	0.078 (0.101)	1150 (1150)
220	221	10 x 12	0.080	865	10 x 20	0.11	1050	10 x 25	0.064	1350
270	271	8 x 20	0.064	1050	10 x 20 (12.5 x 20)	0.078 (0.079)	1220 (1260)	12.5 x 20	0.057	1500
330	331	10 x 16	0.060	1210	10 x 25	0.072	1440			
390	391							12.5 x 25	0.043	1900
470	471	10 x 20 (12.5 x 20)	0.046 (0.049)	1400 (1450)	12.5 x 20 (16 x 20)	0.059 (0.072)	1660 (1690)	12.5 x 30 (16 x 25)	0.039 (0.045)	2300 (2000)
560	561	12.5 x 20	0.042	1650	12.5 x 25 (16 x 20)	0.044 (0.070)	1950 1930	12.5 x 35	0.034	2500
680	681	12.5 x 20 (16 x 20)	0.035 (0.042)	1900 (1940)	12.5 x 30	0.039	2310	16 x 31	0.035	2600
820	821				12.5 x 35 (16 x 20)	0.033 (0.044)	2510 (2210)	16 x 31 (18 x 25)	0.029 (0.034)	2850 (2800)
1000	102	16 x 25 (18 x 20)	0.027 (0.043)	2230 (2210)	12.5 x 40 (16 x 25) (18 x 20)	0.027 (0.033) (0.047)	2920 (2555) (2490)	16 x 35	0.027	2900
1200	122	12.5 x 30 (16 x 20)	0.024 (0.027)	2650 (2530)	16 x 31 (18 x 25)	0.027 (0.028)	3010 (2740)	16 x 40 (18 x 31)	0.025 (0.028)	3400 (3300)
1500	152	12.5 x 35	0.020	2880	16 x 35	0.024	3150	18 x 35	0.025	3400
1800	182	16 x 31 (18 x 25)	0.021 (0.026)	2930 (2860)	16 x 40 (18 x 31)	0.021 (0.024)	3710 (3635)	18 x 40	0.024	3500
2200	222	16 x 35 (18 x 31)	0.016 (0.019)	3500 (3140)	18 x 35	0.022	3680			
2700	272	16 x 40 (18 x 35)	0.015 (0.015)	3610 (4170)	18 x 40	0.018	3800			
3300	332	16 x 40 (18 x 35)	0.013 (0.014)	4080 (4220)						

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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HIGH TEMPERATURE, FOR 125°C USE

125°C 高温品

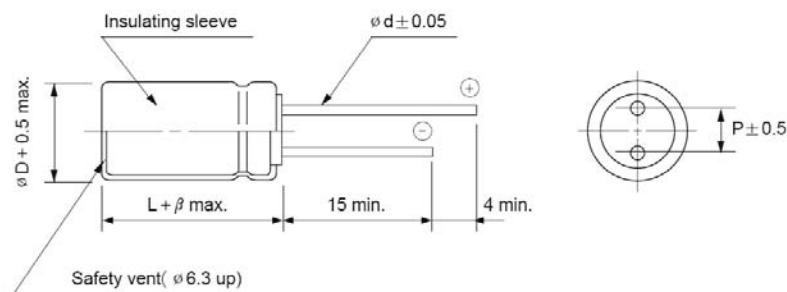
- Low impedance at high frequency
高頻率低阻抗
- For electronic control units and other high temperature applications
適用於電子控制器與其他高溫應用
- Load life of 2000 hours at 125°C
在 125°C 環境中負荷壽命 2000 小時
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性									
Operation Temperature Range 使用溫度範圍	-55 ~ +125°C					-40 ~ +125°C				
Voltage Range 額定工作電壓範圍	6.3 ~ 50V					63 ~ 250V				
Capacitance Range 靜電容量範圍	1 ~ 15000μF					0.47 ~ 100μF				
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C									
Leakage Current 漏電流	Leakage current=0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流=0.01CV 或 3μA, 取較大值 (施加額定工作電壓 2 分鐘後)					Leakage current = 0.02CV+10μA (after 5 minutes application of rated voltage) 漏電流=0.02CV+10μA (施加額定工作電壓 5 分鐘後)				
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF, 其標稱靜電容量每增加 1000μF, 損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C									
	Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	63~100	160~250	
	tan δ (max.) 最大損耗角正切	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.15	
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz									
	Rated Voltage (V) 額定工作電壓		6.3 ~ 10				16 ~ 250			
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)		3		2				
		Z(-40°C) / Z(20°C)		5		4				
Load Life 高溫負荷特性	After 2000 hours application of the rated voltage at 125°C, they meet the characteristics listed below. 在 125°C 環境中施加額定工作電壓 2000 小時後, 電容器的特性符合下表的要求。 (Ø5, Ø6.3 and WV≥100 products are for 1000 hours) (Ø5, Ø6.3 和 WV≥100 產品為 1000 小時)									
	Capacitance Change 靜電容量變化率			Within ±20% of initial measured value 初始值的±20%以內						
	Dissipation Factor 損耗角正切			≒ 300% of initial specified value 不大於規範值的 300%						
	Leakage Current 漏電流			≒ initial specified value 不大於規範值						
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 125°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 125°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。									
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。									

□ DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0		7.5	
Ød	0.5			0.6		0.8	
β	1.5				2.0		

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Cap.(μF) 容量	Frequency 頻率	120Hz	300Hz	1KHz	10KHz	100KHz
1000 > CV		0.50	0.64	0.83	0.90	1.0
1000 ≤ CV		0.67	0.79	0.91	0.95	1.0

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		6.3 (0J)			10 (1A)			16 (1C)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 125°C 100KHz 紋波電流
47	470							5 × 11	1.0	24
68	680				5 × 11	1.0	124	6.3 × 11.5	0.65	176
100	101	5 × 11	1.1	120	6.3 × 11.5	0.71	168	6.3 × 11.5	0.45	212
150	151	6.3 × 11.5	0.64	180	6.3 × 11.5	0.45	212	8 × 11.5	0.30	310
220	221	6.3 × 11.5	0.39	228	8 × 11.5	0.31	310	8 × 11.5	0.21	368
330	331	8 × 11.5	0.26	234	8 × 11.5	0.21	368	10 × 12.5	0.16	500
470	471	10 × 12.5	0.18	460	10 × 12.5	0.17	480	10 × 16	0.12	616
680	681	10 × 16	0.14	560	10 × 16	0.12	616	10 × 20	0.085	816
1000	102	10 × 20	0.097	760	10 × 20	0.078	848	12.5 × 20	0.061	1129
1500	152	10 × 25	0.071	976	12.5 × 20	0.059	1134	12.5 × 25	0.047	1328
2200	222	12.5 × 20	0.056	1150	12.5 × 25	0.044	1368	16 × 20	0.043	1440
3300	332	12.5 × 25	0.044	1368	16 × 20	0.040	1480	16 × 25	0.035	1676
4700	472	16 × 25	0.042	1548	16 × 31.5	0.030	1936	16 × 35.5	0.026	2144
6800	682	16 × 31.5	0.031	1896	16 × 35.5	0.026	2144	18 × 35.5	0.023	2320
10000	103	16 × 40	0.026	2200	18 × 40	0.022	2432			
15000	153	18 × 40	0.023	2368						

WV Parameter 參數 μF		25 (1E)			35 (1V)			50 (1H)		
		Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Impedance (Ω) max. 20°C 100KHz 阻抗值	Ripple current (mA rms) 125°C 100KHz 紋波電流
1	010							5 × 11	5.2	29
1.5	1R5							5 × 11	4.9	36
2.2	2R2							5 × 11	4.5	43
3.3	3R3							5 × 11	3.9	53
4.7	4R7							5 × 11	2.9	65
6.8	6R8							5 × 11	2.3	73
10	100							5 × 11	1.8	92
15	150							5 × 11	1.2	116
22	220				5 × 11	0.97	128	6.3 × 11.5	0.84	156
33	330	5 × 11	1.0	124	6.3 × 11.5	0.64	180	6.3 × 11.5	0.56	192
47	470	6.3 × 11.5	0.72	168	6.3 × 11.5	0.44	216	8 × 11.5	0.39	275
68	680	6.3 × 11.5	0.47	208	8 × 11.5	0.31	307	8 × 11.5	0.26	328
100	101	8 × 11.5	0.31	306	8 × 11.5	0.21	368	10 × 16	0.21	465
150	151	8 × 11.5	0.21	368	10 × 12.5	0.16	500	10 × 20	0.13	656
220	221	10 × 12.5	0.17	480	10 × 16	0.12	616	10 × 25	0.098	832
330	331	10 × 16	0.12	600	10 × 20	0.078	848	12.5 × 20	0.072	1025
470	471	10 × 20	0.084	816	12.5 × 20	0.060	1121	12.5 × 25	0.057	1200
680	681	12.5 × 20	0.060	1114	12.5 × 25	0.047	1328	16 × 20	0.052	1304
1000	102	12.5 × 25	0.047	1328	16 × 20	0.044	1416	16 × 31.5	0.039	1696
1500	152	16 × 20	0.044	1416	16 × 31.5	0.036	1908	16 × 40	0.034	1928
2200	222	16 × 25	0.036	1641	16 × 35.5	0.026	2144	18 × 40	0.031	2048
3300	332	16 × 35.5	0.026	2144	18 × 40	0.022	2432			
4700	472	18 × 40	0.023	2368						

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Parameter 參數 μF		63 (1J)		100 (2A)		160 (2C)	
		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 125°C 100KHz 紋波電流
0.47	R47	8 × 11.5	13	8 × 11.5	13	10 × 12.5	10
1	010	8 × 11.5	19	8 × 11.5	19	10 × 12.5	15
2.2	2R2	8 × 11.5	28	10 × 12.5	33	10 × 16	24
3.3	3R3	8 × 11.5	34	10 × 16	44	10 × 16	32
4.7	4R7	8 × 11.5	41	10 × 16	52	10 × 20	38
10	100	8 × 11.5	61	10 × 20	83	12.5 × 20	66
22	220	10 × 16	113	12.5 × 25	157	16 × 25	118
33	330	10 × 20	151	16 × 25	214	16 × 31.5	158
47	470	12.5 × 20	211	16 × 31.5	279		
100	101	12.5 × 25	336				

WV Parameter 參數 μF		200 (2D)		250 (2E)	
		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 125°C 100KHz 紋波電流	Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 125°C 100KHz 紋波電流
0.47	R47	10 × 12.5	10	10 × 12.5	10
1	010	10 × 12.5	15	10 × 12.5	14
2.2	2R2	10 × 16	24	10 × 16	24
3.3	3R3	10 × 20	32	10 × 20	32
4.7	4R7	10 × 20	38	12.5 × 20	45
10	100	12.5 × 20	72	16 × 25	79
22	220	16 × 31.5	129		

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

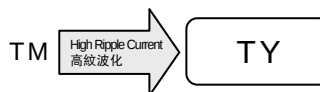
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HIGH RIPPLE CURRENT, HIGH RELIABILITY

高紋波，高可靠品

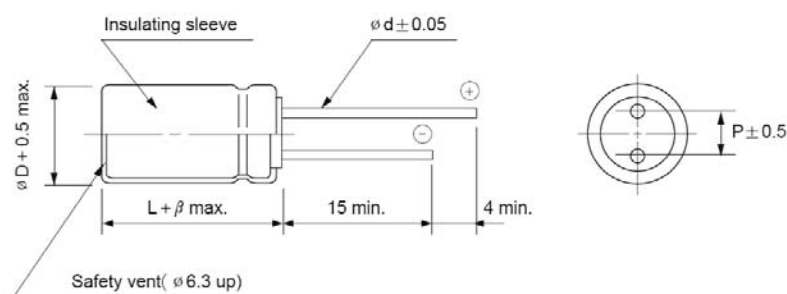
- High frequency, high ripple current and low impedance
高頻率、高紋波電流和低阻抗
- Load life of 2000~7000 hours at 105°C
在 105°C 環境中負荷壽命 2000~7000 小時
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																						
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C																						
Voltage Range 額定工作電壓範圍	6.3 ~ 50V																						
Capacitance Range 靜電容量範圍	22 ~ 18000μF																						
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																						
Leakage Current 漏電流	Leakage current=0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) 漏電流=0.01CV 或 3μA，取較大值（施加額定工作電壓 2 分鐘後）																						
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000μF, tan δ shall be added 0.02 to the listed value with increase of every 1000μF. 當標稱靜電容量大於 1000μF，其標稱靜電容量每增加 1000μF，損耗角正切增加 0.02。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td></tr></table>						Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50	tan δ (max.) 最大損耗角正切	0.22	0.19	0.16	0.14	0.12	0.10			
Rated Voltage (V) 額定工作電壓	6.3	10	16	25	35	50																	
tan δ (max.) 最大損耗角正切	0.22	0.19	0.16	0.14	0.12	0.10																	
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>6.3</td><td>10</td><td>16</td><td>25 ~ 50</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>4</td><td>3</td><td>2</td><td>2</td></tr><tr><td></td><td>Z(-40°C) / Z(20°C)</td><td>8</td><td>6</td><td>4</td><td>3</td></tr></table>						Rated Voltage (V) 額定工作電壓	6.3	10	16	25 ~ 50	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2	2		Z(-40°C) / Z(20°C)	8	6	4	3
Rated Voltage (V) 額定工作電壓	6.3	10	16	25 ~ 50																			
Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	4	3	2	2																		
	Z(-40°C) / Z(20°C)	8	6	4	3																		
Load Life 高溫負荷特性	After an application of DC bias voltage plus the rated ripple current for 2000 hours [Ø8, Ø10 (6.3~10V): 4000 hrs., ØD≥13 (6.3~10V): 6000 hrs., Ø5, Ø6.3 (16~50V): 3000 hrs., Ø8, Ø10 (16~50V): 5000 hrs., ØD≥13 (16~50V): 7000 hrs.] at 105°C the peak voltage shall not exceed the rated DC voltage, capacitors meet the characteristics listed below. 在 105°C 環境下，在不超過額定電壓的範圍內重疊規定的紋波電流 施加 2000 小時 [Ø8, Ø10 (6.3~10V): 4000 小時, ØD≥13 (6.3~10V): 6000 小時, Ø5, Ø6.3 (16~50V): 3000 小時, Ø8, Ø10 (16~50V): 5000 小時, ØD≥13 (16~50V): 7000 小時] 電壓後，電容器的特性符合下表的規定。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±25% of initial measured value 初始值的±25%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>≦200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td>≦ initial specified value 不大於規範值</td></tr></table>						Capacitance Change 靜電容量變化率	Within ±25% of initial measured value 初始值的±25%以內	Dissipation Factor 損耗角正切	≦200% of initial specified value 不大於規範值的 200%	Leakage Current 漏電流	≦ initial specified value 不大於規範值											
Capacitance Change 靜電容量變化率	Within ±25% of initial measured value 初始值的±25%以內																						
Dissipation Factor 損耗角正切	≦200% of initial specified value 不大於規範值的 200%																						
Leakage Current 漏電流	≦ initial specified value 不大於規範值																						
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 500 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 500 小時後，電容器的特性符合高溫負荷特性中所列的規定值。																						
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。																						

□ DRAWING (Unit: mm) 外形圖



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0		7.5	
Ød	0.5			0.6		0.8	
β	1.5				2.0		

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		120Hz	1KHz	10KHz	100KHz
Coefficient 系數	22 ~ 180μF	0.40	0.75	0.90	1.0
	220 ~ 560μF	0.50	0.85	0.94	1.0
	680 ~ 1800μF	0.60	0.87	0.95	1.0
	2200 ~ 3900μF	0.75	0.90	0.95	1.0
	4700 ~ 18000μF	0.85	0.95	0.98	1.0

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE 規格尺寸及最大允許紋波電流及阻抗值

WV Case size ØD×L (mm) 項目 尺寸	6.3 (0J)					10 (1A)					16 (1C)				
	Capacitance (μF) 靜電容量		Impedance (Ω) max. 阻抗值		Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Capacitance (μF) 靜電容量		Impedance (Ω) max. 阻抗值		Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Capacitance (μF) 靜電容量		Impedance (Ω) max. 阻抗值		Ripple current 紋波電流 (mA rms, 105°C 100KHz)
			20°C 100KHz	-10°C 100KHz				20°C 100KHz	-10°C 100KHz				20°C 100KHz	-10°C 100KHz	
5 × 11	150	151	1.16	4.6	215	100	101	1.16	4.6	215	56	560	1.16	4.6	215
6.3 × 11.5	330	331	0.44	1.74	345	220	221	0.44	1.74	345	120	121	0.44	1.74	345
8 × 11	680	681	0.26	1.04	645	470	471	0.26	1.04	645	330	331	0.26	1.04	645
10 × 12	820	820	0.16	0.64	870	680	681	0.16	0.064	870	470	471	0.174	0.70	845
10 × 16	1200	122	0.12	0.48	1215	1000	102	0.12	0.480	1215	680	681	0.138	0.54	1055
10 × 20	1500	152	0.092	0.36	1410	1200	122	0.092	0.360	1410	1000	102	0.092	0.36	1410
10 × 25	2200	222	0.084	0.34	1655	1500	152	0.084	0.340	1655	1200	122	0.084	0.34	1655
10 × 30	2700	272	0.062	0.24	1915	2200	222	0.062	0.240	1915	1500	152	0.062	0.24	1915
12.5 × 20	3300	332	0.070	0.24	1905	2200	222	0.070	0.120	1905	1500	152	0.070	0.24	1905
12.5 × 25	3900	392	0.054	0.178	2235	3300	332	0.054	0.178	2235	2200	222	0.054	0.178	2235
12.5 × 30	4700	472	0.048	0.156	2655	3900	392	0.048	0.156	2655	2700	272	0.048	0.156	2655
12.5 × 35	5600	562	0.040	0.130	2885	4700	472	0.040	0.130	2885	3300	332	0.040	0.130	2885
16 × 20	5600	562	0.054	0.156	2535	3900	392	0.054	0.156	2535	2700	272	0.054	0.140	2535
16 × 25	6800	682	0.042	0.120	2935	5600	562	0.042	0.120	2935	3900	392	0.042	0.120	2935
16 × 31	8200	822	0.034	0.100	3455	6800	682	0.034	0.100	3455	4700	472	0.034	0.100	3455
16 × 35	10000	103	0.030	0.088	3615	8200	822	0.030	0.088	3615	5600	562	0.030	0.088	3615
16 × 40	12000	123	0.026	0.076	4085	10000	103	0.026	0.076	4085	6800	682	0.026	0.076	4085
18 × 20	6800	682	0.052	0.134	2865	5600	562	0.052	0.134	2865	3900	392	0.052	0.134	2865
18 × 25	10000	103	0.038	0.098	3145	6800	682	0.038	0.098	3145	4700	472	0.038	0.049	3145
18 × 31	12000	123	0.030	0.080	4175	8200	822	0.030	0.080	4175	5600	562	0.030	0.040	4175
18 × 35	15000	153	0.028	0.076	4225	10000	103	0.028	0.076	4225	8200	822	0.028	0.038	4225
18 × 40	18000	183	0.024	0.064	4285	12000	123	0.024	0.064	4285	10000	103	0.024	0.032	4285

WV Case size ØD×L (mm) 項目 尺寸	25 (1E)					35 (1V)					50 (1H)				
	Capacitance (μF) 靜電容量		Impedance (Ω) max. 阻抗值		Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Capacitance (μF) 靜電容量		Impedance (Ω) max. 阻抗值		Ripple current 紋波電流 (mA rms, 105°C 100KHz)	Capacitance (μF) 靜電容量		Impedance (Ω) max. 阻抗值		Ripple current 紋波電流 (mA rms, 105°C 100KHz)
			20°C 100KHz	-10°C 100KHz				20°C 100KHz	-10°C 100KHz				20°C 100KHz	-10°C 100KHz	
5 × 11	47	470	1.16	4.6	215	33	330	1.16	2.3	215	22	220	1.4	5.6	185
6.3 × 11.5	100	101	0.44	1.74	345	56	560	0.44	1.74	345	56	560	0.6	2.4	300
8 × 12	220	221	0.26	1.04	645	150	151	0.26	1.04	645	100	101	0.34	1.36	560
10 × 12	330	331	0.160	0.64	870	220	221	0.160	0.64	865	150	151	0.24	0.96	785
10 × 16	470	471	0.120	0.48	1215	330	331	0.100	0.48	1215	220	221	0.168	0.68	1055
10 × 20	680	681	0.092	0.36	1410	470	471	0.080	0.36	1410	270	271	0.110	0.48	1225
10 × 25	820	821	0.084	0.34	1655	560	561	0.084	0.34	1655	330	331	0.090	0.44	1445
10 × 30	1000	102	0.062	0.24	1915	680	681	0.062	0.24	1915	470	471	0.086	0.34	1695
12.5 × 20	1000	102	0.070	0.24	1905	680	681	0.070	0.24	1905	470	471	0.090	0.30	1665
12.5 × 25	1500	152	0.054	0.178	2235	1000	102	0.054	0.178	2235	560	561	0.070	0.22	1955
12.5 × 30	1800	182	0.048	0.156	2650	1200	122	0.048	0.156	2655	680	681	0.068	0.20	2315
12.5 × 35	2200	222	0.040	0.130	2885	1500	152	0.040	0.130	2885	820	821	0.070	0.20	2515
16 × 20	1800	182	0.054	0.156	2535	1200	122	0.054	0.156	2535	820	821	0.068	0.166	2215
16 × 25	2700	272	0.042	0.120	2935	1800	182	0.042	0.120	2935	1000	102	0.050	0.150	2560
16 × 31	3300	332	0.034	0.100	3455	2200	222	0.034	0.100	3455	1200	122	0.044	0.132	3015
16 × 35	3900	392	0.030	0.088	3615	2700	272	0.030	0.088	3615	1500	152	0.038	0.114	3155
16 × 40	4700	472	0.026	0.076	4085	3300	332	0.026	0.076	4085	1800	182	0.032	0.960	2715
18 × 20	2200	222	0.052	0.134	2865	1800	182	0.052	0.134	2865	1000	102	0.072	0.194	2495
18 × 25	3300	332	0.038	0.098	3145	2200	222	0.038	0.098	3145	1200	122	0.052	0.140	2745
18 × 31	3900	392	0.030	0.080	4175	2700	272	0.030	0.080	4175	1800	182	0.042	0.114	3640
18 × 35	4700	472	0.028	0.076	4225	3300	332	0.028	0.076	4225	2200	222	0.034	0.092	3685
18 × 40	5600	562	0.024	0.064	4285	3900	392	0.024	0.064	4285	2700	272	0.028	0.076	3805

● Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。

● Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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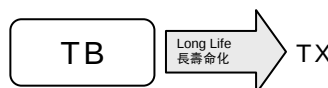
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CAT.2011/V5

HIGH RIPPLE CURRENT, FOR BALLAST

高紋波，鎮流器專用品

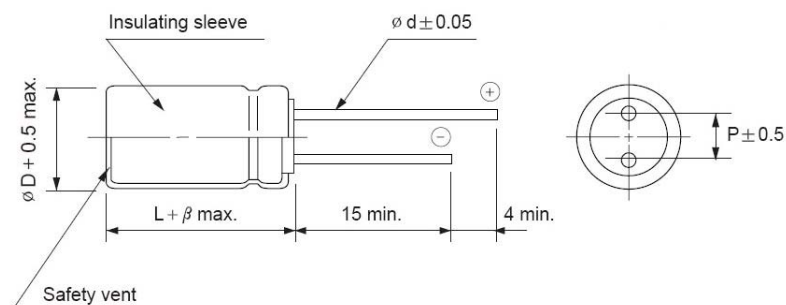
- High ripple current
高紋波特性
- High reliability withstanding 2000~5000 hours load life at 105°C
高可靠性可在 105°C 環境中負荷壽命 2000~5000 小時
- Suitable for electronic ballast and energy-save lamp
適用於電子鎮流器和節能燈
- Comply with the RoHS directive
符合 RoHS 指令



□ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																											
Operation Temperature Range 使用溫度範圍	-25 ~ +105°C																											
Voltage Range 額定工作電壓範圍	160 ~ 450V																											
Capacitance Range 靜電容量範圍	1 ~ 22μF																											
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																											
Leakage Current 漏電流	Leakage current = 0.02CV + 25μA (after 5 minutes application of rated voltage) or Leakage current = 0.04CV + 100μA (after 1 minute application of rated voltage) 漏電流 = 0.02CV + 25μA（施加額定工作電壓 5 分鐘後）或 漏電流 = 0.04CV + 100μA（施加額定工作電壓 1 分鐘後）																											
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>tan δ (max.) 最大損耗角正切</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.20</td><td>0.20</td><td>0.20</td></tr></table>							Rated Voltage (V) 額定工作電壓	160	200	250	350	400	450	tan δ (max.) 最大損耗角正切	0.15	0.15	0.15	0.20	0.20	0.20							
Rated Voltage (V) 額定工作電壓	160	200	250	350	400	450																						
tan δ (max.) 最大損耗角正切	0.15	0.15	0.15	0.20	0.20	0.20																						
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table><tr><td>Rated Voltage (V) 額定工作電壓</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td></tr><tr><td>Impedance Ratio 阻抗比</td><td>Z(-25°C) / Z(20°C)</td><td>3</td><td>3</td><td>3</td><td>6</td><td>6</td><td>6</td></tr></table>							Rated Voltage (V) 額定工作電壓	160	200	250	350	400	450	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	3	3	3	6	6	6						
Rated Voltage (V) 額定工作電壓	160	200	250	350	400	450																						
Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	3	3	3	6	6	6																					
Load Life 高溫負荷特性	After an application of DC bias voltage plus the rated ripple current for 5000 hours (3000 hours for Ø8, 2000 hours for Ø6.3) at 105°C the peak voltage shall not exceed the rated DC voltage, capacitors meet the characteristics listed below. 在 105°C 環境下，在不超過額定電壓的範圍內重疊規定的紋波電流，施加 5000 小時（Ø8 為 3000 小時，Ø6.3 為 2000 小時）電壓後，電容器的特性符合下表的規定。 <table><tr><td>Capacitance Change 靜電容量變化率</td><td colspan="6">Within ±20% of initial measured value 初始值的±20%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td colspan="6">≦ 200% of initial specified value 不大於規範值的 200%</td></tr><tr><td>Leakage Current 漏電流</td><td colspan="6">≦ initial specified value 不大於規範值</td></tr></table>							Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內						Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%						Leakage Current 漏電流	≦ initial specified value 不大於規範值					
Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內																											
Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%																											
Leakage Current 漏電流	≦ initial specified value 不大於規範值																											
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。																											
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷（PVC）或綠色膠管白字印刷（PET）。																											

□ DRAWING (Unit: mm) 外形圖



ØD	6.3	8	10	12.5	16
P	2.5	3.5	5.0	7.5	
Ød	0.5		0.6		0.8
β	1.5			2.0	

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		120Hz	1KHz	10KHz	100KHz
Coefficient 系數	1 ~ 4.7μF	0.20	0.40	0.80	1.00
	6.8 ~ 15μF	0.30	0.60	0.90	1.00
	22μF	0.40	0.70	0.90	1.00

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code 代碼	μF	160		200		250	
		2C		2D		2E	
1	010	6.3 × 12	40	6.3 × 12	42	6.3 × 12	44
1.5	1R5	6.3 × 12	50	6.3 × 12	54	8 × 12	54
1.8	1R8	6.3 × 12	50	6.3 × 12	60	8 × 12	70
2.2	2R2	6.3 × 12	60	6.3 × 12	65	8 × 12	70
3.3	3R3	8 × 12	72	8 × 12	95	8 × 12	75
4.7	4R7	8 × 12	80	8 × 12	98	8 × 16	95
5.6	5R6	8 × 12	84	8 × 12	102	8 × 16	98
6.8	6R8	8 × 12	90	8 × 16 (10 × 12)	102 (108)	8 × 16	102
8.2	8R2	8 × 12	100	10 × 12	112	10 × 16	112
10	100	8 × 12	206	10 × 16	210	10 × 16 (10 × 20)	230 (230)
15	150	10 × 16	235	10 × 16 (10 × 20)	250 (250)	10 × 20	250
22	220	10 × 20	240	10 × 20	285	10 × 21 (12.5 × 20)	290 (290)

WV Code 代碼	μF	350		400		450	
		2V		2G		2W	
1	010	8 × 12	55	8 × 12	58	8 × 12	60
1.5	1R5	8 × 12	58	10 × 12	60	10 × 12	72
1.8	1R8	8 × 12	60	10 × 12	70	10 × 12	76
2.2	2R2	8 × 12 (10 × 12)	65 (65)	8 × 12 (8 × 16) (10 × 16)	72 (75) (75)	10 × 12 (10 × 16)	98 (98)
3.3	3R3	10 × 12	100	10 × 16	80	10 × 16	90
4.7	4R7	10 × 16	115	10 × 12 (10 × 16) (10 × 20)	80 (90) (90)	10 × 16 (10 × 20)	90 (95)
5.6	5R6	10 × 16	142	10 × 20	108	10 × 20	110
6.8	6R8	10 × 20	155	10 × 21 (12.5 × 20)	115	12.5 × 20	115
8.2	8R2	12.5 × 20	200	12.5 × 20	155	12.5 × 20	160
10	100	12.5 × 20	230	10 × 20 (12.5 × 20)	214 (214)	12.5 × 20	220
15	150	12.5 × 25	280	12.5 × 25	230	16 × 20	250
22	220	16 × 20	320	12.5 × 20 (12.5 × 25) (16 × 20)	250 (300) (320)	16 × 25	380
						Case size 尺寸	Ripple current 紋波電流

• Case size ØD×L(mm), ripple current (mA rms) at 105°C 100KHz • 尺寸ØD×L(mm), 紋波電流(mA rms)於 105°C 100KHz

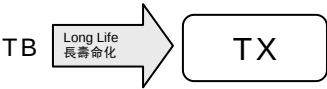
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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HIGH RIPPLE CURRENT, LONG LIFE
高紋波，長壽命品

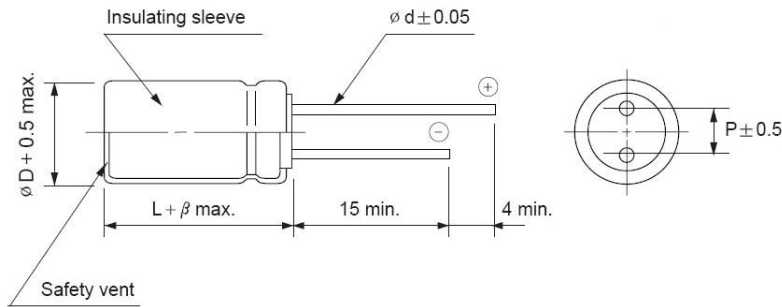
- High ripple current
高紋波特性
- 8000~10000 hours load life at 105°C
可在 105°C 環境中負荷壽命 8000~10000 小時
- Suitable for electronic ballast, energy-save lamp and LED lighting
適用於電子鎮流器，節能燈和 LED 照明
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性						
Operation Temperature Range 使用溫度範圍	-25 ~ +105°C						
Voltage Range 額定工作電壓範圍	160 ~ 450V						
Capacitance Range 靜電容量範圍	2.2 ~ 330μF						
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C						
Leakage Current 漏電流	Leakage current = 0.03CV + 15μA (after 5 minutes application of rated voltage) 漏電流 = 0.03CV + 15μA (施加額定工作電壓 5 分鐘後)						
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C						
	Rated Voltage (V) 額定工作電壓	160	200	250	350	400	450
	tan δ (max.) 最大損耗角正切	0.15	0.15	0.15	0.20	0.20	0.20
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz						
	Rated Voltage (V) 額定工作電壓	160	200	250	350	400	450
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	3	3	3	5	5
Load Life 高溫負荷特性	After 10000 hours (Ø8~Ø10 products are for 8000 hours) application of the rated voltage at 105°C, they meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓 10000 小時 (Ø8~Ø10 產品為 8000 小時) 後，電容器的特性符合下表的要求。						
	Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內					
	Dissipation Factor 損耗角正切	≦ 200% of initial specified value 不大於規範值的 200%					
	Leakage Current 漏電流	≦ initial specified value 不大於規範值					
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。						
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。						

DRAWING (Unit: mm) 外形圖



ØD	6.3	8	10	12.5	16	18
P	2.5	3.5	5.0	7.5		
Ød	0.5	0.6	0.8			
β	1.5	2.0				

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率	120Hz	1KHz	10KHz	100KHz
Coefficient 系數				
2.2 ~ 68µF	0.85	0.90	1.00	1.10
82 ~ 330µF	0.90	0.95	1.00	1.10

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Parameter 參數 μF		160 (2C)			200 (2D)		
		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流	
			105°C 120Hz	105°C 100KHz		105°C 120Hz	105°C 100KHz
10	100	10 × 16	125	313	10 × 16	140	350
22	220	10 × 20	200	500	10 × 20	200	500
33	330	10 × 20	250	625	10 × 20	260	650
47	470	10 × 20	300	750	12.5 × 20	390	975
68	680	12.5 × 20	470	1175	12.5 × 20	470	1175
82	820	12.5 × 20	510	1275	16 × 20	550	1375
100	101	12.5 × 25 (16 × 20)	620 (630)	1395 (1418)	16 × 20	630	1418
150	151	16 × 25	770	1733	16 × 31	840	1890
220	221	16 × 31	1020	2295	18 × 31	1050	2363
330	331	18 × 35	1390	3128	18 × 40	1430	3218

WV Parameter 參數 μF		250 (2E)			350 (2V)		
		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流	
			105°C 120Hz	105°C 100KHz		105°C 120Hz	105°C 100KHz
6.8	6R8				10 × 16	110	275
10	100	10 × 20	140	350	12.5 × 20	260	650
22	220	10 × 20	200	500	16 × 20	360	900
47	470	12.5 × 20	390	975	16 × 20	430	1075
68	680	16 × 20	520	1300	16 × 31 (18 × 25)	560 (550)	1400 (1375)
82	820	16 × 25	550	1375	18 × 31	610	1525
100	101	16 × 31	680	1530	18 × 31	700	1575
150	151	18 × 31	860	1935	18 × 40	960	2160
220	221	18 × 40	1130	2543			

WV Parameter 參數 μF		400 (2G)			450 (2W)		
		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流	
			105°C 120Hz	105°C 100KHz		105°C 120Hz	105°C 100KHz
2.2	2R2	8 × 11.5	60	165			
3.3	3R3	10 × 12	70	185	10 × 12	60	165
4.7	4R7	10 × 12	80	210	10 × 16	70	185
6.8	6R8	10 × 16	110	275	10 × 20	110	275
10	100	10 × 20	140	350	12.5 × 20	180	450
22	220	12.5 × 20	260	650	16 × 20	290	725
33	330	16 × 20	360	900	16 × 25	390	975
47	470	16 × 25 (18 × 20)	470 (450)	1175 (1125)	18 × 25	480	1200
68	680	18 × 25	585	1463	18 × 31	630	1575
82	820	18 × 31	610	1525	18 × 35	715	1788
100	101	18 × 35	765	1721	18 × 40	800	1800

- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
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HIGH RIPPLE CURRENT, HIGH RILIABILITY
高紋波，高可靠品

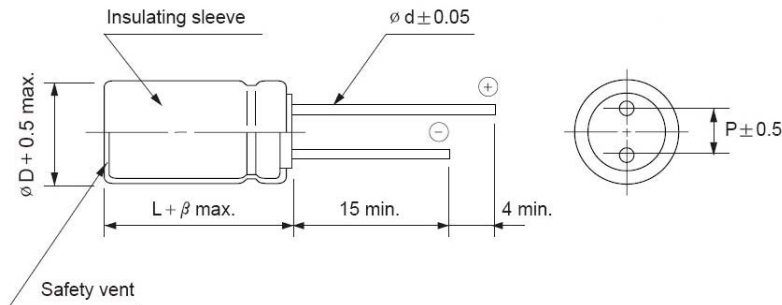
- High ripple current
高紋波特性
- High reliability withstanding 5000 hours load life at 105°C
高可靠性可在 105°C 環境中負荷壽命 5000 小時
- Suitable for SMPS and adaptor
適用於開關式電源及變壓器
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性		
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C	-25 ~ +105°C	
Voltage Range 額定工作電壓範圍	400V	450V	
Capacitance Range 靜電容量範圍	33 ~ 150μF	33 ~ 150μF	
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C		
Leakage Current 漏電流	Leakage current = 0.02CV + 15μA (after 5 minutes application of rated voltage) 漏電流 = 0.02CV + 15μA (施加額定工作電壓 5 分鐘後)		
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C		
	Rated Voltage (V) 額定工作電壓	400	450
	tan δ (max.) 最大損耗角正切	0.24	0.24
Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz		
	Rated Voltage (V) 額定工作電壓	400	450
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C)	6
		Z(-40°C) / Z(20°C)	6
Load Life 高溫負荷特性	After applying rated voltage and rated ripple current for 5000 hours at 105°C, the capacitors shall meet the characteristics listed below. 在 105°C 環境中施加額定工作電壓及額定紋波電流 5000 小時後，電容器的特性符合下表的要求。		
	Capacitance Change 靜電容量變化率	Within ±20% of initial measured value 初始值的±20%以內	
	Dissipation Factor 損耗角正切	≅ 200% of initial specified value 不大於規範值的 200%	
	Leakage Current 漏電流	≅ initial specified value 不大於規範值	
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。		
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。		

DRAWING (Unit: mm) 外形圖



ØD	10	12.5	16	18
P	5.0		7.5	
Ød	0.6		0.8	
β	2.5			

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		60Hz	120Hz	1KHz	10KHz~
Coefficient 係數	400 ~ 450WV	0.80	1.00	1.40	1.50

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Parameter μF 參數		400 (2G)			450 (2W)		
		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流		Case size ØD×L (mm) 尺寸	Ripple current (mA rms) 紋波電流	
			105°C 120Hz	105°C 100KHz		105°C 120Hz	105°C 100KHz
33	330	10 × 35	320	480	10 × 40 (12.5 × 30)	350 (350)	525 (525)
39	390	10 × 40 (12.5 × 30)	380 (380)	570 (570)	10 × 45 (12.5 × 35) (16 × 25)	390 (400) (370)	585 (600) (555)
47	470	10 × 45 (16 × 25)	425 (400)	638 (600)	10 × 50 (12.5 × 40) (16 × 31)	445 (425) (455)	668 (683) (683)
56	560	10 × 50 (12.5 × 35)	490 (475)	735 (713)	12.5 × 45 (16 × 35)	500 (550)	750 (750)
68	680	12.5 × 40 (16 × 31)	550 (530)	825 (795)	16 × 40 (18 × 31)	590 (550)	885 (825)
82	820	12.5 × 45 (16 × 35)	615 (605)	923 (908)	12.5 × 50 (16 × 45) (18 × 35)	625 (675) (645)	938 (1013) (968)
100	101	12.5 × 50 (16 × 40) (18 × 31)	690 (740) (625)	1035 (1110) (938)	16 × 50 (18 × 40)	785 (740)	1178 (1110)
120	121	16 × 45 (18 × 35)	795 (730)	1193 (1095)	18 × 45	825	1238
150	151	18 × 45	910	1365	18 × 50	950	1425

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FOR PHOTO FLASH
閃光燈品

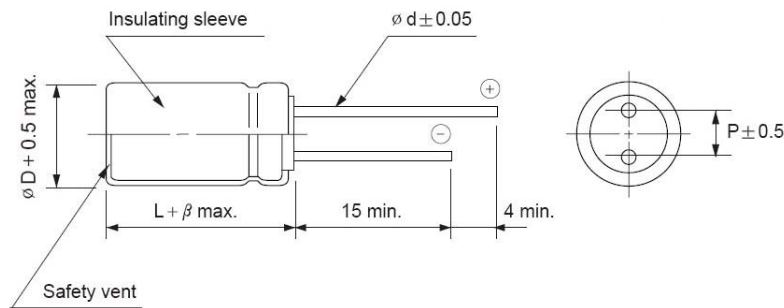
- For photo flash applications with lead wire terminal
閃光燈專用，引線式
- Low dissipation factor, low leakage current and high stability
during the repetition of charge and discharge
快速充放電、低損耗及低漏電
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性						
Operation Temperature Range 使用溫度範圍	-20 ~ +55°C						
Voltage Range 額定工作電壓範圍	330V						
Capacitance Range 靜電容量範圍	50 ~ 240μF						
Capacitance Tolerance 靜電容量允許偏差	-10 ~ +20% at 120Hz, 20°C						
Leakage Current 漏電流	Leakage current = 1 × C (μA) (after 5 minutes application of rated voltage), where C=Normal capacitance (μF) 漏電流 = 1 × C (μA) (施加額定工作電壓 5 分鐘後)，其中 C=標稱靜電容量 (μF)						
Dissipation Factor (tan δ) 損耗角正切	(Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C) 0.06 max.						
Charge and Discharge 充放電特性	The following specifications shall be satisfied when the capacitors are restored to 20°C after charge and discharge are repeated 5000 times at room temperature (5 ~ 35°C). Discharge resistance or Xenon tube: 0.7 ~ 1.0Ω 當電容器在室溫 (5 ~ 35°C) 環境中重複充放電 5000 次後放置於 20°C 環境，其特性符合下表的要求。放電電阻或氙氣燈: 0.7 ~ 1.0Ω <table><tr><td>Capacitance Change 靜電容量變化率</td><td>Within ±10% of initial measured value 初始值的±10%以內</td></tr><tr><td>Dissipation Factor 損耗角正切</td><td>≤ 150% of initial specified value 不大於規範值的 150%</td></tr><tr><td>Leakage Current 漏電流</td><td>≤ 150% of initial specified value 不大於規範值的 150%</td></tr></table>	Capacitance Change 靜電容量變化率	Within ±10% of initial measured value 初始值的±10%以內	Dissipation Factor 損耗角正切	≤ 150% of initial specified value 不大於規範值的 150%	Leakage Current 漏電流	≤ 150% of initial specified value 不大於規範值的 150%
Capacitance Change 靜電容量變化率	Within ±10% of initial measured value 初始值的±10%以內						
Dissipation Factor 損耗角正切	≤ 150% of initial specified value 不大於規範值的 150%						
Leakage Current 漏電流	≤ 150% of initial specified value 不大於規範值的 150%						
Shelf Life 高溫貯存特性	After leaving capacitors under no load at 55°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 55°C 環境中無負荷放置 1000 小時後，電容器的特性符合高溫負荷特性中所列的規定值。						
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。						

DRAWING (Unit: mm) 外形圖



ØD	10	12.5	14.5	16	18
P	5.0		7.5	7.5	
Ød	0.6	0.8		0.8	
β	1.0			1.5	

DIMENSIONS 規格尺寸

WV (Code 代碼)		330 (2U)				
μF (Code 代碼)	Case side 尺寸 [ØDxL(mm)]					
50	500	10 × 27				
70	700	10 × 35	12.5 × 34			
100	101		12.5 × 30	14.5 × 24		
120	121		12.5 × 34	14.5 × 27	16 × 26	
140	141		12.5 × 39	14.5 × 30	16 × 28	18 × 14
160	161		12.5 × 43	14.5 × 33	16 × 30	18 × 26
180	181			14.5 × 36	16 × 33	18 × 28
200	201			14.5 × 39	16 × 35	18 × 29
220	221			14.5 × 43	16 × 38	18 × 31
240	241				16 × 40	18 × 33

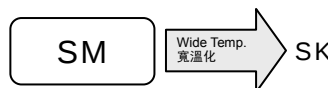
- Please refer to page 16, 18 about the formed or taped product spec. 編帶與引線成型標準請參閱第 16, 18 頁。
- Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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SNAP-IN TERMINAL TYPE, STANDARD

導箔型標準品

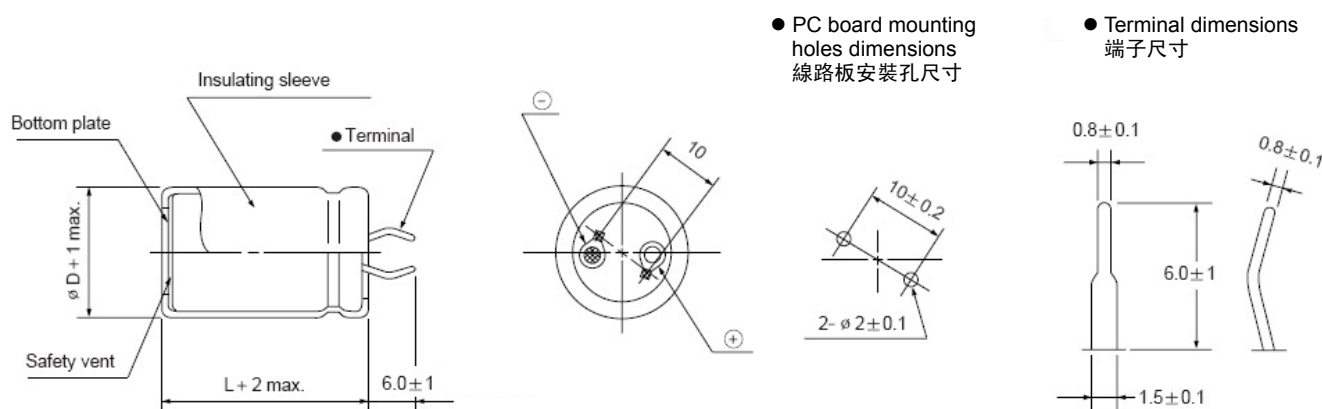
- Standard snap-in terminal series
導箔型標準品系列
- Voltage range of 6.3 ~ 450V
額定工作電壓範圍 6.3 ~ 450V
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性	
Operation Temperature Range 使用溫度範圍	-40 ~ +85°C	-25 ~ +85°C
Voltage Range 額定工作電壓範圍	6.3 ~ 350V	400 ~ 450V
Capacitance Range 靜電容量範圍	68 ~ 100000µF	56 ~ 820µF
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C	
Leakage Current 漏電流	Leakage current = 3√(cv) µA (after 5 minutes application of rated voltage) 漏電流 = 3√(cv) µA (施加額定工作電壓 5 分鐘後)	
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF. 當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.01。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C	
Stability at Low Temperature 低溫特性	Rated Voltage (V) 額定工作電壓	6.3 10 16, 25 35 50, 63 80, 100 160~400 450
	tan δ (max.) 最大損耗角正切	0.45 0.40 0.35 0.30 0.25 0.20 0.15 0.20
	Measurement frequency 測試頻率: 120Hz	
Load Life 高溫負荷特性	Rated Voltage (V) 額定工作電壓	6.3~16 25 35 50, 63 80~100 160~400 450
	Impedance Ratio Z(-25°C) / Z(20°C) 阻抗比	4 3 3 2 2 4 8
	Impedance Ratio Z(-40°C) / Z(20°C)	15 10 8 6 5 — —
Shelf Life 高溫貯存特性	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. 在 85°C 環境中施加額定工作電壓 2000 小時後, 電容器的特性符合下表的要求。	
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內
	Dissipation Factor 損耗角正切	Less than 200% of specified value 不大於規範值的 200%
Marking 標識	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified listed below. 在 85°C 環境中無負荷放置 1000 小時後, 電容器的特性符合下表的要求。	
	Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內
	Dissipation Factor 損耗角正切	Less than 200% of specified value 不大於規範值的 200%
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。	
	Leakage Current 漏電流	Less than specified value 不大於規範值

DRAWING (Unit: mm) 外形圖



● PC board mounting holes dimensions
線路板安裝孔尺寸

● Terminal dimensions
端子尺寸

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 係數	~ 100μF	0.88	1.0	1.06	1.15	1.20
	160 ~ 250μF	0.85	1.0	1.20	1.25	1.45
	315μF ~	0.88	1.0	1.15	1.20	1.40

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV μF ∅D		6.3 (0J)				10 (1A)				16 (1C)			
		22	25	30	35	22	25	30	35	22	25	30	35
10000	103									22 x 25 3.32			
12000	123					22 x 25 3.31				22 x 30 3.56	25 x 25 3.89		
15000	153	22 x 25 3.39				22 x 30 3.82	25 x 25 3.39			22 x 35 4.29	25 x 30 4.45	30 x 25 4.56	
18000	183	22 x 30 3.85	25 x 25 3.96			22 x 35 4.28	25 x 25 4.17			22 x 40 4.77	25 x 35 4.96	30 x 30 5.10	
22000	223	22 x 35 4.34	25 x 25 4.22			22 x 40 4.79	25 x 30 4.71	30 x 25 4.83		22 x 50 5.51	25 x 40 5.51	30 x 30 5.39	
27000	273	22 x 40 4.85	25 x 30 4.77	30 x 25 4.89		22 x 45 5.30	25 x 35 5.26	30 x 30 5.41			25 x 45 6.06	30 x 35 5.98	35 x 25 5.80
33000	333	22 x 50 5.83	25 x 35 5.32	30 x 30 5.47		22 x 50 5.82	25 x 40 5.81	30 x 30 5.69	35 x 25 5.81			30 x 40 6.56	35 x 30 6.41
39000	393		25 x 40 5.82	30 x 30 5.70	35 x 25 5.82		25 x 45 6.31	30 x 35 6.22	35 x 30 6.8			30 x 45 7.08	35 x 35 6.96
47000	473		25 x 45 6.35	30 x 35 6.26	35 x 30 6.41		25 x 50 6.83	30 x 40 6.78	35 x 30 6.62			30 x 50 7.62	35 x 40 7.54
56000	563		25 x 50 6.85	30 x 40 6.80	35 x 30 6.64			30 x 45 7.31	35 x 35 7.18				35 x 45 8.08
68000	683			30 x 45 7.35	35 x 35 7.23				35 x 40 7.76				35 x 50 8.63
100000	104				35 x 45 8.34								

WV μF ∅D		25 (1E)				35 (1V)				50 (1H)			
		22	25	30	35	22	25	30	35	22	25	30	35
3300	332									22 x 30 2.97	25 x 25 3.06		
4700	472					22 x 30 3.06	25 x 25 2.98			22 x 40 3.83	25 x 35 3.98	30 x 25 3.86	35 x 25 4.19
5600	562	22 x 25 2.65				22 x 35 3.28	25 x 30 3.39			22 x 45 4.26	25 x 40 4.44	30 x 30 4.35	35 x 25 4.44
6800	682	22 x 30 3.06	25 x 25 3.15			22 x 40 3.73	25 x 30 3.67	30 x 25 3.76		22 x 50 4.77	25 x 40 4.76	30 x 35 4.92	35 x 30 5.04
8200	822	22 x 35 3.45	25 x 30 3.57			22 x 45 4.13	25 x 35 4.10	30 x 30 4.22			25 x 50 5.43	30 x 40 5.38	35 x 30 5.26
10000	103	22 x 40 3.95	25 x 30 3.89	30 x 25 3.99		22 x 50 4.68	35 x 40 4.68	30 x 30 4.58				30 x 45 6.07	35 x 35 5.97
12000	123	22 x 45 4.41	25 x 35 4.37	30 x 30 4.50			25 x 45 5.18	30 x 35 5.11	35 x 30 5.24			30 x 50 6.62	35 x 40 6.55
15000	153	22 x 50 4.94	25 x 40 4.94	30 x 35 5.10				30 x 40 5.72	35 x 35 5.88				35 x 45 7.20
18000	183		25 x 45 5.45	30 x 35 5.38	35 x 30 5.51			30 x 45 6.28	35 x 40 6.46				35 x 50 7.74
22000	223			30 x 45 6.22	35 x 35 6.12				35 x 45 7.07				
27000	273			30 x 50 6.82	35 x 40 6.74								
33000	333				35 x 45 7.35								

WV μF ∅D		63 (1J)				80 (1K)				100 (2A)			
		22	25	30	35	22	25	30	35	22	25	30	35
1200	122					22 x 25 2.24				22 x 30 2.39	25 x 25 2.46		
1500	152					22 x 30 2.67				22 x 35 2.83	25 x 30 2.93	30 x 25 3.00	
1800	182	22 x 25 2.20				22 x 30 2.92	25 x 25 3.01			22 x 40 3.26	25 x 35 3.39	30 x 30 3.49	
2200	222	22 x 30 2.50	25 x 25 2.58			22 x 35 3.25	25 x 30 3.36	30 x 25 3.45		22 x 45 3.58	25 x 40 3.74	30 x 30 3.66	
2700	272	22 x 35 2.94	25 x 30 3.04			22 x 40 3.79	25 x 35 3.94	30 x 30 4.05			25 x 45 4.33	30 x 35 4.27	35 x 30 4.37
3300	332	22 x 35 3.14	25 x 30 3.26	30 x 25 3.34		22 x 45 4.18	25 x 40 4.36	30 x 30 4.27			25 x 50 4.76	30 x 40 4.72	35 x 35 4.85
3900	392	22 x 40 3.60	25 x 35 3.74	30 x 30 3.85		22 x 50 4.75	25 x 45 4.96	30 x 35 4.89				30 x 45 5.36	35 x 35 5.27
4700	472	22 x 50 4.19	25 x 40 4.19	30 x 35 4.10	35 x 30 4.19		25 x 50 5.44	30 x 40 5.39	35 x 30 5.27			30 x 50 5.86	35 x 40 5.80
5600	562		25 x 45 4.65	30 x 35 4.58	35 x 30 4.70			30 x 45 5.91	35 x 35 5.81				35 x 45 6.34
6800	682		25 x 50 5.20	30 x 40 5.16	35 x 30 5.04				35 x 40 5.46				
8200	822			30 x 45 5.62	35 x 35 5.53				35 x 45 6.91	→ Case size 尺寸 → Ripple current 紋波電流			
10000	103			30 x 50 6.32	35 x 40 6.25								
12000	123				35 x 45 6.83								

•Case size ∅D×L(mm), ripple current (A rms) at 85°C 120Hz •尺寸∅D×L(mm), 紋波電流(A rms)於 85°C 120Hz

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CAT.2011/V5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV μF ∅D		160 (2C)				200 (2D)				250 (2E)			
		22	25	30	35	22	25	30	35	22	25	30	35
150	151									22 x 25 0.90	25 x 20 0.92		
180	181					22 x 20 0.91				22 x 25 0.90	25 x 20 1.01		
220	221	22 x 20 1.01				22 x 25 1.09	25 x 20 1.11			22 x 25 1.09	25 x 25 1.19	30 x 20 1.22	
270	271	22 x 25 1.20	25 x 20 1.32			22 x 25 1.20	25 x 25 1.32	30 x 20 1.35		22 x 30 1.28	25 x 25 1.32	30 x 20 1.35	
330	331	22 x 25 1.33	25 x 20 1.36			22 x 30 1.42	25 x 25 1.46	30 x 20 1.49		22 x 35 1.50	25 x 30 1.56	30 x 25 1.60	35 x 20 1.62
390	391	22 x 25 1.45	25 x 25 1.59	30 x 20 1.62		22 x 30 1.54	25 x 25 1.59	30 x 25 1.74	35 x 20 1.77	22 x 40 1.72	25 x 30 1.69	30 x 25 1.73	35 x 20 1.77
470	471	22 x 30 1.69	25 x 25 1.75	30 x 20 1.78		22 x 35 1.79	25 x 30 1.86	30 x 25 1.90	35 x 20 1.94	22 x 45 1.98	25 x 35 1.96	30 x 30 2.02	35 x 25 2.06
560	561	22 x 35 1.96	25 x 30 2.03	30 x 25 2.08	35 x 20 2.12	22 x 40 2.06	25 x 35 2.14	30 x 25 2.08	35 x 25 2.25	22 x 50 2.26	25 x 40 2.25	30 x 30 2.20	35 x 25 2.25
680	681	22 x 40 2.27	25 x 30 2.23	30 x 25 2.29	35 x 20 2.33	22 x 45 2.38	25 x 40 2.48	30 x 30 2.43	35 x 25 2.48		25 x 45 2.60	30 x 35 2.56	35 x 30 2.62
820	821	22 x 45 2.61	25 x 35 2.59	30 x 30 2.67	35 x 25 2.73	22 x 50 2.73	25 x 45 2.85	30 x 35 2.81	35 x 30 2.88			30 x 40 2.95	35 x 35 3.03
1000	102	22 x 50 3.01	25 x 40 3.01	30 x 30 2.95	35 x 25 3.01			30 x 40 3.26	35 x 30 3.18			30 x 45 3.40	35 x 40 3.50
1200	122		25 x 45 3.23	30 x 35 3.37	35 x 30 3.26			30 x 45 3.49	35 x 35 3.43				35 x 45 3.74
1500	152			30 x 40 3.73	35 x 35 3.83			30 x 50 4.06	35 x 40 4.01				35 x 50 4.35
1800	182				35 x 40 4.39				35 x 45 4.58				

WV μF ∅D		315 (2F)				350 (2V)				400 (2G)			
		22	25	30	35	22	25	30	35	22	25	30	35
68	680									22 x 20 0.56			
82	820					22 x 20 0.62				22 x 25 0.66	25 x 20 0.68		
100	101	22 x 20 0.68				22 x 25 0.73	25 x 20 0.75			22 x 30 0.78	25 x 25 0.81	30 x 20 0.82	
120	121	22 x 25 0.80	25 x 20 0.82			22 x 30 0.86	25 x 25 0.88	30 x 20 0.90		22 x 30 0.86	25 x 25 0.88	30 x 20 0.90	
150	151	22 x 30 0.96	25 x 25 0.99	30 x 20 1.01		22 x 35 1.01	25 x 30 1.05	30 x 20 1.01		22 x 35 1.01	25 x 30 1.05	30 x 25 1.08	35 x 20 1.09
180	181	22 x 35 1.11	25 x 30 1.15	30 x 25 1.18	35 x 20 1.20	22 x 40 1.17	25 x 35 1.21	30 x 25 1.18	35 x 20 1.20	22 x 40 1.17	25 x 35 1.21	30 x 25 1.18	35 x 25 1.28
220	221	22 x 40 1.29	25 x 30 1.27	30 x 25 1.30	35 x 20 1.33	22 x 45 1.35	25 x 35 1.34	30 x 30 1.38	35 x 25 1.41	22 x 45 1.35	25 x 40 1.41	30 x 30 1.38	35 x 25 1.41
270	271	22 x 45 1.50	25 x 35 1.49	30 x 30 1.53	35 x 25 1.56		25 x 45 1.64	30 x 35 1.61	35 x 25 1.65		25 x 45 1.64	30 x 35 1.61	35 x 30 1.65
330	331	22 x 50 1.73	25 x 40 1.73	30 x 35 1.78	35 x 30 1.83		25 x 50 1.89	30 x 40 1.87	35 x 30 1.83		25 x 50 1.89	30 x 40 1.87	35 x 30 1.83
390	391		25 x 45 1.97	30 x 35 1.94	35 x 30 1.99			30 x 45 2.12	35 x 35 2.09			30 x 45 2.12	35 x 35 2.09
470	471			30 x 40 2.23	35 x 35 2.29			30 x 50 2.43	35 x 40 2.40			30 x 50 2.43	35 x 40 2.40
560	561				35 x 40 2.62				35 x 45 2.73				35 x 45 2.73
680	681				35 x 45 3.01				35 x 50 3.13				
820	821				35 x 50 3.44								

WV μF ∅D		450 (2W)			
		22	25	30	35
56	560	22 x 20 0.51			
68	680	22 x 25 0.60	25 x 20 0.62		
82	820	22 x 30 0.71	25 x 25 0.73	30 x 20 0.74	
100	101	22 x 35 0.83	25 x 30 0.86	30 x 25 0.88	35 x 20 0.89
120	121	22 x 40 0.95	25 x 35 0.99	30 x 25 0.96	35 x 20 0.98
150	151	22 x 50 1.17	25 x 40 1.17	30 x 30 1.14	35 x 25 1.17
180	181		25 x 45 1.34	30 x 35 1.32	35 x 25 1.28
220	221		25 x 50 1.54	30 x 40 1.53	35 x 30 1.49
270	270			30 x 45 1.77	35 x 35 1.74
330	331			30 x 50 2.03	35 x 40 2.01
390	391				35 x 45 2.28
470	471				35 x 45 2.52

→ Case size ∅D×L(mm)
→ Ripple current (A rms) at 85°C 120Hz

→ 尺寸∅D×L(mm)
→ 紋波電流(A rms)於 85°C 120Hz

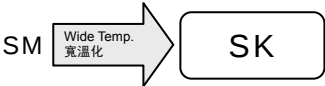
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SNAP-IN TERMINAL TYPE, WIDE TEMPERATURE RANGE
導箔型寬溫品

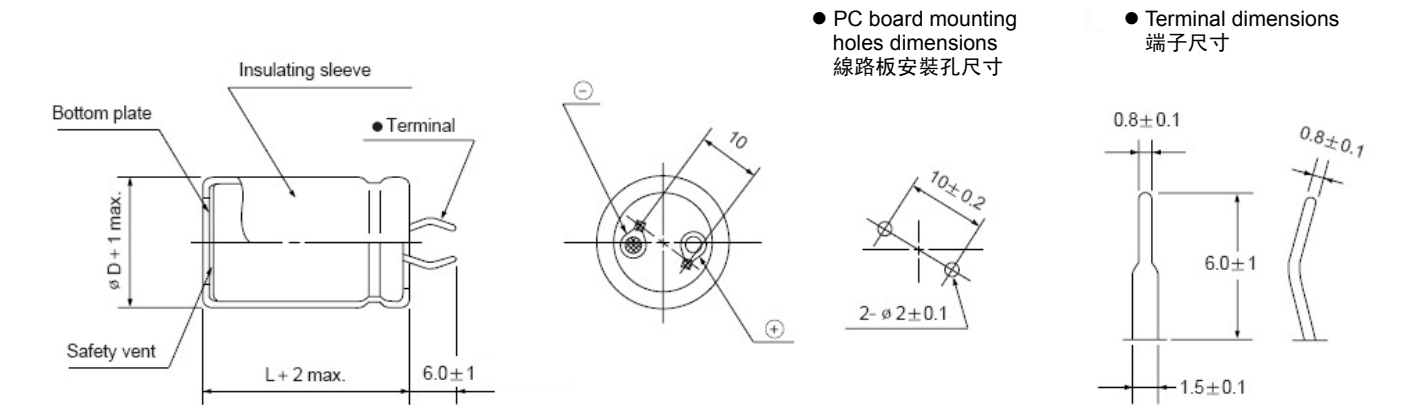
- Wide temperature range of -40 (-25) ~ +105°C
適用於 -40 (-25) ~ +105°C 的寬溫溫度範圍
- Standard snap-in terminal series
導箔型標準品系列
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性	
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C	-25 ~ +105°C
Voltage Range 額定工作電壓範圍	6.3 ~ 400V	450V
Capacitance Range 靜電容量範圍	56 ~ 68000µF	47 ~ 470µF
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C	
Leakage Current 漏電流	Leakage current = 3√(cv) µA (after 5 minutes application of rated voltage) 漏電流 = 3√(cv) µA (施加額定工作電壓 5 分鐘後)	
Dissipation Factor (tan δ) 損耗角正切	When nominal capacitance is over 1000µF, tan δ shall be added 0.01 to the listed value with increase of every 1000µF. 當標稱靜電容量大於 1000µF, 其標稱靜電容量每增加 1000µF, 損耗角正切增加 0.01。 Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C	
Stability at Low Temperature 低溫特性	Rated Voltage (V) 額定工作電壓	10 16 25, 35 50, 63 80, 100 160~400 450
	tan δ (max.) 最大損耗角正切	0.50 0.40 0.35 0.25 0.20 0.15 0.20
	Impedance Ratio 阻抗比	Z(-25°C) / Z(20°C) 5 4 4 2 4 8
Load Life 高溫負荷特性	Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內
	Dissipation Factor 損耗角正切	Less than 200% of specified value 不大於規範值的 200%
	Leakage Current 漏電流	Less than specified value 不大於規範值
Shelf Life 高溫貯存特性	Capacitance Change 靜電容量變化率	Within ±20% of initial value 初始值的±20%以內
	Dissipation Factor 損耗角正切	Less than 200% of specified value 不大於規範值的 200%
	Leakage Current 漏電流	Less than specified value 不大於規範值
Marking 標識	Printed with white colour on black sleeve (PVC) or printed with white colour on green sleeve (PET). 黑色膠管白字印刷 (PVC) 或綠色膠管白字印刷 (PET)。	

DRAWING (Unit: mm) 外形圖



FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 係數	~ 100μF	0.88	1.0	1.06	1.15	1.20
	160 ~ 250μF	0.85	1.0	1.20	1.25	1.45
	315μF ~	0.88	1.0	1.15	1.20	1.40

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV μF ∅D		6.3 (0J)				10 (1A)				16 (1C)			
		22	25	30	35	22	25	30	35	22	25	30	35
8200	822									22 x 25 2.14			
10000	103					22 x 25 2.17				22 x 30 2.48	25 x 25 2.56		
12000	123	22 x 25 2.19				22 x 30 2.48				22 x 35 2.80	25 x 30 2.90	30 x 25 2.97	
15000	153	22 x 30 2.53				22 x 35 2.83	25 x 25 2.75			22 x 40 3.17	25 x 35 3.29	30 x 30 3.38	
18000	183	22 x 35 2.85	25 x 25 2.77			22 x 35 3.00	25 x 30 3.11			22 x 45 3.50	25 x 40 3.65	30 x 30 3.57	
22000	223	22 x 35 3.04	25 x 30 3.15			22 x 40 3.35	25 x 35 3.48	30 x 25 3.38			25 x 45 4.03	30 x 35 3.98	
27000	273	22 x 40 3.40	25 x 35 3.53	30 x 25 3.42		22 x 50 3.88	25 x 40 3.87	30 x 30 3.79			25 x 50 4.42	30 x 40 4.39	35 x 30 4.29
33000	333	22 x 50 3.92	25 x 40 3.91	30 x 30 3.83			25 x 45 4.26	30 x 35 4.20				30 x 45 4.79	35 x 35 4.71
39000	393		25 x 45 4.26	30 x 35 4.20			25 x 50 4.60	30 x 40 4.57				30 x 50 5.16	35 x 40 5.10
47000	473		25 x 50 4.63	30 x 40 4.60	35 x 30 4.50			30 x 45 4.95	35 x 30 4.46				35 x 45 5.50
56000	563			30 x 50 5.17	35 x 40 5.12			30 x 45 4.95	35 x 35 4.87				
68000	683				35 x 45 5.52				35 x 45 5.49				

WV μF ∅D		25 (1E)				35 (1V)				50 (1H)			
		22	25	30	35	22	25	30	35	22	25	30	35
2700	272									22 x 30 1.94			
3300	332					22 x 25 1.62				22 x 35 2.20			
3900	392					22 x 30 1.88				22 x 40 2.52	25 x 35 2.62	30 x 25 2.54	
4700	472	22 x 25 1.73				22 x 35 2.14	25 x 25 2.09			22 x 45 2.81	25 x 40 2.93	30 x 30 2.87	
5600	562	22 x 30 1.98				22 x 35 2.29	25 x 30 2.37	30 x 25 2.43		22 x 50 3.11	25 x 40 3.11	30 x 35 3.21	
6800	682	22 x 30 2.14				22 x 40 2.61	25 x 35 2.71	30 x 30 2.79		22 x 50 3.11	25 x 50 3.64	30 x 40 3.61	35 x 30 3.53
8200	822	22 x 35 2.42	25 x 30 2.50			22 x 50 3.02	25 x 40 3.02	30 x 30 2.95				30 x 45 3.94	35 x 35 3.87
10000	103	22 x 40 2.77	25 x 35 2.88				25 x 45 3.43	30 x 35 3.38				30 x 50 4.42	35 x 40 4.37
12000	123	22 x 45 3.09	25 x 40 3.22	30 x 30 3.15			25 x 50 3.78	30 x 40 3.75	35 x 30 3.67				35 x 45 4.78
15000	153		25 x 45 3.62	30 x 35 3.57	35 x 30 3.65			30 x 45 4.19	35 x 35 4.12				35 x 50 5.24
18000	183		25 x 50 4.36	30 x 40 3.95	35 x 35 4.06				35 x 40 4.52				
22000	223			30 x 45 4.36	35 x 35 4.28				35 x 45 4.95				
27000	273				35 x 45 4.92								

WV μF ∅D		63 (1J)				80 (1K)				100 (2A)			
		22	25	30	35	22	25	30	35	22	25	30	35
820	821					22 x 25 1.37				22 x 30 1.46	25 x 25 1.51		
1000	102					22 x 30 1.62	25 x 25 1.67			22 x 35 1.71	25 x 30 1.77		
1200	122	22 x 25 1.37				22 x 30 1.67	25 x 25 1.72			22 x 40 1.86	25 x 35 1.94	30 x 25 1.88	
1500	152	22 x 30 1.50	25 x 25 1.54			22 x 35 1.98	25 x 30 2.05			22 x 45 2.18	25 x 40 2.28	30 x 30 2.23	
1800	182	22 x 30 1.64	25 x 25 1.69			22 x 40 2.28	25 x 35 2.37	30 x 25 2.30			25 x 45 2.61	30 x 35 2.57	
2200	222	22 x 35 1.86	25 x 30 1.92			22 x 45 2.51	25 x 35 2.49	30 x 30 2.56			25 x 50 2.85	30 x 40 2.83	35 x 30 2.76
2700	272	22 x 40 2.17	25 x 30 2.13	30 x 25 2.18			25 x 45 3.03	30 x 35 2.99				30 x 45 3.27	35 x 30 3.22
3300	332	22 x 50 2.53	25 x 40 2.53	30 x 30 2.48			25 x 50 3.33	30 x 40 3.30	35 x 30 3.23			30 x 50 3.59	35 x 40 3.55
3900	392		25 x 45 2.88	30 x 35 2.84				30 x 45 3.75	35 x 35 3.69				35 x 45 4.03
4700	472		25 x 40 3.20	30 x 40 3.17	35 x 30 3.10			30 x 50 4.90	35 x 40 4.06				35 x 50 4.40
5600	562			30 x 45 3.51	35 x 35 3.46				35 x 45 4.44				
6800	682			30 x 50 3.92	35 x 40 3.88				35 x 50 4.90	→ Case size 尺寸 → Ripple current 紋波電流			
8200	822				35 x 45 4.22								
10000	103				35 x 50 4.74								

•Case size ∅D×L(mm), ripple current (A rms) at 105°C 120Hz •尺寸∅D×L(mm), 紋波電流(A rms)於 105°C 120Hz

Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

注：以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2011/V5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV μF ØD		160 (2C)				200 (2D)				250 (2E)			
		22	25	30	35	22	25	30	35	22	25	30	35
150	151									22 x 25 0.68	25 x 20 0.69		
180	181	22 x 20 0.69				22 x 20 0.41				22 x 25 0.74	25 x 30 0.76	30 x 20 0.83	
220	221	22 x 20 0.76				22 x 25 0.48	25 x 20 0.49			22 x 30 0.88	25 x 25 0.90	30 x 20 0.92	
270	271	22 x 25 0.91	25 x 20 0.93			22 x 25 0.53	25 x 25 0.59	30 x 20 0.60		22 x 35 1.03	25 x 30 1.06	30 x 25 1.09	35 x 20 1.11
330	331	22 x 25 1.01	25 x 25 1.10	30 x 20 1.13		22 x 30 0.62	25 x 25 0.64	30 x 20 0.65		22 x 40 1.20	25 x 30 1.18	30 x 25 1.21	35 x 20 1.23
390	391	22 x 30 1.17	25 x 25 1.20	30 x 20 1.23		22 x 40 0.78	25 x 30 0.76	30 x 25 0.78	35 x 20 0.80	22 x 45 1.36	25 x 40 1.42	30 x 30 1.39	35 x 25 1.42
470	471	22 x 35 1.36	25 x 25 1.32	30 x 25 1.44	35 x 20 1.47	22 x 45 0.89	25 x 35 0.88	30 x 30 0.91	35 x 20 0.87	22 x 50 1.56	25 x 40 1.56	30 x 30 1.53	35 x 25 1.56
560	561	22 x 40 1.56	25 x 30 1.53	30 x 25 1.57	35 x 25 1.70	22 x 50 1.03	25 x 40 1.03	30 x 30 1.00	35 x 25 1.03		25 x 50 1.86	30 x 35 1.76	35 x 30 1.80
680	681	22 x 45 1.80	25 x 35 1.79	30 x 25 1.73	35 x 25 1.88		25 x 45 1.19	30 x 35 1.17	35 x 30 1.20			30 x 45 2.12	35 x 35 2.09
820	821	22 x 50 2.06	25 x 40 2.06	30 x 30 2.02	35 x 25 2.06			30 x 40 1.36	35 x 35 1.40				35 x 40 2.40
1000	102		25 x 45 2.38	30 x 35 2.35	35 x 30 2.41			30 x 45 1.54	35 x 40 1.59				35 x 45 2.76
1200	122		25 x 50 2.52	30 x 40 2.50	35 x 30 2.44				35 x 50 2.06				35 x 50 2.91
1500	152				35 x 40 3.00								

WV μF ØD		315 (2F)				350 (2V)				400 (2G)			
		22	25	30	35	22	25	30	35	22	25	30	35
56	560									22 x 20 0.37			
68	680					22 x 20 0.41				22 x 25 0.44	25 x 20 0.45		
82	820	22 x 20 0.45				22 x 25 0.48	25 x 20 0.49			22 x 30 0.51	25 x 25 0.53	30 x 20 0.54	
100	101	22 x 25 0.53	25 x 20 0.55			22 x 25 0.53	25 x 25 0.59	30 x 20 0.60		22 x 35 0.60	25 x 30 0.62	30 x 20 0.60	
120	121	22 x 30 0.62	25 x 25 0.64	30 x 20 0.65		22 x 30 0.62	25 x 25 0.64	30 x 20 0.65		22 x 40 0.69	25 x 30 0.68	30 x 25 0.70	35 x 20 0.71
150	151	22 x 35 0.74	25 x 30 0.76	30 x 20 0.73		22 x 40 0.78	25 x 30 0.76	30 x 25 0.78	35 x 20 0.80	22 x 45 0.81	25 x 35 0.81	30 x 30 0.83	35 x 20 0.80
180	181	22 x 40 0.85	25 x 35 0.88	30 x 25 0.86	35 x 20 0.87	22 x 45 0.89	25 x 35 0.88	30 x 30 0.91	35 x 20 0.87	22 x 50 0.93	25 x 40 0.93	30 x 30 0.91	35 x 25 0.93
220	221	22 x 45 0.98	25 x 35 0.98	30 x 30 1.00	35 x 20 0.96	22 x 50 1.03	25 x 40 1.03	30 x 30 1.00	35 x 25 1.03		25 x 45 1.07	30 x 35 1.06	35 x 30 1.08
270	271		25 x 45 1.19	30 x 35 1.17	35 x 25 1.14		25 x 45 1.19	30 x 35 1.17	35 x 30 1.20		25 x 50 1.24	30 x 40 1.23	35 x 30 1.20
330	331		25 x 50 1.37	30 x 40 1.36	35 x 30 1.33			30 x 40 1.36	35 x 35 1.40			30 x 45 1.42	35 x 35 1.40
390	391			30 x 45 1.54	35 x 35 1.52			30 x 45 1.54	35 x 40 1.59			30 x 50 1.61	35 x 40 1.59
470	471			30 x 50 1.76	35 x 40 1.74				35 x 45 1.82				35 x 45 1.82
560	561				35 x 40 1.90				35 x 50 2.06				35 x 50 2.06
680	681				35 x 50 2.27								

WV μF ØD		450 (2W)			
		22	25	30	35
47	470	22 x 20 0.34			
56	560	22 x 25 0.40	25 x 20 0.41		
68	680	22 x 30 0.47	25 x 25 0.48	30 x 20 0.49	
82	820	22 x 35 0.54	25 x 30 0.56	30 x 20 0.54	
100	101	22 x 40 0.63	25 x 30 0.62	30 x 25 0.64	35 x 20 0.65
120	121	22 x 45 0.73	25 x 35 0.72	30 x 30 0.74	35 x 25 0.76
150	151	22 x 50 0.85	25 x 40 0.85	30 x 30 0.83	35 x 25 0.85
180	181		25 x 45 0.97	30 x 35 0.96	35 x 30 0.98
220	221		25 x 50 1.12	30 x 40 1.11	35 x 30 1.08
270	270			30 x 45 1.28	35 x 35 1.26
330	331			30 x 50 1.48	35 x 40 1.46
390	391				35 x 45 1.66
470	471				35 x 45 1.85

→ Case size ØD×L(mm)
→ Ripple current (A rms) at 105°C 120Hz

→ 尺寸ØD×L(mm)
→ 紋波電流(A rms)於 105°C 120Hz

● Please refer to page 17 for the minimum package quantity. 最小包裝數量請參閱第 17 頁。

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