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 reserve voltage or AC voltage is applied to the capacitors. Please use non-polarizes capacitors for a circuit that can possibly see reserved polarity.
Note: Even non-polarizes capacitors cannot be used for AC voltage application.

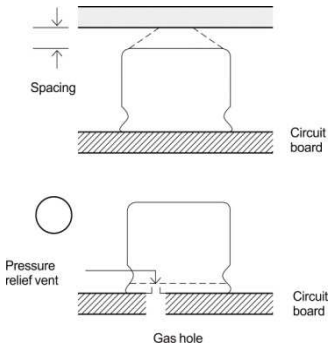
5) For a circuit that rapeats rapid charging/discharging of electricity, an appropriate capacitor that is capable of enduring such a condition must be used. Welding machines and photo flash are a few examples of products that contain such a circuit. For appropriate choice of capacitors for circuit that 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 sleeved 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, 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
Sweet rate:10-55-10Hz per minute
Sweet 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 or P.C. (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.

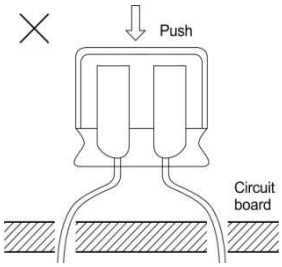
2.Mounting

1) Once a capacitors 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 capacitiors on the floor, nor use a capacitors that was dropped.

6) Be careful not to deform the capacitior during installation.

7) Please confirm that the lead spacing of the capacitior 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 (soldering iron):

① When soldering aluminum electrolytic capacitors with a soldering iron the exposure should be limited to 260℃ for 10 second or 350℃ for 3 seconds.

② At no time should the soldering iron come in contact with the capacitor body. Contact with the body can cause the sleeving to crack or melt.

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

11) Flow soldering(wave solder):

① Aluminum electrolytic capacitors are not to be immersed into the solder bath at anytime. To do so would result in the internal pressure within the capacitor to rise, damaging the capacitor would result.

② Aluminum electrolytic capacitors are only to be mounted to the topside of the circit board.

③ The capacitor should be to a maximum solder bath temperatire of 260℃ for 10 seconds.

④ Preheat temperature should be limited to 125℃ for 30 seconds.

⑤ Please avoid contact between other components and the aluminum electrolytic capacitors. This will prevent heat from these components being transmitted to the capacitors sleeve and damaging the sleeve.

12) Reflow soldering (SMD only):

① Please follow '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 bady 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: lsopropyl 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℃ or lower. After cleaning, capacitors should be 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 halides 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 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 occures, please confirm their adaptation before the use. The condensation of moisture could occure when temperature cycling test/rapid change of tempaerature 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℃ will be emitted when the safety vent operates. if the gas entered your eyes, please flush your eyes immedately 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℃ ~ +35℃
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℃ or higer) capacitors afrer 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) ELCON products meet or exceed quality standards specified by JIS-C-5141 and with the reliability requirements refer to JIS-C-5102.

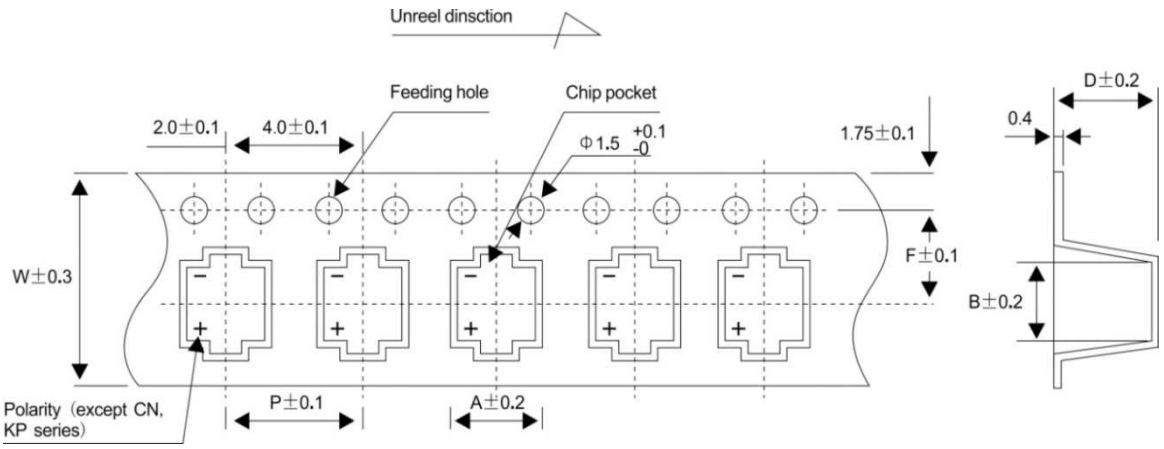
2) None of ozone depleting chemicals (ODC) under the Montreal Protocol is used in our manufacturing process.

TAPING SPECIFICATIONS

□For Chip Type Aluminum Electrolytics Capacitors

■Carrier Tape

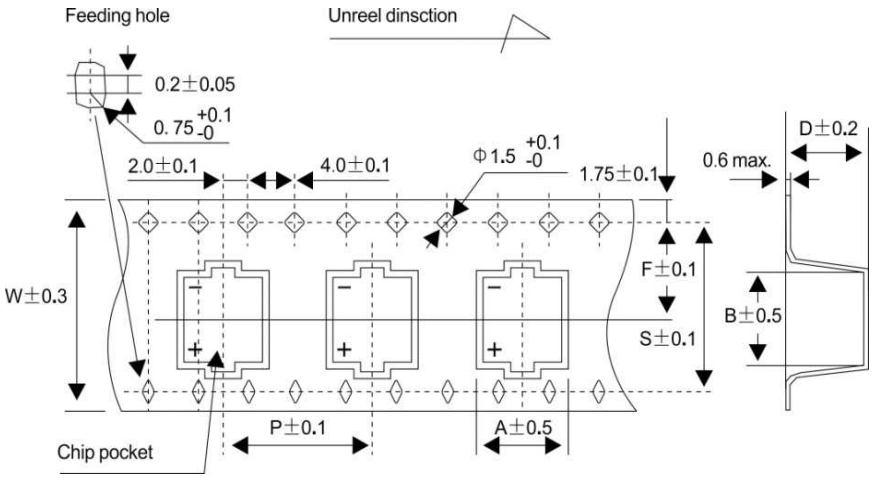
●Φ4~Φ10(mm)



Dimension (Unit:mm)

ΦDxL	4x5.4~5.8	5x5.4~6	6.3x5.4~8	6.3x9	8x9~11	10x8~13.5
W	12.0	12.0	16.0	16.0	24.0	24.0
P	8.0	12.0	12.0	12.0	16.0	16.0
F	5.5	5.5	7.5	7.5	11.5	11.5
A	5.0	6.0	7.0	7.0	8.7	10.7
B	5.0	6.0	7.0	7.0	8.7	10.7
C	5.8/6.3	5.8/6.3	5.8/6.3	8.4	11.0	11.0/14.0

●Φ12.5~Φ12.6(mm)



Dimension (Unit:mm)

ΦDxL	12.5x13.5	12.5x16
W	32	32
P	24	24
F	14.2	14.2
A	14	14
B	14	14
D	14	16.5
S	28.4	28.4

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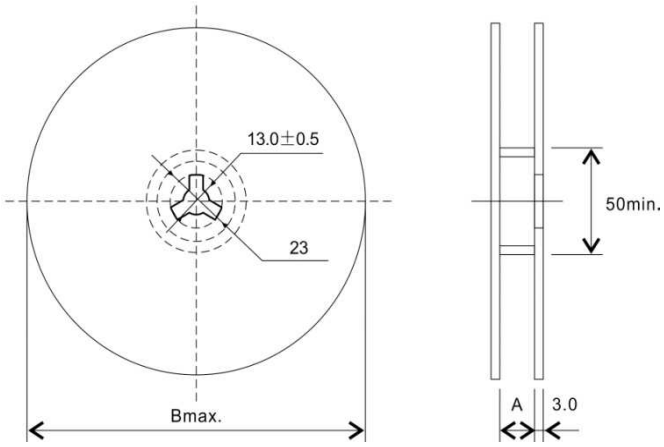
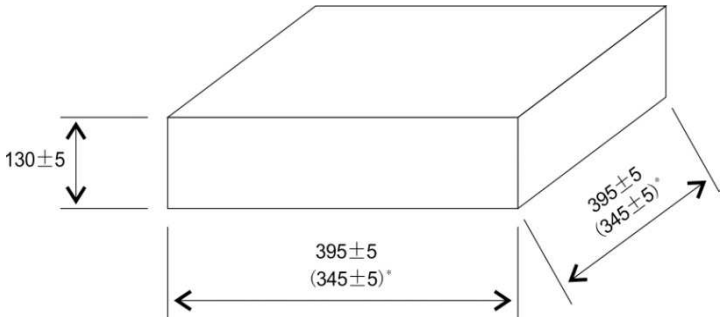
■Reel



(Unit:mm)

ΦDxL	4x5.4~5.8	5x5.4~6	6.3x5.4~9	8x9~11	10x8~10.5	10x12.7~13.5	12.5x13.5~16	16x16.5
A	14	14	18	26	26	26	34	46
B	382	382	382	382	382	382/332*	382/332*	332*

■In-box



■Package Quantity

Size ΦDxL	Reel (pcs)	In-box (reels)	Quantity/In-box (pcs)	3 In-boxse/Carton) (pcs)
4x5.4~5.8	2,000	6	12,000	36,000
5x5.4~6	1,000	6	6,000	18,000
6.3x5.4~9	1,000	5	5,000	15,000
8x9~11	500	4	2,000	6,000
10x10.5	500	4	2,000	6,000
10x12.7~13.5	500	4	2,000	6,000
12.5x13.5	250	3	750	2,250
12.5x16	200/150*	3	600/450*	1800/1350*
16x16.5	125	2	250	750

●**Please order by minimum package quantity.**

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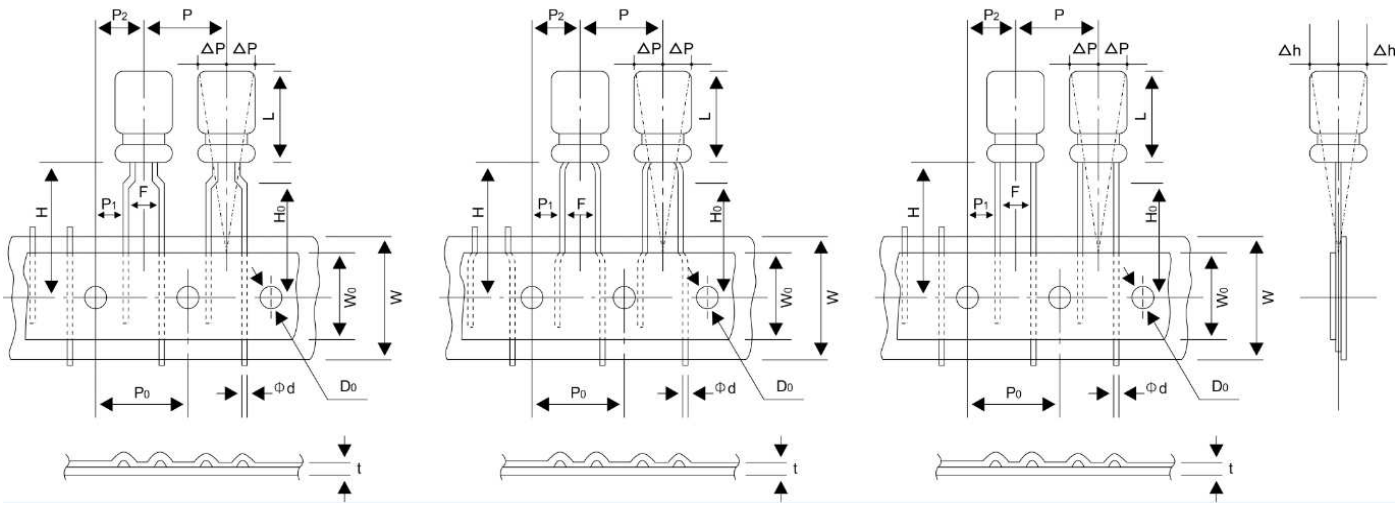
TAPING SPECIFICATIONS

☐lead Taping Capacitors for Automatic Insertion

■Drawing(Unit:mm)

(Drawing A) **(Drawing B)** **(Drawing C)**



■Dimensions(Unit:mm)

Application To Drawing			B				C					A							C		
Descriptions	Symbol	Tolerance	Φ3	Φ4	Φ5		Φ6.3		Φ8			Φ4	Φ5	Φ6.3		Φ8			Φ10	Φ13	Φ16,Φ18
Case Height	L	*Note	5	5,7	5,7	11	5,7	11.5	5	7~14	16,20	5,7	11	5,7	11.5	5	7~14	16,20	20 (max.)	25 (max.)	35,40 (max.)
Lead Wire Diameter	Φd	± 0.05	0.45	0.45	0.45	0.5	0.45	0.5	0.45	0.5	0.6	0.45	0.45	0.45	0.5	0.45	0.5	0.6	0.6	0.6	0.8
Body Pitch	P	± 1.0	12.7				12.7		12.7			12.7				12.7	12.7		12.7	15.0	30.0
Feeding Hole Pitch	P_0	± 0.2	12.7				12.7		12.7			12.7				12.7	12.7		12.7	15.0	15.0
Feeding Hole Center to Lead	P_1	± 0.7	5.1				5.1		5.1			3.85				3.85	3.85		3.85	5.0	3.75
Feeding Hole Alignment	P_2	± 1.0	6.35				6.35		6.35			6.35				6.35	6.35		6.35	7.5	7.5
Lead Center Spacing	F	+0.8 -0.2	2.5				2.5		3.5			5.0				5.0	5.0		5.0	5.0	7.5
Tape Width	W	± 0.5	18.0				18.0		18.0			18.0				18.0	18.0		18.0	18.0	18.0
Adhesive Tape width	W_0	Min.	9.5				9.5		9.5			9.5				9.5	12.5		12.5	12.5	12.5
Length from Seating plane	H	± 0.75	18.0				17.5		18.5			18.5(5,7L=17.5)				17.5	20.0		18.5	18.5	18.5
Lead clinch Height	H_0	± 0.5	17.0				--		--			16.0				16.0	16.0		--	--	--
Feeding Hole Diameter	ϕD_0	± 0.2	4.0				4.0		4.0			4.0				4.0	4.0		4.0	4.0	4.0
Total Tape Thickness	t	± 0.3	0.7				0.7		0.7			0.7				0.7	0.7		0.7	0.7	0.7
Body Inclination	△h	Max.	1.0				1.0		1.0			1.0				1.0	1.0		1.0	1.0	1.0
Body Inclination	△p	Max.	1.0				1.0		1.0			1.0				1.0	1.0		1.0	1.0	1.0
Taping Code			TS				TS		TS			TA				TA	TA		TS	TS	TS

*Please refer to drawing of each series for tolerance

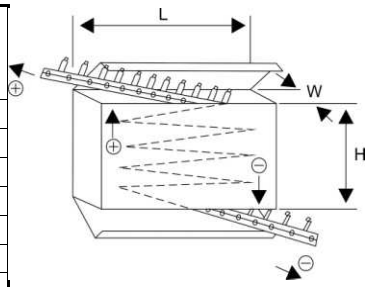
Note: All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistanse before purchanse.

PACKAGING SPECIFICATIONS

■Taping Type(Ammo pack)

☐For Radial Lead Type Aluminum Electrolytic Capacitors

Diameter (mm)	In-box Size			Quantity/In-box (pcs)	Quantity/Carton (pcs)
	L(mm)	H(mm)	W(mm)		
Φ3	337	234	50	2,500*	25,000
Φ4	337	234	50	2,500*	25,000
Φ5	337	234	50	2,000*	20,000
Φ6.3	340	305	53	2,000*	10,000
Φ8	337	234	50	1,000*	10000
Φ8(20L)	337	234	55	1,000*	8,000
Φ10(12L/16L)	337	234	50	500*	5,000
Φ10(20L)	337	234	55	500*	4,000
Φ10(25L)	340	305	65	500*	2,000
Φ13(21L/25L)	340	305	65	500*	2,000
Φ16(25L)	340	320	65	300*	1,200
Φ18(25L)	340	320	65	250*	1,000



■Bulk Type

Case Size (mm)		Vinyl Bag Quantity	Small Box Quantity		Carton Box Quantity		Small Box Size			Carton Box Size		
		pcs/Bag	Vinyl Bag/ Small Box	pcs/ Small Box	Small Box/ Carton Box	pcs/ Carton Box	L (mm)	H (mm)	W (mm)	L (mm)	H (mm)	W (mm)
Radial Lead Type	3x5	1,000*	50	50,000	2	100,000	300	290	220	470	310	310
	4x5,7	1,000*	25	25,000		50,000						
	5x5,7	1,000*	25	25,000		50,000						
	5x11	1,000*	20	20,000		40,000						
	6.3x5	1,000*	25	25,000		50,000						
	6.3x7	1,000*	20	20,000		40,000						
	6.3x11.5	500*	30	15,000		30,000						
	8x5,7,9	500*	20	10,000		20,000						
	8x11.5	500*	20	10,000		20,000						
	8x13~16	250*	30	7,500		15,000						
	8x20	250*	24	6,000		12,000						
	10x12~17	200*	25	5,000		10,000						
	10x20	200*	20	4,000		8,000						
	10x25~30	100*	25	2,500		5,000						
	13x17~20	100*	25	2,500		5,000						
	13x25	100*	20	2,000		4,000						
	13x30	50*	30	1,500		3,000						
	16x20~22	100*	15	1,500		3,000						
	16x25	100*	12	1,200		2,400						
	16x31~35	50*	20	1,000		2,000						
	18x20~25	50*	20	1,000		2,000						
	18x31~40	50*	14	700		1,400						
	22x35~40	25*	10	250	4	1,000	220	145	220			
	25x35~40	25*	8	200		800						
Snap-in Terminal Type	22x20~55	--	--	180*	4	720	340	305	65	355	315	280
	25x20~55	--	--	143*		572						
	30x20~55	--	--	99*		396						
	35x20~55	--	--	72*		288						
	22x60~75	--	--	180*	3	540	340	305	87			
	25x60~75	--	--	143*		429						
	30x60~75	--	--	99*		297						
	35x60~75	--	--	72*		216						

*Minimum package quantity

●There are some difference actual package quantity and above list.Please confirm before you order.

●Please order by minimum package quantity.

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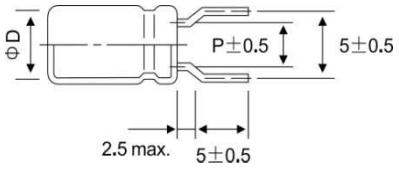
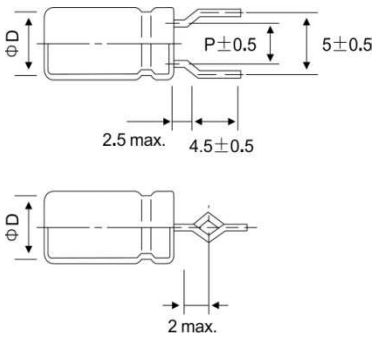
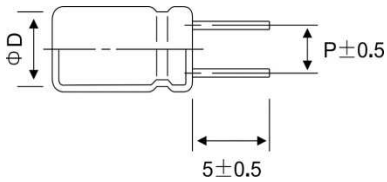
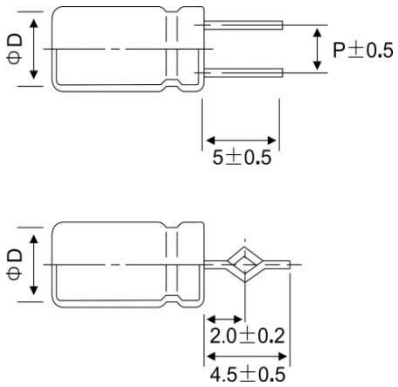
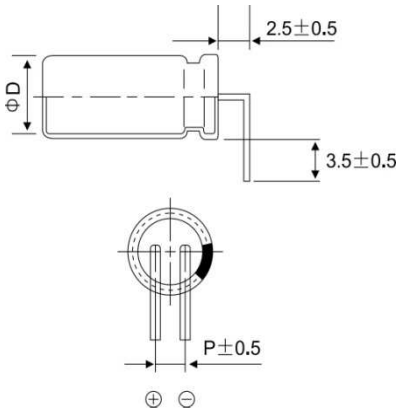
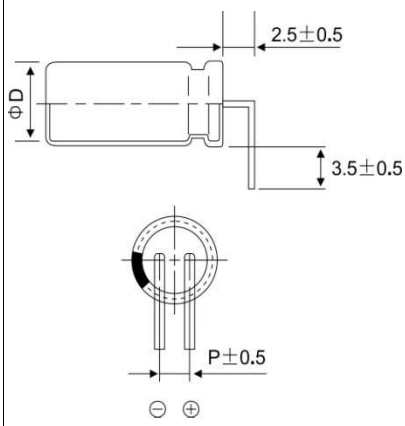
LEAD FORMING&CUTTING

☐For Radial Lead Type Aluminum Electrolytic Capacitors

Configurations	Code	Case Dia.	Shape	Configurations	Code	Case dia.	Shape
Forming Cut (Forming Only)	RF (RM)	Φ5~Φ8		Kinked Forming Cut	RK	Φ5~Φ8	
Cutting	RC	Φ10~ Φ18		Kinked Straight Cut	RY	Φ10~ Φ18	
Cutting& Bending(Left)	RL	Φ4~ Φ6.3		Cutting& Bending(Right)	RR	Φ4~ Φ6.3	

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

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 assistanse before purchanse.