

Precautions and Guidelines for Aluminum Electrolytic Capacitors

1. Guidelines for Circuit Design

Selecting the capacitors to suit installation and operating conditions, and using the capacitors to meet the performance limits prescribed in this catalogue or the product specifications

(1) Polarity

Aluminum electrolytic capacitors are polarized. Make sure of the polarity, if used in reverse polarity, the circuit life may be shortened or the capacitor may be damaged. When the polarity in a circuit sometimes can be reversed or unknown, a bi-polar capacitor shall be used. Also, note that DC capacitors cannot be used for AC application. Reverse voltage 1 voltage acceptable within specified temperature and working voltage.

(2) Operating Voltage

Do not apply DC voltage, which exceeds the rated voltage of the capacitor and not be reverse voltage. If a voltage exceeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increases. Using capacitors at recommended working voltage prolongs capacitor life. The surge voltage rating is the maximum DC over-voltage to which the capacitors may be subjected of short periods.

(3) Ripple Current

- The combined value of DC voltage and the peak AC voltage shall not exceed the rated voltage. When an excessive ripple current passes, the capacitor may be damaged with the vent operating, etc. Use the electrolytic capacitor within the permissible ripple range current at specified frequency and temperature.
- The temperature coefficient shows the limit of ripple current exceeding the rated ripple current that can be applied to the capacitor at the temperature. The expected life of a capacitor is nearly equal to the lifetime at the upper category temperature.

(4) Operating Temperature

Use the capacitors according to the specified operating temperature range. If used the capacitor outside the maximum rated temperature will considerably shorten the life or cause the capacitor to vent. Usage at room ambient will ensure longer life.

(5) Leakage Current

The leakage current shall be within specified levels. When capacitors are applied at a lower voltage, the actual leakage current will be reduced proportionately.

(6) Charge and Discharge

The capacitor is not suitable for a circuit in which charge and discharge are frequently repeated. The capacitance value may drop by forming oxide layer on the cathode foil, or the capacitor may be damaged by generating heat due to continuous rapid charge and discharge.

(7) Condition of Use

- The capacitors shall not be exposed to water, saltwater spray, oil or fumes, high humidity or humidity condensation and direct sunlight.
- Ambient conditions that include hazardous gases/fumes such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or bromine gas, ammonia, etc.
- Exposed to ozone, ultraviolet rays and radiation.
- Severe vibration or physical shock that exceeds the condition in specification sheets.

(8) Consideration to Circuit Design

- Please make sure the application and mounting conditions that the capacitor will be used are within the conditions specified in the catalog. If the conditions are beyond the conditions specified in the catalog, please contact Lelon.
- Do not design a circuit board so that heat-generating components are placed near an aluminum electrolytic capacitor or reverse side of PCB. A cooling system is recommended.
- Operating temperature, applied voltage and ripple current shall be within specification. The ambient temperature shall not exceed the operating temperature and applied ripple current shall not exceed the allowable ripple current specified in the specification.
- Performances of electrical characteristics of aluminum electrolytic capacitors are affected by variation of operating temperature and frequency. Consider this variation

designing the circuit.

- When two or more aluminum capacitors are connected in parallel, consider the current balance that flow through the capacitors.
- If more than two capacitors are connected in series, make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each equally using a balancing resistor in parallel with each capacitor.
- For appropriate choice of capacitors for circuit that repeat rapid charge and discharge, please consult Lelon.
- Outer sleeve of the capacitor is not guaranteed as an electrical insulator. Do not use a standard sleeve on a capacitor that requires the electrical insulation. When the application requires special electrical insulation, please contact Lelon.
- Do not tilt lay down or twist the capacitor's body after the capacitor is soldered to the PCB.

2. Caution for Assembling Capacitors

(1) Mounting

- Aluminum electrolytic capacitors cannot be re-used once the capacitor has assembled in the set and power applied.
- Aluminum electrolytic capacitors may have electrical potential between positive and negative terminal, please discharge through a 1kΩ resistor before use.
- Leakage current of Aluminum electrolytic capacitors may be increased after storage a long period of time. When leakage current has increased, please perform a voltage treatment before use.

Voltage treatment:

The capacitors shall be applied with DC rated voltage through a resistor of 1kΩ in series for one hour, and then discharge through a resistor of 1kΩ. When the capacitors have been assembled in the board, use a volt regulator to input voltage gradually to the rated voltage of the board.

- Please confirm the rated voltage before mounting.
- Please confirm the polarity before mounting.
- Do not use the capacitor that once dropped on the hard floor.
- Do not damage the capacitor while mounting.
- Capacitors shall be mounted that hold spacing on PCB matches the lead pitch of the capacitors.
- During the auto-insertion process and parts inspection, capacitors shall avoid the excessive force and shock.
- Do not design to locate any wiring or circuit around the capacitor's pressure relief vent. The following clearance should be made above the pressure relief vent. The pressure relief vent will not open without the appropriate free space.

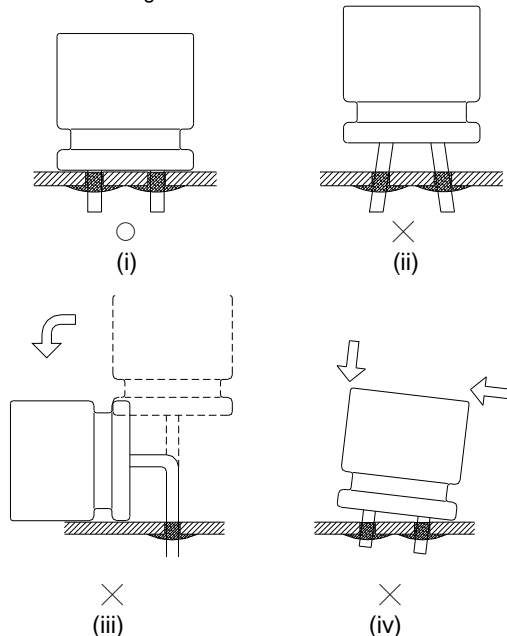
Case Diameter	φ 6.3 ~ φ 16	φ 18 ~ φ 35	φ 40 or more
Clearance (min)	2 mm	3 mm	5 mm

(2) Soldering

- Be careful of temperature and time when soldering. Dip of flow soldering of the capacitors should be limited at less than 260±5℃ for 10±1 seconds or soldering iron with 350±10℃ for 3+1/-0 seconds. Do not dip capacitor's body into melted solder.
- High humidity will affect the solder ability of lead wire and terminals. High temperature will reduce long-term operating life.
- Except SMD type, reflow soldering can not be used for any types of aluminum electrolytic capacitors.** When using SMD type capacitor, please check the reflow profile. The temperature and duration shall not exceed the specified temperature and duration in the specification. If the temperature or duration is higher than the value specified, please consult Lelon before usage.
- Standard aluminum electrolytic capacitors cannot withstand more than one reflow process. Please consult our engineering department when needed.

(Continued on next page)

- (e) Defective mounting on PCB and improper external strength applied on the lead wires or case body after soldering (see below drawings) may damage inside structure of the capacitor and may cause short circuit, high leakage current or leakage problems.
- (i) Good soldering
 - (ii) Hole-to-hole space on board differs from the lead space of lead wires.
 - (iii) Lead wires are bent after soldering.
 - (iv) Case body doesn't stand vertical on board after soldering. Do not bend or twist the capacitor's body after soldering.



(3) Cleaning Circuit Boards after Soldering

Halogenated solvent cleaning is not available for aluminum electrolytic capacitors. IPA (Isopropyl Alcohol) is one of the

most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt. %. If you use other cleaning agents, please consult Lelon.

3. Maintenance Inspection

Periodical inspection is necessary for using the aluminum capacitors with industrial equipment. The following items should be checked:

- (1) Appearance: Vent operation, leaking electrolyte, etc.
 - (2) Electrical characteristic: Capacitance, dissipation factor, leakage current, and other specified items listed in specification.
- Lelon recommend replacing the capacitors if the parts are out of specifications.

4. Storage

- (1) Aluminum electrolytic capacitor should not be stored in high temperature or high humidity condition. The suitable condition is 5°C ~ 35°C and less than 75% in relative humidity indoor.
- (2) Do not store the capacitors in damp conditions such as water, brine or oil.
- (3) Do not store the capacitors that exposed to hazardous gas such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc.
- (4) Do not store the capacitors that exposed to ozone, ultraviolet rays or radiation.
- (5) Do not expose the capacitors to acidic or alkaline solutions.
- (6) It is not applied to a regulation of JEDEC J-STD-020(Rev. C).

5. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

6. Environmental Consideration

Lelon already have received ISO 14000 certificate. Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr+6), PBB and PBDE have never been used in capacitor. If you need "Halogen-free" products, please consult with us.

For further details, please refer to

IEC 60384-4 - Fixed capacitors for use in electronic equipment – Part 4: Sectional specification – Aluminium electrolytic capacitors with solid (MnO₂) and non-solid electrolyte (Established in January 1995, Revised in March 2007), and

EIAJ RCR-2367B - Guideline of notabilia for fixed aluminium electrolytic capacitors for use in electronic equipment [(Technical Standardization Committee on Passive Components (Established in March 1995, Revised in March 2002)]

Precautions and Guidelines for Organic Conductive Polymer Aluminum Capacitors

Organic conductive polymer capacitor (OP-CAP) is specially structured solid aluminum electrolytic capacitor that uses highly conductive polymer electrolytic material.

Please read the following contents in order to get most performance and stable quality by using OP-CAP series products.

1. Guidelines for Circuit design

(1) Polarity

OP-CAP is a solid aluminum electrolytic capacitor with positive and negative electrodes. Make sure of the polarity. If it is used in reverse polarity, leakage current will increase and life span may decrease.

(2) Operating Voltage

Do not apply DC voltage, which exceeds the rated voltage of the capacitor and shall not be reverse voltage. If a voltage exceeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increase. Using capacitors at recommended working voltage prolongs capacitor life. The surge voltage rating is the maximum DC over-voltage to which the capacitors may be subjected of short periods.

(3) Ripple Current

The combined value of DC voltage and the peak AC voltage shall not exceed the rated voltage. The superimposition of a large ripple current increases the rate of heating within the capacitor. This may reduce the service life of the capacitor or damage the capacitor.

(4) Operating Temperature

Use the electrolytic capacitors according to the specified operating temperature range. Usage at room ambient will ensure longer life.

(5) Leakage Current

The initial leakage current shall be within specified levels. Note that the leakage current may increase due to thermal stresses that occur during soldering, etc. Note that increased currents gradually decrease when voltage is applied.

(6) Charge and Discharge

Do not use OP-CAP in circuits where the capacitor is repetitively charged and discharged rapidly. Repetitively charging and discharging rapidly may reduce the capacitance or cause damage due to internal heating. Therefore, protection circuits are recommended to design when rush currents exceed 10A.

(7) Condition of Use

OP-CAP shall not be used / exposed to the following conditions:

- (a) Water, saltwater spray, oil or fumes, high humidity or humidity condensation.
- (b) Ambient conditions that include hazardous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or bromine gas, ammonia, etc.
- (c) Ozone, ultraviolet rays and radiation.
- (d) Severe vibration or physical shock that exceeds the condition in specification sheets.

(8) Consideration to Circuit Design

- (a) Please make sure the application and mounting conditions that the capacitor will be used are within the conditions specified in the catalog. If the conditions are beyond the conditions specified in the catalog, please contact Lelon.
- (b) Do not design a circuit board so that heat-generating components are placed near OP-CAP or reverse side of PCB. A cooling system is recommended.
- (c) Operating temperature, applied voltage and ripple current shall be within specification. The ambient temperature shall not exceed the operating temperature and applied ripple current shall not exceed the allowable ripple current specified in the specification.
- (d) Performances of electrical characteristics of OP-CAP are affected by variation of operating temperature and frequency. Consider this variation designing the circuit.
- (e) When two or more capacitors are connected in parallel, consider the current balance that flow through the capacitors.
- (f) If more than two capacitors are connected in series, make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each equally using a balancing resistor in parallel with each capacitor.

- (g) For appropriate choice of capacitors for circuit that repeat rapid charge and discharge, please consult Lelon.
- (h) Outer sleeve of the capacitor is not guaranteed as an electrical insulator. Do not use a standard sleeve on a capacitor that requires the electrical insulation. When the application requires special electrical insulation, please contact Lelon.
- (i) Do not lie down or twist the capacitor's body after the capacitor is soldered to the PCB.

2. Caution for Assembling Capacitors

(1) Mounting

- (a) OP-CAP cannot be re-used once the capacitor has assembled in the set and power applied.
- (b) OP-CAP may have electrical potential between positive and negative terminal, please discharge through a 1K Ω resistor before use.
Leakage current of OP-CAP may be increased after storage a long period of time. In this case, we recommend that the OP-CAP shall be applied with DC rated voltage through a resistor of 1K Ω in series for 1 hour at 60°C ~70°C, and then discharge through a resistor of 1K Ω . When the capacitors have been assembled in the board, use a volt regulator to input voltage gradually to the rated volt of the board.
- (c) Please confirm the rated voltage before mounting.
- (d) Please confirm the polarity before mounting.
- (e) Do not use the OP-CAP that once dropped on the hard floor.
- (f) Do not damage the OP-CAP while mounting.
- (g) OP-CAP shall be mounted that hold spacing on PCB matches the lead pitch of the capacitors.
- (h) During the auto-insertion process and parts inspection, capacitors shall avoid the excessive force and shock.
- (i) Do not apply excessive external force to the lead terminal and the OP-CAP itself.

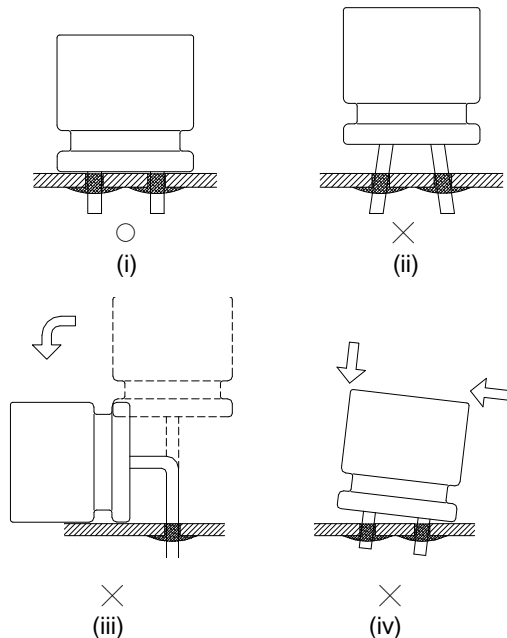
(2) Soldering

- (a) Be careful of temperature and time when soldering. Dip of flow soldering of the capacitors should be limited at less than 260°C and 10 seconds. Do not dip OP-CAP capacitor's body into melted solder.
- (b) High humidity will affect the solder ability of lead wire and terminals. High temperature will reduce long-term operating life.
- (c) **Except SMD type, reflow soldering can not be used for any types of organic conductive polymer aluminum electrolytic capacitors.** When using SMD type of OP-CAP, please check the reflow profile. The temperature and duration shall not exceed the specified temperature and duration in the specification. If the temperature or duration is higher than the value specified, please consult Lelon before usage.

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(d) Defective mounting on PCB and improper external strength applied on the lead wires or case body after soldering (see below drawings) may damage inside structure of the capacitor and may cause short circuit, high leakage current or leakage problems.

- (i) Good soldering
- (ii) Hole-to-hole space on board differs from the lead space of lead wires.
- (iii) Lead wires are bent after soldering.
- (iv) Case body doesn't stand vertical on board after soldering. Do not bend or twist the capacitor's body after soldering.



(3) Cleaning Circuit Boards After Soldering

Halogenated solvent cleaning is not available for OP-CAP. IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt. %. If you use other cleaning agents, please consult Lelon.

3. Maintenance Inspection

Periodical inspection is necessary for using OP-CAP with industrial equipment. The following items should be checked:

- (1) Appearance: bulge, damage, etc.
- (2) Electrical characteristic: Capacitance, dissipation factor, leakage current, and other specified items listed in specification.

Lelon recommend replacing the capacitors if the parts are out of specifications.

4. Storage

- (1) OP-CAP should not be stored in high temperature or high humidity condition. The suitable condition is 5°C ~ 35°C and less than 75% in relative humidity indoor.
- (2) Do not store OP-CAP in damp conditions such as water, brine or oil.
- (3) Do not store OP-CAP that exposed to hazardous gas such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc.
- (4) Do not store OP-CAP that exposed to ozone, ultraviolet rays or radiation.
- (5) Do not expose OP-CAP to acidic or alkaline solutions.
- (6) Open the bags just before mounting and use up all products once opened. For keeping a good solderability, store the OP-CAP as follows:

Series name	Before unseal	After unseal
OCV, OCVZ, OCVU, OVH, OVK	Within 1 year after delivery (Unopened condition)	Within 30 days from opening package
OCR, OCRZ, OCRK, OCRU, ORE	Within 1 year after delivery (Unopened condition)	Within 7 days from opening package

※ It is not applied to a regulation of JEDEC J-STD-020 (Rev. C).

5. Estimation of life time

$$L_r = L_0 \times 10^{\frac{T_0 - T_r}{20}}$$

L_r: Estimated lifetime (hrs)

L₀: Base lifetime specified at maximum operating temperature with applied the DC voltage

T₀: Rated maximum operating temperature (°C)

T_r: Actual ambient temperature (°C)

OP-CAP	Aluminum Electrolytic Capacitors
105°C ≥ 2,000 Hours	105°C ≥ 2,000 Hours
95°C ≥ 6,324 Hours	95°C ≥ 4,000 Hours
85°C ≥ 20,000 Hours	85°C ≥ 8,000 Hours
75°C ≥ 63,245 Hours	75°C ≥ 16,000 Hours

Please note that

- (1) Maximum life is 15 years
- (2) Ripple current in application should be less than or equal to ripple current specified in catalogue

6. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

7. Environmental Consideration

Lelon already have received ISO 14000 certificate. Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr+6), PBB and PBDE have never been used in capacitor. If you need "Halogen-free" products, please consult with us.

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EIAJ RCR-2367B - Guideline of notabilia for fixed aluminium electrolytic capacitors for use in electronic equipment [(Technical Standardization Committee on Passive Components (Established in March 1995, Revised in March 2002))]

Taping Specifications for SMD Type

1. Carrier Tape

Fig. 1-1

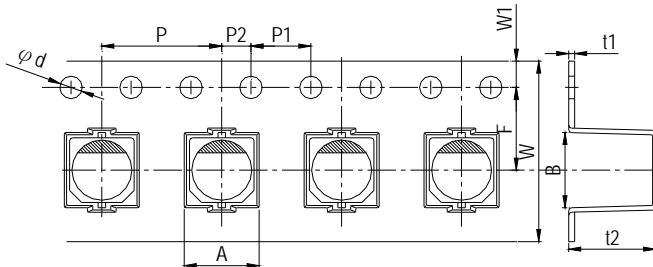


Fig. 1-2

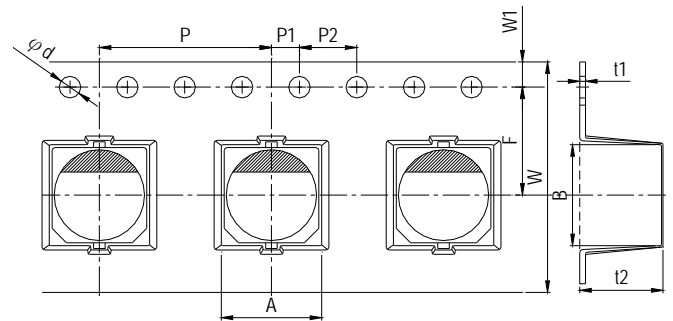
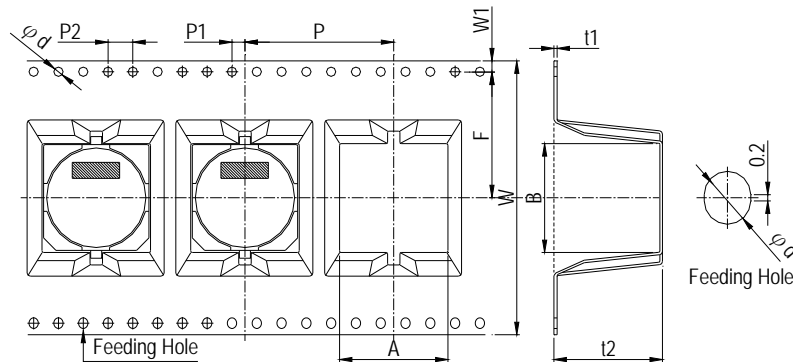


Fig. 1-3



Unit: mm

$\phi D \times L$	A	B	ϕd	F	P	P1	P2	t1	t2	W	W1	Fig. No.
3 × 4 × 4.5 ~ 5.3	5.0	5.0	1.5	5.5	8	2.0	4.0	0.4	5.8	12.0	1.75	1-1
4 × 5.7	5.0	5.0		5.5	8				6.2			
5 × 4.5 ~ 5.3	6.0	6.0		5.5	12				5.8			
5 × 5.7(*)	6.0	6.0		5.5	12				6.2			
6.3 × 4.5 ~ 5.3	7.0	7.0		7.5	12				5.8	16.0		1-2
6.3 × 5.7									6.2			
6.3 × 5.9*									6.2			
6.3 × 7.0*									6.8			
6.3 × 7.7	8.7	8.7		11.5	16				8.3	24.0		
8 × 6.5									6.8			
8 × 6.7*									6.8			
8 × 10									11.0			
8 × 12*	10.7	10.7							13.0	32.0		1-3
10 × 7.7*									10.0			
10 × 10 (9.9*)									11.0			
10 × 12.7*									14.0			
12.5 × 13.5	13.4	13.4		14.2	24			0.5	15.0	32.0		
12.5 × 13.5(G)	13.7	13.7		14.2	24				15.0	32.0		
12.5 × 16	13.4	13.4		14.2	24				17.5	32.0		
12.5 × 16(G)	13.7	13.7		14.2	24				17.5	44.0		
16 × 16.5	17.5	17.5		20.2	28				17.5	44.0		
16 × 16.5(G)	17.5	17.5		20.2	28				17.5	44.0		
16 × 21.5	17.5	17.5		20.2	28				22.5	44.0		
18 × 16.5	19.5	19.5		20.2	32				17.5	44.0		
18 × 21.5	19.5	19.5		20.2	32				22.5	44.0		
Tolerance	±0.2	±0.2	+0.1 / -0	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.3	±0.15	

Note: Case size in mark of "*" are for OP-CAP; case size in mark of "(G)" are for "Anti-vibration".

Taping Specifications for SMD Type

2. Reel Package

Fig. 2-1

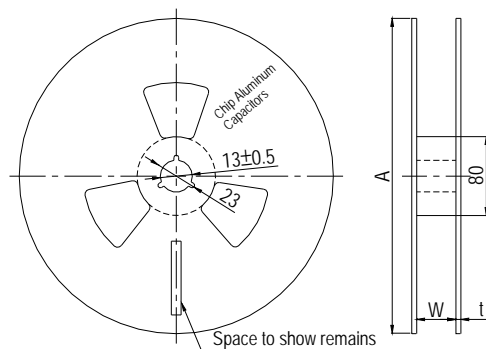
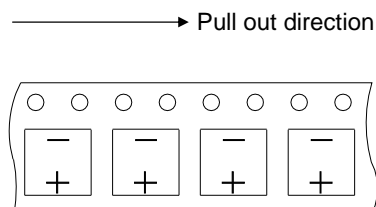


Fig. 2-2

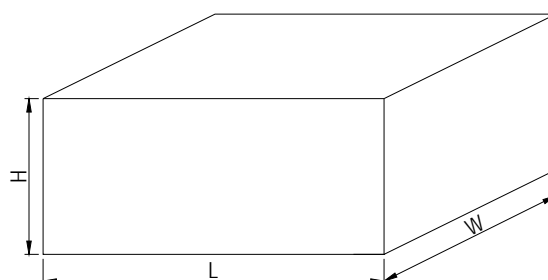


Unit: mm

Case size	3 ~ 4 ϕ	5 ϕ	6.3 ϕ	8 ϕ × 6.5 ~ 7.0L	8 ϕ × 10 ~ 12L	10 ϕ	12.5 ϕ	16 ~ 18 ϕ
W	14	14	18	18	26	26	34	46
A	380	380	380	380	380	380	380 / 450	380 / 450
t	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0

3. Packing Specifications

Fig. 3-1 Carrier tape

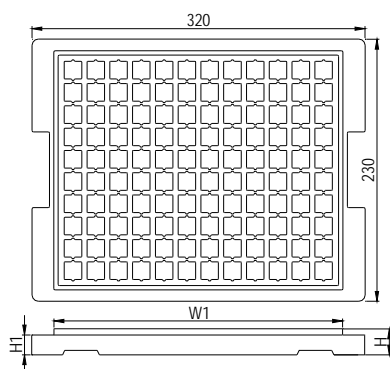


Unit: mm

Case size	3 ~ 4 ϕ	5 ϕ	6.3 ϕ	8 ϕ × 6.5L	8 ϕ × 10L	10 ϕ	12.5 ϕ	16 ~ 18 ϕ
H	180	220	220	220	310	310	315	390
W, L	385	385	385	385	385	385	385 / 455*	385 / 455*

* *: Suitable for reel packing is 450 mm

Fig. 3-2 Chip Tray



Dimension and package quantity

Unit: mm

Case size	W1	H	H1	Q'ty / Tray	Q'ty / Box
12.5 ϕ × 13.5L	284	21	18.5	120	600
12.5 ϕ × 16L	284	21	18.5	120	600
16 ϕ × 16.5L	284	28	24.0	80	400
16 ϕ × 21.5L	284	28	24.0	80	400
18 ϕ × 16.5L	284	28	24.0	60	300
18 ϕ × 21.5L	284	28	24.0	60	300

Part Numbering System (Radial Type)

Product Code Guide

REA series	10μF	±20%	50V	Lead Forming Tape	Gas Type	5 φ × 11L	Pb-free Wire + PET Sleeve	
REA	100	M	1H	TA	-	0511		
□ □ □	□ □ □	□	□ □	□ □	□	□ □ □ □	□	⑨
①	②	③	④	⑤	⑥	⑦	⑧	
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration & Package	Rubber Type	Case Size	Lead Wire and Sleeve Type	Supplement Code

① Series:

Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank. When the series name has 4 letters, use the following series codes. OCRZ→ORZ; OCRK→ORK; OCRU→ORU

② Capacitance:

Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. "R" represents the decimal point for capacitance under 10μF.

Example:

Capacitance	0.1	0.47	1	4.7	10	47	100	470	1,000	4,700	10,000
Part number	0R1	R47	010	4R7	100	470	101	471	102	472	103

③ Tolerance:

J = -5% ~ +5%	K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%
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④ Rated voltage:

Rated voltage in volts (V) is represented by a two-digit code.

Voltage (WV)	2.5	4	6.3	10	16	20	25	35	40	50	63	80	100
Code	0E	0G	0J	1A	1C	1D	1E	1V	1G	1H	1J	1K	2A
Voltage (WV)	160	200	220	250	330	350	400	420	450	500	525		
Code	2C	2D	2U	2E	2M	2V	2G	2P	2W	2H	2Y		

⑤ Lead configuration and package (Please refer to page 17 ~ 19):

BK = Bulk Package	TA = Formed Lead Taping
FC = Formed & Cut Lead	SA = Straight Lead Taping
CC = Cut Lead	SD = Bent Cathode Lead
SF = Snap-in & Formed Cut Lead	BC = Bent & Cut Lead (Leads in Right Direction)
SC = Snap-in & Cut Lead	BU = Bent & Cut Lead (Leads in Left Direction)

⑥ Rubber type:

- = Gas escape type	F = Flat rubber bung
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Note 1: For case sizes of 3 φ × 5L, 12.5 φ × 16L, 16 φ × 16L, 16 φ × 20L, 18 φ × 16L, 18 φ × 20L, 18 φ × 25L of aluminum e-caps and 6.3 φ × 6 ~ 8L and 8 φ × 8L in OCRZ, ORE, OCRK series of OP-CAP, flat rubber bung is the standard design.

⑦ Case size:

The first two digits indicate case diameter and the last two digits indicate case length in mm.

φ D × L	3 × 5	4 × 5	4 × 7	5 × 5	5 × 7	5 × 11	6.3 × 5	6.3 × 5.5	6.3 × 6.5	6.3 × 7	6.3 × 8
Code	0305	0405	0407	0505	0507	0511	0605	0605*	0606*	0607	0608*
φ D × L	6.3 × 11	6.3 × 15	8 × 5	8 × 7	8 × 8	8 × 9	8 × 10	8 × 11.5	8 × 12	8 × 15	8 × 20
Code	0611	0615	0805	0807	0808*	0809	0810*	0811	0812*	0815	0820
φ D × L	10 × 9	10 × 10	10 × 12.5	10 × 16	10 × 20	10 × 25	10 × 30	10 × 35	10 × 40	10 × 45	10 × 50
Code	1009	1010*	1012	1016	1020	1025	1030	1035	1040	1045	1050
φ D × L	12.5 × 16	12.5 × 20	12.5 × 25	12.5 × 30	12.5 × 35	12.5 × 40	12.5 × 45	12.5 × 50	16 × 16	16 × 20	16 × 25
Code	1316	1320	1325	1330	1335	1340	1345	1350	1616	1620	1625
φ D × L	16 × 31.5	16 × 35.5	16 × 40	16 × 45	16 × 50	18 × 16	18 × 20	18 × 25	18 × 31.5	18 × 35.5	18 × 40
Code	1632	1636	1640	1645	1650	1816	1820	1825	1832	1836	1840
φ D × L	18 × 45	18 × 50	20 × 40	20 × 45	20 × 50	22 × 40	22 × 45	22 × 50	25 × 40		
Code	1845	1850	2040	2045	2050	2240	2245	2250	2540		

Note 1: Size codes with a mark of "*" are for OP-CAP.

Note 2: When a case size is required and not shown in the table, please contact with us for further discussion.



Part Numbering System

⑧ Lead wire and sleeve type:

None = Standard design Pb-free wire + PET sleeve (aluminum e-cap) Pb-free wire + Coating case (OP-CAP)	T = Sn-Pb wire + PET sleeve
B = Sn-Bi wire + PET sleeve	G = Pb-free wire + Black PET sleeve (for RGA series only)
K / L = Automotive control code	

* When a supplement code following a blank digit code of lead wire and sleeve type (standard design), use a hyphen, “ - ”, to fill the blank digit.

* When automotive control code is required, please contact with us for further discussion.

⑨ Supplement code (Optional):

For special control purposes.

Part Numbering System (SMD Type)

Product code guide

VE series	10 μ F	\pm 20%	16V	Carrier Tape		4 ϕ \times 5.3L	Pb-free and PET coating case	
VE-	100	M	1C	TR	-	0405		
<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case size	Lead Wire and Coating Type	Supplement Code

① Series:

Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank. When the series name has 4 letters, use the following series codes. OCVZ→OVZ; OCVU→OVU

② ~ ④: Please refer to Part Numbering System (Radial Type)

⑤ Package:

TR	Reel package with reel diameter 380 mm
TM	Reel package with reel diameter 450 mm
T-	Tray package for case diameter 12.5 ~ 18mm

⑥ Terminal:

-	No dummy terminal
A	For automotive application (10G)
G	For super high G shock application (50G)

⑦ Case size:

The first two digits indicate case diameter and the last two digits indicate case length in mm.

ϕ D \times L	3 \times 5.3	4 \times 4.5	4 \times 5.3	4 \times 5.7	5 \times 4.5	5 \times 5.3	5 \times 5.7	5 \times 5.9	6.3 \times 4.5	6.3 \times 5.3
Code	0305	0404	0405	0406	0504	0505	0506	0506*	0604	0605
ϕ D \times L	6.3 \times 5.7	6.3 \times 5.9	6.3 \times 7.0	6.3 \times 7.7	8 \times 6.5	8 \times 6.7	8 \times 10	8 \times 12	10 \times 7.7	10 \times 10(9.9)
Code	0606	0606*	0607*	0607 0608*	0806	0807*	0810	0812*	1008	1010
ϕ D \times L	10 \times 12.7	12.5 \times 13.5	12.5 \times 16	16 \times 16.5	16 \times 21.5	18 \times 16.5	18 \times 21.5			
Code	1013*	1313	1316	1616	1621	1816	1821			

Note 1: Size codes with a mark of "*" are used for OP-CAP only.

Note 2: When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ Lead wire and case coating type:

None = Pb free wire + PET coated case (Standard design)	E = Sn-Bi wire + PET coated case
B = Sn-Bi wire + coating case	K / L = Automotive control code

* When a supplement code following a blank digit code of lead wire and case coating type (standard design), use a hyphen, "-", to fill the blank digit.

* When automotive control code is required, please contact with us for further discussion.

⑨ Supplement code (Optional):

For special control purpose



Part Numbering System (Snap-in Type)

Product Code Guide

LS Series	100μF	±20%	400V	3-pin Terminal	Terminal Length 4.0mm	22 φ ×30L	Pb-free Terminal + PET Sleeve	
LS-	101	M	2G	L3	A	2230		
□□□	□□□	□	□□	□□	□	□□□□	□	□□□□
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Terminal Type	Terminal Length	Case Size	Terminal and Sleeve Type	Supplement Code

① ~ ④: Please Refer to **Part Numbering System (Radial Type)**

⑤ Terminal type (Refer to page 20):

Terminal type(pins)	2 (Standard)	3	4	5	Vibration-resistant	Horizontal Mounting
Terminal code	--	L3 S3	L4	L5	T2	H2 G2

⑥ Terminal length:

Terminal length(mm)	4.0	6.3
Terminal code	A	-

⑦ Case Size:

The first two digits indicate case diameter in mm. The last two digits indicate case length in mm.

φ D×L	20×25	20×30	20×35	20×40	20×45	20×50	22×25	22×30	22×35	22×40	22×45
Code	2025	2030	2035	2040	2045	2050	2225	2230	2235	2240	2245
φ D×L	22×50	25×25	25×30	25×35	25×40	25×45	25×50	30×25	30×30	30×35	30×40
Code	2250	2525	2530	2535	2540	2545	2550	3025	3030	3035	3040
φ D×L	30×45	30×50	35×25	35×30	35×35	35×40	35×45	35×50	35×60	35×70	35×80
Code	3045	3050	3525	3530	3535	3540	3545	3550	3560	3570	3580
φ D×L	35×90	35×100	40×40	40×45	40×50	40×60	40×70	40×80	40×90	40×100	
Code	3590	35A0	4040	4045	4050	4060	4070	4080	4090	40A0	

Note: When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ Terminal and sleeve type

None = Pb free terminal + PET sleeve (Standard design)
R = Pb free terminal + PET sleeve + Rilled
N = Pb free terminal + PET sleeve + No bottom insulation
L = Pb free terminal + PET sleeve + No bottom insulation +Rilled

* When a supplement code following a blank digit code of terminal and sleeve type (standard design), use a hyphen, " - ", to fill the blank digit.

* When the bottom insulation plate is not required or a rilled construction is necessary, please consult Lelon.

⑨ Supplement code (Optional):

For special control purposes

Part Numbering System (Screw Type)

Product Code Guide

MEA series	3300µF	±20%	400V	Rills +Stud Bottom Case	M5 Post	64 φ ×115L	Pb-free Terminal + PVC Sleeve	
MEA	332	M	2G	H	:	C115		
□□□	□□□	□	□□	□	□	□□□□	□	□
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Case Type	Terminal Type	Case Size	Terminal and Sleeve Type	Supplement Code

① ~ ④: Please refer to **Part Numbering System (Radial Type)**

⑤ Case type:

- = Plain Case + Mounting clamp	N = Rilled Case + Mounting clamp
X = Plain Case	R = Rilled Case
S = Plain + Stud Bottom Case	H = Rilled + Stud Bottom Case
I = Plain Case + Mounting clamp (2 footed mounting clamp)	

⑥ Terminal type:

Terminal Type	Post Diameter (mm)	Height (±1 mm)	For Case Diameters	Code
M5 Post, Small	8	6.5	35	A
M5 Post	10	6.5	51 ~ 90	-
M5 Post, High Current	17.4	6.5	77 ~ 90	C
M6 Post, High Current	17.4	6.5	77 ~ 90	D

⑦ Case size:

The first one digit indicates case diameter and the last three digits indicate case length in mm.

φ D×L	35×53	35×65	35×75	35×83	35×100	35×121	51×75	51×83	51×96	51×100	51×115
Code	A053	A065	A075	A083	A100	A121	B075	B083	B096	B100	B115
φ D×L	51×121	51×130	64×96	64×100	64×115	64×121	64×130	64×144	77×96	77×115	77×121
Code	B121	B130	C096	C100	C115	C121	C130	C144	D096	D115	D121
φ D×L	77×130	77×144	77×155	90×130	90×157	90×196	90×236				
Code	D130	D144	D155	E130	E157	E196	E236				

Note: When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ Terminal and sleeve type

None = Pb-free terminal + PVC sleeve (Standard design)

* When a supplement code following a blank digit code of terminal and sleeve type (standard design), use a hyphen, “ - ”, to fill the blank digit.

⑨ Supplement code (Optional):

For special control purposes

Taping Specifications for SMD Type

1. Carrier Tape

Fig. 1-1

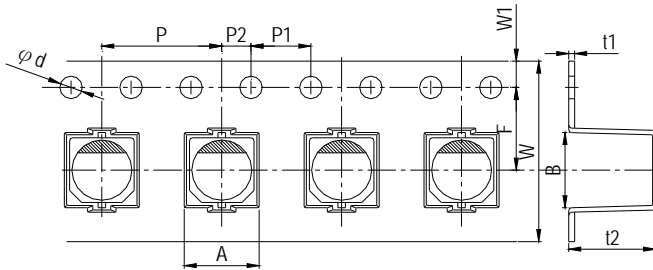


Fig. 1-2

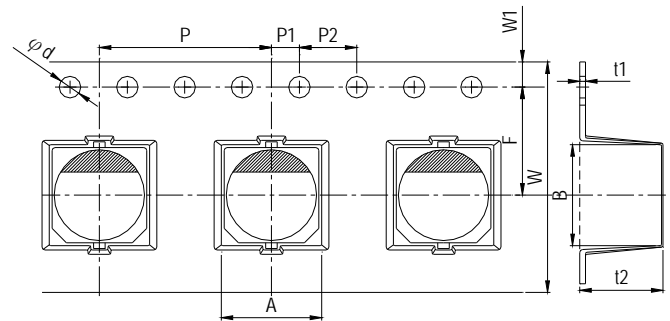
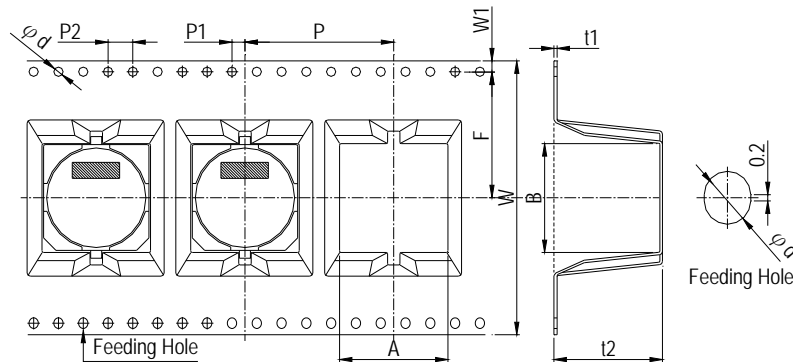


Fig. 1-3



Unit: mm

$\phi D \times L$	A	B	ϕd	F	P	P1	P2	t1	t2	W	W1	Fig. No.
3 ~ 4 × 4.5 ~ 5.3	5.0	5.0	1.5	5.5	8	2.0	4.0	0.4	5.8	12.0	1.75	1-1
4 × 5.7	5.0	5.0		5.5	8				6.2			
5 × 4.5 ~ 5.3	6.0	6.0		5.5	12				5.8			
5 × 5.7(*)	6.0	6.0		5.5	12				6.2			
6.3 × 4.5 ~ 5.3	7.0	7.0		7.5	12				5.8	16.0		1-2
6.3 × 5.7									6.2			
6.3 × 5.9*									6.2			
6.3 × 7.0*									6.8			
6.3 × 7.7	8.7	8.7		11.5	16				8.3	24.0		
8 × 6.5									6.8			
8 × 6.7*									6.8			
8 × 10									11.0			
8 × 12*	10.7	10.7							13.0	32.0		1-3
10 × 7.7*									10.0			
10 × 10 (9.9*)									11.0			
10 × 12.7*									14.0			
12.5 × 13.5	13.4	13.4		14.2	24			0.5	15.0	32.0		
12.5 × 13.5(G)	13.7	13.7		14.2	24				15.0	32.0		
12.5 × 16	13.4	13.4		14.2	24				17.5	32.0		
12.5 × 16(G)	13.7	13.7		14.2	24				17.5	44.0		
16 × 16.5	17.5	17.5		20.2	28				17.5	44.0		
16 × 16.5(G)	17.5	17.5		20.2	28				17.5	44.0		
16 × 21.5	17.5	17.5		20.2	28				22.5	44.0		
18 × 16.5	19.5	19.5		20.2	32				17.5	44.0		
18 × 21.5	19.5	19.5		20.2	32				22.5	44.0		
Tolerance	±0.2	±0.2	+0.1 / -0	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.3	±0.15	

Note: Case size in mark of "*" are for OP-CAP; case size in mark of "(G)" are for "Anti-vibration".

Taping Specifications for SMD Type

2. Reel Package

Fig. 2-1

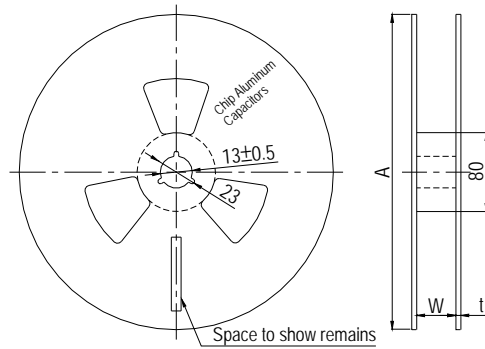
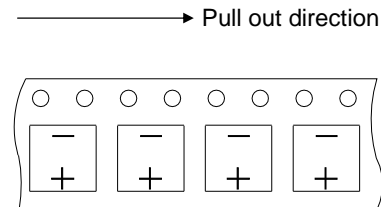


Fig. 2-2

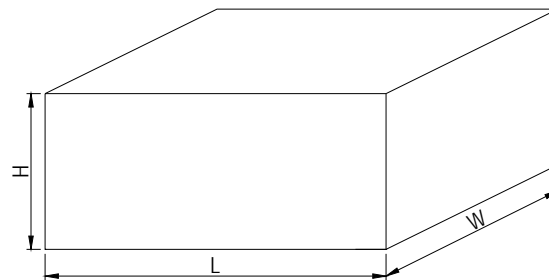


Unit: mm

Case size	3 ~ 4 ϕ	5 ϕ	6.3 ϕ	8 ϕ × 6.5 ~ 7.0L	8 ϕ × 10 ~ 12L	10 ϕ	12.5 ϕ	16 ~ 18 ϕ
W	14	14	18	18	26	26	34	46
A	380	380	380	380	380	380	380 / 450	380 / 450
t	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0

3. Packing Specifications

Fig. 3-1 Carrier tape

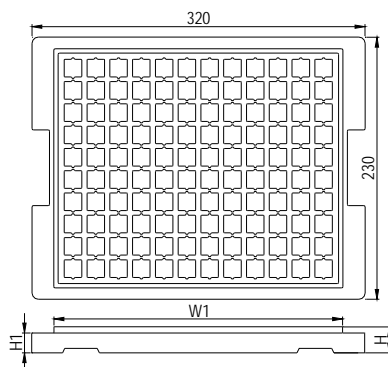


Unit: mm

Case size	3 ~ 4 ϕ	5 ϕ	6.3 ϕ	8 ϕ × 6.5L	8 ϕ × 10L	10 ϕ	12.5 ϕ	16 ~ 18 ϕ
H	180	220	220	220	310	310	315	390
W, L	385	385	385	385	385	385	385 / 455*	385 / 455*

* *: Suitable for reel packing is 450 mm

Fig. 3-2 Chip Tray



Dimension and package quantity

Unit: mm

Case size	W1	H	H1	Q'ty / Tray	Q'ty / Box
12.5 ϕ × 13.5L	284	21	18.5	120	600
12.5 ϕ × 16L	284	21	18.5	120	600
16 ϕ × 16.5L	284	28	24.0	80	400
16 ϕ × 21.5L	284	28	24.0	80	400
18 ϕ × 16.5L	284	28	24.0	60	300
18 ϕ × 21.5L	284	28	24.0	60	300

Taping Specifications for Radial Type

Fig. 1

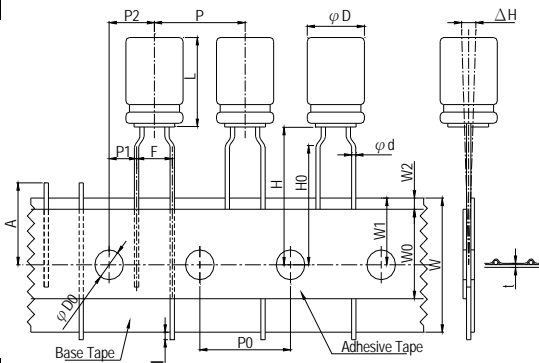


Fig. 2

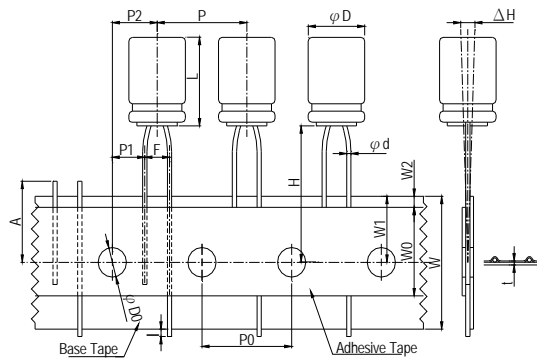


Fig. 3

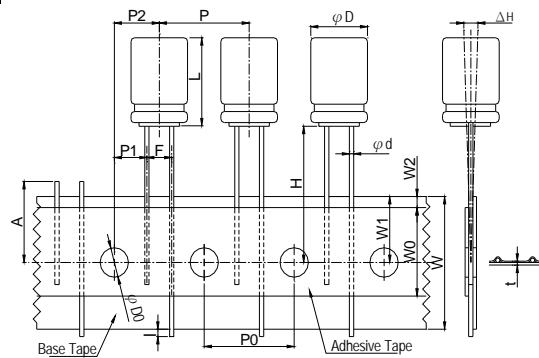
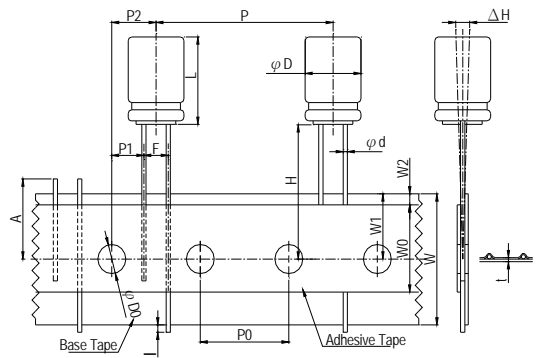


Fig. 4



Unit: mm

Packing L Symbol	φ D	TA										SA														
		5					7 ~ 9			≥ 11		5					≥ 7		7 ~ 9	11.5 ~ 20		9 ~ 25				
		3	4*	5	6.3	8	5	6.3	8*	5	6.3	8	3	4*	5	6.3	8	5	6.3	8	8	Tol.	10	12.5	Tol.	
φ d		0.4	0.45				0.5*			0.5		0.6	0.4	0.45			0.45	0.45	0.5	0.5*	0.5	0.6	±0.05	0.6	0.6	±0.05
F		5.0					5.0			5.0		5.0	2.5			2.5	2.5	2.5	2.5	3.5	3.5	+0.8/-0.2	5.0	5.0	+0.8/-0.2	
H		17.5					17.5			18.5		20.0	17.5			17.5	17.5	17.5	17.5	17.5	18.5	±0.75	18.5	18.5	±0.75	
H0		16.0					16.0			16.0			---			---	---	---	---	---	---	±0.5	---	---	±0.5	
P		12.7					12.7			12.7			12.7			12.7	12.7	12.7	12.7	12.7	12.7	±1.0	12.7	25.4	±1.0	
P0		12.7					12.7			12.7			12.7			12.7	12.7	12.7	12.7	12.7	12.7	±0.2	12.7	12.7	±0.2	
P1		3.85					3.85			3.85			5.1			5.1	5.1	5.1	5.1	4.6	4.6	±0.5	3.85	3.85	±0.7	
P2		6.35					6.35			6.35			6.35			6.35	6.35	6.35	6.35	6.35	6.35	±1.0	6.35	6.35	±1.3	
W		18.0					18.0			18.0			18.0			18.0	18.0	18.0	18.0	18.0	18.0	±0.5	18.0	18.0	±0.5	
W0		6.0					10.0			10.0		12.0	6.0			6.0	6.0	10.0	10.0	10.0	12.0	Min.	12.0	12.0	Min.	
W1		9.0					9.0			9.0			9.0			9.0	9.0	9.0	9.0	9.0	9.0	±0.5	9.0	9.0	±0.5	
W2		1.5					1.5			1.5			1.5			1.5	1.5	1.5	1.5	1.5	1.5	Max.	1.5	1.5	Max.	
A		11.0					11.0			11.0			11.0			11.0	11.0	11.0	11.0	11.0	11.0	Max.	11.0	11.0	Max.	
φ D0		4.0					4.0			4.0			4.0			4.0	4.0	4.0	4.0	4.0	4.0	±0.2	4.0	4.0	±0.2	
ΔH		0					0			0			0			0	0	0	0	0	0	±1.0	0	0	±1.0	
l		1.0					1.0			1.0			1.0			1.0	1.0	1.0	1.0	1.0	1.0	Max.	1.0	1.0	Max.	
t		0.7					0.7			0.7			0.7			0.7	0.7	0.7	0.7	0.7	0.7	±0.2	0.7	0.7	±0.2	
Fig. No.		1					1			1			2			3	3	2	3	3	3		3	4		

Remark: 1. 4 ϕ in mark of "*" is 4 ϕ x 7L the same spec. "SA" packing: 5 ~ 6.3 ϕ x 11 ~ 15L in H is 18.5mm.

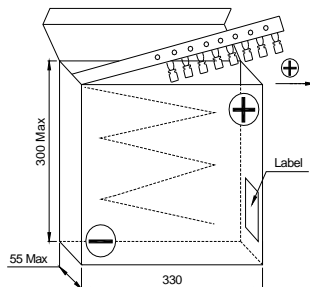
2. For 3 ~ 8 ϕ x 5L, W0 = 10.0mm is available.

3. ϕd in mark of "*" is 0.6mm for OP-CAP's 6.3 ϕ .

4. The "Tol." of "TA" is the same "SA".

Packaging

Fig. 5 Ammo pack box



Packaging Quantity

Unit: pcs/box

ϕD (mm)	3	4	5	6.3	8	10	12.5
TA, SA	3,000	2,000	2,000	2,000	1,000	500	300

Note: The component shall be oriented on the tape as such that the positive lead is leading or the negative lead is leading with customer's request.

Lead Forming and Cutting Specifications for Radial Type

Unit: mm

Forming Method	Code	Shape	Dimensions																																																																																																								
Forming Cut (4 ϕ ~ 8 ϕ)	FC		<table><tr><th>ϕ D × L</th><th>ϕ d</th><th>F</th><th>F'</th><th>H</th></tr><tr><td>3 × 5</td><td>0.4</td><td>1.0</td><td>5.0</td><td>5.0</td></tr><tr><td>4 × 5</td><td>0.45</td><td>1.5</td><td>5.0</td><td>5.0</td></tr><tr><td>5 × 5</td><td>0.45</td><td>2.0</td><td>5.0</td><td>5.0</td></tr><tr><td>6.3 ~ 8 × 5</td><td>0.45</td><td>2.5</td><td>5.0</td><td>5.0</td></tr><tr><td>4 × 7</td><td>0.45</td><td>1.5</td><td>5.0</td><td>5.0</td></tr><tr><td>5 × 7~11</td><td>0.5</td><td>2.0</td><td>5.0</td><td>5.0</td></tr><tr><td>6.3 × 7 ~ 15</td><td>0.5</td><td>2.5</td><td>5.0</td><td>5.0</td></tr><tr><td>8 × 7 ~ 9</td><td>0.5</td><td>3.5</td><td>5.0</td><td>5.0</td></tr><tr><td>8 × 11.5 ~ 50</td><td>0.6</td><td>3.5</td><td>5.0</td><td>5.0</td></tr><tr><td>10</td><td>0.6</td><td>5.0</td><td>---</td><td>4.5</td></tr><tr><td>12.5</td><td>0.6</td><td>5.0</td><td>---</td><td>4.5</td></tr><tr><td>16</td><td>0.8</td><td>7.5</td><td>---</td><td>4.5</td></tr><tr><td>18</td><td>0.8</td><td>7.5</td><td>---</td><td>4.5</td></tr><tr><td>22</td><td>1.0</td><td>10.0</td><td>---</td><td>4.5</td></tr><tr><td>25</td><td>1.0</td><td>12.5</td><td>---</td><td>4.5</td></tr></table>	ϕ D × L	ϕ d	F	F'	H	3 × 5	0.4	1.0	5.0	5.0	4 × 5	0.45	1.5	5.0	5.0	5 × 5	0.45	2.0	5.0	5.0	6.3 ~ 8 × 5	0.45	2.5	5.0	5.0	4 × 7	0.45	1.5	5.0	5.0	5 × 7~11	0.5	2.0	5.0	5.0	6.3 × 7 ~ 15	0.5	2.5	5.0	5.0	8 × 7 ~ 9	0.5	3.5	5.0	5.0	8 × 11.5 ~ 50	0.6	3.5	5.0	5.0	10	0.6	5.0	---	4.5	12.5	0.6	5.0	---	4.5	16	0.8	7.5	---	4.5	18	0.8	7.5	---	4.5	22	1.0	10.0	---	4.5	25	1.0	12.5	---	4.5																								
ϕ D × L	ϕ d	F	F'	H																																																																																																							
3 × 5	0.4	1.0	5.0	5.0																																																																																																							
4 × 5	0.45	1.5	5.0	5.0																																																																																																							
5 × 5	0.45	2.0	5.0	5.0																																																																																																							
6.3 ~ 8 × 5	0.45	2.5	5.0	5.0																																																																																																							
4 × 7	0.45	1.5	5.0	5.0																																																																																																							
5 × 7~11	0.5	2.0	5.0	5.0																																																																																																							
6.3 × 7 ~ 15	0.5	2.5	5.0	5.0																																																																																																							
8 × 7 ~ 9	0.5	3.5	5.0	5.0																																																																																																							
8 × 11.5 ~ 50	0.6	3.5	5.0	5.0																																																																																																							
10	0.6	5.0	---	4.5																																																																																																							
12.5	0.6	5.0	---	4.5																																																																																																							
16	0.8	7.5	---	4.5																																																																																																							
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22	1.0	10.0	---	4.5																																																																																																							
25	1.0	12.5	---	4.5																																																																																																							
Cut (3 ϕ ~ 25 ϕ)	CC																																																																																																										
Snap-in Forming Cut (4 ϕ ~ 8 ϕ)	SF		<table><tr><th>ϕ D × L</th><th>ϕ d</th><th>H1</th><th>H2</th><th>H3</th><th>F</th><th>P</th><th>E</th></tr><tr><td>4 ~ 8 × 5</td><td>0.45</td><td>5.0</td><td>2.8</td><td>2.5</td><td>5.0</td><td>1.1</td><td>1.1</td></tr><tr><td>4 × 7</td><td>0.45</td><td>5.0</td><td>2.8</td><td>2.5</td><td>5.0</td><td>1.1</td><td>1.1</td></tr><tr><td>5 × 7 ~ 11</td><td>0.5</td><td>5.0</td><td>2.8</td><td>2.5</td><td>5.0</td><td>1.1</td><td>1.1</td></tr><tr><td>6.3 × 7 ~ 15</td><td>0.5</td><td>5.0</td><td>2.8</td><td>2.5</td><td>5.0</td><td>1.1</td><td>1.1</td></tr><tr><td>8 × 7 ~ 9</td><td>0.5</td><td>5.0</td><td>2.8</td><td>2.5</td><td>5.0</td><td>1.1</td><td>1.1</td></tr><tr><td>8 × 11.5 ~ 50</td><td>0.6</td><td>5.0</td><td>2.8</td><td>2.5</td><td>5.0</td><td>1.1</td><td>1.1</td></tr><tr><td>10</td><td>0.6</td><td>4.5</td><td>2.5</td><td>---</td><td>5.0</td><td>1.2</td><td>1.1</td></tr><tr><td>12.5</td><td>0.6</td><td>4.5</td><td>2.5</td><td>---</td><td>5.0</td><td>1.2</td><td>1.1</td></tr><tr><td>16</td><td>0.8</td><td>4.5</td><td>2.5</td><td>---</td><td>7.5</td><td>1.2</td><td>1.1</td></tr><tr><td>18</td><td>0.8</td><td>4.5</td><td>2.5</td><td>---</td><td>7.5</td><td>1.2</td><td>1.1</td></tr><tr><td>22</td><td>1.0</td><td>4.5</td><td>2.5</td><td>---</td><td>10.0</td><td>1.2</td><td>1.3</td></tr><tr><td>25</td><td>1.0</td><td>4.5</td><td>2.5</td><td>---</td><td>12.5</td><td>1.2</td><td>1.3</td></tr></table>	ϕ D × L	ϕ d	H1	H2	H3	F	P	E	4 ~ 8 × 5	0.45	5.0	2.8	2.5	5.0	1.1	1.1	4 × 7	0.45	5.0	2.8	2.5	5.0	1.1	1.1	5 × 7 ~ 11	0.5	5.0	2.8	2.5	5.0	1.1	1.1	6.3 × 7 ~ 15	0.5	5.0	2.8	2.5	5.0	1.1	1.1	8 × 7 ~ 9	0.5	5.0	2.8	2.5	5.0	1.1	1.1	8 × 11.5 ~ 50	0.6	5.0	2.8	2.5	5.0	1.1	1.1	10	0.6	4.5	2.5	---	5.0	1.2	1.1	12.5	0.6	4.5	2.5	---	5.0	1.2	1.1	16	0.8	4.5	2.5	---	7.5	1.2	1.1	18	0.8	4.5	2.5	---	7.5	1.2	1.1	22	1.0	4.5	2.5	---	10.0	1.2	1.3	25	1.0	4.5	2.5	---	12.5	1.2	1.3
ϕ D × L	ϕ d	H1	H2	H3	F	P	E																																																																																																				
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Snap-in Cut (10 ϕ ~ 25 ϕ)	SC																																																																																																										
Bending Cut (5 ϕ ~ 25 ϕ)	BC		<table><tr><th>ϕ D × L</th><th>ϕ d</th><th>F ± 0.5</th><th>*E Max</th></tr><tr><td>5 × 11</td><td>0.5</td><td>2.0</td><td>---</td></tr><tr><td>6.3 × 11 ~ 15</td><td>0.5</td><td>2.5</td><td>---</td></tr><tr><td>8 × 11.5 ~ 50</td><td>0.6</td><td>3.5</td><td>---</td></tr><tr><td>10</td><td>0.6</td><td>5.0</td><td>2.3</td></tr><tr><td>12.5</td><td>0.6</td><td>5.0</td><td>2.3</td></tr><tr><td>16</td><td>0.8</td><td>7.5</td><td>2.7</td></tr><tr><td>18</td><td>0.8</td><td>7.5</td><td>2.7</td></tr><tr><td>22</td><td>1.0</td><td>10.0</td><td>2.7</td></tr><tr><td>25</td><td>1.0</td><td>12.5</td><td>2.7</td></tr></table>	ϕ D × L	ϕ d	F ± 0.5	*E Max	5 × 11	0.5	2.0	---	6.3 × 11 ~ 15	0.5	2.5	---	8 × 11.5 ~ 50	0.6	3.5	---	10	0.6	5.0	2.3	12.5	0.6	5.0	2.3	16	0.8	7.5	2.7	18	0.8	7.5	2.7	22	1.0	10.0	2.7	25	1.0	12.5	2.7																																																																
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Cathode Lead Bending (10 ϕ ~ 25 ϕ)	SD		<p>***E" is only suitable for SD cutting.</p> <p>"BU": Leads bending cut are different direction from BC.</p>																																																																																																								



Specifications of Packing

Minimum Package Quantity

1. Radial Type (For OP-CAP Radial Type, please refer to Table 4 on the following page)

Unit: pcs

Case size	Taping		Bulk		Cutting	
	Box	Carton	Bag	Carton	Bag	Carton
3 ϕ	3,000	30,000	1,000	60,000	1,000	80,000
4 ϕ	2,000	20,000	1,000	50,000	1,000	80,000
5 $\phi \times 5 \sim 7L$	2,000	20,000	1,000	40,000	1,000	56,000
5 $\phi \times 11L$	2,000	20,000	1,000	30,000	1,000	40,000
6.3 $\phi \times 5 \sim 7L$	2,000	20,000	1,000	30,000	1,000	40,000
6.3 $\phi \times 11L$	2,000	20,000	1,000	20,000	1,000	24,000
6.3 $\phi \times 15L$	2,000	20,000	1,000	15,000	500	12,000
8 $\phi \times 5 \sim 9L$	1,000	10,000	1,000	15,000	1,000	24,000
8 $\phi \times 11.5L$	1,000	10,000	1,000	12,000	1,000	16,000
8 $\phi \times 15L$	1,000	10,000	1,000	10,000	800	12,800
8 $\phi \times 20L$	1,000	10,000	1,000	8,000	500	8,000
8 $\phi \times 25 \sim 30L$	1,000	10,000	500	6,000	500	8,000
8 $\phi \times 35 \sim 50L$	1,000	10,000	250	3,000	250	4,000
10 $\phi \times 9L$	500	5,000	1,000	12,000	500	12,000
10 $\phi \times 12.5L$	500	5,000	500	8,000	500	8,000
10 $\phi \times 16L$	500	5,000	500	7,000	500	8,000
10 $\phi \times 20L$	500	5,000	500	6,000	400	6,400
10 $\phi \times 25L$	500	5,000	500	6,000	300	4,800
10 $\phi \times 30 \sim 40L$	500	5,000	400	4,000	250	4,000
10 $\phi \times 45 \sim 50L$	250	2,500	200	3,000	200	3,200
12.5 $\phi \times 16 \sim 20L$	300	3,000	300	3,600	200	3,200
12.5 $\phi \times 25L$	300	3,000	250	3,000	200	3,200
12.5 $\phi \times 30L$	300	3,000	250	3,000	150	2,400
12.5 $\phi \times 35 \sim 40L$	300	3,000	250	3,000	150	2,400
12.5 $\phi \times 45 \sim 50L$	150	1,500	100	2,000	100	1,600
16 $\phi \times 16 \sim 25L$	---	---	150	1,800	100	1,600
16 $\phi \times 31.5L$	---	---	100	1,200	100	1,600
16 $\phi \times 35.5 \sim 40L$	---	---	100	1,000	75	1,200
16 $\phi \times 45 \sim 50L$	---	---	50	1,000	50	800
18 $\phi \times 16L$	---	---	150	1,800	100	1,600
18 $\phi \times 20 \sim 25L$	---	---	100	1,200	100	1,600
18 $\phi \times 31.5 \sim 35.5L$	---	---	100	1,200	75	1,200
18 $\phi \times 40L$	---	---	100	800	50	800
18 $\phi \times 45 \sim 50L$	---	---	50	600	50	400
22 ϕ	---	---	50	500	---	400
25 $\phi \times 40L$	---	---	25	300	---	400
25 $\phi \times 45 \sim 50L$	---	---	25	250	---	400

* According to approval sheet for detailed amount.

2. Snap-in Type

Unit: pcs

Case size	Inner Box	Carton
20 ϕ	50	400
22 ϕ	50	400
25 ϕ	50	400
30 ϕ	50	300
35 ϕ	50	300
35 $\phi \times 55 \sim 100L$	---	100
40 $\phi \times 55 \sim 75L$	---	100
40 $\phi \times 80 \sim 100L$	---	50

3. SMD Type

Unit: pcs

Case size	Q'ty / Reel	Q'ty / Box
3 ϕ	2,000	20,000
4 ϕ	2,000	20,000
5 ϕ	1,000	10,000
6.3 ϕ	1,000	10,000
8 $\phi \times 6.5 \sim 7L$	1,000	10,000
8 $\phi \times 10L$	500	5,000
8 $\phi \times 12L^*$	400	2,000
10 $\phi \times 8 \sim 10L$	500	5,000
10 $\phi \times 12.7L^*$	400	2,000
12.5 $\phi \times 13.5L$	250 / 400*	2,000 / 3,200*
12.5 $\phi \times 16L$	200 / 300*	1,600 / 2,400*
16 $\phi \times 16.5L$	200 / 250*	1,600 / 2,000*
16 $\phi \times 21.5L$	150 / 200*	1,200 / 1,600*
18 $\phi \times 16.5L$	150 / 250*	1,200 / 2,000*
18 $\phi \times 21.5L$	100 / 150*	800 / 1,200*

The case size with "*" mark is for OP-CAP;
Quantity with "*" mark is reel packing of 450 mm.

Specifications of Package & Terminal Codes for Snap-in Type

4. OP-CAP Radial Type

Unit: pcs

Case size	Taping		Bulk		Cutting	
	Box	Carton	Bag	Carton	Bag	Carton
5 ϕ	2,000	20,000	500	20,000	500	24,000
6.3 ϕ	2,000	20,000				20,000
8 ϕ × 8 ~ 12L	1,000	10,000				20,000
10 ϕ × 7.7 ~ 10L	500	5,000				12,000
10 ϕ × 12.5L	500	5,000		8,000		8,000

Note: Special packages are available upon request.

5. Screw Type

Unit: pcs

Case size	Q'ty / Box
35 ϕ	100
51 ϕ	36
64 ϕ	25
77 ϕ	16
90 ϕ	9

Terminal Codes for Snap-in Type

Each terminal type has a restriction on the applicable case size.

For other terminal types that are not illustrated here, please contact us.

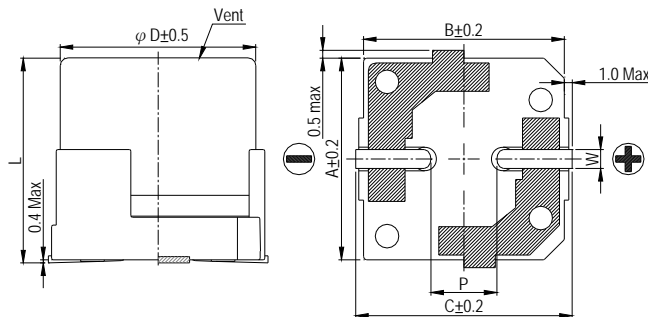
Standard Type Applicable Size : 20 ϕ ~ 40 ϕ Terminal Code : -- 	5-pins Terminal Type Applicable Size : 35 ϕ ~ 40 ϕ Terminal code : L5
3-pins Terminal Type Applicable Size : 20 ϕ ~ 40 ϕ Terminal Code : L3 	Vibration-resistant Type Applicable Size : 35 ϕ ~ 40 ϕ Terminal Code : T2
3-pins Terminal Type Applicable Size : 35 ϕ ~ 40 ϕ Terminal Code : S3 	Horizontal Type Applicable Size : 20 ϕ ~ 25 ϕ Terminal Code : H2
4-pins Terminal Type Applicable Size : 35 ϕ ~ 40 ϕ Terminal Code : L4 	Horizontal Type Applicable Size : 20 ϕ ~ 25 ϕ Terminal Code : G2

Anti-vibration Structure for SMD Type

Available for SMD $\phi 12.5 \sim \phi 16$ in VLV and VLW series
 Suitable for Automotive Application
 Peak acceleration: 50G / 30G

Specifications	Performance							
Peak acceleration: 50G	<table><tr><td>Capacitance Change</td><td>Within ±5% of initial value</td></tr><tr><td>Dissipation Factor</td><td>Within specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table>		Capacitance Change	Within ±5% of initial value	Dissipation Factor	Within specified value	Leakage Current	Within specified value
Capacitance Change			Within ±5% of initial value					
Dissipation Factor			Within specified value					
Leakage Current			Within specified value					
Peak to peak amplitude: 1.5mm								
Frequency: 10 to 2,000 Hz reciprocation for 20 minutes								
Direction and duration of vibration: 3 orthogonal directions mutually each for 4 Hrs								

Diagram of Dimensions



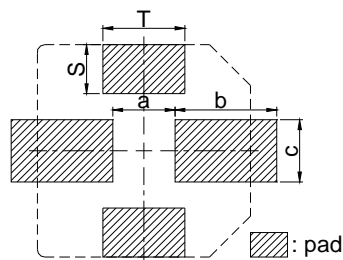
Lead Spacing and Diameter

Unit: mm

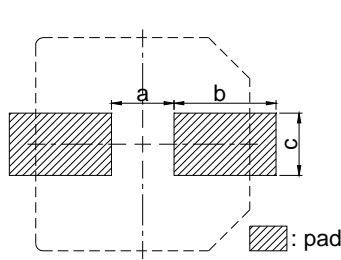
ϕD	L	A	B	C	W	$P \pm 0.2$
12.5	13.5 ± 0.5	13.0	13.5	14.5	1.1 ~ 1.4	4.4
12.5	16 ± 0.5	13.0	13.5	14.5	1.1 ~ 1.4	4.4
16	16.5 ± 0.5	16.5	17.0	18.2	1.1 ~ 1.4	6.4

Land Pattern (Anti-vibration Structure)

50 G



30G



Unit: mm

G value	Case size	Land size		
		a	b	c
50 G	12.5 ϕ	3.8	6.0	4.8
	16 ϕ	5.0	8.0	6.3
30 G	12.5 ϕ	3.8	6.0	6.0
	16 ϕ	5.0	8.0	7.5

When using large surface mount capacitor, please design possibly land pattern area than the recommended pattern dimension in order to increase vibration resistance and avoid to falling off a circuit board.