

TO Messrs. _____

ALUMINUM ELECTROLYTIC CAPACITORS SPECIFICATION SHEET

RoHS Compliant part

CUSTOMER PART No.		
Rubycon PART No.	YXA SERIES	
DRAWING No.	REE ? 031448	ISSUE No. 1
ISSUE DATE	30 JUNE 2005	



RUBYCON CORPORATION
ENGINEERING DIVISION

1938-1, NISHIMINOWA, INA-SHI, NAGANO-KEN, JAPAN
TEL No. 0265-72-7116
FAX No. 0265-73-3380

DESIGN	TETSUYA MIZU
	KENROU FUJII
CHECK	
APPROVAL	TAKUYA MIYAHARA

1. Scope.

This specification covers polarized aluminum electrolytic capacitors with non-solid electrolyte for use in electronic equipments .

2. Reference Standard

JIS C 5141 (1991) and JIS C 5102 (1994) methods for testing.

3. Operating Temperature Range

-55°C to +105°C (6.3 to 100 V.DC.), -40°C to +105°C (160 to 250 V.DC.), -25°C to +105°C (350 to 450 V.DC.)

4. Performance Refer to Table-1

5. Style and Numbering System

(1) Style CE 04 (Radial Leaded)

(2) Numbering System	Rated Voltage	Series	Nominal Capacitance	Tolerance	Lead Forming	Case size
	□□□	YXA	□□□	M	□□	□□□X□□□

6. Marking

Unless otherwise specified, capacitor shall be clearly marked the following items on its body.

Sleeve color: Black
 Lettering color: White

- | | |
|-----------------------------------|---|
| (1) Trade mark | Rubycon |
| (2) Rated Voltage | V |
| (3) Nominal Capacitance | μF |
| (4) Polarity |  (Negative Polarity) |
| (5) Series | YXA |
| (6) Lot Number | |
| (7) Maximum Operating Temperature | 105°C |

7. Vent

On capacitors whose diameter is 6.3mm and greater, a safety vent shall be provided.

8. Notes on use of aluminum electrolytic capacitors

(1) Charge and discharge

Do not use for the circuit that repeats quick charge or discharge.

(2) External stress

Do not apply excessive force of pushing, pulling bending, and/or twisting to the main body, lead wire and terminals.

(3) Heat resistance at soldering process

In the soldering process of PC board with Capacitors mounted, secondary shrinkage or crack of sleeve may be observed when soldering temperature is too high and /or soldering time is too long.

If lead wire of other components or pattern of double sided PC board touches the capacitor, the similar failure may be also originated at pre-heating, heating at hardening process of adhesive and soldering process.

(4) Insulation and PC board mounting

Sleeve is for marking purpose only.
 It is not recognized as insulation materials.

When double sided PC board is employed, note that it could cause a short circuit if lead wire of other components or pattern of double sided PC board touches capacitor. Please avoid circuit pattern runs underneath capacitor.

In addition, case and cathode terminal are not insulated.

(5) Adhesives and coating materials

Do not use the adhesives and coating materials that contain halogenated organic solvents or chloroprene as polymer.

(6) Storage

Keep at a normal temperature and humidity. During a long storage time, leakage current will be increased. To prevent heat rise or any trouble that high leakage current possibly causes, voltage treatment is recommended for the capacitors that have been stored for a long time.

<Storage Condition>

*Aluminum electrolytic capacitors should not be stored in high temperatures or where there is a high level of humidity. The suitable storage condition is 5°C-35°C and less than 75% in relative humidity.

*Aluminum electrolytic capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray.

*Do not store aluminum electrolytic capacitors in an environment full of hazardous gas (hydrogen sulfide, sulfurous acid gas, nitrous acid, chlorine gas, ammonia or bromine gas).

*Aluminum electrolytic capacitors should not be stored under exposure to ozone, ultraviolet rays or radiation.

YXA SERIES

Rubycon
 RUBYCON CORPORATION

(7) Fumigation and halogenated flame retardant

It may cause corrosion of internal electrodes, aluminum cases and terminal surface when the following conditions exist.

*Fumigation of wooden pallets before shipment to disinfect vermin.

*Existence of components or parts that contain halogenated flame retardant agent (bromine etc.) together with capacitors.

*When halogenated detergents or antiseptics for preventing infection of epidemic diseases contact directly to capacitors.

(8) PC board cleaning after soldering

Please consult us when cleaning is subjected.

◆Guide to application except the above are described in our catalog and EIAJ RCR-2367B

EIAJ RCR-2367B : "Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment."

Published by Electronic Industries Association of Japan.

◆Table-1 PERFORMANCE

ITEMS		PERFORMANCE																																																					
1	Rated Voltage(WV) Surge Voltage (SV)	<table border="1"> <tr> <td>WV(V.DC)</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</td> <td>200</td> </tr> <tr> <td>SV(V.DC)</td> <td>8</td> <td>13</td> <td>20</td> <td>32</td> <td>44</td> <td>63</td> <td>79</td> <td>125</td> <td>200</td> <td>250</td> </tr> </table>										WV(V.DC)	6.3	10	16	25	35	50	63	100	160	200	SV(V.DC)	8	13	20	32	44	63	79	125	200	250																						
		WV(V.DC)	6.3	10	16	25	35	50	63	100	160	200																																											
		SV(V.DC)	8	13	20	32	44	63	79	125	200	250																																											
		<table border="1"> <tr> <td>WV(V.DC)</td> <td>250</td> <td>350</td> <td>400</td> <td>450</td> <td colspan="6"></td> </tr> <tr> <td>SV(V.DC)</td> <td>300</td> <td>400</td> <td>450</td> <td>500</td> <td colspan="6"></td> </tr> </table>										WV(V.DC)	250	350	400	450							SV(V.DC)	300	400	450	500																												
WV(V.DC)	250	350	400	450																																																			
SV(V.DC)	300	400	450	500																																																			
2	Nominal Capacitance (Tolerance)	<p><Criteria> 0.1 to 22000μF(\pm20%)</p> <p><Condition></p> <table border="1"> <tr> <td>Measuring Frequency</td> <td>: 120Hz\pm20%</td> </tr> <tr> <td>Measuring Voltage</td> <td>: Not more than 0.5Vrms + 1.5 to 2.0V.DC</td> </tr> <tr> <td>Measuring Temperature</td> <td>: 20 \pm 2 $^{\circ}$C</td> </tr> </table>										Measuring Frequency	: 120Hz \pm 20%	Measuring Voltage	: Not more than 0.5Vrms + 1.5 to 2.0V.DC	Measuring Temperature	: 20 \pm 2 $^{\circ}$ C																																						
Measuring Frequency	: 120Hz \pm 20%																																																						
Measuring Voltage	: Not more than 0.5Vrms + 1.5 to 2.0V.DC																																																						
Measuring Temperature	: 20 \pm 2 $^{\circ}$ C																																																						
3	Leakage Current	<p><Condition> The rated voltage shall be applied between terminals of capacitor such that the terminal voltage will reach the rated voltage within one minute and the leakage current shall be measured at following time after the voltage has reached the rated voltage across a 1000 \pm10 Ω series protection resistor. Then the current value shall not exceed value calculated from following formula.</p> <p><Criteria></p> <ul style="list-style-type: none"> 6.3 to 100V. DC (after 2minutes) I=0.01CV or 3μA whichever is greater 160 to 450V. DC (after 1 minute) (after 5minutes) I=0.1CV +40μA (CV\leq1000) I=0.03CV +15μA (CV\leq1000) I=0.04CV +100μA (CV>1000) I=0.02CV +25μA (CV>1000) <p>where I : Leakage current in μA. C : Nominal capacitance in μF. V : Rated voltage in V.DC.</p>																																																					
4	Dissipation Factor (tan δ :Tangent of loss angle)	<p><Criteria></p> <table border="1"> <tr> <td>WV(V.DC)</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 colspan="2"></td> </tr> <tr> <td>tanδ</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> <td>0.10</td> <td>0.08</td> <td colspan="2"></td> </tr> </table> <table border="1"> <tr> <td>WV(V.DC)</td> <td>160</td> <td>200</td> <td>250</td> <td>350</td> <td>400</td> <td>450</td> <td colspan="4"></td> </tr> <tr> <td>tanδ</td> <td>0.20</td> <td>0.20</td> <td>0.20</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> <td colspan="4"></td> </tr> </table> <p>When nominal capacitance is over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF.</p> <p><Condition> See ITEM 2, Nominal Capacitance, for measuring frequency, voltage and temperature.</p>										WV(V.DC)	6.3	10	16	25	35	50	63	100			tan δ	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.08			WV(V.DC)	160	200	250	350	400	450					tan δ	0.20	0.20	0.20	0.24	0.24	0.24				
WV(V.DC)	6.3	10	16	25	35	50	63	100																																															
tan δ	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.08																																															
WV(V.DC)	160	200	250	350	400	450																																																	
tan δ	0.20	0.20	0.20	0.24	0.24	0.24																																																	

5	Terminal Strength	<p><Condition> Tensile Strength of Terminals The body of capacitor shall be fixed and the tensile force of following table shall be applied to the terminal in lead out direction of the terminal for 10±1 seconds.</p> <p>Bending Strength of Terminals The body of capacitor shall be held in such a way that the regular lead-out axis of lead wire terminal becomes vertical. The weight of following table shall be suspended from the end of terminal. In this condition, after the body of sample is bent through 90 degrees, it shall be returned to the original position. Next the body shall be reversibly bent through 90 degrees and again returned to the original position.</p> <table border="1" data-bbox="544 595 1326 719"> <thead> <tr> <th>Diameter of lead wire</th> <th>Tensile force N{kgf}</th> <th>Bending force N{kgf}</th> </tr> </thead> <tbody> <tr> <td>0.5mm and less</td> <td>5{0.51}</td> <td>2.5{0.25}</td> </tr> <tr> <td>Over 0.5mm to 0.8mm incl</td> <td>10{1.0}</td> <td>5 {0.51}</td> </tr> </tbody> </table> <p><Criteria> Notable changes shall not be found, as breakage or looseness in the terminal.</p>	Diameter of lead wire	Tensile force N{kgf}	Bending force N{kgf}	0.5mm and less	5{0.51}	2.5{0.25}	Over 0.5mm to 0.8mm incl	10{1.0}	5 {0.51}																																																																																
Diameter of lead wire	Tensile force N{kgf}	Bending force N{kgf}																																																																																									
0.5mm and less	5{0.51}	2.5{0.25}																																																																																									
Over 0.5mm to 0.8mm incl	10{1.0}	5 {0.51}																																																																																									
6	Temperature Coefficient and Drift	<p><Condition></p> <table border="1" data-bbox="544 875 1345 1200"> <thead> <tr> <th>STEP</th> <th>Testing Temperature (°C)</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20±2</td> <td>Time to reach thermal equilibrium</td> </tr> <tr> <td>2</td> <td>-40±3</td> <td>//</td> </tr> <tr> <td>3</td> <td>-25±3</td> <td>//</td> </tr> <tr> <td>4</td> <td>20±2</td> <td>//</td> </tr> <tr> <td>5</td> <td>105±2</td> <td>2 hrs.</td> </tr> <tr> <td>6</td> <td>20±2</td> <td>Time to reach thermal equilibrium</td> </tr> </tbody> </table> <p>Capacitance, D.F. and Impedance shall be measured at 120Hz. Rated voltage 160 to 450 WV : Except Step 2.</p> <p><Criteria></p> <table border="1" data-bbox="544 1301 1477 1585"> <thead> <tr> <th>STEP</th> <th>Parameter</th> <th>Criteria</th> </tr> </thead> <tbody> <tr> <td>STEP 2,3</td> <td>Impedance Ratio</td> <td>The value of ratio to STEP 1 not more than value of following table</td> </tr> <tr> <td rowspan="3">STEP 5</td> <td>Capacitance Change</td> <td>6.3 to 100WV : Within ±25% of the value of STEP 1 160 to 450WV : Within ±20% of the value of STEP 1</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than 8 times the specified value</td> </tr> <tr> <td rowspan="3">STEP 6</td> <td>Capacitance Change</td> <td>Within ±10% of the value of STEP 1</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </tbody> </table> <table border="1" data-bbox="533 1610 1390 1760"> <thead> <tr> <th>WV(V.DC)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</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>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>—</td> </tr> </tbody> </table> <table border="1" data-bbox="533 1787 1099 1937"> <thead> <tr> <th>WV(V.DC)</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>3</td> <td>3</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> </tbody> </table>	STEP	Testing Temperature (°C)	Time	1	20±2	Time to reach thermal equilibrium	2	-40±3	//	3	-25±3	//	4	20±2	//	5	105±2	2 hrs.	6	20±2	Time to reach thermal equilibrium	STEP	Parameter	Criteria	STEP 2,3	Impedance Ratio	The value of ratio to STEP 1 not more than value of following table	STEP 5	Capacitance Change	6.3 to 100WV : Within ±25% of the value of STEP 1 160 to 450WV : Within ±20% of the value of STEP 1	Dissipation Factor	Not more than the specified value	Leakage Current	Not more than 8 times the specified value	STEP 6	Capacitance Change	Within ±10% of the value of STEP 1	Dissipation Factor	Not more than the specified value	Leakage Current	Not more than the specified value	WV(V.DC)	6.3	10	16	25	35	50	63	100	160	Z(-25°C)/Z(+20°C)	4	3	2	2	2	2	2	2	3	Z(-40°C)/Z(+20°C)	8	6	4	4	3	3	3	3	—	WV(V.DC)	200	250	350	400	450	Z(-25°C)/Z(+20°C)	3	3	6	6	6	Z(-40°C)/Z(+20°C)	—	—	—	—	—
STEP	Testing Temperature (°C)	Time																																																																																									
1	20±2	Time to reach thermal equilibrium																																																																																									
2	-40±3	//																																																																																									
3	-25±3	//																																																																																									
4	20±2	//																																																																																									
5	105±2	2 hrs.																																																																																									
6	20±2	Time to reach thermal equilibrium																																																																																									
STEP	Parameter	Criteria																																																																																									
STEP 2,3	Impedance Ratio	The value of ratio to STEP 1 not more than value of following table																																																																																									
STEP 5	Capacitance Change	6.3 to 100WV : Within ±25% of the value of STEP 1 160 to 450WV : Within ±20% of the value of STEP 1																																																																																									
	Dissipation Factor	Not more than the specified value																																																																																									
	Leakage Current	Not more than 8 times the specified value																																																																																									
STEP 6	Capacitance Change	Within ±10% of the value of STEP 1																																																																																									
	Dissipation Factor	Not more than the specified value																																																																																									
	Leakage Current	Not more than the specified value																																																																																									
WV(V.DC)	6.3	10	16	25	35	50	63	100	160																																																																																		
Z(-25°C)/Z(+20°C)	4	3	2	2	2	2	2	2	3																																																																																		
Z(-40°C)/Z(+20°C)	8	6	4	4	3	3	3	3	—																																																																																		
WV(V.DC)	200	250	350	400	450																																																																																						
Z(-25°C)/Z(+20°C)	3	3	6	6	6																																																																																						
Z(-40°C)/Z(+20°C)	—	—	—	—	—																																																																																						

7	Load Life Test	<p><Condition> Capacitors shall be applied the rated voltage continuously through 1000 Ω series protective resistor (with maximum ripple current) at 105±2°C for following test period. After the test and returned in standard condition for 1 to 2 hours, and the capacitor shall meet following requirements.</p> <table border="1" data-bbox="533 427 1010 584"> <thead> <tr> <th>Case dia</th> <th>Life Time</th> </tr> </thead> <tbody> <tr> <td>φD≤8</td> <td>1000 $\begin{smallmatrix} +48 \\ 0 \end{smallmatrix}$</td> </tr> <tr> <td>φD=10</td> <td>2000 $\begin{smallmatrix} +72 \\ 0 \end{smallmatrix}$</td> </tr> <tr> <td>φD≥12.5</td> <td>3000 $\begin{smallmatrix} +72 \\ 0 \end{smallmatrix}$</td> </tr> </tbody> </table> <p><Criteria></p> <table border="1" data-bbox="533 622 1441 770"> <tbody> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> <tr> <td>Capacitance Change</td> <td>Within ±25% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Appearance</td> <td>Notable changes shall not be found</td> </tr> </tbody> </table>	Case dia	Life Time	φD≤8	1000 $\begin{smallmatrix} +48 \\ 0 \end{smallmatrix}$	φD=10	2000 $\begin{smallmatrix} +72 \\ 0 \end{smallmatrix}$	φD≥12.5	3000 $\begin{smallmatrix} +72 \\ 0 \end{smallmatrix}$	Leakage Current	Not more than the specified value	Capacitance Change	Within ±25% of the initial value	Dissipation Factor	Not more than 200% of the specified value	Appearance	Notable changes shall not be found
Case dia	Life Time																	
φD≤8	1000 $\begin{smallmatrix} +48 \\ 0 \end{smallmatrix}$																	
φD=10	2000 $\begin{smallmatrix} +72 \\ 0 \end{smallmatrix}$																	
φD≥12.5	3000 $\begin{smallmatrix} +72 \\ 0 \end{smallmatrix}$																	
Leakage Current	Not more than the specified value																	
Capacitance Change	Within ±25% of the initial value																	
Dissipation Factor	Not more than 200% of the specified value																	
Appearance	Notable changes shall not be found																	
8	Shelf Life Test	<p><Condition> Capacitors shall be stored at 105±2°C with no voltage applied for 1000 $\begin{smallmatrix} +48 \\ 0 \end{smallmatrix}$ hours. After the test and returned in standard condition for 1 to 2 hours and the capacitor shall meet following requirements. (If any doubt arises on the judgement, the capacitors shall be subjected to voltage treatment specified in JIS C 5141,5.2.)</p> <p><Criteria></p> <table border="1" data-bbox="533 1010 1445 1158"> <tbody> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> <tr> <td>Capacitance Change</td> <td>Within ±25% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Appearance</td> <td>Notable changes shall not be found</td> </tr> </tbody> </table>	Leakage Current	Not more than the specified value	Capacitance Change	Within ±25% of the initial value	Dissipation Factor	Not more than 200% of the specified value	Appearance	Notable changes shall not be found								
Leakage Current	Not more than the specified value																	
Capacitance Change	Within ±25% of the initial value																	
Dissipation Factor	Not more than 200% of the specified value																	
Appearance	Notable changes shall not be found																	
9	Surge Voltage	<p><Condition> Capacitors shall be applied the surge voltage through a (100±50)/C_R [kΩ] resistor in series for 30±5 seconds in every 6±0.5 minutes at 15 to 35°C. Procedure shall be repeated 1000 times. Then the capacitors shall be left under normal humidity for 1 to 2 hours before measurement. [C_R : Nominal Capacitance (μF)]</p> <p><Criteria></p> <table border="1" data-bbox="533 1391 1445 1538"> <tbody> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> <tr> <td>Capacitance Change</td> <td>Within ±15% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than the specified value</td> </tr> <tr> <td>Appearance</td> <td>Notable changes shall not be found</td> </tr> </tbody> </table> <p>◇This test simulates overvoltage at abnormal situations, and not be hypothesizing that overvoltage is always applied.</p>	Leakage Current	Not more than the specified value	Capacitance Change	Within ±15% of the initial value	Dissipation Factor	Not more than the specified value	Appearance	Notable changes shall not be found								
Leakage Current	Not more than the specified value																	
Capacitance Change	Within ±15% of the initial value																	
Dissipation Factor	Not more than the specified value																	
Appearance	Notable changes shall not be found																	
10	Vibration Test	<p><Condition> Testing shall be done out in 3 AXIS for 2 hours each (total 6 hours) as below. Fix lead wire at a point not more than 4mm from the body , use mounting device separately for the one with a diameter 12.5mm and greater or with a length 25mm and longer.</p> <table border="1" data-bbox="533 1794 1137 1883"> <tbody> <tr> <td>Vibration frequency range</td> <td>: 10 to 55Hz</td> </tr> <tr> <td>Peak to peak amplitude</td> <td>: 1.5mm</td> </tr> <tr> <td>Sweep rate</td> <td>: 10 to 55 to 10Hz, In about 1min.</td> </tr> </tbody> </table>	Vibration frequency range	: 10 to 55Hz	Peak to peak amplitude	: 1.5mm	Sweep rate	: 10 to 55 to 10Hz, In about 1min.										
Vibration frequency range	: 10 to 55Hz																	
Peak to peak amplitude	: 1.5mm																	
Sweep rate	: 10 to 55 to 10Hz, In about 1min.																	

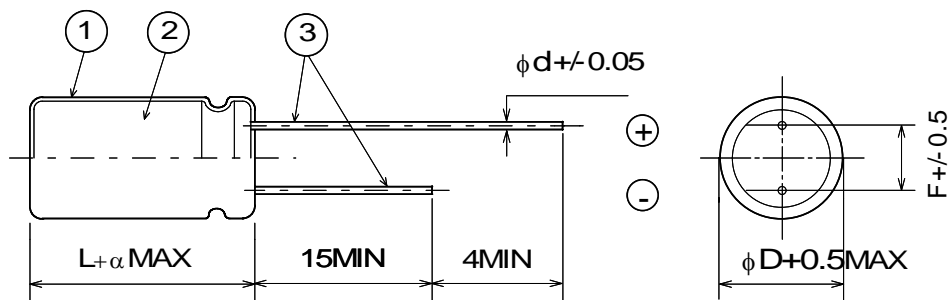
		<p><Criteria></p> <table border="1"> <tr> <td>Capacitance (During test)</td> <td>Measured value shall be stable. (The time from one end to the other of the vibration frequency within last 30 minutes at last direction.)</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 5\%$ of the initial value</td> </tr> <tr> <td>Appearance</td> <td>Notable changes shall not be found</td> </tr> </table>	Capacitance (During test)	Measured value shall be stable. (The time from one end to the other of the vibration frequency within last 30 minutes at last direction.)	Capacitance Change	Within $\pm 5\%$ of the initial value	Appearance	Notable changes shall not be found																																				
Capacitance (During test)	Measured value shall be stable. (The time from one end to the other of the vibration frequency within last 30 minutes at last direction.)																																											
Capacitance Change	Within $\pm 5\%$ of the initial value																																											
Appearance	Notable changes shall not be found																																											
11	Solderability	<p><Condition> Terminals of the capacitor shall be immersed in flux (ethanol solution of the rosin, 25 wt% rosin) for 5 to 10 seconds and shall be immersed in the solder bath ($235\pm 5^{\circ}\text{C}$) and held for 2 ± 0.5 seconds, and pulled out at the same speed.</p> <p><Criteria> At least $3/4$ of circumferential surface of dipped portion of the terminal shall be covered with new solder.</p>																																										
12	Resistance to Solder Heat	<p><Condition> Terminals of the capacitor shall be immersed into solder bath at $260\pm 5^{\circ}\text{C}$ for 10 ± 1 seconds up to 1.5 to 2.0mm from the body of capacitor. Then the capacitors shall be left under the normal temperature and normal humidity for 1 to 2 hours before measurement.</p> <p><Criteria></p> <table border="1"> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 10\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than the specified value</td> </tr> <tr> <td>Appearance</td> <td>Notable changes shall not be found</td> </tr> </table>	Leakage Current	Not more than the specified value	Capacitance Change	Within $\pm 10\%$ of the initial value	Dissipation Factor	Not more than the specified value	Appearance	Notable changes shall not be found																																		
Leakage Current	Not more than the specified value																																											
Capacitance Change	Within $\pm 10\%$ of the initial value																																											
Dissipation Factor	Not more than the specified value																																											
Appearance	Notable changes shall not be found																																											
13	Resistance to Damp Heat (Steady State)	<p><Condition> Capacitor shall be stored in the ambient of $40\pm 2^{\circ}\text{C}$ and relative humidity 90 to 95% for 240 ± 8 hours. Then the capacitors shall be left under the normal temperature and normal humidity for 1 to 2 hours before measurement.</p> <p><Criteria></p> <table border="1"> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> <tr> <td>Capacitance Change</td> <td>6.3 to 100WV : Within $\pm 15\%$ of the initial value 160 to 450WV : Within $\pm 10\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than the specified value</td> </tr> <tr> <td>Appearance</td> <td>Notable changes shall not be found</td> </tr> </table>	Leakage Current	Not more than the specified value	Capacitance Change	6.3 to 100WV : Within $\pm 15\%$ of the initial value 160 to 450WV : Within $\pm 10\%$ of the initial value	Dissipation Factor	Not more than the specified value	Appearance	Notable changes shall not be found																																		
Leakage Current	Not more than the specified value																																											
Capacitance Change	6.3 to 100WV : Within $\pm 15\%$ of the initial value 160 to 450WV : Within $\pm 10\%$ of the initial value																																											
Dissipation Factor	Not more than the specified value																																											
Appearance	Notable changes shall not be found																																											
14	Maximum Permissible Ripple Current	<p>(1)The maximum permissible ripple current is the maximum A.C. current at 120Hz and can be applied at maximum operating temperature. (2)The combined value of D.C. voltage and the peak A.C. voltage shall not exceed the rated voltage and shall not be reverse voltage.</p> <p><Frequency Coefficient></p> <table border="1"> <thead> <tr> <th>Frequency(Hz)</th> <th>60(50)</th> <th>120</th> <th>500</th> <th>1k</th> <th>10k\leq</th> </tr> </thead> <tbody> <tr> <td>Capacitance(μF)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0.1 to 1</td> <td>0.50</td> <td>1.0</td> <td>1.20</td> <td>1.30</td> <td>1.50</td> </tr> <tr> <td>2.2 to 4.7</td> <td>0.65</td> <td>1.0</td> <td>1.20</td> <td>1.30</td> <td>1.50</td> </tr> <tr> <td>10 to 47</td> <td>0.80</td> <td>1.0</td> <td>1.20</td> <td>1.30</td> <td>1.50</td> </tr> <tr> <td>100 to 1000</td> <td>0.80</td> <td>1.0</td> <td>1.10</td> <td>1.15</td> <td>1.20</td> </tr> <tr> <td>2200 to 22000</td> <td>0.80</td> <td>1.0</td> <td>1.05</td> <td>1.10</td> <td>1.15</td> </tr> </tbody> </table>	Frequency(Hz)	60(50)	120	500	1k	10k \leq	Capacitance(μF)						0.1 to 1	0.50	1.0	1.20	1.30	1.50	2.2 to 4.7	0.65	1.0	1.20	1.30	1.50	10 to 47	0.80	1.0	1.20	1.30	1.50	100 to 1000	0.80	1.0	1.10	1.15	1.20	2200 to 22000	0.80	1.0	1.05	1.10	1.15
Frequency(Hz)	60(50)	120	500	1k	10k \leq																																							
Capacitance(μF)																																												
0.1 to 1	0.50	1.0	1.20	1.30	1.50																																							
2.2 to 4.7	0.65	1.0	1.20	1.30	1.50																																							
10 to 47	0.80	1.0	1.20	1.30	1.50																																							
100 to 1000	0.80	1.0	1.10	1.15	1.20																																							
2200 to 22000	0.80	1.0	1.05	1.10	1.15																																							
YXA SERIES		<p style="text-align: center;">Rubycon RUBYCON CORPORATION</p>																																										

< Temperature Coefficient >			
Ambient Temperature(°C)	105	85	65≥
Coefficient	1.0	1.7	2.1

◇Temperature coefficient shows a limit of ripple current exceeding the rated ripple current that can be passed through a capacitor at each temperature when the life expectancy of a capacitor becomes to be nearly equal with the lifetime at the rated maximum operating temperature.

◇Use of aluminum electrolytic capacitor under ripple voltage with wide amplitude is equivalent to quick charge-discharge operation.
When ripple voltage with the amplitude over 70Vp-p is expected for the products with rated voltage over 100V, please contact us.

9. Diagram of dimensions. :unit mm



◆Table-2

φD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	6.3 to 100WV	1.5				2.0	
	160 to 450WV	2.0					

◆Table-3

①	Sleeve	P.V.C. (Lead Free)
②	Case	Aluminum
③	Lead Wire	Tin plated

◆Table-4 Standard size, Maximum permissible ripple current

Size φDXL(mm), Ripple Current(mA r.m.s./105°C,120Hz)

WV Cap (μF)	6.3		10		16		25		35	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
22									5X11	64
33							5X11	69	5X11	77
47					5X11	80	5X11	84	5X11	100
100	5X11	96	5X11	105	5X11	130	6.3X11	140	6.3X11	170
220	5X11	160	6.3X11	175	6.3X11	220	8X11.5	240	10X12.5	300
330	6.3X11	210	6.3X11	235	8X11.5	270	10X12.5	335	10X12.5	400
470	6.3X11	275	8X11.5	295	8X11.5	375	10X12.5	440	10X16	525
1000	8X11.5	460	10X12.5	540	10X16	640	10X20	740	12.5X20	865
2200	10X20	775	10X20	860	12.5X20	1050	12.5X25	1230	16X25	1370
3300	10X20	985	12.5X20	1100	12.5X25	1300	16X25	1500	16X35.5	1680
4700	12.5X20	1150	12.5X25	1350	16X25	1650	16X31.5	1800	18X35.5	1920
6800	12.5X25	1480	16X25	1700	16X31.5	1900	18X35.5	2050		
10000	16X25	1700	16X35.5	1950	18X35.5	2070				
15000	16X35.5	2090	18X35.5	2180						
22000	18X40	2350								

Size ϕ DXL(mm), Ripple Current(mA r.m.s./105°C,120Hz)

WV Cap (μ F)	50		63		100		160		200	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1	5X11	1								
0.15	5X11	1.5								
0.22	5X11	2.5								
0.33	5X11	4								
0.47	5X11	7			5X11	8				
1	5X11	13			5X11	15				
2.2	5X11	20			5X11	21				
3.3	5X11	25			5X11	30			6.3X11	36
4.7	5X11	32			5X11	35	6.3X11	43	8X11.5	50
10	5X11	47	5X11	48	5X11	60	8X11.5	77	10X12.5	80
22	5X11	70	5X11	80	6.3X11	98	10X16	125	10X20	135
33	5X11	94	6.3X11	100	8X11.5	140	10X20	170	12.5X20	200
47	6.3X11	115	6.3X11	140	10X12.5	185	12.5X20	210	12.5X20	220
100	8X11.5	200	10X12.5	230	10X20	290	12.5X25	320	16X25	340
220	10X12.5	360	10X16	390	12.5X25	560	16X35.5	580	18X35.5	580
330	10X16	470	10X20	540	12.5X25	690	18X35.5	700		
470	10X20	600	12.5X20	700	16X25	880				
1000	12.5X25	1060	16X25	1200	18X40	985				
2200	16X35.5	1600	18X35.5	1650						
3300	18X35.5	1780								

WV Cap (μ F)	250		350		400		450	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.47	6.3X11	8	6.3X11	8				
1	6.3X11	16	6.3X11	16	6.3X11	16	8X11.5	15
2.2	6.3X11	30	8X11.5	31	10X12.5	31	10X12.5	25
3.3	8X11.5	43	10X12.5	45	10X12.5	41	10X16	33
4.7	8X11.5	53	10X12.5	55	10X16	55	10X20	42
10	10X16	90	10X20	95	12.5X20	85	12.5X20	67
22	12.5X20	150	12.5X25	175	12.5X25	170	16X25	115
33	12.5X20	200	16X25	220	16X25	220	16X31.5	155
47	12.5X25	240	16X31.5	260	16X31.5	275	16X35.5	185
100	16X31.5	400	18X40	415	18X40	415		

YXA SERIES

Rubycon
RUBYCON CORPORATION

•TAPING SPECIFICATION OF RADIAL LEAD TYPE ALUMINUM ELECTROLYTIC CAPACITORS

1.Scope

This specification covers taped radial lead type electrolytic capacitors, with case dia of $\phi 5 \sim \phi 18$ mm.

2.Requirements.

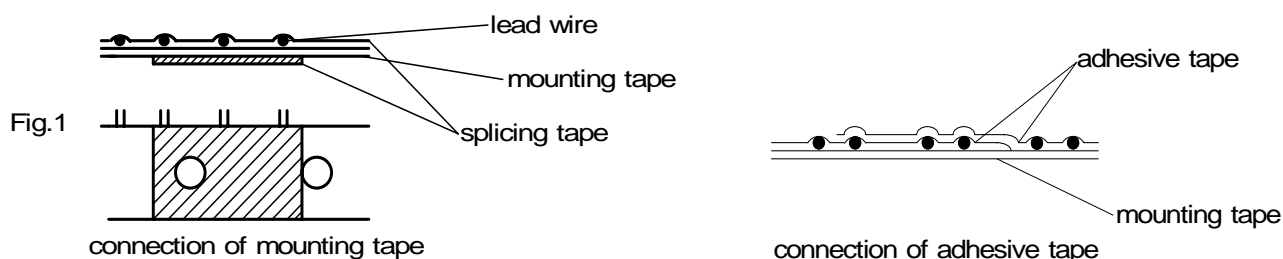
2-1. Body tape requirements are shown in 11/18 ~ 18/18 page.

2-2. All polarized capacitors must be oriented in one direction.

2-3. Leader tape shall be provided before the first capacitor and after the last one on tape at minimum length of 3 feed holes.

2-4 Maximum of 3 consecutive missing capacitors are permitted while one pack quantity meets the specification in para.4.

2-5. Mounting tape shall be spliced as shown in Fig.1. Mounting tape shall not be over lapped.



2-6. Defective capacitors shall be pulled out or clipped from the mounting tape.

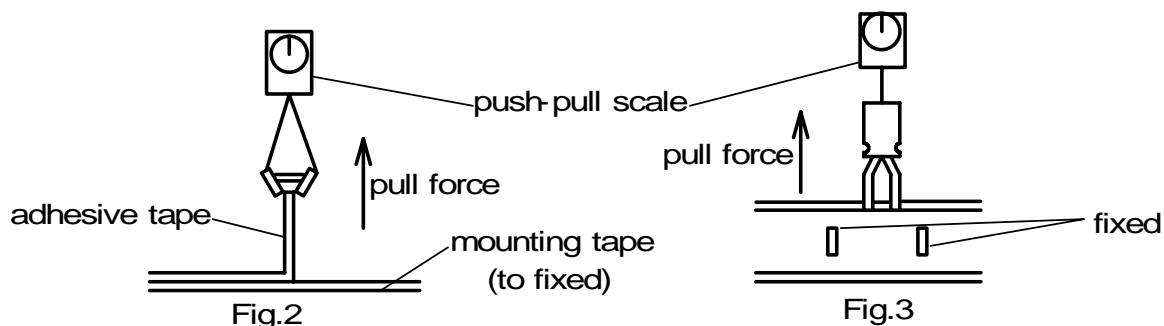
Remaining protrusion of the leads shall not exceed 2mm from edge of the tape, when clipped.

3. Adhesion test of mounting tape

3-1. Adhesive tape on the mounting tape shall not a tear off at the force of less than 3N {0.3kgf} when tested in a manner shown in Fig.2.

3-2. Capacitors shall not be pulled out of the tape with a following load applied to the capacitor body in a manner shown in Fig.3.

Dia $\leq \phi$ 8mm 10N {1.0kgf}
Dia $\geq \phi$ 10mm 5N {0.5kgf}



4.Package

Taped capacitors shall be packed in a carton shown in Fig.4, with tape ammunition.

Packed cartons shall be marked at least polarity, rated voltage, nominal capacitance and quantity.

On case dia $\phi 10\text{mm}$, $\phi 12.5\text{mm}$ and $\phi 16\text{mm}$, one capacitor shall be removed at each bend of the tape.

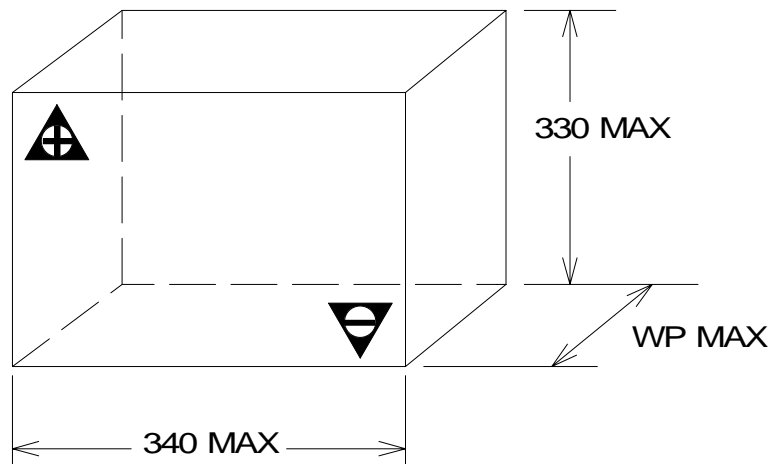
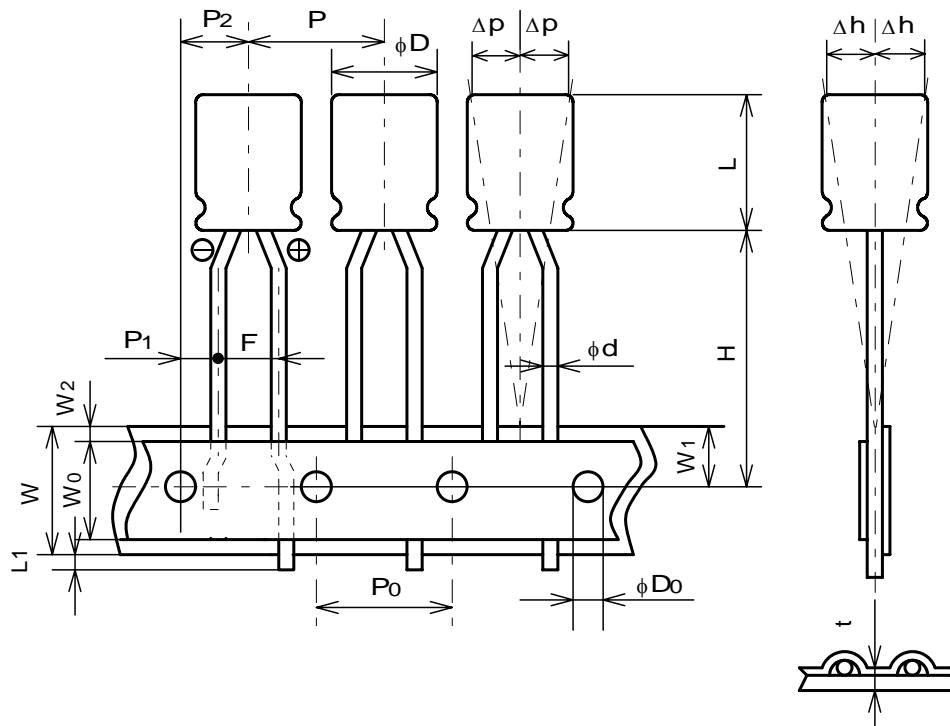


Fig.4

STANDARD PACKING QUANTITY

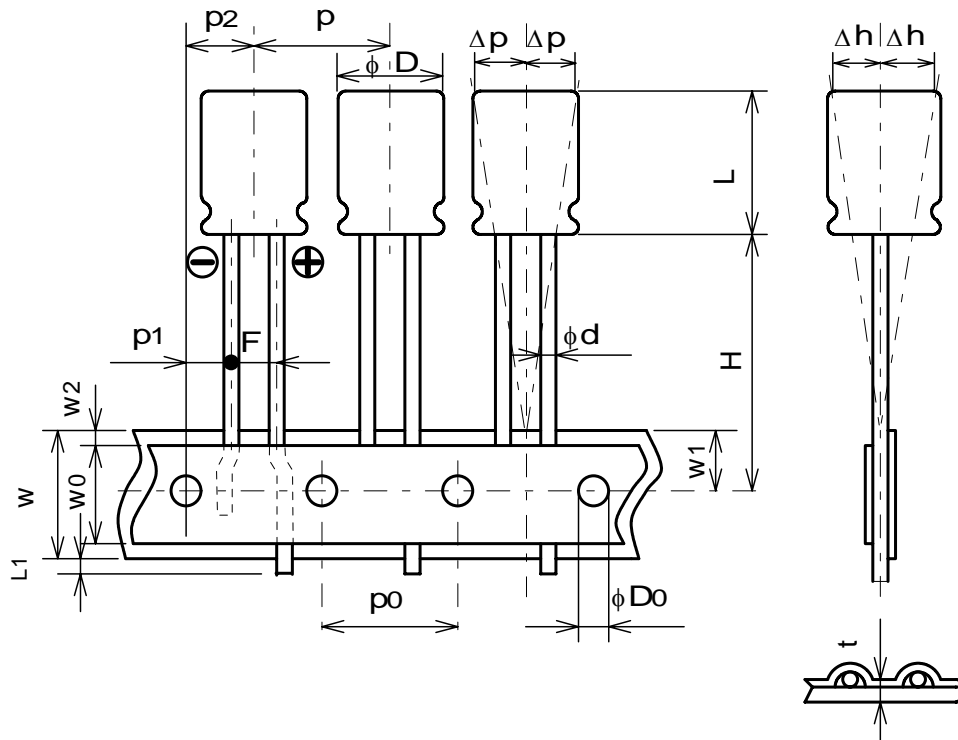
CASE DIA	QUANTITY	WP(mm)
$\phi 5 \times 11\text{L}$	2000	54
$\phi 6.3 \times 11\text{L}$	1000	54
$\phi 8 \times 11.5\text{L}$	1000	54
$\phi 10 \times 12.5\text{L}$	500	60
$\phi 10 \times 16\text{L}$	500	65
$\phi 10 \times 20\text{L}$	500	70
$\phi 12.5 \times 20\text{L}$	500	70
$\phi 12.5 \times 25\text{L}$	500	70
$\phi 16 \times 25\text{L}$	250	75
$\phi 16 \times 31.5\text{L}$	250	85
$\phi 16 \times 35.5\text{L}$	250	85
$\phi 18 \times 35.5\text{L}$	250	85
$\phi 18 \times 40\text{L}$	250	85

CODE : T1 (Positive leading)

LEAD TYPE (DIA. $\phi 5$)

Symbol	Case Dia ϕ mm		Remarks
	$\phi 5$		
ϕd	0.5	± 0.05	Dia of lead
L	12.5	MAX	Hight of body
P	12.7	± 1.0	Distance from center to center of body
P_0	12.7	± 0.2	Distance from center to center of driving hole
P_1	5.1	± 0.5	Distance between center of driving hole and lead
P_2	6.35	± 1.0	Distance between center of driving hole and body
F	2.5	$^{+0.8}_{-0.2}$	Lead spacing
W	18.0	± 0.3	Width of mounting tape
W_0	5.0	MIN	Width of adhesive tape
W_1	9.0	± 0.5	Distance between center of driving hole and edge of mounting tape
W_2	1.5	MAX	Max. allowable distance between mount and adhesive tape side
H	18.5	± 0.75	Distance between center of driving hole and bottom of body
L_1	0.5	MAX	Protrusion of lead
ϕD_0	4.0	± 0.2	Dia. of driving hole
Δh	1.0	MAX	Off alignment of body
Δp	1.0	MAX	Off alignment of body
t	0.6	± 0.3	Sum of thickness for mounting and adhesive tape without lead dia.

CODE : T1 (Positive leading)

LEAD TYPE (DIA. $\phi 6.3$)

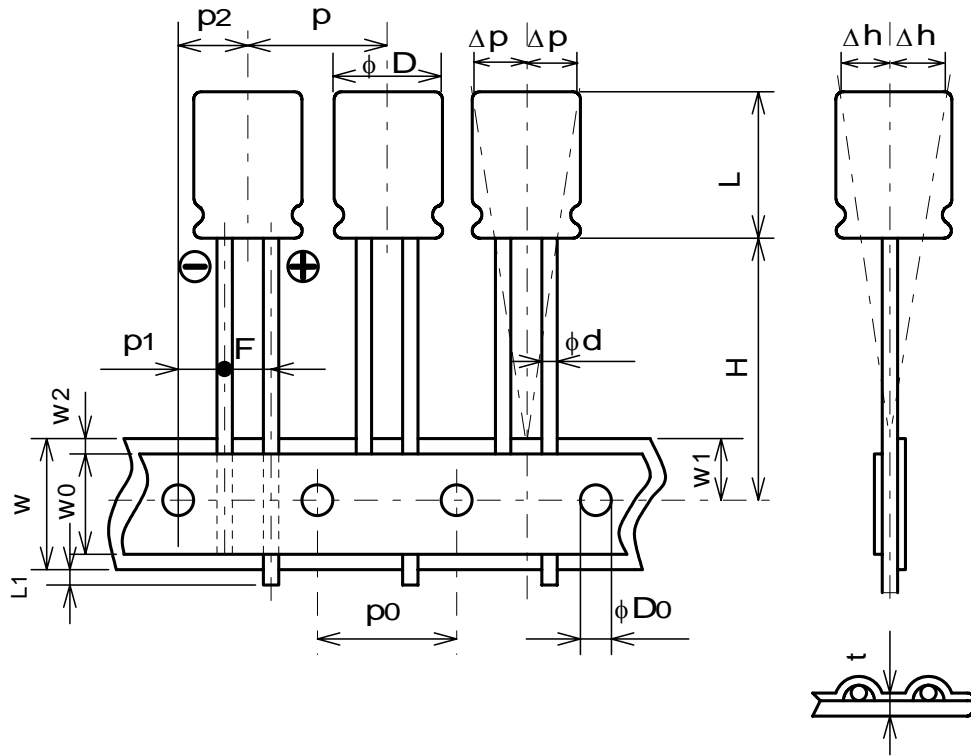
Symbol	Case Dia ϕ mm		Remarks
	$\phi 6.3$		
ϕd	0.5	± 0.05	Dia of lead
L	13.0	MAX	Height of body
P	12.7	± 1.0	Distance from center to center of body
P_0	12.7	± 0.2	Distance from center to center of driving hole
P_1	5.1	± 0.5	Distance between center of driving hole and lead
P_2	6.35	± 1.0	Distance between center of driving hole and body
F	2.5	$^{+0.8}_{-0.2}$	Lead spacing
W	18.0	± 0.3	Width of mounting tape
W_0	5.0	MIN	Width of adhesive tape
W_1	9.0	± 0.5	Distance between center of driving hole and edge of mounting tape
W_2	1.5	MAX	Max. allowable distance between mount and adhesive tape side
H	18.5	± 0.75	Distance between center of driving hole and bottom of body
L1	0.5	MAX	Protrusion of lead
ϕD_0	4.0	± 0.2	Dia. of driving hole
Δh	1.0	MAX	Off alignment of body
Δp	1.0	MAX	Off alignment of body
t	0.6	± 0.3	Sum of thickness for mounting and adhesive tape without lead dia.

YXA SERIES

Rubycon
RUBYCON CORPORATION

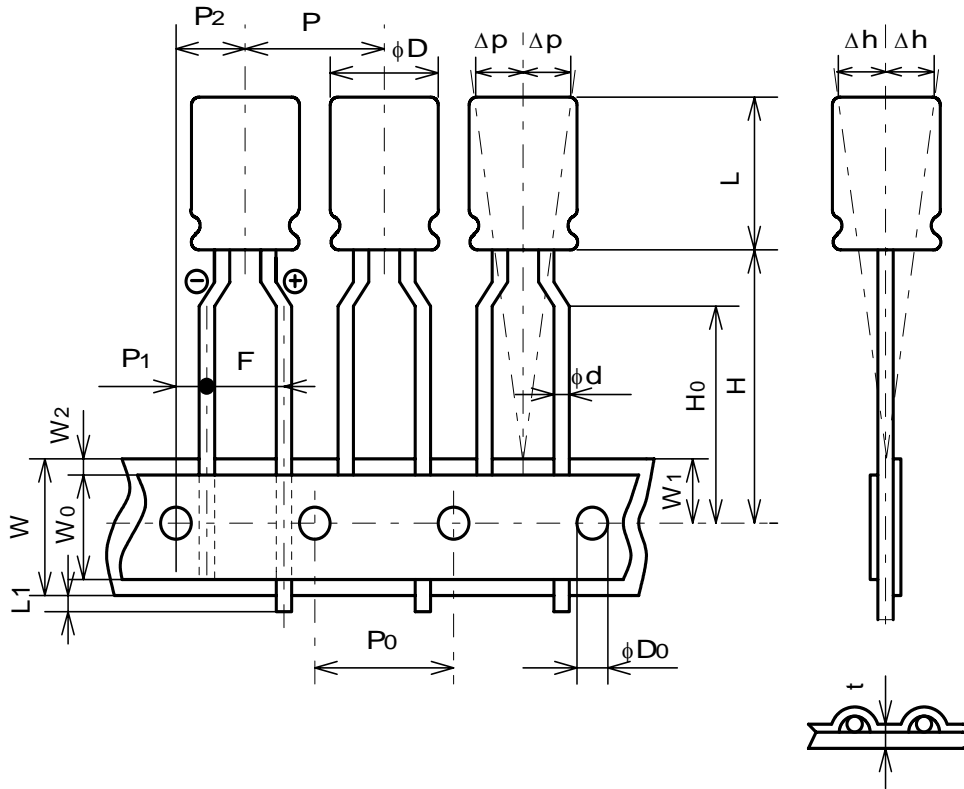
CODE : T7 (Positive leading)

LEAD TYPE (DIA. $\phi 8$)



Symbol	Case Dia ϕ mm		Remarks
	$\phi 8$		
ϕd	0.6	± 0.05	Dia of lead
L	13.5	MAX	Height of body
P	12.7	± 1.0	Distance from center to center of body
P ₀	12.7	± 0.2	Distance from center to center of driving hole
P ₁	4.6	± 0.5	Distance between center of driving hole and lead
P ₂	6.35	± 1.0	Distance between center of driving hole and body
F	3.5	$^{+0.8}_{-0.2}$	Lead spacing
W	18.0	± 0.3	Width of mounting tape
W ₀	5.0	MIN	Width of adhesive tape
W ₁	9.0	± 0.5	Distance between center of driving hole and edge of mounting tape
W ₂	1.5	MAX	Max. allowable distance between mount and adhesive tape side
H	20.0	± 0.75	Distance between center of driving hole and bottom of body
L ₁	0.5	MAX	Protrusion of lead
ϕD_0	4.0	± 0.2	Dia. of driving hole
Δh	1.0	MAX	Off alignment of body
Δp	1.0	MAX	Off alignment of body
t	0.6	± 0.3	Sum of thickness for mounting and adhesive tape without lead dia.

CODE : TA (Positive leading)

LEAD TYPE (DIA. $\phi 5 \sim \phi 8$)

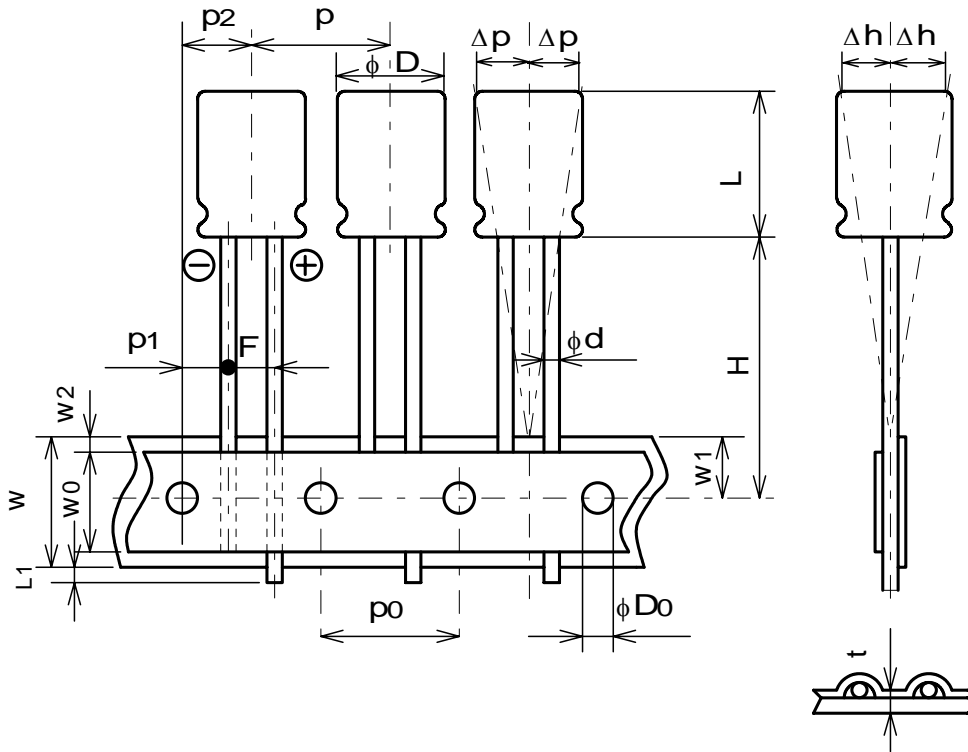
Symbol	Case Dia ϕ mm			Remarks
	$\phi 5$	$\phi 6.3$	$\phi 8$	
ϕd	0.5 \pm 0.05		0.6 \pm 0.05	Dia of lead
L	12.5MAX	13.0MAX	13.5MAX	Hight of body
P	12.7		± 1.0	Distance from center to center of body
P ₀	12.7		± 0.2	Distance from center to center of driving hole
P ₁	3.85		± 0.5	Distance between center of driving hole and lead
P ₂	6.35		± 1.0	Distance between center of driving hole and body
F	5.0		$^{+0.8}_{-0.2}$	Lead spacing
W	18.0		± 0.3	Width of mounting tape
W ₀	5.0		MIN	Width of adhesive tape
W ₁	9.0		± 0.5	Distance between center of driving hole and edge of mounting tape
W ₂	1.5		MAX	Max. allowable distance between mount and adhesive tape side
H	18.5 \pm 0.75		20.0 \pm 0.75	Distance between center of driving hole and bottom of body
H ₀	16.0		± 0.5	Distance between center of driving hole and clinch of lead
L ₁	0.5		MAX	Protrusion of lead
ϕD_0	4.0		± 0.2	Dia. of driving hole
Δh	1.0		MAX	Off alignment of body
Δp	1.0		MAX	Off alignment of body
t	0.6		± 0.3	Sum of thickness for mounting and adhesive tape without lead dia.

YXA SERIES

Rubycon
RUBYCON CORPORATION

CODE : T8 (Positive leading)

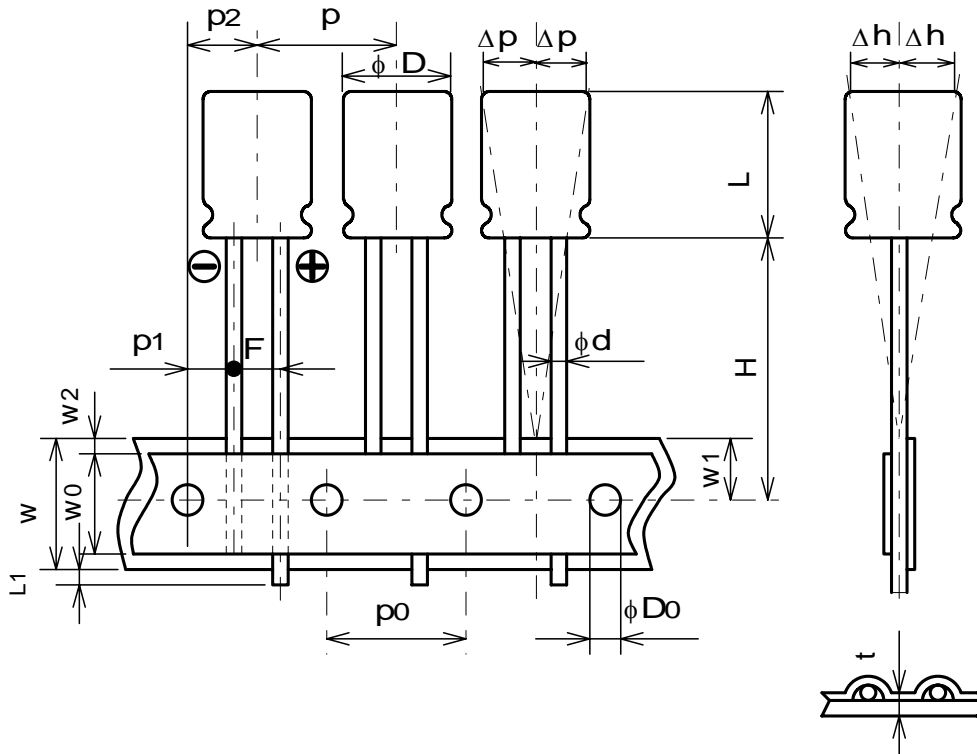
LEAD TYPE (DIA. $\phi 10$)



Symbol	Case Dia ϕ mm			Remarks
	$\phi 10$			
ϕd	0.6	± 0.05		Dia of lead
L	14.5MAX	18.0MAX	22.0MAX	Height of body
P	12.7	± 1.0		Distance from center to center of body
P ₀	12.7	± 0.2		Distance from center to center of driving hole
P ₁	3.85	± 0.5		Distance between center of driving hole and lead
P ₂	6.35	± 1.0		Distance between center of driving hole and body
F	5.0	± 0.8		Lead spacing
W	18.0	± 0.3		Width of mounting tape
W ₀	5.0	MIN		Width of adhesive tape
W ₁	9.0	± 0.5		Distance between center of driving hole and edge of mounting tape
W ₂	1.5	MAX		Max. allowable distance between mount and adhesive tape side
H	18.5	$^{+0.75}_{-0.5}$		Distance between center of driving hole and bottom of body
L ₁	0.5	MAX		Protrusion of lead
ϕD_0	4.0	± 0.2		Dia. of driving hole
Δh	1.0	MAX		Off alignment of body
Δp	1.0	MAX		Off alignment of body
t	0.6	± 0.3		Sum of thickness for mounting and adhesive tape without lead dia.

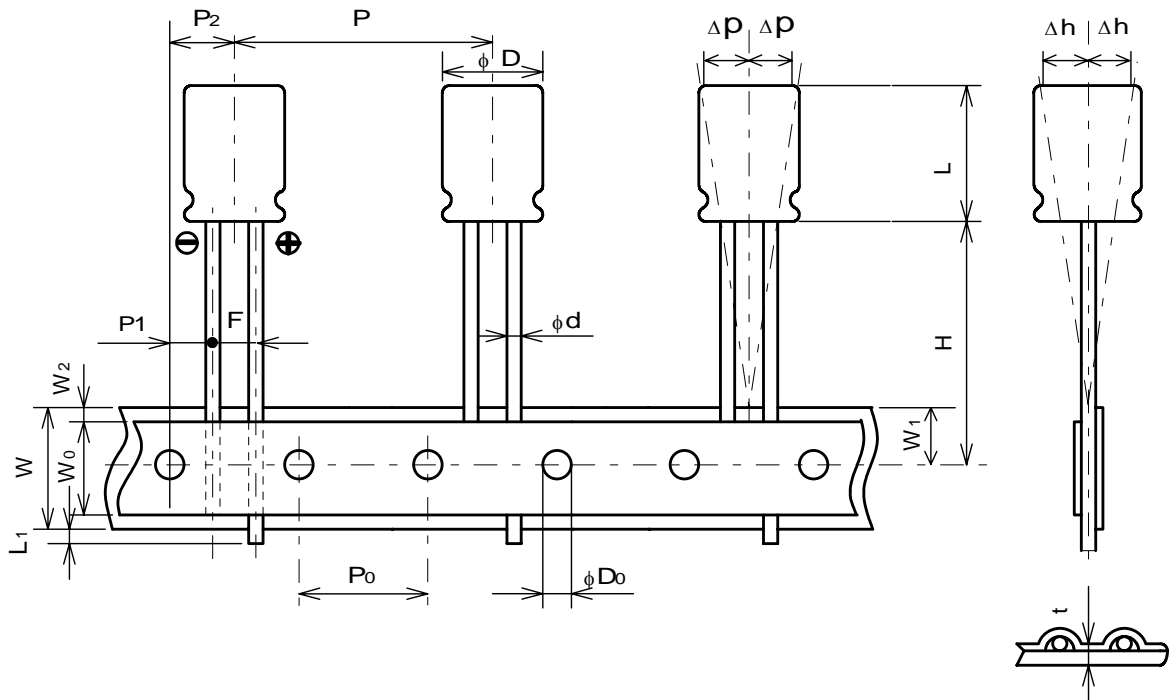
CODE : G4 (Positive leading)

LEAD TYPE (DIA. $\phi 12.5$)



Symbol	Case Dia ϕ mm		Remarks
	$\phi 12.5$		
ϕd	0.6	± 0.05	Dia of lead
L	22.0MAX	27.0MAX	Hight of body
P	15.0	± 1.0	Distance from center to center of body
P_0	15.0	± 0.2	Distance from center to center of driving hole
P_1	5.0	± 0.5	Distance between center of driving hole and lead
P_2	7.5	± 1.0	Distance between center of driving hole and body
F	5.0	± 0.8	Lead spacing
W	18.0	± 0.3	Width of mounting tape
W_0	5.0	MIN	Width of adhesive tape
W_1	9.0	± 0.5	Distance between center of driving hole and edge of mounting tape
W_2	1.5	MAX	Max. allowable distance between mount and adhesive tape side
H	18.5	$^{+0.75}_{-0.5}$	Distance between center of driving hole and bottom of body
L_1	0.5	MAX	Protrusion of lead
ϕD_0	4.0	± 0.2	Dia. of driving hole
Δh	1.0	MAX	Off alignment of body
Δp	1.0	MAX	Off alignment of body
t	0.6	± 0.3	Sum of thickness for mounting and adhesive tape without lead dia.

CODE : GC (Positive leading)

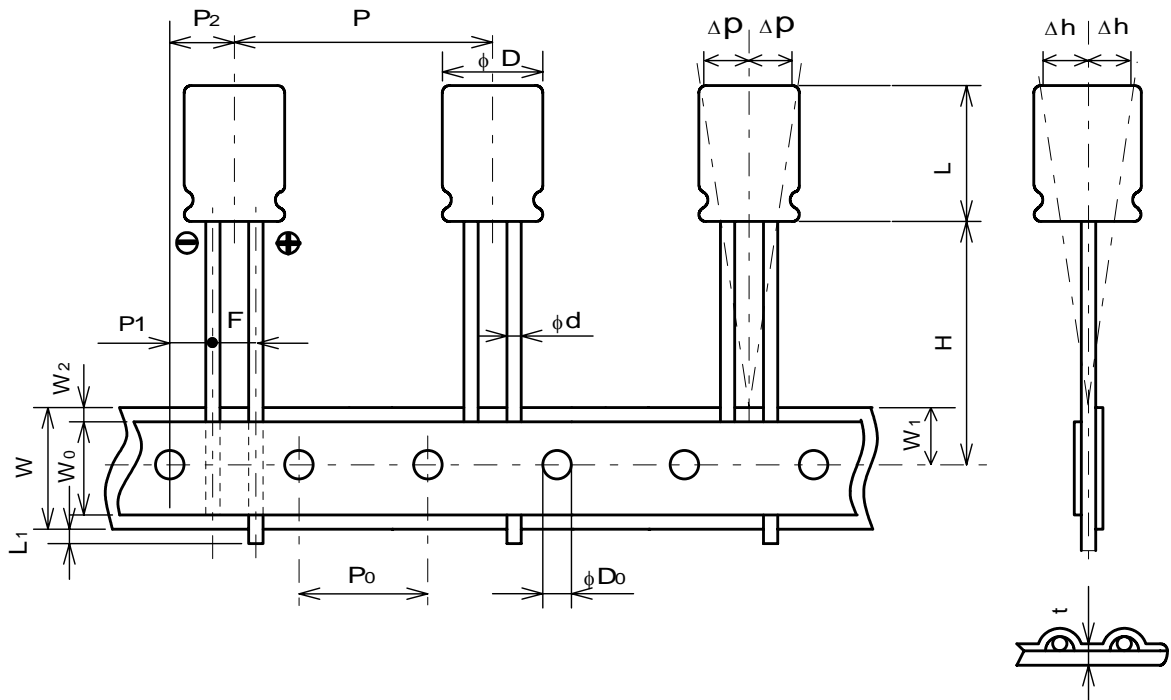
LEAD TYPE (DIA. $\phi 16$)

Symbol	Case Dia ϕ mm			Remarks
	$\phi 16$			
ϕd	0.8	± 0.05		Dia of lead
L	27.0MAX	33.5MAX	37.5MAX	Height of body
P	30.0	± 1.0		Distance from center to center of body
P_0	15.0	± 0.3		Distance from center to center of driving hole
P1	3.75	± 0.5		Distance between center of driving hole and lead
P2	7.5	± 1.0		Distance between center of driving hole and body
F	7.5	± 0.8		Lead spacing
W	18.0	± 0.3		Width of mounting tape
W_0	5.0	MIN		Width of adhesive tape
W_1	9.0	± 0.5		Distance between center of driving hole and edge of mounting tape
W_2	1.5	MAX		Max. allowable distance between mount and adhesive tape side
H	18.5	$^{+0.75}_{-0.5}$		Distance between center of driving hole and bottom of body
L1	0.5	MAX		Protrusion of lead
ϕD_0	4.0	± 0.2		Dia. of driving hole
Δh	1.0	MAX		Off alignment of body
Δp	1.0	MAX		Off alignment of body
t	0.6	± 0.3		Sum of thickness for mounting and adhesive tape without lead dia.

YXA SERIES

Rubycon
RUBYCON CORPORATION

CODE : GC (Positive leading)

LEAD TYPE (DIA. $\phi 18$)

Symbol	Case Dia ϕ mm		Remarks
	$\phi 18$		
ϕd	0.8	± 0.05	Dia of lead
L	37.5MAX	42.0MAX	Height of body
P	30.0	± 1.0	Distance from center to center of body
P_0	15.0	± 0.3	Distance from center to center of driving hole
P1	3.75	± 0.5	Distance between center of driving hole and lead
P2	7.5	± 1.0	Distance between center of driving hole and body
F	7.5	± 0.8	Lead spacing
W	18.0	± 0.3	Width of mounting tape
W_0	5.0	MIN	Width of adhesive tape
W1	9.0	± 0.5	Distance between center of driving hole and edge of mounting tape
W2	1.5	MAX	Max. allowable distance between mount and adhesive tape side
H	18.5	$^{+0.75}_{-0.5}$	Distance between center of driving hole and bottom of body
L1	0.5	MAX	Protrusion of lead
ϕD_0	4.0	± 0.2	Dia. of driving hole
Δh	1.0	MAX	Off alignment of body
Δp	1.0	MAX	Off alignment of body
t	0.6	± 0.3	Sum of thickness for mounting and adhesive tape without lead dia.

YXA SERIES

Rubycon
RUBYCON CORPORATION

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Aluminium Electrolytic Capacitors - Radial Leaded](#) category:

Click to view products by [Rubycon](#) manufacturer:

Other Similar products are found below :

[LXY50VB4.7M-5X11](#) [RFO-100V471MJ7P#](#) [ECE-A1EGE220](#) [B41041A7226M8](#) [B41044A7157M6](#) [NCD681K10KVY5PF](#)

[NEV1000M25EF-BULK](#) [NEV100M35DC](#) [NEV100M63DE](#) [NEV220M25DD-BULK](#) [NEV.33M100AA](#) [NEV4700M50HB](#) [NEV.47M100AA](#)

[NEVH1.0M250AB](#) [NEVH3.3M250BB](#) [NEVH3.3M450CC](#) [KME50VB100M-8X11.5](#) [SG220M1CSA-0407](#) [ES5107M016AE1DA](#)

[ESMG160ETD102MJ16S](#) [ESX472M16B](#) [227RZS050M](#) [476CKH100MSA](#) [477RZS050M](#) [B41793A9108Q1](#) [UVX1V101KPA1FA](#)

[UVX1V222MHA1CA](#) [KME25VB100M-6.3X11](#) [VTL100S10](#) [VTL470S10](#) [VTL470S16A](#) [511D336M250EK5D](#) [052687X](#) [ECE-A1CF471](#)

[NRE-S560M16V6.3X7TBSTF](#) [RGA221M1CTA-0611G](#) [ERZA630VHN182UP54N](#) [UPL1A331MPH](#) [SK035M0100AZS-0611](#)

[NEV1000M6.3DE](#) [NEV100M16CB](#) [NEV100M50DD-BULK](#) [NEV2200M16FF](#) [NEV220M50EE](#) [NEV2.2M50AA](#) [NEV330M63EF](#)

[NEV4700M35HI](#) [NEV4.7M100BA](#) [NEV47M16BA](#) [NEV47M50CB-BULK](#)