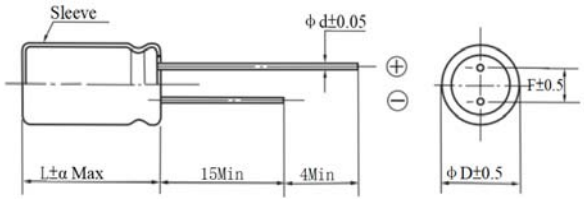
ALTERNATION HISTORY RECORDS 变更记录

Date 日期	Version 版本	Mark 标记	Page 页码	Description 描述	Drafter 制定者	Approver 审批者
2022-12-05	B	/	/	First release 首次发行	Doris Chang	/

Specification: **CBE336M1HH1TD11TW**

1. Dimensions: **Unit: mm**

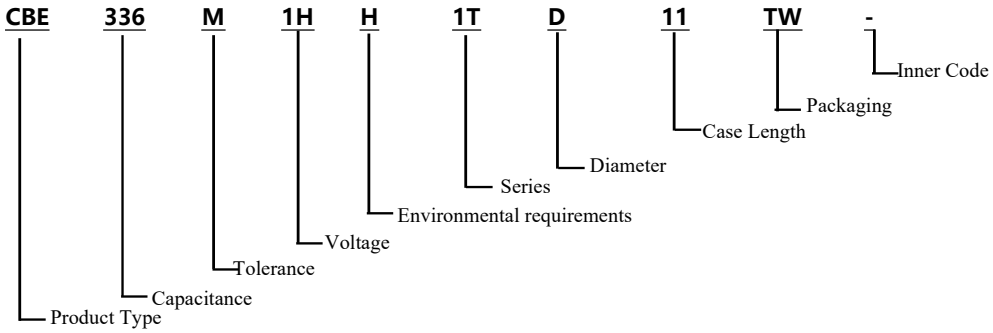


φD	5.0	6.3	8(L＜20)	8（L≥20）		
F	2.0	2.5	2.5/3.5	2.5/3.5		
φd	L≤7: 0.45 7＜L: 0.50			0.6		
φD	10	12.5/13	16	18	20	22
F	5.0		7.5	7.5	7.5	10
φd	0.6		0.8	0.8	0.8	1.0
α	L≤7:1.0 7＜L＜20: 1.5 L≥20:2.0					

2. Technical Parameter:

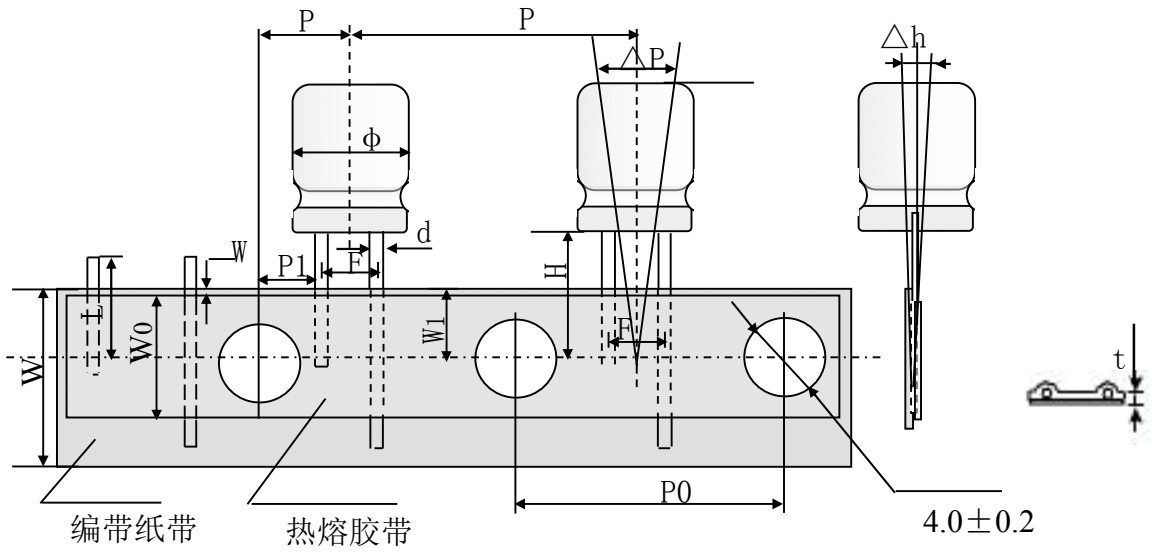
Aillen P/N	Cap. (μF) at +20°C	Cap. Tol.(%) at +20°C	Rate Volt. (VDC)	Surge Volt. (VDC)	Oper. Temp.	Case Size φD*L (mm)	Leakage Current Max at +20°C(μA)	Disspation Factor Max at +20°C 120Hz(%)	ESR Max +20°C 120Hz (Ω)	Impedance Max +20°C 100kHz (Ω)	Ripple Current Max at +105°C 100kHz (mA rms)	Ripple Current Max at +105°C 120Hz (mA rms)	Load Life at 105°C (hours)
CBE336M1HH1TD11TW	33	±20%	50	63	-40~105°C	5x11	16.5	12	6.03	/	/	101	2000

3.Part Number System:



5.Taping Dimension Straight foot braid:

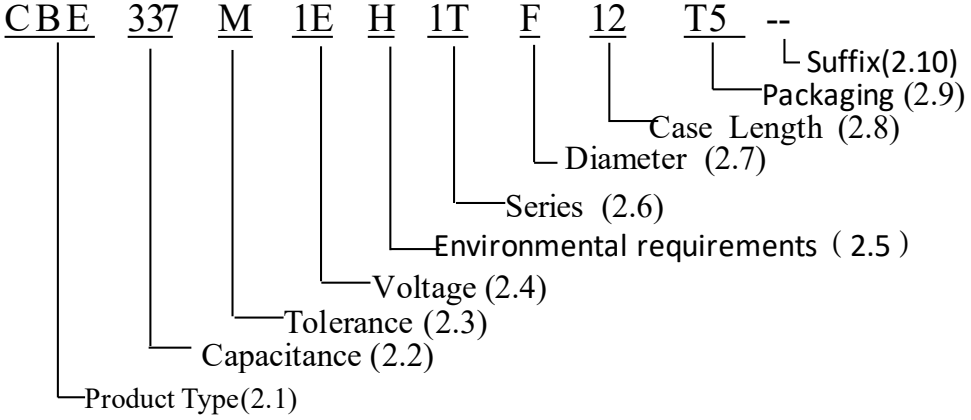
编带尺寸控制标准																		单位:mm
产品尺寸	编带型式	尺寸要求																
		d±0.05	P	P_0±0.2	F±0.5	F_2	W±0.5	W_1±0.5	H±0.5	H_0±0.5	W_0±0.5	t±0.3	△h±0.5	W_2	P_1±0.3	P_2±1.0	L	H-H_0 Max.
φ5x11~12	TW	0.50	12.7±1.0	12.7	2.0	$2.0^{+0.8}_{-0.5}$/$2.5^{+0.8}_{-0.5}$/$3.5^{+0.8}_{-0.5}$	18.0	9.0	23.0	--	12.0	0.6	0.0	0~1.5	5.35	6.35	≤11	--



1. Application

This specification applies to polar Aluminum electrolytic capacitor (foil type) used in electronic equipment.
Designed capacitor's quality meets IEC60384.

2. Part Number System



2.1 Product Type

Code	CBE
Product Type	Radial

2.2 Capacitance code

Code	335	336	337	338
Capacitance (μF)	3.3	33	330	3300

2.3 Capacitance tolerance

Code	M	V
Tolerance Range	±20%	-10%~+20%

2.4 Rated voltage code

Code	0J	1A	1C	1E	1V	1H	1J
Voltage (WV)	6.3	10	16	25	35	50	63
Code	**2A**	**2C**	**2D**	**2E**	**2V**	**2G**	**2W**
Voltage (WV)	100	160	200	250	350	400	450

2.5 Environmental requirements

Code	R	H
Environmental requirements	ROHS Requirements Remark:Product Set PVC Sleeve	ROHS Requirements and Halogen Free Remark:Product Set PET Sleeve

2.6 **Products Series Code**

Code	1T
Series	CD11T

2.7 **Diameter**

Code	B	C	D	E	F	G	J	K	L	M	N
Diameter	3	4	5	6.3	8	10	13	16	18	20	22

2.8 **Case length**

（1）When the code is number, it represent the actual height.(e.g. The code 07 indicates that the height is 7mm; The code 10 indicates that the height is 10mm)

（2）When the code is number + alphabet, please check the following the table:

Code	1A	1B	1C	1D	2A	3A
Case Length(mm)	11.5	12.5	13.5	14.5	21.5	31.5

2.9 **Packaging**

Code	RR	R2	T2	TB	T3	T5
Packaging	Bulk	F8,Lead Pitch=2.5mm, Bulk	Lead Pitch=2.0mm Taping	Lead Pitch=2.5mm Taping	Lead Pitch=3.5mm Taping	Lead Pitch=5.0mm Taping
Code	T7		CA	CB	CC	CD
Packaging	Lead Pitch=7.5mm Taping		Cutting the feet long=3.0mm	Cutting the feet long=3.5mm	Cutting the feet long=4.0mm	Cutting the feet long=4.5mm

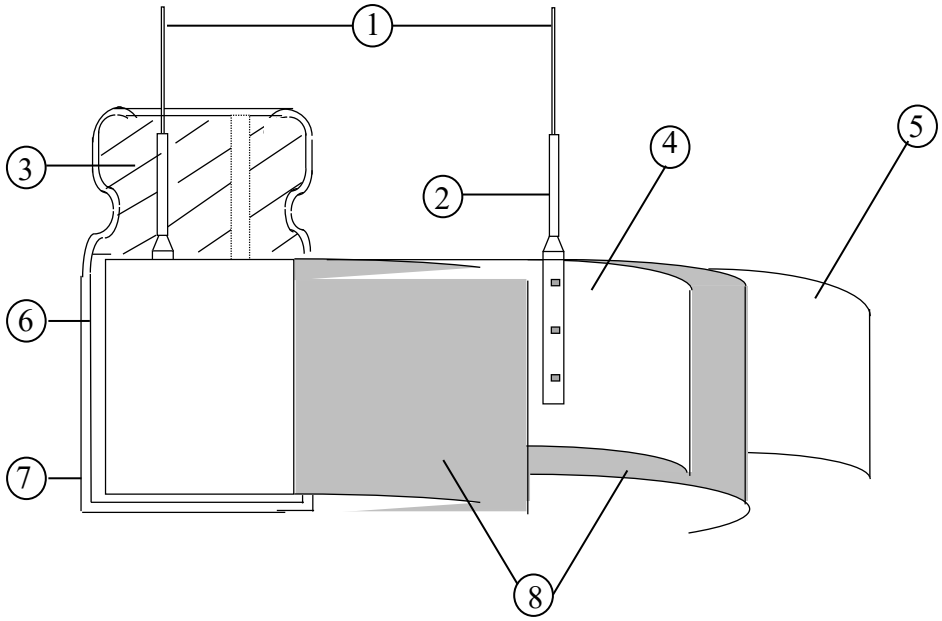
Note: The length of the product's cut feet starts from A=3.0mm. Every time it increases by 0.5mm, the English word is pushed forward one place, as shown in the following table:

Cutting length(mm)	Code
3.0±0.5	CA
3.5±0.5	CB
4.0±0.5	CC
4.5±0.5	CD
5.0±0.5	CE
6.0±0.5	CG
And so on--------	

2.10 **Suffix: Inner Code**

3. Construction:

Single ended type to be produced to fix the terminals to anode and cathode foil, and wind together with paper, and then wound element to be impregnated with electrolyte will be enclosed in an aluminum case. Finally sealed up tightly with end seal rubber, then finished by putting on the vinyl sleeve.



No	Component	Material
1	Lead line	Tinned CP wire (Pb Free)
2	Terminal	Aluminum wire
3	Sealing Material	Rubber
4	Al-Foil (+)	Formed aluminum foil
5	Al-Foil (-)	Etched aluminum foil or formed aluminum foil
6	Case	Aluminum case
7	Sleeve	PET
8	Separator	Electrolyte paper

4. Characteristics

Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient temperature	:15°C to 35°C
Relative humidity	: 45% to 85%
Air Pressure	: 86kPa to 106kPa

If there is any doubt about the results, measurement shall be made within the following conditions:

Ambient temperature	: 20°C ± 2°C
Relative humidity	: 60% to 70%
Air Pressure	: 86kPa to 106kPa

Operating temperature range

The ambient temperature range at which the capacitor can be operated continuously at rated voltage is (6.3~100WV) -40°C to 105°C, (160~450WV) -25°C to 105°C.

As to the detailed information, please refer to table 1.

Table 1

<table>
<tr><th colspan="2">Item</th><th>PERFORMANCE</th></tr>
<tr><td>4.1</td><td>Nominal capacitance (Tolerance)</td><td><Condition>
Measuring Frequency : 120Hz±12Hz
Measuring Voltage : Not more than 0.5V
Measuring Temperature : 20±2℃

<Criteria>
Shall be within the specified capacitance tolerance.</td></tr>
<tr><td>4.2</td><td>Leakage Current</td><td><Condition>
After DC Voltage is applied to capacitors through the series protective resistor (1kΩ±10Ω) so that terminal voltage may reach the reacted use voltage.
The leakage current when measured in 2 minutes shall not exceed the values of the following equation.
<Criteria>
6.3~100V:
I ≤0.01CV or 3 (μA) whichever is greater.
160~450V:
I≤0.03CV+40 (μA)
I: Leakage current (μA)
C: Capacitance (μF)
V: Rated DC working voltage (V)</td></tr>
<tr><td>4.3</td><td>tan δ</td><td><Condition>
See 4.1 Nominal capacitance, for measuring frequency, voltage and temperature.

<Criteria>
<table>
<tr><td>Working voltage (v)</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr>
<tr><td>tan δ(max.)</td><td>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></tr>
</table>
<table>
<tr><td>Working voltage (v)</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td><td>500</td></tr>
<tr><td>tan δ(max.)</td><td>0.15</td><td>0.20</td><td>0.20</td><td>0.24</td><td>0.24</td><td>0.24</td><td>0.24</td></tr>
</table>
For capacitance value >1000uF, add 0.02per another 1000uF</td></tr>
<tr><td>4.4</td><td>Rated voltage (WV)
Surge voltage (SV)</td><td>
<table>
<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></tr>
<tr><td>SV (V.DC)</td><td>8.0</td><td>13</td><td>20</td><td>32</td><td>44</td><td>63</td><td>79</td><td>125</td></tr>
<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></td><td></td></tr>
<tr><td>SV (V.DC)</td><td>200</td><td>250</td><td>300</td><td>400</td><td>450</td><td>500</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

4.5 Temperature characteristic IEC-60384-4 4.12

<Condition>

STEP	Testing Temperature(℃)	Time
1	20±2	Time to reach thermal equilibrium
2	-40(-25) ±3	Time to reach thermal equilibrium
3	20±2	Time to reach thermal equilibrium
4	105±2	Time to reach thermal equilibrium
5	20±2	Time to reach thermal equilibrium

<Criteria>

a. At +105℃, capacitance shall be within ±20% of their origin at +20℃, measured capacitance, tan δ shall be within limit of 4.3.
The leakage current value at +105℃ shall not more than 8 times the specified value.

b. At step 5, tan δ shall be within the limit of 4.3.
The leakage current value shall not more than the specified value.

c. At-40℃ (-25℃), impedance (Z) ratio shall not exceed the value of the following table.

Rated Voltage (V)	6.3	10	16	25~100	160~350	400~420	450~500
Z-25℃/ Z +20℃	5	4	3	2	4	6	15
Z-40℃/ Z +20℃	10	8	6	4	/	/	/

d. Capacitance, tan δ, and impedance shall be measured at 120Hz.

4.6 Terminal Strength IEC-60384-4 4.4

<Condition>

Tensile strength of terminals
Fixed the capacitor, applied force to the terminal in lead out direction for 10±1 seconds.

Bending strength of terminals
Fixed the capacitor, applied force to bent the terminal (1~4 mm from the rubber) for 90o within 2~3 seconds, and then bent it for 90o to its original position within 2~3 seconds.

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	10 (1.0)	5 (0.51)

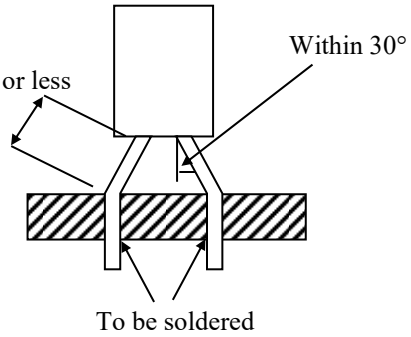
<Criteria>

No noticeable changes shall be found, no breakage or looseness at the terminal.

<table>
<tr>
<td>4.7</td>
<td>Load
Life test
IEC-60384-4 4.13</td>
<td><Condition>
According to IEC60384-4No.4.13 methods, The capacitor is stored at a temperature of 105±2°C with DC bias voltage plus the rated ripple current for 2000+48/0 hours. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) Then the product should be tested after 16 hours recovering time at atmospheric conditions. The result should meet the following table:

<Criteria>
The characteristic shall meet the following requirements.
<table>
<tr><td>Leakage current</td><td>Value in 4.2 shall be satisfied</td></tr>
<tr><td>Capacitance Change</td><td>Within ±20% of initial value.</td></tr>
<tr><td>tan δ</td><td>Not more than 200%of the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table>
</td>
</tr>
<tr>
<td>4.8</td>
<td>Shelf
Life test
IEC-60384-4 4.17</td>
<td><Condition>
The capacitors are then stored with no voltage applied at a temperature of 105±2℃ for 1000+48/0 hours. Following this period the capacitors shall be removed from the test chamber and be allowed to stabilized at room temperature for 4~8 hours. Next they shall be connected to a series limiting resistor(1k±100Ω) with D.C. rated voltage applied for 30min. After which the capacitors shall be discharged, and then, tested the characteristics.

<Criteria>
The characteristic shall meet the following requirements.
<table>
<tr><td>Leakage current</td><td>Value in4.2 shall be satisfied</td></tr>
<tr><td>Capacitance Change</td><td>Within ±20% of initial value.</td></tr>
<tr><td>tan δ</td><td>Not more than 200%of the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table>
Remark: If the capacitors are stored more than 1 year, the leakage current may increase. Please apply voltage through about 1KΩ resistor, if necessary.
</td>
</tr>
</table>

<table>
<tr>
<td>4.9</td>
<td>Surge test
IEC-60384-4 4.9</td>
<td>
<Condition>
Test temperature:15~35℃
Series resistor: $R=\frac{100\pm50}{C}$
R： protective resistor (KΩ)
C： nominal capacitance (μF)
Test voltage: Surge voltage item 4.4
No. of cycles: 1000cycles Each cycles lasts for 6±0.5min
“ON” for 30±5 s “OFF” for 5±0.5min.
<Criteria>
<table>
<tr><td>Leakage current</td><td>Not more than the specified value.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±15% of initial value.</td></tr>
<tr><td>tan δ</td><td>Not more than the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table>
Attention:
This test simulates over voltage at abnormal situation, and not be hypothesizing that over voltage is always applied.
</td>
</tr>
<tr>
<td>4.10</td>
<td>Vibration test
IEC-60384-4 4.8</td>
<td>
<Condition>
The following conditions shall be applied for 2 hours in each 3 mutually perpendicular directions.
Vibration frequency range ：10Hz ~ 55Hz
Peak to peak amplitude ：1.5mm
Sweep rate ：10Hz ~ 55Hz ~ 10Hz in about 1 minute
Mounting method:
The capacitor with diameter greater than 12.5mm or longer than 25mm must be fixed in place with a bracket.


<Criteria>
After the test, the following items shall be tested:
<table>
<tr><td>Inner construction</td><td>No intermittent contacts, open or short circuiting
No damage of tab terminals or electrodes.</td></tr>
<tr><td>Appearance</td><td>No mechanical damage in terminal. No leakage of electrolyte or swelling of the case. The markings shall be legible.</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr>
<td>4.11</td>
<td>Solderability Test
IEC-60384-4 4.6</td>
<td>
<Condition>
The capacitor shall be tested under the following conditions:
Soldering temperature : 245±3°C
Dipping depth : 2mm
Dipping speed : 25±2.5mm/s
Dipping time : 3±0.5s

<Criteria>
<table>
<tr><td>Coating quality</td><td>A minimum of 95% of the surface being immersed</td></tr>
</table>
</td>
</tr>
<tr>
<td>4.12</td>
<td>Resistance to solder heat Test
IEC-60384-4 4.5</td>
<td>
<Condition>
Terminals of the capacitor shall be immersed into solder bath at 260±5℃ for 10±1seconds or 400±10℃ for 3~4 seconds to 1.5~2.0mm from the body of capacitor.

Then the capacitor shall be left under the normal temperature and normal humidity for 1~2 hours before measurement.

<Criteria>
<table>
<tr><td>Leakage current</td><td>Not more than the specified value.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±10% of initial value.</td></tr>
<tr><td>tan δ</td><td>Not more than the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table>
</td>
</tr>
<tr>
<td>4.13</td>
<td>Damp heat test
IEC-60384-4 4.12</td>
<td>
<Condition>
Humidity test:
According to IEC60384-4 No.4.12 methods, capacitor shall be exposed for 500±8 hours in an atmosphere of 90~95%R H .at 40±2℃, the characteristic change shall meet the following requirement.

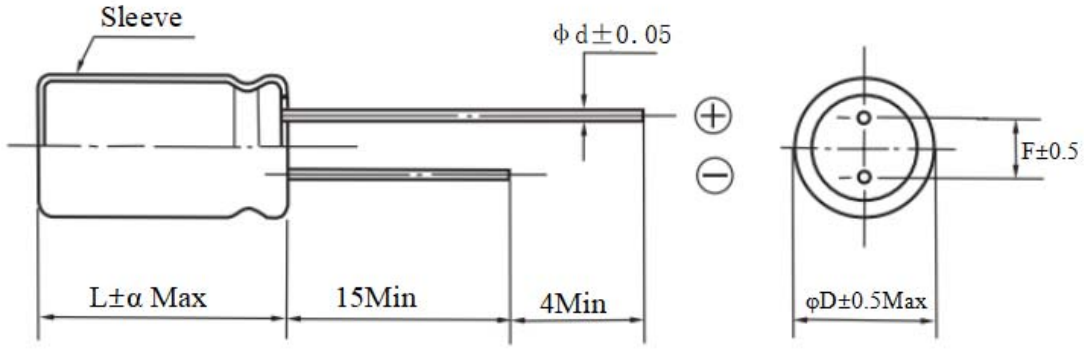
<Criteria>
<table>
<tr><td>Leakage current</td><td>Not more than the specified value.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±20% of initial value.</td></tr>
<tr><td>tan δ</td><td>Not more than 120% of the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr>
<td>4.14</td>
<td>Change of temperature Test
IEC-60384-4 4.7</td>
<td>
<Condition>
Temperature cycle:
According to IEC60384-4 No.4.7 methods, capacitor shall be placed in an oven, the condition according as below:
<table>
<tr><th>Temperature</th><th>Time</th></tr>
<tr><td>(1)+20℃</td><td>≤3 Minutes</td></tr>
<tr><td>(2) -25℃(-40℃)</td><td>30±2 Minutes</td></tr>
<tr><td>(3) +105℃</td><td>30±2 Minutes</td></tr>
<tr><td colspan="2">(1) to (3)=1 cycle, total 5 cycle</td></tr>
</table>
<Criteria>
The characteristic shall meet the following requirement.
<table>
<tr><td>Leakage current</td><td>Not more than the specified value.</td></tr>
<tr><td>tan δ</td><td>Not more than the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table>
</td>
</tr>
<tr>
<td>4.15</td>
<td>Vent test
IEC-60384-4 4.16</td>
<td>
<Condition>
The following test only apply to those products with vent products at diameter ≥∅6.3 with vent.
D.C. test
The capacitor is connected with its polarity reversed to a DC power source. Then a current selected from Table 2 is applied.

<Table 2>
<table>
<tr><th>Diameter (mm)</th><th>DC Current (A)</th></tr>
<tr><td>22.4 or less</td><td>1</td></tr>
</table>
<Criteria>
The vent shall operate with no dangerous conditions such as flames or dispersion of pieces of the capacitor and/or case.
</td>
</tr>
</table>

6. Dimensions:

Unit: mm



ϕD	5.0	6.3	8(L＜20)	8（L≥20）	10	12.5/13	16	18	22
F	2.0	2.5	2.5/3.5	3.5	5.0		7.5		10
ϕd	0.5			0.6	0.6/0.7		0.8		1.0
α	（L＜20) 1.5　　(L≥20) 2.0								

7. Multiplier for Ripple Current

Frequency coefficient

Coefficient Frequency (Hz) / Cap(μF)	60 (50)	120	500	1K	≥10K
0.1~47μF	0.80	1.00	1.20	1.30	1.50
100~1000μF	0.80	1.00	1.10	1.15	1.20
2200~4700μF	0.80	1.00	1.05	1.10	1.15

Temperature coefficient

Ambient Temperature	105	85	≤70
Coefficient	1.0	1.5	2.0

8. Marking:

Unless otherwise specified. Capacitor shall be clearly marked on it body.

(1) Brand: Aillen

(2) Polarity: 

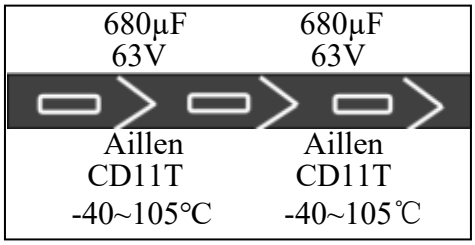
(3) Nominal capacitance: 680μF

(4) Rated voltage: 63V

(5) Series: CD11T

(6) Temperature Range: -40(-25)~+105℃

Casing Type:



Sleeve and printing color: White Printing on black Sleeve.