PA600V477M0D Specification

（600-V-470μF-2V-9mΩ）

1. Application range

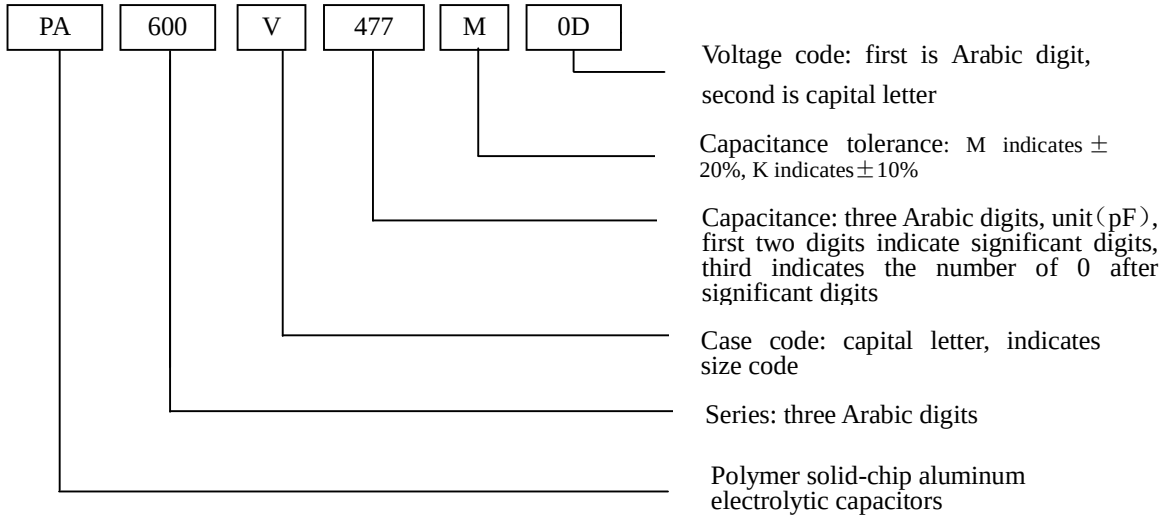
This Specifications applicable to Polymer solid-chip aluminum electrolytic capacitors for electronic equipment.

2. Standard source

Q/GGDZ 001-2005《Polymer solid-chip aluminum electrolytic capacitors》standard is drew up according to international standard IEC384-18《Fixed capacitors for use in electronic equipment Part 18: Sectional specification, Fixed aluminum electrolytic chip capacitors with solid and non-solid electrolyte》. The superior standard is GB/T 2693-2001《Fixed capacitors for use in electronic equipment Part 1: Generic specification》.

3. Explanation of part numbers

3.1 Type designation



3.2 Rated voltage code

Rated voltage（V）	2
Voltage code	0D

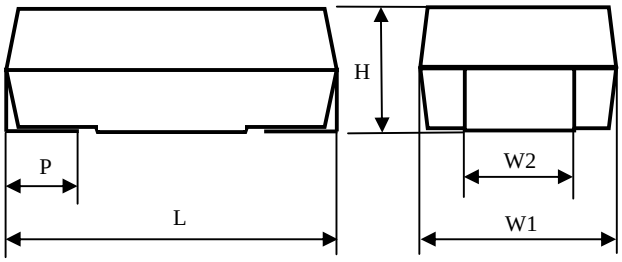
4. Product specifications

Item	Characteristics
Operating temperature range	-55～+105℃
Rated voltage (V_R)	2V.DC
Rated capacitance	470μF
Capacitance tolerance	376μF~564μF (M：±20%)/120Hz 20℃
Leakage current (L C)	≤37.6μA (2minutes)
Dissipation factor(tgδ)	≤0.06 (120Hz 20℃)
Equivalent series resistance (ESR)	≤9mΩ (100kHz 20℃)

Part numbers	Rated voltage（V.DC）	Rated capacitance 120Hz/20℃（μF）	tgδ 120Hz/20℃ max	L.C. max (μA) 2minutes	ESR 100kHz/20℃ max (mΩ)	Rated ripple current 100kHz/20~105℃ max (A)
PA600V477M0D	2	470	0.06	37.6	9	5.4

5. Configuration and dimension

5.1 Configuration



5.2 Size code and dimension

Unit:(mm)

Dimension / Size code	L±0.2	W1±0.2	H±0.2	P±0.2	W2±0.1
V	7.3	4.3	1.9	1.3	2.4

6. Characteristic

	Item	Characteristics		
1	Rated capacitance range	376μF~564μF (120Hz 20℃)		
2	L.C. (I_L)	≤37.6μA (2minutes)		
3	Dissipation factor (tgδ)	≤0.06 (120Hz 20℃)		
4	Equivalent series resistance (ESR)	≤9mΩ (100kHz 20℃)		
5	Resistance to soldering heat	Dip soldering Temperature：260±5℃ Dipping depth：1.5~2.0mm Dipping time：10±1s Stabilizing time：24±2h	Appearance	No visible damage, clear mark.
			Capacitance change	≤±5% of initial value
			Dissipation factor (tgδ)	≤0.06
6	Resistance to solvents	Deionized water or distilled water, resistivity≥1MΩ·cm。 Solvent temperature: 23±5℃ Test time：5±0.5min No wiping	Appearance	No visible damage, clear mark.
			Capacitance change	≤±5% of initial value

		Stabilizing time：48h		Dissipation factor (tgδ)	≤0.06
7	Bond strength of lead coating	Capacitor is Measured when circuit board is bent		Appearance	No visible damage, clear mark.
				Capacitance change	≤±5% of initial value
				Dissipation factor (tgδ)	≤0.06
8	Temperature change fleetly	θA: -55±3℃，θB: +105±3℃ 5 cycles，Time: 30min Stabilizing time :1～2h		Appearance	No visible damage, clear mark.
				Capacitance change	≤±10% of initial value
				Dissipation factor (tgδ)	≤0.06
				Leakage current (LC)	≤37.6μA
9	Climate order	Test temperature:：+105±3℃，duration: 16h First cycle of test Db: 24h Low temperature: -55±3℃，duration:2h Other cycle of test Db，duration:24h for each cycle，Stabilizing time: 1～2h		Appearance	No visible damage, clear mark.
				Capacitance change	≤±10% of initial value
				Dissipation factor (tgδ)	≤0.06
				Leakage current (LC)	≤37.6μA
10	Damp heat, Steady state	Test temperature: 60±2℃ Test humidity: 93^{+2}_{-3}%RH No load Test time: 21d Stabilizing time: 1～2h		Appearance	No visible damage, clear mark.
				Capacitance change	≤-20%~+40% of initial value
				Dissipation factor (tgδ)	≤0.12
				Leakage current (LC)	≤75.2μA
11	Endurance	Test temperature: +105±3℃ Applied voltage: Rated voltage Test time: 2000h Stabilizing time: 1～2h		Appearance	No visible damage, clear mark.
				Capacitance change	≤±20% of initial value
				Dissipation factor (tgδ)	≤0.09
				Leakage current (LC)	≤37.6μA
12	Characteristics at high and low temperature	Step 1: Test temperature: 20±2℃; initial value measuring	Step 2: Test temperature: -55±3℃	Capacitance change	≤±20% of initial value
				Dissipation factor (tgδ)	≤0.12
			Step 3：Test temperature: +105±3℃	Capacitance change	≤±20% of initial value
				Dissipation factor (tgδ)	≤0.06

				Leakage current (LC)	≤188μA
13	Charge and discharge	Test temperature:15～35℃ Cycles: 1000000 Charge: rated DC voltage， interior resistance of power and exterior series resistance according to RC=0.1s Charge time: 0.5s，Discharge time: 0.5s		Capacitance change	≤±20% of initial value
				Leakage current (LC)	≤37.6μA
14	Shelf life	Test temperature: +105±3℃ Test time: 500±24h Stabilizing time: 16h		Appearance	No visible damage, clear mark.
				Capacitance change	≤±20% of initial value
				Dissipation factor (tgδ)	≤0.06
				Leakage current (LC)	≤75.2μA
15	Surge	Test temperature: 15～35℃ Cycles: 1000 Applied Voltage: 1.25times of rated voltage Protection resistance: RC=0.1±0.05s Charge time: 30s，Discharge time: 5min30s		Appearance	No visible damage, clear mark.
				Capacitance change	≤±10% of initial value
				Dissipation factor (tgδ)	≤0.06
				Leakage current (LC)	≤37.6μA
16	Reverse voltage	Duration: Applying 0.15U_R DC reverse voltage at+105℃ for 125h， then applying U_R DC voltage at +105℃for 125h		Capacitance change	≤±20% of initial value
				Dissipation factor(tgδ)	≤0.06
				Leakage current (LC)	≤75.2μA

7. Marking

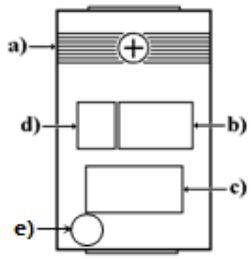
a) Lead end polarity (Positive)

b) Rated capacitance

c) Rated voltage

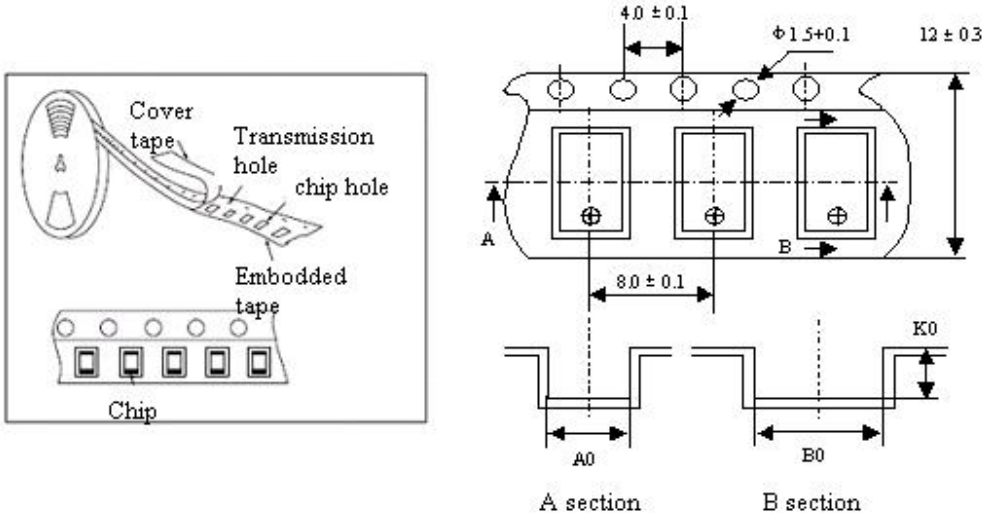
d) Company mark (G)

e) Lead end polarity (Negative)



8. Tape & reel packaging

Sketch map of embossed tape (Unit： mm)



Side code		Tape dimension (mm)									
Code	L×W1×H (mm)	P0 ± 0.10	P1 ± 0.10	A0 ± 0.20	B0 ± 0.20	W ±0.30	K0 ± 0.10	E1 ±0.10	F ± 0.10	D0 +0.10 -0.00	7"reel (chip)
V	7.3×4.3×1.9	4.0	8.0	4.6	7.6	12	2.3	1.75	5.5	1.5	1200

9.Application Guidelines

To ensure the stable quality of capacitor, and make full use of its capability, please read following guidelines before use:

9.1. Polarity

PA-Cap polymer solid chip aluminum electrolytic capacitors have polarity. Polarity must be identified before use. If the polarity is reversed, the leakage current of this capacitor will increase rapidly, even more it will make the circuit short.

9.2. Voltage

The application of over-voltage will increase the leakage current, so that capacitor will be damaged because of its interior temperature rise. The sum of DC voltage and ripple voltage should not exceed rated voltage.

9.3. Temperature

Must be used in or under the rated temperature. Operation at temperatures exceeding specifications will cause large changes in electrical properties. The potential deterioration will also lead to failure of capacitor. When thinking of the operating temperature of the capacitor, be sure to include not only the ambient temperature but also interior heat coming from the components.

9.4. Ripple current

Use Capacitor in permitted ripple current. When excessive ripple current is applied to the capacitor, it will cause increasing in leakage current, short circuits and decreasing in life.

9.5. Storage of capacitor

Capacitors should be stored in a moisture proof and without direct sunlight environment. The prefer temperature is 5-30℃, relative humidity lower than 60%RH.

Moisture Sensitivity Level: Level 3.

To maintain good mounting capability, please keep it as the package in factory, and would better be used out after opening the package. The remains should be taken back to the package and sealed.

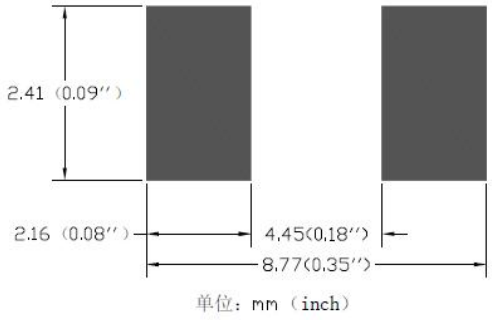
After the storage more than two years, drying treatment is first necessary and DC voltage is gradually applied up to rated voltage with 1KΩ/V series resistance and remain at rated voltage for 1h before use.

9.6. Capacitor measurement

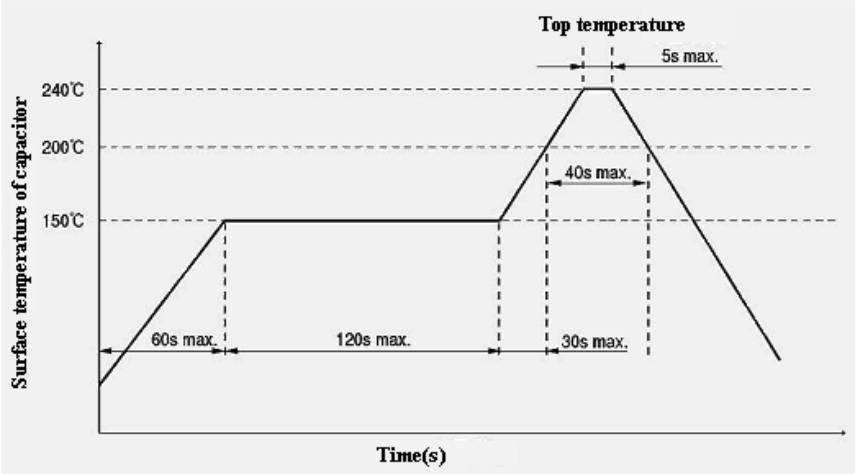
Excessive impact current resulted from charge and discharge hastily will cause increasing of leakage current, even short circuit. Therefore please contact a 1KΩ protective resistance in series, and applied voltage increases gradually up to rated voltage during leakage current measurement. Before other measurement, please discharge capacitor fully with a 1KΩ resistance in series.

9.7. Capacitor mounting

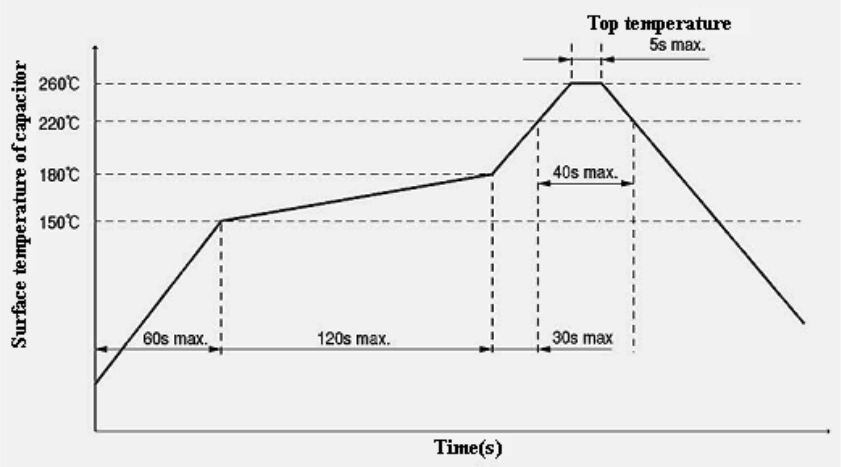
Recommend land-pattern:



PA-Cap is suit to re-flow soldering, recommended curve for soldering is as following.



Recommended curve for lead free soldering is as following:



When soldering, electric iron should not touch the case. Insure that the soldering temperature is no more than 350℃ and the time is shorter than 3 seconds.

Before mounting, please affirm if the lead size is suit to designed dimensions of circuit board. Do not distort and apply strong force to the capacitor during mounting, otherwise the electrical performance of the capacitor will be affected greatly, even damage. After it is soldered on PCB board, do not remove it with strong force.

In addition，re-flow soldering should be no more than twice.

9.8. Capacitors cannot be used in the following environments.

a) Contact directly with water, salt water or oil.

b) Full of deleterious chemically active gases

c) Exposed to direct sunlight.

10. Lead-Free Stance

All complete parts and homogenous materials of PA-Cap capacitors are lead-free.

11.Halogen-Free Stance

Almost all PA-Cap capacitors already comply with halogen-free requirements. Please contact us for details.

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