

承认

APPROVAL SHEET

客 户: CUSTOMER	Ropla	承认书编号: APP. NO.	D24010201T-A
系 列: SERIES	VQ	使用温度范围: OPERATION TEMP. RANGE	-55~+125°C

凯美产品料号 JAMICON PART NO.:	客户产品料号 CUSTOMER PART NO.:
YVQ687M020S0CNHA8L	

客户承认印 CUSTOMER'S APPROVAL STAMP 凯美电机股份有限公司(总部)

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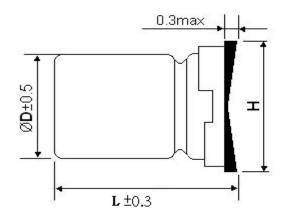
Revision Change History

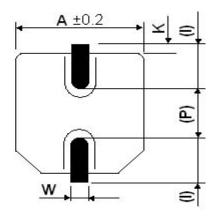
Version	Date	Res.	Change Description	Checked
版本	日期	责任人	变更描述	审核
0.1	2024/01/02	梁艷	The first issue	王冠中



Dimensions 尺寸



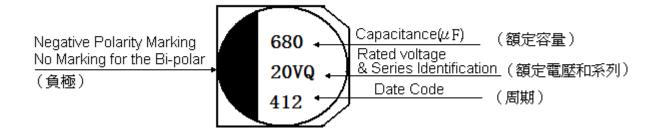




Electrical performance 电气特性

		静电容	容量	工作	损失角	阻抗值	洩漏电	滤波电流	滤波电流	负载寿命			
		量	公差	电压	DF(%)	$ESR(m\Omega)$	流	RC(mArms)	RC(mArms)	Load Life		尺寸	
		САР (μ	CAPT	WV	(MAX)	(MAX)	LC(µA)	(MAX)	(MAX)	(Hrs)	Di	imensio	ns
N O	料 号	F)	ol. (%)		120Hz	100kHz	(MAX)	100kHz	100kHz	125℃		(mm)	
О	Part NO	120Hz			20 ℃	20 ℃	20°℃	TX ≦105°C	105°C < TX				
		20°℃							≦125°C				
											φД	L	P
1	YVQ687M020S0CNHA8L	680	±20	20	12	12	2720	5400	1700	1000	10	12.2	4.6

Marking: case with red printing 标示: 红色印字铝壳



Notes: (特殊要求备注) Part Number 13th Code (料號第十三碼) C:ESR=12mΩ

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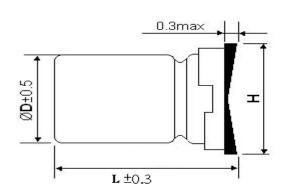


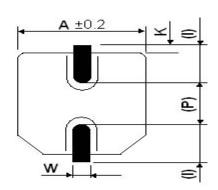
I. Scope 范围

This standard defines characteristics and dimensions for conductive polymer aluminum solid electrolytic capacitors named VQ series for general purpose.

此标准描述了固态铝质电解电容 VQ 系列的特性和尺寸。

Ⅱ. Construction & Dimensions 构造&尺寸图 (Unit = mm)





* Reference size 参考尺寸

Size	ΦВ	L	A	Н	I	W	P	K
CA1	5.0	5.8	5.3	6.5Max	2.2	0.65±0.15	1.5±0.2	0.35+0.15/-0.20
EA1	6.3	5.8	6.6	7.8Max	2.6	0.65±0.15	1.8±0.2	0.35+0.15/-0.20
EA4	6.3	7.7	6.6	7.8Max	2.6	0.65±0.15	1.8±0.2	0.35+0.15/-0.20
GA9	8	9.0	8.3	10.0Max	3.4	0.90±0.2	3.1±0.2	0.50±0.20
GA6	8	10.4	8.3	10.0Max	3.4	0.90±0.2	3.1±0.2	0.50±0.20
GA8	8	12.2	8.3	10.0Max	3.4	0.90±0.2	3.1±0.2	0.50±0.20
HA5	10	10.2	10.3	12.0Max	3.5	0.90±0.2	4.6±0.2	0.50±0.20
HA8	10	12.2	10.3	12.0Max	3.5	0.90±0.2	4.6±0.2	0.50±0.20

Ⅲ. Technical Data 技术参数

VQ Type VQ 系列

- -55 to +125° C Ultra low ESR of conductive polymer aluminum solid capacitors.
- -55~+125℃超低 ESR 的导电高分子铝固态电容。

VQ type capacitors have been developed for use in switching regulators, motherboard and other high frequency applications, which feature low equivalent series resistance, high ripple and inductance over wide temperature range.

VQ 系列电容器具有低 ESR、高纹波、应用范围广等特点,主要应用在整流器、主板和其他高频设 备上。



1. Standard test conditions 标准试验条件

Unless otherwise specified all tests shall be performed at, or referred to, an ambient temperature of 20°C and a relative humidity not greater than 60%.

所有试验应在环境温度 20℃和相对湿度小于等于 60%的条件下进行,除非另有规定。

2. Electrical characteristics 电气特性

2.1 Working voltage 工作电压: 2.5~80 Vdc

2.2 Operating temp. range 使用温度范围: -55 to 125℃

2.3 Capacitance 容量: 22~1200μF

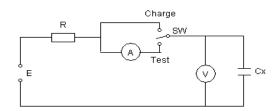
2.4 Leakage Current 漏电流:

Less than or equal to the value of the table.小于或等于特性表给的值。

(Measurements shall be made after a 2 minute charge at rated working voltage)

(额定电压充电2分钟后测试)

Measurement circuit 测试电路



2.5 Dissipation Factor 损失角: (tanδ)

Dissipation Factor at 120Hz/20°C shall not exceed the values given in the table below.

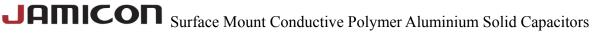
在 120Hz/20℃条件下的 DF 值不超过如下值。

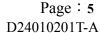
Mechanical Characteristics 机械特性

Lead Pull Test 导针拉力测试

Capacitors shall be with stand the pull test shown in the following table. 电容器的导针需要承受下表中所示的拉力测试。

lead diameter (mm)	load (kg)	test time (sec)
导针直径	负荷	测试时间(秒)
d≤0.5	0.5	30+5/-0
$0.5 < d \le 0.8$	1.0	30+5/-0
0.8 < d≤1.2	2.5	30+5/-0







4. Endurance characteristics 耐久特性

4.1 Load Life 负荷寿命

Rated voltage shall be applied to the capacitors for a period of 1000 hours at 125±2°C. We will examine the electric characteristics after getting them cooled down to room temperature.

The values must not be over those on following table.

当电容器在施加额定电压的情况下于 125±2℃放置 1000 小时之后, 我们取出电容器冷却至室温后测 试其电气特性。应满足以下条件:

Capacitance Change	within 20% of initial value	
容量变化	在初始值的±20%以内	
Dissipation Factor	not exceed 150% of specified value	
损失角	不超过规格值的 150%	
Equivalent Series Resistance	not exceed 150% of specified value	
等效串联电阻	不超过规格值的 150%	
Leakage Current	not exceed the specified value	
漏电流	不超过规格值	

4.2 Surge Voltage 浪涌电压

The surge DC rating is the maximum voltage to which the capacitor should be subjected under any conditions. This includes transients and peak ripple at the highest line voltage.

浪涌电压是指电容器在任何条件下包括在最高线路电压下的瞬变和峰值纹波电流,所应承受的 最大电压。

4.2.1 Capacitors, connected in series with 1000 ohm resistors, shall withstand the surge test voltage applied at the rated of 30 sec. on, 330 sec. off, for 1000 successive test cycles at normal temperature.(see the following table)

浪涌电压测试是指,室温下,电容器串联 1000 欧姆电阻后,承受额定浪涌电压充电 30 秒,放 电 330 秒共 1000 次充放电循环(如下表所示)

Rated Voltage 额定电压: 2.5~80 (Rated Voltage 额定电压) x 1.15 Surge Voltage 浪涌电压:



4.2.2 After the test, the capacitors shall meet the requirement specified in the following table. 浪涌测试后电容器应满足以下要求、

Appearance	No significant damage		
外观	无显著损坏		
Capacitance Change	Within±20% of the initial value		
容量变化	在初始值的±20%以内		
Dissipation Factor	Not more than 150% of the initial specified value		
损失角	不超过初始规格值的 150%		
Equivalent Series Resistance	Not more than 150% of the initial specified value		
等效串联电阻	不超过初始规格值的 150%		
Leakage Current	Not more than the initial specified value		
漏电流	不超过初始规格值的 150%		

4.3 Humidity Test 耐湿测试

The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 60°C,90 to 95%RH for 1000 hours. The values must not be over those on following table.

电容器负载工作电压,并置于60℃,90~95%RH环境下1000小时后,待温度恢复到20℃测试, 其各指标需满足如下要求:

Appearance	No significant damage		
外观	无显著损坏		
Capacitance Change	Within±20% of the initial value		
容量变化	在初始值的±20%以内		
Dissipation Factor	Not more than 150% of the initial specified value		
损失角	不超过初始规格值的 150%		
Equivalent Series Resistance	Not more than 150% of the initial specified value		
等效串联电阻	不超过初始规格值的 150%		
Leakage Current	Not more than the initial specified value		
漏电流	不超过规格值		

4.4 Solder ability Test 焊锡性测试

The following specifications shall be satisfied when the lead wires are tested in solder bath at 235±5°C for 2±0.5 seconds, more than 95% of the terminal surface shall be covered with new solder.

当导针在235±5℃的焊锡槽中浸渍2±0.5秒后,95%以上的端子表面应当要被新焊锡覆盖。



4.5 Resistance to soldering heat 焊锡耐热测试

Test condition 测试条件

4.5.1 Vapor phase soldering method 焊浴方法

Solder paste should be applied to the printed wiring boards and then the capacitors are mounted on it. After that, the capacitor should be maintained in the vapor phase bath at a temperature of $230 \pm 2^{\circ}$ C for 75 ± 1 seconds.

锡膏应先涂在印刷线路板上再安装电容器,电容器应在温度230±2℃条件下焊浴75±1秒。

4.5.2 Soldering iron method 烙铁方法

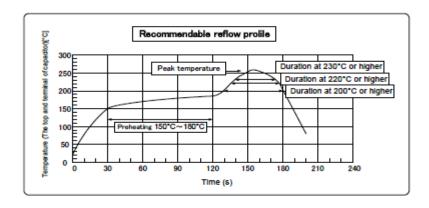
Temperature 温度: 400 ±10℃

Duration 持续时间: 3⁺¹₋₀ seconds

Capacitance Change	within $\pm 10\%$ of initial value.(2.5V: Within $\pm 15\%$ of initial value)		
容量变化	小于或等于初始值的±10%(2.5V小于等于初始值的±15%)		
Dissipation Factor	not exceed 130% of specified value		
损失角	不超过初始值的 130%		
Equivalent Series Resistance	not exceed 130% of specified value		
等效串联电阻	不超过初始值的 130%		
Leakage Current	not exceed the specified value		
漏电流	不超过规格值		

Recommendable reflow condition 回流焊推荐条件

Reflow profile 回流曲线



Peak temperature of the top and terminals of a capacitor	250 °C or less	260 °C or less
Preheating	150°C to 180°C	90 ± 30 seconds
Time of being at 200 °C and higher	Within 60 seconds	Within 60 seconds
Time of being at 220 °C and higher	Within 50 seconds	Within 50 seconds
Time of being at 230 °C and higher	Within 40 seconds	Within 40 seconds
The number of reflow	Twice or less	Only 1 time



Note 注:

- (1) For reflow, use a thermal conduction system such as infrared radiation (IR) or hot blast.
 - Vapor heat transfer systems (VBS) are not recommended.
 - 对于回流,使用热传导系统,如红外辐射(IR)或热风。不推荐蒸汽传热系统(VBS)。
- (2) Observe proper soldering conditions (temperature, time, etc.). Do not exceed the specified limits. 观察适当的焊接条件(温度、时间等)。不要超过指定限定。
- (3) An interval of reflow: In case two times reflow is necessary, CP-CAP shall be taken into reflow when its return to normal temperature.
 - 回流间隔:如果需要二次回流,待CP-CAP恢复到正常温度时也需考虑回流。
- (4) Measurement position of temperature: The top surface of capacitor and board's surface nearby terminal. 温度测量位置: 电容器的顶部表面及附近端子表面。
- (5) Measurement method: Thermo-junction is fixed on measurement position by silver paste or an adhesive of resin. Thermo-junction is Classification K, material CA with diameter 0.1mm.
 - 测量方法: 用银糊或树脂胶固定在测量位置。材料直径为 0.1mm 的 K 类热偶接头。
- (6) Heat stress to CP-CAP will be influenced by the different of reflow equipment, board material, size, and numbers of mounting. The following action must be practice through a practical test mounting before mass-production.
 - CP-CAP 所受到的热应力将受到不同的回流设备、板材、尺寸和安装数量的影响。在批量生产之 前,必须通过实际的测试安装来实践以下操作。
 - 1. Check your reflow condition whether it is within the above JAMICON Recommendable Reflow Condition or not.
 - 核实贵司的回流条件是否在上述我司所推荐的回流条件之内。
 - 2. Confirm CP-CAP's electric characteristic change before and after reflow.
 - 在回流前后确认 CP-CAP 的电气特性变化。

We would like to offer samples for your confirmation test and help you to measure the electric characteristic before and after reflow.

我司可提供样品进行测试确认,也可帮贵司测量回流前后的电气特性。



4.6 Resistance to vibration 振动试验

Total amplitudes 1.5mm (Frequency $10 \sim 55 \sim 10$ Hz/1 minute), Direction and duration of vibration it is done in the X. Y. Z axis direction for 2 hours each, with a total of 6 hours. Frequency Range $10 \sim 55 \text{ Hz}.$

总振幅 1.5 毫米(频率 10~55~10Hz/分钟), 振动方向及持续时间为: 以 X、Y 和 Z 轴各做两小时, 总共六小时, 频率范围 10~55Hz.

Capacitance	During test, measured value shall be stabilized						
容量	试验期间测量值应维持稳定						
Capacitance change	Within ±5% of initial value						
容量变化	在初始值的±5%以内						
Visual	NO damage						
外观	无异常						

4.7 Thermal shock 冷熱沖击

Capacitor is placed in an oven whose temperatures follow specific regulation to change.

电容需置放于符合下列指定温度转变之烤箱中.

Step 1 步骤一:30 ± 3 min. Lowest use temperature ±3℃ 30±3 分钟, 最低使用温度±3℃.

Step 2 步骤二:常溫 Normal temperature, ≤ 3 min. 常溫 Normal temperature,小等于 3 分钟.

Step 3 步骤三:30 ± 3 min. Highest use temperature ±2℃ 30±3 分钟, 最高使用温度±2℃

Step 4 步骤四: 常溫 Normal temperature, ≤ 3 min. 常溫 Normal temperature,小等于 3 分钟.

Step 1 \sim 4, 5 cycles. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made.

重复步骤一到四共10次,并将电容置放于标准环境中1~2小时后方可做测试.

Visual	NO damage						
外观	无异常						
Capacitance Change	Within ±20% of initial value						
容量变化	在初始值的±20%以内						
Dissipation Factor 损失角	Not more than 150% of the initial specified value 不超过初始规格值的 150%						
Leakage Current	Not more than the specified value						
漏电流	不超过规格值						
Equivalent Series Resistance 等效串联电阻	Not more than 150% of the initial specified value 不超过初始规格值的 150%						



4.8 Low temperature storage test 低温放置试验

The capacitor without rated voltage at the lowest operation temperature 96 hours, after 16 hours in room temperature, should do final measurements, the values are as following:

在最低工作溫度下, 无負荷放置 96 小時, 试验后, 室溫放置 16 小時后做最终测试, 电容器应满足以下要求:

Visual	NO damage						
外观	无异常						
Capacitance Change	Within ±20% of initial value						
容量变化	在初始值的±20%以内						
Dissipation Factor 损失角	Not more than 150% of the initial specified value 不超过初始规格值的 150%						
Leakage Current	Not more than the specified value						
漏电流	不超过规格值						
Equivalent Series Resistance 等效串联电阻	Not more than 150% of the initial specified value 不超过初始规格值的 150%						

IV. Guide To Application 应用指南

1. Maximum Ripple Current 最大纹波电流

- 1.1 Maximum rms. ripple current at 125°C, 100 kHz is given in the table. 最大纹波电流于 125℃, 100kHz 条件下测得
- 1.2 When capacitors are operated at frequency other than 100 kHz, the maximum rms. ripple currents must be multiplied by the factors shown in below table.

当电容器在 100kHz 以外的频率下工作时,其纹波电流需乘于一个相对应的系数,如下表所示: Compensation factor of ripple current versus frequency

纹波电流补偿系数与频率

Frequency 频率(Hz)	120≦f<1k	$1k \le f < 10k$	$10k \le f < 100k$	$100k \leq f \leq 500k$
Coefficient 系数	0.05	0.3	0.7	1

2.Applying voltage 施加电压

Do not apply an over voltage exceeding the full rated operating voltage of the capacitors. The over voltage may cause increasing the leakage current and giving short circuit.

电容器施加的电压不得高于额定电压,因为过压可能会导致产品漏电流上升和短路现象的发生。

3. Ripple voltage 纹波电压

Ripple voltage must not exceed the following:

纹波电压不得超过以下:



The sum of the DC voltage plus the AC ripple voltage must not exceed the rated DC voltage. The DC voltage plus the peak AC voltage must not cause a voltage reversal more than 1.5 volts.

直流电压加上交流纹波电压的总和不得超过额定直流电压。直流电压加上峰值交流电压的总和不 会导致1.5 伏以上的反向电压。

4.Circuit Design 电路设计

Verify the following before designing the circuit:

设计电路之前,需查证以下事项:

4.1 The electrical characteristics of the capacitor will vary depending on differences in temperature and frequency. Perform circuit design after verifying the scope of these factors.

电容器的电气特性随使用温度、频率的改变而变化。电路设计值需先确认温度及频率等。

4.2When connecting two or more capacitors in parallel, ensure that the design takes current balancing into account.

当两个或两个以上的电容器并联时,设计需考虑电路平衡。

4.3 When two or more capacitors are connected in series, variability in applied voltage may cause over-voltage conditions, Contact Jamicon before using capacitors connected in series.

如使用两个及以上的电容器并联时(电压的变化可能导致过压),请先联系我们。

5. Failures and Service Life 失效和使用寿命

5.1 Failure Modes 失效模式

The main causes of failure are thermal stresses caused by the thermal use environment, along with electrical stresses and mechanical stresses. The most common capacitor failure mode is the short circuit mode, where the following phenomenon may occur after shorting:

电容器失效的主要原因是环境温度引起的热应力以及电应力和机械应力。最常见的电容器失效 为短路,发生短路后可能会出现现象如下:

5.1.1 If the pass-through current when the product is shorted is 1A or less, then the product becomes heated, but no effects are visible, even when the current is continuously carried. However, larger currents may cause substantial internal heating that causes the rubber seal to separate from the case, causing the release of an odorous gas.

产品发生短路时,如短路电流≤1A,则产品只会变得很热,即使有持续的电流也不会出现其他 可见的变化。然而,如果短路电流>1A,产品由于短路使内部发热膨胀,最终可能导致胶盖与 铝壳分开,释放出难闻气体。

5.1.2 Some flammable materials are used in the capacitor. If an extremely large electric current flows through the capacitor after shorting, the shorted part may spark, and in a worst-case scenario, may ignite. Consequently, ensure safety by fully considering the design issues described below when using this capacitor in equipment where safety is a priority.

容器应用了一些可燃材料。如果短路电流很大时,一旦发生短路则可能引发火花,甚至使电容 器发生燃烧。因此,使用此电容器在需优先考虑设备安全时,应充分考虑以下问题。

- Increase safety by using in conjunction with a protective circuit or protective equipment. 链接保护电路或防护设备增强安全系数。
- Install measures such as redundant circuits so that the failure of a part of equipment will not cause

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unstable operation.

安装冗余电路以便部分失效时不会引起设备运作不稳定。

5.2 Service Life 使用寿命

This series uses rubber as the sealing material, so the service life depends on the thermal deterioration of the rubber. Consequently, it is recommended to use the capacitor at a lower temperature than the maximum temperature for the capacitor category as much as possible.

电容器使用胶盖作为密封材料,故产品使用寿命取决于胶盖的热老化。因此,电容器需在产品 目录书中最高温度以下使用。

6. The Operation of Devices 装置操作

6.1 Do not touch the capacitor terminals directly.

不能直接地接触电容端子。

6.2 Do not short-circuit the terminal of a capacitor by letting it come into contact.

电容器的端子之间不可有导电体以免造成短路。

7. Storage Condition 储存条件

We recommend the following condition for storage.

我们推荐以下条件储存。

(a) Store capacitors in a cool, dry place. Store at a temperature between 5 and 35° C, with a humidity of 75% or less.

电容器储存在通风,干燥的地方。储存温度是 5~35℃,相对湿度低于 75%。

- (b) Store the capacitor in a location free from direct contact with water, salt water, and oil. 电容器不能储存在潮湿的条件下,如水、盐水喷雾或油雾。
- (c) Store in a location where the capacitor is not exposed to toxic gas, such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or chlorine compounds, bromine or other halogen gases, methyl bromide or other halogen compounds, ammonia, or similar.

不要将电容器储存在充满有害气体的环境下,如硫化氢、二氧化硫、亚硝酸、氯或氯化合物、 溴或其他卤素气体, 甲基溴或其他卤素化合物, 氨等等。

(d) Store in a location where the capacitor is not exposed to ozone, ultraviolet radiation, or other radiation.

电容器储存不应暴露在臭氧、紫外线辐射或射线中。

- (e) It is recommended to store capacitor in their original packaging wherever possible. 电容器尽可能以原始的包装储存。
- (f) To keep good solder ability, store SMD types for not more than six months (after delivery) before opening.

为保持良好的焊锡性, SMD 型电容器未开封前储存不得超过 6 个月(在交货后)。 (Refer to the following table 参考如下表格

	Before unseal 拆封前	After unseal 拆封后			
SMD type	Within 6 months after delivery	Within 30 days from opening			
SMD 型	(Unopened condition)	(Packaged condition with carrier tape)			
	在交货后的6个月内(未开封状态)	自拆封起30天内(胶带密封)			

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8. Transport 运输

These capacitors are capable of withstanding in transit conditions where storage temperature may range from -55°C to +105°C and the altitude may reach 200,000 feet.

电容器运输过程,应控制产品储存温在-55~+125℃内,运输中最大高度不能超过 200000 英尺

9. Cleaning agents 清洗剂

Halogenated hydrocarbon cleaning solvents are not recommended for use in cleaning capacitors supplied with exposed end seals. Where cleaning with a halogenated solvent is desired, capacitors should be ordered with a Epoxy-coated end seal.

不能用含卤代烃的洗涤剂清洗电容器露出的封口,若必须使用卤代烃清洗时,需将封口用环氧 树脂涂层覆盖后再清洗。

10.Others 其他

(1) All the Jamicon capacitors, which are authenticated by the SGS, and the test report shows that the inspection results of Hexavalent Chromium VI (Cr(VI)), Cadmium (Cd), Mercury (Hg), Lead (Pb), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ether (PBDEs) comply with the RoHS requirements.

凱美所有电容器经 SGS 认证测试报告中所检测的六价铬 (Cr^{6+}) 、镉(Cd)、汞 (Hg)、铅(Pb)、 多溴联苯(PBBs)和多溴联苯醚(PBDEs)均符合 RoHS 要求。

- (2)Satisfied characteristic JIS C 5101 满足 JIS C 5101 特性需求
- (3) Aluminum Electrolytic Capacitors may be damaged by corrosion which is caused by any halogenated hydrocarbon solvents.

卤代烃类试剂可能会腐蚀铝电解电容器。

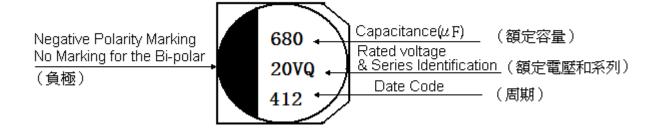
Please let us know in advance the solvent name and conditions for your PCB cleaning 请提前告知我们您 PCB 使用的清洗剂名称和使用条件。

V. Marking (For example) 标识(示例)

Capacitors shall be marked with rated capacitance; rated DC working voltage range and the date code of manufacture.

电容器应当标明额定容量,额定电压及生产周期。

The cathode lead will be identified with minus signs (red color) on the top of the case. 负导针以负号(红色)标识在铝壳顶部。





JAMICON Surface Mount Conductive Polymer Aluminium Solid Capacitors

D24010201T-A

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Remark: Date code numbering system 备注: 周期编号系统

Manufactured year 生产年份

Year 年	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code 编码	0	1	2	3	4	5	6	7	8	9

Manufactured month 生产月份

Month 月	1	2	3	4	5	6	7	8	9	10	11	12
Code 编码	1	2	3	4	5	6	7	8	9	A	В	С

Aluminum shell Manufactured Vender 鋁殼生产廠商

Vender 廠商	Qingquan 庆泉	Yuankang 源康	D.N Tech	Aoxing 奧星
Code	1	2	3	4

S:車載專用印字代碼

VI. Catalog numbering(For example)目录编码(示例)

