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东莞市科尼盛电子有限公司
DONGGUAN KNSCHA ELECTRONICS CO., LTD.

Specification for approval

(Customer Name)	和风科技（香港）有限公司
(Product Name)	SMD Aluminum Electrolytic Capacitor
(Customer part number)	
(KNSCHA number)	189RV0098
(Specifications)	SMDE/C 330UF/50V 10X10.5mm GVM

(Manufacture) Approval			(Customer) Approval		
(Fiction)	(Chief)	(Approval)	(Inspect)	(Chief)	(Approval)
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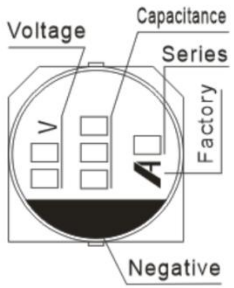
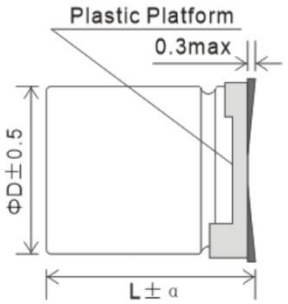
Change Records

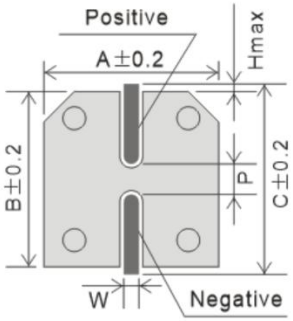
Version	Reason of Change	Contents	Effective date
RDA23101104A			2023-10-11

Table of specification and characteristics

Table 1





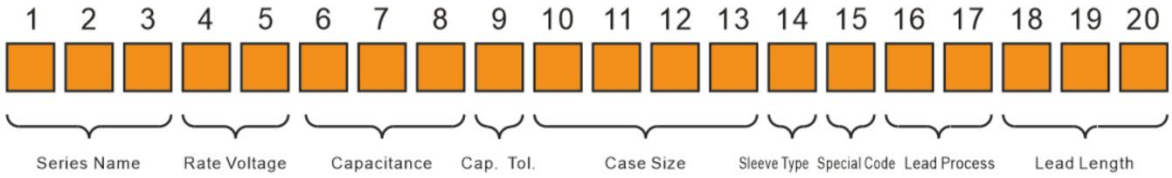


Case	Φ10x10.5
A	10.3
B	10.3
C	11.0
P	4.7
L	10.5
α	±0.5
W	0.8~1.1
H	0.5max.

*Marking color：Black

Customer P/N	Series	Rated Capacitance (uF)	Rated Voltage (V)	Case		Capacitance Tolerance (%)	Dissipation factor (%, Max.)	Leakage Current (uA, Max.)	Surge Voltage (V)	Impedance Max. (mΩ, 20℃, 100KHz)	Max. Ripple Current (mA rms) (105℃, 100KHz)	Endurance (Hrs, at 105℃)	Vender P/N
				Diameter (mm)	Height (mm)								
	GVM	330	50	10	10.5	-20~+20	10.0	165	57.5	120	900	5,000	189RV0098

Explanation of part numbers



(1-3)

系列
GVS
GVT
GVE
GVZ
GVM
GVL
GVU
GVY
GVF
GVR
GVG
GVD
GVP
GVT
GVC
GVN
GVK
GVA

(4-5)

工作电压 (W.V)	代码
4	0G
6.3	0J
10	1A
16	1C
25	1E
35	1V
50	1H
63	1J
80	1K
100	2A
125	2B
160	2C
180	2Z
200	2D
220	2P
250	2E
315	2F
330	2L
350	2V
400	2G
420	2Q
450	2W
500	2H

(6-8)

静电容量 (uF)	代码
0.1	104
0.22	224
0.33	334
0.47	474
1	105
2.2	225
3.3	335
4.7	475
10	106
22	226
33	336
47	476
68	686
100	107
220	227
330	337
470	477
680	687
1000	108
2200	228
3300	338
4700	478
6800	688

(9)

容量误差 (%)	代码
+5 -5	J
+10 -10	K
+15 -15	L
+20 -20	M
+30 -30	N
+20 -10	V
+30 -10	Q
+50 -10	T
+50 -20	S
+80 -20	Z
+20 -0	R

(10-13)

产品尺寸 ΦDxL	代码
4x5(5.4)	0405
4x5.7	0406
4x7	0407
5x5(5.4)	0505
5x5.7	0506
5x7	0507
5x11	0511
6.3x5(5.4)	0605
6.3x5.7	0606
6.3x7	0607
6.3x7.7	0608
6.3x8.7	0609
8x6.5	0806
8x9	0809
8x10(10.5)	0810
8x11(11.5)	0811
8x12	0812
10x10(10.5)	1010
10x12.5	1012
10x14	1014
12.5x13.5	1213
12.5x16	1216
16x16.5	1616

(14)

胶管材质	代码
Sleeveless	C
PVC	V
PET	E

(15)

特殊码	代码
无特殊	N
引线直径特殊	D
凸台胶粒	C

(16~17)

引线加工成型		代码
长脚品		RB
V-Chip贴装品		VC
Snap-in贴装品		SN
绿胶贴装品		ST
剪脚	直脚剪脚	CC
	成型5.0mm脚距剪脚	FC
	成型2.5mm脚距剪脚	CM
	直脚折曲剪脚	SC
	成型后折曲剪脚	FS
	右弯脚	BR
	左弯脚	BL
编带	直脚编带	TS
	成型2.5mm脚距编带	TP
	成型5.0mm脚距编带	TF

(18~20)

剪脚长度	代码
可用剪脚脚长2.8mm	028
可用剪脚脚长3.0mm	030
可用剪脚脚长3.2mm	032
可用剪脚脚长10.0mm	100

■ Conformance Standard

This specification covers “GVM series” surface mount type aluminum electrolytic capacitors with non-solid electrolyte. This approval sheet consulted the institute of IEC 60384-1 and IEC 60384-4.

■ Operating Temperature Range

Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage.

Rated Voltage	Temperature
6.3 ~ 100 VDC	-55 ~ +105℃

■ Condition of test

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

Ambient temperature：15℃ to 35℃

Relative humidity：45% to 75%

Air pressure：86Kpa to 106Kpa

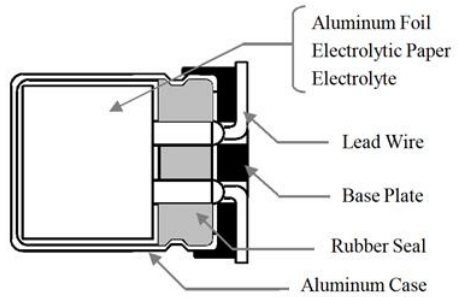
If there may be doubt on the results, measurements shall be made within the following limits.

Ambient temperature：20±1℃

Relative humidity：63% to 67%

Air pressure：86Kpa to 106Kpa

■ Construction



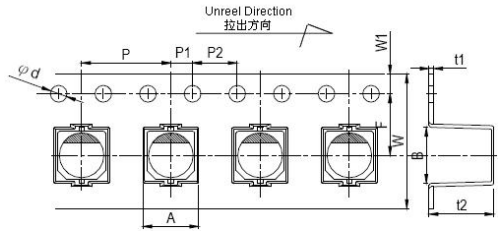
	Parts Name	Materials
1	Aluminum Foil	Aluminum
2	Separator Paper	Manila Hemp
3	Electrolyte	Gamma-Butyrolactone
4	Case	Aluminum and PET
5	Rubber Seal	Butyl Rubber
6	Lead Wire	Tinned Copper-Clad Steel Wire
7	Base Plate	Thermo-plastic Resin

■ Ripple Current Frequency Coefficient

Frequency (Hz) / Capacitance (uF)	50	120	1k	10k	10k up
Under 100	0.45	0.65	0.85	0.95	1.00
100 ~ 2200uF	0.50	0.70	0.90	0.95	1.00

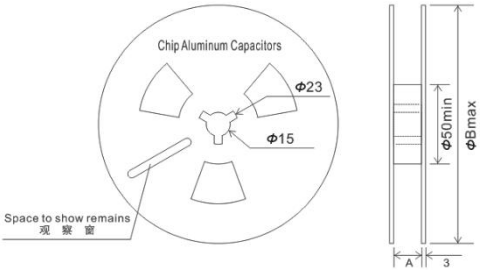
※The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

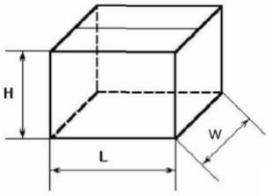
■ Taping Specifications：



Case	W (mm)	W1 (mm)	F (mm)	P (mm)	P1 (mm)	P2 (mm)	A (mm)	B (mm)	t1 (mm)	t2 (mm)
Tolerance	±0.3	±0.15	±0.1	±0.1	±0.1	±0.1	±0.2	±0.2	±0.1	±0.2
Φ10x10.5	24	1.75	11.5	16	2	4	10.7	10.7	0.4	11

■ Parking：

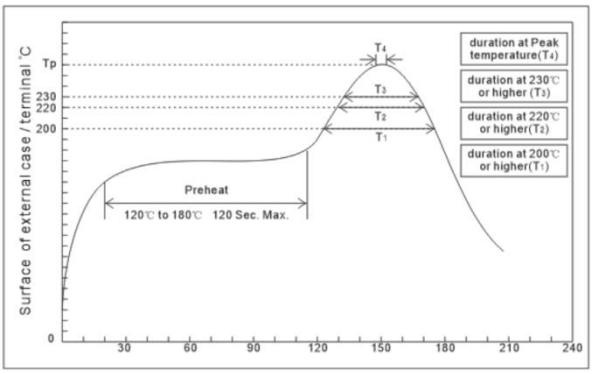




Case	Reel	Box	A±0.3(mm)	B±2(mm)	Box Size (L*W*H)
Φ10x10.5	500	5000	26	382	395*395*315

■ Soldering Conditions：

1. The following conditions are recommended for air convection and infrared reflow soldering on the SMD products onto a glass epoxy circuit boards by cream solder. The temperatures shown are the surface temperature values on the top of the can and on the capacitor terminals.
2. Reflow should be performed twice or less.
3. Please ensure that the capacitor became cold enough to the room temperature (5 to 35℃) before the second reflow.

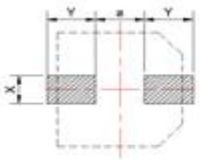


Note：

1. Average ramp-up rate is 5℃/second max.
2. Ramp-down rate is 6℃/second max.
3. Time from 25℃ to peak temperature is 6 minutes max.

Category	Time maintained above 200℃ (T1)	Time maintained above 220℃ (T2)	Time maintained above 230℃ (T3)	Range of Peak		Reflow Number
				Temp.	Times	
Φ10	60 sec.	50 sec.	30 sec.	255℃ Max.	5sec Max.	2 times or less

4. Recommended Solder Land on PC Board



Size	X	Y	a
Φ10	2.5	4.0	4.0

■ Product Characteristics

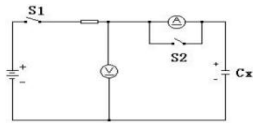
1. Nominal Capacitance

Test Method	Performance
Measuring Frequency:120Hz Measuring Circuit：Series equivalent circuit. Measuring Voltage：0.5Vrms or less +1.5 to 2.0 VDC	Refer to Table 1

2. Dissipation Factor

Test Method	Performance
Testing condition are the same as 1.0 for nominal capacitance.	Refer to Table 1

3. Leakage Current

Test Method	Performance
The rated voltage shall be applied across the capacitor and its protective resistor which shall be 1000±10Ω. The leakage current shall then be measured after an electrification period of 2 min. 	Refer to Table 1

4. Rated Voltage & Surge Voltage

Test Method	Performance
Capacitors shall be applied the surge voltage trough a (100±50)/CR (KΩ) resister in series for 30±5 seconds in every 5.5±0.5 minutes at 15~35℃. Procedure shall be repeated 1000 times. Then the capacitors shall be left under normal humidity for 1~2 hours before measurement. (CR: Nominal Capacitance, uF)	Appearance：Notable changes shall be found. Leakage Current：Not more than the specified value. Capacitance Change：Within ±20% of the initial value. Dissipation Factor：Not more than 175% of the specified value.

Note: This test simulates overvoltage at abnormal situations and not be hypothesizing that overvoltage is always applied.

5. Shelf life test

Test Method	Performance
After 1000+48/-0 Hrs test at 105±2℃ without rated working voltage. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after which measurement shall be made.	Appearance：Notable changes shall be found. Leakage Current：Not more than the specified value. Capacitance Change：Within ±30% of the initial value. Dissipation Factor：Not more than 200% of the specified value.

6. Load life test

Test Method	Performance
Capacitors shall be applied the rated voltage and rated ripple current at 105±2 ℃ for rated life. The Capacitors shall be stored under standard atmospheric conditions for 1~2 hours, after which measurements shall be made.	Appearance：Notable changes shall be found. Leakage Current：Not more than the specified value. Capacitance Change：Within ±30% of the initial value. Dissipation Factor：Not more than 200% of the specified value.

7. Temperature Characteristic

Performance：

Rated voltage (V)	6.3	10	16	25	35	50	63	100
Z(-25℃)/Z(20℃)	4	3	2	2	2	2	2	2
Z(-55℃)/Z(20℃)	8	5	4	3	3	3	3	3

Step 2 3	Impedance Ratio	The value of ratio to Step 1 not more than value of above table.
Step 5	Leakage Current	Not more than 5 time the specified value.
	Capacitance Change	Within ±25% of the value of Step 1.
	Dissipation Factor	Not more than the specified value.

Test Method：

Step	Testing Temperature	Time
1	20±2	Time to reach thermal equilibrium.
2	-25±3	Time to reach thermal equilibrium.
3	-55±3	Time to reach thermal equilibrium.
4	20±2	Time to reach thermal equilibrium.
5	+105±3	Time to reach thermal equilibrium.

Capacitance, Impedance and Dissipation Factor shall be measured at 120Hz.

8. Vibration Test

Test Method	Performance
Testing shall be done out in 3 axis for 2 hours each (Total 6 hours) as below. a).Vibration frequency range：10~55HZ b).Peak to peak amplitude：1.5mm c).Sweep rate：10 to 55 to 10 HZ in about 1 minute.	Appearance：Notable changes shall 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 ±5% of the initial value.

9. Solderability

Test Method	Performance
Terminals of the capacitors shall be immersed into flux (ethanol solution of the rosin, 25wt% rosin) for 5~10 seconds and shall be immersed solder bath (245±5℃) to 1.5~2.0mm from the body of the capacitor, and retained for 2±0.5 seconds.	At least 90% of circumferential surface of the dipping portion of termination shall be covered with new solder.

10. Resistance to soldering heat

Test Method	Performance
a. After reflow soldering (Recommended soldering heat conditions). b. The terminal side of the capacitor shall be placed on the heat panel at 250℃ for a period of 30 seconds.	Appearance：Notable changes shall be found. Leakage Current：Not more than the specified value. Capacitance Change：Within ±10% of the initial value. Dissipation Factor：Not more than the specified value.

11. Resistance to damp heat

Test Method	Performance
Capacitors shall be stored in the ambient of and 40±5 ℃ relative humidity 90~95% for 240±8 hours. Then the capacitors and shall be left under the normal temperature and normal humidity for 1~2 hours before measurement.	Appearance：Notable changes shall be found. Leakage Current：Not more than the specified value. Capacitance Change：Within ±20% of the initial value. Dissipation Factor：Not more than 120% of the specified value.

12. Safety vent

Test Method	Performance
a). AC test The capacitor shall be connected across a applying 50 or 60 Hz AC which is 0.7 times of rated voltage or 250Vrms AC whichever is the lower. b). DC test Applying inverse DC rated voltage with current to the capacitor. Where case diameter: ΦD≤22.4mm: 1A DC max. ΦD>22.4mm: 10A DC max.	When the pressure relief vent operated, the capacitor shall not flame although gas generation or explosion of a part of the inside element is allowable. If the vent does not operate with the voltage applied 30 minutes, the test is considered to be passed. This performance apply to the body of the capacitor with 8mm and larger in diameter.

■ Declaration of Non-use of environment-related Substance

We are hereby to certify the followings:

Our company hereby warrants and guarantees that all of or part of products, including, but not limited to, the peripherals, accessories or package, delivered to your company (including your subsidiaries and affiliated companies) directly or indirectly by our company are free from any of the substances listed below.

☒ Compliance with the current RoHS Directive 2011/65/EU without any exemption.

☒ All merchandise and/or material do not contain Substances of Very High Concern (SVHC) are defined in Article XIV of REACH regulation.

☒ Compliance with Directive 2006/22/EC (PFOA/PFOS)

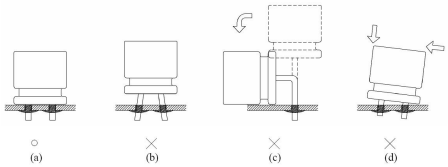
☒ Compliance with Directive 2005/84/EC (16P)

☒ Compliance with ZEK 01.2-08 (PAHs)

☒ Compliance with SONY SS-00259 V18

■ Important information for application

1. Aluminum electrolytic capacitors are polarized. Make sure of the polarity, if used in reverse polarity, the circuit life may be shortened or the capacitor may be damaged. When the polarity in a circuit sometimes can be reversed or unknown, a bi-polar capacitor shall be used.
2. Do not apply DC voltage, which exceeds the rated voltage of the capacitor and not be reverse voltage. If a voltage exceeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increase. Using capacitors at recommended working voltage prolongs capacitor life. The surge voltage rating is the maximum DC over-voltage to which the capacitors may be subjected of short periods.
3. Use capacitors within rated ripple current. If excessive ripple current is applied on the capacitor, which will result in generating excessive heat inside, reducing capacitance and shortening life of capacitor. The combined value of DC voltage and the peak AC voltage shall not exceed the rated voltage.
4. Use the capacitor according to the specified operating temperature range. If used the capacitor outside the maximum rated temperature will considerably shorten the life or cause the capacitor to vent. Usage at room ambient will ensure longer life. It is generally known that the life doubles for each 10℃ decrease in temperature.
5. Leakage current tends to increase when aluminum capacitors have been stored for long period of time. The higher the storage temperature, the higher the leakage current increase. Please take caution when selecting the storage location. The leakage current will decrease gradually as voltage is applied to the capacitor. The capacitor is subjected to aging before using where increased leakage current may cause problems in the circuit.
6. The capacitor is not suitable for a circuit in which charge and discharge are frequently repeated. The capacitance value may drop by forming oxide layer on the cathode foil, or the capacitor may be damaged by generating heat due to continuous rapid charge and discharge.
7. Defective mounting on PCB and improper external strength applied on the lead wires or case body after soldering (see below drawings) may damage inside structure of the capacitor and may cause short circuit, high leakage current or leakage problem.



a). Good soldering
b). Hole-to-hole space board differs from the lead space of lead wires. PCB
c). Lead wires are bent after soldering.
d). Case body doesn't stand vertical on board after soldering, Do not bend or twist the capacitor's body after soldering.

8. During soldering process, secondary shrinkage or sleeve crack may occur when soldering temperature is too high or soldering time is too long.
9. The aluminum electrolyte capacitors should be fee halogenated solvents during board cleaning after soldering. Use solvent proof capacitors when halogenated solvents are used. After cleaned with the solvent which should proof the quality of capacitors, the capacitors should not be kept in solvent environments of non-ventilated places. Let the capacitors after cleaning dry with hot blast fully above 10mins and the temperature of hot blast should not be over than specified upper limit of capacitors.
10. Do not use halogenated adhesives and coating materials to fix aluminum electrolytic capacitors. Do not cover up all the sealing area of capacitors with adhesives, fixative or coating materials, make coverage only partial.
11. we recommend store with the temperature range between 15 to 35℃ , and the relative humidity of 75% or less , without direct sunshine and store in the package states if possible. Storage time within 12 month after shipment. If storage time more than 12 month, please check the electrical characteristics and solderability before using.
12. Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.
13. For further details, please refer to EIAJ RCR-2367B (Guideline of notabilia for aluminum electrolytic capacitors for use in electronic equipment).