DONGGUAN XUANSN ELECTRONIC TECH CO.,LTD

PRODUCT SPECIFICATION

To：

CATEGORY：V-chip Aluminum Electrolytic Capacitors

DESCRIPTION：47uf25v 6.3*5.3mm, 105℃ 2000Hours

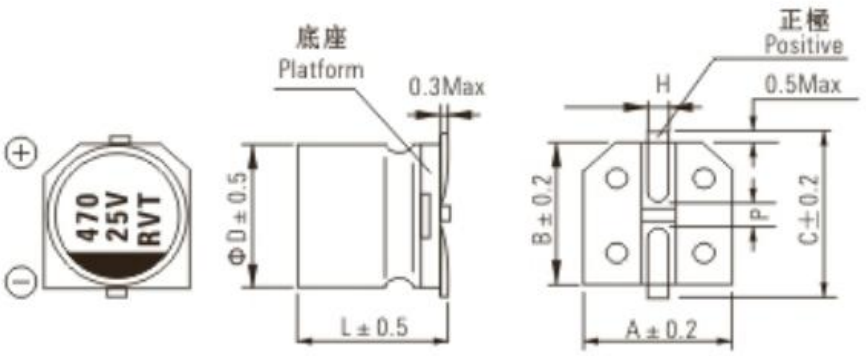
MNP: XVT470M1ED06L05T

DATE：

SUPPLIER			CUSTOMER		
APPROVER	AUDITOR	DESIGNER	APPROVER	AUDITOR	TESTING
Yaojun Lv	Xianchen Liu	Xinda Zong			

Confirmed,please sign back

一. Dimension/mm



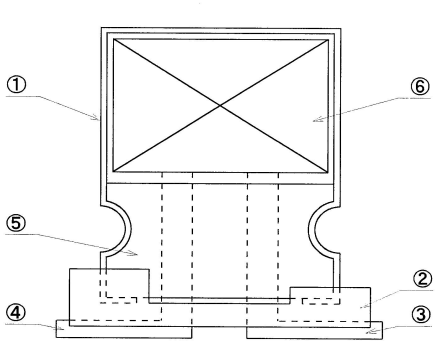
ΦD*L	A±0.2	B±0.2	C±0.2	P ±0.2	L±0.5	H
6.3*5.3	6.6	6.6	7.2	2.1	5.3	0.5~0.8

NO	SpecificaTion	WV /V	Cap. /μf	Cap. tol.	≤ DF/120Hz 20℃	≤ LC/uA）（2min)	DΦ* L/mm	Allowable ripple current (mArms) at 105°C,120Hz	Life/105℃	≤ ESR 100KHz (Ω) 20℃
1	47uf25v	25	47	±20%	0.18	11.75	6.3*5.3	49	2000	/

Frequency Coefficient of Allowable Ripple Current

Frequency	50Hz	120Hz	1KHz	10kHz	≥100kHz
Coefficient	0.7	1	1.36	1.5	/

Construction



Item	Material
①，Aluminum Case	AL purity ≥ 98％、PU purity ≥ 1.5％
②,Base	Polyphthalamide purity 40~70％
③, + Lead Wire	Al、Fe、Cu、Sn
④，-Lead Wire	Al、Fe、Cu、Sn
⑤, Rubber	IIR
⑥，Corse	aluminum foil、electrolytic Paper、 GBL、electrolyte,Lead Wire

The Raw Materials of Lead Wire

Name	Material	Percentage
TPCS	Fe	77.04%
	Cu	14.25%
	Sn	8.71%

三. How to order

MPN: XVT ① 470 ② M ③ 1E ④ D06 ⑤ L05 ⑥ T ⑦

1. Series

Code	Series
XVT	High Stability

2. Rated Capacitance

Code	Capacitance/μf
470	47

3. Tolerance

Code	Tolerance(%)
M	±20%

4. Rated Voltage

Code	Voltage/V
1E	25

5. Diameter

Code	Diameter/mm
D06	6.3

6. Leight

Code	Leight/mm
L05	5.3

7. Packaging

Code	Packaging
T	Reel and Tape

XVT Series environmental protection standard product SMD(V-chip) aluminum electrolytic capacitor.

1.Scope

This specification covers “XVT Series” SMD(V-chip) aluminum electrolytic capacitors.

2.Reference Standard

Japanese industrial Standard JIS C-5141 characteristics W and JIS C-5101 except as specified

3.Environment protection standard

RoHS, 2011/65/EU

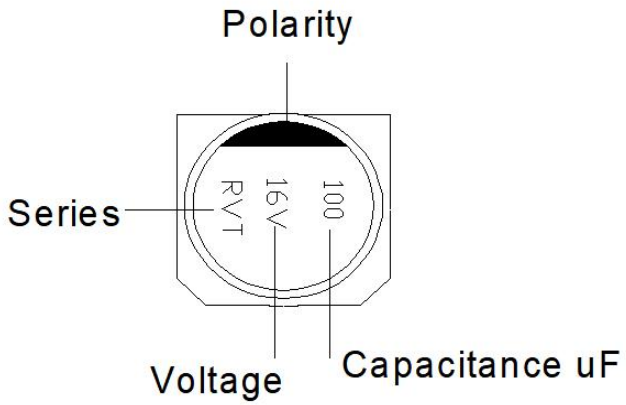
4.Characteristic

<table>
<tr><td>No.</td><td>Item</td><td colspan="5">Performance Characteristics</td><td colspan="2">Test method（JIS C 5101-1）</td></tr>
<tr><td>1</td><td>Operating temperature range</td><td colspan="7">- 55 ~ +105℃</td></tr>
<tr><td>2</td><td>Voltage Range/VDC</td><td colspan="7">25</td></tr>
<tr><td>3</td><td>Leakage Current</td><td colspan="7">I ≦ 0.02 CV or 3 uA, whichever is greater (after 2 minutes)</td></tr>
<tr><td>4</td><td>Capacitance Tolerance</td><td colspan="7">±20% (120 Hz, +20℃)(%)</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Tanδ(120 Hz, +20℃)</td><td colspan="3">Rated Voltage (V)</td><td colspan="2">25</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Tanδ(max.)</td><td>φ6.3</td><td colspan="2">0.18</td></tr>
<tr><td rowspan="15">6</td><td rowspan="15">Temperature Characteristics</td><td colspan="7">Temperature test</td></tr>
<tr><td>Step</td><td colspan="2">T （℃）</td><td colspan="2">H（min）</td><td colspan="2">Measurement (120 Hz)</td></tr>
<tr><td>1</td><td colspan="2">20±2</td><td colspan="2">3</td><td colspan="2">CAP、ESR</td></tr>
<tr><td>2</td><td colspan="2">-25 and -55（+0、-2）</td><td colspan="2">30</td><td colspan="2">ESR</td></tr>
<tr><td>3</td><td colspan="2">15~35</td><td colspan="2">15</td><td colspan="2"></td></tr>
<tr><td>4</td><td colspan="2">125（+2、-0</td><td colspan="2">30</td><td colspan="2">LC、CAP、DF</td></tr>
<tr><td>5</td><td colspan="2">20±2</td><td colspan="2">3</td><td colspan="2"></td></tr>
<tr><td colspan="7">In Step1, Impedance Ratio: CAP ± 20%, DF, LC are within specifications</td></tr>
<tr><td colspan="7">In Step2，Impedance Ratio：</td></tr>
<tr><td colspan="3">Rated Voltage (V)</td><td colspan="2">25</td><td colspan="2" rowspan="3"></td></tr>
<tr><td colspan="2" rowspan="2">Impedance Ratio ZT/Z20 (max.)</td><td>Z-25C /Z+20C</td><td colspan="2">2</td></tr>
<tr><td>Z-55°C /Z+20°C</td><td colspan="2">4</td></tr>
<tr><td colspan="7">In Step4，Impedance Ratio：</td></tr>
<tr><td colspan="2">Capacitance Change</td><td colspan="3">±25 %of the value in Step1</td><td colspan="2" rowspan="2"></td></tr>
<tr><td colspan="2">Tanδ</td><td colspan="3">initial specified value</td></tr>
<tr><td colspan="7">In Step5，Impedance Ratio：</td></tr>
<tr><td colspan="2">Capacitance Change</td><td colspan="3">±25 %of the value in Step1</td><td colspan="2" rowspan="2"></td></tr>
<tr><td colspan="2">Tanδ</td><td colspan="3">initial specified value</td></tr>
</table>

No.	Item	Performance Characteristics		Test method（JIS C 5101-1）
7	Surge Voltage Test	Rated Voltage (V)	25	
		Surge Voltage (V)	32	
		After surge voltage applied at a cycling rate of 30 seconds charge and 5.5 minutes discharge1000 successive test cycle.Test temperature:15~35℃.		
		Judgement：		
		a. △C/C ≦ ±15 %		
		b. DF ≦ 100 % initial specified value		
		c. LC ≦ initial specified value		
		d. No abnormal appearance of the product		
8	Solderability	A minimum of 95% of the surface being immersed		The capacitor shall be tested under the following conditions: Soldering temperature: 245±5℃ Dipping depth: 2mm Dipping speed: 25±2.5mm/s Dipping time: 3±0.5s
9	Vibration test	Capacitance Change: Within ±5% of initial value. Appearance: There shall be no leakage of electrolyte.		The following conditions shall be applied for 2 hours in each (X,Y,Z) 3 mutually perpendicular directions,with a total of 6 hours . Vibration frequency range: 10Hz ~ 55Hz Peak to peak amplitude: 1.5mm
10	Solvent Resistance of the Marking	There shall be no damage end legibly marked can be deciphered easily		Class of Reagent:Isopropyl Alcohol; Test Temperature:20~25C; Immersing Time:30±5S
11	Solder Heat Resistance Test	△C/C ≦ ±10% ; Appearance:No significant change can be observe		After reflow soldering according to Reflow Soldering Condition (see page 9) and restored at room temperature, they meet the characteristics listed.
12	High Temperature Load Life Test	△C/C	≦±30% initial specified value	After more than 2000 hours application of rated voltage at 105℃, then resumed 16 hous, capacitors meet the characteristics requirements listed.
		Tanδ	≦300% initial specified value	
		LC	≦ initial specified value	
13	Shelf life	△C/C	≦±30% initial specified value	After storge for 1000 hours at 105℃, capacitors meet the characteristics requirements listed.
		Tanδ	≦300% initial specified value	
		LC	≦ 200% initial specified value	
14	Humidity Test	△C/C≦± 15% DF ≦ 100 % initial specified value LC≦ 100 % initial specified value Appearance:No significant change can be observe		Capacitors shall be exposed for 240 ± 8 hrs in an atmosphere of 90 - 95 % R.H.at40℃. And then the Capacitor shall be subjected to standard atmospherjc conditions for 1-2hours, after which measurements Shall be made.

5.Marking

A) Capacitors shall be legibly marked with the following:

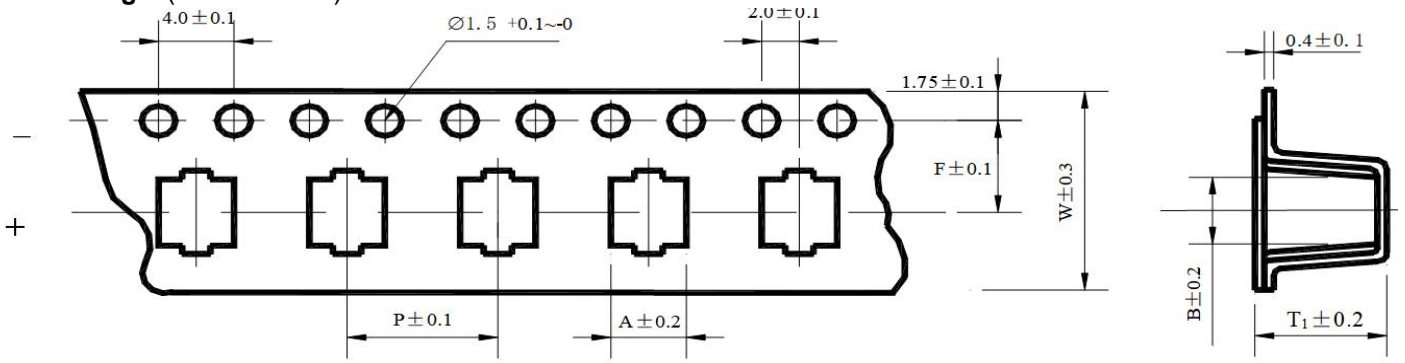


B) Following items should be marked on the taping reel
1.Rated Voltage and Capacitance
2.Customer's Part Number(if request)
3.Series Mark
4.Lot Number
5.Packing quantity

6.Taping Specifications

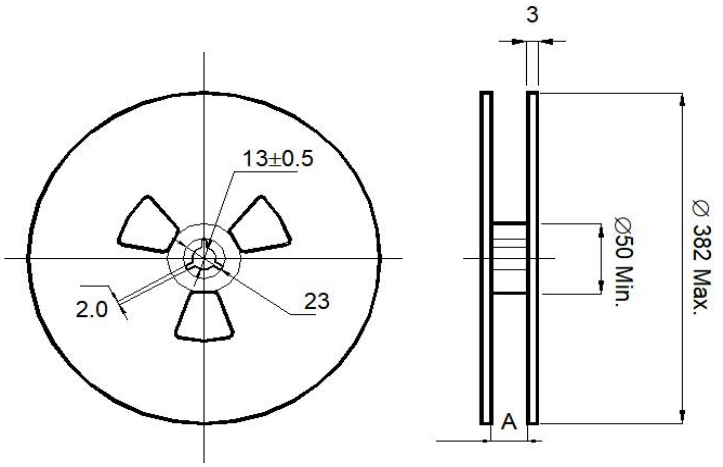
Applicable standard JIS C0806

6.1 Drawing 1 (for ∅4 ~ ∅10) Unit:mm



Seze	W	P	F	A	B	T1
4*5.4	12	8	5.5	4.7	4.7	5.8
5*5.4	12	12	5.5	5.7	5.7	5.8
6.3*5.4	16	12	7.5	7.0	7.0	5.8
6.3*7.7	16	12	7.5	7.0	7.0	8.3
6.3*10.2	16	12	7.5	7.0	7.0	11.0
8*6.5	16	12	7.5	8.7	8.7	6.8
8*10.2	24	16	11.5	8.7	8.7	11.0
8*12.5	24	16	11.5	8.7	8.7	13.0
10*10.2	24	16	11.5	10.7	10.7	11.0
10*12.5	24	16	11.5	10.7	10.7	13.0
10*13.5	24	16	11.5	10.7	10.7	14.1
12.5*13.5	32	24	14.0	14.0	14.0	14.1
12.5*16	32	24	14.0	14.0	14.0	16.4
16*16.5	44	28	17.5	17.5	17.5	16.9
16*21.5	44	28	17.5	17.5	17.5	21.9
18*16.5	44	32	19.5	19.5	19.5	16.9
18*21.5	44	32	19.5	19.5	19.5	21.9
20*16.5	44	36	21.5	21.5	21.5	16.9
20*21.5	44	36	21.5	21.5	21.5	22.0

6.2 Tape Reel And Packaging Quantity



Size mm	Qty/Reel Pcs	Qty/Box pcs	A±0.3 mm	B±2.0 mm
4*5.4	2000	20000	14	382
5*5.4	1000	10000	14	382
6.3*5.4	1000	10000	18	382
6.3*7.7	1000	1000	18	382
6.3*10.2	700	7000	18	382
8*6.5	1000	10000	18	382
8*10.2	500	5000	26	382
8*12.5	400	4000	26	382
10*10.2	500	500	26	382
10*12.5	400	4000	26	382
10*13.5	300	3000	26	382
12.5*13.5	200	1600	34	382
12.5*16	200	1600	34	382
16*16.5	125	250	46	332
16*21.5	75	150	46	332
18*16.5	125	250	46	332
18*21.5	75	150	46	332
20*16.5	100	200	46	332
20*21.5	50	100	46	332

7. Lead-free Reflow Soldering Condition

A. Recommended Conditions for Reflow Soldering

(1).A thermal condition system such as infrared radiation (IR) or hot blast should be adopted, and vapor heat transfer systems (VPS) are not recommended.

(2).Reflow soldering should be performed one time. If the capacitor has to be reflowed twice, 30 minutes must be layout between each time.

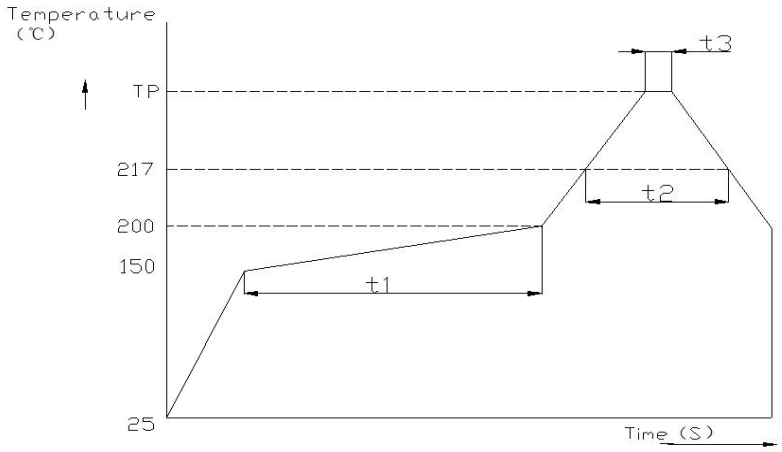
(3).For lead-free type reflow soldering, please observe proper conditions below:

a.The time of preheating from 150°C to 200°C shall be within maximum t1 seconds;

b.The time of soldering temperature at 217°C measured on capacitors' top shall not exceed t2s

c.The peak temperature on capacitors' top shall not exceed Tp(°C), and the time within 5°C of actual peak temperature shall not exceed t3s.

B. Classification Reflow Profile

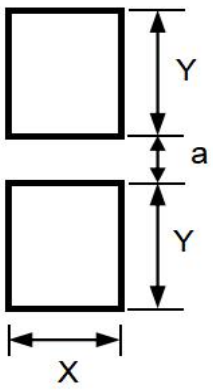


*1. Average ramp-up rate is 3℃/second max.
*2. Ramp-down rate is 6℃/second max.
*3 .Time from 25℃ to peak temperature is 8 minutes max.

C. Allowable Range of Peak Temperature

Size	Thickness (mm)	TP(°C)	t1(Max,secs)	t2(Max,secs)	t3(TP,secs)
∅4~∅6.3	≥2.5	260	120	90	5
∅8	≥2.5	240	100	60	5
∅10	≥2.5	235	100	40	5

D. Recommended Land Size (Unit: mm)



Size	X	Y	a
∅4	1.6	2.6	1.0
∅5	1.6	3.0	1.4
∅6.3	1.6	3.5	2.1
∅8	2.5	3.5	3.0
∅10	2.5	4.0	4.0

Application guideline for V-CHIP aluminum electolytic capacitors

A)Circuit Design

1)Please make sure the environmental and mounting conditions to which the capacitor will be exposed are within the conditions specified in RJ's catalogue.
2)Operating temperature and applied ripple shall be within RJ specification.
3)Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.
4)Aluminum electrolytic capacitors are polar. Make sure that no reverse voltage or AC voltage is applied to the capacitors. Please use bi-polar capacitors for a circuit that can possibly see reversed polarity.
Note: Even bi-polar capacitors cannot be used for AC voltage application.
5）Do not use aluminum electrolytic capacitors in a circuit that requires rapid and very frequent charge / discharge.
In this type of circuit, it is necessary to use a special design capacitor with extended life characteristics.
6）Do not apply excess voltage.
①Please pay attention to that the peak voltage, which is DC voltage overlapped by ripple current, will not exceed the rated voltage.
②In the case where more than 2 aluminum electrolytic capacitors are used in series, please make sure that applied voltage will be lower than rated voltage and the voltage will be applied to each capacitor equally by using a balancing resistor in parallel with the capacitor
7)Aluminum electrolytic capacitors shall not be used under the following environmental conditions:
①(a) Capacitors will be exposed to water (including condensation), brine or oil.
(b)Ambient conditions that include toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, ammonium, etc.
(c)Ambient conditions that expose the capacitor to ozone, ultraviolet ray and radiation.
② Severe vibration and physical shock conditions that exceed RJ specification.
Vibration test condition:
vibration frequency range : 10～55～10Hz
sweep rate　: 10～55～10Hz/minute
sweep method : logarithmic
amplitude or acceleration : 1.5mm
direction of vibration : X, Y, Z direction
testing time : 2 hours per each direction
Shock is not applicable normally.
If a particular condition is required, please contact our sales office.
8）The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible. The electrolyte is conductive. When it comes in contact with the PC board, there is a possibility of pattern corrosion or short circuit between the circuit pattern, which could result in smoking or catching fire. Do not locate any circuit pattern beneath the capacitor end seal.
9）Do not design a circuit board that the heat generating components are placed near the aluminum electrolytic capacitor or on the reverse side of PC board, if that just under the capacitor.
10 Electrical characteristics may vary depending on changes in temperature and frequency. Please consider this variation when you design circuits.
11）When you install more than 2 capacitors in parallel, please consider the balance of current flowing into the capacitors.
12）While mounting capacitors on double-side PC board, the capacitors should be away from those unnecessary base plate holes and connection holes.

B）Mounting

1）Once a capacitor has been assembled in the set and power applied, do not attempt to re-use the capacitor in other circuits or application.
2）Leakage current of the capacitors that have been stored for more than 2 years may increase. When leakage current has increased, please perform a voltage treatment using a 1kΩ resistor.
3）Please confirm specifications and polarity before installing capacitors on the PC board.
4) Do not drop capacitors on the floor, nor use a capacitor that was dropped.
5) Do not deform the capacitor during installation.
6) Please pay attention to the mechanical shock to the capacitor by suction nozzle of the automatic insertion machine or automatic mounter, or by product checker, or by centering mechanism.
7)Reflow soldering
①Please follow “Reflow Soldering Conditions” in catalogue.
②When an infrared heater is used, please pay attention to the extent of heating since the absorption rate of infrared will vary due to difference in the color and size of the capacitor.
8)Do not tilt lay down or twist the capacitor body after the capacitor are soldered to the PC board.
9)Do not carry the PC board by grasping the soldered capacitor.
10)Please do not allow anything to touch the capacitor after soldering. If PC boards are stored in stack, please make sure the PC board or other components away from the capacitor.
11The capacitors shall not be effected by any radiated heat from the soldered PC board or other components after soldering.
12）Cleaning
①Do not clean capacitors with halogenated cleaning agent. However, if it is necessary to clean with halogenated cleaning agent, please contact our sales office.
②Recommended cleaning method
Applicable : Any type, any ratings
Cleaning conditions ：Total cleaning time shall be within 2 minutes by immersion, ultrasonic or other methods. Temperature of the cleaning agents shall be 40℃ or below. After cleaning, capacitors should be dried by using hot air for the minimum 10 minutes along with the PC board mounted. Hot air temperature should be within the maximum operating temperature of the capacitor. Insufficient dryness after water rinse may cause appearance problems, such as bottom-plate bulge and etc.
③Avoid using ozone destructive substances as cleaning agents for protecting global environment.

C）In the Equipment

1）Do not directly touch terminal by hand.
2）Do not link positive terminal and negative terminal by conductor, nor spill conductible liquid such as alkaline or acidic solution on or near the capacitor.
3）Please make sure that the ambient conditions where the set is installed are free from spilling water or oil, direct sunlight, ultraviolet rays, radiation, poisonous gases, vibration or mechanical shock.
D） Maintenance and Inspection
Please periodically inspect the aluminum capacitors that are installed in industrial equipment. The following items should be checked:
Appearance: remarkable abnormality such as pressure relief vent opening, electrolyte leaking, etc.
Electrical characteristics: capacitance, dielectric loss tangent, leakage current and etc., which are specified in catalogue or alternate product specification.

E）In an Emergency

1）If you see smoke due to operation of safety vent, please turn off the main switch or pull out the plug from the outlet.
2）If you breathe the gas or ingest the electrolyte, please wash out your mouth and throat with water immediately.
3）If your skin is exposed to the electrolyte, please wash it away using soap and water.

F）Storage

1）Do not keep capacitor in high temperature and high humidity atmosphere.
Storage conditions should be:
Temperature: 5℃～35℃ Humidity : lower than 75% Place : Indoor
2）Avoid ambient conditions where capacitors are covered with water, brine or oil.
4）Avoid ambient conditions where capacitors are exposed to ozone, ultraviolet ray or radiation.

G）Disposal

Please take either of the following methods in disposing capacitors.
1）Incinerate them after crushing capacitors or making a hole on the capacitor body.
2）If incineration is not applicable, hand them over to a waste disposal agent and have them buried in landfills.