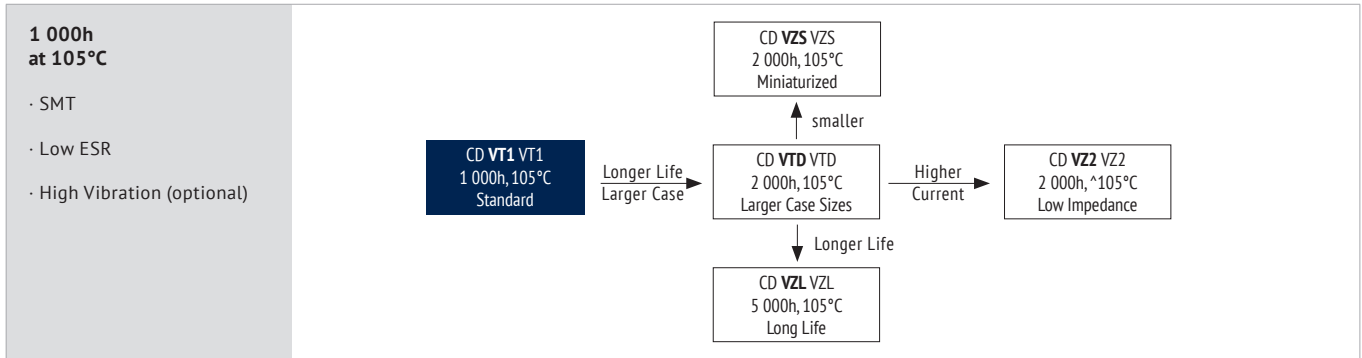




ALUMINUM ELECTROLYTIC CAPACITORS · SMT TYPE

CD **VT1** VT1 SERIES





ITEM CHARACTERISTICS STABILY AT LOW TEMPERATURE (IMPEDANCE RATIO AT 120HZ)

Operating Temperature Range (°C)	-55 ~ +105
Voltage Range (V)	6,3 ~ 50
Capacitance Range (µF)	1 ~ 47
Capacitance Tolerance (20°C, 120Hz)	± 20%
Dissipation Factor	at 20°C, 120Hz, see table
Leakage Current (µA)	at 20°C after 2 minutes

Rated Voltage	6,3	10	16	25	35	50
Z _{-25°C/+20°C}	4	3	2	2	2	2
Z _{-40°C/+20°C}	8	6	4	4	3	3

ITEM LOAD LIFETIME L₀ SHELF LIFE RESISTANCE TO SOLDERING HEAT SMT

Lifetime	1 000h	1 000h	30sec, Hot Plate
Leakage Current	≤ the specified value	≤200% the specified value	≤ the specified value
Capacitance Change	Within ± 25% of initial value	Within ± 20% of initial value	Within ± 10% of initial value
Dissipation Factor	≤ 200% of specified value	≤ 200% of specified value	≤ specified value
Condition	105°C U _R = 0 I _R = 0 Before measurement: 16h resuming	105°C U _R = 0 I _R = 0 Before measurement: 16h resuming	250°C Before measurement: Restore to 15°C

MULTIPLIER FOR RIPPLE CURRENT (FREQUENCY COEFFICIENT)

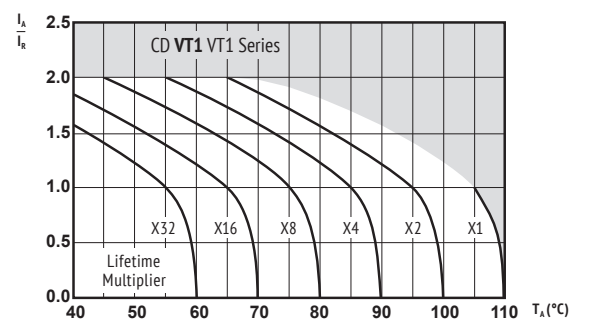
Frequency	50Hz	120Hz	1kHz	≥10kHz
Rated Voltage				
6,3-16V	0,8	1	1,15	1,25
25-35V	0,8	1	1,25	1,40
50-63V	0,8	1	1,35	1,50

Multipliers for typical operating conditions.

ENVIRONMENTAL

The products are RoHS, WEEE and REACH compliant. The detailed version please see separate "Environmental Certificates" document or www.jianghai-europe.com

MULTIPLIER FOR LIFETIME (LIFETIME DIAGRAM)



I_A = actual ripple current at 120Hz,
 I_R = rated ripple current at 120Hz, 105°C
 Multiplier of Useful Life as a function of ambient temperature & ripple current load





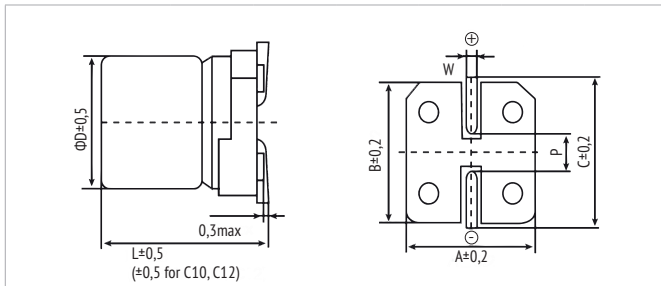
ORDER CODE ALUMINUM ELECTROLYTIC CAPACITORS SMT TYPE

EC	V		1V		VT1		101		M		0607		V1		X		E3	JExxxxx	
Technology	Terminal Type		Rated Voltage Code		Series Code		Capacitance Code (µF)		Capacitance Tolerance		Size Code (ΦDxL)		Lead Form		Pitch		for internal use	for Specials only	
EC = Electrolytic Capacitor	SMT	V	6,3	0J	CD VT1	VT1	0,1	OR1	±20%	M	0405	4,0 x 5,4	Standard	V1	Standard	X			
		10	1A	CD VZ2	VZ2	0,22	R22	±10%	K	0506	5,0 x 6,0			Vibration	G				
		16	1C	CD VTD	VTD	0,47	R47	+30/-10%	Q	0605	6,3 x 5,4								
		25	1E	CD VZL	VZL	1	10	preferred		0606	6,3 x 6								
		35	1V	CD VZS	VZS	2,2	2R2			0607	6,3 x 7,7								
		50	1H			3,3	3R3			0806	8 x 6,2								
		63	1J			4,7	4R7			0810	8 x 10,2								
		80	1K			10	100			1010	10 x 10,2								
		100	2A			22	220			1012	10 x 12,5								
						33	330			1213	12,5 x 13,5								
						47	470			1216	12,5 x 16								
						68	680			1616	16,0 x 16,5								
						82	820			1621	16,0 x 21,5								
						100	101			1816	18,0 x 16,5								
						120	121			1821	18,0 x 21,5								
						150	151												
						180	181												
						220	221												
						330	331												
						470	471												
						560	561												
						680	681												
						820	821												
						1 000	102												
						1 500	152												
				2 200	222														
				4 700	472														
				5 600	562														
				6 800	682														
				10 000	103														
				22 000	223														
				33 000	333														
				68 000	683														



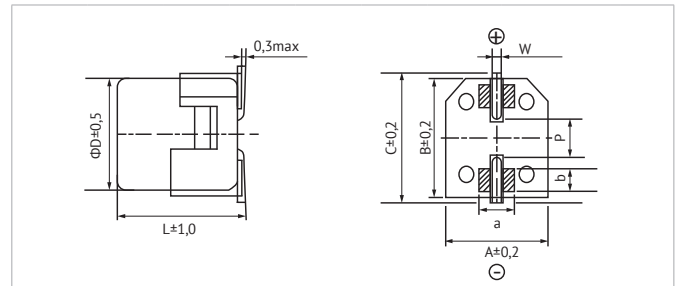


DIMENSIONS FOR SMT TYPE STANDARD



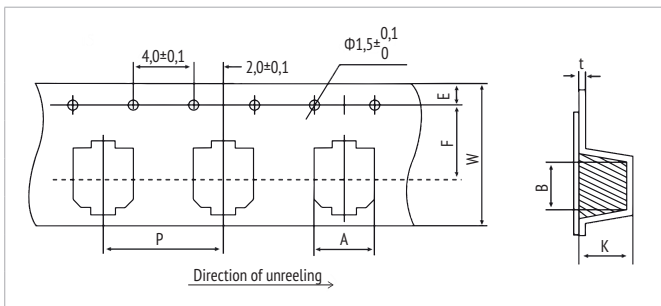
Size Code	$\varnothing D$	L	A	B	C	W	$P \pm 0,2$
0405	4,0	5,4	4,3	4,3	5,0	0,5-0,9	1,0
0505	5,0	5,4	5,3	5,3	6,0	0,5-0,9	1,3
0506	5,0	6,0	5,3	5,3	6,0	0,5-0,9	1,3
0605	6,3	5,4	6,6	6,6	7,2	0,5-0,9	2,2
0606	6,3	6,0	6,6	6,6	7,2	0,5-0,9	2,2
0607	6,3	7,7	6,6	6,6	7,2	0,5-0,9	2,2
0806	8,0	6,2	8,3	8,3	9,0	0,8-1,1	3,1
0810	8,0	10,2	8,3	8,3	9,0	0,8-1,1	3,1
1010	10,0	10,2	10,3	10,3	11,0	0,8-1,1	4,5
1012	10,0	12,5	10,3	10,3	11,0	0,8-1,1	4,5
1213	12,5	13,5	13,0	13,0	13,8	1,1-1,4	5,2
1216	12,5	16,5	13,0	13,0	13,8	1,1-1,4	5,2
1616	16,0	16,5	17,0	17,0	18,0	1,1-1,4	6,5
1621	16,0	21,5	17,0	17,0	18,0	1,1-1,4	6,5
1816	18,0	16,5	19,0	19,0	20,0	1,1-1,4	6,5
1821	18,0	21,5	19,0	19,0	20,0	1,1-1,4	6,5

VIBRATION IMPROVED DESIGN



Size Code	$\varnothing D$	L	A	B	C	W	$P \pm 0,2$	a	b
0810	8,0	10,2	8,3	8,3	9,0	0,9-1,1	3,1	4,0	3,0
1010	10,0	10,2	10,3	10,3	11,0	0,9-1,1	4,5	4,4	3,2
1012	10,0	12,5	10,3	10,3	11,0	0,9-1,1	4,5	4,4	3,2
1213	12,5	13,5	13,0	13,0	14,3	1,1-1,4	5,2	4,4	3,2
1216	12,5	16,0	13,0	13,0	14,3	1,1-1,4	5,2	4,4	3,2
1616	16,0	16,5	17,0	17,0	18,0	1,1-1,4	6,5	4,4	3,2
1620	16,0	20,0	17,0	17,0	18,0	1,1-1,4	6,5	4,4	3,2
1621	16,0	21,5	17,0	17,0	18,0	1,1-1,4	6,5	4,4	3,2
1821	18,0	21,5	19,0	19,0	20,0	1,1-1,4	6,5	4,4	3,2

DIMENSIONS FOR TAPING



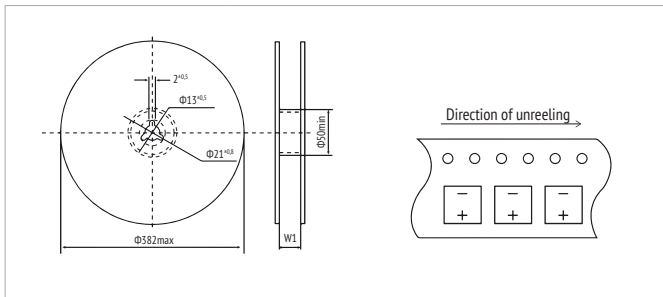
$E = 1,75 \pm 0,1 \text{ mm}$; $t = 0,4 \pm 0,1 \text{ mm}$

Size Code	A	B	W	F	P	K
	$\pm 0,2$	$\pm 0,2$	$\pm 0,3$	$\pm 0,1$	$\pm 0,1$	$\pm 0,2$
0405	4,7	4,7	12,0	5,5	8	5,8
0505	6,0	6,0	12,0	5,5	12,0	5,8
0506	6,0	6,0	12,0	5,5	12,0	5,8
0605	7,0	7,0	16,0	7,5	12,0	5,8
0606	7,0	7,0	16,0	7,5	12,0	8,0
0607	7,0	7,0	16,0	7,5	12,0	8,0
0806	8,7	8,7	16,0	7,5	12,0	8,8
0810	8,7	8,7	24,0	11,5	16,0	11,0
1010	10,7	10,7	24,0	11,5	16,0	11,0
1012	10,7	10,7	24,0	11,5	16,0	13,0
1213	13,4	13,4	32,0	14,2	24,0	14,5
1216	13,4	13,4	32,0	14,2	24,0	17,0
1616	14,5	14,5	44,0	20,2	28,0	17,0
1621	17,5	17,5	44,0	20,2	28,0	22,4
1816	19,5	19,5	44,0	20,2	32,0	17,0
1821	19,5	19,5	44,0	20,2	32,0	22,4



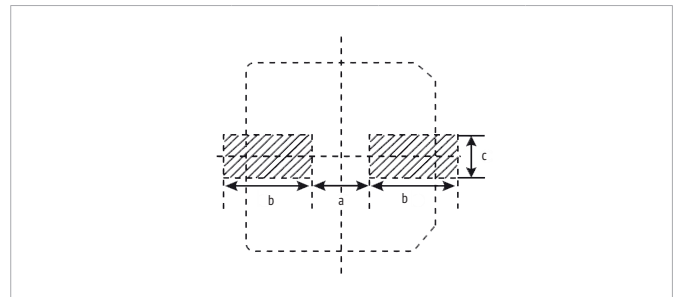


REEL DIMENSIONS



Diameter	W ₁ (mm)
4	14
5	14
6,3	18
8	26
10	26
12,5	34
16	46
18	46

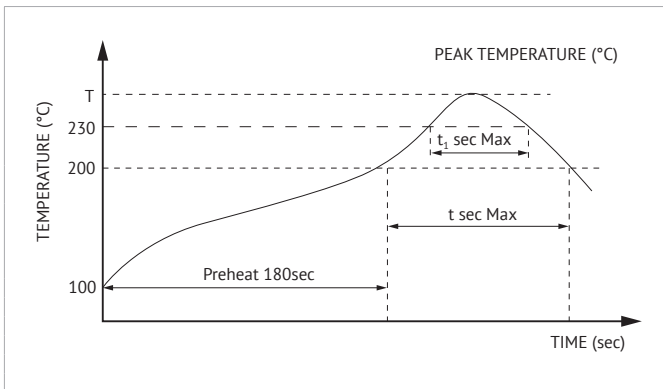
RECOMMENDED SOLDERING PAD DIMENSIONS



Diameter	a	b	c
4	1,0	2,6	1,6
5	1,4	3,0	1,6
6,3	2,1	3,5	1,6
8	3,0	4,0	2,2
10	4,0	4,6	2,5
12,5	5,0	5,7	3,0
16	7,0	6,5	3,0
18	7,0	7,5	3,0

in mm

RECOMMENDED SOLDERING PROFILE SMT



Diameter	T (°C)	t (s)	t1 (s)
4-6,3	255	100	50
8-10	245	100	40
12,5-18	245	100	40

Only 1 reflow soldering cycle allowed. All temperatures are measured on the topside of the Al-can.





WARNING

JIANGHAI is not liable for any extent of possible injuries or damages to persons or things, of any kind, caused by the improper application of and/or operating conditions harmful to electrolytic capacitors. Misapplications which may cause failures include, but are not limited to: ripple current or peak current or voltage above specification, operating voltage above surge voltage specified, temperature exposure outside the specified operating temperature range. Examples of harmful operating conditions comprise, but are not limited to: unusual storage or transport temperatures, excessive and/or rapid changes of ambient temperature or humidity, heavy mechanical shock or vibration, corrosive and abrasive particles in the ambient (cooling) air, conducting dust in the ambient (cooling) air, oil or water vapor or corrosive substances, explosive gas or dust, operation under extremely high or low ambient pressure conditions (below or above sea level), superimposed radio frequency voltages, radioactivity. In case of doubt about the impact of operating conditions on capacitor performance, please contact JIANGHAI.

PERSONAL SAFETY

Electrical or mechanical misapplication of electrolytic capacitors may be hazardous. Personal injury or property damage may result from explosion of a capacitor or from the expulsion of electrolyte due to mechanical disruption or the release of a safety vent of a capacitor. In case of injury or skin or eye exposure to electrolyte, immediately seek professional medical advice. Before using electrolytic capacitors in any application, please read these Handling Precautions, familiarizing thoroughly with the information contained herein. Please check before using any of our electrolytic capacitors if these components fulfill the requirements of your application and that warnings and instructions for use are followed.

WARRANTY

The information contained in this catalogue does not form part of any quotation or contract, is believed to be accurate, reliable and up to date. Quality data are based on the statistical evaluations of a large quantity of parts and do not constitute a guarantee in a legal sense. However, agreement on these specifications does mean that the customer may claim for replacement of individual defective capacitors within the terms of delivery. We will not assume any liability beyond the replacement of defective components. This applies in particular to any consequential damage caused by component failure. Furthermore it must be taken into consideration that the figures stated for lifetime, failure rates and outlier percentages refer to the average production status and are therefore to be understood as mean values (statistic expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves the right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life support applications, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of JIANGHAI do so at their own risk and agree fully to indemnify JIANGHAI for any damage resulting from such improper use or sale. This version of the catalogue supersedes all previous versions. Latest versions of datasheets can be found on our homepage: www.jianghai-europe.com. For more details on precautions and guidelines for aluminum electrolytic capacitors, please refer to CENELEC Technical Report CLC/TR 50454:2008 E, "Guide for the application of aluminum electrolytic capacitors".

POLARITY

Electrolytic capacitors are polar and shall never be used with incorrect polarity, as there is a possible danger of shorting or destruction.

RATED VOLTAGE U_R

The rated voltage is marked on the capacitor and defined in the datasheets as U_R . This voltage should never be exceeded and is the maximum peak voltage including any ripple voltages allowed to avoid a shortening of the lifetime or damage of the capacitor. When a ripple current is applied to the capacitor, the sum of the peak ripple voltage and bias DC voltage shall never exceed the rated voltage. It might be necessary to lower the maximum allowed bias DC voltage, when certain ripple currents are applied to the capacitor.

SURGE VOLTAGE

Maximum voltage, which may be applied to the capacitor for short periods of time: max. 1000 cycles of 30 sec. per 6 min., max. 5 pulses per hour. Capacitance drift +/- 15% max.

REVERSE VOLTAGE

Reverse voltages or voltages < 0V are not allowed.

RECOVERY VOLTAGE

Electric potential between the positive and negative terminal may exist as a result of dielectric absorption. Please take action that this load does not damage other devices or

scare workers during the production process (sparks possible). If needed please discharge the capacitor through a 1k Ω resistor.

TEMPERATURE RANGE

Use electrolytic capacitors only within the specified operating temperature range.

OVER-CURRENT

Currents exceeding the rated ripple currents should be avoided.

RIPPLE CURRENT/VOLTAGE

The combined value of DC voltage and peak AC voltage (due to ripple current) shall not exceed the rated voltage and shall never be < 0V. Use of aluminum electrolytic capacitors under ripple current with wide amplitudes is equivalent to rapid charge-discharge operation.

RAPID CHARGING/DISCHARGING

Rapid charging/discharging generates severe heat and gas may be emitted which may lead to explosion. Consult JIANGHAI about specially designed capacitors suitable for such kind of applications. Example: Servo Drive Application

BALANCING RESISTORS

Balancing resistors should be utilized if capacitors are used in serial connection. Please choose low-tolerance resistors to limit voltage drift.

CHARGE-DISCHARGE PROOF

JIANGHAI capacitors are charge-discharge proof, which means that 10⁶ switching cycles will cause capacitance reduction of less than 10%.

LIFETIME

There are many different lifetime definitions known without any true standard definition. Take special care when capacitors are compared that the capacitors fulfill the needed requirements. JIANGHAI publishes all conditions to be as transparent as possible. In the case of lifetime tests with additional ripple currents, the bias DC voltage must be reduced, so that the sum of bias DC voltage and the peak of the ripple voltage does not exceed the Rated Voltage U_R .

Load life: Period of time, during which the technical parameters of all capacitors stay within the given limits. JIANGHAI defines this without allowing for outliers.

Shelf Life: Definition of time with acceptable drift of capacitor parameters after storage at upper category temperature without load.

VIBRATION AND MECHANICAL STRESS

Capacitors are sensitive to vibration and mechanical forces applied on the leads. Do not use capacitors, which have been dropped onto a rigid surface.

INSULATION

If any defect of the sleeve is visible, the component should not be used – the same holds for any kind of visible damage. A capacitor should be electrically isolated from the following parts: aluminum case, cathode lead wire, anode lead wire and circuit pattern, and auxiliary terminal of snap-in type. The sleeve is not recognized as an isolator and therefore the standard capacitor should not be used in a place where insulation function is needed. Please contact JIANGHAI if a higher grade of insulation is required.

ENVIRONMENTAL CONDITIONS

Avoid direct contact with water, salt solution, oil, dewing conditions. Halogens generally, especially fumigation treatment with bromides and flame retardant agents containing halogens must be avoided. Avoid exposing to direct sunshine, ozone, ultraviolet rays and x-ray radiation. Air Pressure: Max. 150kPa, min. 8kPa. For usage >2000m altitude above sea level current deratings might be necessary. No heavy air pressure changes are allowed. Do not use or store in an environment containing any hazardous gas (e.g., hydrogen sulphide, sulphurous acid, nitrous acid, chlorine, ammonia, bromine, methyl bromide, other halogens) or acidic or alkaline solutions.

STORAGE

Temperature 5 to 35°C, relative humidity below 75%. Electrolytic capacitors may accumulate charge naturally during storage. In this case discharge through a 1k Ω resistor before use (Recovery voltage). Leakage current may be increased after long storage time. In this case the capacitor should be subjected to the rated voltage treatment through a 1k Ω resistor before use for 1 hour, then it should be discharged through a resistor of about 1 Ω /Volt. Storage times above 1 year should be avoided or rated voltage treatment may be necessary. In accordance to IEC 60384-4 electrolytic capacitors are subject to a reforming process before acceptance testing. Rated voltage is applied via a series resistance (100 Ω : $U_R \leq 100VDC$, 1k Ω : $U_R > 100VDC$).

SOLDERING

Soldering conditions (temperature, times) should be within specified conditions, especially for SMD components. Avoid high soldering temperatures as this may reduce lifetime or damage the capacitor. Do never dip the capacitor body into molten solder. Flux should not be adhered to the capacitor's body but only to its terminals. For details and different methods please contact us.



**GLUEING, CLEANING AND COATING**

Do not use fixing agents or cleaning substances containing halogens. Do not use coating and moulding components that completely seal the capacitor from the environment. Also, never use solvents containing: halogenated hydrocarbons, alkali, petroleum, trichloroethylene/-ethane, xylene, acetones, trichlorotrifluoroethane, tetrachloroethylene, methylenechloride, chloroform, acetates, ketones, esters, chlorides and bromides.

MOUNTING

Other devices, which are mounted near the capacitor, should not touch the capacitor. Additional heat coming from other components near the capacitor may reduce the lifetime of the capacitor. Do never bend or twist the capacitor after soldering to avoid stress on the leads. Capacitors are not protected against mechanical forces on the leads. Forces on the pins might damage the capacitor. No printed circuit board tracks are allowed between the lead pads of the capacitor.

TRANSPORT

Avoid fumigation and spraying insecticides (especially with bromides) in the import or export procedures which can cause corrosion. This applies also to the finished devices.

MAINTENANCE

Periodical inspection should be carried out for the capacitor: visual inspection to check pressure relief open or leakage of electrolyte, electrical characteristics as leakage current, capacitance, and dissipation factor.

ELECTROLYTE AND SEPARATOR PAPER

Electrolyte and separator paper used in aluminum capacitors may be flammable. Also, electrolyte is electrically conductive. Therefore, in case electrolyte gets in contact with PC board it may cause corrosion of circuit pattern or cause short circuit between patterns, and may lead to smoke generation or ignition in worst case.

CAUTION DURING USE OF CAPACITORS

Do not touch the terminals of capacitors. Keep the capacitor free from conductive solution, such as acids, alkali and so on. Ensure that the operating environment of the equipment into which the capacitor has been built is within the specified conditions mentioned in the catalogue or specification sheets.

SAFETY VENT

The safety vent needs some free space to open properly. Allow for free headroom of at least 2mm for diameter ≤16mm, more than 3mm for diameter 18-35mm, more than 5mm for case diameter 40mm and larger.

EMERGENCY ACTIONS

When the pressure relief vent is open and some gas blows out from the capacitor, please turn the main switch of the equipment off or pull out the plug from the power outlet immediately. During safety vent operation, extremely hot gas (>100°C) may blow out of the capacitors. Do not stand close to the capacitors. In case of eye contact, rinse the open eye(s) with clean water immediately. In case of ingestion, gargle with water immediately, do not swallow. Do not touch electrolyte but wash skin with soap and water in case of skin contact.

DEFINITION OF ELECTRICAL PARAMETERS

Separate documents as application notes, equivalent circuit diagrams and so on are available on request.

PACKAGING

Please refer to the data book for details. Further information is available on request.

DISPOSAL

Scrapped capacitors are classified as scrapped metal. For disposal they are handled as controllable industrial waste because of the nature of the contents (electrolyte). Most of the material is aluminum and cannot be completely burned.

Jianghai Europe Electronic Components GmbH

VERSION 10/2021

