

This product is completed the Lead-free & RoHS2.0 & Halogen-free.

Issued Date **2025-4-14**

Customer : Ozdisan No. RD20250414002

SPECIFICATION FOR APPROVAL

No	Customer No.	Koshin Part No.	Description	ФD x L
1		PKLH-025V221ME150-T2.5	25V220µF	6.3X15

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APPROVE	KOSHIN O SIGNATURE FO	R KOSHIN	APPROVEDSIGNATUREFORCUSTOMER
APPROVAL	CHECK	DESIGN	APPROVED BY
R & D Apr.14.2025 Alex Shen	R & D Apr.14.2025 D.S.He	R & D Apr.14.2025 X.L.Kuang	

Please return one copy with your authorized signature when you accept these specifications.

DJS-SD-0013



Make/revised curriculum vitae

Version	Date	Res.	Content	Checked
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1.Scope

This specification covers "KLH series" miniature single-ended aluminium electrolytic capacitors.

2. Operating Temperature Range

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

3. Characteristics

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

Ambient temperature : 15 to 35℃

大气力压 Air pressure: 86kpa to 106kpa

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

Ambient temperature : 20±2℃ Air pressure: 86kpa to 106kpa

4.Frequency Coefficient for Ripple Current

Frequency (Hz) Capacitance(μF)	50•60	120	1K	10K	100K
CAP≤10	0.47	0.59	0.85	0.97	1.00
10 <cap≤100< td=""><td>0.52</td><td>0.65</td><td>0.89</td><td>0.97</td><td>1.00</td></cap≤100<>	0.52	0.65	0.89	0.97	1.00
100 <cap≤1000< td=""><td>0.58</td><td>0.72</td><td>0.90</td><td>0.98</td><td>1.00</td></cap≤1000<>	0.58	0.72	0.90	0.98	1.00
1000 <cap< td=""><td>0.63</td><td>0.78</td><td>0.91</td><td>0.98</td><td>1.00</td></cap<>	0.63	0.78	0.91	0.98	1.00

5. Coefficient of Temperature for Ripple Current

Temperature (°C)	45	60	85	95	105
Coefficient	2.10	1.90	1.65	1.25	1.00

NOTE: Temperature coefficient is not used in life formula but for reference.

6.Max. Impedance Ratio

Low temperatur	Rated vol	tage(V)	6.3	10	16	25	35	50	63	100	160	200-250	350-400	450-500	
e characterist	Impeda nce	Z _{(-25℃})/ Z _(+20℃)	4	3	3	2	2	2	2	2	2	2	5	6	120Hz
ics	ratio (max)	Z _(-40℃) / Z _(+20℃)	8	6	4	4	4	3	3	3	3	6	6	-	



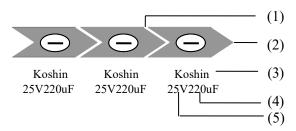
7.Characteristics Table

	Alum	inum Electrolytic	Capacitor S	Specification			
Series	PKLH	25V 220 μ F	Part No.	PKLH-025V221ME150-T2.5			
Customer No.			Case size	ΦD 6.3 X L 15			
		Items		Standard			
	Operatir	ng temperature range		- 40~ + 105 ℃			
	Capaci	tance tolerance		±20% (20℃ ,120Hz)			
0	Dissip	pation factor (MAX)	小于(Les	ss than) 14% (20℃ ,120Hz)			
Specification	Leak	age current (MAX)	小于(Less than) 55 μA (20℃ 25V 2 min)				
		ESR(MAX)	0.13Ω (100KHz ,20℃)				
	Ripp	le current (MAX)	646	646mArms (100KHz ,105℃)			
		Load life	2000 hrs				
			Dimensions				
产品外形 Outline	6.3+0.5max	Markings	Copper clad steel wir Φ0.5± 0.05 Finin 4min	↓			
APPR	OVAL	СНІ	ECK	DESIGN			
R&D Apr.14.2025 Alex Shen		Apr.1	&D 4.2025 i.He	R&D Apr.14.2025 X.L.Kuang			

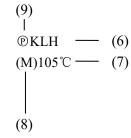


8. Marking

8.1Marking on capacitors include:



Front Side



Back Side

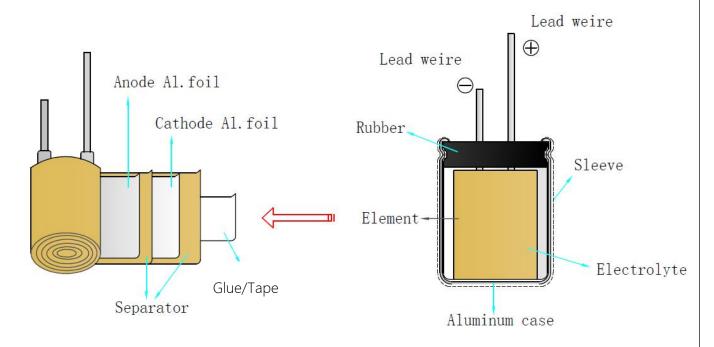
NO.	ITEM
1	direction of current
2	Polarity
3	Brand
4	Capacity
5	Voltage
6	Series
7	Temp
8	Tolerance
9	/ Sleeve material (PET)

8.2 Marking color:

Sleeve color: Coffee PET Marking color: White



9.Inner conformation drawing and inner constitute parts(curtness drawing)



Composing Parts	Material					
Anode Foil	Aluminum Foil					
Cathode Foil	Aluminum Foil					
Paper	Cellulose					
Lead Wire	Fe+Al+Cu+Sn					
Lead Wire	Fe+Al+Cu+Sn					
Seal	Rubber					
Case	Aluminum					
Sleeve	PET					
Electrolyte	EG					
Glue/Tape	Poly/OPP					

10. Electrical characteristics:

NO.	ITEM		TEST M	SPECIFICATION		
10.1	Rated voltage	Voltage: I	DC voltage + peak ripple v	See 6.Characteristics Table		
10.2	Capacitance	2. Measur	ring frequency:120Hz±12 ring voltage:≤0.5Vrms+0. ring circuit:	Capacitance tolerance : $\pm 20\%$ See 6.Characteristics Table		
10.3	Dissipation factor	3.11 10 asar				
10.4	Leakage current	R: 1000 \(\Omega\) A: DC cu	rated working voltage thr	S1:Switch S2:Switch for protect of current meter C_x : Testing capacitor	6.3V-100V Less than 0.01CV or 3μA, whichever is large (at 20°C, 2 minutes) 160V-500V Less than 0.03CV or 3μA, whichever is large (at 20°C, 2 minutes) I: Leakage current(μA) C: Capacitance(μF) V: Rated voltage (V)	
10.5	Temperature characteristi cs	STEP 1 2	TEMPERATURE 20℃±2℃	STORAGE TIME 30minutes	Step2. Low temperature impedance stability	
		2 -	40°C±3°C -25°C±3°C	2hours	Less than specified value. Step4.	
		3 2	20℃±2℃	4hours	Capacitance change:	
		4 1	105°C ±2°C	2hours	within $\pm 10\%$ of the initial	
		Step2. Me	rasure the capacitance and $z = 0.20\%$, $120 \text{Hz} \pm 2 \text{Hz}$) reasure the impedance at the $z = 0.40\%$ rasure the leakage current at	measured value. Dissipation factor: Less than specified value.		



NO.	ITEM	TEST METHOD										SPECIFICATION
10.6	Surge test	Rated surge volt second and the discharge for 5.5 be repeated for 1 minutes Surge voltage Working voltage(V) 工作电压(V) Surge voltage (V) 浪涌电压(V)	en s imin	hall at ro	be om	app] temp	lied erati	(sw ire. '	itch This	off) cycle	with shall	Capacitance change: within±15% of the initial specified value. Dissipation factor: Less than specified value. Leakage current: Within initial specified value.

11.Mechanical characteristics:

NO.	ITEM	TEST METHOD	SPECIFICATION
11.1	Lead strength	(A)Tensile strength: wire lead terminal:	
		(B) Bending strength: wire lead terminal:	When the capacitance is measured, there shall be no intermittent contacts, or open-or short-circuiting. There shall be no such mechanical damage as terminal damage etc.



	1		
NO.	ITEM	TEST METHOD	SPECIFICATION
11.2	Vibration	The frequency of the vibration shall vary uniformly within the	Capacitance: no unsteady.
	resistance	range 10 to 55 Hz with the amplitude of 0.75mm, completing the cycle in the internal of one minute. The capacitor shall be securely mounted by its leads with hold the body of capacitor. The capacitor shall be vibrated in three mutually perpendicular directions for a period of 2 hours in each direction.	Appearance: no abnormal. Capacitance change: within ± 5% of initial measured value.
11.3	Solder -ability	The leads are dipped in the solder bath of Sn at 235°C±5°Cfor 2±0.5 seconds. The dipping depth should be set at 1.5~2.0 mm.	The solder alloy shall cover the 95% or more of dipped lead's area.

12. Reliability:

NO.	ITEM	TEST METHOD	SPECIFICATION
12.1	Soldering heat resistance	The leads immerse in the solder bath of Sn at 260°C±5°C for 10±1seconds until a distance of 1.5~2.0mm from the case.	No visible damage or leakage of electrolyte. Capacitance change: Within ± 5% of the initial measured value Tan δ: Less than specified value. Leakage current: Less than specified value
12.2	Moisture Resistance	Subject the capacitor to $40^\circ\text{C} \pm 2^\circ\text{C}$ and 90% to 95% relative humidity for 504 hours.	Capacitance change: Within \pm 20% of the initial measured value Tan δ : Less than 1.2 specified value. Leakage current: Less than specified value



NO.	ITEM	TEST METHOD	SPECIFICATION
12.3	Load life	After 2000 hours continuous application of $\ DC$ rated working voltage and rated ripple current at $105^\circ\!C \pm 2^\circ\!C$, Measurements shall be performed after 16 hours exposed at room temperature.	Capacitance change: within±20% of the initial specified value. Dissipation factor: Less than 200% of the initial specified value.
12.4	Shelf life	After storage for 1000 hours at 105 °C \pm 2 °C without voltage application ,Measurements shall be performed after exposed for 16 hrs at room temperature after application of Testing	Leakage current: Within initial specified value.
12.5	Storage at low temperature	The capacitor shall be stored at temperature of -40 °C \pm 3 °C for 16 hours, during which time be subjected to standard atmospheric conditions for 16 hours or more. After which measurements shall be made.	Capacitance change: Within \pm 10% of the initial value. Tan δ :less than specified value Leakage current: Less than specified value. Appearance :no Abnormal.
12.6	Pressure relief	DC test Send the following electricity while applying the inverse voltage. Where case size D≤22.4mm:1 A d.c.max D > 22.4mm:10 A d.c.max Note: 1.This requirement applies to capacitors with a diameter of 6 mm or more. 2. When the pressure relief device does not open even 30 minutes after commencement of test, the test may be ended.	DC test circuit S P A A CX T + S: Switch End : DC current meter Cx: testing capacitor The pressure relief device shall open in such a way as to avoid any damage of fire or explosion of capacitor elements(terminal and metal foil etc.) or cover.



13.Koshin Part No

Part Number System

PKL	H-0	25V	221	М	Ε	150-T2.5
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1	2	(3)	(4)	(5)	6)	$\overline{7}$
(I)		(S)	4	\odot	\odot	\cup

(1) Series

KC:	K3S	K3N	KCL	KR2	KRJ	KRN	KLS	KZL	KSH	KSJ	KLJ	KR1	KLP	KRM	KHP	KAG	KZM	KHT	KRB	KZB
KBF	KRL	KLL	KJH	KLH	KZH	ксн	KZF	KRH	KLF	KLG	KLW	KLE	KRF	K2A	K3A	KA3	KBD			

(2) Voltage(WV)

Voltage(WV)	4	6.3	10	16	25	35	50	63	80	100	110	115
Code	004	6R3	010	016	025	035	050	063	080	100	110	115

Voltage(W V)	125	160	165	200	220	250	330	350	400	450	500	550
Code	125	160	165	200	220	250	330	350	400	450	500	550

(3) Capacitance

Capacitance is show in microfarads (µF)

μF	0.1	0.47	1	2.2	22	220	2200	22000	21~ 25(KLT)
Code	0R1	R47	010	2R2	220	221	222	223	21T25

(4) Capacitance tolerance

<u> </u>	<u> </u>								
To	olerance %	±5	±10	±15	±20	-0 to +100	-0 to +20	-10 to +20	-10 to +100
	Code	J	К	L	М	Р	R	V	W

Tolerance %	-15 to +20	-20 to +40	-20 to +80	-20 to +5	+5 to +20	-10 to +5	-30 to +20	-15 to +5
Code	N	Х	Е	Α	В	С	D	F

(5) Case (D: mm)

Diameter	3	4	5	6	6.3	7	8	10	12.5	13	16	18	20	22	25	30	34	
Code	А	В	С	D	Е	1E	F	G	Н	ı	J	К	L	М	N	0	Р	

Diameter	35	36.5	40	42	45	46	50	51	52.3	55	60	63.5	65.5	76	90	100
Code	Q	R	S	Т	U	V	W	Х	Υ	Z	1A	1B	1C	1D	1E	1F



Part Number System

(6) Case (L: mm)

Description	5	7	11	12.5	25	35.5	40	100	110	111	120	130	140	150	220	250
Code	050	070	110	125	250	355	400	A00	A10	A11	A20	A30	A40	A50	B20	B50

(7) Lead treatment

Descripti on		Taping(F:3.5mm) Ammo Packing		
Code	T2.5(T/A2.5)	T/A3.5	T/A5.0(S)	T/A7.5

Descripti on	Lead	d cut	Lea	ad forming	cut	Lead forming cut	Lead forming cut	Frog forming cut	
Code	F10	L/C	F4	F12	F/C	S1	F/S	F/W	

Note: PET sleeve capacitors adding "P" in Part No. System before.

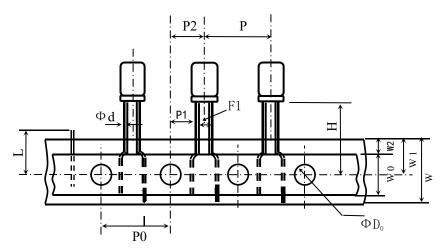


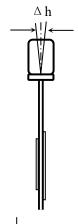
14. Product processing diagram:

Taping size Φ **6.** 3

TP2.5mm pitch tape packing

Taping code number: T2.5





 \uparrow T Table of dimensions

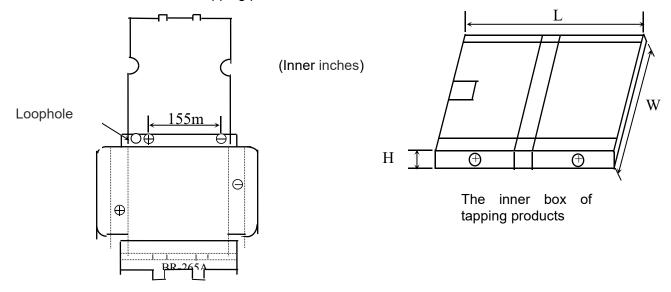
Item	Symbol	Dimension	Tolerance	Reference
Lead-wire diameter	Фф	0.5	±0.05	
Distance between centers of leads	F1	2.5	±0.5	
Height of component form tape center	Н	18.5	+0.75 -0.5	
Component spacing	P	12.7	±1.0	
Perforation pitch	Р0	12.7	±0.3	
Hole center to lead distance	P1	4.6	±0.5	
Hole center to component center	P2	6.35	±1.0	
Carrier tape width	W	18.0	±0.5	
Hole down tape width	W0	6.0~13.0	±0.1	
Feed hole position	W1	9.0	±0.5	
Hole down tape width	W2	0.5-1.5		
Diameter of sprocket holes	ФD0	4.0	±0.2	
Body inclination forward or backward	Δh	0	±1.0	
Tape base thickness	t0	0.38	±0.05	
Total thickness of the combined carrier tape and hold down tape	Т	0.7	±0.2	
Cut off position of defectives	L	11.0	or less	



15. Packing

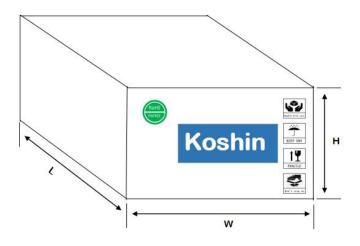
Packing Standards: standards of the carton

1. Standards of the inner box of tapping products.



Specification	Size±2 (mm) L×W×H	Packing form	Textures	Quantity(PCS)
BR-285B	290X330X45	Tapping and boxed	A3A	2000

2. 散装与编带外箱标准 Standards of the outer box of bulk and tapping products.



Specification	Size ±2 (mm) L×W×H	Packing form	Textures	Quantity(PCS)
BW-605A	605X340X260	Tapping	K=K	20K



3. 标签 Label:

Series	Size(mm)	Sample
Label	90×40	As the right

	Koshin Elec	trolytic Capaci	tors	
OPN:		$\times \times \times \times$		里加魯海里
	3	(8	
Type:	567	Qty:	9 pc	s 📆 🐺
Type: CPN:	4	生产日	期:	KS2020011302460
1		2		

1)Customer name

6 Voltage

②Work order number Lot NO.

7 Capacity

③PART No. Koshin Part No.

(8)Size

4) PART No. Customer Part No.

Quantity

(5)Series

⑩ "制造传票"上的编号 Lot NO.:

- "制造传票"上的编号 Lot NO. 编码原则为:产品类型+"-"+年份+月份+日期+工单流水号+"-"+制造传票流水号
- 1、产品类型: 2511 液态产品, 2513 固态产品, 2515 SMD 产品
- 2、年份由 2 位数组成, 例: 2022 年用 "22"表示, 2023 年用 "23"表示, 依此类推。
- 3、月份由 2 位数组成,例:1月份用"01"表示,2月份用"02"表示,依此类推。
- 4、日期由 2 位数组成, 例: 1 号用"01"表示, 10 号用"10"表示, 依此类推。
- 5、工单流水号由四位数组成,从 0001、0002、0003 编号。
- 6、制造传票流水号由两位数组成,从01、02、03……编号。



Cautions for Using Aluminum Electrolytic Capacitors

- 1. When reverse voltage is applied on DC aluminum electrolytic capacitor, the circuit will be short out and the capacitor will be damaged due to abnormal current flows through the capacitor. Please use non-polar types of capacitors when the positive voltage is applied on the cathode terminal.
- 2. When capacitor is used at higher voltage than the rated voltage, leakage current increased, characteristics drastically deteriorated and damaged in a short period may occur as a result. Please take extra caution that the peak voltage should not exceed the rated voltage.
- 3. Sudden charge and discharge

When aluminum electrolytic capacitors for general purpose-use are employed in rapid charge and discharge application, its life expectancy may be shortened resulted from capacitance decrease, heat rise, etc.

- 4. Storage of the capacitor
 - ①We recommend the following conditions for storage:

Ambient temperature: 5~35°C ,Ambient humidity: <75%RH;

- a) Storage life: ≤ 12 months;
- b) If storage life >12 months, the products need to be charged again before using;
- c) If Storage time >three years, the products need to be discarded;
- d) Expiry Date: calculating from the date marked on the sleeve;
- e) Please keep capacitors in the original package;
- f) Avoid storing the capacitors under such circumstances:
- With water and oil or damp &dewing location.
- * With gas and oil.
- With toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine and methane.
- With direct sunlight, Ozone, ultraviolet rays or radiation.
- 5. If excessive ripple current is applied on the capacitor, excessive heat will be generated inside, the capacitance will be reduced and capacitor's life shall be shortened. Rated voltage has been marked on the capacitor; therefore, the peak value of the ripple voltage should be less than the rated voltage.
- 6. Ambient temperature

Life of aluminum electrolytic capacitor is affected by the ambient temperature. It is generally known that the life doubles for each 10° C decrease in temperature.

7. Tensile strength of lead wire

When a strong force is applied to the lead wires or terminals, stress is put on the internal connections, which may result in short circuit, open circuit or increased leakage current. So it is not advisable to bend or handle a capacitor after it has been soldered to the PC board.

8. Heat resistance at the soldering process

During soldering process, secondary shrinkage or sleeve crack may occur when soldering temperature is too high or soldering time is too long.

Koshin

ALUMINUM ELECTROLYTIC CAPACITORS

9. Hole pitch and position of PC board

When designing a PC board, its hole pitch should be designed to coincide with the lead pitch (lead spacing) of the capacitor specified in the catalog or specifications. When a capacitor is forcibly inserted into an unmatched hole pitch, a force will put on the leads and which could result in a short circuit or increased leakage current.

10. Cleaning after soldering

- ① The aluminum electrolyte capacitors should be fee halogenated solvents during board cleaning after soldering. Use solvent proof capacitors when halogenated solvents are used.
- ② 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.

11. Adhesives, fixative and coating materials(coating agent)

- ① Do not use halogenated adhesives and coating materials to fix aluminum electrolytic capacitors.
- ②Do not cover up all the sealing area of capacitors with adhesives 、 fixative or coating materials(coating agent), make coverage only partial

12. Certificates

- ① ISO 9001:2015
- ② ISO 14001:2015
- ③ ISO/IATF 16949:2016
- 4 OHSAS 45001:2016

※ 符合 RoHS2.0 RoHS compliance

Accord with the latest standard of RoHS2.0, if customers have any special requirments, according to the relevant agreements which signed by both parts.