

NO.: JSB200117009

TO: Ozdisan

APPROVAL SHEET No. : B-7516C

Series No.: KRM

Specification No.:

RoHS

APPROVAL SHEET

FOR AL. ELECTROLYTIC CAPACITORS

No.	(Customer No.)	(Koshin Part No.)	Description	ΦD x L
1		PKRM-400V4R7MF095-T/A3.5	400V4.7UF	8X9.5max
2		PKRM-400V4R7MF105-T/A3.5	400V4.7UF	8X10.5max

APPROVED BY:

PLEASE SIGN RETURN US ONE COPY OF THE APPROVAL SHEET

DESIGNED BY: LUOLI CHECKED BY: CAOGUIHUA APPROVED BY: SHENZHIHONG

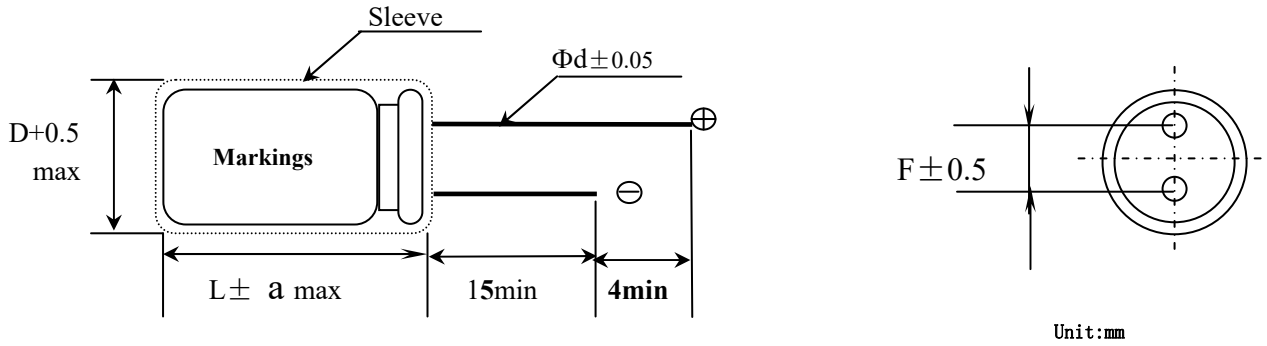
DATE: 2020-1-17

KOSHIN

DJS-DS-0013



Standard Size map:



ΦD	5	6.3	8	10	12.5	16	18	22	25
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0
Φd	0.5	0.5	0.6/0.5	0.6	0.6	0.8	0.8	0.8/1.0	1.0
a	1.5			1.5 for L16max 2.0 for L20min					

Coefficient of Frequency for Ripple Current

Rated voltage (v)	Frequency (Hz)	50• 60	120	1K	10K	100K
	CV(μ F × V)					
6.3 to 100	CAP ≤ 10	0.80	1.00	1.30	1.65	1.70
	10 < CAP ≤ 100	0.80	1.00	1.23	1.48	1.53
	100 < CAP ≤ 1000	0.80	1.00	1.16	1.35	1.38
	1000 < CAP	0.80	1.00	1.11	1.25	1.28
160 to 500	0.47 to 330	0.80	1.00	1.30	1.40	1.60

Coefficient of Temperature for Ripple Current

Rated voltage (V)	Temperature (°C)	70 or less	85	105
6.3 to 100		2.00	1.70	1.00
160 to 500		1.80	1.40	1.00



Series KRM Capacitor

1. Our part No. : For example :

<u>PKRM</u>	<u>400 V</u>	<u>4R7</u>	<u>M</u>	<u>F095</u>
Series code	rated voltage	capacitance	tolerance	case size symbol
PKRM	400 v	4.7 μ F	\pm 20%	Φ 8X9.5max

2 Marking:

Include company's brand "Koshin", series code, rated voltage, capacitance, rated temperature range, polarity and tolerance of capacitance.

3. Specifications:

3.1 Temperature range : - 40 ~+105°C

3.2 Electrical characteristics

3.2.1 Capacitance tolerance: \pm 20%

3.2.2 Tangent of loss angle ($\tan \delta$) :

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160-250	350-500
$\tan \delta$ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.15

Note: 0.02 is added to each 1000 μ F increase over 1000 μ F

3.2.3 Leakage current (μ A) :

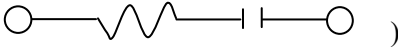
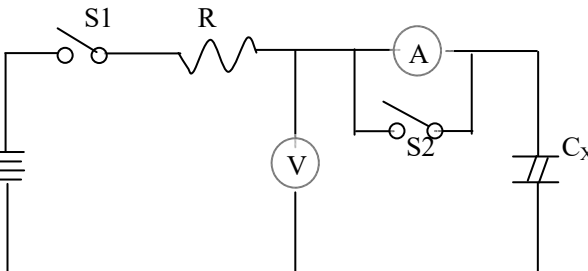
Rated voltage (V)	6.3 ~ 100	160 ~ 500
Leakage current (μ A)	Less than 0.01CV or 3 μ A Whichever is larger . (after 1 minutes)	Less than 0.03CV(after 1 minutes)

Note: I : Leakage current (μ A) , C : Capacitance (μ F) , V : Rated DC working voltage (V)

1. Scope:

This specification applies to aluminum electrolytic capacitor, used in electronic equipment.

2. Electrical characteristics:

NO.	ITEM	TEST METHOD	SPECIFICATION 规格		
2.1	Rated voltage		Voltage range、capacitance range ,see specification of this series		
2.2	Capacitance	1.Measuring frequency:120Hz±12Hz			
2.3	Dissipation factor	2.Measuring voltage:≤0.5Vrms+0.5VDC~2.0VDC 3.Measuring circuit: ()			
2.4	Leakage current	<p>DC leakage current shall be measured after 1~2minutes application of the DC rated working voltage through the 1000 Ω resistor at 20℃</p> <div style="text-align: center;">  </div> <p>R: 1000 Ω 100 Ω S1:Switch 开关 A: DC current meter S2:Switch for protect of current meter V: DC voltage meter Cx: Testing capacitor</p>	Dissipation factors, leakage current, see specification of this series.		
2.5	Temperature characteristics	STEP	TEMPERATURE	STORAGE TIME	<p>Step2. Low temperature impedance stability Less than specified value.</p> <p>Step4. Capacitance change: within ± 10% of the initial measured value.</p> <p>Dissipation factor: Less than specified value.</p>
		1	20℃ ± 2℃	30minutes	
		2	-40℃ ± 3℃	2hours	
		3	20℃ ± 2℃	4hours	
		4	105℃ ± 2℃	2hours	
<p>Step1.Measure the impedance. (Z , 20℃, 120Hz±2HZ)</p> <p>Step2. Measure the impedance at thermal balance after 2 hours. (Z , -40℃ 120Hz±2HZ)</p> <p>Step4.Measure the leakage current at thermal balance after 2 hours.</p>					

NO	ITEM	TEST METHOD	SPECIFICATION
2.6	Surge test	Rated surge voltage shall be applied (switch on)for 30±5 second and then shall be applied (switch off) with discharge for 5.5min at room temperature. This cycle shall be repeated for 1000 cycles. Duration of one cycle is 6±0.5 minutes	<p>Capacitance change: within±15% of the initial specified value.</p> <p>Dissipation factor: Less than specified value.</p> <p>Leakage current: Within initial specified value.</p>

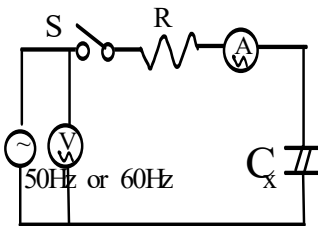
3.Mechanical characteristics:

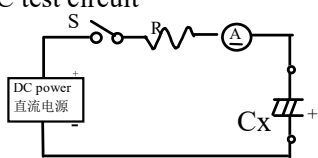
NO	ITEM	TEST METHOD	SPECIFICATION																
3.1	Lead strength	<p>(A)Tensile strength: wire lead terminal:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">d(mm)</td> <td style="width: 25%;">≤0.5</td> <td style="width: 25%;">0.5 < d ≤ 0.8</td> <td style="width: 25%;">0.8 < d ≤ 1.25</td> </tr> <tr> <td>load(kg)</td> <td>0.5</td> <td>1.0</td> <td>2.0</td> </tr> </table> <p>The capacitor shall withstand the constant tensile force specified between the body and each lead for 10seconds without damage either mechanical or electrical.</p> <p>(B) Bending strength: wire lead terminal:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">d(mm)</td> <td style="width: 25%;">≤0.5</td> <td style="width: 25%;">0.5 < d ≤ 0.8</td> <td style="width: 25%;">0.8 < d ≤ 1.25</td> </tr> <tr> <td>load(kg)</td> <td>0.5</td> <td>0.5</td> <td>1.0</td> </tr> </table> <p>With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position. The 90° in the opposite direction and back the original position. Performance of capacitor shall not have change and leads shall be undamaged.</p>	d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25	load(kg)	0.5	1.0	2.0	d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25	load(kg)	0.5	0.5	1.0	<p>When the capacitance is measured, there shall be no intermittent contacts, or open-or short-circuiting.</p> <p>There shall be no such mechanical damage as terminal damage etc. Capacitance change: within ±5% of the initial specified value.</p>
d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25																
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NO.	ITEM	TEST METHOD	SPECIFICATION
3.2	Vibration resistance	The frequency of the vibration shall vary uniformly within the 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 $\pm 5\%$ of initial measured value.
3.3	Solder ability	The leads are dipped in the solder bath of Sn at $245^{\circ}\text{C}\pm 5^{\circ}\text{C}$ for 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.

4. Reliability:

NO.	ITEM	TEST METHOD	SPECIFICATION
4.1	Soldering heat resistance	The leads immerse in the solder bath of Sn at $260^{\circ}\text{C}\pm 5^{\circ}\text{C}$ for 10 ± 1 seconds until a distance of 1.5~2.0mm from the case.	No visible damage or leakage of electrolyte. Capacitance change: Within $\pm 5\%$ of the initial measured value Tan δ : Less than specified value. Leakage current: Less than specified value
4.2	Damp head (steady state)	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 Impedance: Less than 1.2 specified value.

NO	ITEM	TEST METHOD	SPECIFICATION														
4.3	Load life	After 2000 hours continuous application of max allowable ripple current and DC rated voltage at $105^{\circ}\text{C} \pm 2^{\circ}\text{C}$, Measurements shall be performed after 16 hours exposed at room temperature.	<p>Capacitance change: Within $\pm 20\%$ of the initial value.</p> <p>Tan δ :less than 200% specified value</p>														
4.4	Shelf life	After storage for 1000 hours at $105^{\circ}\text{C} \pm 2^{\circ}\text{C}$ without voltage application, Measurements shall be performed after exposed for 16 hrs at room temperature after application of Testing	<p>Leakage current: Less than initial specified value.</p> <p>Appearance :no Abnormal</p>														
4.5	Storage at low temperature	The capacitor shall be stored at temperature of $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 16 hours, during which time be subjected to standard atmospheric conditions for 16 hours or more. After which measurements shall be made.	<p>Capacitance change: Within $\pm 10\%$ of the initial value.</p> <p>Tan δ :less than specified value</p> <p>Leakage current: Less than specified value.</p> <p>Appearance: no Abnormal.</p>														
4.6	Pressure relief	<p>AC test: Applied voltage: AC voltage not exceeding 0.7 times of the rated direct voltage or 250V AC whichever is the lower.</p> <p>Frequency : 50Hz or 60Hz. Series resistor :refer to the table below</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Capacitance(C)</th> <th>Series resistor</th> </tr> </thead> <tbody> <tr> <td>$C < 1\mu\text{F}$</td> <td>1000 Ω</td> </tr> <tr> <td>$1\mu\text{F} < C \leq 10\mu\text{F}$</td> <td>100 Ω</td> </tr> <tr> <td>$10\mu\text{F} < C \leq 100\mu\text{F}$</td> <td>10 Ω</td> </tr> <tr> <td>$100\mu\text{F} < C \leq 1000\mu\text{F}$</td> <td>1 Ω</td> </tr> <tr> <td>$1000\mu\text{F} < C \leq 10000\mu\text{F}$</td> <td>0.1 Ω</td> </tr> <tr> <td>$10000\mu\text{F} < C$</td> <td>*</td> </tr> </tbody> </table> <p>* Resistance is equivalent to a half impedance by test frequency.</p>	Capacitance(C)	Series resistor	$C < 1\mu\text{F}$	1000 Ω	$1\mu\text{F} < C \leq 10\mu\text{F}$	100 Ω	$10\mu\text{F} < C \leq 100\mu\text{F}$	10 Ω	$100\mu\text{F} < C \leq 1000\mu\text{F}$	1 Ω	$1000\mu\text{F} < C \leq 10000\mu\text{F}$	0.1 Ω	$10000\mu\text{F} < C$	*	<p>AC test circuit</p>  <p> \ominus : AC power S : Switch V : AC voltage meter A : AC current meter R : protection resistor C_x : testing capacitor </p>
Capacitance(C)	Series resistor																
$C < 1\mu\text{F}$	1000 Ω																
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$1000\mu\text{F} < C \leq 10000\mu\text{F}$	0.1 Ω																
$10000\mu\text{F} < C$	*																

NO.	ITEM	TEST METHOD	SPECIFICATION
4.6	Pressure relief	<p>DC test</p> <p>Send the following electricity while applying the inverse voltage.</p> <p>Where case size $D \leq 22.4\text{mm}$: 1 A d.c.max $D > 22.4\text{mm}$: 10 A d.c.max</p> <p>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.</p>	<p>DC test circuit</p>  <p>S : Switch Ⓐ : DC current meter C x: testing capacitor</p> <p>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.</p>
4.7	Temp cycle	<p>LSL temperature($^{\circ}\text{C}$):-40 ± 3 time(H): 0.5H/timeX5 times USL temperature($^{\circ}\text{C}$):105 ± 2 time(H): 0.5H/timeX5 times Judgment: CAP: $\Delta C/C \leq \pm 10\%$, Appearance no Abnormal. No electrolyte leakage.</p>	
4.8	Thermal shock	<p>dry heat temperature ($^{\circ}\text{C}$): 105 ± 2 time(H): 16 moist heat temperature($^{\circ}\text{C}$): 55 time(H): 24/ cold temperature($^{\circ}\text{C}$): -40 ± 2 time(H): 2/ moist heat temperature($^{\circ}\text{C}$): 55 time(H): 24 : Judgment: CAP,$\Delta C/C \leq \pm 10\%$, Tan δ :Less than 1.2 specified value, Leakage current: Less than specified value. Appearance no Abnormal. No electrolyte leakage.</p>	

5. Marking

Marking on capacitors include:

Koshin trade-mark

Koshin
 Working voltage

Normal capacitance

Tolerance

Polarity

Operating temperature range

Sleeving pipe basic: Deep Blue /Deep Green PET

Printing color: White

Required space above the valve (mm): 2.0mm

Detergent needing attention

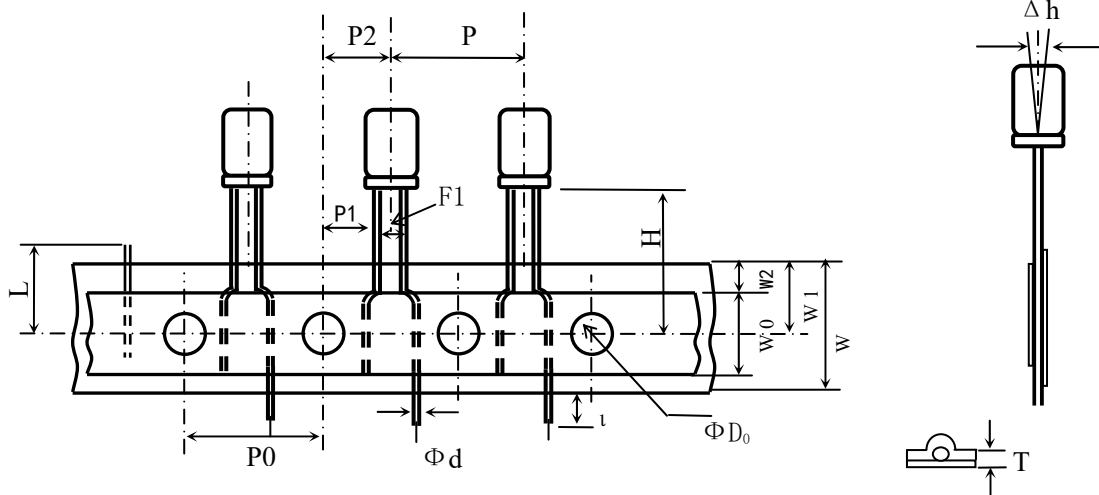
Hydrogen carbide liquid and halogen liquid can cause Aluminium Electrolytic Capacitor to corrode. Some of Safe and Unsafe detergent are as follows

Safe	Unsafe
Dimethylbenzene	1,1,2-trichloroethane
Ethanol	1,2,2- trichloroethane
Butanol	Tetrachloroethylene
Methanol	Chloroform(colorless volatilizable liquid)
Propanol	Dichloromethane
Detergent	Trichloroethylene

Taping size $\Phi 8$

TP3.5mm pitch tape packing

Taping code number: T/A3.5



Item	Symbol	Dimension	Tolerance	Reference
Lead-wire diameter	Φd	0.5	± 0.05	
Distance between centers of leads	F1	3.5	± 0.5	
Height of component from tape center	H	18.5	+0.75 -0.5	
Component spacing	P	12.7	± 1.0	
Perforation pitch	P0	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	$\Phi D0$	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	T	0.7	± 0.2	
Protrusion of lead beyond carrier tape	l	0	--	
Cut off position of defectives	L	11.0	or less	

Aluminum Electrolytic Capacitor Specification

Series	PKRM	400 V 4.7 μ F	Part No.	PKRM-400V4R7MF095-T/A3.5
Customer No.	/		Case size	Φ D 8 X L 9.5max
Specification	Items		Standard	
	Operating temperature range		- 40 ~ + 105 $^{\circ}$ C	
	Capacitance tolerance		\pm 20% (20 $^{\circ}$ C , 120Hz)	
	Dissipation factor (MAX)		(Less than) 0.15 (20 $^{\circ}$ C , 120Hz)	
	Leakage current (MAX)		(Less than) 56.4 μ A (20 $^{\circ}$ C 400 V 1 min)	
	Impedance (MAX)		/	
	Ripple current (MAX)		45 mArms (120Hz , 105 $^{\circ}$ C)	
	Load life		2000 hrs	
Outline	Sleeve color		Deep Blue PET	
	Marking color		White	
	(Dimensions)			
	<p>The drawing shows a side view and a top view of the capacitor. The side view labels include: 'Vent' at the top left, 'Sleeve' pointing to the main body, 'Markings' on the side, 'Copper clad steel wire(tinned)' for the leads, and a diameter of $\Phi 0.5 \pm 0.05$ for the leads. Dimensions are given as: height 8 ± 0.5 MAX, body length $9.5 (0/-1.5)$ max, lead length 15 min, and lead diameter 4 min. The top view shows a circular capacitor with 'Flat Rubber' on top and 'Lead space 3.5 ± 0.5' between the leads. A note states: '[Remarks: Taping space: 3.5 ± 0.5]' and the unit is 'Unit:mm'.</p>			
Recorder	(The first edition) : 2020-1-17			
Wrote by: LUOLI		Checked by: CAOGUIHUA		Approved by: SHENZHIHONG

Aluminum Electrolytic Capacitor Specification

Series	PKRM	400 V 4.7 μ F	Part No.	PKRM-400V4R7MF105-T/A3.5
Customer No.	/		Case size	Φ D 8 X L 10.5max
Specification	Items		Standard	
	Operating temperature range		- 40 ~ + 105 $^{\circ}$ C	
	Capacitance tolerance		\pm 20% (20 $^{\circ}$ C , 120Hz)	
	Dissipation factor (MAX)		(Less than) 0.15 (20 $^{\circ}$ C , 120Hz)	
	Leakage current (MAX)		(Less than) 56.4 μ A (20 $^{\circ}$ C 400 V 1 min)	
	Impedance (MAX)		/	
	Ripple current (MAX)		50 mArms (120Hz , 105 $^{\circ}$ C)	
	Load life		2000 hrs	
Outline	Sleeve color		Deep Green PET	
	Marking color		White	
	(Dimensions)			
	<p>The drawing shows a side view and a top view of the capacitor. The side view labels include: 'Vent' (height 8+0.5 MAX), 'Sleeve', 'Markings', 'Copper clad steel wire(tinned)' with diameter $\Phi 0.5 \pm 0.05$, and lead lengths of 10.5 (0/-1.5) max, 15min, and 4min. The top view shows a circular capacitor with 'Flat Rubber' and a 'Lead space' of 3.5\pm0.5. A note states: [Remarks: Taping space: 3.5\pm0.5]. The unit is mm.</p>			
Recorder	(The first edition) : 2020-1-17			
Wrote by: LUOLI		Checked by: CAOGUIHUA		Approved by: SHENZHIHONG