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MESSRS: APPROVAL NO 710-026
DATE 2016.09.19

**ALUMINUM ELECTROLYTIC** 

## CAPACITOR

# APPROVAL SHEET

CATALOG TYPE	KMG SERIES
CATALOG TIPE	
USER PART NO.	
适用机种	
特记事项	Halogen-Free

SAMYOUNG ELECTRONICS CO.,LTD.

MANAGER OF DEVELOPMENT DEPARTMENT

GONG JANG SUG



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**APPROVAL NO.:** 

SamYoung(Korea): 47,SAGIMAKGOL-RO,JUNGWON-GU,SEONGNAM-SI,GYEONGGI-DO,KOREA

SamYoung(China): No.5 CHANGJIANG ROAD, PINGDU-CITY, SHANDONG-PROVINCE, CHINA

样式: H-1001-011 A4 (210×297)



# APPROVAL NO. 710-026

## **ALUMINUM ELECTROLYTIC CAPACITOR**

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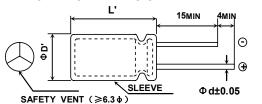
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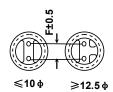
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## **Specifications of KMG Series**

ltem	Characteristics														
Rated Voltage Range	6.3 ~ 100	)V <sub>DC</sub>				16	60 ~ 4	00V	С			450	)V <sub>DC</sub>		
Operating Temperature Range	- 55 ~ + 1	05 ℃				- 4	10 ~ +	105	$^{\circ}\!\mathbb{C}$			- 25 ~	5 ~ + 105 °C		
Capacitance Tolerance	±20% <m> (at 20℃,120Hz</m>														
	The following specification	ns shall	be satist	fied whe	en the r	ated	voltag	e is a	pplied for	the r	equire	d time			
	≤100V <sub>DC</sub>									>	100V	DC			
eakage Current (max.)	After 1 minute:0.03CV(μΑ	) or 4 μ <i>Α</i>	A,whiche	ver is g	reater			Λ.C.	. 4	1.		A.C			
( at 20 ℃ )	After 2 minutes:0.01CV(µ	A) or 3 µ	ıA,which	ever is	greater			Апе	r 1 minu	ıte		After 5	minutes		
,	Where, C = Nominal cap				Ü		CRV	⁄R≪10	000 CRVF	>100	00 Cr	RVR≪1000	C <sub>R</sub> V <sub>R</sub> >100		
	V = Rated Volta		(  /				0.1	C <sub>R</sub> V <sub>R</sub> +	-40 0.04C	<sub>R</sub> V <sub>R</sub> +1	0.0	3C <sub>R</sub> V <sub>R</sub> +15	0.02C <sub>R</sub> V <sub>R</sub> +2		
District France (TANE)				1						.		1			
Dissipation Factor ( TANδ)	Rated Voltage(VDC)	6.3	10	16	25	)	35	5	0 63	3	100	160~250	350~450		
( 20℃,120Hz )	TANδ (Max)	0.34	0.24	0.20	0.1	6	0.14	4 0.12 0.10			0.09 0.2		0.24		
	When the capacitance	exceeds	1000µF	,0.02 sh	nall be a	adde	d every	/ 100	0μF incre	ase.					
Temperature Characteristics	Rated Voltage(VDC)	6.3	10	16	25	35	5 5	50 63~160 200			~250	350~400	450		
Tomporatare onaractoristics	Z-25℃/Z20℃	5	4	3	2	2	:	2	3	3 3		6	6		
(Impedance ratio at 120Hz)	Z-40℃/Z20℃	12	10	8	5	4		3	4		5	6	-		
	The following specification voltage applied for 2,000	hours at	t 105℃.(	where,	1000 ho	•		re re	stored to	20℃ :	after t	he rated	·		
Load Life	Capacitance change: ≤:														
	Tanδ LC		of the in	•		value	;								
	The following specification		nitial spe			ranac	ritors a	re re	stored to	20℃:	after e	exposing th	em		
	for 1,000 hours at 105℃					зарас	JILOI 3 E	1010	stored to	200	arter e	Aposing th	CIII		
	The rated voltage shall be		Ū			mini	mum d	of 30	minutes,a	at leas	st 24 h	ours and n	ot more		
	than 48 hours before the			•					,						
Shelf Life	Capacitance change: ≤:	±20% of	the initia	al value			,								
	Tanδ		of the ir			value	)								
	LC	≪The in	nitial spe	cified	value	(Wh	ere, 20	00% f	or ≥ WV	160V	/DC)				
Others	Satisfied characteristics	KS C IE	C 60384-	4											

#### A. DIAGRAM OF DIMENSION









B. MARKING: <u>BROWN</u> SLEEVE, <u>WHITE</u> INK

FRONT VIEW OF CAPACITO BACK VIEW OF CAPACITOR

When  $\Phi$  D $\leq$ 8,  $\Phi$  D' $\leq$   $\Phi$  D+0.5,and L' $\leq$ L+1.5

When  $\Phi\,D\!>\!8,\Phi\,D'\!\!\leqslant\!\Phi\,D\!+\!0.5,\!and\,L'\!\!\leqslant\!\!L\!+\!2.0$ 

ΦD	5	6.3	8	10	12.5	16	18
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2	2.5	3.5	5	5	7.5	7.5









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## **RATINGS OF KMG SERIES**

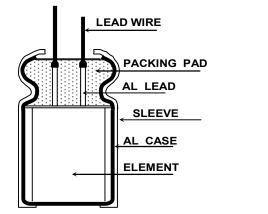
CAP	6.3	10	16	25	35	50	63	100	160	200	250	350	400	420	450
0.1						5X11 2.1	5X11 3.2	5X11 3.6							
0.22						5X11 3.2	5X11 4.3	5X11 4.8							
0.33						5X11 6.3	5X11 7.2	5X11 7.8							
0.47						5X11 10	5X11 11	5X11 12	6.3X11 12	6.3X11 12	6.3X11 12	6.3X11 12			
0.68						5X11 12	5X11 13	5X11 14	6.3X11 14	6.3X11 15	6.3X11 15	6.3X11 15			
1						5X11 13	5X11 15	5X11 16	6.3X11 16	6.3X11 17	6.3X11 17	6.3X11 18	6.3X11 19		8x11.5 16
2.2						5X11 18	5X11 19	5X11 21	6.3X11 22	6.3X11 24	6.3X11 27	8X11.5 29	8X11.5 30		10X12.5 28
3.3						5X11 30	5X11 33	5X11 34	6.3X11 35	6.3X11 36	8X11.5 37		10X12.5 41		10X16 38
4.7				5X11 25	5X11 27	5X11 37	5X11 39	5X11 40	6.3X11 41	8X11.5 42	8X11.5 45	10X12.5 47	10X16 49		10X16 38
4.7													8x11.5 39		10X20 45
															10X16 54
6.8				5X11 31	5X11 33	5X11 44	5X11 48	5X11 49	8X11.5 52	10X12.5 59	10X12.5 60	10X16 62	10X16 65		10X20 59
			5X11 35	5X11 37	5X11 40	5X11 54	5X11 59	6.3X11 61		10X12.5 72	10X16 74	10X20 79	10X20 86		12.5X20 84
10			- 00	- 01	- 40	- 01	- 00	01	, ,	,,_	, -	7.0	12.5X20 90		04
													12.5X20 148		
22		5X11 48	5X11 53	5X11 56	5X11 67	5X11 79	5X11 87	6.3X11 100	10X20 117	10X20 119	10X20 127	12.5X20 12.5X21	12.5X25 163		16X25 151
		70	33	30	01	73	- 01	100	117	113	121	12.5/21	12.5X30 221		131
33	5X11 52	5X11 56	5X11 60	5X11 75	5X11 80	5X11 97	6.3X11 122	8X11.5 144	10X20 156	10X20 158	12.5X20 184	16X25 200	16X25 222		16X31.5 203
	32	30	00	73	- 80	91	122	144	130	136	104	200	16X20 250		16X35.5 254
													16X25 255		254
47	5X11 61	5X11 66	5X11 77	5X11 80	5X11 101	6.3X11 133	6.3X11 146	10X12.5 199	12.5X20 218	12.5X20 220	12.5X25 238	16X25 265	16X31.5 290		18X25 190
	01	00	- 77	- 00	101	100	140	199	210	220	230	203	18X20 260		190
	5X11 69	5X11 83	5X11 92	5X11 113	6.3X11 138	8X11.5 189	8X11.5 207	10X16 264	12.5X25 287	16X20 293	16X25 318	16X31.5 348	18X20 290		18X31.5 235
68	09	- 03	92	113	130	109	201	204	207	293	310	340	18X25 300		233
													18X31.5 330		
82													18X35.5 392		18X31.5 254
							8X11.5 235						332		254
100	5X11 90	5X11 100	5X11 125	6.3X11 159	6.3X11 168	8X11.5 229	10X12.5 251	10X20 349	12.5X25 360	16X25 386	16X31.5 422	18X31.5 450			
120	- 55		.20					0.10	- 555	12.5X35 440			18X31.5 437	18X31.5 380	
						10X12.5 395				16X31.5 684					
220	5X11 153	5X11 170	6.3X11 213	8X11.5 277	8X11.5 294		10X16 474	12.5X25 662	16X31.5 680		18X40 730				
	6.3X11 216	6.3X11 239	8X11.5 308	8X11.5 340	10X12.5 419	10X16 529	10X20 633	16X20 810	18X35.5 863	700	700				
330		200	- 555	0.0	1.10	020	- 555	12.5X25 662							
	6.3X11	6.3X11 286	8X11.5 366		10X16 547	10X20 690	12.5X20 886	16X25 1072	18X31.5 848						
470	258	∠00	300	471	10X20	บษบ	000	1012	046						
680	8X11.5		10X12.5					18X31.5							
	365	472	480 10X12.5	620	777	973	1160	1410							
1000	8X11.5	10X12.5	480 10X16	10X20		12.5X25		18X40							
	443	571	680	821 12.5X20		1287 16X35.5	1565	2020							
2200	10X20	10X20		1160 12.5X25		1884 18X25									
3300	817 10X20		1108 12.5X25	1297 16X25	1497 16X35.5	1500 18X35.5	+		ZE ØD X		(ma A m== = / f	0E*C 400			
4700	1032 12.5X20	1205 12.5X25	1389 16X25		1950 18X35.5	2260	-	Permissi	ble Ripple	Current	mArms/1	ບລ <sub>ີ</sub> C,120l	ΠZ)		
6800	1280 12.5X25	1492 16X25	1740 16X31.5		2335										
10000	1554 16X25	1824 16X35.5		2452											
15000	1897 16X35.5	2201 18X35.5	2527												
	2344	2606													

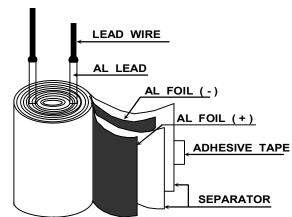
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## **ALUMINUM ELECTROLYTIC CAPACITORS**

APPROVAL NO. 710-026







CE04 TYPE

### MINIATURE SIZED TYPE CAPACITORS COMPONENT

LEAD WIRE  TINNED COPPER - PLY WIRE(Pb-FREE)  KISTRON KOHOKU NANTONG HONG YANG (CHINA) KANG WON AUTO FITTING NAN TONG HUI FENG (CHINA) NANTONG HONG YANG (KOREA/CHINA) NANTONG HONG YANG (KOHOKU NANTONG HONG YANG KOHOKU NANTONG HONG YANG (KOREA/CHINA) KISTRON (KOREA/CHINA) KISTRON (KOREA/CHINA) CCWI/ZHE JIANG TIAN TAI ZHE JIANG TIAN HUA  MOO DEUNG SUZHOU QILLIAN SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING ANATONG CHUANGJIA DONG NAM D.N TECHHAN NAM (KOREA/CHINA) SAM YOUNG BECROMAL (ITALY) SATMA HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXOM/LITON (TAIWAN) K.J.CC (KOREA) BECROMAL (ITALY) SATMA HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXOM/LITON (TAIWAN) K.J.CC (KOREA) BECROMAU (ITALY) SATMA HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXOM/LITON (TAIWAN) (JAPAN) APTINICULCU/SHENGHONG ELECON/WU JIANG FEILO (CHINA)  SEPARATOR INSULATION PAPER SPO (GERMANY) N.K.K (JAPAN) DABILISWECO (KOREA)  INTITO/NICHIBAN DABILISWECO (KOREA)	PART NAME	MATERIALS	VENDER				
AL LEAD  AL UMINUM 99.92 % OVER  AL LEAD  AL UMINUM 99.92 % OVER  AL LEAD  AL LEA			KISTRON	(KOREA/CHINA)			
AL LEAD  ALUMINUM 99.92 % OVER  ALUMINUM 99.93 % OVER  ALUMINUM 99.00 % OVER  ALUMINUM 99.0	LEAD WIRE	TINNED COPPER - PLY WIRE(Pb-FREE)	коноки	(JAPAN/CHINA)			
AL LEAD  ALUMINUM 99.92 % OVER  NAN TONG HUI FENG (CHINA) NANTONG HONG YANG KOHOKU (JAPAN/CHINA) KISTRON (KOREA/CHINA) KISTRON (KOREA/CHINA) CCW/ZHE JIANG TIAN HUA (CHINA)  PACKING PAD  SYNTHETIC RUBBER  SLEEVE  P.E.T(Poly Ethlylene Terephthalate Resin)  AL CASE  ALUMINUM 99.0 % OVER  AL CASE  ALUMINUM 99.0 % OVER  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  NAN TONG CHINA) (CHINA)			NANTONG HONG YANG	(CHINA)			
AL LEAD  ALUMINUM 99.92 % OVER  NANTONG HONG YANG KOHOKU KISTRON  SUNG NAM CCW/ZHE JIANG TIAN TAI ZHE JIANG TIAN HUA  MOO DEUNG SUZHOU QILIAN SUZHOU QILIAN SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING DONG NAM LIN AN AO XING DONG NAM LIN AN AO XING KOREA/CHINA)  K.D.K/JCC/MATSUSHITA SAM YOUNG BECROMAL LITALY) SATMA FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  SEPARATOR  INSULATION PAPER  INSULAT			KANG WON AUTO FITTING				
ROHOKU (JAPAN/CHINA) KISTRON (KOREA/CHINA) KISTRON (KOREA/CHINA) SUNG NAM CCW/ZHE JIANG TIAN TAI ZHE JIANG TIAN TAI ZHE JIANG TIAN HUA  (CHINA)  SLEEVE  P.E.T(Poly Ethlylene Terephthalate Resin)  AL CASE  ALUMINUM 99.0 % OVER  ALUMINUM 99.0 % OVER  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  BECROMAL  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  KAN/LUNAN  SEPARATOR  INSULATION PAPER  KAN/LUNAN  KAN/LUNAN  (KOREA/CHINA)  SAM YOUNG  BECROMAL  (ITALY)  SATMA  (FRANCE)  HEC XINJIANG JOINWORLD  (CHINA)  (HUAFENG / NANTONG /RAOIO  LUXON/LITON  (TAIWAN)  (KOREA)  (GEMMANY)  (CHINA)  (CHINA			NAN TONG HUI FENG	(CHINA)			
PACKING PAD  SYNTHETIC RUBBER  MOO DEUNG SUZHOU QILIAN SHUN PENG PLASTIC YUN LIN PLASTIC  ZHANG JIA GANG LIAN YI LIN AN AO XING CHINA) NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM  K.D.K/JCC/MATSUSHITA SAM YOUNG BECROMAL SATMA (FRANCE) HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  SEPARATOR  INSULATION PAPER  SPO (GERMANY) N.K.K (JAPAN)  ADHESIVE TABE ROL X PRODYLENE OR ROL X IMIDE EII M NITTO/NICHIBAN (KOREA/CHINA) CHINA)  (KOREA/CHINA) (KOREA/CHINA) (KOREA/CHINA) (KOREA/CHINA) SATMA (FRANCE) (HEC XINJIANG JOINWORLD LUXON/LITON (TAIWAN) (CHINA) (CH	AL LEAD	ALUMINUM 99.92 % OVER	NANTONG HONG YANG				
PACKING PAD  SYNTHETIC RUBBER  SUNG NAM CCWZHE JIANG TIAN TAI CCHINA)  CCWZHE JIANG TIAN TAI CCWZHE JIANG TIAN TAI CCWZHE JIANG TIAN TAI CHINA)  MOO DEUNG SUZHOU QILIAN SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING ANTONG CHUANGJIA DONG NAM DONG NAM ANTONG CHUANGJIA DONG NAM ANTONG CHUANGJIA DONG NAM SAM YOUNG BECROMAL SATMA (FRANCE) HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  SEPARATOR  INSULATION PAPER  SPO (GERMANY) NATIONICHIBAN  (ICHINA)  (KOREA/CHINA) CHINA)  (KOREA/CHINA) (KOREA/CHINA) CHINA)  (KOREA/CHINA) CHINA)  (KOREA/CHINA) (KOREA/CHINA) CHINA) (KOREA/CHINA) CHINA) (KOREA/CHINA) (HAVAI) (KOREA/CHINA) (KOREA/CHINA) (KOREA/CHINA) (KOREA/CHINA) (HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON (TAIWAN) (CHINA) (			коноки	(JAPAN/CHINA)			
PACKING PAD  SYNTHETIC RUBBER  CCW/ZHE JIANG TIAN HUA  MOO DEUNG SUZHOU QILIAN SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  CCW/ZHE JIANG TIAN HUA  MOO DEUNG SUZHOU QILIAN SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM  K.D.K.JCC/MATSUSHITA SAM YOUNG BECROMAL HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON  K.J.CC (KOREA) HUAFENG / NANTONG /RAOIO LUXON/LITON  TAWAN)  K.J.CC (KOREA) K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA)  SPO (GERMANY) N.K.K (JAPAN) ADHESIVE TARE DOLY PRODICI ENE OR DOLY IMIDE ELI M  NITTO/NICHIBAN (JAPAN)			KISTRON	(KOREA/CHINA)			
SLEEVE P.E.T(Poly Ethlylene Terephthalate Resin)  SHUN PENG PLASTIC  YUN LIN PLASTIC  ZHANG JIA GANG LIAN YI  LIN AN AO XING  (KOREA)  DON NAM  D.N TECH/HA NAM  (KOREA/CHINA)  D.N TECH/HA NAM  (KOREA/CHINA)  SAM YOUNG  BECROMAL  (ITALY)  SATMA  (FRANCE)  HEC  XINJIANG JOINWORLD  (HUAFENG / NANTONG /RAOIO  LUXON/LITON  (TAIWAN)  K-JCC  (KOREA)  HEC  XINJIANG JOINWORLD  (HUAFENG / NANTONG /RAOIO  LUXON/LITON  (TAIWAN)  (CHINA)  SEPARATOR  INSULATION PAPER  INSULATION PAPER  ROLL PROPRYLENE OR DOLY IMIDE FILM  NITTO/NICHIBAN  (JAPAN)  NITTO/NICHIBAN  (JAPAN)			SUNG NAM	(KOREA/CHINA)			
SLEEVE P.E.T(Poly Ethlylene Terephthalate Resin)  P.E.T(Poly Ethlylene Terephthalate Resin)  AL CASE  ALUMINUM 99.0 % OVER  AL CASE  ALUMINUM 99.0 % OVER  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.	PACKING PAD	SYNTHETIC RUBBER	CCW/ZHE JIANG TIAN TAI	(011114)			
SLEEVE P.E.T(Poly Ethlylene Terephthalate Resin)  SUZHOU QILIAN SHUN PENG PLASTIC (CHINA) SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING (CHINA)  AL CASE  ALUMINUM 99.0 % OVER  BECROMAL (KOREA)  BECROMAL (ITALY)  SATMA (FRANCE)  HEC  XINJIANG JOINWORLD (CHINA)  HUAFENG / NANTONG /RAOIO  LUXON/LITON (TAIWAN)  K-JCC K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  SEPARATOR  INSULATION PAPER  INSULATION PAPER  INSULATION PAPER  BULY PROPLY ENE OR POLY IMIDE FILM  NITTO/NICHIBAN  NITTO/NICHIBAN  (JAPAN)			ZHE JIANG TIAN HUA	(CHINA)			
SLEEVE P.E.T(Poly Ethlylene Terephthalate Resin)  SHUN PENG PLASTIC YUN LIN PLASTIC ZHANG JIA GANG LIAN YI LIN AN AO XING NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM K.D.K/JCC/MATSUSHITA SAM YOUNG SATMA HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON TO CHINA)  AL FOIL   ETCHED ALUMINUM 98.0 % OVER  SEPARATOR  INSULATION PAPER  SHUN PENG PLASTIC YUN LIN PLASTIC (CHINA) SHUN PENG PLASTIC YUN LIN PLASTIC (CHINA) (KOREA) (KOREA) (KOREA) HEC XINJIANG JOINWORLD (CHINA) HUAFENG / NANTONG /RAOIO LUXON/LITON (TAIWAN)  K-JCC K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA) SEPARATOR  INSULATION PAPER SPO (GERMANY) N.K.K (JAPAN) NITTO/NICHIBAN (JAPAN)  NITTO/NICHIBAN (JAPAN)			MOO DEUNG	(KOREA/CHINA)			
AL CASE  ALUMINUM 99.0 % OVER  AL CASE  ALUMINUM 99.0 % OVER  AL FOIL  FORMED ALUMINUM 99.9 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  SHUP PER PLASTIC  YUN LIN PLASTIC  ZHANG JIA GANG LIAN YI  LIN AN AO XING  NANTONG CHUANGJIA  DONG NAM  K.D.K.JCC/MATSUSHITA  SAM YOUNG  BECROMAL  K.D.K.JCC/MATSUSHITA  SAM YOUNG  BECROMAL  (ITALY)  SATMA  (FRANCE)  HEC  XINJIANG JOINWORLD  (CHINA)  HUAFENG / NANTONG /RAOIO  LUXON/LITON  K-JCC  K.D.K  AFT/INCULCU/SHENGHONG  ELECON/WU JIANG FEILO  KAN/LUNAN  (CHINA)  SEPARATOR  INSULATION PAPER  SPO  (GERMANY)  N.K.K  (JAPAN)  ADJESIVE TARE POLY REORY IENE OR POLY IMIDE ELM  NITTO/NICHIBAN  (JAPAN)	OLEEVE	D. F. T/Daly: Ethiniana Tananhthalata Dasin)	SUZHOU QILIAN				
AL CASE  ALUMINUM 99.0 % OVER    LIN AN AO XING   (CHINA)	SLEEVE	P.E. I (Poly Ethiylene Terephthalate Resin)	SHUN PENG PLASTIC	(CHINA)			
AL CASE  ALUMINUM 99.0 % OVER  LIN AN AO XING (CHINA) NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM  K.D.K/JCC/MATSUSHITA (JAPAN) SAM YOUNG (KOREA) BECROMAL (ITALY) SATMA (FRANCE) HEC XINJIANG JOINWORLD (CHINA) HUAFENG / NANTONG /RAOIO LUXON/LITON (TAIWAN)  AL FOIL  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  KAP/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA) SPO (GERMANY) N.K.K (JAPAN)  ADJESSI/E TARE DOLY BRODY ENE OR DOLY IMIDE FILM NITTO/NICHIBAN (JAPAN)			YUN LIN PLASTIC				
AL CASE  ALUMINUM 99.0 % OVER  NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM  K.D.K/JCC/MATSUSHITA SAM YOUNG BECROMAL HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON  ETCHED ALUMINUM 98.0 % OVER  FORMED ALUMINUM 98.0 % OVER  AL FOIL   ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN  KAN/LUNAN (CHINA)  KAN/LUNAN (CHINA)  SEPARATOR  INSULATION PAPER  N.K.K (JAPAN)  ADDIESIVE TARE ROLV PROPEYLENE OR ROLV IMIDE FILM NITTO/NICHIBAN (JAPAN)			ZHANG JIA GANG LIAN YI				
DONG NAM D.N TECH/HA NAM  K.D.K/JCC/MATSUSHITA SAM YOUNG SAM YOUNG BECROMAL HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  KAN/LUNAN  KAN/LUNAN SEPARATOR  INSULATION PAPER  DONG NAM (KOREA/CHINA)  K.D.K (JAPAN)  KAJCC (KOREA) K.D.K (JAPAN)  KAN/LUNAN (CHINA)  KAN/LUNAN (CHINA)  SEPARATOR  INSULATION PAPER  NITTO/NICHIBAN (JAPAN)			LIN AN AO XING	(CHINA)			
D.N TECH/HA NAM  K.D.K/JCC/MATSUSHITA (JAPAN)  SAM YOUNG (KOREA)  BECROMAL (ITALY)  SATMA (FRANCE)  HEC  XINJIANG JOINWORLD (CHINA)  HUAFENG / NANTONG /RAOIO  LUXON/LITON (TAIWAN)  K-JCC (KOREA)  K-JCC	AL CASE	ALUMINUM 99.0 % OVER	NANTONG CHUANGJIA				
AL FOIL  FORMED ALUMINUM 99.9 % OVER  FORMED			DONG NAM	(KODE A (CLUMA)			
AL FOIL  FORMED ALUMINUM 99.9 % OVER  FORMED			D.N TECH/HA NAM	(KOREA/CHINA)			
AL FOIL  FORMED ALUMINUM 99.9 % OVER  BECROMAL SATMA (FRANCE) HEC XINJIANG JOINWORLD (HUAFENG / NANTONG /RAOIO LUXON/LITON (TAIWAN)  K-JCC (KOREA) K-JCC (KOREA) (JAPAN) AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA)  SEPARATOR  INSULATION PAPER  SPO (GERMANY) N.K.K (JAPAN)  ADHESIVE TARE BOLY PROPYLENE OF POLY IMIDE FILM NITTO/NICHIBAN (JAPAN)			K.D.K/JCC/MATSUSHITA	(JAPAN)			
AL FOIL  FORMED ALUMINUM 99.9 % OVER    SATMA   HEC   XINJIANG JOINWORLD   (CHINA)   HUAFENG / NANTONG /RAOIO   LUXON/LITON   (TAIWAN)			SAM YOUNG	(KOREA)			
AL FOIL FORMED ALUMINUM 99.9 % OVER  HEC XINJIANG JOINWORLD HUAFENG / NANTONG /RAOIO LUXON/LITON  K-JCC K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN  SEPARATOR  INSULATION PAPER  SPO (GERMANY) N.K.K (JAPAN)  NITTO/NICHIBAN  (JAPAN)  NITTO/NICHIBAN  (JAPAN)			BECROMAL	(ITALY)			
AL FOIL   ETCHED ALUMINUM 98.0 % OVER  K-JCC (KOREA) K.D.K (JAPAN) AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA) SEPARATOR  INSULATION PAPER  SPO (GERMANY) N.K.K (JAPAN)  ADJUSTIVE TARE POLY PROPYLENE OR POLY IMIDE FILM  NITTO/NICHIBAN (JAPAN)	AL FOUL T	FORMED ALLIMINUM OF 6 % OVER	SATMA	(FRANCE)			
AL FOIL   ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  K-JCC (KOREA) K.D.K (JAPAN) AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA)  SEPARATOR  INSULATION PAPER  SPO (GERMANY) N.K.K (JAPAN)  ADHESIVE TARE POLY PROPYLENE OR POLY IMIDE FILM  NITTO/NICHIBAN (JAPAN)	AL FUIL U	FORMED ALUMINUM 99.9 % OVER	HEC				
AL FOIL   ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  ETCHED ALUMINUM 98.0 % OVER  K-JCC (KOREA) K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA) SEPARATOR  INSULATION PAPER  SPO (GERMANY) N.K.K (JAPAN)  ADJUSTIVE TARE POLY PROPYLENE OR POLY IMIDE FILM  NITTO/NICHIBAN (JAPAN)			XINJIANG JOINWORLD	(CHINA)			
AL FOIL   ETCHED ALUMINUM 98.0 % OVER  K.J.CC K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN SEPARATOR  INSULATION PAPER  KAN/LUNAN SPO (GERMANY) N.K.K (JAPAN)  ADJESIVE TARE POLY PROPYLENE OR POLY IMIDE FILM NITTO/NICHIBAN (JAPAN)			HUAFENG / NANTONG /RAOIO				
AL FOIL   ETCHED ALUMINUM 98.0 % OVER  K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN SPO N.K.K (JAPAN) (JAPAN)  ADJESIVE TARE POLY PROPYLENE OR POLY IMIDE FILM  NITTO/NICHIBAN (JAPAN)			LUXON/LITON	(TAIWAN)			
AL FOIL   ETCHED ALUMINUM 98.0 % OVER  AFT/INCULCU/SHENGHONG (CHINA)  ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA)  SEPARATOR INSULATION PAPER  SPO (GERMANY)  N.K.K (JAPAN)  ADJESIVE TARE POLY PROPYLENE OR POLY IMIDE FILM  NITTO/NICHIBAN (JAPAN)			K-JCC	(KOREA)			
AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO  KAN/LUNAN (CHINA)  SEPARATOR INSULATION PAPER SPO (GERMANY) N.K.K (JAPAN)  ADJESIVE TARE POLY PROPYLENE OR POLY IMIDE FILM NITTO/NICHIBAN (JAPAN)	AL FOIL	ETCHED ALLIMINUM OR O 9/ OVER	K.D.K	(JAPAN)			
SEPARATOR INSULATION PAPER    KAN/LUNAN (CHINA)	AL FUIL	ETCHED ALUMINUM 90.0 % OVER	AFT/INCULCU/SHENGHONG	(CHINA)			
SEPARATOR INSULATION PAPER SPO (GERMANY) N.K.K (JAPAN)  ADJEST/F TABE DOLY PROPYLENE OR DOLY IMIDE FILM (JAPAN)			ELECON/WU JIANG FEILO	(CHINA)			
N.K.K (JAPAN)  ADHESIVE TARE DOLV PROBYLENE OR BOLV IMIDE FILM NITTO/NICHIBAN (JAPAN)			KAN/LUNAN	(CHINA)			
ADHESIVE TARE DOLY PROBYLENE OF POLY IMIDE FILM NITTO/NICHIBAN (JAPAN)	SEPARATOR	INSULATION PAPER	SPO	(GERMANY)			
I ANDERIVE TABEIDAI A DRUDAI ENE UD DUI A IMIDE EII M I			N.K.K	(JAPAN)			
DAEIL/SWECO (KOREA)	ADHESIVE TARE	BOLV BROBYLENE OF BOLV IMIDE EILM		(JAPAN)			
	ADRESIVE TAPE	FOLT FROFTLENE OR FOLT IMIDE FILM	DAEIL/SWECO	(KOREA)			

#### When using aluminum electrolytic capacitors, pay strict attention to the following:

#### 1. Electrolytic capacitors for DC application require polarization.

Confirm the polarity. If used in reversed polarity, the circuit life may be shortened or the capacitor may be damaged. For use on circuits whose polarity is occasionally reversed, or whose polarity is unknown, use bi-polarized capacitors (BP-series). Also, note that the electrolytic capacitor cannot be used for AC application.

#### 2. Do not apply a voltage exceeding the capacitor's voltage rating.

If a voltage execeeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increases. When using the capacitor with AC voltage superimposed on DC voltage, care must be exercised that the peak value of AC voltage does not exceed the rated voltage.

#### 3. Do not allow excessive ripple current to pass.

Use the electrolytic capacitor at current values within the permissible ripple range. If the ripple current exceeds the specified value, request capacitors for high ripple current applications.

#### 4. Ascertain the operating temperature range.

Use the electrolytic capacitors according to the specified operating temperature range. Usage at room temperature will ensure longer life.

#### 5. The electrolytic capacitor is not suitable for circuits in which charge and discharge are frequently repeated.

If used in circuits in which charge and discharge are frequently repeated, the capacitance value may drop, or the capacitor may be damaged. Please consult our engineering department for assistance in these applications.

#### 6. Apply voltage treatment to the electrolytic capacitor which has been allowed to stand for a long time.

If the electrolytic capacitor is allowed to stand for a long time, its withstand voltage is liable to drop, resulting in increased leakage current. If the rated voltage is applied to such a product, a large leakage current occurs and this generates internal heat, which damaged the capacitor. If the electrolytic capacitor is allowed to stand for a long time, therefore, use it after giving voltage treatment (Note 1). (However, no voltage treatment is required if the electrolytic capacitor is allowed to stand for less than 2 or 3 years at normal temperature.)

#### 7. Be careful of temperature and time when soldering.

When soldering a printed circuit board with various, components, care must be taken that the soldering temperature is not too high and that the dipping time is not too long. Otherwise, there will be adverse effects on the electrical characteristics and insulation sleeve of electrolytic capacitors in the case of small-sized electrolytic capacitors, nothing abnormal will occur if dipping is performed at less than  $260^{\circ}$ C for less than  $10^{\circ}$  seconds.

#### 8. Do not place a soldering iron on the body of the capacitor.

The electrolytic capacitor is covered with a vinyl sleeve. If the soldering iron comes in contact with the electrolytic capacitor body during wiring, damage to the vinyl sleeve and/or case may result in defective insulation, or improper protection of the capacitor element.

#### 9. Cleaning circuit boards after soldering.

Some solvents have adverse effects on capacitors.

Please refer to the next page.

#### 10.Do not apply excessive force to the lead wires or terminals.

If excessive force is applied to the lead wires and terminals, they may be broken or their connections with the internal elements may be affected. (For strength of terminals, refer to KS C IEC 60384-4(JIS C5101-1, JIS C5101-4)

#### 11. Care should be used in selecting a storage area.

If electrolytic capacitors are exposed to high temperatures caused by such things as direct sunlight, the life of the capacitor may be adversely affected. Storage in a high humidity atmosphere may affect the solderability of lead wires and terminals.

#### 12. Surge voltage.

The surge voltage rating is the maximum DC over-voltage to which the capacitor may be subjected for short periods not exceeding approximately 30 seconds at infrequent intervals of not more than six minutes. According to KS C IEC 60384-4, the test shall be conducted 1000 cycles at room temperature for the capacitors of characteristic KS C IEC 60384-4 or at the maximum operating temperature for the capacitors of characteristics B and C of KS C IEC 60384-4 with voltage applied through a series resistance of 1000 ohms without discharge. The electrical characteristics of the capacitor after the test are specified in KS C IEC 60384-4. Unless otherwise specified, the rated surge voltage are as follows:

Rated Voltage(V)	2	4	6.3	10	16	25	35	50	63	80	100	160	200	250	315	350	400	450	500
Rated Surge Voltage(V)	2.5	5	8	13	20	32	44	63	79	100	125	200	250	300	365	400	450	500	550

**Note 1 Voltage treatment** ... Voltage treatment shall be performed by increasing voltage up to the capacitor's voltage rating gradually while lowering the leakage current. In this case, the impressed voltage shall be in the range where the leakage current of the electrolytic capacitor is less than specified value. Meanwhile, the voltage treatment time may be effectively shortened if the ambient temperature is increased (within the operating temperature range).

Note 2 For methods of testing, refer to KS C IEC 60384-4, (JIS C 5101-1, JIS C 5101-4)

#### **CLEANING CONDITIONS**

Aluminum electrolytic capacitors that have been exposed to halogenated hydrocarbon cleaning and defluxing solvents are susceptible to attack by these solvents. This exposure can result in solvent penetration into the capacitors, leading to internal corrosion and potential failure.

Common type of halogenated cleaning agents are listed below.

Chemical Name	Structural Formula	Representatice Brand Name
Trichlorotrifluoroethane	C <sub>2</sub> CI <sub>3</sub> F <sub>3</sub>	Freon TF,Daiflon S-3
Fluorotrichloromethane	CCl₃F	Freon-11,Daiflon S-1
1,1,1-Trichloroethane	F <sub>2</sub> H <sub>3</sub> CI <sub>3</sub>	Chloroethane
Trichloroethylene	C₂HCl₃	Trichiene
Methyl Chloride	CH₃CI	MC

We would like to recommend you the below cleaning materials for your stable cleaning condition taking the place of previous materials.

◎Isopropyl Alcohol(IPA) or Water

Cleaning method: One of immersion, ultrasonic or vapor cleaning.

Maximum cleaning time: 5 minutes(Chip type: 2 minutes)

**%Do not use AK225AES** 

Aluminum electrolytic capacitors are easily affeceted by halogen ions, particularly by chloride ions. Excessive amounts of halogen ions, if happened to enter the inside of the capacitors, will give corrosion accidents-rapid capacitance drop and vent open. The extent of corrosion accidents varies with kinds of electrolytes and seal-materials. Therefore, the prevention of halogen ion contamination is the most improtant check point for quality control in our procuction lines. At present, halogenated hydrocarbon-contained organic solvents such as Trichloroethylene, 1,1,1-Trichloroethane, and Freon are used to remove flux from circuit boards.

If electroytic capacitors are cleaned with such solvents, they may gradually penetrate the seal portion and cause the eosion. When using latex-based adhesive on the capacitors rubber end seal for adhesion to a PCB, corrosion may occur depending on the kind of solvent in the adhesive. Select an adhesive as an organic solvent with dissolved polymer that is not halogenated hydrocarbon. Hot air drying is required for eliminating the solvent between the product and the PCB at  $50^{\circ}$ C after coating.

Followings are the penetration path of the halogenated solvent.

- (1) Penetration between the rubber and the aluminum case
- 2 Penetration between the rubber and the lead wire
- ③ Penetration through the rubber

The inside of the capacitors, the mechanism of corrosion of aluminum electrolytic capacitors by halogen ions can be explained as follows:

Halides(RX) are absorbed and diffused into the seal portion. The halides then enter the inside of the capacitors and contact with the electrolyte of the capacitors. Where by halogen ions are made free by a hydrolysis with water in the electrolyte:

$$RX + H_2O \rightarrow ROH + H^{+} + X^{-}$$

The halogen ions (X) react with the dielectric substance(Al<sub>2</sub>O<sub>3</sub>) of aluminum electrolytic capacitors:

$$AI_2O_3 + 6H^+ + 6X^- \rightarrow 2ALX_3 + 3H_2O$$

AIX<sub>3</sub> is dissociated with water:

$$ALX_3 + 3H_2O \rightarrow AL (OH)_3 + 3H^{+} + 3X^{-}$$

#### **\*\*MANUFACTURING SITE**

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