承　认　书

APPROVAL SHEET

客　户： CUSTOMER	**ROPLA**	承认书编号： APP. NO.	**JSU003218120026-2**
系　列： SERIES	**LS**	使用温度范围： OPERATION TEMP. RANGE	**-40~+85℃**

凯美产品料号 JAMICON PART NO.：	客户产品料号 CUSTOMER PART NO.：
TLS*M***S1A****L** **Old PN: LSW*********M**	

客 户 承 认 印 CUSTOMER'S APPROVAL STAMP	凯美电机股份有限公司（总部） KAIMEI ELECTRONIC CORP.(Headquarters) 凱美電機股份有限公司 17.DEC.2018 技術部	
	APPROVED BY:	TESTED BY:
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Check list 对照表

No.	Jamicon P/N 凯美料号	Old P/N 旧料号
1	TLS109M063S1A5T35L	LSW103M1JQ35M
2	TLS827M400S1A5T60L	LSW821M2GQ60M
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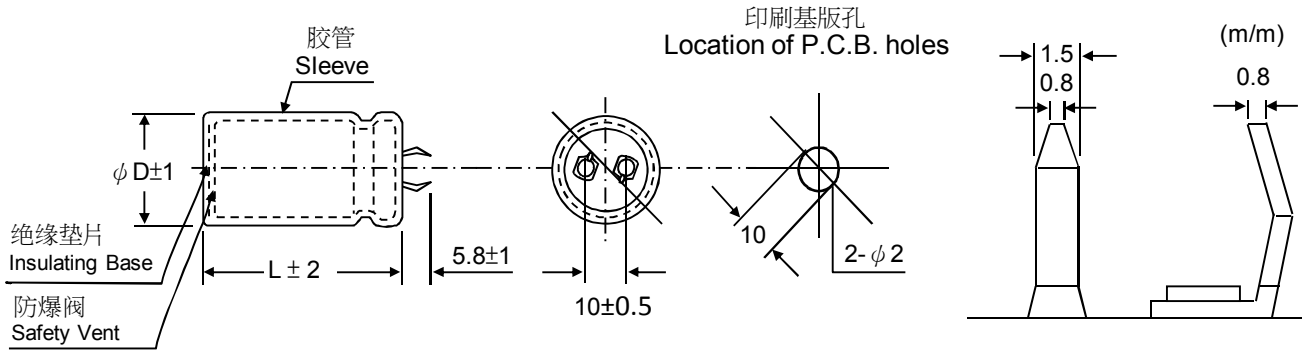
Table of specification and characteristics 规格和特性表

NO	料号 Part NO.	静电容量 CAP(μF) 120Hz 20℃	容量公差 CAP Tol. (%)	工作电压 WV	损失角 DF(%) (MAX) 120Hz 20℃	漏电流 LC(μA) (MAX) 5 min 20℃	纹波电流 RC(Arms) (MAX) 120Hz 85℃	纹波寿命 Ripple Life (Hrs) 85℃	尺寸 Dimensions (mm) φD	L	P
1	TLS109M063S1A5T35L	10000	±20	63	35	3000	3.67	2000	35	35	10.0
2	TLS827M400S1A5T60L	820	±20	400	15	3000	3.60	2000	35	60	10.0

Ⅰ. Scope 范围

This standard defines characteristics and dimensions for aluminum electrolytic capacitors named LS series is standard product.
此标准规定了铝质电解电容标准品LS系列的特性和尺寸。

Ⅱ. Construction & Dimensions 尺寸图



Ⅲ. Characteristics 特性

Standard test condition 标准试验条件

Unless otherwise specified all tests shall be performed at, or referred to, an ambient temperature of 20℃ and a relative humidity not greater than 60%.
所有的试验应在环境温度20℃和相对湿度小于等于60%的条件下进行，除非另有规定。

Operating Temperature Range 工作温度范围

16~500VDC -40~+85℃

1. Electrical characteristics 电气特性

(1). Working Voltage and Surge Voltage 工作电压和浪涌电压

WV: Working Voltage 工作电压(VDC)

SV: Surge Voltage 浪涌电压 (V)

WV	16	25	35	50	63	80	100	160	180	200	250	350	350	400	450	500
SV	20	32	44	63	79	100	125	200	225	250	300	400	400	450	500	550

(2). Leakage Current 漏电流

The maximum leakage current is specified in the following formula after DC working voltage applied for 5 minutes.

印加直流工作电压5分钟后的最大漏电流值如下列公式所示：

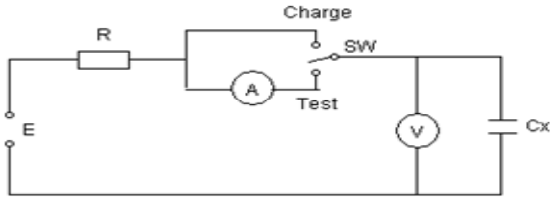
I=0.02CVor3(mA),whichever is smaller 5 minutes 任意一个较小值.

where I: Leakage Current (漏电流) (μA)

C: Nominal Capacitance (标称容量) (μF)

V: Rated Voltage (额定电压) (V)

Measurement circuit 测试电路



(3). Dissipation Factor 损失角

Dissipation Factor at 120Hz/ 20℃ shall not exceed the values given in the table below.

在120 Hz / 20℃条件下的DF值不应超过下表中给出的值。

WV	16		25		35		50		63		80		100		≧160
CAP	≦47000	≧56000	≦33000	≧47000	≦22000	≧33000	≦6800	≧10000	≦6800	≧10000	≦2200	≧3300	≦3300	≧4700	-
DF(%)	50	60	40	50	35	40	30	35	25	35	20	25	20	25	15

(4). Low Temperature Characteristics 低温特性

The ratio of impedance at -25℃/+20℃ and -40℃/+20℃ of the capacitor shall be less than the following value at 120Hz.

电容器在120Hz的条件下,分别在-25℃/+20℃和-40℃/+20℃的阻抗比，应小于以下的规格值：

WV额定电压 / Z阻抗(120Hz)	16~100	160~250	350~500
Z(-25℃) / Z(+20℃)	4	6	8
Z(-40℃) / Z(+20℃)	15	—	—

(5). Multiplier for Ripple Current 纹波电流频率修正系数

Frequency coefficient 频率系数

Frequency 频率(Hz)	60	120	400	1k	10k
W.V.	Coefficient系数				
≦100V	0.80	1.00	1.10	1.20	1.20
≧160V	0.80	1.00	1.10	1.30	1.40

Temperature coefficient 温度系数

Ambient Temperature 环境温度 (℃)	40	60	70	85
Coefficient系数	1.80	1.40	1.20	1.00

2. Mechanical Characteristics 机械特性

Lead Pull Test 端子拉力测试

Capacitors shall be with stand the pull test shown in the following table.
电容器的导针应能承受下表所示的拉力测试

Mechanical Characteristics 机械特性	Load 负荷（kg）	Test time 测试时间(sec)
Terminal Strength 端子强度	4.5	30 +5 -0
Bending Test 折弯测试	2.5	30 +5 -0

3. Endurance characteristics 耐久特性

(1). Load Life 负荷寿命

After applying rated voltage with rated ripple current for 2000+12/-0 hours at 85±2℃,when the capacitors are restored to 20℃ the capacitors shall meet the following requirements.
在85±2℃环境中，不超过额定电压的范围下叠加额定纹波电流，连续加载额定电压2000+12/-0小时后，待温度恢复到20℃进行测量时，应满足以下要求。

Capacitance Change 容量变化	Within ±15% of initial value 在初始值的±15%以内
Dissipation Factor 损失角	Not more than 175% of specified value 不超过规格值的175%
Leakage Current 漏电流	Not more than the specified value 不超过规格值

(2). Shelf life 高温无负荷寿命

After placed at 85±2℃without voltage applied for 1000+12/-0 hours,when the capacitors are restored to 20℃, the capacitors shall meet the following requirements.
(Reference JIS C5101-4 4.1)
在85±2℃环境中，无负荷放置1000+12/-0小时，待温度恢复至20℃进行测量时，电容器应满足以下要求(参考JIS C5101-4 4.1)：

Capacitance Change 容量变化	Within ±15% of initial value 在初始值的±15%以内
Dissipation Factor 损失角	Not more than 175% of specified value 不超过规格值的200%
Leakage Current 漏电流	Not more than the specified value 不超过规格值

(3). Solderability test 焊锡性试验

The following specifications shall be satisfied when the lead wires are tested in solder bath at 245±5℃ for 2.5±0.5 seconds, more than 95% of the terminal surface shall be covered with new solder.

当端子在245±5℃的焊锡槽中试验2.5±0.5秒后，95%以上的端子表面应当要被新焊料覆盖。

(4). Solder Heat Resistance Test 焊锡耐热试验

The following specifications shall be satisfied when the lead wires are tested in solder bath at 275+2/-0℃ for 20±0.5 seconds.

当端子在275+2/-0℃的焊锡槽中试验20±0.5秒后，应当满足以下要求：

Capacitance Change 容量变化	≦±5% of the initial value ≦初始值的±5%
Dissipation factor 损失角	≦Initial specified value 低于初始规格值
Leakage Current 漏电流	≦Initial specified value 低于初始规格值

Ⅳ. Mounting 安装

The paper separators and the electrolytic-conductive electrolytes in a non-solid aluminum electrolytic capacitor is flammable.

非固态电容器内中的电解纸和电解液都是易燃品。

Leaking electrolyte on a PC board can gradually erode the copper traces, possibly causing smoke or burning by short-circuiting the copper traces.

PC板上漏液会逐渐侵蚀铜丝,很可能由于铜丝短路导致冒烟或燃烧。

Verify the following points when designing a PC board.

在设计PC板时需验证以下要点：

(1) Provide the appropriate hole spacing on the PC board to match the terminal spacing of the capacitor.在PC板上保留适当的孔距以匹配电容器的端子间距。

(2) Make the following open space over the vent so that the vent can operate correctly.

Case diameter 铝壳直径	Clearance 间隔
φ22 ~ φ35 mm	≧3 mm
≧φ40 mm	≧5 mm

(3) Do not place any wires or copper traces over the vent of the capacitor.

请不要在电容器的防爆阀上方放置任何电线或铜丝。

(4) Installing a capacitor with the vent facing the PC board needs an appropriate ventilation hole in PC board. 在安装电容器时，如果防爆阀正对PC板，则PC板上需要开一个适当的通风孔。

(5) Do not pass any copper traces beneath the seal side of a capacitor.

The trace must pass 1 or 2 mm to the side of the capacitor.

请不要在电容器的封口部下面进行电路配线。如果在电容器附近配线,请确保线路与电容器间隔1~2㎜。

(6) Avoid placing any heat-generating objects adjacent to a capacitor or even on the reverse side of the PC board.

请不要在电容器周围或PC板的背面放置任何发热部件。

(7) Do not pass any via holes or underneath a capacitor.
请不要从电容器通孔或电容器底部穿过。

(8) In designing double-sided PC boards, do not locate any copper trace under the seal side of capacitor.设计双面PC板时，请不要在电容器的封口面放置任何铜丝。

(9) The liquid aluminum electrolytic capacitor can't be reflow soldering, please contact us if you need to do that. 液态铝电解电容器不能进行回流焊，如需进行回流焊请与我司联系。

(10) In order to enhance the vibration resistance of the capacitor, it is recommended to be fixed on the PCB with fixed adhesive when installed.
为增强电容的抗振动能力，建议安装时用固定胶辅助其固定于PCB上。

Ⅴ. Storage Condition 储存条件

(1) Aluminum Electrolytic Capacitors should not be stored in high temperatures or where there is a high level of humidity. The suitable storage condition is 5~35℃ and less than 75% in relative humidity.
铝电解电容器不应当储存在高温或高湿的条件下.合适的储存条件为5~35℃,相对湿度低于75%。

(2) Aluminum Electrolytic Capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray.
铝电解电容器不应当储存在潮湿的条件下，如水、盐水喷雾或油雾

(3) Do not store Aluminum Electrolytic Capacitors in an environment full of hazardous gas (hydrogen sulfide , sulfurous acid gas, nitrous acid, chlorine gas, ammonium, etc…).
请不要将铝电解电容器存储在一个充满有害气体的环境下(硫化氢、二氧化硫、亚硝酸、氯气、铵气等…)。

(4) Aluminum Electrolytic Capacitors should not be stored under exposure to ozone, ultraviolet rays or radiation.
铝电解电容器储存不应暴露在臭氧、紫外线辐射和射线中。

(5) If a capacitor has been stored for more than one year under normal temperature (shorter if high temperature) and it shows increased leakage current, then a treatment by voltage application is recommended. The capacitor which hasn't been treated mustn't be used directly.
如果电容器在常温下储存超过一年(高温条件下不超过一年),出现漏电流上升现象,
那么建议对电容器进行加压处理.未被处理过的电容器不能直接使用。

Ⅵ. Marking 标识

Marking on capacitor include 电容器上的标识包含：

JAMICON trademark 商标

Polarity of the terminals 负极标示线

Capacitance and Rate voltage 标称容量和工作电压

LS P 85℃ ← Series and Maximan operating temperature, PET Sleeve.
系列和最高工作温度及PET胶管

XXXXX(X)

Weeks of production 生产周期

Year of production 生产年份

Remark: Date code numbering system. Date code is indicated manufactured date
备注:周期编号系统,周期是表示生产日期.

Manufactured year 生产年份

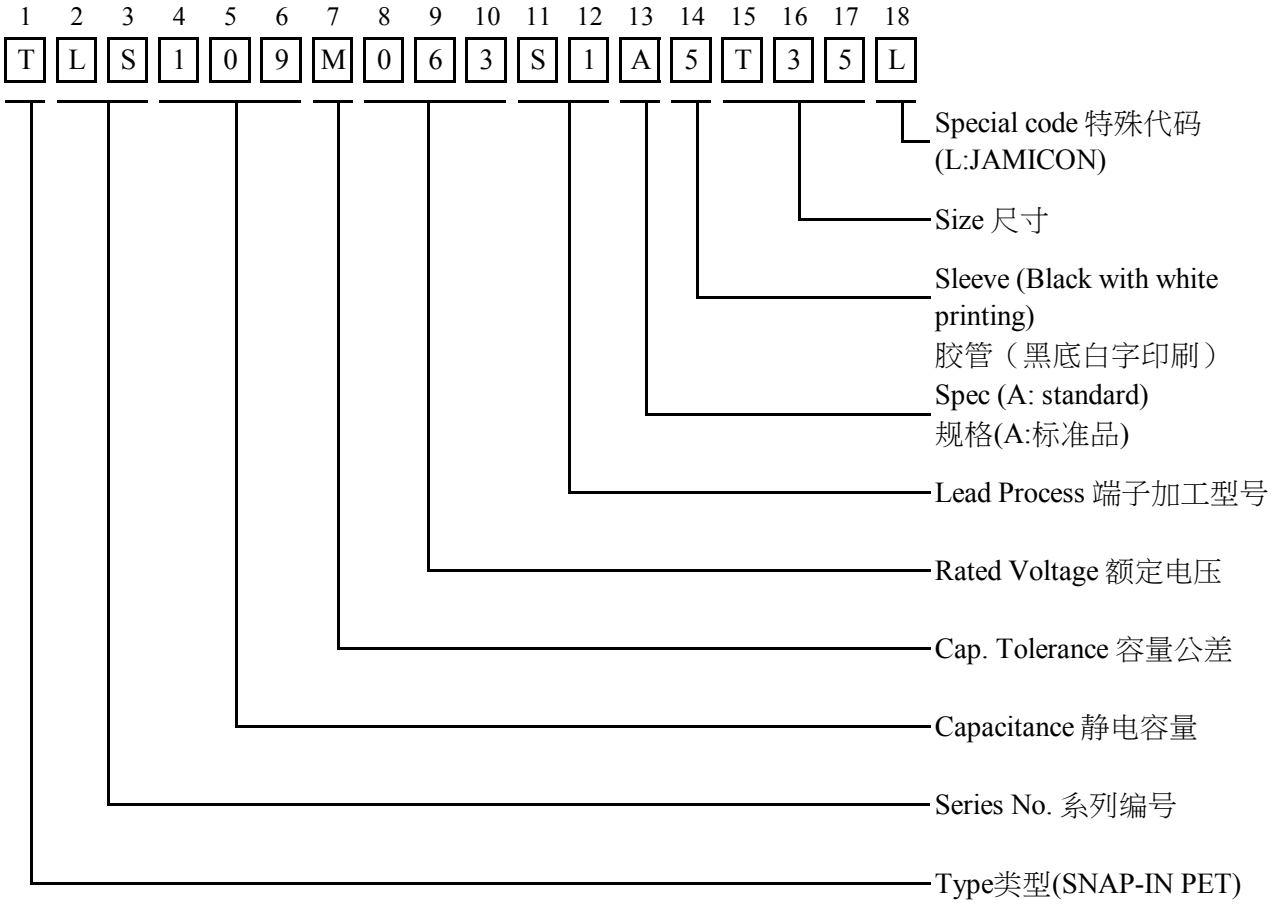
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Code	0	1	2	3	4	5	6	7	8

Manufactured month 生产月份

Month	1~2	3~4	5~6	7~8	9~10	11~12
Code	08	16	24	32	40	48

Ⅶ. Catalog numbering

JAMICON TYPE 类型(Part Number 料号)：



Ⅷ.Packaging specification(包装规格)

Large Can Type Aluminum Electrolytic Capacitors (大型铝电解电容器)

Packaging	Size	Height高度	Spacer size	Inner	Inner box size	Inner box	Outer carton
Row packaging 排装	φ22	≦30	XFN-293040	6	XAA-3112020531	100	800
		30＜L≦55	XFN-293055	6	XAA-3112020701	100	600
		55＜L≦70	XFN-293075	6	XAA-3112020901	100	400
		70＜L≦90	XFN-293095	6	XAA-3112021051	100	400
	φ25	≦30	XFN-335040	3	XAA-3462110531	100	800
		30＜L≦55	XFN-335055	3	XAA-3462110701	100	600
		55＜L≦70	XFN-335075	3	XAA-3462110901	100	400
		70＜L≦90	XFN-335095	3	XAA-3462111051	100	400
	φ30	≦30	XFN-293040	10	XAA-3112020531	50	400
		30＜L≦55	XFN-293055	10	XAA-3112020701	50	300
		55＜L≦70	XFN-293075	10	XAA-3112020901	50	200
		70＜L≦90	XFN-293095	10	XAA-3112021051	50	200
	φ35	≦33	XFN-280040	4	XAA-3112020531	40	320
		30＜L≦55	XFN-280055	4	XAA-3112020701	40	240
		55＜L≦73	XFN-280075	4	XAA-3112020901	40	160
		70＜L≦90	XFN-280095	4	XAA-3112021051	40	160
	φ40	L≦30	XFN-200040	9/7	XAA-3462110531	40	320
		30＜L≦55	XFN-200055	9/7	XAA-3462110701	40	240
		55＜L≦70	XFN-200075	9/7	XAA-3462110901	40	160
		70＜L≦90	XFN-200095	9/7	XAA-3462111051	40	160

Explain 说明：

(1) 22、30、35 ϕ L≦55mm 、L＞70 Outer carton size 外箱尺寸：XAN-4253242352

(2) 22、30、35 ϕ 55＜ L≦70mm Outer carton size 外箱尺寸：XAN-4253242002

(3) 25、40 ϕ L≦55mm、L＞77mm Outer carton size 外箱尺寸：XAN-4403582352

(4) 25、40 ϕ 55＜ L≦70mm Outer carton size 外箱尺寸：XAN-4403582002

Ⅸ. Others

(1) All the Jamicon capacitors, which are authenticated by the SGS, and the test report shows that the inspection results of Hexavalent Chromium VI(Cr(VI)), Cadmium (Cd), Mercury (Hg), Lead (Pb), Polybrominated Biphenyls (PBBs),Polybrominated Diphenyl Ether (PBDEs) comply with the RoHS requirements.

凯美所有电容器经SGS认证测试报告中所检测的六价铬（Cr^{6+}）、镉(Cd)、汞（Hg）、铅(Pb)、多溴联苯(PBBs)和多溴联苯醚(PBDEs)均符合RoHS要求.

(2)Satisfied characteristic JIS C 5101. 符合JIS C 5101特性。

(3)Aluminum Electrolytic Capacitors may b e damaged by corrosion which is caused by any halogenated hydrocarbon solvents.

铝电解电容器可能会被卤化烃类溶剂导致的腐蚀而损坏。

Please let us know in advance the solvent name and conditions for your PCB cleaning

请让我们事先了解贵司印刷线路板使用的清洗剂的名称和清洗条件。