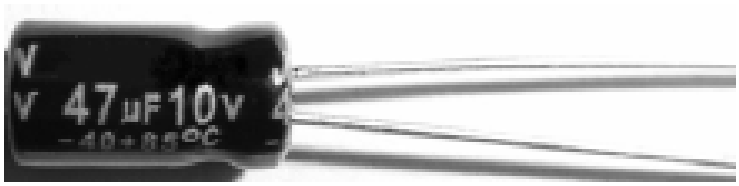
Datasheet

ENGLISH

22µF 400 V dc, Through Hole Aluminium Electrolytic Capacitor

RS Stock number 711-2059



Specifications:

Item	Performance Characteristics	
Operating Temperature Range	-40 to +105℃	-25 to +105℃
Rated Voltage Range	6.3 to 100 VDC	160 to 450 VDC
Capacitance Tolerance	±20%(120Hz, +20℃)	
Leakage Current (+20℃)	10V ~100V DC: I≤0.01CV+3(uA) 160V~450V DC: I≤0.03CV+3(uA) I: Leakage current(uA) C: Rated Capacitance(uF) V: Working Voltage[V] After 1minute whichever is greater measured with rated working voltage applied.	

Dissipation Factor [120Hz,20 °C]	W.V	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	Tanθ	0.23	0.20	0.16	0.14	0.12	0.10	0.10	0.10	0.15	0.15	0.16	0.20	0.20	0.20

For capacitance exceeding 1000uF,add 0.02 per increment of 1000uF

Temperature Caracteristics [Tanθ]	W.V.		6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	Impedance	-25 °C/+20 °C	4	3	2	2	2	2	2	2	3	3	3	5	6	15
		-40 °C/+20 °C	8	6	4	3	3	3	3	3	-	-	-	-	-	-

Impedance ratio of 120Hz

Load Test	Test conditions Duration time : 5Ø~6Ø1000Hrs 8Ø~25Ø 2000Hrs Ambient temperature:+105℃ Applied voltage: Rated DC working voltage After test requirements:at+20℃ After test requirements:△±20% of the initial measured value Dissipation Factor: △200% of the initial specified value Leakage current: △The initial specified value
Shelf Test	Test conditions Duration time :500Hrs Ambient temperature:+105℃ Applied voltage: None After test requirements at +20℃: Some limits as Load life. Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.

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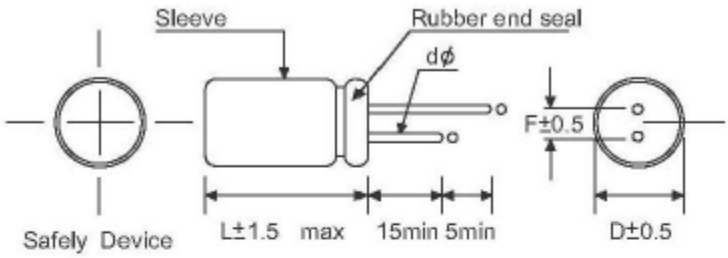
Diagram of Dimensions:



(Unit: mm)

D	5	6	8	10	13	16	18	22	25
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	12
φd	0.5			0.6		0.8			1.0

Ripple Current & Temperature

Temperature (□)	45	60	70	85	105
Multiplier	2.10	1.90	1.65	1.40	1.00

Ripple Current & Frequency Multipliers

Cap.(μF) \ Freq.(Hz)		50(60)	120	400	1K	10K	50-100K
Multiplier	CAP□10	0.8	1.0	1.30	1.45	1.65	1.70
	10<CAP□100	0.8	1.0	1.23	1.36	1.48	1.53
	100<CAP□1000	0.8	1.0	1.16	1.25	1.35	1.38
	1000<CAP	0.8	1.0	1.11	1.18	1.25	1.28

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CONTENTS OF QUALITY ASSURANCE

ASSURANCE METHOD CONTENTS

Performance

Unless otherwise specified, the capacitors shall be measured at +15℃ to +35℃ , 45to75%RH. However, if any doubt arises on the judgment, the measurement conditions shall be +20±1℃, 60to70%RH the test Conditions shall comply with IEC-60384-4.

1.Capacitance(CAP.)

Measuring frequency	:120Hz±20%
Measuring voltage	:0.5V rms. +1.5 to 2.0V dc
Measuring circuit	:Series equivalent circuit.

Criteria: Shall be within the specified capacitance tolerance.

2.Dissipation Factor (tanδ)

Measuring frequency	:120Hz±20%
Measuring voltage	:0.5V rms. +1.5 to 2.0V dc
Measuring circuit	:Series equivalent circuit.

Criteria: Shall not exceed the specified in the table of Ratings.

3. Leakage Current (L.C.)

DC leakage current shall be measure with rate voltage, which is applied through a resistor of 1,000±10Ω connected in series with the capacitors , at the end of a specified period after the capacitors reached the rated voltage across the terminals.
Criteria: Shall not exceed the specified in the table of Ratings.

4. Surge Voltage

4.1 The surge DC rating is the maximum voltage to which the capacitor should be subjected under any conditions. This includes transients and peak ripple at the highest line voltage.

4.2 Capacitors, connected in series with 1000 ohm resistors, shall withstand the surge test voltage applied at the rated of 1/2 minute on, 4 1/2 minutes off, for 1000 successive test cycles at 20°C (see the following table)

Rated Voltage (WV)	6.3	10	16	25	35	50	63	100
Surge Voltage (SV)	10	13	20	32	44	63	79	125

Criteria:

Capacitance change	:≦±15% of initial value
Dissipation Factor	:within specified value
Leakage Current	:within specified value
Physical	:no broken and undamaged

Endurance characteristic

5. High temperature load life test

Condition	Specification	
1. Capacitors shall be placed in oven with application of ripple current and rate voltage for 1000±12hrs at 105℃ 2. The capacitors should be use within specified permissible ripple current in each standard products table(the sum of DC working voltage and AC peak voltage shall be equal to the rated DC working voltage 3. The specified maximum permissible ripple current in defined at 105℃ and 120 Hz 4. Then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within ±25% of the initial value
	TANδ	Less then 200% of specified value
	Leakage Current	Within specified value
	Physical	no broken and undamaged

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6. High temperature shelf life test

After 500hrs test at 105℃ without rated working voltage. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within ±25% of the initial value
	TANδ	Less then 200% of specified value
	Leakage Current	Less then 200% of specified value
	Physical	no broken and undamaged

7. Rotational temperature test

Capacitor is place in a oven whose temperature follow specific regulation to change. The specific regulations is "+25℃ (1 hr) → +105℃ (2 hrs) → +25℃ (0.5 hr) → -40℃ (2 hrs) →+25℃ (0.5 hr)",and it called a cycle. The test totals 10 cycles. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within ±10% of the initial value
	TANδ	Within specified value
	Leakage Current	Within specified value
	Physical	no broken and undamaged

8. Humidity test

Capacitors shall be exposed for 500±8hrs in an atmosphere of 90~ 95%R.H at 40℃. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within ±10% of the initial value
	TANδ	Less then 120% of specified value
	Leakage Current	Within specified value
	Physical	no broken and undamaged

9. Low temperature test

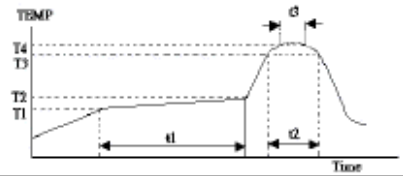
Capacitor are place at -40±3℃ for 72±4hrs.And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within ±10% of the initial value
	TANδ	Within specified value
	Leakage Current	Within specified value
	Physical	no broken and undamaged

10. Vibration test

1. Fix it at the point 4mm or less form body. For ones of 12.5mm or 25mm or more length, use separate fixture. 2. Direction and during of vibration:3 orthogonal direction each for 2hrs total 6hrs. 3. Mutually frequency: 10 to55Hz reciprocation for 1 min. 4.Total amplitude:1.5mm	Capacitance change	Within ±10% of the initial value
	TANδ	Within specified value
	Leakage Current	Within specified value
	Physical	no broken and undamaged

11. Reflow test

1. IR Reflow



Preheat	Temp (T1~T2)	100~150℃
	Time (t1) max	40 sec
Duration	Temp(T3)	260℃
	Time (t2) max	10 sec
Peck	Temp(T4)	270℃
	Time (t3) max	5 sec
Reflow cycle	Twice or less	

2. Solder bath method:
Solder temperature:260±3℃
Immersion time:5+1/-0 sec
Thickness of heat shunt
(Printed wiring board):1.6mm
3. Soldering iron method:
Bit temperature: 350±10℃
Application time of soldering Iron:3+1/-0 sec

Capacitance change	Within ±10% of the initial value
TANδ	Within specified value
Leakage Current	Within specified value
Physical	no broken and undamaged

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12. Solderability test

After the lead wire fully immersed in the solder for 2±0.1 sec at a temperature of 245±2℃, the solder coating must be more then 95%

13. Mechanical

1. The test is about lead tabs strength.
2. Tension test:
   The lead tabs shall not be broken or any malformed condition after fixing capacitor vertically and pressing the following weight on the lead tabs of capacitor for 10±1 sec.

Lead tabs diameter(mm)	Weight(Kg)
≦0.5	0.5
0.6~0.8	1.0
>0.8	2.5

3. Bending test:
   capacitor is held in vertical position. Attach a weight to the lead tabs, slowly rotate the capacitor 90°to a same way in the opposite direction. Repeat it again (5 secs per cycle). The lead tabs shall not be broken or cracked.

Lead tabs diameter(mm)	Weight(Kg)
≦0.5	0.5
0.6~0.8	1.0
>0.8	2.5

14. Safety vent

Condition: Apply a reverse voltage with current 1 amp.(DC reverse voltage test)
Criteria: When the pressure relief vent operated, the capacitor shall not flame although gas generation or expulsion of a part of the inside element is allowable. If the vent does not operate with the voltage applied for 30 minutes, the test is Considered to be passed.

15. Standards

Satisfies Characteristic W of IEC-60384-4,18

Code System

LMK	4R7	M	50	V	4	7	----
Series (1)	Capacitance (2)	Tol. (3)	Voltage (4)	Sleeve (5)	Dia. (6)	Length (7)	Forming (8)

(1) Series:

LGK	LHK	LMK	LSM	LEK	LPS	LKP	LNP	LLK	LBP

(2) Capacitance (uF):

μF	0.1	1	10	100	1000	10000	1.5
Code	0R1	010	100	101	102	103	1R5
μF	0.22	2.2	22	220	2200	22000	15
Code	R22	2R2	220	221	222	223	150
μF	0.33	3.3	33	330	3300	33000	150
Code	R33	3R3	330	331	332	333	151
μF	0.47	4.7	47	470	4700	47000	1500
Code	R47	4R7	470	471	472	473	152

(3) Tolerance:

Code	J	K	M
Tolerance	±5%	±10%	±20%

(4) Working Voltage (V):

6.3	10	16	25	35	50	63
100	160	200	250	350	400	450

(5) Sleeve:

Code	V	E
Sleeve	PVC	PET

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(6) Diameter (mm):

4	5	6	8	10	13	16	18
22	25	30	35	51	64	77	90

(7) Length (mm):

5	7	9	11	12	14	16	20	21	25
26	31	33	36	40	42	45	50	53	65
75	83	96	100	115	121	130	140	144	157

(8) Forming (optional):

Taping + pitch (mm)	Cutting + length (mm)	Kink + pitch (mm)
TB2	C3.3	K5
TB2.5	C3.5	
`TB3.5	C5	
TB5	C7	

LABEL

FRONT

	Electrolytic Capacitor	
Capacitance Range:	4.7	uF
Voltage Range:	50	V
Quantity:	2000	pcs
Remark:4*7	105□	RoHS
MADE IN TAIWAN		COMPLIANT