



Datasheet

RS PRO Through Hole Aluminium Electrolytic Capacitor Low-ESR

EN



Article No	Description	uF	WV	Size	Ripple Current	Impedance
1815042/1815348	1UF M(±20%) 100V 5*11 L.ESR	1	100	5x11	30	1.5
1815043/1815360	1UF M(±20%) 50V 5*11 L.ESR	1	50	5x11	25	3.3
1815044/1815372	10UF M(±20%) 100V 6*11 L.ESR	10	100	6x11	135	1.2
1815045/1815382	10UF M(±20%) 160V 10*12 L.ESR	10	160	10x12	175	3.1
1815046/1815401	10UF M(±20%) 25V 5*11 L.ESR	10	25	5x11	56	1.3
1815047/1815416	10UF M(±20%) 50V 5*11 L.ESR	10	50	5x11	100	1.2
1815048/1815424	10UF M(±20%) 63V 5*11 L.ESR	10	63	5x11	118	1.2
1815050/1815439	100UF M(±20%) 16V 5*11 L.ESR	100	16	5x11	300	0.36
1815051/1815448	100UF M(±20%) 25V 6*11 L.ESR	100	25	6x11	370	0.29
1815052/1815458	100UF M(±20%) 35V 6*11 L.ESR	100	35	6x11	390	0.24
1815053/1815354	100UF M(±20%) 35V 8*11 L.ESR	100	35	8x11	400	0.22
1815054/1815366	100UF M(±20%) 50V 8*11 L.ESR	100	50	8x11	440	0.26
1815056/1815374	100UF M(±20%) 63V 10*12 L.ESR	100	63	10x12	500	0.2
1815057/1815384	1000UF M(±20%)10V 8*11 L.ESR	1000	10	8x11	750	0.095
1815058/1815403	1000UF M(±20%) 16V 10*15 L.ESR	1000	16	10x15	1100	0.058
1815059/1815407	1000UF M(±20%)16V 8*16 L.ESR	1000	16	8x16	1050	0.062
1815060/1815420	1000UF M(±20%) 25V 10*20 L.ESR	1000	25	10x20	1380	0.04
1815062/1815432	1000UF M(±20%) 35V 13*21 L.ESR	1000	35	13x21	1650	0.037
1815063/1815446	1000UF M(±20%) 35V 13*26 L.ESR	1000	35	13x26	1700	0.035
1815064/1815456	1000UF M(±20%) 50V 13*26 L.ESR	1000	50	13x26	2000	0.036
1815065/1815350	22UF M(±20%) 50V 5*11 L.ESR	22	50	5x11	160	0.9
1815066/1815362	22UF M(±20%) 63V 6*11 L.ESR	22	63	6x11	220	0.8
1815067/1815370	220UF M(±20%) 100V 13*21 L.ESR	220	100	13x21	850	0.095
1815068/1815380	220UF M(±20%) 10V 6*11 L.ESR	22	10	6x11	350	0.25
1815069/1815399	220UF M(±20%) 16V 6*11 L.ESR	220	16	6x11	420	0.28
1815070/1815413	220UF M(±20%) 16V 8*11 L.ESR	220	16	8x11	440	0.2
1815071/1815422	220UF M(±20%) 25V 10*12 L.ESR	220	25	10x12	600	0.105
1815072/1815434	220UF M(±20%) 25V 8*11 L.ESR	220	25	8x11	500	0.14

1815073/1815450	220UF M(±20%) 35V 10*12 L.ESR	220	35	10x12	660	0.085
1815074/1815466	220UF M(±20%) 35V 8*11 L.ESR	220	35	8x11	580	0.1
1815075/1815352	220UF M(±20%) 50V 10*12 L.ESR	220	50	10x12	730	0.084
1815076/1815364	220UF M(±20%) 63V 10*17 L.ESR	220	63	10x17	790	0.11
1815078/1815376	2200UF M(±20%) 25V 13*21 L.ESR	2200	25	13x21	1480	0.024
1815079/1815389	2.2UF M(±20%) 160V 6*11 L.ESR	2.2	160	6x11	44	10
1815080/1815393	2.2UF M(±20%) 63V 5*11 L.ESR	2.2	63	5x11	38	2.2
1815081/1815405	330UF M(±20%)16V 8*11 L.ESR	330	16	8x11	560	0.1
1815082/1815418	330UF M(±20%) 25V 8*11 L.ESR	330	25	8x11	600	0.085
1815083/1815430	47UF M(±20%) 25V 5*11 L.ESR	47	25	5x11	210	0.6
1815084/1815444	47UF M(±20%) 35V 6*11 L.ESR	47	35	6x11	250	0.53
1815085/1815356	470UF M(±20%) 10V 6*11 L.ESR	470	10	6x11	450	0.13
1815086/1815358	470UF M(±20%)10V 8*11 L.ESR	470	10	8x11	520	0.1
1815087/1815368	470UF M(±20%) 16V 8*11 L.ESR	470	16	8x11	600	0.095
1815088/1815378	470UF M(±20%) 25V 10*12 L.ESR	470	25	10x12	790	0.066
1815089/1815387	470UF M(±20%) 25V 8*14 L.ESR	470	25	8x14	780	0.068
1815090/1815397	470UF M(±20%) 35V 10*15 L.ESR	470	35	10x15	1000	0.065
1815091/1815411	470UF M(±20%) 35V 10*17 L.ESR	470	35	10x17	1070	0.058
1815092/1815426	470UF M(±20%) 35V 10*20 L.ESR	470	35	10x20	1120	0.055
1815093/1815441	470UF M(±20%) 50V 10*20 L.ESR	470	50	10x20	1200	0.057
1815094/1815454	470UF M(±20%)6.3V 6*11 L.ESR	470	6.3	6x11	370	0.145
1815095/1815461	470UF M(±20%) 63V 13*21 L.ESR	470	63	13x21	1500	0.055
1815096/1815395	470UF M(±20%) 63V 13*26 L.ESR	470	63	13x26	1650	0.048
1815097/1815409	4.7UF M(±20%) 400V 8*12 L.ESR	4.7	400	8x12	110	9.2
1815098/1815428	4.7UF M(±20%) 63V 5*11 L.ESR	4.7	63	5x11	80	1.8
1815099/1815436	6.8UF M(±20%) 400V 10*12 L.ESR	6.8	400	10x12	140	3.5
1815100/1815452	6.8UF M(±20%) 50V 5*11 L.ESR	6.8	50	5x11	78	1.6
1815101/1815463	820UF M(±20%) 6.3V 8*11 L.ESR	820	6.3	8x11	700	0.1

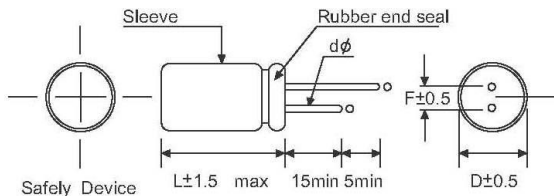
Note:

* Ripple Current (mA,rms) at 105°C 100Khz

* Max Impedance {Ω} at 20°C 100Khz

Specification									
Item	Performance Characteristics								
Operating Temperature Range	-40 to +105°C								
Rated voltage Range	6.3 to 100 VDC								
Capacitance Range	0.47 to 10000 uF								
Capacitance Tolerance	±20%(120Hz, +20°C)								
Leakage Current (+20°C, max.)	I ≤ 0.01 CV or 2(uA) After 2minute whichever is greater measured with rated working voltage applied.	I ≤ 0.03 CV or 3(uA) After 2minute with rated working voltage applied..							
Dissipation Factor (tanδ)	Working Voltage (VDC)	6.3 10 16 25 35 50 63 100							
	D.F.(%)max	22 19 16 14 12 10 9 8							
For Capacitance > 1000uF, add 2% per another 1000uF(+20°C, at 120Hz)									
Low Temperature Characteristics (120Hz)	Impedance ratio max.								
	Working Voltage (VDC)	6.3	10	16	25	35	50	63	100
	Z(-25°C)/Z(+20°C)	4	3	3	3	3	3	2	2
	Z(-40°C)/Z(+20°C)	8	6	4	3	3	3	3	3
Load Life	Test conditions Duration time : 5φ-6φ 1000Hrs D ≥ 8φ 2000Hrs Ambient temperature:+105°C Applied voltage: Rated DC working voltage After test requirements:at+20°C Capacitance change: ≤ ±20%of the initial measured value Dissipation Factor: ≤ 200%of the initial specified value Leakage current: ≤ The initial specified value								
	Shelf Life Test conditions Duration time :1000Hrs Ambient temperature:+105°C Applied voltage: None After test requirements at +20°C: Some limits as Load life. Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.								

Diagram of Dimensions: (Unit: mm)



Dφ	5	6.3	8	10	13	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
dφ		0.5		0.6		0.8	

Multiplier For Ripple Current VS, Frequency

CAP(uF) \ Hz		50(60)	120	400	1K	10K	50K-100K
Multiplier	CAP ≤ 10	0.47	0.59	0.76	0.85	0.97	1.0
	10 < CAP ≤ 100	0.52	0.62	0.80	0.89	0.97	1.0
	100 < CAP ≤ 1000	0.58	0.72	0.84	0.90	0.98	1.0
	1000 < CAP	0.63	0.78	0.87	0.91	0.98	1.0

Multiplier for Ripple Current VS. Temperature

Temperature(°C)	45	60	70	85	85	105
Multiplier	1.8	1.5	1.4	1.3	1.2	1.0

CONTENTS OF QUALITY ASSURANCE

ASSURANCE METHOD CONTENTS

Performance

Unless otherwise specified, the capacitors shall be measured at +15°C to +35°C , 45to75%RH. However, if any doubt arises on the judgment, the measurement conditions shall be +20±1°C , 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
Surge Voltage (SV)	10	13	20	32	44	63	79

Rated Voltage (WV)	100	160	200	250	350	400	450
Surge Voltage (SV)	125	200	250	300	400	450	500

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 2000±12hrs at 105°C	Capacitance change	Within ±20% of the initial value
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	TANδ	Less than 200% of specified value
3. The specified maximum permissible ripple current in defined at 105°C and 120 Hz	Leakage Current	Within specified value
4. Then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Physical	no broken and undamaged

6. High temperature shelf life test

After 1000-2000hrs test at 105°C 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 ±20% of the initial value
	TANδ	Less than 200% of specified value
	Leakage Current	Less than 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°C (1 hr) → +105°C (2 hrs) → +25°C (0.5 hr) → -40°C (2 hrs) → +25°C (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°C. 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 than 120% of specified value
	Leakage Current	Within specified value
	Physical	no broken and undamaged

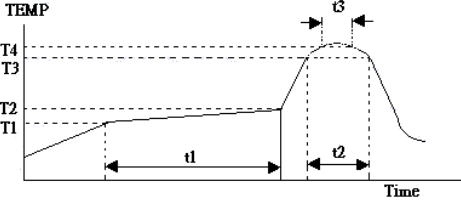
9. Low temperature test

Capacitor are place at -40±3°C 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

<ol style="list-style-type: none"> Fix it at the point 4mm or less form body. For ones of 12.5mm or 25mm or more length, use separate fixture. Direction and during of vibration:3 orthogonal direction each for 2hrs total 6hrs. Mutually frequency: 10 to55Hz reciprocation for 1 min. 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

<ol style="list-style-type: none"> IR Reflow 	Capacitance change	Within ±10% of the initial value																		
	TANδ	Within specified value																		
<table border="1" data-bbox="135 1624 726 1870"> <tr> <td rowspan="2">Preheat</td> <td>Temp (T1~T2)</td> <td>100~150°C</td> </tr> <tr> <td>Time (t1) max</td> <td>40 sec</td> </tr> <tr> <td rowspan="2">Duration</td> <td>Temp(T3)</td> <td>260°C</td> </tr> <tr> <td>Time (t2) max</td> <td>10 sec</td> </tr> <tr> <td rowspan="2">Peck</td> <td>Temp(T4)</td> <td>270°C</td> </tr> <tr> <td>Time (t3) max</td> <td>5 sec</td> </tr> <tr> <td>Reflow cycle</td> <td colspan="2">Twice or less</td> </tr> </table>	Preheat	Temp (T1~T2)	100~150°C	Time (t1) max	40 sec	Duration	Temp(T3)	260°C	Time (t2) max	10 sec	Peck	Temp(T4)	270°C	Time (t3) max	5 sec	Reflow cycle	Twice or less		Leakage Current	Within specified value
Preheat		Temp (T1~T2)	100~150°C																	
	Time (t1) max	40 sec																		
Duration	Temp(T3)	260°C																		
	Time (t2) max	10 sec																		
Peck	Temp(T4)	270°C																		
	Time (t3) max	5 sec																		
Reflow cycle	Twice or less																			
<ol style="list-style-type: none"> Solder bath method: Solder temperature:260±3°C 																				

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	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 than 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