Product Specification

LSUC 002R7C 3000F EA
LSUC 002R7C 2000F EA
LSUC 002R7C 1500F EA
LSUC 002R7C 1200F EA
LSUC 002R7C 0650F EA

LS ULTRACAPACITOR
LSUC

Product Specification

■ Features

High Power and Long-Term Reliability feature
If LS Ultracapacitor enables this component to
use in various applications as backup power unit,
auxiliary power unit, instantaneous power compensation,
peak power compensation and energy storage as well.
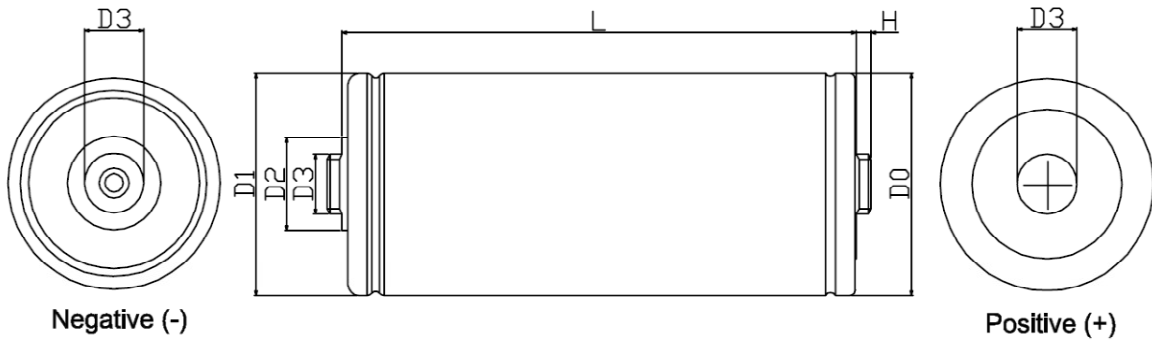
■ Specification

Rated Voltage	2.7 V	
Surge Voltage	2.85 V	
Capacitance Tolerance	0% / +20%	
Resistance Tolerance	< Spec. Value	
Operating temperature range	-40 ~ 65 °C	
Storage temperature range	-40 ~ 70 °C	
Endurance Life (65 ℃)	1500 Hours	
	Capacitance change	Within 20% of initially specified value
	Internal resistance change	Within 100% of initially specified value
Life Time (25 ℃)	10 Years at rated voltage and +25 ℃	
	Capacitance change	Within 20% of initially specified value
	Internal resistance change	Within 100% of initially specified value
Cycle Life (25 ℃)	1,000,000 Cycles between rated voltage to half rated voltage at +25 ℃	
	Capacitance change	Within 20% of initially specified value
	Internal resistance change	Within 100% of initially specified value
Shelf Life (25 ℃)	4 Years stored uncharged state at +25 ℃	
Certifications	ROHS, REACH, UL810A (Certificate No. : MH46367)	
Shock & Vibration	IEC 61373, IEC 60068	

■ Standard Ratings

Part number	Capacitance (F)	DC ESR (mΩ)	Max. Current (A)	Leakage Current (mA)	Max. Stored Energy (Wh)	Max. Continuous Current (A)		Thermal Resistance (℃/W) _ Cell Surface
						△T=15 ℃	△T=40 ℃	
LSUC 002R7C 3000F EA	3000	0.23	2,396	< 5	3.04	150	245	2,90
LSUC 002R7C 2000F EA	2000	0.27	1,753	< 4	2.03	126	206	3.50
LSUC 002R7C 1500F EA	1500	0.28	1,426	< 3	1.52	115	188	4.05
LSUC 002R7C 1200F EA	1200	0.33	1,160	< 2.7	1.22	98	159	4.73
LSUC 002R7C 0650F EA	650	0.57	640	< 1.5	0.66	67	110	5.86

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Product Specification

■ Physical Properties

Negative (-)

Positive (+)

■ Standard Ratings

Part number (Short Threaded Terminal)	Dimension (mm)						Weight (g)
	D0 (± 0.3)	D1 (± 0.7)	D2 (±0.1)	D3	H (±0.1)	L (±0.5)	
LSUC 002R7C 3000F EA ST01	Ø 60	Ø 60.7	Ø 25	M16, P1.0	4	138	515
LSUC 002R7C 2000F EA ST01	Ø 60	Ø 60.7	Ø 25	M16, P1.0	4	102	380
LSUC 002R7C 1500F EA ST01	Ø 60	Ø 60.7	Ø 25	M16, P1.0	4	85	320
LSUC 002R7C 1200F EA ST01	Ø 60	Ø 60.7	Ø 25	M16, P1.0	4	74	280
LSUC 002R7C 0650F EA ST01	Ø 60	Ø 60.7	Ø 25	M16, P1.0	4	51.5	200

Part number (Long Threaded Terminal)	Dimension (mm)						Weight (g)
	D0 (± 0.3)	D1 (± 0.7)	D2 (±0.1)	D3	H (±0.1)	L (±0.5)	
LSUC 002R7C 3000F EA LT01	Ø 60	Ø 60.7	Ø 25	M16, P2.0	14	138	520
LSUC 002R7C 2000F EA LT01	Ø 60	Ø 60.7	Ø 25	M16, P2.0	14	102	385
LSUC 002R7C 1500F EA LT01	Ø 60	Ø 60.7	Ø 25	M16, P2.0	14	85	325
LSUC 002R7C 1200F EA LT01	Ø 60	Ø 60.7	Ø 25	M16, P2.0	14	74	285
LSUC 002R7C 0650F EA LT01	Ø 60	Ø 60.7	Ø 25	M16, P2.0	14	51.5	205

Part number (Weldable Terminal)	Dimension (mm)						Weight (g)
	D0 (± 0.3)	D1 (± 0.7)	D2 (±0.1)	D3 (±0.05)	H (±0.125)	L (±0.5)	
LSUC 002R7C 3000F EA WT01	Ø 60	Ø 60.7	Ø 25	Ø 14	3.18	138	515
LSUC 002R7C 2000F EA WT01	Ø 60	Ø 60.7	Ø 25	Ø 14	3.18	102	380
LSUC 002R7C 1500F EA WT01	Ø 60	Ø 60.7	Ø 25	Ø 14	3.18	85	320
LSUC 002R7C 1200F EA WT01	Ø 60	Ø 60.7	Ø 25	Ø 14	3.18	74	280
LSUC 002R7C 0650F EA WT01	Ø 60	Ø 60.7	Ø 25	Ø 14	3.18	51.5	200

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Technical Information (1)

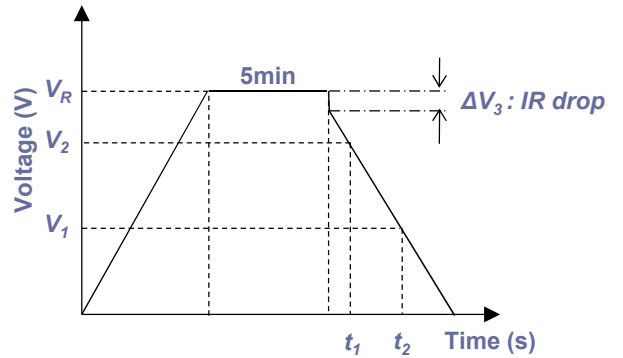## How to calculate specification value

1. The Measurement Methods

    1-1 Capacitance

    Apply rated voltage and charge for 5min after the constant current / constant voltage power supply has achieved the rated voltage. After a charge for 5min has finished, discharge with 10mA/F to 0.1V.

    Measure the time t1 to t2 where the voltage between capacitor terminals at the time of discharge reduces from V1 to V2 as shown figure and calculate the capacitance value by the following formula:

    1) Constant current charge with 10mA/F to V_R
    2) Constant voltage charge at V_R for 5min
    3) Constant current discharge with 10mA/F to 0.1V

$$C = \frac{I \times (t_2 - t_1)}{V_2 - V_1}$$
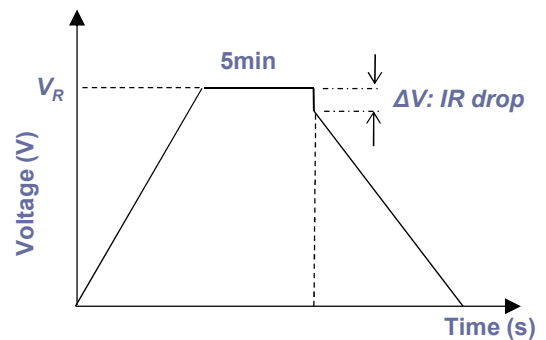
    1-2 DC ESR (Equivalent Series Resistance)

    DC ESR of a capacitor shall be calculated by the following formula;

$$R_{DC} = \frac{\Delta V}{I_{DC}}$$

Where
R_{DC} is the DC internal resistance (Ω);
V is the effective value of AC voltage (V);
ΔV is the drop voltage for 10ms (V);
I_{DC} is the discharge current (A); 100A;

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Technical Information (2)

1-3 Leakage Current

The leakage current shall be measured using the direct voltage appropriate to the test temperature(25℃) for 72hrs.

1-4 Maximum current

Current for 1sec discharge from the rated voltage to the half of it in constant current discharge,

$$I_{Max} = \frac{V_R - 0.5*V_R}{\triangle t / C + R_{DC}}$$

Where I_{Max} is the Maximum current (A);
$\triangle t$ is the discharge time (sec), 1 sec in this case ;
C is the capacitance (F);
R_{DC} is the DC resistance (Ω);
V_R is the rated voltage (V).

1-5 Maximum stored energy (E_{MAX})

$$E_{MAX} (Wh) = \frac{½ CV_R^2}{3600}$$

2. The Standard Atmospheric Condition for Measurement

All test and measurements shall be made under standard atmospheric conditions for testing. Before the measurements are made, the capacitor shall be stored at the measuring temperature for a time sufficient to allow the entire capacitor to reach this temperature. The period as prescribed for recovery at the end of a test is a normally sufficient for this purpose.

Temperature :   15~35 ℃
Relative humidity : 25~75%
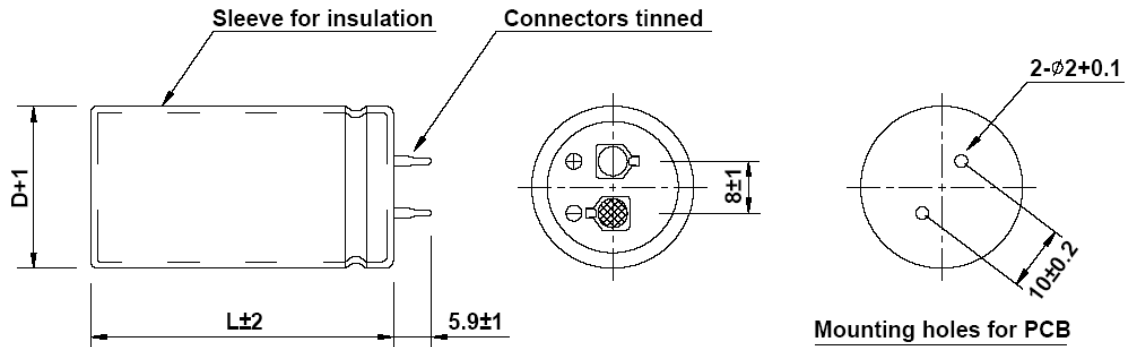Air Pressure :   86~106 kPa

Product Specification

LS ULTRACAPACITOR
LSUC

Product Specification

■ Physical Properties

Sleeve for insulation   **Connectors tinned**

D+1   L±2   5.9±1

2-∅2+0.1   8±1   10±0.2

Mounting holes for PCB

■ Specification

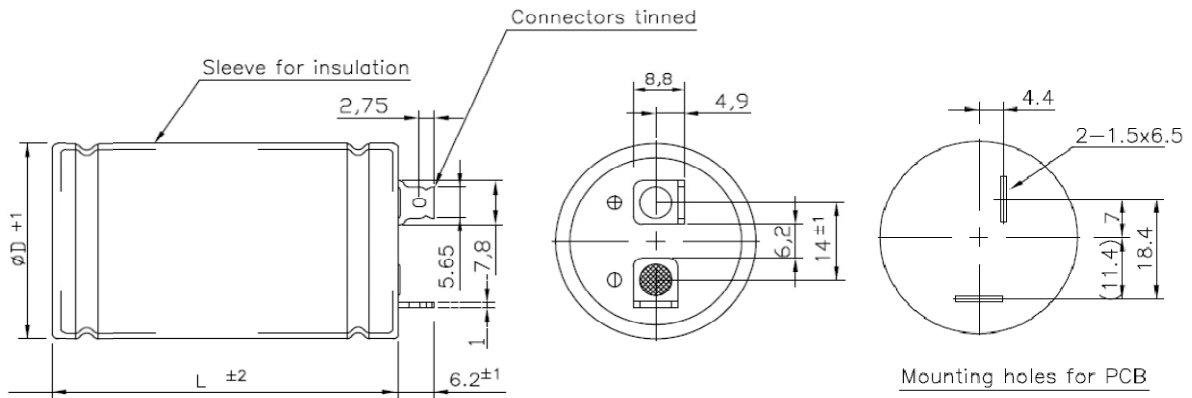|	
Rated Voltage	2.8 V
Surge Voltage	3.0 V
Capacitance Tolerance	0% / 20%
Resistance Tolerance	< Spec. Value
Operating temperature range	-40 ~ 65 ℃
Storage temperature range	-40 ~ 70 ℃
Life Time (25℃/ 65℃)	10 Years at rated voltage and +25℃ 1,500 Hours at rated voltage and +65℃
	Capacitance change — Within 20% of initially specified value
	Internal resistance change — Within 100% of initially specified value
Cycle Life (25℃)	500,000 Cycles between rated voltage to half rated voltage at +25℃
	Capacitance change — Within 20% of initially specified value
	Internal resistance change — Within 100% of initially specified value
Certifications	ROHS, REACH, UL810A (Certificate No. : MH46367)

■ Standard Ratings

Part number	Capacitance (F)	ESR (mΩ)		Max. Current (A)	Leakage Current (mA)	Max. Stored Energy (Wh)
		AC (1KHz)	DC			
LSUC 002R8S 0100F EA	100	7	9	74	< 0.3	0.109
LSUC 002R8S 0120F EA	120	7	9	81	< 0.4	0.131

Part number	Max. Continuous Current (A)		Thermal Resistance (℃/W)_Cell Surface	Dimension (mm)		Weight (g)
	△T=15 ℃	△T=40 ℃		D1 (+ 1.0)	L (±2.0)	
LSUC 002R8S 0100F EA	12.5	20	11.1	22.0	46.0	23
LSUC 002R8S 0120F EA	12.5	20	11.1	22.0	46.0	23

Product Specification

■ Physical Properties

Dimension in mm (not to scale)

Connectors tinned

Sleeve for insulation

Mounting holes for PCB

■ Specification

Rated Voltage	2.8 V	
Surge Voltage	3.0 V	
Capacitance Tolerance	0% / 20%	
Resistance Tolerance	< Spec. Value	
Operating temperature range	-40 ~ 65 ℃	
Storage temperature range	-40 ~ 70 ℃	
Life Time (25℃/ 65℃)	10 Years at rated voltage and +25℃ 1,500 Hours at rated voltage and +65℃	
	Capacitance change	Within 20% of initially specified value
	Internal resistance change	Within 100% of initially specified value
Cycle Life (25℃)	500,000 Cycles between rated voltage to half rated voltage at +25℃	
	Capacitance change	Within 20% of initially specified value
	Internal resistance change	Within 100% of initially specified value
Certifications	ROHS, REACH, UL810A (Certificate No. : MH46367)	

■ Standard Ratings

Part number	Capacitance (F)	ESR (mΩ)		Max. Current (A)	Leakage Current (mA)	Max. Stored Energy (Wh)
		AC (1KHz)	DC			
LSUC 002R8L 0350F EA	350	3.0	3.2	231	< 1	0.38
LSUC 002R8L 0400F EA	400	2.8	3	255	< 1	0.44

Part number	Max. Continuous Current (A)		Thermal Resistance (℃/W) _ Cell Surface	Dimension (mm)		Weight (g)
	△T=15 ℃	△T=40 ℃		D1 (+ 1.0)	L (±2.0)	
LSUC 002R8L 0350F EA	25	40	8.0	35.0	61.0	72
LSUC 002R8L 0400F EA	25	40	8.3	35.0	66.0	80

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LSUC LS ULTRACAPACITOR

Technical Information (1)

How to calculate specification value

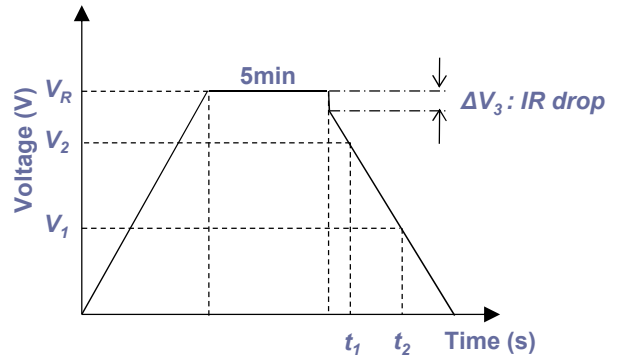1. The Measurement Methods

   1-1 Capacitance

   Apply rated voltage and charge for 5min after the constant current / constant voltage power supply has achieved the rated voltage. After a charge for 5min has finished, discharge with 10mA/F to 0.1V.

   Measure the time t1 to t2 where the voltage between capacitor terminals at the time of discharge reduces from V1 to V2 as shown figure and calculate the capacitance value by the following formula:

   1) Constant current charge with 10mA/F to V_R
   2) Constant voltage charge at V_R for 5min
   3) Constant current discharge with 10mA/F to 0.1V

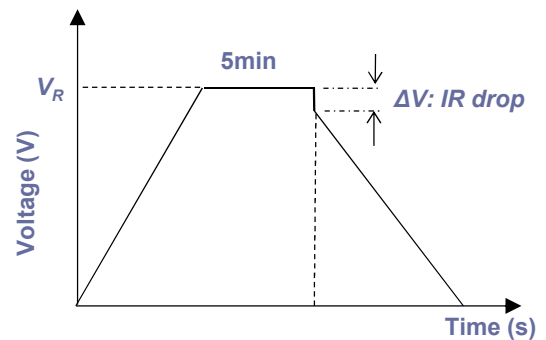 $$C = \frac{I \times (t_2 - t_1)}{V_2 - V_1}$$

   1-2 DC ESR (Equivalent Series Resistance)

   DC ESR of a capacitor shall be calculated by the following formula;

   $$R_{AC} = \frac{V}{I_{AC}} \qquad \text{(The frequency of the measuring voltage shall be 1kHz)}$$

   $$R_{DC} = \frac{\Delta V}{I_{DC}}$$

   Where R_{AC} is the AC internal resistance (Ω);
   R_{DC} is the DC internal resistance (Ω);
   V is the effective value of AC voltage (V);
   ΔV is the drop voltage for 10ms (V);
   I_{AC} is the effective value of AC current (A);
   I_{DC} is the discharge current (A); 5A

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Technical Information (2)

1-3 Leakage Current

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1-4 Maximum current

Current for 1sec discharge from the rated voltage to the half of it in constant current discharge,

$$I_{Max} = \frac{V_R - 0.5*V_R}{\triangle t / C + R_{DC}}$$

Where I_{Max} is the Maximum current (A);
 $\varDelta t$ is the discharge time (sec), 1 sec in this case ;
 C is the capacitance (F);
 R_{DC} is the DC resistance (Ω);
 V_R is the rated voltage (V).

1-5 Maximum stored energy (E_{MAX})

$$E_{MAX} (Wh) = \frac{½ CV_R^2}{3600}$$

2. The Standard Atmospheric Condition for Measurement

All test and measurements shall be made under standard atmospheric conditions for testing. Before the measurements are made, the capacitor shall be stored at the measuring temperature for a time sufficient to allow the entire capacitor to reach this temperature. The period as prescribed for recovery at the end of a test is a normally sufficient for this purpose.

Temperature :   15~35 ℃
Relative humidity :   25~75%
Air Pressure :   86~106 kPa