TO. DATE : 200 . . .

SPECIFICATION

PRODUCT : STARCAP

MODEL : DL SERIES

(DL2R5107L/DL2R7107L)

WRITTEN	CHECKED	APPROVED

Taiwan Agent : Component Plus Inc.

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1. Scope

These are the specifications of STARCAP(Electric Double Layer Capacitor) which you are using.

Please review this document and approve it.

2. General Specification

1) Applications

This capacitor, Electric Double Layer Capacitor(EDLC), is applied to electronic circuits such as memory back up, motor driving, toys, and etc.

2) General test conditions

- Temperature range : 5~35 ℃
- Humidity range : 45~85 %RH

In special case, temperature range of 20±3 ℃ and humidity range of 65±5 %RH can be accepted.

3) Standard test methods

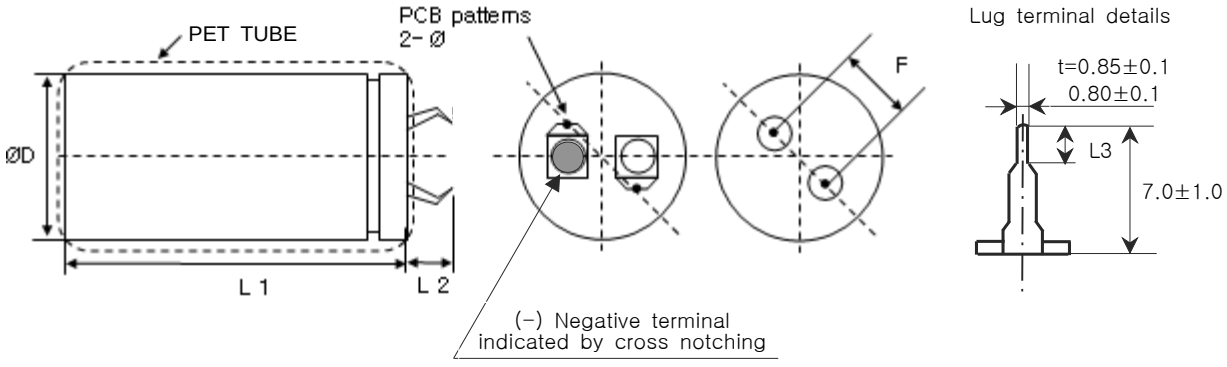
The standard test methods are based on JIS-C-5102.

3. Photo

4. General Characteristics

ITEM	VALUE	
Part No.	DL2R5107L	DL2R7107L
Operating voltage	DC 2.5 V	DC 2.7 V
Surge Voltage	2.7V	2.85V
Rated Current (25℃)	11A	20A
Max. Current (25℃)	40A	60A
Operating Temp.	-25 ~+70 ℃	-40 ~+60 ℃
Rated Capacitance	100 F	
Cap. Tolerance (20℃)	-20 % ~ +40 %	
Equivalent Series Resistance (1KHz)	≤ 18 mΩ	≤ 14 mΩ
Size (Ø × L)	Ø 22 × 45 mm(L)	
Weight	23.3 g	21.0 g
Volume	17.10 ml	
Stored Energy	312.50 J (0.0868 Wh)	364.50 J (0.1013 Wh)

5. Construction and Dimension (Unit : mm)



Size	ØD	L1	L2	L3	F
Ø22×45 (L)	22+1.0max	45+2.0max	5.5±1.0	2.3±0.2	10.0±1.0

6. Specifications and Test method

<table>
<tr><th colspan="2">ITEM</th><th colspan="2">SPECIFICATION</th><th>CONDITION</th></tr>
<tr><td rowspan="6">Temp. Characteris-tics</td><td>Capacitance</td><td rowspan="2">Step2</td><td>70%↑of Initial Value</td><td rowspan="6"><table><tr><th>Step</th><th>Temp,</th></tr><tr><td>1</td><td>20±2℃</td></tr><tr><td>2</td><td>-25(-40)±2℃</td></tr><tr><td>3</td><td>20±2℃</td></tr><tr><td>4</td><td>70(60)±2℃</td></tr><tr><td>5</td><td>20±2℃</td></tr></table></td></tr>
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<tr><td rowspan="3">Vibration resistance</td><td>Capacitance</td><td colspan="2">Spec. Value</td><td rowspan="3">Amplitude : 1.5mm
Frequency : 10~55Hz
Direction: X,Y,Z 3direction
Test Time : 6 Hrs</td></tr>
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→70(60)℃→20℃
Cycle : 5 cycle</td></tr>
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Humidity : 90~95%RH
Test Time : 240±8hours</td></tr>
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<tr><td rowspan="3">High Temp. Loading</td><td>Capacitance</td><td colspan="2">Within ±30% of Initial Value</td><td rowspan="3">Temp : 70(60)±2℃
Voltage : 2.5(2.7)VDC
Resistance : 0Ω
Test Time : 1,000hours</td></tr>
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Resistance : 0Ω
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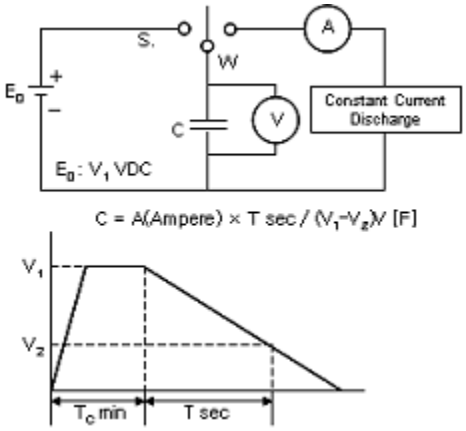
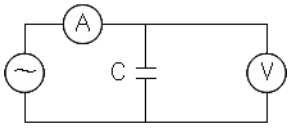
7. Measuring Method Of Characteristics

Capacitance	1) CHARGE THE STARCAP WITH CONSTANT CURRENT 100±0.1㎃ TO OPERATION VOLTAGE(V1) FOR 120 MINUTES. 2) DISCHARGE THE STARCAP WITH CONSTANT CURRENT(A) 1±0.1㎃/F TO THE VOLTAGE OF V2 WHILE MEASURE THE DISCHARGE TIME(T). 3) CALCULATE CAPACITANCE USING THE FOLLOWING FORMULA.  C = A(Ampere) × T sec / $(V_1-V_2)V$ [F]
Equivalent Series Resistance (ESR @1kHz)	1. MEASURE ESR BY THE LCR METER. (Frequency:1㎑, Bias Voltage : $0^{+0.05}$V) or 2. CALCULATE ESR USING THE FOLLOWING FORMULA.  ESR[Ω] = V / i **R[Ω] = V[V] / I[A]** * i[㎃] = I[A] x 10^{-3} R : Internal resistance(ESR)[Ω] V : Measured voltage between the terminal[V] i : Current 1mA ~ 10mA(A.C.)
☞ THE STARCAP SHOULD BE DISCHARGED WITH RESISTOR FOR 12 HOURS OR MORE BEFORE EACH MEASUREMENT OF CAPACITANCE OR ESR.	

8. Packing

Part number	Quantity (EA)		Size(W × L × H)		Weight(Kg)
	Inner Box	Outer Box	Inner Box	Outer Box	
DL2R5107L	125	500	295×230×140	485×310×310	14.0
DL2R7107L					14.0

9. Mounting

Do not touch the capacitor body with a soldering iron. Solder the capacitor using a soldering tip temperature of 350℃ or less for three seconds or less. Solder a capacitor three times or less at intervals of 9 seconds or more.

It is not allowed to go through reflow (IR, Atmosphere heating methods etc.) process.

10. Cautions for use

Please be careful for following points when you use STARCAP.

1) Do not apply more than rated voltage.
   If you apply more than rated voltage, STARCAP's electrolyte will be electrolyzed and its ESR increase. At the worst, it may be broken.

2) Do not use STARCAP for ripple absorption.

3) Polarity
   The STARCAP is non-polar fundamentally, however STARCAP gets polarity through aging process before it is packed. Please mount it in accordance with its polarity to maintain the best condition.

4) Operating temperature and life
   Generally, STARCAP has a lower leakage current, longer back-up time and longer life in the low temperature i.e. the room temperature. But it has a higher leakage current, shorter back-up time and shorter life in the high temperature.
   Please design to keep STARCAP away from calorific parts.

5) Cleaning
   Some detergent or high temperature drying cause deterioration of STARCAP.
   If you wash STARCAP, consult us.

6) Storage

In long term storage, please store STARCAP in following condition;

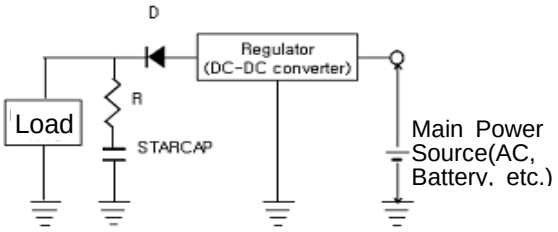
① TEMP. : 15 ~ 35 ℃

② HUMIDITY : 45 ~ 75 %RH

③ NON-DUST

7) Do not disassemble STARCAP. It contains electrolyte.

8) Following figure shows the general back-up circuit.



D : Diode for protection of counter

R : Resistor for protection of electric power source

9) Short-circuit STARCAP

You can short-circuit between terminals of STARCAP without resistor. However when you short-circuit frequently, please consult us.

10) Series connection of STARCAP

Over-rated voltage may be applied to a single STARCAP in series connection due to the deviation of capacitance and ESR of each STARCAP. Please inform us if you are using STARCAP in series connection and please design so as not to apply over-rated voltage to each STARCAP, and use STARCAPs from same lot.

11. Environmental management

All STARCAP products are RoHS compliant and environment friendly.

By changing the solder plating from leaded solder to lead-free solder, and the outer tube from Polyvinyl Chloride(PVC) to Polyethylene Terephthalate(PET), our new STARCAP has became even more friendly to the environment.

Series	RoHS directive Pb, Cr+6, Hg, Cd, PBB,PBDE	ELV directive Pb, Cr+6, Hg, Cd	PVC	etc.
DL	N.D.	N.D.	N.D.	

* N.D : Not detected

TO. DATE : 20 . . .

SPECIFICATION

PRODUCT : STARCAP

MODEL : DL SERIES

(DL2R5367/DL2R7367)

WRITTEN	CHECKED	APPROVED

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1. Scope

These are the specifications of STARCAP(Electric Double Layer Capacitor) which you are using. Please review this document and approve it.

2. General Specification

1) Part Number System

DL	2R7	367	(Example)
①	②	③	

① Series Name : DL(Lug terminal double layer capacitor)
② Rated Voltage : 2.7VDC
③ Capacitance : 360 F (367 = 36 × 10^{+7} uF)

2) Applications

This capacitor, Electric Double Layer Capacitor(EDLC), is applied to electronic circuits such as memory back up, motor driving, toys, and etc.

3) General test conditions

- Temperature range : 5~35 ℃
- Humidity range : 45~85 %RH

In special case, temperature range of 20±3 ℃ and humidity range of 65±5 %RH can be accepted.

4) Standard test methods

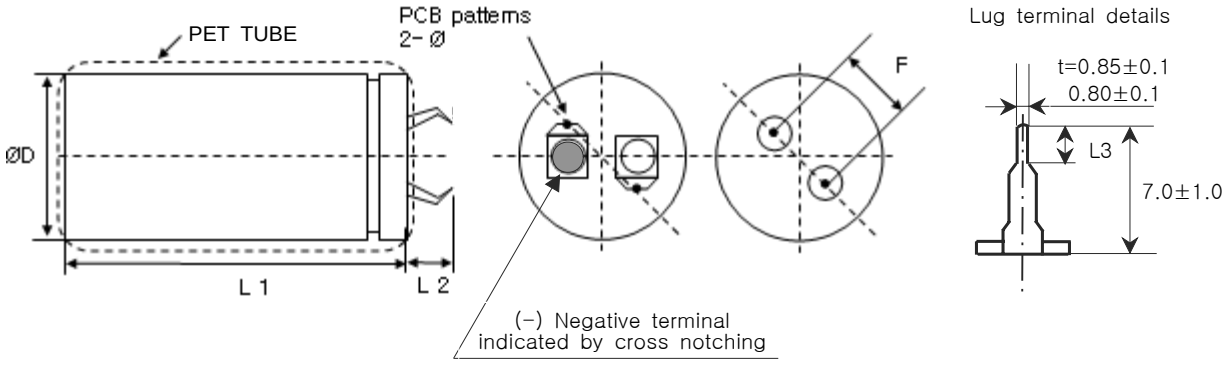
The standard test methods are based on EIAJ RC-2377.

3. Photo

4. General Characteristics

ITEM	VALUE	
Part No.	DL2R5367	DL2R7367
Operating voltage	DC 2.5 V	DC 2.7 V
Surge Voltage	2.7V	2.85V
Rated Current (25℃)	25A	45A
Max. Current (25℃)	90A	130A
Operating Temp.	-25 ~+70 ℃	-40 ~+60 ℃
Rated Capacitance	360 F	
Cap. Tolerance (20℃)	-20 % ~ +40 %	
Equivalent Series Resistance (1KHz)	≤ 15 mΩ	≤ 10 mΩ
Size (Ø × L)	Ø 35 × 60 mm(L)	
Weight	≃ 65 g ± 5%	≃ 60 g ± 5%
Volume	57.70 ml	
Stored Energy	1125 J (0.3125 Wh)	1312.2 J (0.3645 Wh)

5. Construction and Dimension (Unit : mm)



Size	ØD	L1	L2	L3	F
Ø35×60 (L)	35+1.0max	60+2.0max	7.6±1.0	2.3±0.2	10.0±1.0

6. Specifications and Test method

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Voltage : 2.5(2.7)VDC
Resistance : 0Ω
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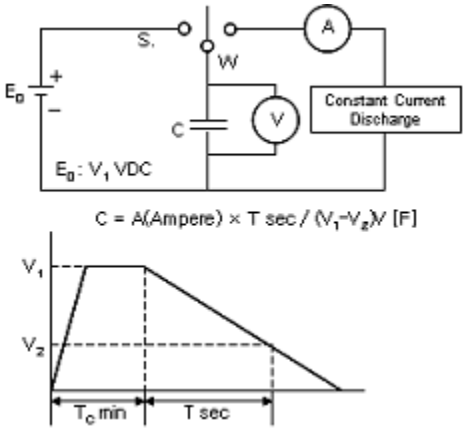
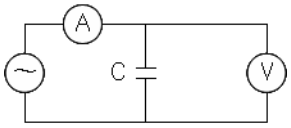
7. Measuring Method Of Characteristics

Capacitance	1) CHARGE THE STARCAP WITH CONSTANT CURRENT 1±0.1A TO OPERATION VOLTAGE(V1) FOR 30 MINUTES. 2) DISCHARGE THE STARCAP WITH CONSTANT CURRENT(A) 1±0.1㎃/F TO THE VOLTAGE OF V2 WHILE MEASURE THE DISCHARGE TIME(T). 3) CALCULATE CAPACITANCE USING THE FOLLOWING FORMULA.  C = A(Ampere) × T sec / $(V_1-V_2)V$ [F]
Equivalent Series Resistance (ESR @1kHz)	1. MEASURE ESR BY THE LCR METER. (Frequency:1㎑, Bias Voltage : $0^{+0.05}$V) or 2. CALCULATE ESR USING THE FOLLOWING FORMULA.  ESR[Ω] = V / i **R[Ω] = V[V] / I[A]** * i[㎃] = I[A] x 10^{-3} R : Internal resistance(ESR)[Ω] V : Measured voltage between the terminal[V] i : Current 1mA ~ 10mA(A.C.)
☞ THE STARCAP SHOULD BE DISCHARGED WITH RESISTOR FOR 12 HOURS OR MORE BEFORE EACH MEASUREMENT OF CAPACITANCE OR ESR.	

8. Packing

Part number	Quantity (EA)		Size (W × L × H mm)		Weight (Kg)
	Inner Box	Outer Box	Inner Box	Outer Box	
DL2R5367	36	144	295×230×140	485×310×310	≃ 12.5
DL2R7367	36	144	295×230×140	485×310×310	≃ 11.5

9. Mounting

Do not touch the capacitor body with a soldering iron. Solder the capacitor using a soldering tip temperature of 350℃ or less for three seconds or less. Solder a capacitor three times or less at intervals of 9 seconds or more.

It is not allowed to go through reflow (IR, Atmosphere heating methods etc.) process.

10. Cautions for use

Please be careful for following points when you use STARCAP.

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   If you apply more than rated voltage, STARCAP's electrolyte will be electrolyzed and its ESR increase. At the worst, it may be broken.

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   Please design to keep STARCAP away from calorific parts.

5) Cleaning
   Some detergent or high temperature drying cause deterioration of STARCAP.
   If you wash STARCAP, consult us.

6) Storage
   In long term storage, please store STARCAP in following condition;
   ① TEMP. : 15 ~ 35 ℃
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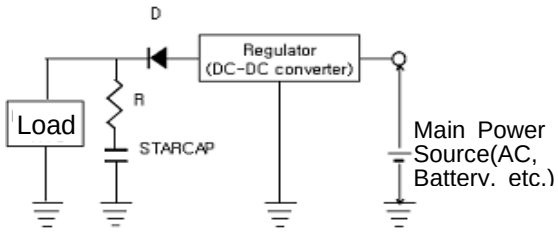
   ③ NON-DUST

7) Do not disassemble STARCAP. It contains electrolyte.

8) Following figure shows the general back-up circuit.



D : Diode for protection of counter

R : Resistor for protection of electric power source

9) Short-circuit STARCAP

Do not short-circuit between terminals of this DL series STARCAP without resistor. The capacitance of DL series STARCAP is so big that it is very dangerous to connect its terminals directly without any resistor even when the capacitor is charged.

10) Series connection of STARCAP

Over-rated voltage may be applied to a single STARCAP in series connection due to the deviation of capacitance and ESR of each STARCAP. Please inform us if you are using STARCAP in series connection and please design so as not to apply over-rated voltage to each STARCAP, and use STARCAPs from same lot.

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Series	RoHS directive Pb, Cr+6, Hg, Cd, PBB,PBDE	ELV directive Pb, Cr+6, Hg, Cd	PVC	etc.
DL	N.D.	N.D.	N.D.	

* N.D : Not detected