To. DATE : . . .

RoHS 1,2 and 3	Halogen Free

SPECIFICATION

PRODUCT : STARCAP

MODEL : DL Series

(DL2R7107L)

WRITTEN	CHECKED	APPROVED

KORCHIP CORP.

KORCHIP B/D, 359, Manan-ro, Manan-gu, Anyang-si, Gyeonggi-do, KOREA

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Revision History

No.	Documentation	Check	Description of Revision	Approval	Date
1	S.K. Shin (R&D)	J.H. Song (Q.A.)	First Release	B.I. Lim (R&D)	Sep. 23 2025

Manufacturer Information

Manufacturer : Korchip Corporation

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1. Scope

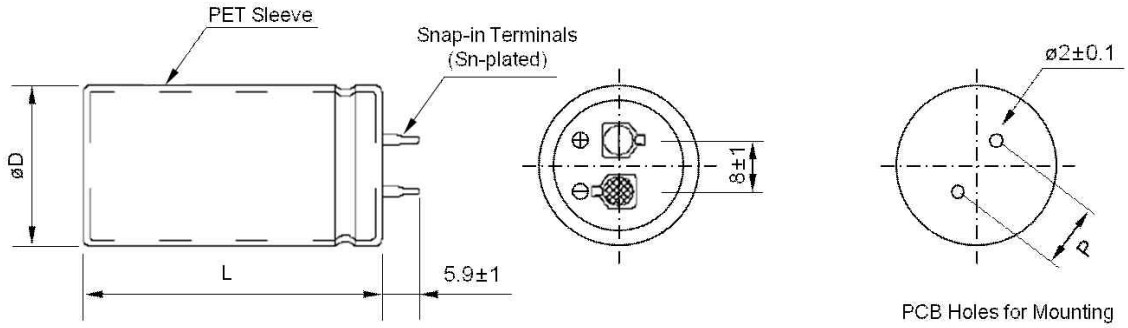
This specification applies to STARCAP(Electric Double Layer Capacitor), submitted to specified customer in cover page.

2. Construction and Dimensions (Unit : mm)

1) Structure of unit cell

- Inside structure : Wound anode and cathode electrodes with two separators
- Outer structure : Aluminum-can case and Bake-rubber cover

2) Shape and dimensions (not to scale)



Dimensions in mm	ØD	L	P
	22+1.0 max	46±2	10.0±0.2

3. Part Number System

DL	2R7	107	L
①	②	③	④

① Series Name : DL
② Rated Voltage : 2.7VDC
③ Capacitance : 100 F (107 = 10 × 10^{+7} uF)
④ Terminal Type Identification Code

4. General Specifications

ITEM	VALUE
Operating voltage	DC 2.7 V
Operating Temp.	-40 ~+65 ℃
Rated Capacitance	100 F
Cap. Tolerance (20℃)	0 % ~ +20 %
Equivalent Series Resistance (1KHz)	≤ 7 mΩ
Equivalent Series Resistance (DC)	≤ 9 mΩ
*Peak Current	61 A
**Rated Current	20 A
Leakage Currrent (72hr CV)	≤ 0.3 mA
Size (Ø × L)	Ø 22 × 46 mm(L)
Weight	≃ 23 g
Volume	17.10 ml
Stored Energy	365 J (0.1013 Wh)
***Energy Density	4.404 wh/kg
****Power Density	8.804 kW/kg

* Peak current is defined as the current with which a supercapacitor discharge from $V_{op.}$ to ½$V_{op.}$ for 1 second

** Rated current is defined as the current with which a supercapacitor discharge from $V_{op.}$ to ½$V_{op.}$ for 5 seconds

*** Energy density : $(0.5xCxV_{op.}xV_{op.})/3600)$/weight(Kg)

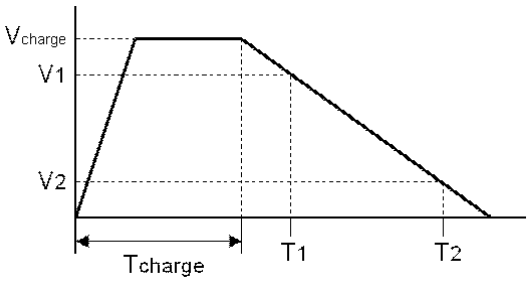
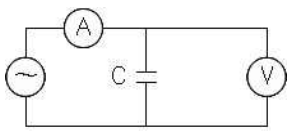
**** Power density : $(0.25xV_{op.}xV_{op.}/R_{DC})$/weight(kg)

5. Reliability Specifications

<table>
<tr><th colspan="2">Item</th><th colspan="2">Specification</th><th>Test Condition</th></tr>
<tr><td rowspan="10">Temp. Character -istics</td><td>Capacitance Change</td><td rowspan="2">Step2</td><td>Within ±20% of Spec. Value</td><td rowspan="10">Measure electrical characteristics after exposing STARCAP Capacitor to each temperature atmosphere for one(1) hour
<table><tr><th>Step</th><th>Temp.</th></tr><tr><td>1</td><td>20±2℃</td></tr><tr><td>2</td><td>-40±2℃</td></tr><tr><td>3</td><td>20±2℃</td></tr><tr><td>4</td><td>65±2℃</td></tr><tr><td>5</td><td>20±2℃</td></tr></table></td></tr>
<tr><td>ESR</td><td>2 Times or less than Spec. Value</td></tr>
<tr><td>Capacitance Change</td><td rowspan="2">Step4</td><td>Within ±20% of Spec. Value</td></tr>
<tr><td>ESR</td><td>2 Times or less than Spec. Value</td></tr>
<tr><td>Capacitance Change</td><td rowspan="2">Step5</td><td>Within ±20% of Spec. Value</td></tr>
<tr><td>ESR</td><td>2 Times or less than Spec. Value</td></tr>
<tr><td rowspan="3">Vibration Resistance</td><td>Capacitance</td><td colspan="2">Within ±20% of Spec. Value</td><td rowspan="3">Amplitude : 1.5mm
Frequency : 10~55Hz
Direction: X,Y,Z 3direction
Test Time : 6 Hrs</td></tr>
<tr><td>ESR</td><td colspan="2">2 Times or less than Spec. Value</td></tr>
<tr><td>Appearance</td><td colspan="2">No Marked Defect</td></tr>
<tr><td rowspan="3">High Temp. Loading</td><td>Capacitance Change</td><td colspan="2">Within ±20% of Initial Value</td><td rowspan="3">Temp : 65±2℃
Voltage : 2.7VDC
Test Time : 1,500 hours</td></tr>
<tr><td>ESR</td><td colspan="2">2 Times or less than Spec. Value</td></tr>
<tr><td>Appearance</td><td colspan="2">No Marked Defect</td></tr>
<tr><td rowspan="3">Shelf Life</td><td>Capacitance Change</td><td colspan="2">Within ±20% of Initial Value</td><td rowspan="3">Temp : 65±2℃
Test Time : 1,500hours
No Load Applied</td></tr>
<tr><td>ESR</td><td colspan="2">2 Times or less than Spec. Value</td></tr>
<tr><td>Appearance</td><td colspan="2">No Marked Defect</td></tr>
<tr><td rowspan="3">Cycle Life</td><td>Capacitance Change</td><td colspan="2">Within ±20% of Initial Value</td><td rowspan="3">1Cycle : Charge(20sec)→ CV(10sec) →CC(1/2Vw, 20sec) → Rest(10sec)

Total 500,000Cycles</td></tr>
<tr><td>ESR</td><td colspan="2">2 Times or less than Spec. Value</td></tr>
<tr><td>Appearance</td><td colspan="2">No Marked Defect</td></tr>
</table>

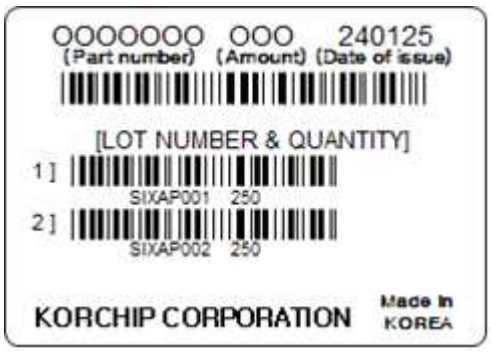
6. Measuring Method of Characteristics

Capacitance	1) Charge the STARCAP with constant current I_{charge}(=1A) to V_{chage}(=2.7V) then keep charging for T_{charge}(=1200sec.) 2) Discharge the STARCAP with constant current I_{disch}(=1A) while measure the discharge time T_1, T_2 between V_1(=2.16V)and V_2(=1.08V). 3) Calculate capacitance using the following formula.  $C = \frac{I_{disch} \times (T_1 - T_2)}{V_1 - V_2}$
Equivalent Series Resistance (ESR @1kHz)	● Measure ESR by the LCR meter. (Frequency:1kHz, Bias Voltage : $0^{+0.05}$V) or ● Calculate ESR using the following formula.  ESR[Ω] = V / i **R[Ω] = V[V] / I[A]** * i[mA] = 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.	

7. Packing Specifications

Part No.	Quantity (EA)	Size (W × L × H mm)	Weight(Kg)
	Inner Box	Box	
DL2R7107L	100	285×275×60	≃ 3

8. Labeling Standards



← (Example)

Lot No. System

Ex.) S J X A C 002
① ② ③ ④ ⑤ ⑥

① Product Code : S (Chipcell Carbon)

② Production Year Code : A (2016), B (2017), C (2018), ... , H (2023), I (2024), J (2025)...

③ Factory Identification Code : X (Factory X)

④ Production Month Code : A (Jan.), B (Feb.), ... , J (Oct.), K (Nov.), L (Dec.)

⑤ Production Date Code : 1 (1st), 2 (2nd), ... , 9 (9th), A (10th), B (11th), C (12th) ...
Q (26th), R (27th), S (28th), ... , V (31th)

⑥ Lot Issuing Serial Code : 001 (First lot of a specific day), 002 (Second lot of a specific day), 003 (Third lot of a specific day)...

9. 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 decomposed and its ESR increase. At the worst, it may be broken.

2) Do not use STARCAP for ripple absorption.

3) Polarity

Please mount it in accordance with its polarity.

4) Operating environment and lifetime

STARCAP shows faster deterioration in high temperature operation. The lifetime of STARCAP follows the general lifetime acceleration rule of double or half per every 10℃ of ambient temperature decrease or increase respectively. A large temperature difference in one day or humid operating environment results in dew condensation on the surface of STARCAP and it may cause fast deterioration or electrolyte leakage of STARCAP.

If STARCAP capacitor is used in an electronic or electrical device over a long period of time especially in high temperature or high humidity environment, please check it periodically and replace it when necessary.

5) Storage

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

① TEMP. : 15 ~ 35 ℃

② HUMIDITY : 45 ~ 75 %RH

③ Non-dust, non-acidic and/or non-alkaline atmosphere

④ Avoid direct sun light, strong magnetic field

Storage period limit is one(1) year when a STARCAP is stored in the above condition. Storage in improper condition may cause some damage on terminal surface or on outer tube of STARCAP. If the storage period exceed one(1) year in the customer's warehouse, please contact the manufacturer.

6) Do not disassemble STARCAP. It contains electrolyte.

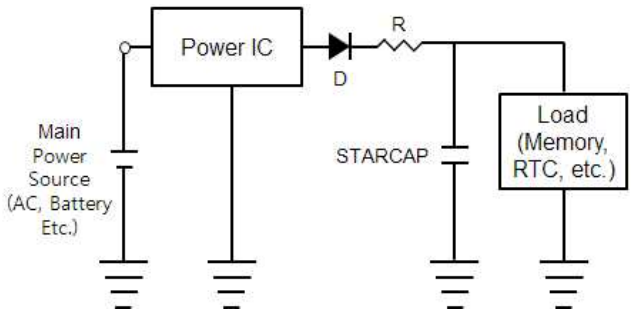
7) Cleaning

Some detergent or high temperature drying causes deterioration of STARCAP. If you wash STARCAP, Consult us.

8) Avoid mechanical impacts such as dropping on the floor or touching with a hard blade. Also avoid tearing of sleeves and waving of lead wire.

9) Please contact KORCHIP if you want to subject STARCAP to severe vibrating conditions exceeding rated specification or use under mechanical and electrical stress conditions.

10) Following figure shows the general back-up circuit using STARCAP.



D : Diode to prevent reverse-current

R : Resistor to control charging current

11) Short-circuit STARCAP

Do not short-circuit between terminals of STARCAP without resistor.

12) Series connection of STARCAP

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

13) Industrial Application

Some industrial applications require a very high level of reliability to its parts including EDLCs. Therefore if the EDLC is to be used in an industrial application such as factory machinery, heavy electricity, etc. periodic inspection of EDLC is necessary. If there found any problem with the EDLC, please replace it.

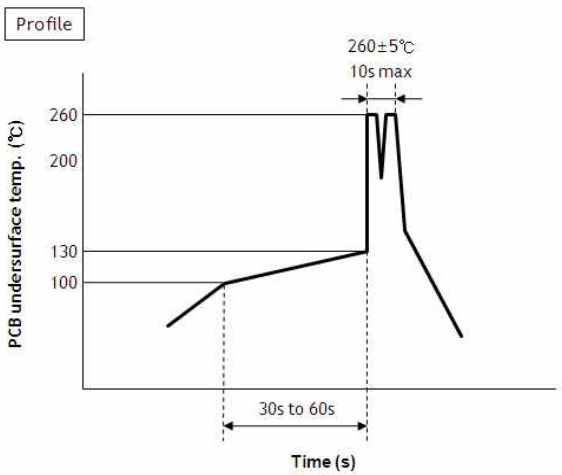
14) Please maintain minimum distance of 5 mm between the surface of STARCAP and the housing in order to allow for unimpeded venting of gas through the safety vent if and when such need arise.

15) Manual Soldering

When you solder STARCAP on PCB using a solder iron, Please do it quickly within 3 sec., below 350 ℃.

Please don't touch the body of STARCAP with the solder iron.

16) Flow Soldering Condition



- Do not dip the capacitor into melted solder.
- Do not flux other part than the terminals.
- If there is a direct contact between the sleeve of capacitor and printed circuit pattern or a metal part of another component such as a lead wire, it may cause shrinkage of crack.
- If the application is for extended use, understand and manage the soldering characteristics to avoid abnormal current caused by a contact failure between the capacitor and the PCB.

10. Environmental Management

All STARCAP products are RoHS 1, 2 and 3 compliant, Halogen Free and environment friendly.

Series	RoHS 1,2 directive (Pb, Cr+6, Hg, Cd, PBB, PBDE)	ELV directive (Pb, Cr+6, Hg, Cd)	PVC	Halogen Flame Retardant Free (Cl, Br)	RoHS 3 directive (DEHP, BBP, DBP, DIBP)	etc.
DL	N.D.	N.D.	N.D.	N.D.	N.D.	

* N.D. : Not Detected or Within Permitted Range