CDCL3000C0-0002R7STB ULTRACAPACITOR CELL

SERIES	CDCL ULTRACAPACITOR CELL

Rev	Date	Revision of historical records
V2019-1	24-10-19	The First Release
V2020-1	14-5-20	Version Update

SCOPE

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

FEATURES

- Low ESR & High Power Density
- Over 1,000,000 duty cycles
- Threaded connection

APPLICATIONS

- EV/HEV
- Hybrid driven trains
- Mass transportation braking energy recovery system
- Heavy duty machinery
- Locomotive engine start system

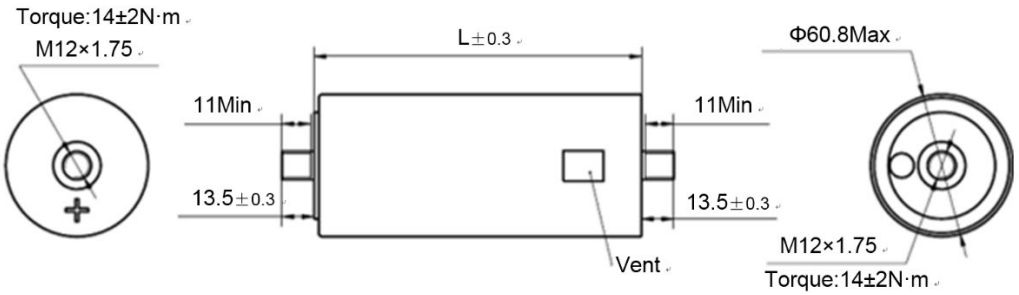
CONSTRUCTION AND DIMENSIONS

1) Construction

Inside structure: fold anode and cathode electrode with separator

Outer structure: aluminum case, insulating sleeve

2) Dimensions



PART NUMBER	DIMENSION(mm)
	L
CDCL2000C0-0002R7STB	138.0

PART NUMBER NAMING SYSTEM

CDCL	3000	C	0	-	0002	R	7	STB
Product Series	**Nominal Capacitance (F)**			Dash	**Rated Voltage (V)**		**Terminal Design**	

C	Cell	3000	3000		0002	2	ST	Threaded connection
D	Electric double layer	C	Decimal		R	Decimal		
C	Cylindrical	0	0.0		7	0.7	B	Improved Design
L	Large							

GENERAL CHARACTERISTICS

Items	Specification
Rated Voltage (V DC)	2.7
Surge Voltage (V DC)	2.85
Operating Temp. (℃)	-40 ～ +65
Rated Capacitance (F)	3000
Capacitance Tolerance	0% ～ 20%
ESR Max. (AC@1KHz, mΩ)	0.22
ESR Max. (DC, mΩ)	0.29
Maximum Continuous Current (ΔT=15℃, A)	129
Maximum Continuous Current (ΔT=40℃, A)	211
Maximum Peak Current (A) (1s)	2166
Max.LC (Room Temp. after 72hrs, mA)	5.2
Typical Thermal Resistance (R_{th}, Housing, ℃/W)	3.1
Typical Thermal Capacitance (C_{th}, J/℃)	645
Weight (g)	548
Energy Stored (Wh)	3.04

RELIABILITY SPECIFICATIONS

ITEM		SPECIFICATION		CONDITION
Temp. Characteristics	Capacitance	Step. 1	Change within 5% of Initial Value	Step 1:+25±2℃, 1h Step 2:+65±2℃, 1h Step 3: −25±2℃, 1h Step 4: -40±2℃, 1h
	ESR		Change within 50% of rated value	
	Capacitance	Step. 2	Change within 5% of Initial Value	
	ESR		Change within 50% of rated value	
	Capacitance	Step. 3	Change within 5% of Initial Value	
	ESR		Change within 50% of rated value	
	Capacitance	Step. 4	Change within 5% of Initial Value	
	ESR		Change within 50% of rated value	
Vibration Test	Capacitance	Initial Value		ISO16750-3 Table 14
	ESR	Initial Value		
	Appearance	Not Marked Defect		
Thermal Cycle	Capacitance	Initial Value		Temp.: -40℃ ~ 65℃ Cycle times: 6 Test Time(One Cycle): −40℃ 2hrs, +65℃ 2hrs, Temp change 2hrs
	ESR	Initial Value		
	Appearance	Not Marked Defect		
Humidity Test	Capacitance	Change within 20% of Initial Value		Temp.: +40±2℃ Humidity: 90-95%RH Test Time: 240±8hrs
	ESR	Change within 100% of Initial Value		
	Appearance	Not Marked Defect		
DC Life	Capacitance	Change within 20% of Initial Value		Temp.: +65±2℃ Voltage: 2.7V Time: 1,500hrs
	ESR	Change within 100% of Initial Value		
	Appearance	Not Marked Defect		
Shelf Life	Capacitance	Change within 20% of Initial Value		Temp.: +70±2℃ Time: 1,000hrs
	ESR	Change within 100% of Initial Value		
	Appearance	Not Marked Defect		
Cycle Life	Capacitance	Change within 20% of Initial Value		Temp.: +25±2℃ Cycles times: 1,000,000
	ESR	Change within 100% of Initial Value		
	Appearance	Not Marked Defect		

MEASURING METHOD

1) Charge and Discharge procedure (Figure 1)

A) Charge the capacitor using constant current I to rated voltage V_0

B) Keep rated voltage 5 mins

C) Discharge the capacitor using constant current I to half rated voltage, record discharge time T_1 during voltage change from V_1 to V_2

D) Rest 2-5s, record voltage change ΔV

E) Discharge it to a very low voltage around 0.01V

F) V_1=85% V_0 V_2=50% V_0

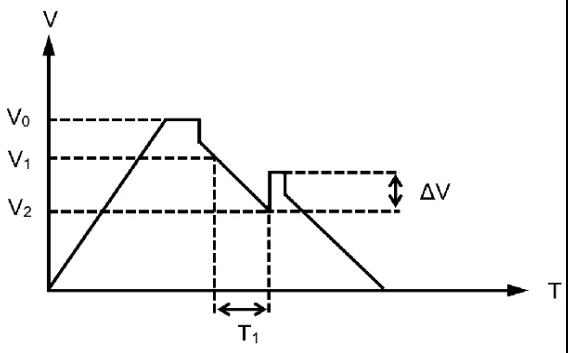


Figure 1

2) Capacitance

$C=I \cdot T1/(V_1-V_2)$

C: Capacitance (F)

I: Constant Discharge Current (A)

Time (S)

V_1-V_2: Voltage Change (V)

3) DC ESR

DC ESR=ΔV/I

DC ESR: DC Equivalent Series Resistance (Ω)

ΔV: Voltage Change (V)

I: Constant Discharge Current (A)

4) AC ESR

Measure AC ESR using LCR meter

Frequency: 1KHz

Voltage: fully discharge

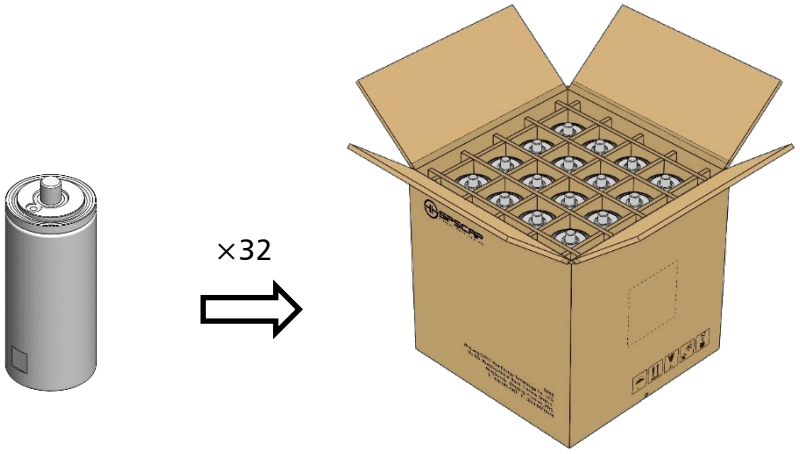
REMARK: SPSCAP EDLC SHOULD BE DISCHARGED WITH RESISTOR FOR AT LEAST 12 HOURS BEFORE MEASUREMENT OF CAPACITANCE OR ESR.

NOTES AND CAUTION

Please notice below points when you start use SPSCAP.

1) The SPSCAP gets polarity through aging/testing process before it is packed, so please mount it in accordance with its polarity to maintain the best condition;
2) Please only apply SPSCAP at rated voltage. If you apply more than rated voltage, capacitor will be damaged or broken due to electrolyte inside will be electrolyzed;
3) Ambient temperature greatly affects the lifetime of the capacitor, by reducing the temperature by 10℃, lifetime can be approximately doubled;
4) Storage: In long term storage, please store SPSCAP in following condition:
   - Temp.: 15 ~ 35℃
   - Humidity: 40 ~ 75 %RH
   - No-dust, non-acidic and/or non-alkaline atmosphere
   - Avoid direct sun light
5) Do not disassemble SPSCAP. It contains electrolyte;
6) Avoid serious mechanical impacts onto capacitor, such as force or twist capacitor;
7) Please contact us if you want to subject SPSCAP to severe vibrating conditions exceeding rated specification;
8) Please contact us if you want to connect a certain number of single capacitor to make a module;
9) Over-rated voltage may be applied to a single SPSCAP in series connection due to the deviation of capacitance and ESR of each SPSCAP. Please inform us if you are using SPSCAP in series connection and please design so as not to apply over-rated voltage to each capacitor, and use SPSCAP from same date code/lot.

PACKING



Part Number	Quantity (pcs)	Box Size (W×L×H) mm	Gross Weight (kg)
CDCL3000C0-0002R7STB	32	330×330×430	20.63

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