

## 2.7V 5000F Supercapacitor

- 2.7V DC output
- 5000F Capacitance
- High cycle life of 1 million cycles
- High power density
- Laser-weldable



### ELECTRICAL SPECIFICATIONS

Type	C60W-2R7-5000
Rated Voltage $V_R$	2.7 V
Surge Voltage $V_S^1$	2.85 V
Rated Capacitance $C^2$	5000 F
Capacitance Tolerance $^3$	-0%/+20%
ESR $^2$	$\leq 0.25$ m $\Omega$
Leakage Current $I_L^4$	<9 mA
Self-discharge Rate $^5$	<20%
Max Constant Current $I_{MCC}(\Delta T = 15^\circ C)^6$	136 A
Max Current $I_{Mmax}^7$	3.0 kA
Short Current $I_S^8$	10.8 kA
Stored Energy $E^9$	5.1 Wh
Energy Density $E_d^{10}$	9.9 Wh/kg
Usable Power Density $P_d^{11}$	6.8 kW/kg
Matched Impedance Power $P_{dMmax}^{12}$	14.2 kW/kg

### THERMAL CHARACTERISTICS

TYPE	C60W-2R7-5000
Working Temperature	-40~65 °C
Storage Temperature $^{13}$	-40~70 °C
Thermal Resistance $R_{th}^{14}$	3.2 K/W
Thermal Capacitance $C_{th}^{15}$	575 J/K

### SAFETY & ENVIRONMENTAL SPECIFICATIONS

TYPE	C60W-2R7-5000
Safety	RoHS, REACH and UL810A
Vibration	ISO16750 Table 12 IEC 60068-2-64 (Table A.5/A.6)
Shock	IEC 60068-2-27

### LIFE TIME CHARACTERISTICS

TYPE	C60W-2R7-5000
DC Life at High Temperature $^{16}$	1500 hours
DC Life at RT $^{17}$	10 years
Cycle Life $^{18}$	1,000,000 cycles
Shelf Life $^{19}$	4 years

### PHYSICAL PARAMETERS

TYPE	C60W-2R7-5000
Mass M	515 g
Terminals (leads) $^{20}$	Weldable
Dimensions $^{21}$	Height 138 mm Diameter 60 mm

## NOTES:

### TYPE

### C60W-2R7-5000

- Surge voltage  $V_S$ : Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.
- Rated capacitance C: The rated capacitance test method is as shown in Figure 1.
  - The test current is  $0.1 A/F$ . If the calculated test current is  $> 100 A$ , then 100 A is applied.

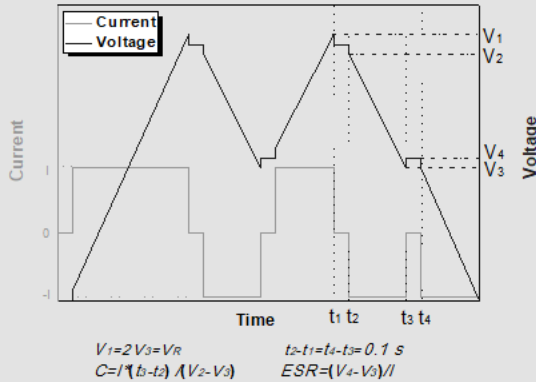
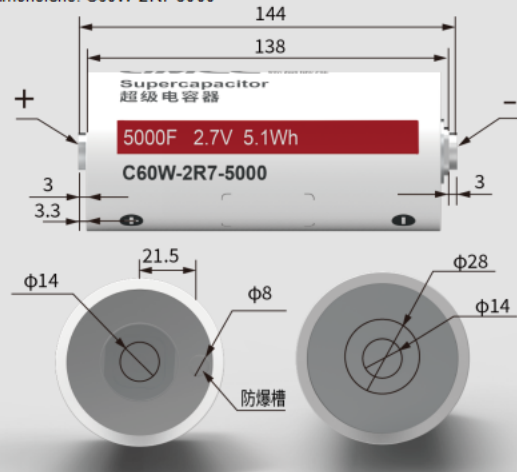


Figure 1

- Capacitance tolerance: Typical capacitance is 100% to 120% of rated capacitance.
- Leakage current measurement procedure: 1) Charge the supercapacitor to the  $V_R$  with a constant current ( $0.1 A/F$ , if the calculated current is  $> 100A$ , then apply 100A). 2) Hold the voltage at  $V_R$  for 72h. 3) The current to maintain  $V_R$  after 72 h is the leakage current.
- Self-discharge rate measurement procedure: 1) Charge the supercapacitor to  $V_R$  with a constant current ( $0.1 A/F$ , if the calculated current is  $> 100A$ , then apply 100A). 2) Hold the voltage at  $V_R$  for 3h. 3) Floating for 72h. 4) Measure the voltage after 72 h.
- Max constant working current:  $I_{MCC} = \sqrt{\Delta T / (ESR * R_{th})}$ , the working current of the supercapacitor in static air depends on the natural convection heat dissipation of the shell and the Joule heat balance.
- Max current:  $I_{Max} = 0.5C * V_R (\Delta t + ESR * C)$ , discharge from  $V_R$  to  $V_R / 2$  in 1 second.
- Short current:  $I_s = V_R / ESR$ , Each parameter adopts SI system unit or its conversion unit, this current can't be used as working current.
- Stored energy:  $E = 0.5C * V^2 / 3600$ .
- Energy density:  $E_d = E / M$
- Usable power density:  $P_d = 0.12V_R^2 / (ESR * M)$ .
- Matched impedance power density:  $P_{dF} = 0.25V_R^2 / (ESR * M)$ .
- Storage temperature: Discharged state (cell voltage  $< 0.2 V$ ).
- Thermal resistance:  $R_{th} = 1 / (h * A)$ , where  $h = 10 W / (m^2 * K)$ , A = surface area.
- Thermal capacitance: For the whole capacitor.

- DC Life at High Temperature: Hold the supercapacitor at the rated voltage for 1500h at the maximum operating temperature ( $65^\circ C$ ), the capacitance is above 80% of the rated value under normal temperature, and the internal resistance is below 200% of the rated value.
- DC Life at RT: Keep the supercapacitor charged at the rated voltage at room temperature. The life criterion is that the capacitance is above 80% of the rated value, and the internal resistance is below 200% of the rated value.
- Cycle life: Charge and discharge the supercapacitor in the range between  $V_R$  and  $0.5V_R$  for 0.1 seconds waiting period between charge and discharge. The constant test current is  $0.1 A/F$  (if the calculated current  $> 100A$ , then apply 100A).
- Shelf life: Within the storage temperature range, keep the supercapacitor discharged and no load applied (cell voltage  $< 0.2 V$ ).
- Terminals (leads):  $\Phi 14 \text{ mm} * 3 \text{ mm}$ .
- Dimensions: C60W-2R7-5000



- Standard markings:
  - + Name of manufacturer, part number, serial number
  - + Rated voltage and capacitance, negative and positive terminals, warning marking
  - + Stored energy in watt-hours.
- Mounting recommendations:
  - + Recommended welding depth is not less than 1.8 mm.
  - + Provide sufficient distance between cells to meet the insulation strength.
  - + Keep enough space around the explosion-proof tank and keep the top clean and avoid mechanical damage.
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