

Product Datasheet

60mm \varnothing Ultracapacitors – threaded type

- Rated voltage 2.7VDC
- 5000F capacitance
- Ultra-low ESR,
- High cycle life of 1 million cycles
- Excellent DC life performance
- Laser-weldable posts
- Very high energy and power density

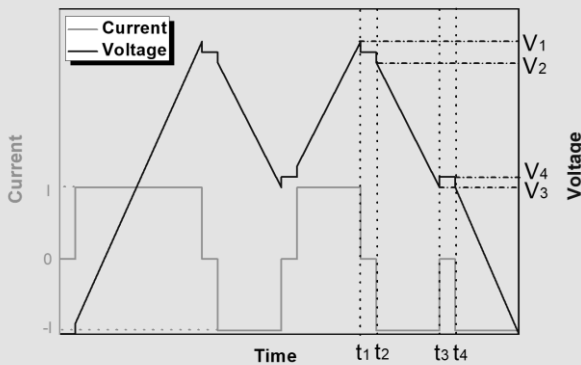


ELECTRICAL SPECIFICATIONS	
Type	C60W-2R7-5000
Rated Voltage V_R	2.70 V
Surge Voltage V_S^1	2.80 V
Rated Capacitance C^2	5000 F
Capacitance Tolerance ³	-0% / +20%
ESR ² (DC)	<0.25 m Ω
ESR ² (AC, 1 kHz)	<0.22 m Ω
Leakage Current I_L^4	<12 mA
Self-discharge Rate ⁵	<20%
Constant Current ($\Delta T = 15^\circ C$) ⁶	136 A
Max Current I_{Max}^7	3.0 kA
Short Current I_S^8	10.8 kA
Stored Energy E^9	5.1 Wh
Energy Density E_d^{10}	10.1 Wh/kg
Usable Power Density P_d^{11}	6.9 kW/kg
Matched Impedance Power Density P_{dMax}^{12} , 10 Hz ESR	14.4 kW/kg
Matched Impedance Power Density P_{dMax}^{12} , 1 kHz ESR	16.4 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
LIFETIME 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
SAFETY & ENVIRONMENTAL SPECIFICATIONS	
Type	C60W-2R7-5000
Safety	RoHS, REACH and UL810A
Vibration	ISO 16750-3 Table 12
Shock	IEC 60068-2-64 (Table A.5/A.6) IEC 60068-2-27 18x 100g 6ms
PHYSICAL PARAMETERS	

Type	C60W-2R7-5000
Mass M	505 g
Terminals	Weldable
Dimensions 20	138 mm
Height L	60 mm
Diameter	60 mm

NOTES:

- Surge voltage V_S : Absolut maximum voltage, non-repetitive. The duration must not exceed 1 second.
- Capacitance C: The test current is 0.075 A/F, if the calculated current is >100A, then apply 100A.

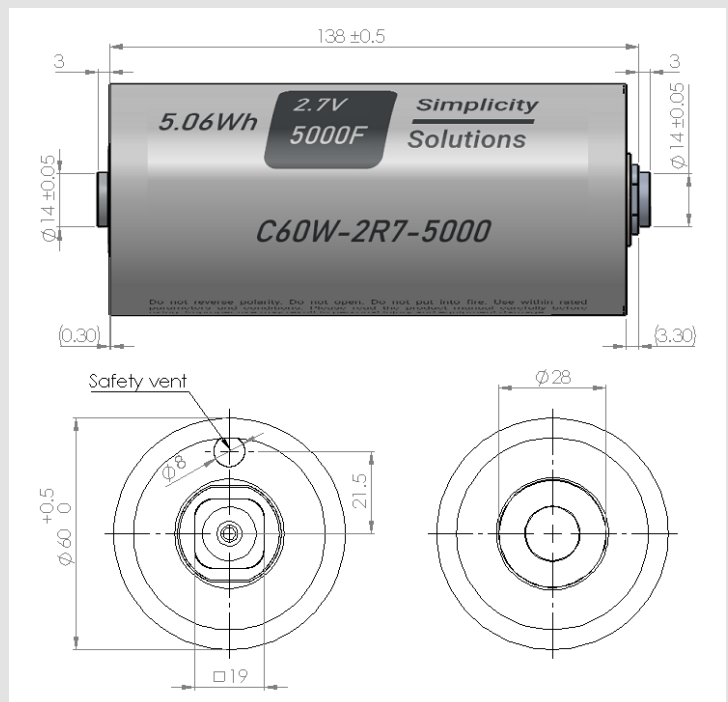


$$V_1 = 2V_3 = V_R \quad t_2 - t_1 = t_4 - t_3 = 0.1 \text{ s}$$

$$C = I * (t_3 - t_2) / (V_2 - V_3) \quad ESR = (V_4 - V_3) / I$$

- Capacitance tolerance: Typical tolerance is +5%~+10%.
- Leakage current measurement procedure: 1) Charge the capacitor to the V_R with a constant current (0.075 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 capacitor to V_R with a constant current (0.075 A/F, if the calculated current >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: $I_{MCC} = \sqrt{\Delta T / (ESR * R_{Th})}$
- 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: $I_S = V_R / ESR$
- 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: $P_{dMax} = (0.25V_R^2 / ESR) / M$
- Storage temperature: Storage in discharge state at RT.
- Thermal resistance: $R_{Th} = \Delta T / P$, where $P = ESR * I^2$
- Thermal capacitance is indicated for the whole product.
- DC life at high temperature: Hold the capacitor charged at rated voltage at 65°C for 1500h. The capacitance shall be >80% of the rated value, the ESR shall be <200% of the rated value.

- DC life at RT: Hold the capacitor charged at rated voltage at room temperature RT, the capacitance shall be >80% of the rated value, the ESR shall be <200% of the rated value.
- Cycle life: Charge and discharged the capacitor in the range between V_R and $V_R / 2$. 5 seconds waiting period between charge and discharge. The constant test current is 0.075 A/F (if the calculated current >100A, then apply 100A).
- Shelf life: Discharged and no load applied at RT.
- Dimensions:



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:

- + Mounting without applying undue mechanical stress on the terminals
- + Provide adequate spacing in between cells to secure required insulation strength
- + Provide clearance around the safety vent and do not position anything above the safety vent that may be damaged in an event of vent rupture

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