

Product Datasheet

46mm Ø Ultracapacitors

- Rated voltage 3VDC
- 600 and 1100F capacitance
- High cycle life of 1 million cycles
- Very high energy and power density
- Laser-weldable terminals
- Environmentally friendly product



ELECTRICAL SPECIFICATIONS

Type	C46W-3R0-0600	C46W-3R0-1100
Rated Voltage V_R	3.00 V	3.00 V
Surge Voltage V_S^1	3.10 V	3.10 V
Rated Capacitance C^2	600 F	1100 F
Capacitance Tolerance ³	0% / +30%	0% / +30%
DC ESR ² (DC, 10 Hz)	<0.7 mΩ	<0.6 mΩ
ESR ² (AC, 1 kHz)	<0.55 mΩ	<0.45 mΩ
Leakage Current I_L^4	<3.0 mA	<5.0 mA
Self-discharge Rate ⁵	<20%	<20%
Constant Current ($\Delta T = 15^\circ C$) ⁶	52 A	65 A
Max Current I_{Max}^7	0.63 kA	0.99 kA
Short Current I_S^8	4.3 kA	5.0 kA
Stored Energy E^9	0.75 Wh	1.4 Wh
Energy Density E_d^{10}	5.4 Wh/kg	7.0 Wh/kg
Usable Power Density P_d^{11}	11.1 kW/kg	9.1 kW/kg
Matched Impedance Power Density P_{dMax}^{12} , 10 Hz ESR	23.1 kW/kg	19.0 kW/kg
Matched Impedance Power Density P_{dMax}^{12} , 1 kHz ESR	29.4 kW/kg	25.4 kW/kg

THERMAL CHARACTERISTICS

Type	C46W-3R0-0600	C46W-3R0-1100
Working Temperature	-40 ~ 65°C	-40 ~ 65°C
Storage Temperature ¹³	-40 ~ 70°C	-40 ~ 70°C
Thermal Resistance R_{Th}^{14}	8.0 K/W	5.85 K/W
Thermal Capacitance C_{Th}^{15}	155 J/K	240 J/K

LIFETIME CHARACTERISTICS

Type	C46W-3R0-0600	C46W-3R0-1100
DC Life at High Temperature ¹⁶	1500 hours	1500 hours
DC Life at RT ¹⁷	10 years	10 years
Cycle Life ¹⁸	1'000'000 cycles	1'000'000 cycles
Shelf Life ¹⁹	4 years	4 years

SAFETY & ENVIRONMENTAL SPECIFICATIONS

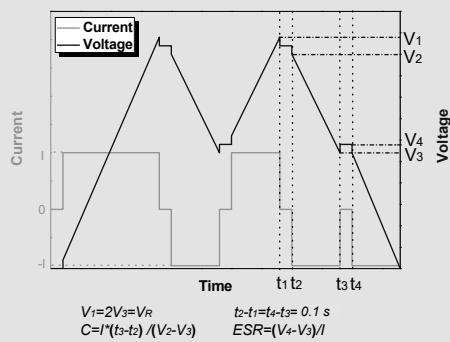
Type	C46W-3R0-0600	C46W-3R0-1100
Safety	RoHS, REACH and UL810	RoHS, REACH and UL810
Vibration	IEC 60068-2-64 (table A.5/A.6)	IEC 60068-2-64 (table A.5/A.6)
Shock	IEC 60068-2-27, 100g 6ms	IEC 60068-2-27, 100g 6ms

PHYSICAL PARAMETERS

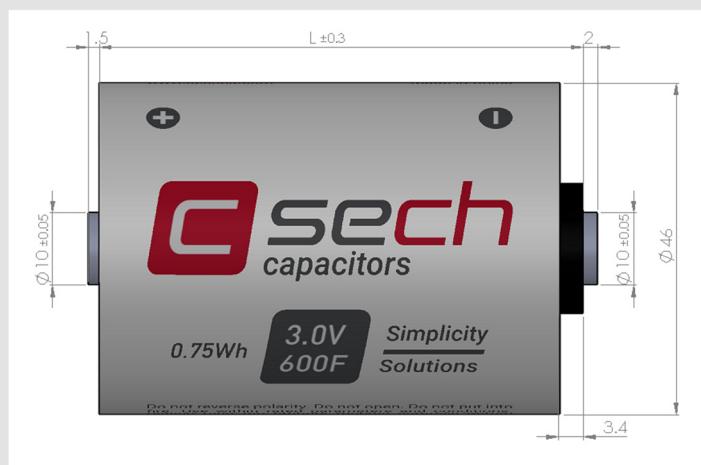
Type	C46W-3R0-0600	C46W-3R0-1100
Mass M	139 g	197 g
Terminals	Weldable ²⁰	Weldable ²⁰
Dimensions ²¹		
Height L	67.4 mm	98.7 mm
Diameter	46 mm	46 mm

NOTES:

1. Surge voltage V_s : Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.
2. Capacitance C: The test current is 0.075 A/F, if the calculated current is >100A, then apply 100A.
17. 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.
18. 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).
19. Shelf life: Discharged and no load applied at RT.
20. The welding depth should be larger than 0.8 mm
21. Dimensions:



3. Capacitance tolerance: Typical tolerance is +10% ~ +30%.
4. 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.
5. 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 8h. 3) Floating for 72h. 4) Measure the voltage after 72 h.
6. Max constant working current: $I_{MCC} = \sqrt{\Delta T / (ESR * R_{Th})}$
7. Max current: $I_{Max} = 0.5C * V_R / (\Delta t + ESR * C)$, discharge from V_R to $V_R/2$ in 1 second.
8. Short current: $I_s = V_R / ESR$
9. Stored energy: $E = 0.5C * V^2 / 3600$
10. Energy density: $E_d = E / M$
11. Usable power density: $P_d = (0.12V_R^2 / ESR) / M$
12. Matched impedance power density: $P_{dMax} = (0.25V_R^2 / ESR) / M$
13. Storage temperature: Storage in discharge state at RT.
14. Thermal resistance: $R_{Th} = \Delta T / P$, where $P = ESR * I^2$
15. Thermal capacitance: For the whole capacitor
16. 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.



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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