Product Datasheet

46mm ∅ 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 IL[4]	<3.0 mA	<5.0 mA
Self-discharge Rate[5]	<20%	<20%
Constant Current (ΔT = 15°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

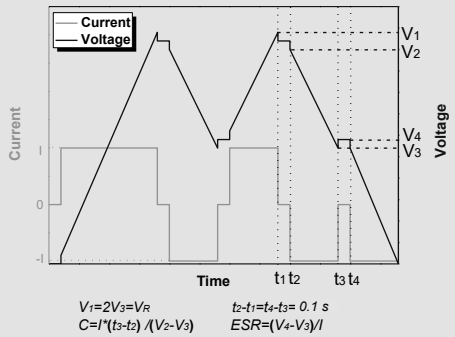
SAFETY & ENVIRONMENTAL SPECIFICATIONS		
Type	**C46W-3R0-0600**	**C46W-3R0-1100**
Safety	RoHS, REACH and UL810	RoHS, REACH and UL810A
Vibration	IEC 60068-2-64 (table A.5/A.6)	IEC 60068-2-64 (table A.5/A.6)
Shock	IEC 60068-2-27, 100g 6ms	IEC 60068-2-27, 100g 6ms

PHYSICAL PARAMETERS

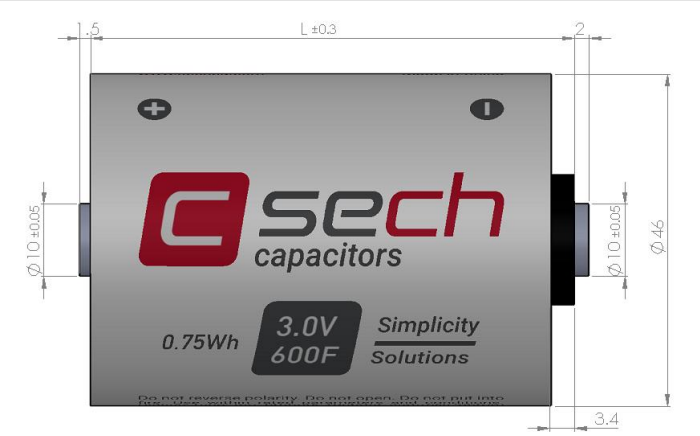
Type		C46W-3R0-0600	C46W-3R0-1100
Mass M		139 g	197 g
Terminals		Weldable[20]	Weldable[20]
Dimensions[21]	Height L	67.4 mm	98.7 mm
	Diameter	46 mm	46 mm

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.



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.
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:



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