Product Datasheet

60mm ∅ Ultracapacitors – weldable type

- Rated voltage 3VDC
- 3000F up to 5000F capacitance
- Ultra-low ESR, especially 'P' type cell
- High cycle life of 1 million cycles
- Excellent DC life performance
- Laser-weldable posts
- Very high energy and power density

ELECTRICAL SPECIFICATIONS				
Type	**C60W-3R0-3000**	**C60W-3P0-3000**	**C60W-3R0-3400**	**C60W-2R7-5000**
Rated Voltage V_R	3.00 V	3.00 V	3.00 V	2.70 V
Surge Voltage V_S[1]	3.10 V	3.10 V	3.10 V	2.80 V
Rated Capacitance C[2]	3000 F	3000 F	3400 F	5000 F
Capacitance Tolerance[3]	0% / +20%	0% / +20%	0% / +20%	-0% / +20%
ESR[2] (DC)	<0.23 mΩ	<0.15 mΩ	<0.24 mΩ	<0.25 mΩ
ESR[2] (AC, 1 kHz)	<0.2 mΩ	<0.12 mΩ	<0.21 mΩ	<0.22 mΩ
Leakage Current I_L[4]	<12 mA	<12.0 mA	<12 mA	<12 mA
Self-discharge Rate[5]	<20%	<20%	<20%	<20%
Constant Current (ΔT = 15°C)[6]	145 A	180 A	142 A	136 A
Max Current I_{Max}[7]	2.8 kA	3.1 kA	2.8 kA	3.0 kA
Short Current I_S[8]	13 kA	20.0 kA	12.5 kA	10.8 kA
Stored Energy E[9]	3.75 Wh	3.75 Wh	4.25 Wh	5.1 Wh
Energy Density E_d[10]	7.8 Wh/kg	7.7 Wh/kg	8.7 Wh/kg	10.1 Wh/kg
Usable Power Density P_d[11]	9.8 kW/kg	14.7 kW/kg	9.2 kW/kg	6.9 kW/kg
Matched Impedance Power Density P_{dMax}[12], 10 Hz ESR	20.5 kW/kg	30.7 kW/kg	19.1 kW/kg	14.4 kW/kg
Matched Impedance Power Density P_{dMax}[12], 1 kHz ESR	23.5 kW/kg	38.3 kW/kg	21.9 kW/kg	16.4 kW/kg

THERMAL CHARACTERISTICS				
Type	**C60W-3R0-3000**	**C60W-3P0-3000**	**C60W-3R0-3400**	**C60W-2R7-5000**
Working Temperature	-40 ~ 65°C			
Storage Temperature[13]	-40 ~ 70°C			
Thermal Resistance R_{Th}[14]	3.1 K/W	3.1 K/W	3.1 K/W	3.2 K/W
Thermal Capacitance C_{Th}[15]	575 J/K	584 J/K	565 J/K	575 J/K

LIFETIME CHARACTERISTICS				
Type	**C60W-3R0-3000**	**C60W-3P0-3000**	**C60W-3R0-3000**	**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			

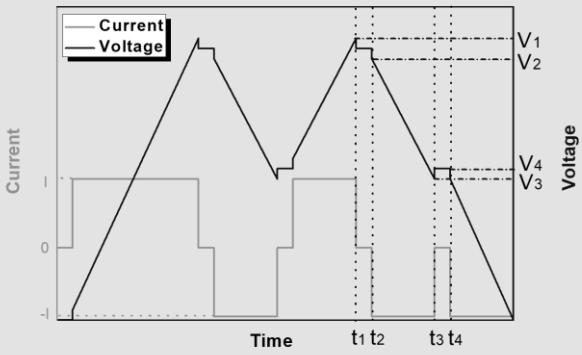
SAFETY & ENVIRONMENTAL SPECIFICATIONS				
Type	**C60W-3R0-3000**	**C60W-3P0-3000**	**C60W-3R0-3000**	**C60W-2R7-5000**
Safety	RoHS, REACH, UL810A			
Vibration	IEC 60068-2-64 ISO 16750-3 (Table 12)			
Shock	IEC 60068-2-27, 100g 6ms			

PHYSICAL PARAMETERS

Type		C60W-3R0-3000	C60W-3P0-3000	C60W-3R0-3000	C60W-2R7-5000
Mass M		478 g	489 g	490 g	505 g
Terminals		Weldable[20]	Weldable[20]	Weldable[20]	Weldable[20]
Dimensions[21]	Height L	138 mm	138 mm	138 mm	138 mm
	Diameter	60 mm	60 mm	60 mm	60 mm

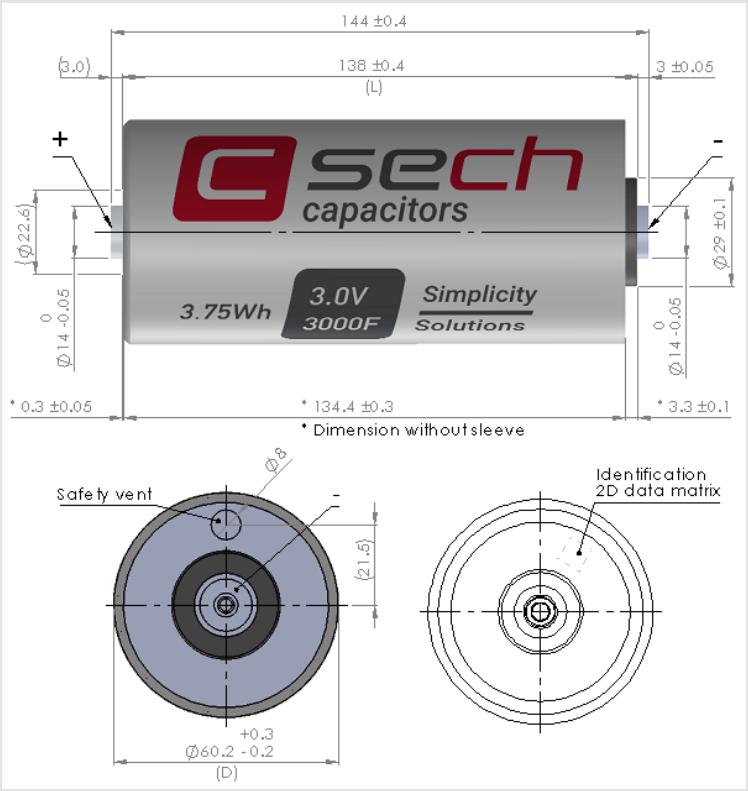
NOTES:

1. Surge voltage V_S: Absolut 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.



$V_1=2V_3=V_R$ $t_2-t_1=t_4-t_3=0.1$ s
$C=I*(t_3-t_2)/(V_2-V_3)$ $ESR=(V_4-V_3)/I$

3. Capacitance tolerance: Typical tolerance is +5%~+10%.
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 3h. 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.
14. Thermal resistance: $R_{Th} = \Delta T/P$, where P = ESR * I^2
15. Thermal capacitance is indicated for the whole product.
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 discharge 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 of the Ø60mm cells:



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