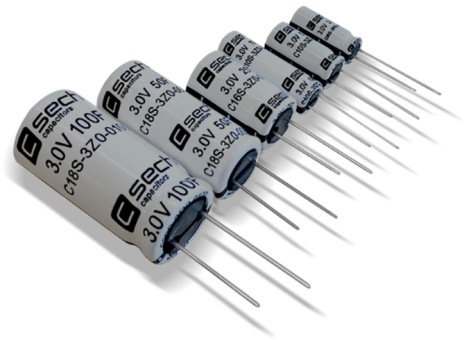
Product Datasheet

Small cell ultracapacitor – solderable type



- 3V rated voltage
- Long cycle life
- Excellent DC life performance
- Small size and light
- Low-cost

PRODUCT SPECIFICATION	
Type	**Rating**
Rated Voltage V_R	**3.0 V**
Surge Voltage[1]	3.15 V
Capacitance tolerance	-0% / +30%
Operating Temperature	-40°C to +65°C
Storage Temperature[13]	-40°C to +70°C
DC Life @ 3V and 65°C[10]	1000 hours
DC Life @ 2.5V and 85°C[10]	1000 hours
DC Life @ 3V and 25°C[11]	10 years
Cycle Life[12]	500'000 cycles
Shelf Life[14]	4 years

Type	Rated Voltage (V)	Rated Capacitance[2] (F)	Dimension (mm)		Internal Resistance (mΩ)		Max Operating Current[5] (A)	Max Peak Current[4] (A)	Leakage Current[3] (µA)	Stored Energy[6] (Wh)	Energy Density[7] (Wh/kg)	Power Density[8] (kW/kg)	Mass (g)
			Diameter (ØD)	Height (L)	ESR, AC (1kHz)	ESR, DC							
C08S-3Z0-0003	3.0	3.3 (0/+50%)	8	20	≤45	≤140	0.77	3.39	≤10	0.0041	2.84	2.84	1.45
C10S-3Z0-0005	3.0	5	10	20	≤40	≤90	1.09	5.17	≤15	0.0063	2.84	2.84	2.2
C10S-3Z0-0010	3.0	10	10	30	≤25	≤50	1.75	10	≤25	0.0125	3.91	6.75	3.2
C12S-3Z0-0015	3.0	15	12.5	25	≤20	≤50	1.82	12.86	≤35	0.0188	4.36	5.02	4.3
C16S-3Z0-0025	3.0	25	16	25	≤15	≤25	2.96	23.08	≤70	0.0313	4.17	5.76	7.5
C16S-3Z0-0030	3.0	30	16	30	≤20	≤30	2.92	23.68	≤80	0.0375	4.46	4.29	8.4
C18S-3Z0-0050	3.0	50	18	40	≤15	≤23	4.05	34.88	≤100	0.0625	4.70	3.53	13.3
C18S-3Z0-0100	3.0	100	18	60	≤8	≤10	7.39	75.00	≤260	0.1250	5.95	5.14	21.0

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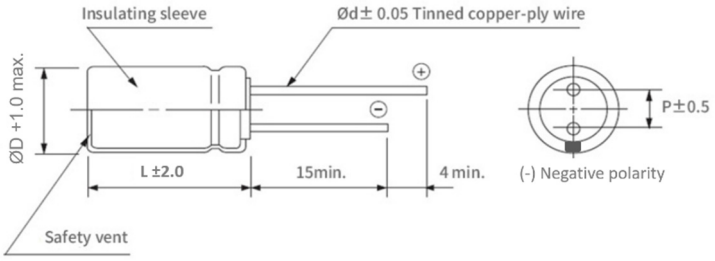
PHYSICAL PARAMETER

Per Diameter

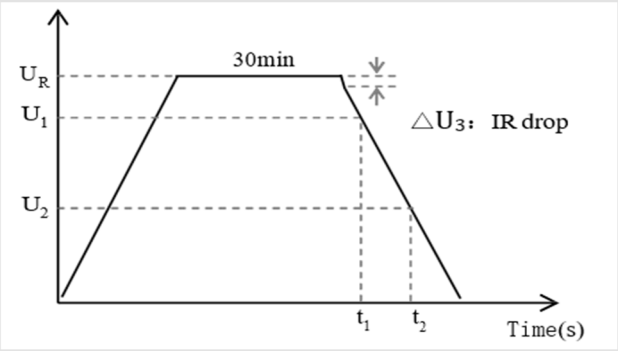
ØD +1.0 mm	8	10	12.5	16	18
P ±0.5 mm	3.5	5.0	5.0	7.7	7.7
Ød ±0.05 mm	0.6	0.6	0.6	0.8	0.8

Dimensions

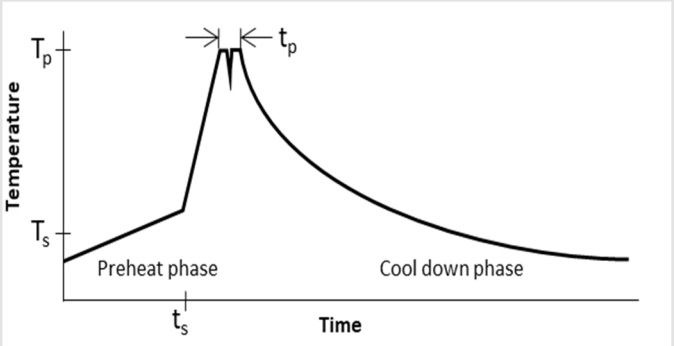


NOTES FOR ALL SMALL CELL TYPES

1. Surge voltage V_S:
   Absolute maximum voltage, non-repetitive. The duration must not exceed 1 sec.
2. Capacitance C:
   Discharging current: $4 \times C_R \times U_R$ (mA)
   U1 Start voltage: $0.8 \times U_R$ (V)
   U2 End voltage: $0.4 \times U_R$ (V)



3. Leakage current measurement procedure:
   1) Charge the capacitor to the V_R with a constant current (0.075 A/F).
   2) Hold the voltage at V_R for 72h.
   3) The current to maintain V_R after 72 h is the leakage current.
4. Max peak current: $I_{Max} = 0.5C * V_R/(\Delta t + ESR * C)$, $\Delta t = 1s$, discharge from V_R to $V_R/2$ in 1 second.
5. Max constant operating current with 15°C ΔT:
   $I_{MCC} = \sqrt{\Delta T/(ESR * R_{Th})}$
6. Stored energy: $E = 0.5C * V^2/3600$
7. Energy density: $E_d = E/M$
8. Usable power density: $P_d = (0.12V_R^2/ESR)/M$
9. Thermal resistance ($\Delta T = 15°C$): $R_{Th} = \Delta T/P$, where P = ESR * I^2
10. DC life at high temperature:
    At 65°C hold the capacitor charged at rated voltage for 1000h or at 85°C @ max. 2.5V for 1000h. The capacitance shall be >70% of the rated value, the ESR shall be <200% of the rated value.
11. 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.
12. 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.
13. Storage temperature: Storage in discharge state
14. Shelf life: Stored uncharged at RT, <50% RH
15. Wave solder profile



Profile feature	Standard SnPb	Pb free
Preheat/soak temperature T_s	100°C	100°C
Preheat/soak time t_s	60 s	60 s
Peak temperature T_p	220 – 260°C	250 – 260°C
Time to peak temperature t_p	10s max, 5s max/wave	10s max, 5s max/wave
Ramp-down rate	2-5 K/s	2-5 K/s
Time solder process (RT to RT)	4 min	4 min

Notes:

Standard markings:

- Name of manufacturer, part number
- Rated voltage and capacitance, negative and positive terminals
- 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