


DATA SHEET

SkelCap
ULTRACAPACITOR

- + Capacitance 500 - 3200 F
- + Extreme power density
- + Durable and safe aluminum casings
- + Weldable terminals
- + High cycle life >1,000,000 cycles
- + High temperature tolerance (operating and storage)
- + Made in EU
- + RoHS Compliant 



GENERAL SPECIFICATIONS

| | |
|-------------------------|-----------------|
| Rated voltage V_R | 2.85 V |
| Surge voltage | 3.0 V |
| Specific energy | 5.1 - 6.8 Wh/kg |
| Specific power, typical | 42 - 80 kW/kg |
| Power density, typical | 58 - 112 kW/L |

TEMPERATURE AND LIFE

| | |
|--|------------------|
| Operating temperature range | |
| Minimum | -40 °C |
| Maximum | +65 °C |
| Storage temperature range (uncharged) | |
| Minimum | -40 °C |
| Maximum | +70 °C |
| Life | |
| Shelf-life @ RT, uncharged | 10 years |
| Cyclelife @ RT, between V_R and $V_R/2$ | 1,000,000 cycles |
| Lifetime @ 65 °C and V_R | 1,500 hours |

PACKAGE DETAILS

| | UNIT | SCA0500 | SCA0750 | SCA1200 | SCA1800 | SCA3200 |
|------------------|------|---------|---------|---------|---------|---------|
| Package quantity | pcs | 49 | 49 | 25 | 25 | 25 |
| Package weight | kg | 6.2 | 8.0 | 7.2 | 9.3 | 14.2 |
| Package height | mm | 120 | 120 | 170 | 170 | 170 |
| Package width | mm | 395 | 395 | 395 | 395 | 395 |
| Package depth | mm | 395 | 395 | 395 | 395 | 395 |

ELECTRICAL

| | UNIT | SCA0500 | SCA0750 | SCA1200 | SCA1800 | SCA3200 |
|---|------|-------------|-------------|-------------|-------------|-------------|
| Rated capacitance | F | 500 | 750 | 1200 | 1800 | 3200 |
| Initial capacitance, typical | F | 540 | 800 | 1280 | 1910 | 3450 |
| ESR DC per IEC62391-1B, rated / typical | mΩ | 0.40 / 0.35 | 0.37 / 0.32 | 0.19 / 0.16 | 0.16 / 0.13 | 0.13 / 0.11 |
| DC 10ms ESR (≈ AC 100 Hz), rated / typical | mΩ | 0.30 / 0.23 | 0.28 / 0.21 | 0.14 / 0.11 | 0.13 / 0.10 | 0.12 / 0.09 |
| DC 1s ESR (≈ AC 0.1 Hz), rated / typical | mΩ | 0.50 / 0.38 | 0.45 / 0.35 | 0.23 / 0.18 | 0.18 / 0.14 | 0.14 / 0.12 |
| Maximum peak current, for 1 second ¹ | kA | 0.6 | 0.8 | 1.4 | 2.0 | 3.2 |
| Leakage current, 2.85 V (After 72 hours, 25 °C) | mA | 1.6 | 2.5 | 4.1 | 5.6 | 9.7 |
| Leakage current, 2.7 V (After 72 hours, 25 °C) | mA | 1.1 | 1.5 | 3.3 | 3.8 | 5.2 |

SAFETY

| | | | | | | |
|--|----|---|---|----|----|----|
| Short circuit current, typical (Possible current with short circuit @ rated voltage. Don't use as operating current) | kA | 8 | 9 | 18 | 22 | 26 |
|--|----|---|---|----|----|----|

ENERGY, based on rated capacitance

| | | | | | | |
|------------------------------|-------|------|------|------|------|------|
| Energy ² | Wh | 0.56 | 0.85 | 1.35 | 2.03 | 3.61 |
| Specific energy ³ | Wh/kg | 5.1 | 5.8 | 5.4 | 6.0 | 6.8 |
| Energy density ⁴ | Wh/L | 7.1 | 7.9 | 7.6 | 8.5 | 9.3 |

POWER*

| | | | | | | |
|---|-------|-----|-----|------|------|------|
| Power, (matched impedance), typical ⁵ | kW | 8.8 | 9.7 | 18.5 | 20.3 | 22.6 |
| Specific power, matched impedance, minimum ⁶ | kW/kg | 61 | 49 | 57 | 46 | 32 |
| Specific power, matched impedance, typical ⁶ | kW/kg | 80 | 66 | 73 | 60 | 42 |
| Power density, matched impedance, minimum ⁷ | kW/L | 86 | 68 | 81 | 65 | 43 |
| Power density, matched impedance, typical ⁷ | kW/L | 112 | 90 | 104 | 85 | 58 |

STANDARDS AND CERTIFICATIONS

| | |
|-------------------------|-----------------------|
| Vibration Specification | ISO 16750-3, Table 14 |
| Certifications | RoHS |

THERMAL*

| | | | | | | |
|--|------|-----|-----|-----|-----|-----|
| Thermal resistance, R _{ca} , typical | °C/W | 7.1 | 6.6 | 5.7 | 4.3 | 3.0 |
| Thermal capacitance, C _{th} , typical | J/°C | 110 | 159 | 253 | 335 | 634 |
| Max continuous current, ΔT = 15°C ⁸ | A | 96 | 104 | 154 | 188 | 237 |
| Max continuous current, ΔT = 40°C ⁸ | A | 157 | 170 | 252 | 307 | 387 |

PHYSICAL PARAMETERS

| | | | | | | |
|--|----|-------|-------|-------|-------|-------|
| Typical mass (± 3-6g mm, from small to large size) | kg | 0.111 | 0.147 | 0.253 | 0.337 | 0.533 |
| Volume | L | 0.079 | 0.107 | 0.178 | 0.240 | 0.390 |
| Diameter (± 0.2 mm, including label), D1 | mm | 40.2 | 40.2 | 60.2 | 60.2 | 60.2 |
| Length (± 0.3 mm), L1 | mm | 63 | 85 | 63 | 85 | 138 |
| Terminal diameter, D2 | mm | 8 | 8 | 12 | 12 | 12 |
| Terminal length, L2 | mm | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |

$$(1) \text{ Maximum peak current (1 sec)} = \frac{1/2 CV}{C \times \text{ESR} + 1s} \quad (2) E_{\text{stored}} = \frac{1/2 CV^2}{3,600} \quad (3) E_{\text{max}} = \frac{1/2 CV^2}{3,600 \times \text{mass}} \quad (4) E_{\text{max}} = \frac{1/2 CV^2}{3,600 \times \text{volume}}$$

$$(5) P_{\text{max}} = \frac{V^2}{4 \times \text{ESR}} \quad (6) P_{\text{max}} = \frac{V^2}{4 \times \text{ESR} \times \text{mass}} \quad (7) P_{\text{max}} = \frac{V^2}{4 \times \text{ESR} \times \text{volume}} \quad (8) I_{\text{max}} = \sqrt{\frac{\Delta T}{\text{ESR} \times R_{\text{th}}}}$$

Typical value represents the mean production sample value
Rated value represents the absolute minimum capacitance or maximum ESR value of production sample.

*Power values calculated using DC 10ms ESR ≈ AC 100Hz.

Standard markings

- + Name of Manufacturer, Part number, Serial number, Rated voltage
- + Rated capacitance, Negative and positive terminals, Warning marking
- + Total energy in watt-hours
- + Electrolyte material used

Notes

- + Testing instructions available on www.skeletontech.com
- + All information provided on this data sheet and all subsequent ultra-capacitors sales and testing are subject to Standard Terms of Service (ToS) available on www.skeletontech.com, document *General Terms of Sale for Skeleton Technologies OÜ*.

