SKELE+ON
TECHNOLOGIES

DATA SHEET

SkelCap

ULTRACAPACITOR

SCA0500 to **SCA3200** weldable cells
& **SCA0300** PCB-mountable cell

DATA SHEET

SkelCap
ULTRACAPACITOR

- + Capacitance 300 - 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)
- + German quality
- + RoHS compliant
- + UL certified

** PCB-mountable for 300F cell*

GENERAL SPECIFICATIONS*	VALUE	UNIT
Rated voltage V_R	2.85	V
Surge voltage V_s	3.0	V
Specific energy	5.1 - 6.8	Wh/kg
Nominal specific power	27 - 48	kW/kg
Practical specific power	21 - 27	kW/kg

** See values for SCA0300 on page 3.*

TEMPERATURE AND LIFE	VALUE	UNIT
Operating temperature range		
Minimum	-40	°C
Maximum	+65	°C
Storage temperature range (uncharged)		
Minimum	-40	°C
Maximum	+50	°C
Life		
Lifetime @ V_R and +65 °C	1500	Hours
Capacitance decrease 20% against rated value; 1s ESR increase 100% against rated value		
Storage life @ RT, uncharged	10	Years
Cyclelife @ RT, between V_R and $V_R/2$	1,000,000	Cycles

GENERAL	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Rated voltage	2.85	2.85	2.85	2.85	2.85	V
Rated capacitance	500	750	1200	1800	3200	F
DC 10ms ESR rated	0.38	0.32	0.18	0.16	0.14	mΩ
DC 1s ESR rated	0.70	0.52	0.30	0.27	0.18	mΩ
Maximum peak current, for 1 second[1]	0.6	0.9	1.4	2.0	3.1	kA
Leakage current (At 2.85 V, 25 °C and 72 hours, max)	1.6	2.5	4.5	6.3	11.0	mA

SAFETY	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Short circuit current	7.5	8.9	15.8	17.8	20.4	kA

ENERGY	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Energy[2]	0.6	0.8	1.4	2.0	3.6	Wh
Specific energy[3]	5.1	5.8	5.4	6.0	6.8	Wh/kg
Energy density[4]	7.1	7.9	7.6	8.5	9.3	Wh/L

POWER*	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Nominal power, calculated from 10ms ESR (for comparison)						
Specific power, matched impedance[6]	48	43	45	38	27	kW/kg
Power density, matched impedance[7]	68	59	63	53	37	kW/L
Nominal power, calculated from 1s ESR (for engineering)						
Power, matched impedance[5]	2.9	3.9	6.8	7.5	11.3	kW
Specific power, matched impedance[6]	26	27	27	22	21	kW/kg
Power density, matched impedance[7]	37	36	38	31	29	kW/L

STANDARDS AND CERTIFICATIONS	
Vibration Specification	ISO 16750-3, Table 12
Certifications	RoHS, UL 810A

THERMAL*	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Thermal resistance, R_{ca}, typical	7.1	6.6	5.7	4.3	3.0	°C/W
Thermal capacitance, C_{th}, typical	109.6	158.7	252.7	334.7	633.7	J/°C
Max continuous current, ΔT = 15°C[8]	75	84	121	148	190	A
Max continuous current, ΔT = 40°C[8]	122	138	197	242	310	A

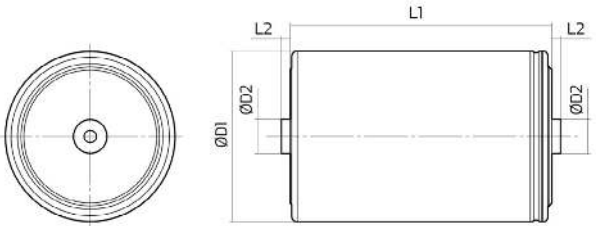
PHYSICAL	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Mass, typical (± 3-6 g, from small to large size)	0.11	0.15	0.25	0.34	0.53	kg
Volume	0.08	0.11	0.18	0.24	0.39	L
Diameter (± 0.2 mm, including label), D1	40.2	40.2	60.2	60.2	60.2	mm
Length (± 0.3 mm), L1	63	85	63	85	138	mm
Terminal diameter, D2	8	8	12	12	12	mm
Terminal length, L2	3.2	3.2	3.2	3.2	3.2	mm

PACKAGE DETAILS*	SCA0500	SCA0750	SCA1200	SCA1800	SCA3200	UNIT
Package quantity	49	49	25	25	25	pcs
Package weight	6.2	8.0	7.1	9.2	14.1	kg
Package height	120	120	170	170	170	mm
Package width	395	395	395	395	395	mm
Package depth	395	395	395	395	395	mm

** SCA0300 only sold as a product platform, not as individual cells.*

(1) Maximum peak current (1 sec) = $\frac{½\,CV}{C \times ESR + 1s}$ (2) $E_{stored} = \frac{½\,CV^2}{3{,}600}$ (3) $E_{max} = \frac{½\,CV^2}{3{,}600 \times mass}$ (4) $E_{max} = \frac{½\,CV^2}{3{,}600 \times volume}$

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



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 ultracapacitors 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*.

SCA0300 PCB-Mountable Cell

Note: Polarity of the cell is stated as following: center terminal for "-", can and 3-pillar PCB frame for "+".

GENERAL SPECIFICATIONS	VALUE	UNIT
Rated voltage V_R	2.85	V
Surge voltage V_s	3.0	V
Specific energy	5.3	Wh/kg
Nominal specific power	32	kW/kg
Practical specific power	20	kW/kg

TEMPERATURE AND LIFE	VALUE	UNIT
Operating temperature range		
Minimum	-40	ºC
Maximum	+65	ºC
Storage temperature range (uncharged)		
Minimum	-40	ºC
Maximum	+50	ºC
Life		
Lifetime at V_R and +65 ºC	1500	Hours
Capacitance decrease 20% against rated value; 1s ESR increase 100% against rated value		
Storage life @ RT, uncharged	10	Years
Cyclelife @ RT, between V_R and $V_R/2$	1,000,000	Cycles

GENERAL	VALUE	UNIT
V_{Rated}	2.85	V
Rated capacitance	300	F
DC 10ms ESR, rated	1.00	mΩ
DC 1s ESR, rated	1.60	mΩ
Maximum peak current, for 1 second[1]	0.3	kA
Leakage current (at 2.85 V, 25 °C and 72 h, max)	1.5	mA

SAFETY	VALUE	UNIT
Short circuit current	3	kA

ENERGY	VALUE	UNIT
Energy[2]	0.34	Wh
Specific energy[3]	5.3	Wh/kg
Energy density[4]	6.4	Wh/L

POWER*	VALUE	UNIT
Nominal power*, calculated from 10 ms ESR (for comparison)		
Specific power, matched Impedance[6]	32	kW/kg
Power density, matched Impedance[7]	38	kW/L
Practical power*, calculated from 1 s ESR (for engineering)		
Power, matched impedance[5]	1.3	kW
Specific power, matched Impedance[6]	20	kW/kg
Power density, matched impedance[7]	24	kW/L

STANDARDS AND CERTIFICATIONS	
Vibration Specification	ISO 16750-3 Table 12
Shock Resistance	IEC60068-2-27 Shock Test
Certifications	RoHS
Standards	REACH, UL 810A, AEC-Q200*

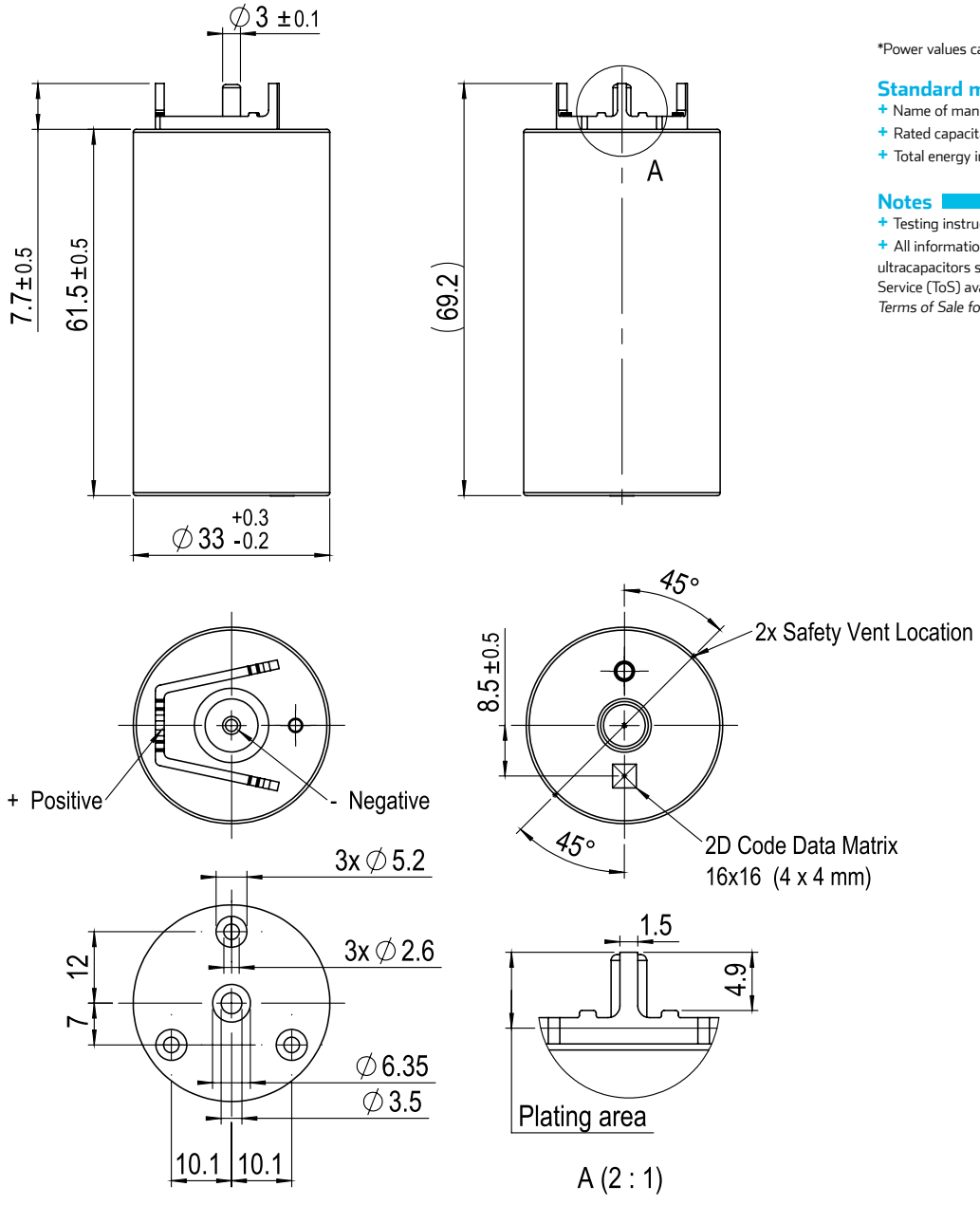
**Tested according AEC-Q200 requirements, modified to match ultracapacitor properties*

THERMAL*	VALUE	UNIT
Thermal resistance, R_{ca}, typical	10.8	°C/W
Thermal capacitance, C_{th}, typical	60	J/°C
Max continuous current, ΔT = 15°C[8]	37	A
Max continuous current, ΔT = 40°C[8]	61	A

PHYSICAL PARAMETERS	VALUE	UNIT
Mass. Typical	0.064	kg
Volume	0.053	L
Diameter	33	mm
Length	61.5	mm

(1) Maximum peak current (1 sec) = $\frac{½\,CV}{C \times ESR + 1s}$ (2) $E_{stored} = \frac{½\,CV^2}{3{,}600}$ (3) $E_{max} = \frac{½\,CV^2}{3{,}600 \times mass}$ (4) $E_{max} = \frac{½\,CV^2}{3{,}600 \times volume}$

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



Board drillings
Board thickness: 1.5-3.2 mm

*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

Notes

+ Testing instructions available on www.skeletontech.com
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Skeleton Technologies GmbH

Sales and Headquarters
Schücostraße 8, 01900 Großröhrsdorf, Germany
info@skeletontech.com

www.skeletontech.com