DATASHEET

2.3V 300F PSEUDOCAPACITOR CELL

FEATURES AND BENEFITS

- High performance product with low ESR
- Exceptional shock and vibration resistance
- Long lifetimes with up to 100,000 duty cycles*
- Compliant with RoHS and REACH requirements

APPLICATIONS

- Flashlights
- LED
- Memory Back-Up
- Portable Hand Tools
- Solar Charger
- Off-Grid Lighting
- Automotive Subsystems (Power Windows and Door Locks)

PRODUCT SPECIFICATIONS & CHARACTERISTICS

PCAP0300 P230 S07
PSHLR-0300C0-002R3

ELECTRICAL

Rated Voltage, V_R	2.3 VDC
Surge Voltage[1]	2.5 VDC
Rated Capacitance, C[3]	300 F
Min. / Max. Capacitance, Initial	270 F / 360 F
Typical Capacitance, Initial[2,3]	304 F
Rated (Max.) ESR_{DC}, Initial[3]	18 mΩ
Typical ESR_{DC}, Initial[2,3]	13 mΩ
Maximum Leakage Current[4]	960 µA
Maximum Peak Current, Non-repetitive[5]	53 A

PHYSICAL

Nominal Mass	24.0 g

POWER & ENERGY

Operating Temp. Range	**-25°C to 60°C**
Maximum Stored Energy, E_{max}[6,8]	0.22 Wh
Gravimetric Specific Energy[6]	9.1 Wh/kg
Usable Specific Power[6]	1.4 kW/kg
Impedance Match Specific Power[6]	3.0 kW/kg

LIFE*

Projected DC Life at Room Temperature (At rated voltage and 25°C, EOL[9])	10 years
DC Life at High Temperature (At rated voltage and 60°C, EOL[9])	2,000 hours
Projected Cycle Life at Room Temperature (Constant current charge-discharge from V_R to 1/2V_R at 25°C, EOL[9])	100,000 cycles
Shelf Life (Stored uncharged at 25°C)	2 years

SAFETY

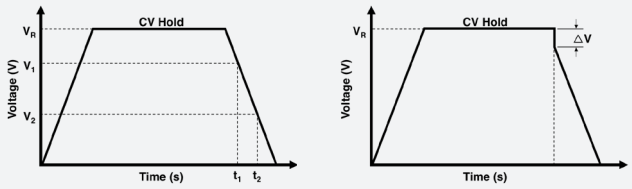
Certifications	RoHS, REACH

*Results may vary. Additional terms and conditions, including the limited warranty, apply at the time of purchase. See the warranty details for applicable operating and use requirements.

1. Surge Voltage
   Absolute maximum voltage, non-repetitive. Duration not to exceed 1 second.

2. "Typical" values represent mean values of production sample.

3. Rated Capacitance & ESR_{DC} (measure method)
   - Capacitance: Constant current charge to V_R with 250 mA, constant voltage charge at V_R for 5 min., constant current discharge to 0.9 V with 250 mA.
   - ESR_{DC}: Constant current charge to V_R with 250 mA, constant voltage charge at V_R for 5 min., constant current discharge with 4 * C * V_R [mA] to 0.9 V.
     e.g. in case of 2.3V 300F pseudo cell, 4 * 300 * 2.3 = 2,760 mA.



$$C = \frac{I \times (t_2 - t_1)}{V_1 - V_2} \qquad ESR_{DC} = \frac{\Delta V}{I}$$

where C is the capacitance (F);
I is the absolute value of the discharge current (A);
V_R is the rated voltage (V);
V_1 is the measurement start voltage, 2V;
V_2 is the measurement end voltage, 1V;
t_1 is the time from start of discharge to reach V_1 (s);
t_2 is the time from start of discharge to reach V_2 (s);
ESR_{DC} is the DC-ESR (Ω);
ΔV is the voltage drop during first 10ms of discharge (V).

4. Maximum Leakage Current
   - Current measured after 72 hrs at rated voltage and 25°C. Initial leakage current can be higher.
   - If applicable, module leakage current is the sum of cell and balancing circuit leakage currents.

5. Maximum Peak Current
   - Current needed to discharge cell/module from rated voltage to half-rated voltage in 1 second.

$$I = \frac{½V_R}{\Delta t / C + ESR_{DC}}$$

where Δt is the discharge time (sec); Δt = 1 sec in this case

   - The stated maximum peak current should not be used in normal operation and is only provided as a reference value.

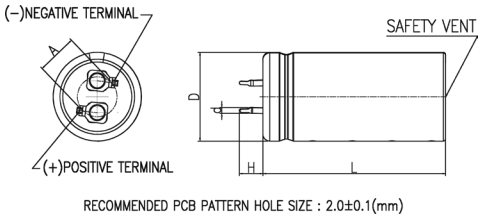
6. Energy & Power (Based on IEC 62391-2)
   - Maximum Stored Energy, E_{max}(Wh) = $\frac{½CV_R^2}{3{,}600}$
   - Gravimetric Specific Energy (Wh/kg) = $\frac{E_{max}}{mass}$
   - Usable Specific Power (W/kg) = $\frac{0.12V_R^2}{ESR_{DC} \times mass}$
   - Impedance Match Specific Power (W/kg) = $\frac{0.25V_R^2}{ESR_{DC} \times mass}$
   - Presented Power and Energy values are calculated based on Rated Capacitance & Rated (Max.) ESR_{DC}, Initial values.

7. Cycle Life Test Profile
   Cycle life varies depending upon application-specific characteristics. Actual results will vary.

8. Per United Nations material classification UN3499, all Maxwell ultracapacitors have less than 10 Wh capacity to meet the requirements of Special Provisions 361. Both individual ultracapacitors and modules composed of those ultracapacitors shipped by Maxwell can be transported without being treated as dangerous goods (hazardous materials) under transportation regulations.

9. BOL: Beginning of Life, rated initial product performance
   EOL: End of Life criteria.
   - Capacitance: 70% of min. BOL rating
   - ESR_{DC}: 2x max. BOL rating

PCAP0300 P230 S07



RECOMMENDED PCB PATTERN HOLE SIZE : 2.0±0.1(mm)

Part Description	Dimensions (mm) L (±1.0)	D (+1.0)	d (±0.05)	H (±1.0)	A (±0.2)
PCAP0300 P230 S07	46.0	22.0	1.50	6.0	10.0

When ordering, please reference the Maxwell Model Number below.

Maxwell Model Number:	Maxwell Part Number:	Alternate Model Number:
PCAP0300 P230 S07	133740	PSHLR-0300C0-002R3

The information in this document is correct at time of printing and is subject to change without notice. Images are not to scale.

Maxwell Technologies, Inc.
Global Headquarters
3888 Calle Fortunada
San Diego, CA 92123
USA
Tel: +1 (858) 503-3300
Fax: +1 (858) 503-3301

Maxwell Technologies SA
Route de Montena 65
CH-1728 Rossens
Switzerland
Tel: +41 (0)26 411 85 00
Fax: +41 (0)26 411 85 05

Maxwell Technologies, GmbH
Leopoldstrasse 244
80807 Munich
Germany
Tel: +49 (0)89 4161403 0
Fax: +49 (0)89 4161403 99

Maxwell Technologies Shanghai Trading Co., Ltd.
Room 1005, 1006, and 1007
No. 1898, Gonghexin Road,
Jin An District, Shanghai
2000072, P.R. China
Tel: +86 21 3852 4000
Fax: +82 21 3852 4099

Nesscap Co., Ltd.
17, Dongtangiheung-ro
681 Beon-gil, Giheung-gu,
Yongin-si, Gyeonggi-do
17102
Republic of Korea
Tel: +82 31 289 0721
Fax: +82 31 286 6767

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