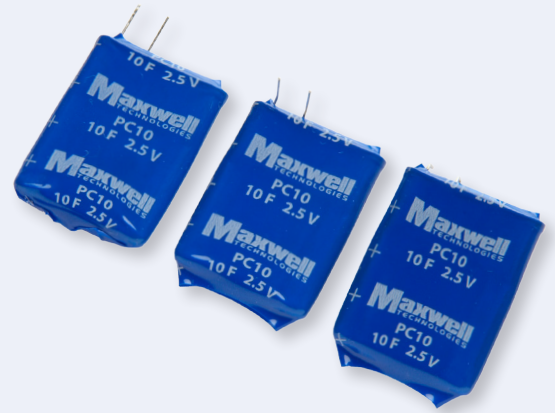


FEATURES AND BENEFITS

- Up to 500,000 duty cycles with 10 year life capability
- Hermetically sealed, stainless steel construction
- Low profile prismatic design
- Higher energy vs electrolytic capacitors
- Higher power vs batteries

TYPICAL APPLICATIONS

- Automotive subsystems
- Smart Meter
- Back up power for SSD and NV-DIMM
- Consumer electronics



PRODUCT SPECIFICATIONS

ELECTRICAL

PC10, PC10-90, PC10-270

PC10HT, PC10HT-90, PC10HT-270

Rated Capacitance ¹	10 F	10 F
Minimum Capacitance, Initial ¹	9 F	9 F
Maximum Capacitance, Initial ¹	12 F	12 F
Maximum ESR _{DC} , initial ¹	180 mΩ	180 mΩ
Test Current for Capacitance and ESR _{DC} ¹	1 A	1 A
Rated Voltage	2.50 V	2.20 V
Absolute Maximum Voltage ³	2.70 V	2.70 V
Absolute Maximum Current	2.80 A	2.40 A
Leakage Current at 25°C, maximum ⁴	0.040 mA	0.040 mA

TEMPERATURE

Operating temperature range
(Cell case temperature)

Minimum	-40°C	-40°C
Maximum	70°C	85°C

Storage temperature range
(Stored uncharged)

Minimum	-40°C	-40°C
Maximum	85°C	85°C

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL

Mass, typical	6.3 g	6.3 g
Terminals	Wire Leads	Wire Leads
Vibration Specification	ISO16750, Table 14	ISO16750, Table 14
Shock Specification	-	-

POWER AND ENERGY

PC10, PC10-90, PC10-270

PC10HT, PC10HT-90, PC10HT-270

Usable Specific Power, P_d ⁵	660 W/kg	510 W/kg
Impedance Match Specific Power, P_{max} ⁶	1,400 W/kg	1,100 W/kg
Specific Energy, E_{max} ⁷	1.4 Wh/kg	1.1 Wh/kg
Stored Energy ^{8, 11}	0.009 Wh	0.007 Wh

SAFETY

Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	14 A	12 A
Certifications	UL810a, RoHS	UL810a, RoHS

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS

PC10, PC10-90, PC10-270

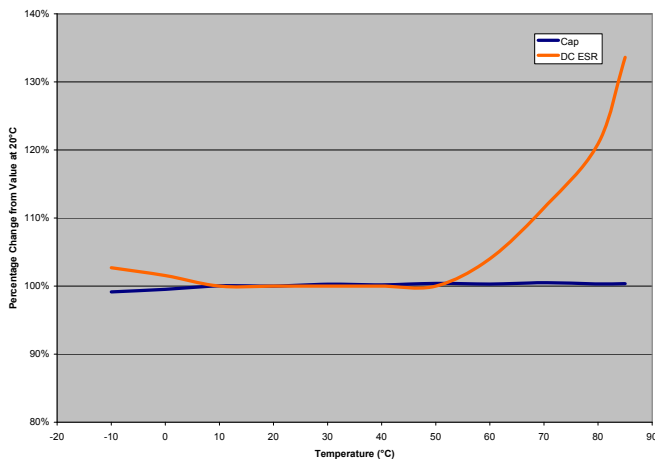
PC10HT, PC10HT-90, PC10HT-270

Thermal Resistance (R _{th} , Case to Ambient), typical ²	15°C/W	15°C/W
Thermal Capacitance (C _{th}), typical ²	3.6 J/°C	3.6 J/°C
Maximum Continuous Current (ΔT = 15 °C) ²	2.4 A _{RMS}	2.4 A _{RMS}
Maximum Continuous Current (ΔT = 40 °C) ²	3.8 A _{RMS}	3.8 A _{RMS}

LIFE

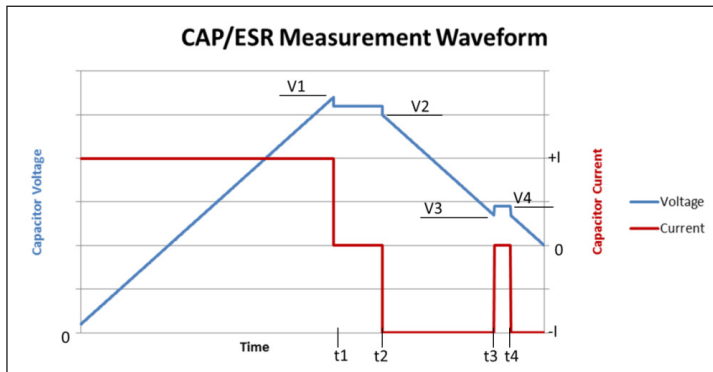
DC Life at High Temperature ¹ (held continuously at Rated Voltage and Maximum Operating Temperature)	3,000 hours	1,000 hours
Capacitance Change (% decrease from minimum initial value)	20%	20%
ESR Change (% increase from maximum initial value)	100%	100%
Projected DC Life at 25°C ¹	10 years	10 years
Capacitance Change (% decrease from minimum initial value)	20%	20%
ESR Change (% increase from maximum initial value)	100%	100%
Cycle Life ^{1,9}	500,000 cycles	500,000 cycles
Capacitance Change (% decrease from minimum initial value)	20%	20%
ESR Change (% increase from maximum initial value)	100%	100%
Test Current	1.0 A	1.0 A
Shelf Life (Stored uncharged at 25°C)	4 years	4 years

ESR AND CAPACITANCE VS TEMPERATURE

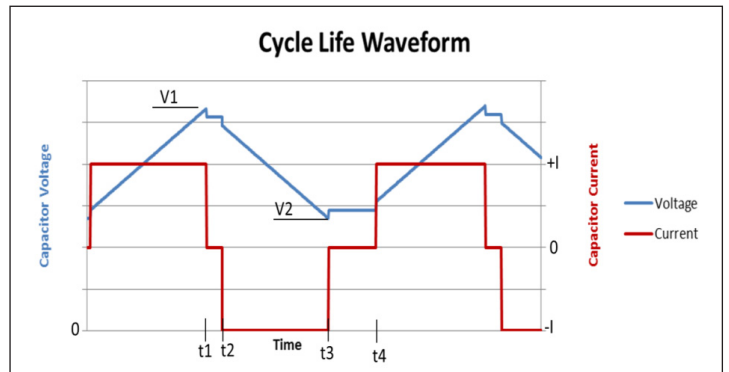


NOTES

1. Capacitance and ESR_{DC} measured at 25°C using specified test current per waveform below.
2. $\Delta T = I_{RMS}^2 \times ESR \times R_{th}$
3. Absolute maximum voltage, non-repeated. Not to exceed 1 second.
4. After 72 hours (208 hours - BCAP3400) at rated voltage. Initial leakage current can be higher.
5. Per IEC 62391-2, $P_d = \frac{0.12V^2}{ESR_{DC} \times mass}$
6. $P_{max} = \frac{V^2}{4 \times ESR_{DC} \times mass}$
7. $E_{max} = \frac{\frac{1}{2} CV^2}{3,600 \times mass}$
8. $E_{stored} = \frac{\frac{1}{2} CV^2}{3,600}$
9. Cycle using specified test current per waveform below.
10. Cycle life varies depending upon application-specific characteristics. Actual results will vary.
11. 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.



$V1 = V_{rated}$ $t2 - t1 = 15 \text{ seconds}$ $Capacitance = I \times (t3 - t2) / (V2 - V3)$
 $V3 = 0.5 \times V_{rated}$ $t4 - t3 = 5 \text{ seconds}$ $ESR = (V4 - V3) / I$



$V1 = V_{rated}$ $t2 - t1 = 5 \text{ seconds (I=0)}$
 $V2 = 0.5 \times V_{rated}$ $t4 - t3 = 15 \text{ seconds (I=0)}$

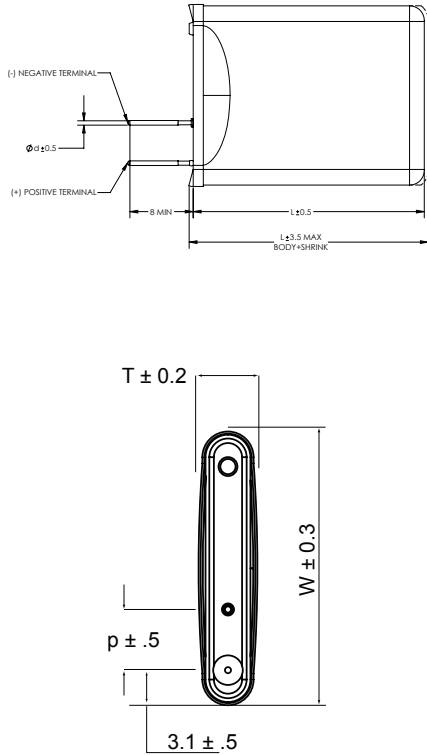
MOUNTING RECOMMENDATIONS

Do not reverse polarity. Please refer to document number 1008238, available at maxwell.com for soldering recommendations.

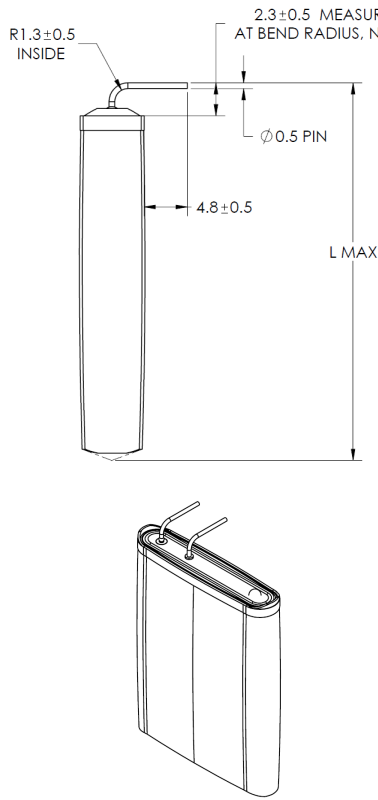
MARKINGS

Products are marked with the following information: Rated capacitance, rated voltage, product number, name of manufacturer, and positive terminal.

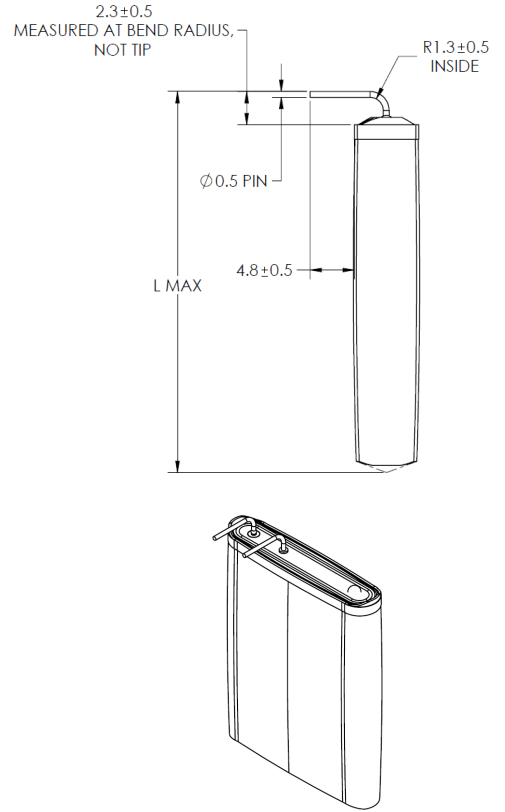
PC10, PC10HT



PC10-90, PC10HT-90



PC10-270, PC10HT-270



Part Description	Dimensions (mm)					Package Quantity
	L (mm)	W (mm)	T (mm)	d (mm)	p (mm)	
PC10, PC10HT	29.6	23.6	4.8	0.5	5.1	2,000
PC10-90, PC10HT-90	35.9	23.6	4.8	0.5	5.1	2,000
PC10-270, PC10HT-270	35.9	23.6	4.8	0.5	5.1	2,000

Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice. Please contact Maxwell Technologies directly for any technical specifications critical to application. All products featured on this datasheet are covered by the following U.S. patents and their respective foreign counterparts: 6585152, 6643119, 6842330, 7116545, 7295423, 7342770, 7352558, 7384433, 7407520, 7492571, 7508651, 7791860, 7791861, 7883553, 7935155, 8072734, 8279580, and patents pending.



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