# DATASHEET K2 ULTRACAPACITORS - 2.85V/3400F

NEW

## FEATURES AND BENEFITS

- DuraBlue™ Shock and Vibration Technology
- Up to 1,000,000 duty cycles or 10 year DC life*
- Highest power and energy
- Up to 18 kW/kg of Specific Power[2]
- Up to 4.00 Wh of Stored Energy[2]
- Threaded terminals or laser-weldable posts

## TYPICAL APPLICATIONS

- High shock and vibration environments
- Automotive subsystems
- Wind turbine pitch control
- Hybrid vehicles
- Rail
- Heavy industrial equipment
- UPS & telecom systems


## PRODUCT SPECIFICATIONS

| ELECTRICAL | BCAP3400 |
|---|---|
| Rated Capacitance[1] | 3,400 F |
| Minimum Capacitance, initial[1] | 3,400 F |
| Typical Capacitance, initial[1,2] | 3,550 F |
| Maximum Capacitance, initial[1] | 3,740 F |
| Typical $ESR_{DC}$, initial[1,2] | 0.22 mΩ |
| Maximum $ESR_{DC}$, initial[1] | 0.28 mΩ |
| Test Current for Capacitance and $ESR_{DC}$[1] | 100 A |
| Rated Voltage | 2.85 V |
| Absolute Maximum Voltage[3] | 3.0 V |
| Absolute Maximum Current | 2,500 A |
| **POWER & ENERGY** | |
| Minimum Usable Specific Power, $P_d$[5] | 6.7 kW/kg |
| Typical Usuable Specific Power, $P_d$[2,5] | 8.5 kW/kg |
| Minimum Impedance Match Specific Power, $P_{max}$[6] | 14 kW/kg |
| Typical Impedance Match Specific Power, $P_{max}$[2,6] | 18 kW/kg |
| Minimum Specific Energy, $E_{max}$[7] | 7.4 Wh/kg |
| Typical Specific Energy, $E_{max}$[2,7] | 7.7 Wh/kg |
| Minimum Stored Energy, $E_{stored}$[8,12] | 3.84 Wh |
| Typical Stored Energy, $E_{stored}$[2,8,12] | 4.00 Wh |
| **SHOCK & VIBRATION** | |
| Vibration Specification | ISO 16750-3, Tables 12 & 14 |
| Shock Specification | SAE J2464, IEC 60068-2-27, -29 |
| **SAFETY** | |
| Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.) | 10,000 A |
| Certifications | UL810a, RoHS, REACH |

## TYPICAL CHARACTERISTICS

| TEMPERATURE | BCAP3400 |
|---|---|
| Operating temperature range (Cell case temperature) | |
| Minimum | -40°C |
| Maximum | 65°C |
| Storage temperature range (Stored uncharged) | |
| Minimum | -40°C |
| Maximum | 70°C |
| **ELECTRICAL** | |
| Leakage Current at 25°C, typical[4] | 15 mA |
| **LIFE** | |
| DC Life at High Temperature[1] (held continuously at Rated Voltage & Maximum Operating Temperature) | 1,500 hours |
| Capacitance Change (% decrease from minimum initial value) | 25% |
| ESR Change (% increase from maximum initial value) | 110% |
| Projected DC Life at 25°C[1] (held continuously at Rated Voltage) | 10 years |
| Capacitance Change (% decrease from minimum initial value) | 20% |
| ESR Change (% increase from maximum initial value) | 100% |
| Projected Cycle Life at 25°C[1, 10, 11] | 1,000,000 cycles |
| Capacitance Change (% decrease from minimum initial value) | 20% |
| ESR Change (% increase from maximum initial value) | 100% |
| Test Current | 100 A |
| Shelf Life (Stored uncharged at 25°C) | 4 years |

*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.



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NEW

# PRODUCT SPECIFICATIONS (Cont'd)

| THERMAL | BCAP3400 |
|---|---|
| Thermal Resistance ($R_{th}$, Case to Ambient), typical[9] | 3.2°C/W |
| Thermal Capacitance ($C_{th}$), typical | 640 J/°C |
| Maximum Continuous Current (ΔT = 15°C)[9] | 131 $A_{RMS}$ |
| Maximum Continuous Current (ΔT = 40°C)[9] | 211 $A_{RMS}$ |

| PHYSICAL | BCAP3400 |
|---|---|
| Mass, typical | 520 g |
| Terminals | Threaded or Weldable |
| Maximum Terminal Torque (K04) | 14 Nm |

## MOUNTING RECOMMENDATIONS

Do not reverse polarity. Please refer to document number 1016419, available at maxwell.com for welding recommendations.

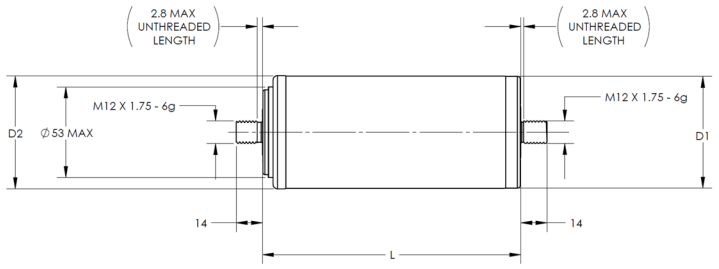
## MARKINGS

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

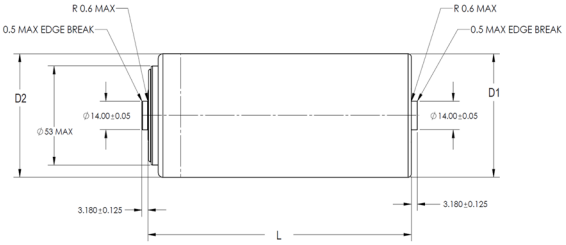
## NOTES

1. Capacitance and $ESR_{DC}$ measured at 25°C using specified test current in K2 2.7V Series Datasheet.
2. Typical values represent mean values of a production sample.
3. Absolute maximum voltage, non-repeated. Not to exceed 1 second.
4. After 72 hours 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. $E_{max} = \frac{½\ CV^2}{3{,}600 \times mass}$
8. $E_{stored} = \frac{½\ CV^2}{3{,}600}$
9. $\Delta T = I_{RMS}^2 \times ESR \times R_{ca}$
10. Cycle using specified test current per waveform in K2 2.7V Series Datasheet.
11. Cycle life varies depending upon application-specific characteristics. Actual results will vary.
12. Per United Nations material classification UN3499, all Maxwell ultracapacitors have less than 10 Wh capacity to meet the requirements of Special Provisions 361. When packaged according to the regulation, both individual ultracapacitors and modules composed of those ultracapacitors shipped by Maxwell can be transported without being treated as dangerous goods (hazardous materials).

## BCAP3400 P285 K04




## BCAP3400 P285 K05




| Part Description | Dimensions (mm) L (±0.3mm) | D1 (±0.2mm) | D2 (±0.7mm) | Package Quantity |
|---|---|---|---|---|
| BCAP3400 P285 K04/05 | 138 | 60.4 | 60.7 | 15 |

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: 6643119, 7295423, 7342770, 7352558, 7384433, 7440258, 7492571, 7508651, 7580243, 7791860, 7791861, 7859826, 7883553, 7935155, 8072734, 8098481, 8279580.

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