

FEATURES AND BENEFITS*

- Up to 1,000,000 duty cycles or 10 year DC life
- 16V DC working voltage
- Resistive or active cell balancing available
- Temperature output
- Overvoltage outputs available
- High power density
- Compact, rugged, fully enclosed splash-proof design

TYPICAL APPLICATIONS

- Wind turbine pitch control
- Transportation
- Heavy industrial equipment
- UPS systems



PRODUCT SPECIFICATIONS

ELECTRICAL

| | BMOD0500 P016 B01 | BMOD0500 P016 B02 |
|--|-------------------|-------------------|
| Rated Capacitance ¹ | 500 F | 500 F |
| Minimum Capacitance, initial ¹ | 500 F | 500F |
| Maximum Capacitance, initial ¹ | 600 F | 600 F |
| Maximum ESR _{DC} , initial ¹ | 2.1 mΩ | 2.1 mΩ |
| Test Current for Capacitance and ESR _{DC} ¹ | 100 A | 100 A |
| Rated Voltage | 16 V | 16 V |
| Absolute Maximum Voltage ² | 17 V | 17 V |
| Absolute Maximum Current | 1,900 A | 1,900 A |
| Leakage Current at 25°C, maximum (B01 Suffix - VMS 2.0) ³ | 5.2 mA | N/A |
| Leakage Current at 25°C, maximum (B02 Suffix - Passive Balancing) ³ | N/A | 170 mA |
| Maximum Series Voltage | 750 V | 750 V |
| Capacitance of Individual Cells ¹¹ | 3,000 F | 3,000 F |
| Maximum Stored Energy, Individual Cell ¹¹ | 3.0 Wh | 3.0 Wh |
| Number of Cells | 6 | 6 |

TEMPERATURE

| | | |
|---|-------|-------|
| Operating Temperature (Cell Case Temperature) | | |
| Minimum | -40°C | -40°C |
| Maximum | 65°C | 65°C |
| Storage Temperature (Stored Uncharged) | | |
| Minimum | -40°C | -40°C |
| Maximum | 70°C | 70°C |

*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.

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL

| | BMOD0500 P016 B01 | BMOD0500 P016 B02 |
|-------------------------------|--------------------|--------------------|
| Mass, typical | 5.5 kg | 5.5 kg |
| Power Terminals | M8/M10 | M8/M10 |
| Recommended Torque - Terminal | 20/30 Nm | 20/30 Nm |
| Vibration Specification | SAE J2380 | SAE J2380 |
| Shock Specification | SAE J2464 | SAE J2464 |
| Environmental Protection | IP65 | IP65 |
| Cooling | Natural Convection | Natural Convection |

MONITORING / CELL VOLTAGE MANAGEMENT

| | | |
|-----------------------------|-------------------|----------------|
| Internal Temperature Sensor | NTC Thermistor | NTC Thermistor |
| Temperature Interface | Analog | Analog |
| Cell Voltage Monitoring | Overvoltage Alarm | N/A |
| Connector | Deutsch DTM | Deutsch DTM |
| Cell Voltage Management | VMS 2.0 | Passive |

POWER & ENERGY

| | | |
|---|------------|------------|
| Usable Specific Power, P_d^4 | 2,700 W/kg | 2,700 W/kg |
| Impedance Match Specific Power, P_{max}^5 | 5,500 W/kg | 5,500 W/kg |
| Specific Energy, E_{max}^6 | 3.2 Wh/kg | 3.2 Wh/kg |
| Stored Energy, E_{stored}^7 | 18 Wh | 18 Wh |

SAFETY

| | | |
|--|----------------------|----------------------|
| Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.) | 7,600 A | 7,600 A |
| Certifications | RoHS, UL810a (150 V) | RoHS, UL810a (150 V) |
| High-Pot Capability ¹² | 2,500 VDC | 2,500 VDC |

TYPICAL CHARACTERISTICS

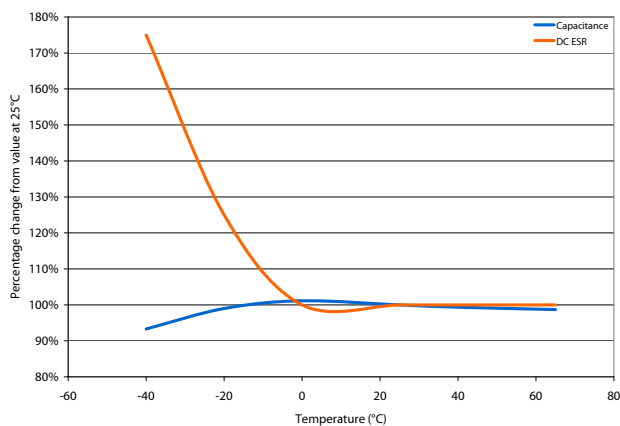
THERMAL CHARACTERISTICS

| | BMOD0500 P016 B01 | BMOD0500 P016 B02 |
|--|----------------------|----------------------|
| Thermal Resistance (R_{ca} , All Cell Cases to Ambient), typical ⁸ | 0.70°C/W | 0.70°C/W |
| Thermal Capacitance (C_{th}), typical | 4,300 J/°C | 4,300 J/°C |
| Maximum Continuous Current ($\Delta T = 15^\circ\text{C}$) ⁸ | 100 A _{RMS} | 100 A _{RMS} |
| Maximum Continuous Current ($\Delta T = 40^\circ\text{C}$) ⁸ | 160 A _{RMS} | 160 A _{RMS} |

LIFE

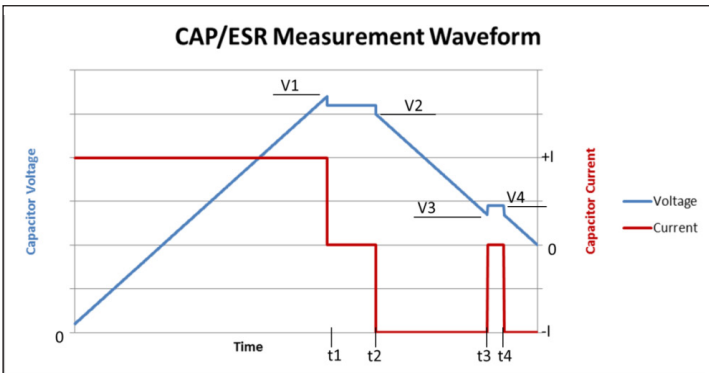
| | | |
|--|------------------|------------------|
| DC Life at High Temperature ¹ (held continuously at Rated Voltage & Maximum Operating Temperature) | 1,500 hours | 1,500 hours |
| Capacitance Change (% decrease from minimum initial value) | 20% | 20% |
| ESR Change (% increase from maximum initial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

ESR AND CAPACITANCE VS TEMPERATURE

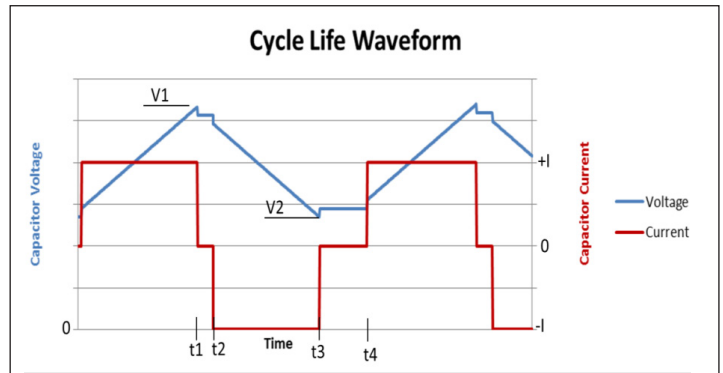


NOTES

1. Capacitance and ESR_{DC} measured at 25°C using specified test current per waveform below.
2. Absolute maximum voltage, non-repeated. Not to exceed 1 second.
3. After 72 hours at rated voltage. Initial leakage current can be higher.
4. Per IEC 62391-2, $P_d = \frac{0.12V^2}{ESR_{DC} \times \text{mass}}$
5. $P_{\text{max}} = \frac{V^2}{4 \times ESR_{DC} \times \text{mass}}$
6. $E_{\text{max}} = \frac{\frac{1}{2} CV^2}{3,600 \times \text{mass}}$
7. $E_{\text{stored}} = \frac{\frac{1}{2} CV^2}{3,600}$
8. $\Delta T = I_{RMS}^2 \times ESR \times R_{ca}$
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.
12. Duration = 60 seconds. Not intended as an operating parameter.



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



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

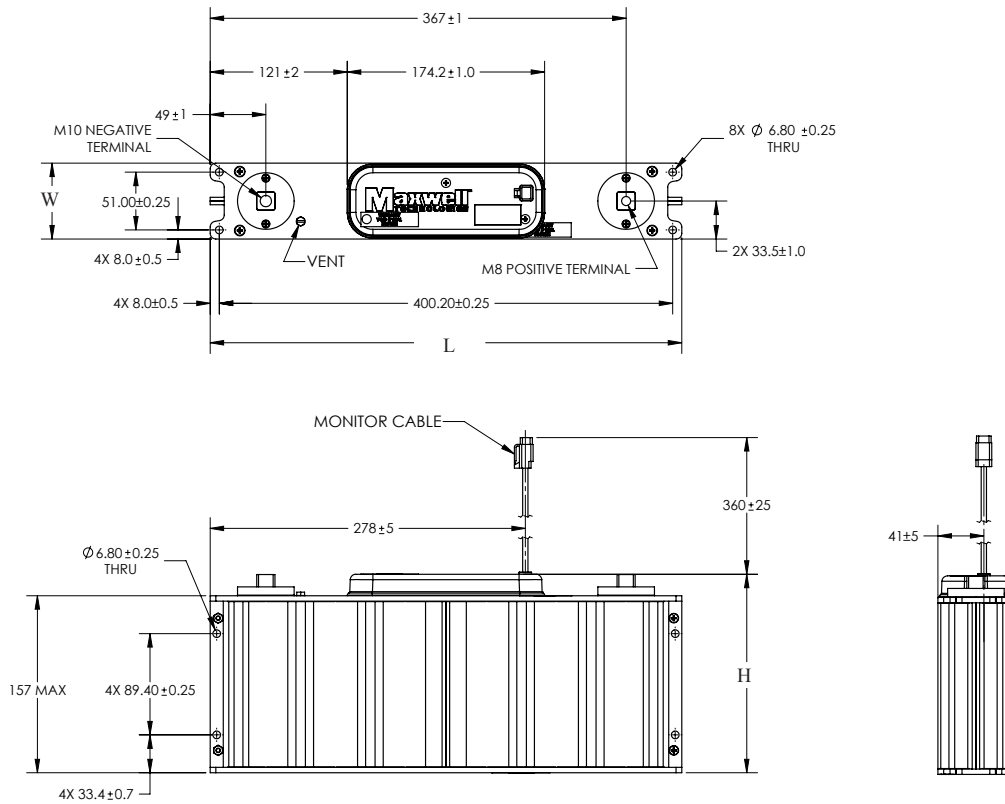
MOUNTING RECOMMENDATIONS

Please refer to the user manual for installation recommendations.

MARKINGS

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

BMOD0500 P016 BOX



| Part Description | Dimensions (mm) | | | Package Quantity |
|-----------------------|-----------------|---------|---------|------------------|
| | L (max) | W (max) | H (max) | |
| BMOD0500 P016 B01/B02 | 418 | 68 | 179 | 3 |

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, 7816891, 7859826, 7883553, 7935155, 8072734, 8098481, 8279580, and patents pending.



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