

FEATURES AND BENEFITS

- 16 V DC working voltage
- Individually balanced cells
- Compact, lightweight system
- Screw terminals

TYPICAL APPLICATIONS

- Automotive subsystems
- Consumer electronics
- Portable power tools
- Renewable energy systems
- Short term UPS & telecom
- Wind pitch control



PRODUCT SPECIFICATIONS

ELECTRICAL

BMOD0058 E016 B02

Rated Capacitance ¹	58 F
Minimum Capacitance, initial ¹	58 F
Maximum ESR _{DC} , initial ¹	22 mΩ
Rated Voltage	16 V
Absolute Maximum Voltage ¹⁴	17 V
Maximum Continuous Current ($\Delta T = 15^{\circ}\text{C}$) ²	12.0 A _{RMS}
Maximum Continuous Current ($\Delta T = 40^{\circ}\text{C}$) ²	19 A _{RMS}
Maximum Peak Current, 1 second (non repetitive) ³	200 A
Leakage Current, maximum (B02 Suffix - Passive Balancing) ⁴	25 mA
Maximum Series Voltage	750 V

TEMPERATURE

Operating Temperature (Ambient temperature)	
Minimum	-40°C
Maximum	65°C
Storage Temperature (Stored uncharged)	
Minimum	-40°C
Maximum	70°C

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL

BMOD0058 E016 B02

Mass, typical	0.63 kg
Power Terminals	M5 Thread
Recommended Torque - Terminal	4 Nm
Vibration Specification	IEC60068-2-6
Shock Specification	IEC60068-2-27, -29
Environmental Protection	IP54
Cooling	Natural Convection

MONITORING / CELL VOLTAGE MANAGEMENT

Internal Temperature Sensor	N/A
Temperature Interface	N/A
Cell Voltage Monitoring	N/A
Connector	N/A
Cell Voltage Management	Passive

POWER & ENERGY

Usable Specific Power, P_d^5	2,200 W/kg
Impedance Match Specific Power, P_{max}^6	4,600 W/kg
Specific Energy, E_{max}^7	3.3 Wh/kg
Stored Energy ⁸	2.1 Wh

LIFE

High Temperature¹ (at Rated Voltage & Maximum Operating Temperature)	1,500 hours
Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%
Room Temperature¹ (at Rated Voltage & 25°C)	10 years
Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%

PRODUCT SPECIFICATIONS (Cont'd)

BMOD0058 E016 B02

Cycle Life ^{1,9}	500,000 cycles
Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%
Test Current	35 A
Shelf Life ^{1,10} (Stored uncharged up to a maximum storage temperature)	2 years

SAFETY

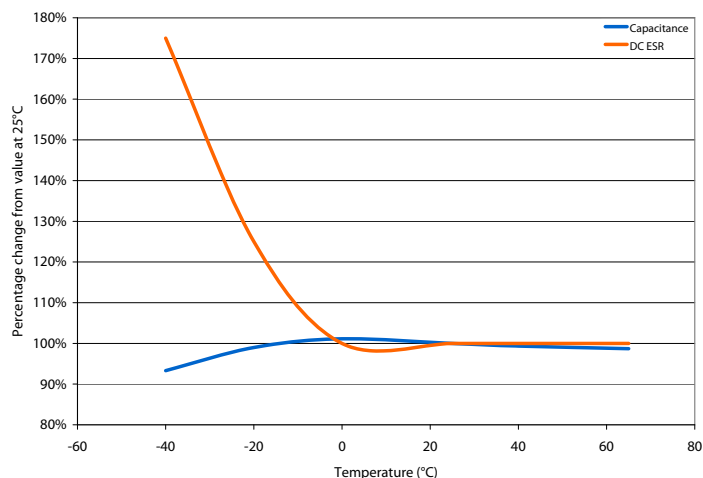
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	730 A
Factory High-Pot Test ¹³	Not Required
Certifications	RoHS, UL810a (640 Volts)

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS

Thermal Resistance (R_{ma} , Module Case to Ambient), typical	N/A
Thermal Resistance (R_{ca} , All Cell Cases to Ambient), typical	4.8°C/W
Thermal Capacitance (C_{th}), typical ²	420 J/°C

ESR AND CAPACITANCE VS TEMPERATURE



NOTES

1. Capacitance and ESR_{DC} measured at 25°C per Document Number 1007239 available at www.maxwell.com.
2. Per Maxwell Document 1007239 available at www.maxwell.com.
3. Maximum Peak current (1 sec) = $\frac{\frac{1}{2} CV}{C \times ESR_{DC} + 1}$
4. After 72 hours at 25°C and rated voltage. Initial leakage current can be higher.
5. Per IEC 62391-2, $P_d = \frac{0.12V^2}{ESR_{DC} \times \text{mass}}$
6. $P_{max} = \frac{V^2}{4 \times ESR_{DC} \times \text{mass}}$
7. $E_{max} = \frac{\frac{1}{2} CV^2}{3,600 \times \text{mass}}$
8. $E_{stored} = \frac{\frac{1}{2} CV^2}{3,600}$
9. Cycle per Document Number 1007239 available at www.maxwell.com.
10. No more than 10% decrease in capacitance from minimum initial capacitance or 50% increase in ESR from maximum initial ESR.
11. Tested at 1 kV DC.
12. For a given application, sufficient cooling must be provided to keep cell case temperatures below 65°. See R_{th} .
13. Duration = 60 seconds. Not intended as an operating parameter.
14. Absolute maximum voltage non repeated, not to exceed 1 second.

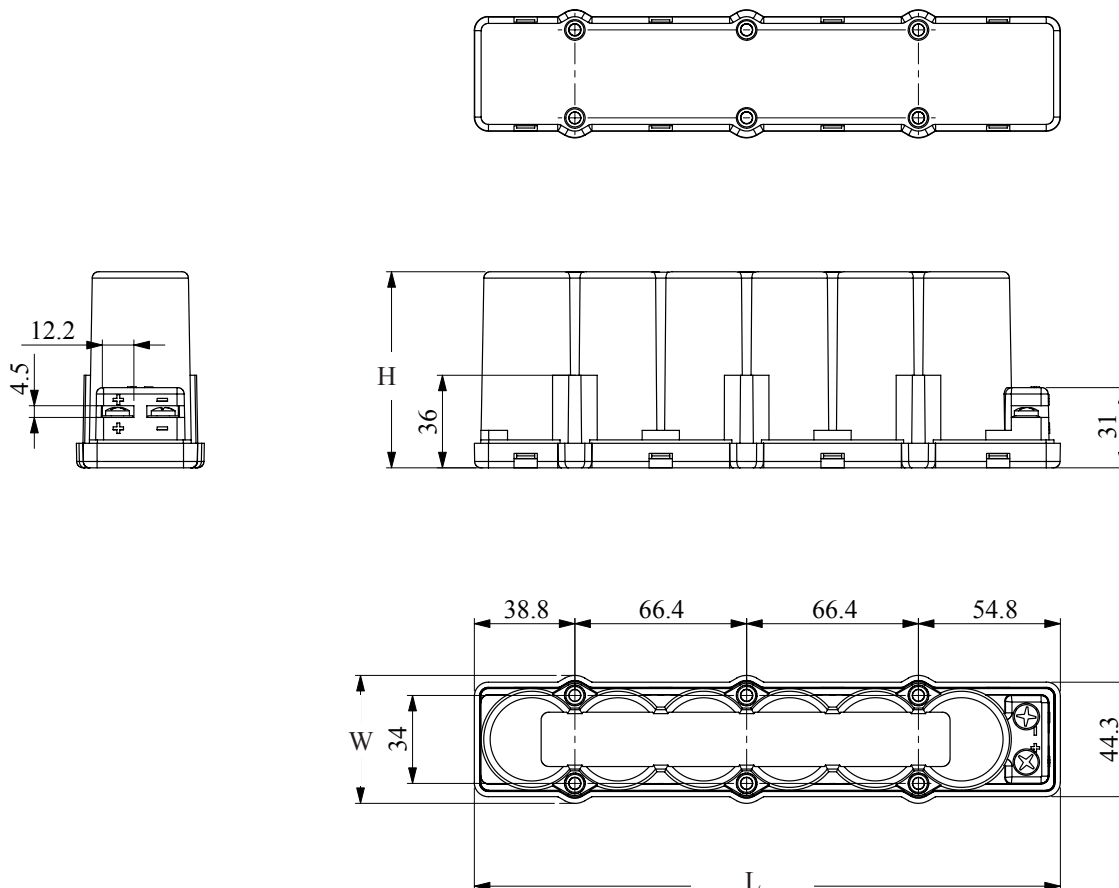
MOUNTING RECOMMENDATIONS

Recommended mounting screw M4. Maximum torque on mounting screws 4 Nm. All 6 mounting locations must be utilized to meet vibration specifications.

MARKINGS

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

BMOD0058 E016



Part Description	Dimensions (mm)			Package Quantity
	L (±0.5mm)	W (±0.5mm)	H (±0.5mm)	
BMOD0058 E016	226.5	49.5	76.0	10

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FEATURES AND BENEFITS

- Ultra-low internal resistance
- Highest power performance available
- Over 1,000,000 duty cycles
- Compact, rugged, fully enclosed splash proof design

TYPICAL APPLICATIONS

- Automotive
- Industrial
- Telecommunications
- Transportation
- Uninterruptible Power Supplies (UPS)
- Wind turbines



PRODUCT SPECIFICATIONS

ELECTRICAL

	BMOD0500 B01	BMOD0500 B02
Rated Capacitance ¹	500 F	500 F
Minimum Capacitance, initial ¹	500 F	500F
Maximum ESR _{DC} , initial ¹	2.1 mΩ	2.1 mΩ
Rated Voltage	16 V	16 V
Absolute Maximum Voltage ¹⁴	17 V	17 V
Maximum Continuous Current ($\Delta T = 15^{\circ}\text{C}$) ²	100 A _{RMS}	100 A _{RMS}
Maximum Continuous Current ($\Delta T = 40^{\circ}\text{C}$) ²	160 A _{RMS}	160 A _{RMS}
Maximum Peak Current, 1 second (non repetitive) ³	2,000 A	2,000 A
Leakage Current, maximum (B01 Suffix - VMS 2.0) ⁴	5.2 mA	N/A
Leakage Current, maximum (B02 Suffix - Passive Balancing) ⁴	N/A	170 mA
Maximum Series Voltage	750 V	750 V

TEMPERATURE

Operating Temperature (Ambient 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

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL	BMOD0500 B01	BMOD0500 B02
Mass, typical	5.51 kg	5.51 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	-
Connector	Deutsch DTM	Deutsch DTM
Cell Voltage Management	VMS 2.0	Passive
POWER & ENERGY		
Usable Specific Power, P_d^5	2,700 W/kg	2,700 W/kg
Impedance Match Specific Power, P_{max}^6	5,500 W/kg	5,500 W/kg
Specific Energy, E_{max}^7	3.2 Wh/kg	3.2 Wh/kg
Stored Energy ⁸	17.8 Wh	17.8 Wh
LIFE		
High Temperature ¹ (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%
Room Temperature ¹ (at Rated Voltage & 25°C)	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}	1,000,000 cycles	1,000,000 cycles

PRODUCT SPECIFICATIONS (Cont'd)

	BMOD0500 B01	BMOD0500 B02
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 ^{1,10} (Stored uncharged up to a maximum storage temperature)	2 years	2 years

SAFETY

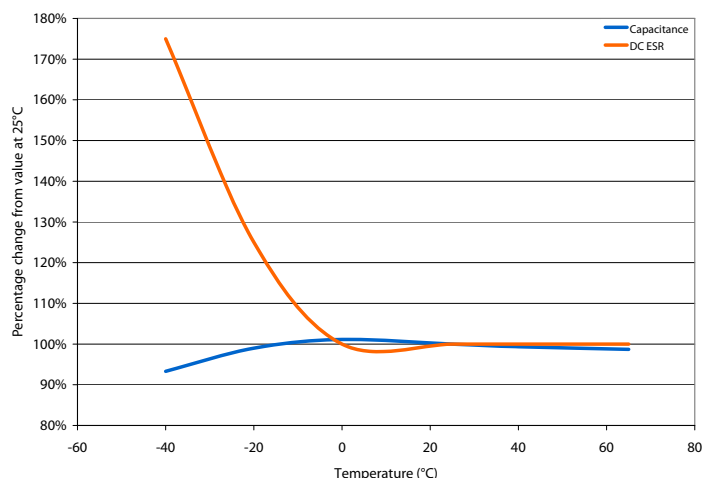
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	7,600 A	7,600 A
Factory High-Pot Test ¹³	2,500 V DC	2,500 V DC
Certifications	RoHS UL810a (150 V)	RoHS UL810a (150 V)

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS

Thermal Resistance (R_{cm} , One Cell Case to Module Case), typical ²	1.0°C/W	1.0°C/W
Thermal Resistance (R_{ma} , Module Case to Ambient), typical	0.45°C/W	0.45°C/W
Thermal Resistance (R_{ca} , All Cell Cases to Ambient), typical	0.70°C/W	0.70°C/W
Thermal Capacitance (C_{th}), typical ²	4,280 J/°C	4,280 J/°C

ESR AND CAPACITANCE VS TEMPERATURE



NOTES

1. Capacitance and ESR_{DC} measured at 25°C per Document Number 1007239 available at www.maxwell.com.
2. Per Maxwell Document 1007239 available at www.maxwell.com.
3. Maximum Peak current (1 sec) = $\frac{\frac{1}{2} CV}{C \times ESR_{DC} + 1}$
4. After 72 hours at 25°C and rated voltage. Initial leakage current can be higher.
5. Per IEC 62391-2, $P_d = \frac{0.12V^2}{ESR_{DC} \times \text{mass}}$
6. $P_{\max} = \frac{V^2}{4 \times ESR_{DC} \times \text{mass}}$
7. $E_{\max} = \frac{\frac{1}{2} CV^2}{3,600 \times \text{mass}}$
8. $E_{\text{stored}} = \frac{\frac{1}{2} CV^2}{3,600}$
9. Cycle per Document Number 1007239 available at www.maxwell.com.
10. No more than 10% decrease in capacitance from minimum initial capacitance or 50% increase in ESR from maximum initial ESR.
11. Tested at 1 kV DC.
12. For a given application, sufficient cooling must be provided to keep cell case temperatures below 65°. See R_{th} .
13. Duration = 60 seconds. Not intended as an operating parameter.
14. Absolute maximum voltage non repeated, not to exceed 1 second.

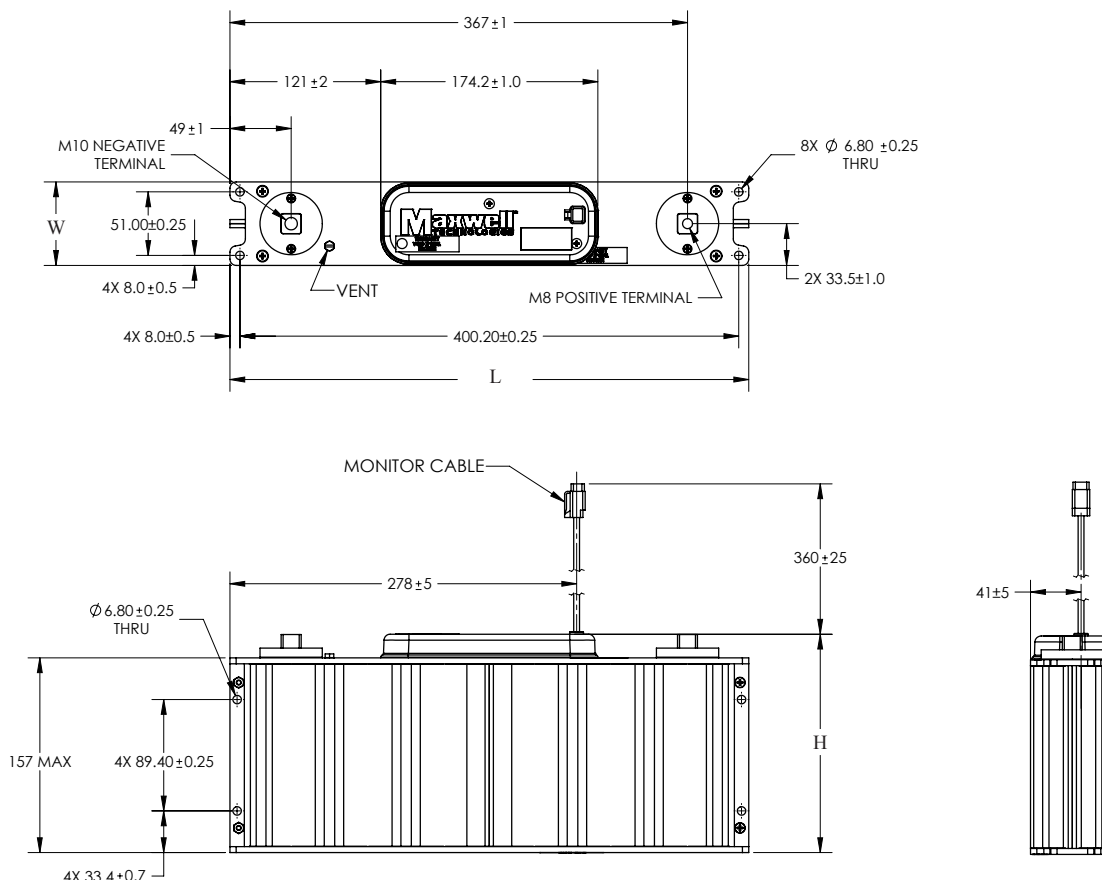
MOUNTING RECOMMENDATIONS

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 B0x



Part Description	L (max)	Dimensions (mm) W (max)	H (max)	Package Quantity
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: 7511942, 7307830, 7203056, 7180726, 7027290, 7.352.558, 7.295.423, 7.090.946, 7.508.651, 7.492.571, 7.342.770, 6.643.119, 7.384.433, 7.147.674, 7.317.609, 7.495.349, 7.102.877.



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FEATURES AND BENEFITS

- Compact, rugged, fully enclosed splash proof design
- Highest power performance available
- Individually balanced cells
- Over 1,000,000 duty cycles
- Ultra-low internal resistance
- Voltage & temperature sensor output included

TYPICAL APPLICATIONS

- Automotive
- Industrial
- Telecommunications
- Bus, Train
- Uninterruptible Power Supplies (UPS)



PRODUCT SPECIFICATIONS

ELECTRICAL

	BMOD0083	BMOD0165
Rated Capacitance ¹	83 F	165 F
Minimum Capacitance, initial ¹	83 F	165 F
Maximum ESR _{DC} , initial ¹	10 mΩ	6.3 mΩ
Rated Voltage	48 V	48 V
Absolute Maximum Voltage ¹⁴	51 V	51 V
Maximum Continuous Current ($\Delta T = 15^{\circ}\text{C}$) ²	61 A _{RMS}	77 A _{RMS}
Maximum Continuous Current ($\Delta T = 40^{\circ}\text{C}$) ²	100 A _{RMS}	130 A _{RMS}
Maximum Peak Current, 1 second (non repetitive) ³	1,100 A	1,900 A
Leakage Current, maximum (B01 Suffix - VMS 2.0) ⁴	3.0 mA	5.2 mA
Maximum Series Voltage	750 V	750 V

TEMPERATURE

Operating Temperature (Ambient 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

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL	BMOD0083	BMOD0165
Mass, typical	10.3 kg	13.5 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	Overvoltage Alarm
Connector	Deutsch DTM	Deutsch DTM
Cell Voltage Management	VMS 2.0	VMS 2.0
POWER & ENERGY		
Usable Specific Power, P_d^5	2,700 W/kg	3,300 W/kg
Impedance Match Specific Power, P_{max}^6	5,600 W/kg	6,800 W/kg
Specific Energy, E_{max}^7	2.6 Wh/kg	3.9 Wh/kg
Stored Energy ⁸	26.6 Wh	52.8 Wh
LIFE		
High Temperature ¹ (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%
Room Temperature ¹ (at Rated Voltage & 25°C)	10 years	10 years
Capacitance Change (% decrease from minimum initial value)	20%	20%
ESR Change (% increase from maximum initial value)	100%	100%

PRODUCT SPECIFICATIONS (Cont'd)

	BMOD0083	BMOD0165
Cycle Life ^{1,9}	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 ^{1,10} (Stored uncharged up to a maximum storage temperature)	2 years	2 years

SAFETY

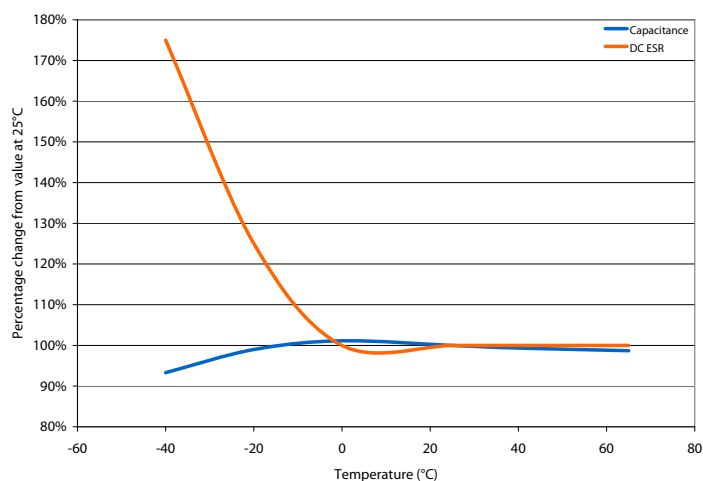
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	4,800 A	7,600 A
Factory High-Pot Test ¹³	2,500 V DC	2,500 V DC
Certifications	RoHS	RoHS UL810a (150 Volts)

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS

Thermal Resistance (R_{cm} , One Cell Case to Module Case), typical ²	1°C/W	1°C/W
Thermal Resistance (R_{ma} , Module Case to Ambient), typical	0.30°C/W	0.25°C/W
Thermal Resistance (R_{ca} , All Cell Cases to Ambient), typical	0.40°C/W	0.40°C/W
Thermal Capacitance (C_{th}), typical ²	7,675 J/°C	12,715 J/°C

ESR AND CAPACITANCE VS TEMPERATURE



NOTES

1. Capacitance and ESR_{DC} measured at 25°C per Document Number 1007239 available at www.maxwell.com.
2. Per Maxwell Document 1007239 available at www.maxwell.com.
3. Maximum Peak current (1 sec) = $\frac{\frac{1}{2} CV}{C \times ESR_{DC} + 1}$
4. After 72 hours at 25°C and rated voltage. Initial leakage current can be higher.
5. Per IEC 62391-2, $P_d = \frac{0.12V^2}{ESR_{DC} \times \text{mass}}$
6. $P_{\text{max}} = \frac{V^2}{4 \times ESR_{DC} \times \text{mass}}$
7. $E_{\text{max}} = \frac{\frac{1}{2} CV^2}{3,600 \times \text{mass}}$
8. $E_{\text{stored}} = \frac{\frac{1}{2} CV^2}{3,600}$
9. Cycle per Document Number 1007239 available at www.maxwell.com.
10. No more than 10% decrease in capacitance from minimum initial capacitance or 50% increase in ESR from maximum initial ESR.
11. Tested at 1 kV DC.
12. For a given application, sufficient cooling must be provided to keep cell case temperatures below 65°. See R_{th} .
13. Duration = 60 seconds. Not intended as an operating parameter.
14. Absolute maximum voltage non repeated, not to exceed 1 second.

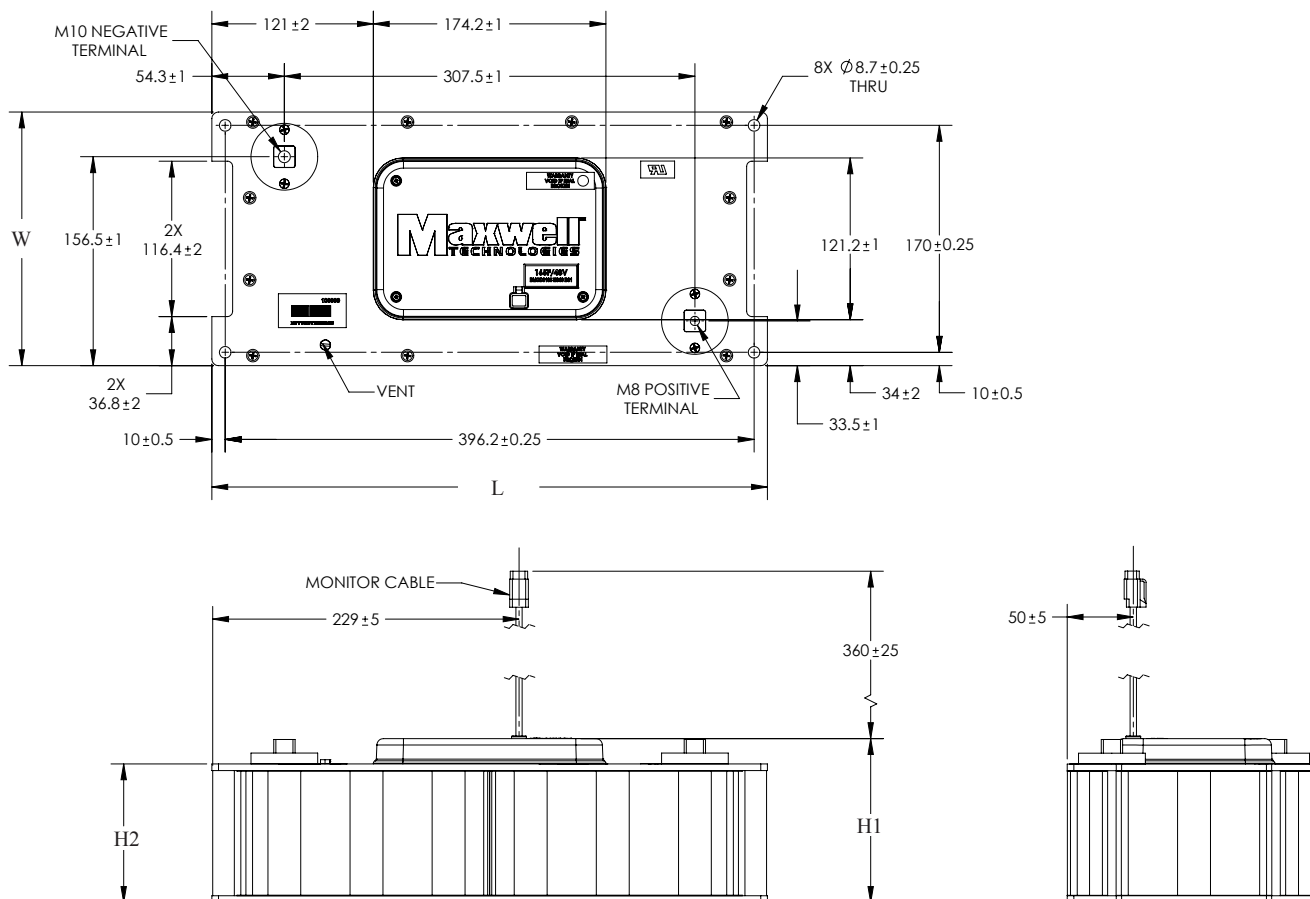
MOUNTING RECOMMENDATIONS

Please refer to the user manual for installation recommendations.

MARKINGS

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Rated capacitance, rated voltage, product number,
name of manufacturer, positive and negative terminal,
warning marking, serial number.

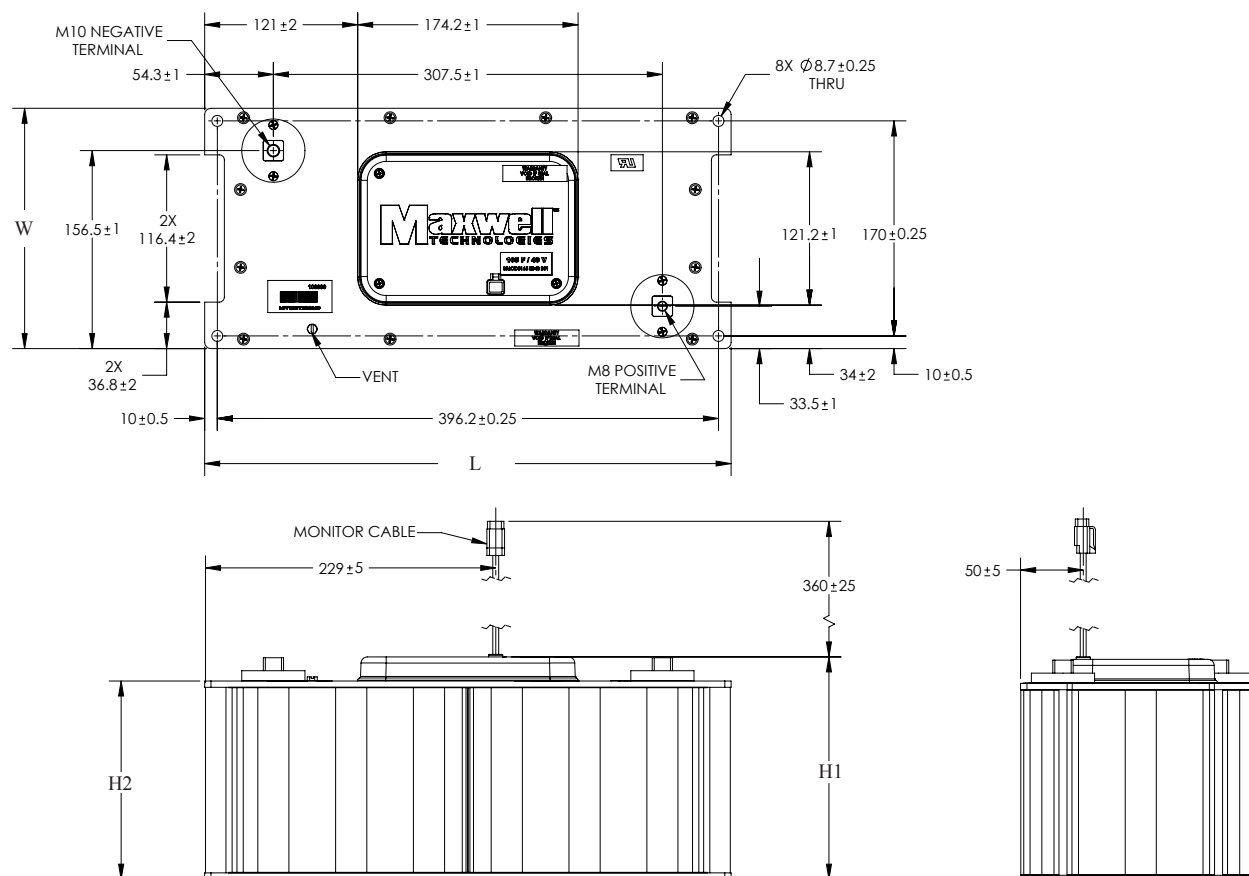
BMOD0083 P048 B01



Part Description	Dimensions (mm)				Package Quantity
	L (max)	W (max)	H1 (max)	H2 (max)	
BMOD0083 P048 B01	418	191	126	106	1

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BMOD0165 P048 B01



Part Description	Dimensions (mm)				Package Quantity
	L (max)	W (max)	H1 (max)	H2 (max)	
BMOD0165 P048 B01	418	194	179	157	1

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FEATURES AND BENEFITS

- Ultra-low internal resistance
- Highest performance available
- Temperature monitoring
- Over 1,000,000 duty cycles

TYPICAL APPLICATIONS

- Grid/Power quality
- UPS/Backup for heavy machinery
- Wind turbine pitch systems



PRODUCT SPECIFICATIONS

ELECTRICAL

BMOD0094 P075 B02

Rated Capacitance ¹	94 F
Minimum Capacitance, initial ¹	94 F
Maximum ESR _{DC} , initial ¹	13 mΩ
Rated Voltage	75 V
Absolute Maximum Voltage ¹⁴	91 V
Maximum Continuous Current ($\Delta T = 15^{\circ}\text{C}$) ²	48 A _{RMS}
Maximum Continuous Current ($\Delta T = 40^{\circ}\text{C}$) ²	78 A _{RMS}
Maximum Peak Current, 1 second (non repetitive) ³	1,600 A
Leakage Current, maximum (B02 Suffix - Passive Balancing) ⁴	50 mA
Maximum Series Voltage	750 V

TEMPERATURE

Operating Temperature (Ambient temperature)	
Minimum	-40°C
Maximum	65°C
Storage Temperature (Stored uncharged)	
Minimum	-40°C
Maximum	70°C

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL

BMOD0094 P075 B02

Mass, typical	25 kg
Power Terminals	M8/M10
Recommended Torque - Terminal	20/30 Nm
Vibration Specification	SAE J2380
Shock Specification	-
Environmental Protection	IP54
Cooling	Natural Convection

MONITORING / CELL VOLTAGE MANAGEMENT

Internal Temperature Sensor	RTD
Temperature Interface	Analog
Cell Voltage Monitoring	N/A
Connector	Harting
Cell Voltage Management	Passive

POWER & ENERGY

Usable Specific Power, P_d^5	2,100 W/kg
Impedance Match Specific Power, P_{max}^6	4,300 W/kg
Specific Energy, E_{max}^7	2.9 Wh/kg
Stored Energy ⁸	73.4 Wh

LIFE

High Temperature¹ (at Rated Voltage & Maximum Operating Temperature)	1,500 hours
Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%
Room Temperature¹ (at Rated Voltage & 25°C)	15 years
Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%

PRODUCT SPECIFICATIONS (Cont'd)

BMOD0094 P075 B02

Cycle Life ^{1,9}	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 ^{1,10} (Stored uncharged up to a maximum storage temperature)	2 years

SAFETY

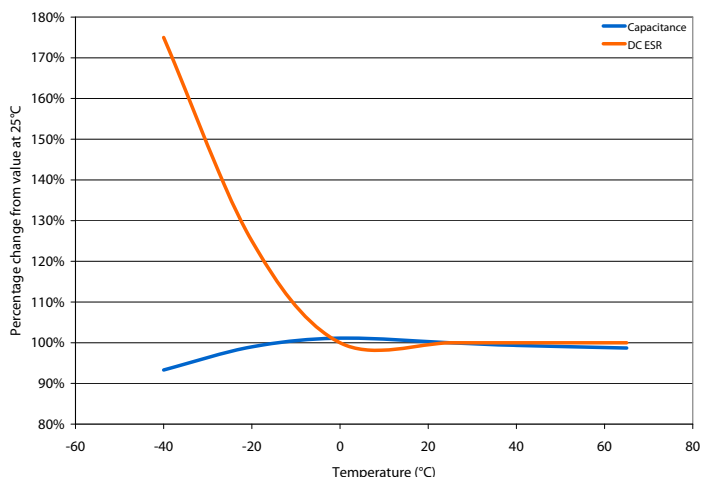
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	5,800 A
Factory High-Pot Test ¹³	2,500 V DC
Certifications	RoHS

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS

Thermal Resistance (R_{ma} , Module Case to Ambient), typical	N/A
Thermal Resistance (R_{ca} , All Cell Cases to Ambient), typical	0.50°C/W
Thermal Capacitance (C_{th}), typical ²	19,200 J/°C

ESR AND CAPACITANCE VS TEMPERATURE



NOTES

1. Capacitance and ESR_{DC} measured at 25°C per Document Number 1007239 available at www.maxwell.com.
2. Per Maxwell Document 1007239 available at www.maxwell.com.
3. Maximum Peak current (1 sec) = $\frac{\frac{1}{2} CV}{C \times ESR_{DC} + 1}$
4. After 72 hours at 25°C and rated voltage. Initial leakage current can be higher.
5. Per IEC 62391-2, $P_d = \frac{0.12V^2}{ESR_{DC} \times \text{mass}}$
6. $P_{\text{max}} = \frac{V^2}{4 \times ESR_{DC} \times \text{mass}}$
7. $E_{\text{max}} = \frac{\frac{1}{2} CV^2}{3,600 \times \text{mass}}$
8. $E_{\text{stored}} = \frac{\frac{1}{2} CV^2}{3,600}$
9. Cycle per Document Number 1007239 available at www.maxwell.com.
10. No more than 10% decrease in capacitance from minimum initial capacitance or 50% increase in ESR from maximum initial ESR.
11. Tested at 1 kV DC.
12. For a given application, sufficient cooling must be provided to keep cell case temperatures below 65°. See R_{th} .
13. Duration = 60 seconds. Not intended as an operating parameter.
14. Absolute maximum voltage non repeated, not to exceed 1 second.

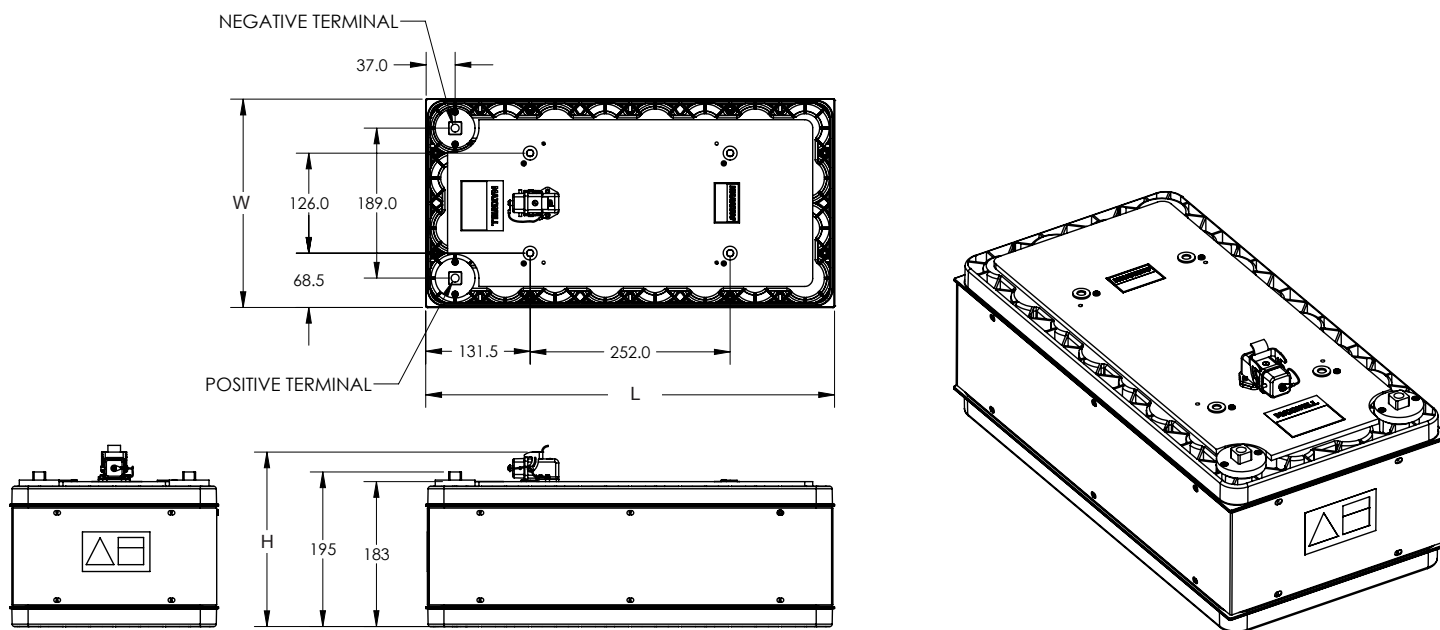
MOUNTING RECOMMENDATIONS

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.

BMOD0094 P075



Part Description	Dimensions (mm)			Package Quantity
	L ($\pm 0.3\text{mm}$)	W ($\pm 0.2\text{mm}$)	H ($\pm 0.7\text{mm}$)	
BMOD0094 P075 B02	515	263	220	1

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: 7307830, 7203056, 7027290, 7.352.558, 7.295.423, 7.090.946, 7.508.651, 7.492.571, 7.342.770, 6.643.119, 7.384.433, 7.147.674, 7.317.609, 7.495.349, 7.102.877.



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