

## 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	BMOD0110	BMOD0165
Rated Capacitance <sup>1</sup>	83 F	110 F	165 F
Minimum Capacitance, initial <sup>1</sup>	83 F	110 F	165 F
Maximum ESR <sub>DC</sub> , initial <sup>1</sup>	10 mΩ	8.1 mΩ	6.3 mΩ
Rated Voltage	48 V	48 V	48 V
Absolute Maximum Voltage <sup>15</sup>	51 V	51 V	51 V
Maximum Continuous Current ( $\Delta T = 15^{\circ}\text{C}$ ) <sup>2</sup>	61 A <sub>RMS</sub>	68 A <sub>RMS</sub>	77 A <sub>RMS</sub>
Maximum Continuous Current ( $\Delta T = 40^{\circ}\text{C}$ ) <sup>2</sup>	100 A <sub>RMS</sub>	110 A <sub>RMS</sub>	130 A <sub>RMS</sub>
Maximum Peak Current, 1 second <sup>3</sup>	1,100 A	1,400 A	1,900 A
Leakage Current, maximum (B01 Suffix - VMS 2.0) <sup>4</sup>	3.0 mA	4.2 mA	5.2 mA
Leakage Current, maximum (B02 Suffix - Passive Balancing) <sup>4</sup>	N/A	N/A	N/A
Maximum Series Voltage	750 V	750 V	750 V

## TEMPERATURE

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

## PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL	BMOD0083	BMOD0110	BMOD0165
Mass, typical	10.3 kg	11.3 kg	13.5 kg
Power Terminals	M8/M10	M8/M10	M8/M10
Recommended Torque - Terminal	20/30 Nm	20/30 Nm	20/30 Nm
Vibration Specification	SAE J2380 ISO16750-2, T14	SAE J2380 ISO16750-2, T14	SAE J2380 ISO16750-2, T14
Shock Specification	SAE J2464	SAE J2464	SAE J2464
Environmental Protection	IP65	IP65	IP65
Cooling	Natural Convection	Natural Convection	Natural Convection

## MONITORING / CELL VOLTAGE MANAGEMENT

Internal Temperature Sensor	NTC Thermistor	NTC Thermistor	NTC Thermistor
Temperature Interface	Analog	Analog	Analog
Cell Voltage Monitoring	Overvoltage Alarm	Overvoltage Alarm	Overvoltage Alarm
Connector	Deutsch DTM	Deutsch DTM	Deutsch DTM
Cell Voltage Management	VMS 2.0	VMS 2.0	VMS 2.0

## POWER &amp; ENERGY

Usable Specific Power, $P_d^5$	2,700 W/kg	3,000 W/kg	3,300 W/kg
Impedance Match Specific Power, $P_{max}^6$	5,600 W/kg	6,300 W/kg	6,800 W/kg
Specific Energy, $E_{max}^7$	2.6 Wh/kg	3.1 Wh/kg	3.9 Wh/kg
Stored Energy <sup>8</sup>	26.6 Wh	35.2 Wh	52.8 Wh

## LIFE

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

PRODUCT SPECIFICATIONS (Cont'd)

	BMOD0083	BMOD0110	BMOD0165
Cycle Life <sup>1,9</sup>	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Capacitance Change (% decrease from minimum initial value)	20%	20%	20%
ESR Change (% increase from maximum initial value)	100%	100%	100%
Test Current	100 A	100 A	100 A
Shelf Life <sup>1,10</sup> (Stored uncharged up to a maximum storage temperature)	2 years	2 years	2 years

SAFETY

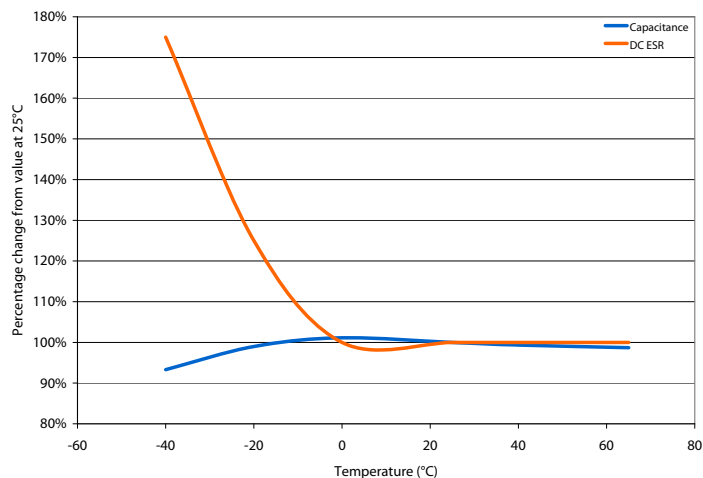
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	4,800 A	5,900 A	7,600 A
Factory High-Pot Test <sup>14</sup>	2,500 V DC	2,500 V DC	2,500 V DC
Certifications	RoHS	RoHS	RoHS UL810a (150 Volts)

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS

Thermal Resistance ( $R_{cm}$ , One Cell Case to Module Case), typical <sup>2</sup>	1°C/W	1°C/W	1°C/W
Thermal Resistance ( $R_{ma}$ , Module Case to Ambient), typical	0.30°C/W	0.25°C/W	0.25°C/W
Thermal Resistance ( $R_{ca}$ , All Cell Cases to Ambient), typical	0.40°C/W	0.40°C/W	0.40°C/W
Thermal Capacitance ( $C_{th}$ ), typical <sup>2</sup>	7,675 J/°C	9,295 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](http://www.maxwell.com).
2. Per Maxwell Document 1007239 available at [www.maxwell.com](http://www.maxwell.com).
3. Maximum Peak current (1 sec) =  $\frac{1/2 CV}{C \times ESR_{DC} + 1}$
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.  $E_{max} = \frac{1/2 CV^2}{3,600 \times \text{mass}}$
8.  $E_{stored} = 1/2 CV^2$
9. Cycle per Document Number 1007239 available at [www.maxwell.com](http://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. Without fan. With fan, mass is 63.4 kg.
14. Duration = 60 seconds. Not intended as an operating parameter.
15. Absolute maximum voltage non repeated, not to exceed 1 second.

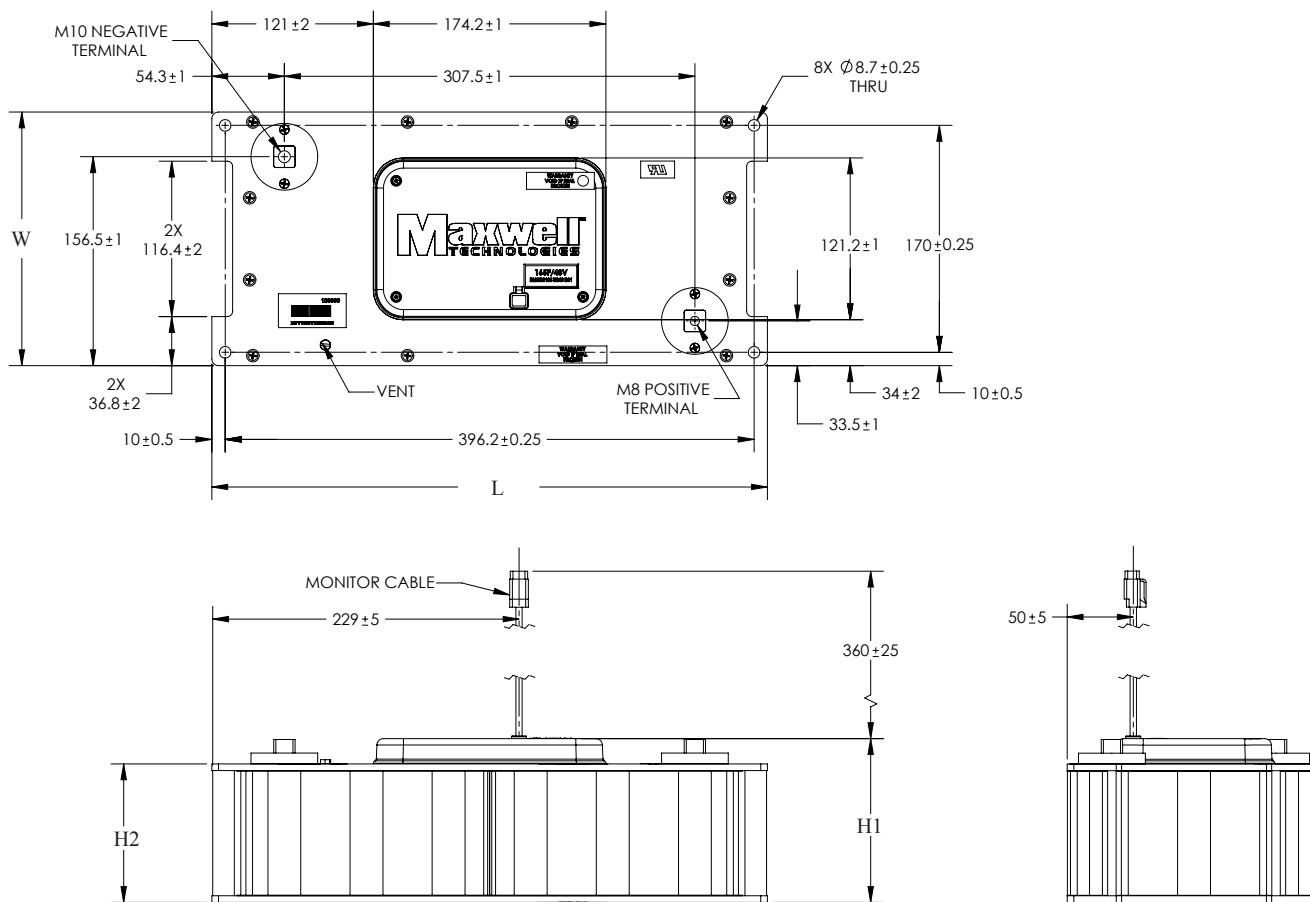
## MOUNTING RECOMMENDATIONS

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.

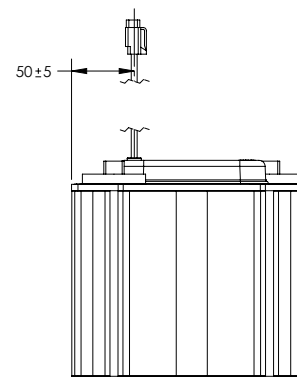
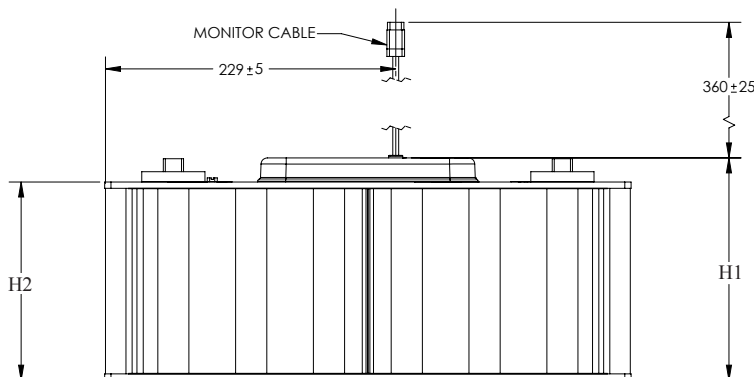
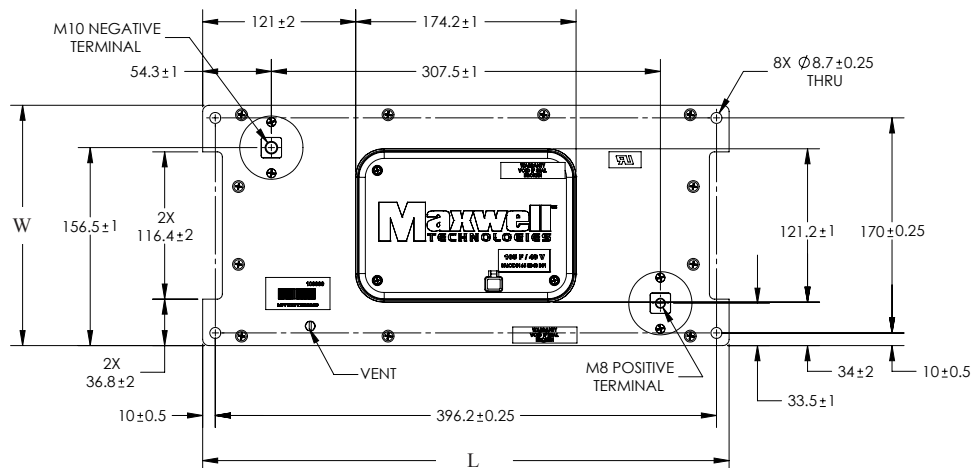
BMOD0083/110 P048



Part Description	Dimensions (mm)				Package Quantity
	L (max)	W (max)	H1 (max)	H2 (max)	
BMOD0083 P048 B01	418	191	179	104	1
BMOD0110 P048 B01	418	191	143	121	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.

BMOD0165 P048



Part Description	Dimensions (mm)			H2 (max)	Package Quantity
	L (max)	W (max)	H1 (max)		
BMOD0165 P048 B01	418	194	179	157	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: 7511942, 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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