DATASHEET NEW 48V MODULE

DuraBlue™
Advanced Shock & Vibration Technology

FEATURES AND BENEFITS*

- Up to 1,000,000 duty cycles or 10 year DC life
- 48V DC working voltage
- Active cell balancing
- Temperature output
- Overvoltage outputs available
- High power density
- Extreme Vibration Environment Compatible

TYPICAL APPLICATIONS

- Hybrid vehicles
- Rail
- Heavy industrial equipment
- UPS systems

PRODUCT SPECIFICATIONS

ELECTRICAL	BMOD0165 P048 C01
Rated Capacitance[1]	165 F
Minimum Capacitance, initial[1]	165 F
Maximum Capacitance, initial[1]	200 F
Maximum ESR $_{DC,}$ initial[1]	6.0 mΩ
Test Current for Capacitance and ESR $_{DC}$[1]	100 A
Rated Voltage	48 V
Stored Energy[4]	53 Wh
Absolute Maximum Voltage[2]	51 V
Absolute Maximum Current	1,900 A
Maximum Series Voltage	750 V
Capacitance of Individual Cells[8]	3,000 F
Stored Energy, Individual Cell[8]	3.0 Wh
Number of Cells	18
TEMPERATURE	
Operating Temperature (Cell Case Temperature)	
Minimum	-40˚C
Maximum	65˚C
Storage Temperature (Stored Uncharged)	
Minimum	-40˚C
Maximum	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.

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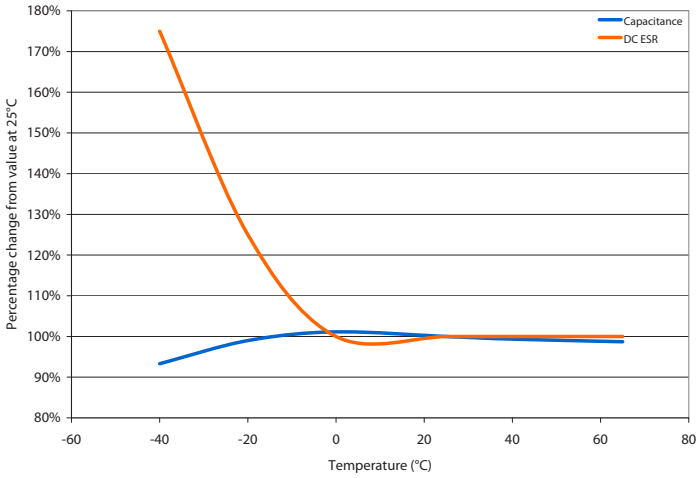
PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL	BMOD0165 P048 C01
Mass, typical	13.7 kg
Power Terminals	M8/M10
Recommended Torque - Terminal	20 Nm (M8)/30 Nm (M10)
Vibration Specification	ISO 16750-3, Table 12
Shock Specification	IEC 60068-2-27, -29
Environmental Protection	IP65
Cooling	Natural Convection
MONITORING / CELL VOLTAGE MANAGEMENT	
Internal Temperature Sensor[3]	NTC Thermistor (10 kΩ)
Temperature Interface	Analog
Cell Voltage Monitoring[3]	Overvoltage Alarm (open collector)
Connector (Mating)	Deutsch DTM04-4P, Amphenol ATM04-4P
Cell Management System	CMS 2.0
SAFETY	
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	8,100 A
Certifications	RoHS, UL810a (50 volts)
High-Pot Test[9]	2,500 VDC

TYPICAL CHARACTERISTICS

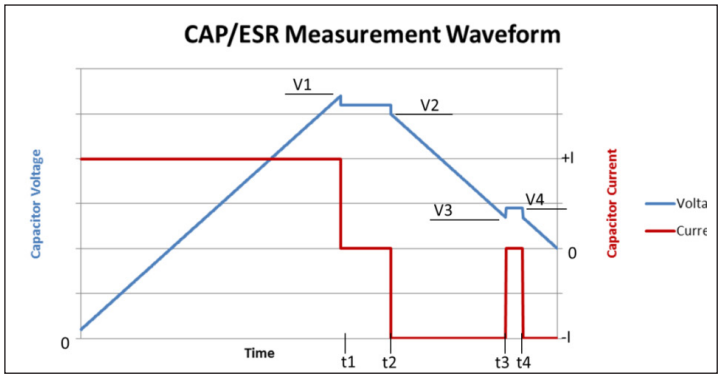
THERMAL CHARACTERISTICS	BMOD0165 P048 C01
Thermal Resistance ($R_{ca,}$ All Cell Cases to Ambient), typical[5]	0.40°C/W
Thermal Capacitance (C_{th}), typical	13,000 J/°C
Maximum Continuous Current (ΔT = 15 °C)[5] (BOL, Beginning of Life)	79 A, RMS
Maximum Continuous Current (ΔT = 40 °C)[5] (BOL, Beginning of Life)	130 A, RMS
LIFE	
DC Life at High Temperature[1] (held continuously at Rated Voltage and Maximum Operating Temperature)	1,500 hours
Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%
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[1,6,7]	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

ESR AND CAPACITANCE VS TEMPERATURE

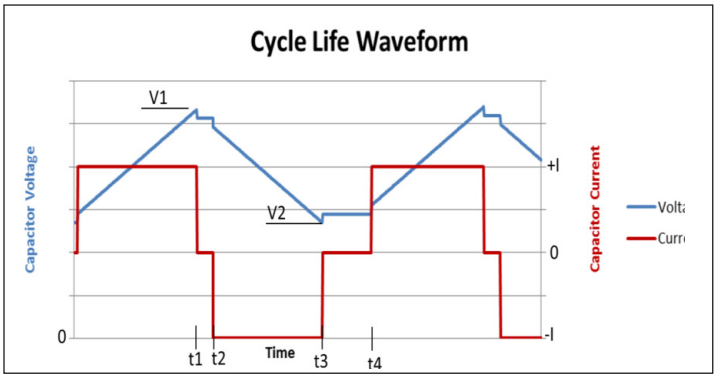


NOTES

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. Please refer to module user manual for additional technical details.
4. $E_{stored} = \frac{½\ CV^2}{3,600}$
5. $\Delta T = I_{RMS}^2 \times ESR \times R_{ca}$
6. Cycle using specified test current per waveform below.
7. Cycle life varies depending upon application-specific characteristics. Actual results will vary.
8. 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.
9. Duration = 60 seconds. Not intended as an operating parameter.

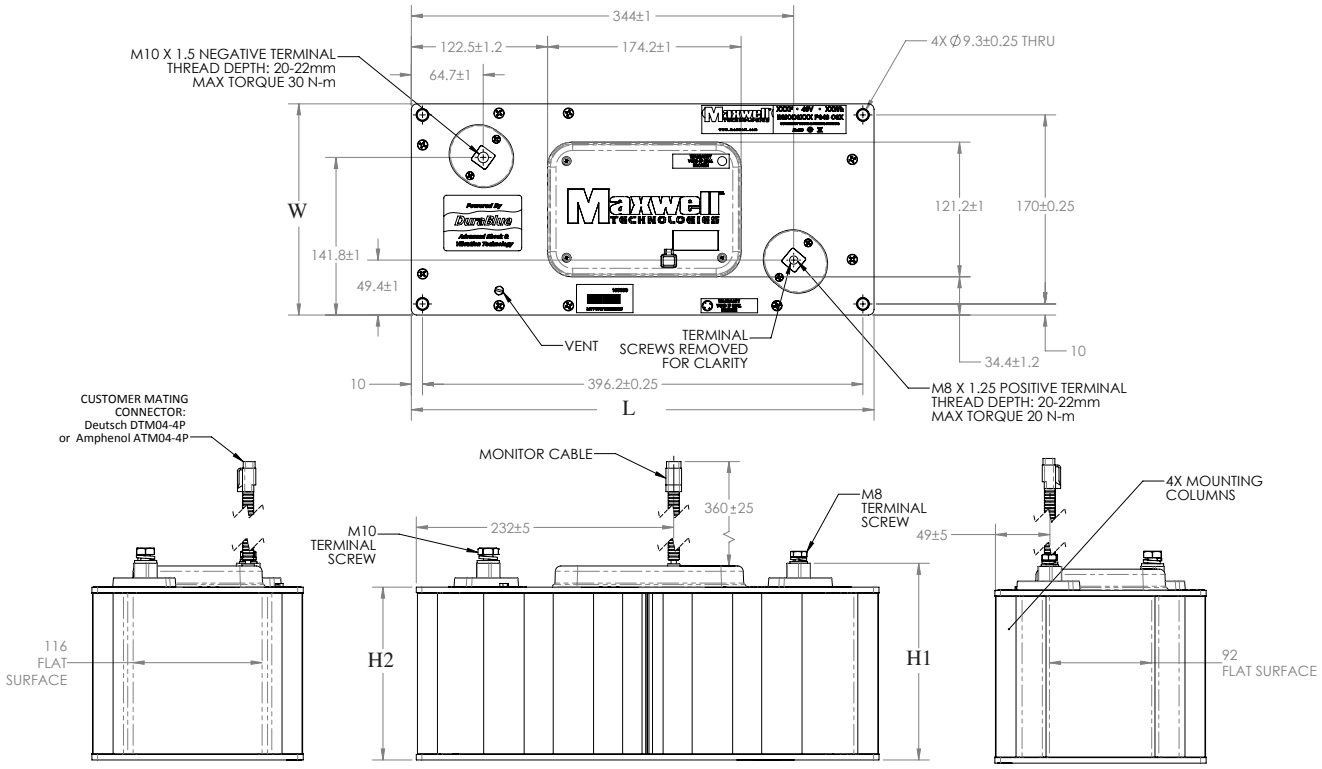


$V1 = V_{rated}$ t2 - t1 = 15 seconds Capacitance = I x (t3-t2)/(V2-V3)
$V3 = 0.5 \times V_{rated}$ t4 - t3 = 5 seconds ESR = (V4 - V3)/I



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

BMOD0165 P048 C01



Part Description	Dimensions (mm) L (max)	W (max)	H1 (max)	H2 (max)	Package Quantity
BMOD0165 P048 C01	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: 6643119, 7180726, 7295423, 7342770, 7352558, 7384433, 7440258, 7492571, 7508651, 7580243, 7791860, 7816891, 7859826, 7883553, 7935155, 8072734, 8098481, 8279580, and patents pending.

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