Maxwell TECHNOLOGIES
Enabling Energy's Future™

DATASHEET
CONFIDENTIAL

GRID CELL PACK

The Grid Cell Pack from Maxwell Technologies is a stackable module with advanced diagnostics and communications enabling reliable and safe performance in high power, fast response applications scalable from kW to MW.

Features and Benefits:

- High power density for voltage and frequency stabilization, peak power applications, battery support
- Up to 1,000,000 duty cycles. Typical lifetimes of 15+ years in grid applications*
- Advanced CAN bus digital monitoring and communications
- Standard rack mount
- Wide operating temperature window
- Active cell balancing
- Temperature and voltage monitoring

Typical Applications:

- Grid and microgrid energy storage
- Voltage sag mitigation
- Frequency response
- UPS
- Stationary high power density deployments
- Wayside rail

Example configuration

- Stackable and scalable, the Grid Cell Pack is designed for integration into grid and microgrid systems
- Open configuration simplifies cooling, reduces cost and complexity
- Utilizes Maxwell's industry-proven ultracapacitor cell technology
- Advanced Cell Management System (CMS) continuously monitors module conditions and performs cell balancing
- Enables communication to higher-level system controls via CAN bus

*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

ELECTRICAL	BMOD0141 P064 B04
Rated Capacitance[1]	141 F
Minimum Capacitance, initial[1]	141 F
Maximum Capacitance, initial[1]	170 F
Maximum $ESR_{DC,}$ initial[1]	7.5 mΩ
Test Current for Capacitance and ESR_{DC}[1]	100 A
Rated Voltage	64.0 V
Stored Energy[3]	80 Wh
Absolute Maximum Voltage[2]	68.4 V
Absolute Maximum Current	1,900 A
Maximum Series Voltage	1,500 V
Capacitance of Individual Cells[7]	3,400 F
Stored Energy, Individual Cell[7]	3.3 Wh
Number of Cells	24
TEMPERATURE	
Operating Temperature (Cell Case Temperature)	
Minimum	-40°C
Maximum	65°C

PRODUCT SPECIFICATIONS (Cont'd)

PHYSICAL	BMOD0141 P064 B04
Mass, typical	14.5 kg
Power Terminals	M8-1.25 x 25mm Stud
Recommended Max Torque - Terminal	15 Nm
Environmental Protection	IP00
Cooling	N/A
MONITORING / CELL VOLTAGE MANAGEMENT	
Internal Temperature Sensor	NTC Thermistor x2
Temperature Interface	CAN
Cell Voltage Monitoring	Smart
Connector (Mating)	RJ45
Cell Management System	CMS 3.1L, CAN
SAFETY	
Short Circuit Current, typical (Current possible with short circuit from rated voltage. Do not use as an operating current.)	9,000 A
Certifications	RoHS, REACH
High-Pot Test[8]	5,600 VDC

TYPICAL CHARACTERISTICS

THERMAL CHARACTERISTICS	BMOD0141 P064 B04
Thermal Resistance ($R_{ca,}$ All Cell Cases to Ambient), typical[4]	0.60°C/W (Free Convection)
Thermal Capacitance (C_{th}), typical	16,000 J/°C
Maximum Continuous Current (ΔT = 15 °C)[4] (BOL, Beginning of Life)	58 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[1,5,6]	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

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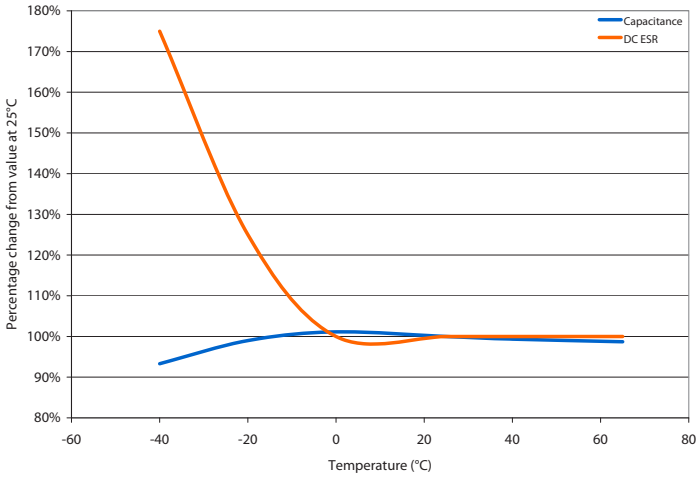
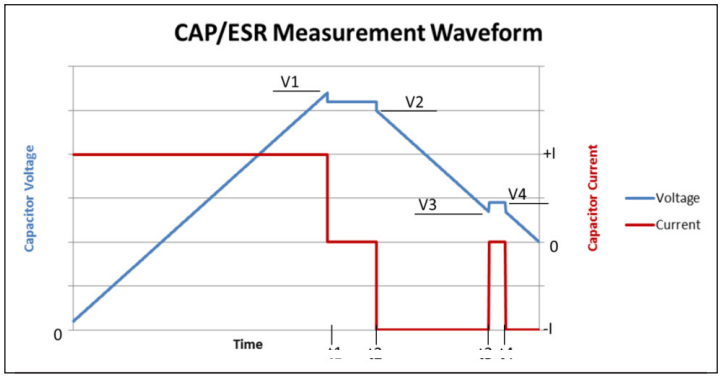
ESR AND CAPACITANCE VS TEMPERATURE

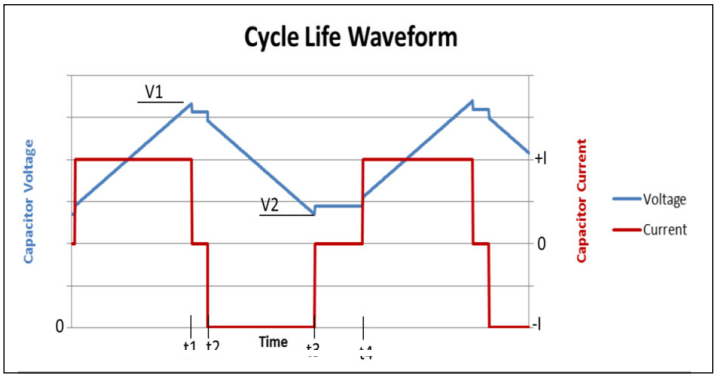


NOTES

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

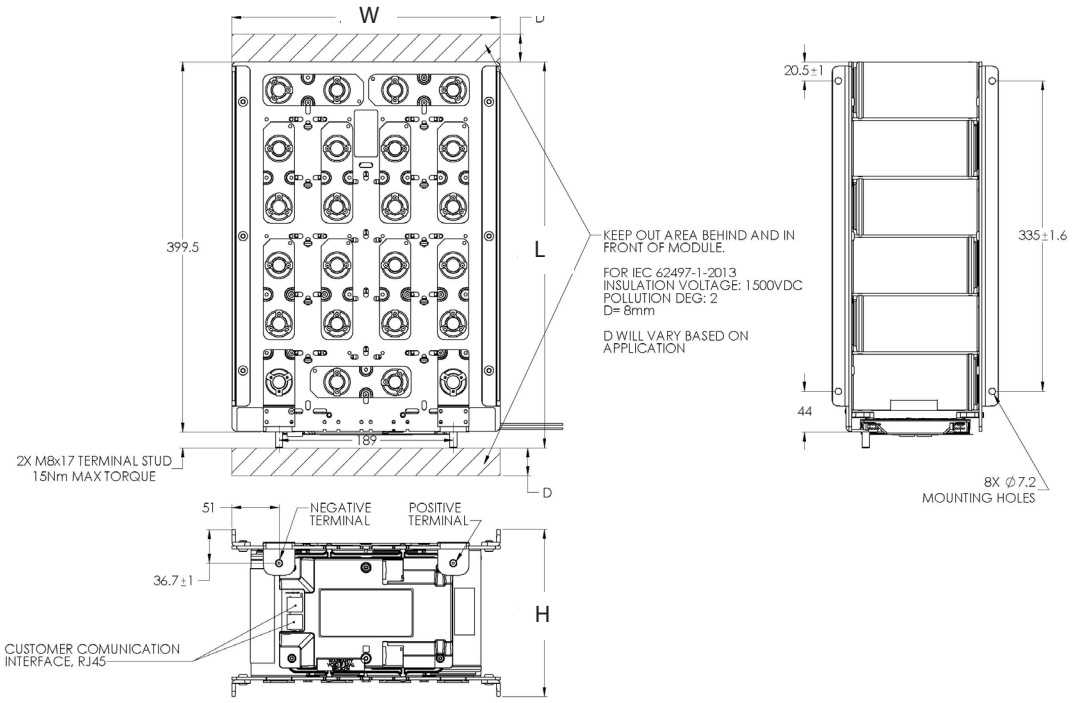


$V1 = V_{rated}$ t2 - t1 = 15 seconds Capacitance = I x (t3-t2)/(V2-V3)
$V3 = 0.5 \times V_{rated}$ t4 - t3 = 5 seconds ESR = (V4 - V3)/I



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

BMOD0141P064 B04



Part Description	Dimensions (mm) L (max)	W (max)	H (max)	Package Quantity
BMOD0141 P064 B04	421	293	182	1

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