

Product Datasheet

54V Large cell module

- Rated voltage 54VDC 166F capacitance
- High cycle life of 1 million cycles
- Excellent energy and power density
- Laser welded internal connections
- Robust and vibration proof design
- Active cell balancing
- Voltage and temperature monitoring



ELECTRICAL SPECIFICATIONS

Type	M23W-054-0166
Rated Voltage V_R	54.00 V
Surge Voltage V_S^1	55.00 V
Rated Capacitance C^2	166 F
Capacitance Tolerance ³	0% / +20%
DC ESR ²	<6 mΩ
Leakage Current I_L^4	<12 mA
Constant Current ($\Delta T = 15^\circ C$) ⁵	79 A
Max Current I_{Max}^6	2.2 kA
Short Current I_S^7	9 kA
Stored Energy E^8	67.5 Wh
Energy Density E_d^9	4.4 Wh/kg
Usable Power Density P_d^{10}	4.1 kW/kg
Matched Impedance Power	
Density P_{dMax}^{11}	8.4 kW/kg

THERMAL CHARACTERISTICS

Type	M23W-054-0166
Working Temperature	-40 ~ 65 °C
Storage Temperature ¹²	-40 ~ 70 °C
Thermal Resistance R_{Th}^{13}	0.4 °C/W
Thermal Capacitance C_{Th}^{14}	13'000 J/°C

LIFETIME CHARACTERISTICS

Type	M23W-054-0166
DC Life at High Temperature ¹⁵	1500 hours
DC Life at RT ¹⁶	10 years
Cycle Life ¹⁷	1'000'000 cycles
Shelf Life ¹⁸	4 years

SAFETY & ENVIRONMENTAL SPECIFICATIONS

Type	M23W-054-0166
Safety	RoHS, REACH
Vibration	IEC60068-2-6
Shock	IEC60068-2-28, 29

MONITORING AND CELL VOLTAGE MANAGEMENT

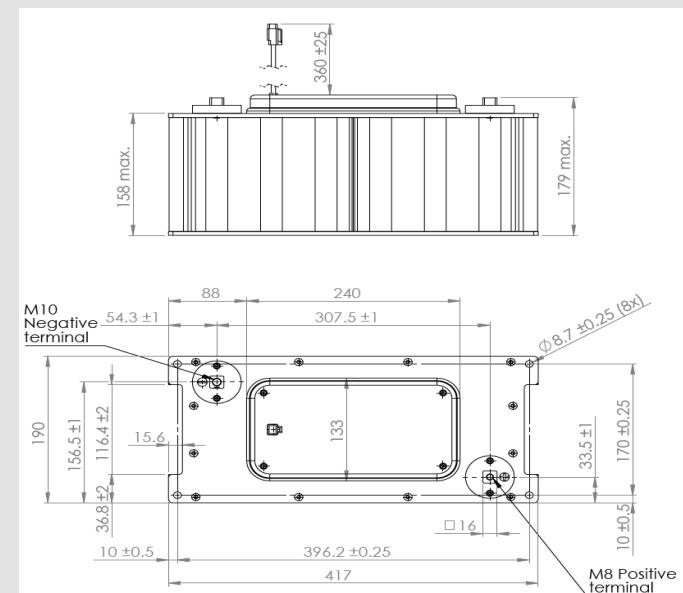
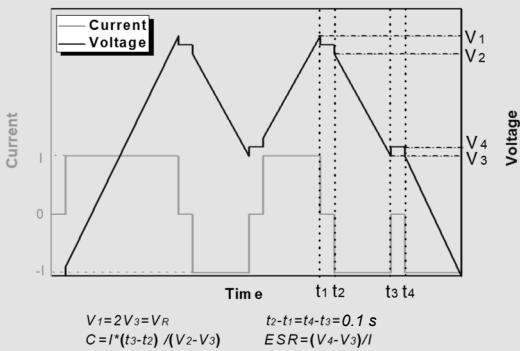
Type	M23W-054-0166
Internal Temperature Sensor	NTC 3950 10kΩ
Temperature Interface	Analog
Connector	Deutsch DTM04-4P
Cell Voltage Monitoring and Management	Active CMS

PHYSICAL PARAMETERS

Type	M23W-054-0166
Mass M	14.5 kg
Terminals	M10 ¹⁹
Dimensions ²⁰	
Length	418 mm
Width	194 mm
Height	179 mm

NOTES:

- Surge voltage V_S : Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.
- Capacitance C: The test current is 0.075 A/F, if the calculated current is >100A, then apply 100A.
- Capacitance tolerance: Typical tolerance is +5%~+10%.
- Leakage current measurement procedure: 1) Charge the capacitor to the V_R with a constant current (0.075 A/F, if the calculated current is >100A, then apply 100A). 2) Hold the voltage at V_R for 72h. 3) The current to maintain V_R after 72 h is the leakage current.
- Max constant working current: $I_{MCC} = \sqrt{\Delta T / (ESR * R_{Th})}$
- Max current: $I_{Max} = 0.5C * V_R / (\Delta t + ESR * C)$, discharge from V_R to $V_R/2$ in 1 second.
- Short circuit current: $I_S = V_R / ESR$
- Stored energy: $E = 0.5C * V^2 / 3600$
- Energy density: $E_d = E / M$
- Usable power density: $P_d = (0.12V_R^2 / ESR) / M$
- Matched impedance power density: $P_{dMax} = (0.25V_R^2 / ESR) / M$
- Storage in discharge state.
- Thermal resistance: $R_{Th} = \Delta T / P$, where $P = ESR * I^2$
- Thermal capacitance is indicated for the whole module.
- DC life at high temperature: Hold the capacitor charged at rated voltage at 65°C for 1500h. The capacitance shall be >80% of the rated value, the ESR shall be <200% of the rated value. DC life at RT: Hold the capacitor charged at rated voltage at room temperature RT, the capacitance shall be >80% of the rated value, the ESR shall be <200% of the rated value.
- Cycle life: Charge and discharged the capacitor in the range between V_R and $V_R/2$. 5 seconds waiting period between charge and discharge. The constant test current is 0.075 A/F (if the calculated current >100A, then apply 100A).
- Shelf life: Discharged and no load applied at RT.
- The maximum torque is 25Nm for M10, 14-18Nm for M8
- Dimensions:



Notes:

Standard markings:

- Name of manufacturer, part number, serial number
- Rated voltage and capacitance, negative and positive terminals, warning marking
- Stored energy in watt-hours

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