Product Datasheet

18V Large cell module

- Rated voltage 18VDC 500F capacitance
- High cycle life of 1 million cycles
- Excellent energy and power density
- Laser welded internal connections
- Robust and vibration proof design
- Active or passive cell balancing
- Voltage and temperature monitoring

ELECTRICAL SPECIFICATIONS		
Type	**M23W-018-0500**	**M13W-018-0500**
Rated Voltage V_R	18.00 V	18.00 V
Surge Voltage V_S[1]	18.60 V	18.60 V
Rated Capacitance C[2]	500 F	500 F
Capacitance Tolerance[3]	0% / +20%	0% / +20%
DC ESR[2]	<2.1 mΩ	<2.1 mΩ
Leakage Current I_L[4]	<12 mA	<170mA
Constant Current (ΔT = 15°C)[5]	104 A	104 A
Max Current I_{Max}[6]	2.2 kA	2.2 kA
Short Current I_S[7]	9 kA	9 kA
Stored Energy E[8]	22.5 Wh	22.5 Wh
Energy Density E_d[9]	3.9 Wh/kg	3.9 Wh/kg
Usable Power Density P_d[10]	3.5 kW/kg	3.5 kW/kg
Matched Impedance Power Density P_{dMax}[11]	7 kW/kg	7 kW/kg

THERMAL CHARACTERISTICS		
Type	**M23W-018-0500**	**M13W-018-0500**
Working Temperature	-40 ~ 65 °C	-40 ~ 65 °C
Storage Temperature[12]	-40 ~ 70 °C	-40 ~ 70 °C
Thermal Resistance R_{Th}[13]	0.7 °C/W	0.7 °C/W
Thermal Capacitance C_{Th}[14]	4'300 J/°C	4'300 J/°C

LIFETIME CHARACTERISTICS		
Type	**M23W-018-0500**	**M13W-018-0500**
DC Life at High Temperature[15]	1500 hours	1500 hours
DC Life at RT[16]	10 years	10 years
Cycle Life[17]	1'000'000 cycles	1'000'000 cycles
Shelf Life[18]	4 years	4 years

SAFETY & ENVIRONMENTAL SPECIFICATIONS		
Type	**M23W-018-0500**	**M13W-018-0500**
Safety	RoHS, REACH	RoHS, REACH
Vibration	IEC60068-2-6	IEC60068-2-6
Shock	IEC60068-2-28, 29	IEC60068-2-28, 29

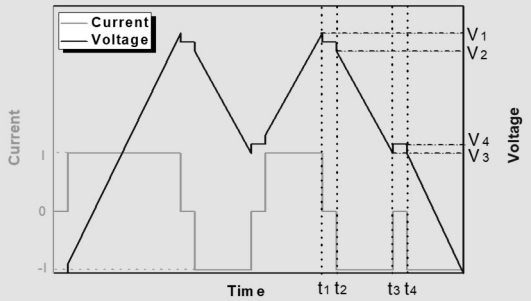
MONITORING AND CELL VOLTAGE MANAGEMENT		
Type	**M23W-018-0500**	**M13W-018-0500**
Internal Temperature Sensor	NTC 3950 10kΩ	NTC 3950 10kΩ

Temperature Interface	Analog	Analog
Connector	Deutsch DTM04-4P	Deutsch DTM04-4P
Cell Voltage Monitoring and Management	Active CMS	Passive

PHYSICAL PARAMETERS			
Type		**M23W-018-0500**	**M13W-018-0500**
Mass M		5.8 kg	5.8 kg
Terminals		M8/M10[19]	M8/M10[19]
Dimensions[20]	Length	418 mm	418 mm
	Width	68 mm	68 mm
	Height	178 mm	178 mm

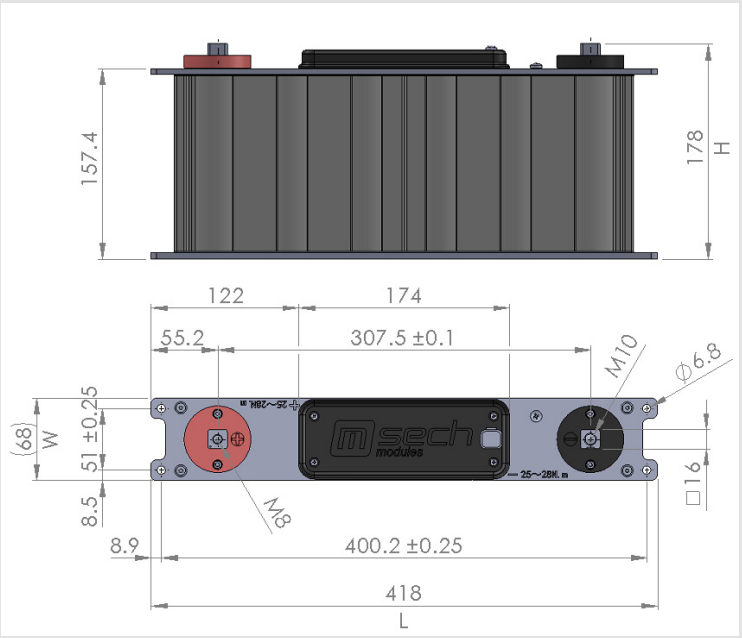
NOTES:

1. Surge voltage V_S: Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.
2. Capacitance C: The test current is 0.075 A/F, if the calculated current is >100A, then apply 100A.



$V_1=2V_3=V_R$ $t_2-t_1=t_4-t_3=0.1$ s
$C=I*(t_3-t_2)/(V_2-V_3)$ $ESR=(V_4-V_3)/I$

3. Capacitance tolerance: Typical tolerance is +5%~+10%.
4. 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.
5. Max constant working current: $I_{MCC} = \sqrt{\Delta T/(ESR * R_{Th})}$
6. Max current: $I_{Max} = 0.5C * V_R/(\Delta t + ESR * C)$, discharge from V_R to V_R /2 in 1 second.
7. Short circuit current: $I_S = V_R/ESR$
8. Stored energy: $E = 0.5C * V^2/3600$
9. Energy density: $E_d = E/M$
10. Usable power density: $P_d = (0.12V_R^2/ESR)/M$
11. Matched impedance power density: $P_{dMax} = (0.25V_R^2/ESR)/M$
12. Storage in discharge state.
13. Thermal resistance: $R_{Th} = \Delta T/P$, where P = ESR * I^2
14. Thermal capacitance is indicated for the whole module.
15. 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.
16. 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).
17. Shelf life: Discharged and no load applied at RT.
18. The maximum torque is 25Nm for M10, 14-18Nm for M8
19. 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