

Product Datasheet

ESS Module

- Optimized for grid and power supply integration
- Modular 19" rack-mountable design
- Precision laser-welded connections
- Built-in voltage and temperature monitoring
- CAN bus communication interface
- High dielectric strength for enhanced safety
- Advanced thermal management for optimal cooling



ELECTRICAL SPECIFICATIONS

Type	M35W-144-0063	M35W-144-P063	M35W-144-0071	M35W-130-0104
Rated Voltage V_R	144 V			130 V
Surge Voltage V_S^1	148.8 V			134.4 V
Rated Capacitance C^2	63 F		71 F	104 F
Capacitance Tolerance 3	0% / +20%			
ESR 2	12 mΩ	9.0 mΩ	12 mΩ	14 mΩ
Leakage Current I_L^4	<30 mA			
Constant Current ($\Delta T = 15^\circ\text{C}$) 5 passive cooling	79 A	91 A	79 A	72 A
Constant Current ($\Delta T = 15^\circ\text{C}$) 5 active cooling 60CFM	177 A	205 A	177 A	152 A
Max Current I_{Max}^6	2.7 kA	2.9 kA	2.7 kA	2.7 kA
Short Current I_S^7	12 kA	16 kA	12 kA	9.2 kA
Stored Energy E^8	181 Wh		205 Wh	243 Wh
Energy Density E_d^9	5.6 Wh/kg	5.6 Wh/kg	6.3 Wh/kg	7.3 Wh/kg
Usable Power Density P_d^{10}	6.8 kW/kg	8.8 kW/kg	6.7 kW/kg	4.5 kW/kg
Impedance Match Power Density P_{dMax}^{11}	13.5 kW/kg	17.8 kW/kg	13.5 kW/kg	9.0 kW/kg

THERMAL CHARACTERISTICS

Type	M35W-144-0063	M35W-144-P063	M35W-144-0071	M35W-130-0104
Working Temperature	-40 ~ 65°C			
Storage Temperature 12	-40 ~ 70°C			
Thermal Resistance R_{Th}^{13} passive cooling	0.2°C/W			
Thermal Resistance R_{Th}^{13} active cooling 60 CFM	0.04°C/W			
Thermal Capacitance C_{Th}^{14}	36 kJ/°C			

LIFETIME CHARACTERISTICS

Type	M35W-144-0063	M35W-144-P063	M35W-144-0071	M35W-130-0104
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	M35W-144-0063	M35W-144-P063	M35W-144-0071	M35W-130-0104
Safety	RoHS, REACH			
Vibration	Seismic Standard IEC 60068-3-3 Zone 3			
Rated insulation voltage (maximum series voltage)	1500 VDC			

MONITORING AND CELL VOLTAGE MANAGEMENT (CMS)

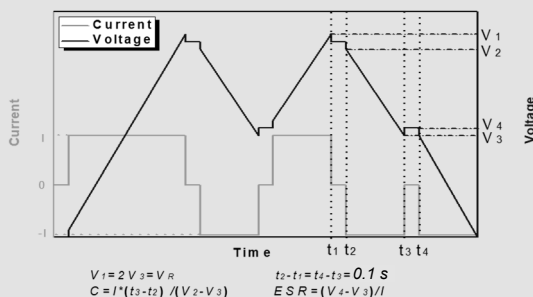
Type	M35W-144-0063	M35W-144-P063	M35W-144-0071	M35W-130-0104
Connector	Phoenix MCV1.5/8-GF-3.81			
Auxiliary power supply	24V ± 10% 5W			
Cell Voltage Monitoring and Management ¹⁹	Microprocessor based, individual cell balancing			
Temperature Sensor	4x NTC (10kOhm @25°C)			
Communication interface	CAN bus 2.0A			

PHYSICAL PARAMETERS

Type	M35W-144-0063	M35W-144-P063	M35W-144-0071	M35W-130-0104
Mass M, typical	32 kg			
Power Terminals ²⁰	M8			
Dimensions ²¹ L x W x H	555 x 483 x 150 mm (19" 4U)			

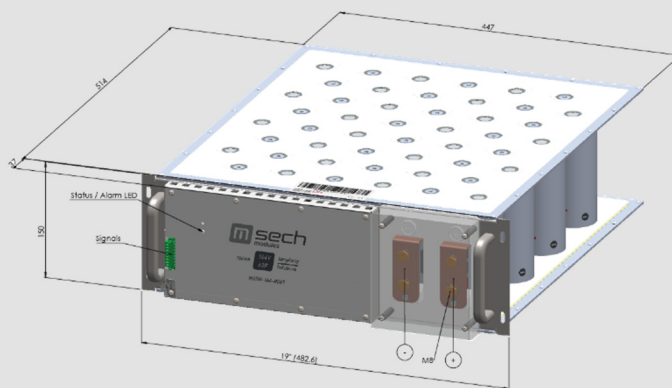
NOTES:

- 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:
 - Charge the module to V_R .
 - Hold the voltage at V_R for 72h.
 - The current to maintain V_R after 72 h is the leakage current. Leakage current may be greater if balancing is activated.
- Max constant working current: $I_{MCC} = \sqrt{\Delta T / (ESR \cdot R_{Th})}$
- Max current: $I_{Max} = 0.5C \cdot V_R / (\Delta t + ESR \cdot C)$, discharge from V_R to $V_R/2$ in 1 second.
- Short current: $I_S = V_R / ESR$
- Stored energy: $E = 0.5C \cdot V^2 / 3600$
- Energy density: $E_d = E / M$
- Usable power density: $P_d = 0.125V_R^2 / (ESR \cdot M)$
- Impedance match power density: $P_{dMax} = 0.25V_R^2 / (ESR \cdot m)$
- Storage temperature: Storage in discharge state.
- Thermal resistance: $R_{Th} = \Delta T / P$, where $P = ESR \cdot I^2$
- 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.
- Shelf life: Discharged and no load applied at RT.
- See detailed CMS datasheet and user manual.
- The maximum torque is 15Nm for M8.
- 19" rack module with a height of 4U



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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