

Product Datasheet

174V modules

- Rated voltage 174VDC
- Capacitance 6.2 F / 5.7 F / 5.3 F
- Resistive cell balancing
- Compact and light weight package
- Based on 3V hermetically sealed cells
- PCB push-in connections



ELECTRICAL SPECIFICATIONS

Part Number Type	19-00000723-M14S-174-0006	26-00001548-M14S-174-P006	26-00001550-M14S-174-0005
Rated Voltage V_R	174 V	174 V	174 V
Surge Voltage V_S^1	179.8 V	179.8 V	179.8 V
Rated Capacitance C^2	6.2 F	5.7 F	5.3 F
Capacitance Tolerance ³	0% / +20%	0% / +20%	0% / +20%
DC ESR ²	<105 mΩ	<70 mΩ	<112 mΩ
Leakage Current I_L^4	<20 mA	<20 mA	<20 mA
Cell specification	C35S-3R0-0360	C33S-3P0-0330-B20-0	C33S-3R0-0310-230
Module configuration	1p 58s	1p 58s	1p 58s
Constant Current ($\Delta T = 15^\circ C$) ⁵	13.1 A	15.6 A	12.3 A
Constant Current ($\Delta T = 40^\circ C$) ⁵	22.9 A	27.4 A	21.7 A
Max Current I_{Max}^6	300 A	400 A	300A
Short Current I_S^7	1.7 kA	2.5 kA	1.6 kA
Stored Energy E^8	26.1 Wh	23.8 Wh	22.6 Wh
Energy Density E_d^9	4.9 Wh/kg	4.5 Wh/kg	4.4 Wh/kg
Usable Power Density P_d^{10}	6.5 kW/kg	9.8 kW/kg	6.4 kW/kg
Impedance Match Power Density P_{dMax}^{11}	13.6 kW/kg	20.4 kW/kg	13.3 kW/kg

THERMAL CHARACTERISTICS

Working Temperature	-40 ~ 65°C
Storage Temperature ¹²	-40 ~ 70°C
Thermal Resistance R_{Th}^{13}	1.06 °C/W
Thermal Capacitance C_{Th}^{14}	5'692 J/°C

LIFETIME CHARACTERISTICS

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

Safety	RoHS, REACH
Vibration	IEC60068-2-6
Shock	IEC60068-2-27
Environmental Protection	IP44

MONITORING AND CELL VOLTAGE MANAGEMENT

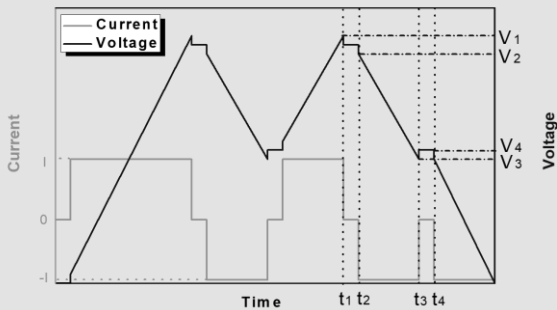
Cell Voltage Management	Passive balancing
Cell Voltage monitoring	NA
Internal temperature sensor	Optional

PHYSICAL PARAMETERS

Type	M14S-174-0006	M14S-174-P006	M14S-174-0005
Mass M	5.3 kg	5.3 kg	5.1 Kg
Terminals ¹⁹	Spring quick-connect terminals; PCB push-in connections, wire size AWG 5~6; max. 16mm ²		
Dimensions ²⁰ L x W x H	391 x 234 x 77 mm		
Module Fixation Holes ²⁰	12 x Ø6mm x 24mm (for screws M5 x 35~40) , tightening torque: 5~8 Nm		

NOTES:

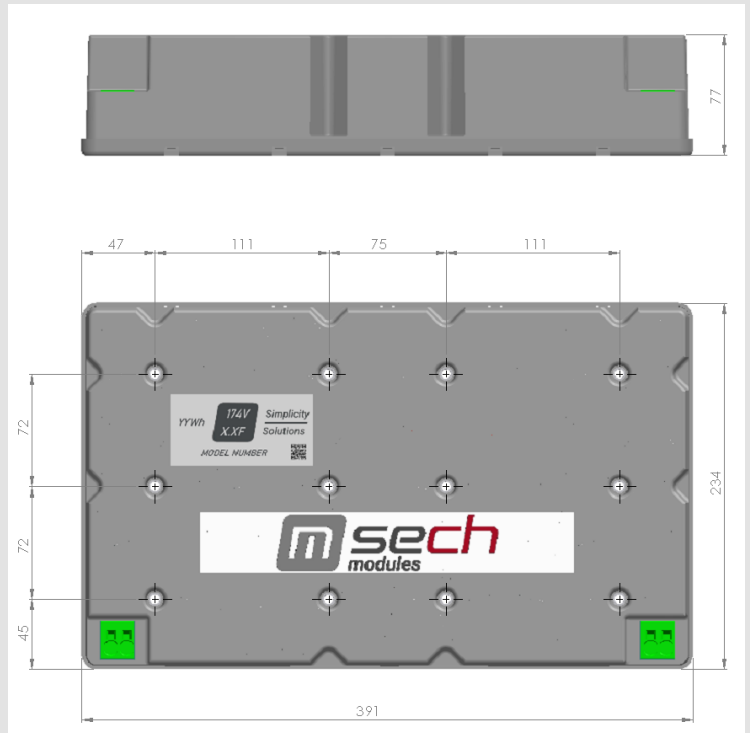
- Surge voltage V_S : Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.
- Capacitance C: The test current is 0.075 A/F, if the calculated current is $>100A$, then apply 100A.
- Capacitance tolerance: Typical tolerance is $+5\% \sim +10\%$.
- Leakage current measurement 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 current: $I_S = V_R / ESR$
- Stored energy: $E = 0.5C * V^2 / 3600$
- Energy density: $E_d = E / M$
- Usable power density: $P_d = 0.125V_R^2 / (ESR * M)$
- Impedance match power density: $P_{dMax} = 0.25V_R^2 / (ESR * m)$
- Storage temperature: 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 module charged at rated voltage at $65^\circ C$ 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 module 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 module 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.
- Phoenix Contact PCB terminal block – SPT 16/2-V-10.0-ZB - 1735875
- Dimensions and position of fixation holes: See below drawing



$$V_1 = 2V_3 = V_R \quad t_2 - t_1 = t_4 - t_3 = 0.1 \text{ s}$$

$$C = I * (t_3 - t_2) / (V_2 - V_3) \quad ESR = (V_4 - V_3) / I$$

- Capacitance tolerance: Typical tolerance is $+5\% \sim +10\%$.
- 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 current: $I_S = V_R / ESR$
- Stored energy: $E = 0.5C * V^2 / 3600$
- Energy density: $E_d = E / M$
- Usable power density: $P_d = 0.125V_R^2 / (ESR * M)$
- Impedance match power density: $P_{dMax} = 0.25V_R^2 / (ESR * m)$
- Storage temperature: 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 module charged at rated voltage at $65^\circ C$ 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 module 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.



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

The contents of this document are subject to change without notice. SECH accepts no liability for the accuracy or credibility of the values and information contained in this document.