

DATASHEET

18V 500F MODULE



PRODUCT CODE	CTM 00500C0 0018V0 NN00
DATASHEET VERSION	V2021-1 of 05/01/2021

CapTop 18V 500F Module has low ESR & high Power Density, over 1,000,000 duty cycles, low maintenance needs, compact and fully closed splash proof design. Suitable for applications like automotive, railway transportation, heavy duty machinery and Energy storage system.

SPECIFICATIONS	
Item	Characteristics
Nominal Capacitance (25°)	500 F
Capacitance Tolerance	0% / +20%
Rated Voltage	18 V
Surge Voltage	19 V
ESR, DC	1,32 (mΩ)
Maximum Continuous Current (ΔT=15°C)	100 A
Maximum Continuous Current (ΔT=40°C)	160 A
Maximum Peak Current, 1 sec.	2000 A
Leackage Current (25°Cd, after 72h)	10 mA
Operating Temperature Range	- 40° to +65°C
Storage Temperature Range	- 40° to +70°C
Environment Humidity	≤ 90%RH

Weight 20 kg	5,48 kg
Power Terminals	M8/M10
Recommended Torque - Terminal	20/30 Nm
Vibration Specification IEC 255-21-1	IEC 255-21-1
Shock Specification IEC 255-21-2	IEC 255-21-2
Environmental Protection	IP54
Balancing	Equalization Circuit
Cell Voltage Monitoring	Overvoltage Alarm
Temperature Monitoring	NTC Thermistor
Usable Power Density (Pd)	5,379 W/kg
Impedance Match Power Density (Pmax)	11,206 W/kg
Gravimetric Energy Density (Emax)	4,109 Wh/kg
Stored Energy	22.5 Wh
Temperature Performance (-40°C to 65°C)	$\Delta C \leq 5\%$ of initial measured value @ 25°C ESR $\leq 50\%$ of specified value
High Temp. Life (1,500 hours @ 65°C, Rated Voltage)	$\Delta C \leq 20\%$ of initial measured value ESR $\leq 200\%$ of specified value
Room Temp. Life (10 years @ 25°C, Rated Voltage)	$\Delta C \leq 20\%$ of initial measured value ESR $\leq 200\%$ of specified value
Cycle Life (1,000,000 cycles between VR and 1/2 VR)	$\Delta C \leq 20\%$ of initial measured value ESR $\leq 200\%$ of specified value
Shelf Life (25°C, uncharged)	4 years
Factory High-Pot Test	DC 2,500 V
Typical Thermal Resistance	0.8°C/W
Typical Thermal Capacitance	4,400J/°C

*All values are provisional and may vary

PIN DEFINITION			
Pin Number	Wire Color	Definition	Outputs
1	Black	GND	/
2	Red	Overvoltage Alarm	High - Inactive Low - Active
3	Void	Void	
4	Green	Temperature	

NOTES

1. Surge voltage is non-repetitive. The duration must not exceed 1 second.
2. Maximum peak Current is non-repetitive. The duration must not exceed 1 second.
3. Formula of maximum peak Current:

$$I_{peak} = \frac{1 / 2CV}{C \times ESR_{DC} + 1}$$

C is rated capacity, V is rated voltage.

4. Formula of power and energy:

Usable Power Density:

$$P_d = \frac{0.12V^2}{ESR_{DC} \times mass}$$

Impedance Match Power Density:

$$P_{max} = \frac{V^2}{4ESR_{DC} \times mass}$$

Gravimetric Energy Density:

$$E_{max} = \frac{1 / 2CV^2}{3600 \times mass}$$

Stored Energy:

$$E = \frac{1 / 2CV^2}{3600}$$

MEASURING METHOD

1) Charge and Discharge procedure (Figure 1)

- A) Charge the capacitor using constant current I to rated voltage V_0
- B) Keep rated voltage 5 min
- C) Discharge the capacitor using constant current I to half rated voltage, record discharge time T_1 during voltage change from V_1 to V_2
- D) Rest 2-5s, record voltage change ΔV
- E) Discharge it to a very low voltage around C
- F) $V_1=85\% V_0$ $V_2=50\% V_0$

2) Capacitance

$$C = I * T_1 / (V_1 - V_2)$$

C: Capacitance (F)

I: Constant Discharge Current (A)

T_1 : Discharge Time (S)

3) DC ESR

$$DC\ ESR = \Delta V / I$$

DC ESR: DC Equivalent Series Resistance(Ω)

ΔV : Voltage Change (V)

I: Constant Discharge Current (A)

4) AC ESR

Measure AC ESR using LCR meter Frequency:

1KHz

Voltage: fully discharge

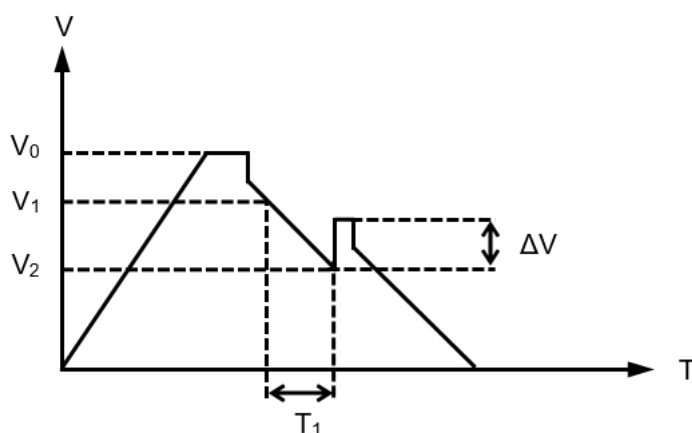
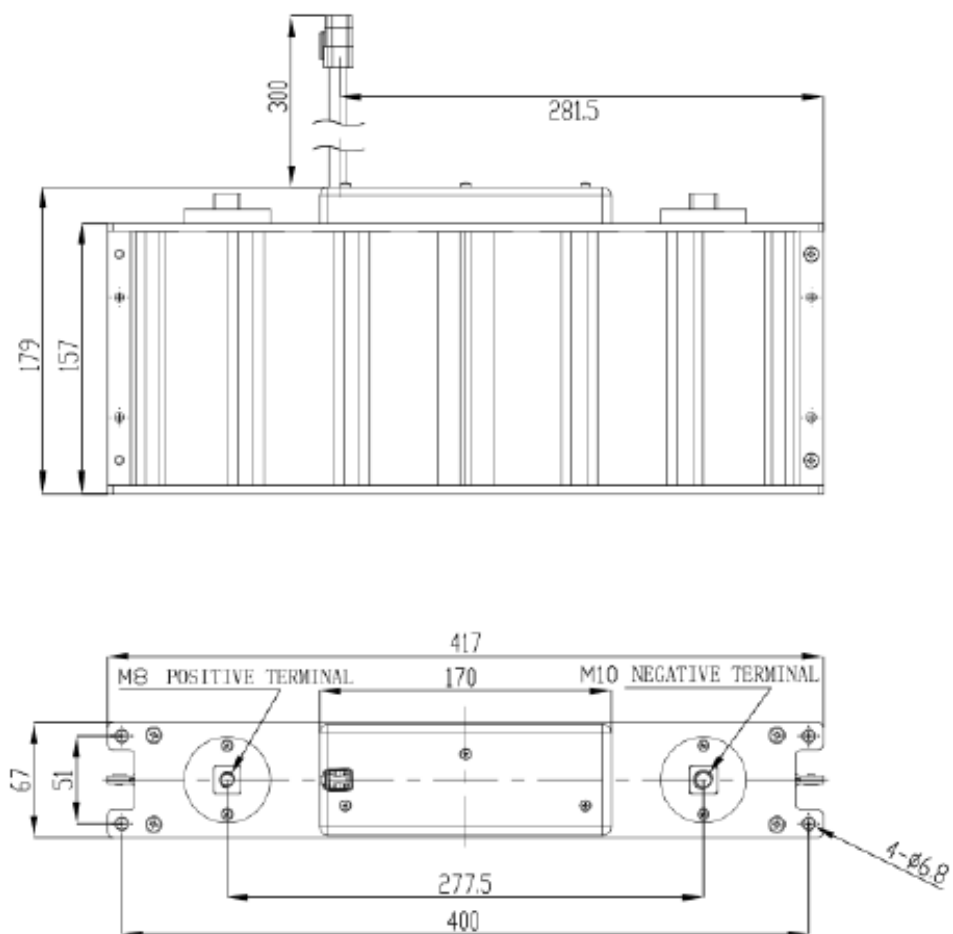


Figure 1

CONSTRUCTION & DIMENSIONS



L/mm		
D (Max.)	L1	L2
417(± 1) mm	67 (± 1) mm	179 (± 1) mm

Product dimensions are for reference only unless otherwise identified.
Product dimensions and specifications may change without notice.
Product complies to the following certification requirements:



Version	Date	Revision History
V2020-0	16/10/2020	Original Version
V2021-1	05/01/2021	Revised Version

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