

## SM1000-012-A



### FEATURES & ADVANTAGES

- 2200 CCA
- 12.5L Max Engine Size
- One Million Cycle Life
- 10-15 Year Calendar Life
- Wide Temperature Range: -40C to +65C
- High Power Charge & Discharge
- No Lead or Toxic Materials
- No Thermal Runaway Potential

### Specifications

Capacitance	Rated <sup>1</sup>	1000F
	Tolerance	-0/+20%
Voltage	Rated	12V DC
	Maximum	16.2V DC
ESR	ESR (DC) - maximum initial	1.1mΩ
Current	CCA <sup>2</sup> (3 Sec)	2200A
	Maximum leakage <sup>3</sup>	10mA
Energy Storage	Maximum energy <sup>4</sup>	20Wh
	Impedance Match Power Density <sup>5</sup>	3.12kW/kg
	Volumetric energy density <sup>6</sup>	1.54Wh/L
	Gravametric energy density <sup>7</sup>	1.90Wh/kg
Power	Power density <sup>8</sup>	1441W/kg

### Temperature

Temperature Characteristics	Operating temperature range	-40°C to +65°C
	Storage temperature range	-40°C to +70°C

### Safety

Safety	Short circuit current	10.9kA
	500V DC Insulation resistance	≥100MΩ
	2500V DC Leakage current	≤10mA
	Environmental ingress protection	IP65

### Service Lifetime

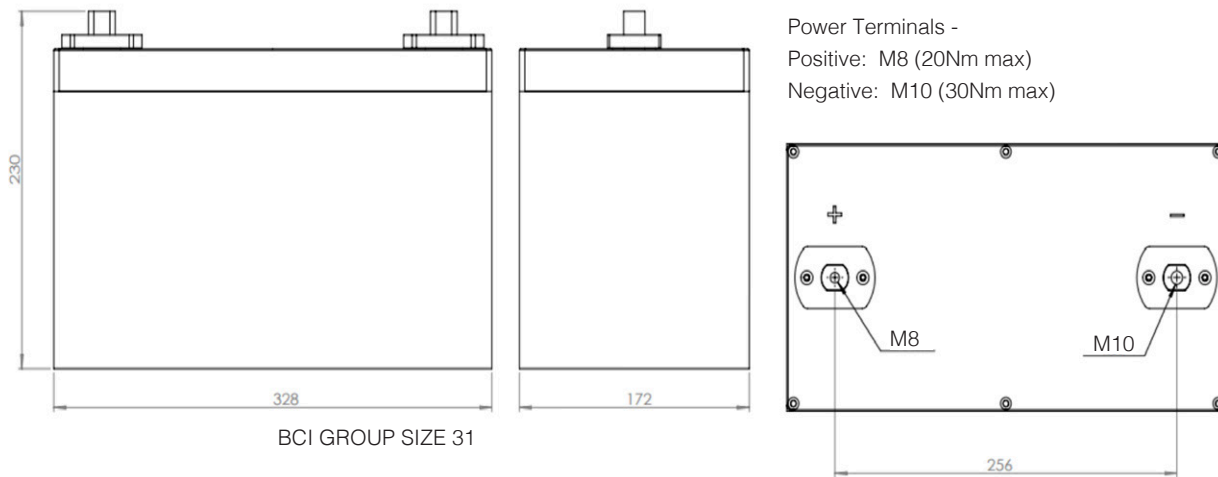
Endurance	<b>Product held at rated voltage in 65°C environment for 1500 hours</b>	
	Change in capacitance (% drop from rated)	≤20%
	Change in ESR (% increase from maximum initial)	≤100%
DC Life	<b>Product held at rated voltage in 25°C environment</b>	
	Life (projected)	10+ years
	Change in capacitance (% drop from rated)	≤20%
	Change in ESR (% increase from maximum initial)	≤100%
Cycle Life	<b>Cycling from rated voltage to 50% voltage under constant current in 25°C environment</b>	
	Life (projected)	1,000,000 cycles
	Change in capacitance (% drop from rated)	≤20%
	Change in ESR (% increase from maximum initial)	≤100%
Storage	<b>Stored uncharged in original packaging in 25°C environment</b>	
	Life	4 years

### Physical Characteristics

Mechanical	Vibration	SAE J1455 Mid Frame
	Shock	SAE J1455



## Outline Drawings:



Power Terminals -  
 Positive: M8 (20Nm max)  
 Negative: M10 (30Nm max)

## Weight and Size:

**Weight:** ≤10.9 kg | **Size: (Typical value):** 328\*172\*230 (L\*W\*H) mm

## Naming Rules:

Type	Capacitance	Dash	Rated Voltage	Dash	CMS - Capacitor Management/Monitoring
SM Supercapacitor Module	1000 = 1000F	-	012 = 12V	-	A = Active Balancing

## Notes:

1. Measure capacitance and DC internal resistance at 25°C under specified test current per Figure 1

$$2. CCA = \frac{C \times (V_{max} - V_{min})}{T + C \times ESR}$$

3. Corresponding current value after 72 hours of rated voltage at 25°C

$$4. 0.5C(V_{nom}^2)/3600$$

$$5. 0.5C(V_{nom}^2 - 0.5V_{nom}^2)/3600$$

$$6. \text{Max energy (Wh)} / \left( \frac{L \times W \times H \text{ (mm)}}{1 \times 10^6} \right)$$

7. Max energy (Wh)/Weight (kg)

$$8. \text{Per IEC62391-2, } P_d = \frac{0.12V^2}{ESR_{dc} \times \text{Weight(kg)}}$$

**CAP/ESR Measurement Waveform**

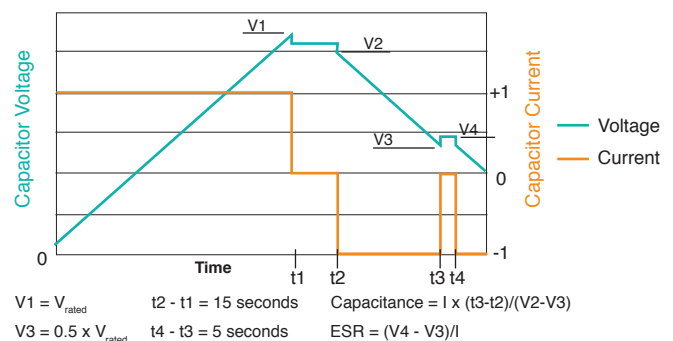


Figure 1

### Precautions:

- This product may vent or rupture if overcharged, reverse charged, incinerated or heated above 100°C
- Do not crush, mutilate, or disassemble
- Do not dispose of unit in trash

 Specifications are subject to change without notice.