

## 3V 1200F Supercapacitor Cells

- 3V DC output
- 1200F Capacitance
- High cycle life of 1 million cycles
- Very high power density
- Laser-weldable posts



### ELECTRICAL SPECIFICATIONS

TYPE	C60W-3R0-1200
Rated Voltage $V_R$	3.0 V
Surge Voltage $V_S^1$	3.1 V
Rated Capacitance $C^2$	1200 F
Capacitance Tolerance <sup>3</sup>	-0%/+20%
ESR <sup>2</sup>	$\leq 0.4$ m $\Omega$
Leakage Current $I_L^4$	<5 mA
Self-discharge Rate <sup>5</sup>	<20 %
Constant Current $I_{MCC}(\Delta T = 15^\circ C)^6$	84 A
Max Current $I_{Max}^7$	1.22 kA
Short Current $I_S^8$	7.5 kA
Stored Energy $E^9$	1.5 Wh
Energy Density $E_d^{10}$	5.6 Wh/kg
Usable Power Density $P_d^{11}$	10.0 kW/kg
Matched Impedance Power $P_{dMax}^{12}$	20.8 kW/kg

### THERMAL CHARACTERISTICS

Type	C60W-3R0-1200
Working Temperature	-40~65 °C
Storage Temperature <sup>13</sup>	-40~70 °C
Thermal Resistance $R_{Th}^{14}$	5.3 K/W
Thermal Capacitance $C_{th}^{15}$	279 J/K

### LIFETIME CHARACTERISTICS

TYPE	C60W-3R0-1200
DC Life at High Temperature <sup>16</sup>	1500 hours
DC Life at RT <sup>17</sup>	10 years
Cycle Life <sup>18</sup>	1,000,000 cycles
Shelf Life <sup>19</sup>	4 years

### SAFETY & ENVIRONMENTAL SPECIFICATIONS

TYPE	C60W-3R0-1200
Safety	RoHS, REACH and UL810A
Vibration	ISO 16750-3 (Table 14)
Shock	SAE J2464

### PHYSICAL PARAMETERS

TYPE	C60W-3R0-1200
Mass M	270 g
Terminals(leads) <sup>20</sup>	Weldable
Dimensions <sup>21</sup>	Height 74.4 mm
	Diameter 60 mm

**NOTES:**

TYPE	C60W-3R0-1200
<p>1. Surge voltage VS: Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.</p> <p>2. Rated capacity C: the rated capacity test method is as shown in Figure 1. The test current is 100 C multiple current, i.e. 0.075 A/F. if the calculated test current is greater than 100 A, 100 A is used.</p>	<p>17. DC Life at RT: keep the supercapacitor at its rated voltage. The life criterion is that the capacity is kept above 80% of the rated capacity, and the internal resistance is below 200% of the rated internal resistance.</p> <p>18. Cycle life: Charge and discharged the capacitor in the range between VR and VR /2. 5 seconds waiting period between charge and discharge. The constant test current is 0.075 A/F (if the calculated current &gt;100A, then apply 100A).</p> <p>19. Storage life: within the storage temperature range, keep the discharge state, no load (cell voltage &lt; 0.2 V).</p> <p>20. Leading end: Positive pole Φ14 mm*3 mm, negative pole Φ14 mm*3 mm.</p> <p>21. Dimensions C60W-3R0-1200</p>
<p>3. Capacitance tolerance: Typical capacity is 105% of rated capacity.</p> <p>4. Leakage current measurement procedure: 1) Charge the capacitor to the VR with a constant current (0.075 A/F, if the calculated current is &gt;100A, then apply 100A). 2) Hold the voltage at VR for 72h. 3) The current to maintain VR after 72 h is the leakage current.</p> <p>5. Self-discharge rate measurement procedure: 1) Charge the capacitor to VR with a constant current (0.075 A/F, if the calculated current &gt;100A, then apply 100A). 2) Hold the voltage at VR for 3h. 3) Floating for 72h. 4) Measure the voltage after 72 h.</p> <p>6. Max constant working current: <math>I_{MCC} = \sqrt{\Delta T / (ESR * R_{Th})}</math> the working current of the supercapacitor in static air depends on the natural convection heat dissipation of the shell and the Joule heat balance.</p> <p>7. Max current: <math>I_{Max} = 0.5C * VR (\Delta t + ESR * C)</math> , discharge from VR to VR /2 in 1 second.</p> <p>8. Short current: <math>I_s = VR / ESR</math> Each parameter adopts SI system unit or its conversion unit, This current can't be used as working current.</p> <p>9. Stored energy: <math>E = 0.5C * V^2 / 3600</math>.</p> <p>10. Energy density: <math>E_d = E / M</math></p> <p>11. Usable power density: <math>P_d = 0.12V_R^2 / (ESR * M)</math>.</p> <p>12. Impedance match power density: <math>P_{dMax} = 0.25V_R^2 / (ESR * M)</math></p> <p>13. Storage temperature: discharged state (cell voltage &lt; 0.2 V).</p> <p>14. Thermal resistance: <math>R_{Th} = 1 / (h * A)</math>, where h=10 W/(m<sup>2</sup>*K), A=surface area.</p> <p>15. Thermal capacitance: For the whole capacitor.</p> <p>16. DC Life at High Temperature: Under the maximum working temperature of the supercapacitor (65 ° C), it is constant at its rated voltage for 1500h, the capacity is kept above 80% of the rated capacity under normal temperature, and the internal resistance is below 200% of the rated internal resistance.</p>	<p>22. Standard marking</p> <p>23. Name of manufacturer, part number, serial number</p> <p>Rated voltage and capacitance, negative and positive terminals, warning marking</p> <p>Stored energy in watt-hours.</p> <p>24. Mounting recommendations:</p> <p>25. Recommended welding depth is not less than 1.8 mm.</p> <p>Provide sufficient distance between cells to meet the insulation strength.</p> <p>Keep enough space around the explosion-proof tank and keep the top clean and avoid mechanical damage.</p> <p>26. The contents of this document are subject to change without notice. GMCC accepts no liability for the accuracy or credibility of the values and information contained in this document.</p>