



# DATA SHEET

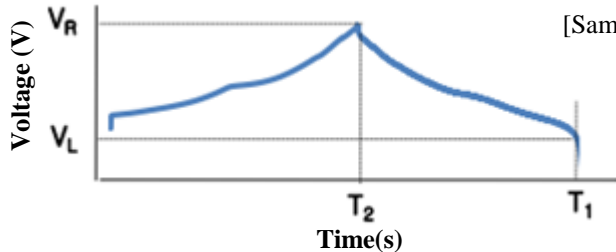
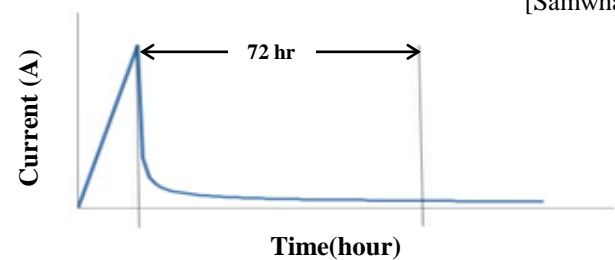
<b>NAME</b>	<b>BATTERY CAPACITOR</b>
<b>ITEM</b>	2.7V 20,000F(Ø60 × L74) Part No. CB2R7209W60074ATBHE
<b>APPLICATION</b>	-
<b>REMARK</b>	-
<b>COMPANY</b>	SAMWHA CAPACITOR
<b>TEL</b>	82 31 330 5922
<b>ADDRESS</b>	227, Gyeonggidong-ro, Namsa-myeon, Cheoin-gu, Youngin-si, Gyeonggi-do, Korea

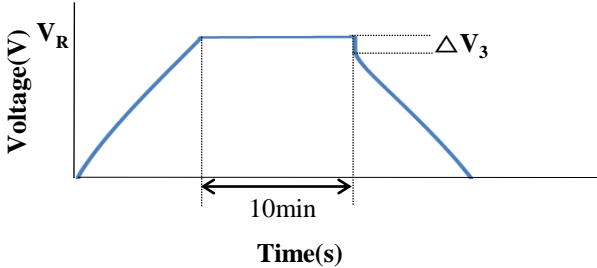
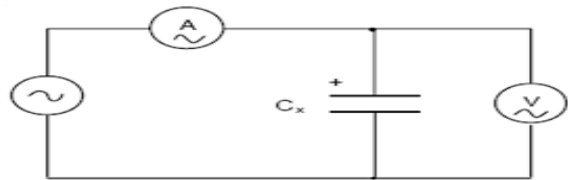


**CB2R7209W60074ATBHE**

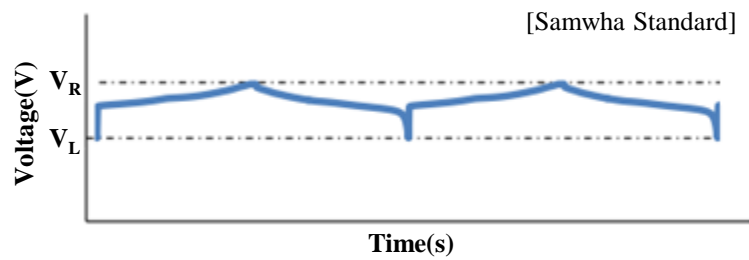
<b>Item</b>	<b>Unit</b>	<b>Specification</b>
<b>Capacitance (25℃, 2.7~1.6V)</b>	F	20,000
<b>Capacity(25℃, 2.7~1.6V)</b>	Ah	6.4
<b>Usable Energy Density(25℃, 2.7~1.6V)</b>	Wh	12.2
<b>Rated Voltage, V<sub>R</sub></b>	V	2.7
<b>Max. Current</b>	A	20
<b>ESR (DC / AC,1kHz)</b>	mΩ	<1.3 / <1.1
<b>Usable Specific Power(P<sub>d</sub>)</b>	W/kg	1220
<b>Dimensions</b>	mm	60Φ x 74mm
<b>Weight</b>	kg	0.55
<b>Operating Temperature Range</b>	℃	-20 ~ +50
<b>Capacitance Change</b>	%	Within ±40% of initial value
<b>Internal Resistance Change</b>	%	Less than 200% of initial value
<b>Max. Leakage Current, L<sub>C</sub> (after 72h)</b>	mA	<9
<b>Cycle Life(25℃)</b>	cycle	15,000

## 1. Electrical Performance

No	Item	Unit	Specification	Test Conditions and Methods
1	Capacitance at 20°C	F	20,000	 <p>[Samwha Standard]</p> $E = \frac{1}{2} \times C \times \frac{(V_R^2 - V_L^2)}{3600} \quad (Wh)$ <p>1) Charging is performed by constant current of 1mA/F.            2) Charging is performed for duration of 30 minutes a rated voltage.            3) Discharge use a constant current load device and measure the time for the terminal voltage from V<sub>R</sub> to V<sub>L</sub> at the current density of 1mA/F.</p>
2	Capacitance Tolerance at 20°C	%	-10 / +20	-
3	Rated voltage	V	2.7	-
4	Leakage current after 72 hour	mA	<9	 <p>[Samwha Standard]</p> <p>The battery capacitor is charged with the rated voltage for 72hours. Then, leakage current is measured by current measurement equipment.</p>

No	Item		Unit	Specification	Test Conditions and Methods
5	Internal resistance (ESR)	DC	mΩ	<1.3	<p>[Samwha Standard]</p>  <p style="text-align: right;"><math>R_D = \frac{\Delta V_3}{I}</math></p>
		AC 1kHz	mΩ	<1.1	<p>[IEC 62391-1]</p>  <p style="text-align: right;"><math>R_A = \frac{\Delta V}{I}</math></p> <ol style="list-style-type: none"> <li>1) The internal resistance <math>R_A</math> of a capacitor shall be calculated by the above formula.</li> <li>2) The frequency of the measuring voltage shall be 1kHz.</li> <li>3) The AC current shall be from 1mA to 10mA.</li> </ol>
6	Operating temperature		°C	-20 ~ +50	Operating temperature range shall be -20 ~ +50°C.
7	Energy density	Gravimetric	Wh/kg	22.2	2.7~1.6V
8	Power density	Gravimetric	W/kg	1220	-

## 2. Reliability

No	Item		Unit	Specification	Test Conditions and Methods										
1	Temperature Characteristic	Capacitance change	%	Within $\pm 40\%$ of initial specified value at $+20^\circ\text{C}$	<p>[Samwha Standard]</p> <table border="1"> <thead> <tr> <th>Temperature(<math>^\circ\text{C}</math>)</th> <th>Keep Time</th> </tr> </thead> <tbody> <tr> <td><math>+ 20 \pm 2</math></td> <td>-</td> </tr> <tr> <td><math>- 20 \pm 2</math></td> <td>2 hr</td> </tr> <tr> <td><math>+ 20 \pm 2</math></td> <td>15 min</td> </tr> <tr> <td><math>+ 50 \pm 2</math></td> <td>2 hr</td> </tr> </tbody> </table> <p>Measure electrical characteristics after exposing capacitor to each temperature atmosphere for 2 hours or 15 minutes.</p>	Temperature( $^\circ\text{C}$ )	Keep Time	$+ 20 \pm 2$	-	$- 20 \pm 2$	2 hr	$+ 20 \pm 2$	15 min	$+ 50 \pm 2$	2 hr
		Temperature( $^\circ\text{C}$ )	Keep Time												
$+ 20 \pm 2$	-														
$- 20 \pm 2$	2 hr														
$+ 20 \pm 2$	15 min														
$+ 50 \pm 2$	2 hr														
		Internal resistance change	%	Less than 200 % of initial specified value at $+20^\circ\text{C}$											
2	Shelf life after 1000 hours no load test same as endurance		%	Same as endurance	<p>[Samwha Standard]</p> <p>Temperature : <math>50 \pm 2^\circ\text{C}</math> Duration : 1000 <math>+72/-0</math> hour</p>										
3	Cycle life (at $25^\circ\text{C}$ )	Cycle	Cycle	15,000	<p>[Samwha Standard]</p>  <p>where <math>V_R</math> is the rated voltage of 2.7V <math>V_L</math> is the low voltage of 1.6V</p> <p>Condition the capacitor at <math>25 \pm 3^\circ\text{C}</math> until thermal equilibrium is reached. Initialize the voltage on the capacitor at <math>V_L</math>(1.6V). Then charge the capacitor at a current 45A to <math>V_R</math>. Maintain voltage <math>V_R</math> on the capacitor for <math>10 \pm 0.50</math> s. Then discharge the capacitor to <math>V_L</math> at current 45A. Hold at <math>V_L</math> for <math>10 \pm 0.50</math> s. This defines a cycle(see Figure). Repeat this cycle throughout the testing.</p>										
		Capacitance change	%	Within $\pm 40\%$ of initial specified value											
		Internal resistance change	%	Less than 200 % of initial specified value											

No	Item		Unit	Specification	Test Conditions and Methods
4	Damp heat	Capacitance change	%	Within $\pm 30$ % of initial specified value	[Samwha Standard]  Temperature : $50 \pm 2$ °C Relative humidity : 90%~95% Duration : $240 \pm 8$ hours
		Internal resistance change	%	Within $\pm 200$ % of initial specified value	

### 3. Dimensions

Part number	Capacitance (F)	Dimension(mm)		
		D ( $\pm 0.2$ )	L ( $\pm 0.3$ )	H ( $\pm 0.7$ )
CB2R7209W60074ATBHE	20,000	60.2	74.5	15

