

DATA SHEET

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|----------|--|
| PRODUCTS | Green-Cap (Electric Double Layer Capacitor) |
| ITEM | DV 2.85V 1200F (Ø60.4 × L74) Part No. DV5R128W60074TH |
| REMARK | |
| COMPANY | SAMWHA ELECTRIC |
| TEL | 82-43-261-0200 |
| ADDRESS | 3, Bongmyeong-ro, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, Korea |

Approved by *k. c. Eom*



Technical team manager

- Green-Cap is brand of SAMWHA's electric double layer capacitor(EDLC).
- Electric double layer capacitor(EDLC) is a next generation energy storage device.

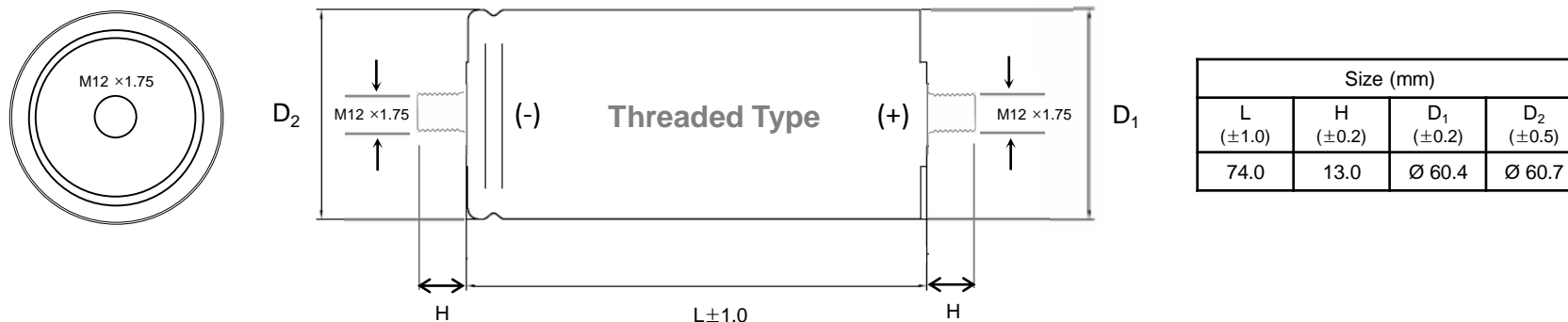
DV5R128W60074TH

Threaded Terminal Type
Standard Series

FEATURE

- High Power Density
- Suitable for Electric Power Storage
- Charge and Discharge efficiency are higher than regular batteries

DIMENSIONS



PRODUCTS SPECIFICATION

| Rated Voltage (DC) | Capacitance (F) | ESR, 1kHz (mΩ) | ESR, DC (mΩ) | L/C(72hr) (mA Max.) | Energy density | | Power density | | Weight (g) | Volume (mℓ) | Dimension Ø D × L (mm) |
|--------------------|-----------------|----------------|--------------|---------------------|----------------|--------|---------------|--------|------------|-------------|------------------------|
| | | | | | (Wh/kg) | (Wh/L) | (W/kg) | (W/L) | | | |
| 2.85 | 1200 | 0.33 | 0.36 | 3.4 | 4.51 | 6.38 | 9,025 | 12,769 | 300 | 212 | 60.4 × 74 |

PRODUCTS CHARACTERISTIC

| CAPACITANCE | | |
|-------------------------------|----------------------------|-----------------|
| Nominal Capacitance | | 1200F |
| Capacitance tolerance | | 0 ~ +20% |
| VOLTAGE | | |
| Rated voltage | | 2.85 V |
| Surge voltage | | 3.0 V |
| TEMPERATURE | | |
| Operating temperature range | | -40~+65°C |
| Storage temperature range | | -40~+65°C |
| Temperature characteristics | Capacitance change | ±5% (at 20°C) |
| | Internal resistance change | ±100% (at 20°C) |
| INTERNAL RESISTANCE | | |
| AC ESR (1KHz) | | < 0.33 mΩ |
| DC ESR | | < 0.36 mΩ |
| CURRENT | | |
| Maximum continuous current | | 83.7 A |
| Maximum peak current (1 sec.) | | 1194.1 A |
| SIZE | | |
| Weight (g) | | 300 |
| Dimension (ΦDxL) (mm) | | 60.4 x 74 |

| ENDURANCE | |
|---|--------------------------------|
| Endurance After 1,500hr application of rated voltage at 65°C | |
| Capacitance change | Within ±20% of specified value |
| Internal resistance change | Within 100% of specified value |
| Life test After 10 years at rated voltage and 25°C | |
| Capacitance change | < 20% |
| Internal resistance change | < 100% |
| CYCLES | |
| Capacitors cycles between rated voltage under constant current at 25°C (Over 1,000,000cycle) | |
| Capacitance change | < 20% |
| Internal resistance change | < 100% |

PERFORMANCE

Test environmental conditions

- Ambient temperature : $25 \pm 2^\circ\text{C}$, Relative humidity : 60~70%, Air pressure : 86~106kPa

| No | ITEM | TEST CONDITION | SPECIFICATION | | | | | | | | | | | | | | | |
|------|-----------------------------|--|---|-----------------|------|---|------------|--|---|-------------|-----|---|------------|--------|---|------------|------|---|
| 1 | Rated voltage | | See the table "PRODUCTS CHARACTERISTIC" | | | | | | | | | | | | | | | |
| 2 | Capacitance (tolerance) | To see measure method (See No. 9) | See the table "PRODUCTS CHARACTERISTIC" | | | | | | | | | | | | | | | |
| 3 | Internal resistance | To see measure method (See No. 10) | See the table "PRODUCTS CHARACTERISTIC" | | | | | | | | | | | | | | | |
| 4 | Temperature characteristics | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>STEP</th> <th>TEMPERATURE(°C)</th> <th>TIME</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20 ± 2</td> <td></td> </tr> <tr> <td>2</td> <td>-40 ± 2</td> <td>2hr</td> </tr> <tr> <td>3</td> <td>20 ± 2</td> <td>15 min</td> </tr> <tr> <td>4</td> <td>65 ± 2</td> <td>2 hr</td> </tr> </tbody> </table> <p>Step-1 Capacitance, ESR and leakage current shall be measured.</p> <p>Step-2, 4 After the capacitor being stored for 2hours, capacitance and ESR and leakage current shall be measured.</p> <p>Step-3 After the capacitor being stored for 15min, capacitance and ESR and leakage current shall be measured.</p> | STEP | TEMPERATURE(°C) | TIME | 1 | 20 ± 2 | | 2 | -40 ± 2 | 2hr | 3 | 20 ± 2 | 15 min | 4 | 65 ± 2 | 2 hr | <ul style="list-style-type: none"> • Capacitance change within $\pm 5\%$ of initial value • Internal resistance change $\leq 100\%$ of initial value • Leakage current \leq specified value |
| STEP | TEMPERATURE(°C) | TIME | | | | | | | | | | | | | | | | |
| 1 | 20 ± 2 | | | | | | | | | | | | | | | | | |
| 2 | -40 ± 2 | 2hr | | | | | | | | | | | | | | | | |
| 3 | 20 ± 2 | 15 min | | | | | | | | | | | | | | | | |
| 4 | 65 ± 2 | 2 hr | | | | | | | | | | | | | | | | |

PERFORMANCE

Test environmental conditions

- Ambient temperature : $25 \pm 2^\circ\text{C}$, Relative humidity : 60~70%, Air pressure : 86~106kPa

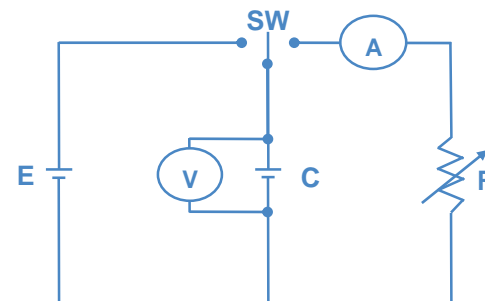
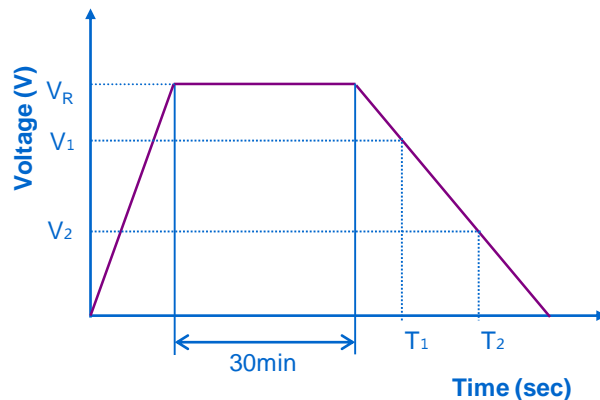
| No | ITEM | TEST CONDITION | SPECIFICATION | | | | | | | | | | | | | | | |
|------|---|--|---|------------|-------------|---|-------------------------|------------|---|-----------------------|--------------|---|---|---------------------|---|------------------------------------|--------------|---|
| 5 | Endurance | <ul style="list-style-type: none"> • Temperature : $65^\circ\text{C} \pm 2^\circ\text{C}$ • Applied voltage : rated voltage • Duration : 1500 +72/-0 hours | <ul style="list-style-type: none"> • No visible damage • Capacitance change within $\pm 20\%$ of specified value • Internal resistance change $\leq 100\%$ of specified value • Leakage current \leq specified value | | | | | | | | | | | | | | | |
| 6 | Shelf life | <ul style="list-style-type: none"> • Temperature : $65^\circ\text{C} \pm 2^\circ\text{C}$ • Duration : 1500 +72/-0 hours | <ul style="list-style-type: none"> • No visible damage • Capacitance change within $\pm 20\%$ of specified value • Internal resistance change $\leq 100\%$ of specified value • Leakage current \leq specified value | | | | | | | | | | | | | | | |
| 7 | Cycle life | <table border="1"> <thead> <tr> <th>STEP</th> <th>VOLTAGE(V)</th> <th>TIME (sec.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Charge to Rated Voltage</td> <td>20 ± 1</td> </tr> <tr> <td>2</td> <td>Rest to Rated Voltage</td> <td>10 ± 0.5</td> </tr> <tr> <td>3</td> <td>Discharge to Rated Voltage $\times 1/2$</td> <td>about(20 ± 1)</td> </tr> <tr> <td>4</td> <td>Rest to Rated Voltage $\times 1/2$</td> <td>10 ± 0.5</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Cycle : 1,000,000 cycles | STEP | VOLTAGE(V) | TIME (sec.) | 1 | Charge to Rated Voltage | 20 ± 1 | 2 | Rest to Rated Voltage | 10 ± 0.5 | 3 | Discharge to Rated Voltage $\times 1/2$ | about(20 ± 1) | 4 | Rest to Rated Voltage $\times 1/2$ | 10 ± 0.5 | <ul style="list-style-type: none"> • No visible damage • Capacitance change within $\pm 20\%$ of specified value • Internal resistance change $\leq 100\%$ of specified value • Leakage current \leq specified value |
| STEP | VOLTAGE(V) | TIME (sec.) | | | | | | | | | | | | | | | | |
| 1 | Charge to Rated Voltage | 20 ± 1 | | | | | | | | | | | | | | | | |
| 2 | Rest to Rated Voltage | 10 ± 0.5 | | | | | | | | | | | | | | | | |
| 3 | Discharge to Rated Voltage $\times 1/2$ | about(20 ± 1) | | | | | | | | | | | | | | | | |
| 4 | Rest to Rated Voltage $\times 1/2$ | 10 ± 0.5 | | | | | | | | | | | | | | | | |
| 8 | Damp heat (steady state) | <ul style="list-style-type: none"> • Temperature : $40 \pm 2^\circ\text{C}$ • Relative humidity : 90%~95% • Duration : 240 ± 8 hours | <ul style="list-style-type: none"> • No visible damage • Capacitance change within $\pm 20\%$ of specified value • Internal resistance change $\leq 100\%$ of specified value • Leakage current \leq specified value | | | | | | | | | | | | | | | |

Measuring Method Of Characteristics

9 Capacitance

- 1) Charging is performed by constant current followed by constant voltage charging
- 2) Charging is performed for duration of 30 minutes at rated voltage.
- 3) Discharge use a constant current load device and measure the time for the terminal voltage to drop from V_1 to V_2 upon discharge at 1mA/F. ($V_1 = 0.8 \times V_R$, $V_2 = 0.4 \times V_R$)
- 4) The capacitance can be obtained by the following equation.

$$C = \frac{I \times (T_2 - T_1)}{V_1 - V_2} \text{ (F)}$$



10 ESR

- The AC Resistance is used.
- 1) The Frequency of the measuring voltage shall be 1kHz.
 - 2) The AC current shall be from 1 to 10mA.

Measuring Method Of Characteristics

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Mounting Recommendations

Maximum torque for M12 screw terminals are 16Nm.
Clean terminals before mounting.



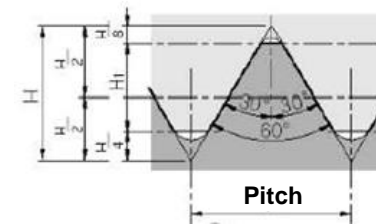
※ Threads Standards

Notation Example) M12 x 1.75

The above M is symbol to mark thread type, 12 means screw diameter (External), and 1.75 means thread pitch.

| Thread Type | Symbol | Mark method |
|------------------------------|--------|------------------------------|
| M thread (Metric Threads) | M | M12 x 1.75 M size x pitch |

M thread



• Please contact SAMWHA Green-Cap directly for any technical specifications critical to application.