

N₆₀TM 3.0V 3400F Cell

NE03V03400ST001

Datasheet



See Note on Assembly Recommendations¹⁰

DIMENSION & WEIGHT

D1 (±0.5)	60.3 mm
D2 (±0.2)	60.3 mm
L (±0.3)	138.0 mm
H (±0.3)	13.0 mm
Nominal Weight	505 g

TYPICAL THERMAL CHARACTERISTICS

Thermal Resistance, R_{th} (Housing)	3.2 °C/W
Thermal Capacitance, C_{th}	580 J/°C
Usable Continuous Current ($\Delta T = 15^\circ\text{C}$) ⁹	140 A
Usable Continuous Current ($\Delta T = 40^\circ\text{C}$) ⁹	225 A

ELECTRICAL SPECIFICATIONS

Rated Voltage, V_R	3.0 VDC	
Surge Voltage ¹	3.15 VDC	
Rated Capacitance, C^2	3400 F	
Capacitance Tolerance	Min. / Max.	3400F / 4080F
	Average ⁴	3560F
Initial DC-ESR, R_{DC} ³	Max.	0.24 mΩ
	Average ⁴	0.15 mΩ
Maximum Leakage Current ⁵	12 mA	
Maximum Peak Current, Non-repetitive ⁶	2,800 A	
Maximum Stored Energy, E_{max} ⁷	4.2 Wh	
Gravimetric Specific Energy ⁷	8.4 Wh/kg	
Usable Specific Power ⁷	8.9 kW/kg	
Impedance Match Specific Power ⁷	18.5 kW/kg	

TYPICAL LIFETIME CHARACTERISTICS

DC Life at High Temperature ⁸ (Continuous charging at V_R and 65°C)	1,500 hours
Projected DC Life at Room Temperature ⁸ (Continuous charging at V_R and 25 ± 10 °C)	10 years
Projected Cycle Life at Room Temperature ⁸ (Cycled from V_R to 1/2 V_R using constant current of 100A at 25 ± 10 °C)	1,000,000 cycles
Shelf Life (Stored without charge at 25 ± 10 °C)	4 years

TEMPERATURE SPECIFICATIONS

Operating Temperature Range	-40 ~ 65°C
Storage Temperature Range (Stored without charge)	-40 ~ 70°C

SAFETY & ENVIRONMENTAL SPECIFICATIONS

Vibration	ISO 16750-3 Table 12 & 14
Shock	SAE J2464, IEC 60068-2-27
RoHS	Compliant
REACH	Compliant
UL	Compliant (UL 810A)

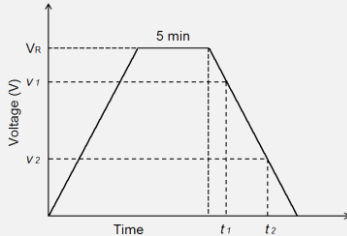
NOTE

1. Surge Voltage

- > Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.

2. Rated Capacitance (Measurement Method)

- > Constant current charge with 5A to V_R .
- > Constant voltage charge at V_R for 5 min.
- > Constant current discharge with 5A to 0.1V.



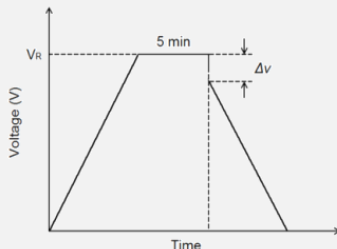
$$C = \frac{I \times (t_2 - t_1)}{v_1 - v_2}$$

where C is the capacitance (F);

I is the absolute value of the discharge current (A);
 v_1 is the measurement starting voltage, $0.8 \times V_R$ (V);
 v_2 is the measurement end voltage, $0.4 \times V_R$ (V);
 t_1 is the time from discharge start to reach v_1 (s);
 t_2 is the time from discharge start to reach v_2 (s)

3. Initial DC-ESR (Measurement Method)

- > Constant current charge with $4 * C * V_R$ [mA] to V_R .
*e.g. In case of 3V 3400F cell, $4 * 3400 * 3 = 40,800 \text{ mA} = 40.8 \text{ A}$*
- > Constant voltage charge at V_R for 5 min.
- > Constant current discharge with 150A to 0.1V.



$$ESR_{DC} = \frac{\Delta v}{I}$$

where ESR_{DC} is the DC-ESR (Ω);

Δv is the voltage drop during first 10ms of discharge (V);
 I is the absolute value of the discharge current (A)

4. Average

- > Typical value or percentage spread that may be present in one shipment

5. Maximum Leakage Current (Measurement Method)

- > The capacitor is charged to its rated voltage V_R at 25°C.
- > Leakage current is the amount of current measured after 72 hours of continuous holding of the capacitor at V_R .

6. Maximum Peak Current

- > Current that can be used for 1-second discharging from the rated voltage to the half rated voltage under the constant current discharging mode

$$I = \frac{\frac{1}{2}V_R}{\Delta t / C + ESR_{DC}}$$

where I is the maximum peak current (A);
 V_R is the rated voltage (V);
 Δt is the discharge time (sec); $\Delta t = 1$ sec in this case;
 C is the rated capacitance (F);
 ESR_{DC} is the maximum DC-ESR (Ω)

- > The stated maximum peak current should **not** be used in normal operation and is only provided as a reference value.

7. Energy & Power (Based on IEC 62391-2)

- > Maximum Stored Energy, E_{max} (Wh) = $\frac{\frac{1}{2}CV_R^2}{3600}$
- > Gravimetric Specific Energy (Wh/kg) = $\frac{E_{Max}}{Weight}$
- > Usable Specific Power (W/kg) = $\frac{0.12V_R^2}{ESR_{DC} \times Weight}$
- > Impedance Match Specific Power (W/kg) = $\frac{0.25V_R^2}{ESR_{DC} \times Weight}$

8. DC Life and Cycle Life Test

- > End-of-Life (EOL) Conditions:
 - Capacitance: -20% from the rated minimum value
 - DC-ESR: +100% from the specified maximum initial value
- > Capacitance and ESR measurements are taken at 25°C.

9. Usable Continuous Current

- > Maximum current which can be used within the allowed temperature range under the constant current discharging mode

$$I = \sqrt{\frac{\Delta T}{R_{th} \times ESR_{DC}}}$$

where I is the maximum continuous current (A);
 ΔT is the change in temperature (°C);
 R_{th} is the thermal resistance (°C/W);
 ESR_{DC} is the maximum DC-ESR (Ω)

10. Assembly Recommendations

- > Assembly should be done in such way as not to place undue mechanical stress on the terminals of the cell.
- > Do not exceed the maximum torque value of 14 N-m when assembling threaded type cells.
- > Provide adequate spacing in between cells to secure required insulation strength for the application.
- > Provide sufficient clearance above the safety vent and do not position anything near the safety vent that may be damaged in an event of vent rupture.

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