Datasheet - 2.7V / 360F Cell

POWERED TO MOVE

FEATURES

- *High performance product with ultra-low ESR*
- *Exceptional shock and vibration resistance*
- *Long lifetimes with up to 500,000 duty cycles*
- *Compliant with RoHS and REACH requirements*

** Image is not to scale*

SPECIFICATIONS

ELECTRICAL		ESHSR-0360C0-002R7A
Rated Voltage (V_R) at 65°C		**2.7 VDC**
Rated Voltage (V_R) at 85°C		2.3 VDC
Surge Voltage[1]		2.85 VDC
Rated Capacitance[2]		**360 F**
Capacitance Tolerance	Max.	0% / +20%
	Avg.[4]	0% / +10%
DC-ESR (Equivalent Series Resistance)[3]	Max.	3.2 mΩ
	Avg.[4]	2.9 mΩ
Maximum Leakage Current[5]		0.75 mA
Maximum Peak Current, Non-repetitive[6]	at 65°C	220 A
	at 85°C	190 A
Maximum Stored Energy, E_{max}[7]	at 65°C	0.36 Wh
	at 85°C	0.26 Wh
Gravimetric Specific Energy[7]	at 65°C	5.4 Wh/kg
	at 85°C	3.9 Wh/kg
Usable Specific Power[7]	at 65°C	4.0 kW/kg
	at 85°C	2.9 kW/kg
Impedance Match Specific Power[7]	at 65°C	8.5 kW/kg
	at 85°C	6.1 kW/kg

TEMPERATURE	
Operating Temperature Range	-40 ~ 65°C (up to 85°C with de-rated voltage) (ΔCAP<5% and ΔESR<100% of initial values measured at 25°C, with linear voltage de-rating to 2.3V at 85°C)
Storage Temperature Range	-40 ~ 70°C (storage without charge)

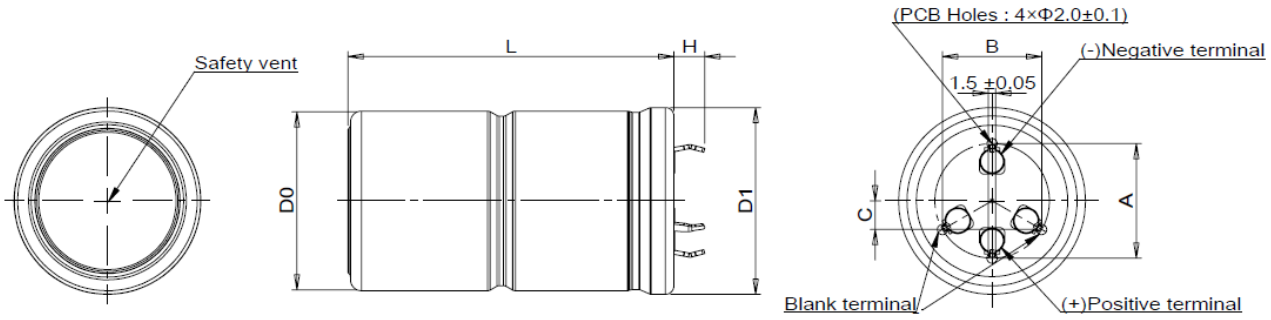
LIFE		
Endurance[8]	at 2.7V, 65°C	1,500 hours
	at 2.3V, 85°C	1,000 hours
Room Temperature (at 2.7V and 25°C)[8]	10 years	
Cycle Life (at 25°C)[9]	500,000 cycles	
Shelf Life	2 years (Stored without charge at under 70°C and 40% RH)	

PHYSICAL	
RoHS	Compliant
REACH	Compliant
UL	Complies to 810A, Certificate No.: BBBG2.MH46340

SPECIFICATIONS (Cont'd)

THERMAL	
Typical Thermal Resistance, R_{th} (Housing)	8.8 °C/W
Typical Thermal Capacitance, C_{th}	75.6 J/°C
Maximum Continuous Current (ΔT = 15°C)	23 A
Maximum Continuous Current (ΔT = 40°C)	37 A

DRAWING



See Note on Mounting[10]

DIMENSION & WEIGHT	
D0 (±0.3)	35.5 mm
D1 (±0.3)	35.7 mm
L (±0.5)	63.5 mm
H (±0.1)	5.6 mm
A (±0.1)	22.5 mm
B (±0.1)	19.5 mm
C (±0.1)	5.6 mm
Nominal Weight	67.0 g

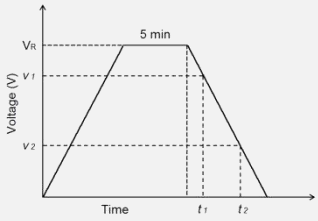
NOTE

1. Surge Voltage

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

2. Rated Capacitance (Measurement Method)

> Constant current charge with 4CV [mA] to V_R.
> Constant voltage charge at V_R for 5min.
> Constant current discharge with 4CV [mA] to 0.1V.

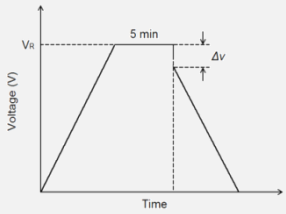


$$C = \frac{I \times (t_2 - t_1)}{v_1 - v_2}$$

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 x V_R (V);
v_2 is the measurement end voltage, 0.4 x 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. DC-ESR (Measurement Method)

> Constant current charge with 4CV [mA] to to V_R.
> Constant voltage charge at V_R for 5min.
> Constant current discharge with 40CV [mA] 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 the rated voltage at 25°C.
> Leakage current is the current after 72 hours that is required to keep the capacitor charged at the rated voltage

6. Maximum Peak Current

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

$$I = \frac{½V_R}{\Delta t / C + ESR_{DC}}$$

where I is the maximum peak current (A);
V_R is the rated voltage (V);
Δt is the discharge time (sec); Δt = 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

> Maximum Stored Energy, E_{max} (Wh) = $\frac{½CV_R^2}{3600}$

> 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. Endurance and Room Temperature DC Life

> Test Conditions:
- Temperature: 65 ± 2°C, 85 ± 2°C, 25 ± 2°C
- Applied Voltage: V_R ± 0.02V

> End-of-Life Conditions:
- Capacitance: -30% from the rated minimum value
- DC-ESR: +100% from the rated maximum value

> Capacitance and ESR measurements are taken at 25°C

9. Cycle Life

> Obtained or projected from cycling the capacitor from V_R to 1/2V_R using constant current equal to 100mA/F with 10 second rest period between charge and discharge steps

10. Mounting Recommendations

> Provide properly spaced holes for mounting according to the cell dimensions in order to prevent the terminal leads from being mechanically stressed.
> Do not place any copper patterns, including the ground pattern or through-hole via underneath the cell or on the underside of the PCB (if a double-sided PCB is used) as the electrolyte inside the cell, should it leak, can corrode, short-circuit the patterns, or damage other components nearby. Spacing of 1mm or more should be provided in between the footprint of the cell and the nearest copper pattern.
> Provide at least 2mm clearance above the safety vent and do not position anything above the safety vent that may be damaged by an event of vent rupture.

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