

- Rated voltage 3V DC
- 650-3000 F capacitance
- High cycle life of 1million cycles
- Very high power density
- Laser weldable terminals
- Green and Environment protection



ELECTRICAL SPECIFICATIONS

Type	C60W-3R0-3000	C60W-3R0-2000	C60W-3R0-1500	C60W-3R0-1200	C60W-3R0-0650
Rated Voltage V_R	3.00 V	3.00 V	3.00 V	3.00 V	3.00 V
Surge Voltage V_S ¹	3.10 V	3.10 V	3.10 V	3.10 V	3.10 V
Rated Capacitance C^2	3000 F	2000 F	1500 F	1200 F	650 F
Capacitance Tolerance ³	-0% / +20 %	-0% / +20 %	-0% / +20 %	-0% / +20 %	-0% / +20 %
ESR ²	≤0.28 mΩ	≤0.36 mΩ	≤0.47 mΩ	≤0.55 mΩ	≤0.79 mΩ
Leakage Current, typical I_L ⁴	<12 mA	<8 mA	<7 mA	<5 mA	<3 mA
Self-discharge Rate, typical ⁵	<20 %	<20 %	<20 %	<20 %	<20 %
Constant Current $I_{MCC}(\Delta T = 15^\circ C)$ ⁶	130 A	102 A	83 A	73 A	54 A
Max Current I_{Max} ⁷	2.4 kA	1.7 kA	1.3 kA	1.0 kA	644 A
Short Current I_S ⁸	10.7 kA	8.3 kA	6.4 kA	5.5 kA	3.8 kA
Stored Energy E^9	3.75 Wh	2.5 Wh	1.8 Wh	1.5 Wh	0.8 Wh
Energy Density E_d ¹⁰	7.8 Wh/kg	7.3 Wh/kg	6.6 Wh/kg	6.1 Wh/kg	5.1 Wh/kg
Usable Power Density P_d ¹¹	8.1 kW/kg	8.8 kW/kg	8.1 kW/kg	8.0 kW/kg	8.5 kW/kg
Matched Impedance Power Density P_{dMax} ¹²	16.8 kW/kg	18.3 kW/kg	16.8 kW/kg	16.7 kW/kg	17.7 kW/kg

THERMAL CHARACTERISTICS

Type	C60W-3R0-3000	C60W-3R0-2000	C60W-3R0-1500	C60W-3R0-1200	C60W-3R0-0650
Working Temperature	-40 ~ 65 °C	-40 ~ 65 °C	-40 ~ 65 °C	-40 ~ 65 °C	-40 ~ 65 °C
Storage Temperature ¹³	-40 ~ 70 °C	-40 ~ 70 °C	-40 ~ 70 °C	-40 ~ 70 °C	-40 ~ 70 °C
Thermal Resistance R_{Th} ¹⁴	3.1 K/W	4.0 K/W	4.6 K/W	5.1 K/W	6.5 K/W
Thermal Capacitance C_{th} ¹⁵	575 J/K	409 J/K	330 J/K	279 J/K	172 J/K

LIFETIME CHARACTERISTICS

Type	C60W-3R0-3000	C60W-3R0-2000	C60W-3R0-1500	C60W-3R0-1200	C60W-3R0-0650
DC Life at High Temperature ¹⁶	1500 hours	1500 hours	1500 hours	1500 hours	1500 hours
DC Life at RT ¹⁷	10 years	10 years	10 years	10 years	10 years
Cycle Life ¹⁸	1'000'000 cycles	1'000'000 cycles	1'000'000 cycles	1'000'000 cycles	1'000'000 cycles
Shelf Life ¹⁹	4 years	4 years	4 years	4 years	4 years

SAFETY & ENVIRONMENTAL SPECIFICATIONS

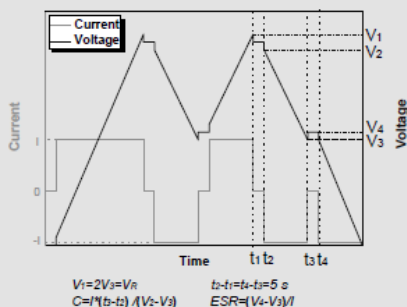
Type	C60W-3R0-3000	C60W-3R0-2000	C60W-3R0-1500	C60W-3R0-1200	C60W-3R0-0650
Safety	RoHS, REACH and UL810A	RoHS, REACH and UL810A	RoHS, REACH and UL810A	RoHS, REACH and UL810A	RoHS, REACH and UL810A
Vibration	ISO 16750-3 (Table 14)	ISO 16750-3 (Table 14)	ISO 16750-3 (Table 14)	ISO 16750-3 (Table 14)	ISO 16750-3 (Table 14)
Shock	SAE J2464	SAE J2464	SAE J2464	SAE J2464	SAE J2464

PHYSICAL PARAMETERS

Type	C60W-3R0-3000	C60W-3R0-2000	C60W-3R0-1500	C60W-3R0-1200	C60W-3R0-0650
Mass typical M	494 g	342 g	285 g	245 g	161g
Terminals ²⁰	Weldable	Weldable	Weldable	Weldable	Weldable
Dimensions ²¹ Height	138 mm	102 mm	85 mm	74 mm	52 mm
Diameter	60 mm	60 mm	60 mm	60 mm	60 mm

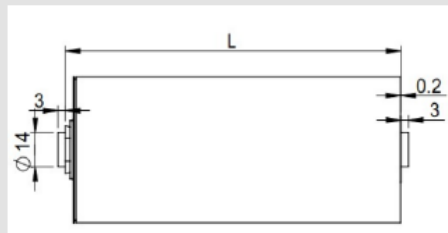
NOTES

- Surge voltage V_S : Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.
- Capacitance C: The test current is 0.12 A/F, if the calculated current is >100A, then apply 100A.



- Capacitance tolerance: Typical is 5% rated capacity
- Leakage current measurement procedure: 1) Charge the capacitor to the V_R with a constant current (0.12 A/F, if the calculated current is >100A, then apply 100A). 2) Hold the voltage at V_R for 72h. 3) The current to maintain V_R after 72 h is the leakage current.
- Self-discharge rate measurement procedure: 1) Charge the capacitor to V_R with a constant current (0.12 A/F, if the calculated current >100A, then apply 100A). 2) Hold the voltage at V_R for 3h. 3) Floating for 72h. 4) Measure the voltage after 72 h.
- Max constant working current: $I_{MCC} = \sqrt{\Delta T / (ESR * R_{Th})}$
- Max current: $I_{Max} = 0.5C * V_R / (\Delta t + ESR * C)$, discharge from V_R to $V_R/2$ in 1 second.
- Short current: $I_S = V_R / ESR$
- Stored energy: $E = 0.5C * V^2 / 3600$
- Energy density: $E_d = E / M$
- Usable power density: $P_d = 0.12V_R^2 / (ESR * M)$
- Impedance match power density: $P_{dMax} = 0.25V_R^2 / (ESR * M)$
- Storage temperature: Discharged state (The voltage of cell < 0.2V).
- Thermal resistance: $R_{Th} = 1 / (h * A)$, where $h=10 \text{ W}/(\text{m}^2 * \text{K})$, A =surface area.
- Thermal capacitance: For the whole capacitor

- DC life at high temperature: Hold the capacitor charged at rated voltage at 65°C for 1500h. The capacitance shall be >80% of the rated value, the ESR shall be <200% of rated value.
- DC life at RT: Hold the capacitor charged at rated voltage at room temperature RT, the capacitance shall be >80% of the rated value, the ESR shall be <200% of rated value.
- Cycle life: Charge and discharged the capacitor in the range between V_R and $V_R/2$, 5 seconds rest between charge and discharge. The constant test current is 0.12 A/F (if the calculated current >100A, then apply 100A).
- Shelf life: Discharged state (The voltage of cell < 0.2V).
- Threaded connection: φ 14*3mm, the welding depth should be larger than 1.8mm
- Dimensions:



- Standard markings:
 - + Name of manufacturer, part number, serial number
 - + Rated voltage and capacitance, negative and positive terminals, warning marking
 - + Stored energy in watt-hours
- Mounting recommendations:
 - + Mounting without applying undue mechanical stress on the terminals
 - + Provide adequate spacing in between cells to secure required insulation strength
 - + Provide clearance around the safety vent and do not position anything above the safety vent that may be damaged in an event of vent rupture
- The contents of this document are subject to change without notice.