FEATURES

- High performance product with low RC time constant
- Long lifetimes with over 1,000,000 duty cycles
- Rated capacitance of 1200F
- Threaded terminals for easy integration
- Compliant with RoHS and REACH requirements

** Image is not to scale*

SPECIFICATIONS

Electrical		ESHSR-1200C0-002R7A5T
Rated Voltage (V_R) at 65°C		**2.7 VDC**
Surge Voltage[1]		2.85 VDC
Rated Capacitance[2]		**1200 F**
Capacitance Tolerance	Max.	-0% / +20%
	Avg.[4]	+5% / +12%
DC-ESR, Initial[3]	Max.	0.48 mΩ
	Avg.[4]	0.20 mΩ
Max. Leakage Current[5]		2.7 mA
Maximum Continuous Current	at ΔT = 15°C	84 A
	at ΔT = 40°C	137 A
Maximum Peak Current, Non-repetitive[6]		1,020 A
Max. Stored Energy (E_{max}) at V_R[7]		1.2 Wh
Usable Specific Power[7]		6.3 kW/kg
Impedance Match Specific Power[7]		13.3 kW/kg
Max. Gravimetric Specific Energy[7]		4.2 Wh/kg

Temperature	
Operating Temperature Range	-40 ~ 65°C (ΔCAP<5% and ΔESR<100% of initial value measured at 25°C)
Storage Temperature Range	-40 ~ 70°C (storage without charge)

Life	
Endurance (at V_R and 65°C)[8,9]	1,500 hours
Room Temperature (at V_R and 25°C)[8]	10 years
Cycle Life (at 25°C)[8]	1,000,000 cycles (Estimated value when cycled from V_R to 1/2V_R using constant current of 100A with 10 second rest between charge and discharge steps)
Shelf Life	2 years (Stored without charge at under 70°C and under 40% RH)

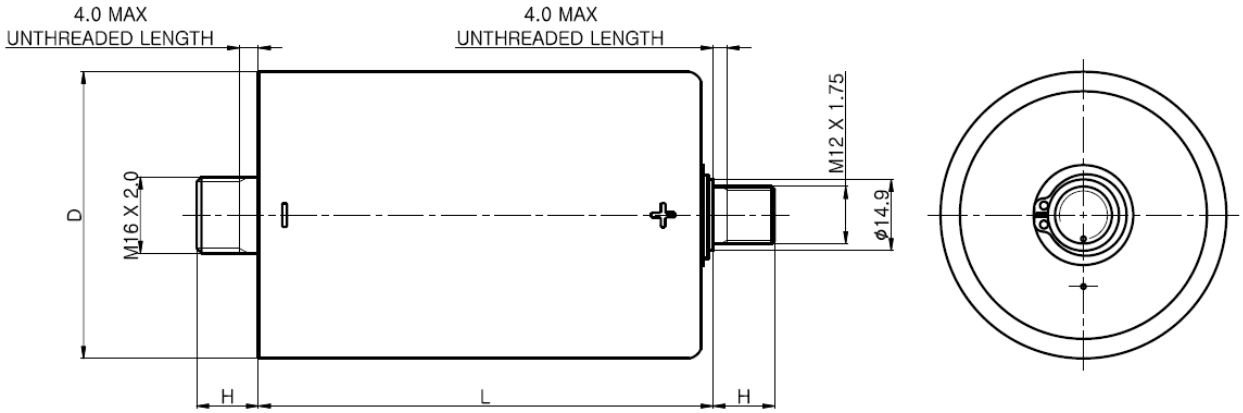
Safety & Certification	
RoHS	Compliant
REACH	Compliant
UL	Complies to 810A, Certificate No.: BBBG2.MH46340

THERMAL

Characteristics	ESHSR-1200C0-002R7A5T
Typical Thermal Resistance, R_{th} (Housing)	4.4 °C/W
Typical Thermal Capacitance, C_{th}	260 J/°C
Cont. Current to ΔT = 15°C	84 A
Cont. Current to ΔT = 40°C	137 A

PHYSICAL

Drawing



See Note on Mounting[10]

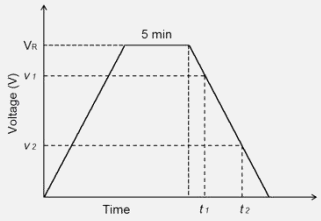
Dimensions	ESHSR-1200C0-002R7A5T
D (±0.2)	60.2 mm
L (±0.3)	75.0 mm
H (±0.125)	13.0 mm
Nominal Weight	285 g

Shock & Vibration	
Shock Specification	SAE J2464
Vibration Specification	ISO 16750-3 (Table 14)

NOTE

1. Surge Voltage
   > Absolute maximum voltage, not repeated and for no longer than 1 second.

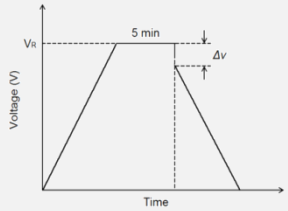
2. Rated Capacitance
   > Constant current charge with 10mA/F to V_R
   > Constant voltage charge at V_R for 5min
   > Constant current discharge with 10mA/F to 0.1V



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

Where 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);
I is the absolute value of the discharging current (A).

3. ESR (Equivalent Series Resistance)
   > ESR_{DC}
   - Constant current charge to V_R
   - Constant voltage charge at V_R for 5min
   - Constant current discharge to 0.1V



$$R_d = \frac{\Delta v}{I}$$

Where R_d is the ESR_{DC} (Ω);
Δv is the voltage drop for 10ms (V);
I is the discharge current (A).

4. Average (or Typical)
   > Percentage spread that may be present in one shipment

5. Leakage Current
   > The capacitor is charged to the rated voltage at 25°C.
   > Leakage current is the current at 72 hours that is required to keep the capacitor charged at the rated voltage

6. Max. Current
   > Current for 1sec discharging from rated voltage to half rated voltage under constant current discharging mode.

$$I_{Max.}\ (A) = \frac{½V_R}{\Delta t\ /\ C + R_d}$$

Where Δt is the discharge time (sec) and Δt is 1 sec in this case;
C is the capacitance (F);
R_d is the ESR_{DC} (Ω);
V_R is the rated voltage (V).

   > Max. Current **should not** be used in normal operation and is only provided as a reference value.

7. Energy & Power
   > Max. Stored Energy at V_R = $\frac{½CV_R^2}{3600}$

Where C is the capacitance (F);
V_R is the rated voltage (V).

   > Usable Specific Power, IEC 62391-2 (W/kg) = $\frac{0.12 \cdot V^2}{ESR_{DC} \cdot Mass}$

   > Impedance Match Specific Power (W/kg) = $\frac{0.25 \cdot V^2}{ESR_{DC} \cdot Mass}$

   > Gravimetric Specific Energy (Wh/kg) = $\frac{E_{Max.}}{Weight}$

8. Lifetime
   > End-of-Life Conditions
   - Capacitance: -30% from rated min. value
   - ESR: +100% from max. ESR value

9. Endurance
   > Conditions
   - Temperature: 65 ± 2°C
   - Test duration : 1500 (+48/-0) h
   - Applied voltage: V_R ± 0.02V
   - Capacitance and ESR measurement are made at 25°C

10. Mounting
   > Mounting should be designed in such a way as to not place undue mechanical stress on the terminals
   > Do not exceed the max torque value of 8Nm when assembling threaded type cells.
   > Provide adequate spacing in between cells to ensure required insulation strength for the application.
   > Provide clearance above the safety vent and do not position anything above the safety vent that may be damaged by vent rupture.
   > Welding recommendation for weldable cells available on www.nesscap.com under Support > Download.

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