

HS/HSL Supercapacitors

Hybrid cylindrical cells



Description

Eaton hybrid supercapacitors are high reliability, high power, ultra-high capacitance energy storage devices utilizing proprietary materials and processes. This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to applications for backup power, pulse power and hybrid power systems.

They can be applied as the sole energy storage or in combination with batteries to optimize cost, life time and run time. System requirements can range from a few microwatts to hundreds of watts.

All products feature low ESR for high power density with environmentally friendly materials for a green power solution. Eaton supercapacitors are maintenance-free with design lifetimes up to 20 years* and operating temperatures down to -25 °C (HSL) and up to +85 °C (HS)

Features and benefits

- 3.8 V operating voltage for high energy
- Low ESR for high power density
- Up to 8 times energy density compared to standard supercapacitors
- Low self discharge ideal for use with batteries
- UL recognized

Applications

- Industrial backup/ride through
- Backup for storage servers
- Water and gas smart meters
- IoT energy storage
- Medical backup power/alarm
- Commercial trucks/containers asset tracking

*Supercapacitor lifetimes vary based on charge voltage and temperature. See Eaton's application guidelines or contact your local Eaton sales representative for more information on lifetime estimates

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Ratings

Capacitance	30 F to 220 F
Working voltage	3.8 V
Minimum working voltage	2.2 V
Surge voltage	4.0 V
Capacitance tolerance	-20% to +20% (+20 °C)
Operating temperature range	HSL: -25 °C to +60 °C HS: -15 °C to +70 °C
Extended operating temperature range	HS: -15 °C to +85 °C (with linear voltage derating to 3.5 V @ +85 °C)

Specifications

Capacitance ¹ (F)	Part number	Maximum initial ESR ¹ (mΩ)	Continuous current ⁵ (A)	Peak current ⁵ (A)	Nominal leakage current ² (μA) HS/HSL	Peak power ⁴ (W)	Stored energy ³ (mWh)	Short circuit current ^{**7} (A)
30	HS/HSL1016-3R8306-R	550	0.15	2.7	3.0/4.0	6.6	40	7.0
50	HS/HSL1020-3R8506-R	450	0.25	3.4	4.0/5.0	8.0	67	9.0
70	HS/HSL1025-3R8706-R	250	0.35	6.1	5.0/8.0	14	93	15
120	HS/HSL1225-3R8127-R	200	0.6	7.7	7.0/12	18	160	19
220	HS/HSL1625-3R8227-R	100	1.1	15.3	12/25	36	293	38

** Repeated short circuit current will permanently damage the leads.

Performance

Parameter	Capacitance change (% of initial value)	ESR (% of maximum initial value)
Lifetime: (1000 hours, rated voltage, maximum operating temperature)	≤ 30%	≤ 200%
Charge/discharge cycles ⁸ : HS: (500,000 at +20 °C), HSL: (250,000 at +20 °C)	≤ 30%	≤ 200%
Storage: (3 years, uncharged, <+35 °C)	≤ 5%	≤ 10%

1. Capacitance, Equivalent series resistance (ESR) and Leakage current are measured according to IEC62391-1

2. Leakage current at +20 °C after 72 hour charge and hold.

3. Stored energy (mWh) = $0.5 \times \frac{(V_{\text{rated}}^2 - V_{\text{min}}^2)}{3600} \times C$ x1000

4. Peak power (W) = $\frac{V^2}{4 \times \text{ESR}}$

5. Pulse current for 1 second from full rate voltage to minimum rated voltage.(A) = $\frac{(V_{\text{rated}} - V_{\text{min}}) \times C}{(1 + \text{ESR} \times C)}$

6. Continuous current with a 15 °C temperature rise. Continuous current (A) = $\sqrt{\frac{\Delta T}{\text{ESR} \times R_{\text{TH}}}}$

7. Short circuit current is for safety information only. Do not use as operating current.

8. Cycling between rated voltage and 2.5 V, 3 second rest at +20 °C.

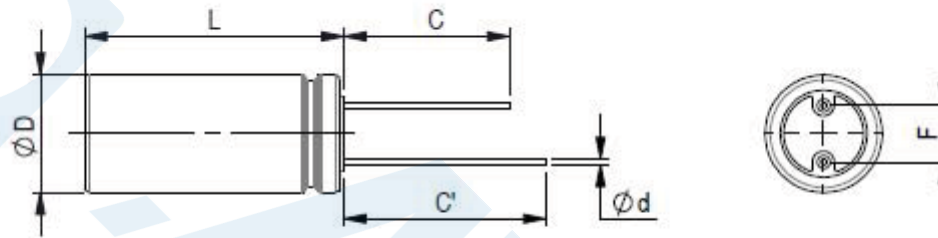
Note: Do not discharge supercapacitors below minimum working voltage.

Safety and Certifications

Agency information	UL810a
Shock and vibration	MIL-STD 202G
Environmental compliance	RoHS, REACH, lead free, halogen free
Warnings	Do not overvoltage, do not reverse polarity
Shipping	No restrictions, per UN 3508 with all cells <0.3 watt-hours

Dimensions (mm)

Part number	ØD maximum	L maximum	F ±0.5	Ød ±0.05	C minimum	C' minimum
HS/HSL1016-3R8306-R	10.5	18	5	0.6	22	27
HS/HSL1020-3R8506-R	10.5	22	5	0.6	22	27
HS/HSL1025-3R8706-R	10.5	27	5	0.6	22	27
HS/HSL1225-3R8127-R	12.9	27	5	0.6	22	27
HS/HSL1625-3R8227-R	16.5	27	7.5	0.8	22	27



Longer lead is positive

Part numbering system

HS	1020	-3R8	50	6	-R
Family code	Size reference (mm)	Voltage (V) R = decimal	Capacitance (µF) Value	Multiplier	Standard product
HS/HSL = Hybrid supercapacitor	Diameter = 10 Length = 20	3R8 = 3.8 V	Example 506= 50 x 10 ⁶ µF or 50 F		

Packaging information

- Bulk

Part marking

- Manufacturer
- Capacitance value (F)
- Max working voltage (V)
- Family code or part number
- Polarity

Manual solder only (Wave and reflow soldering not recommended)

+350 °C (4-5 seconds by soldering iron)

Cleaning/Washing

No clean soldering recommended. Do not wash the supercapacitors..

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

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Publication No. 11043 BU-MC20019
April 2020

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