HS/HSL Supercapacitors

Hybrid cylindrical cells

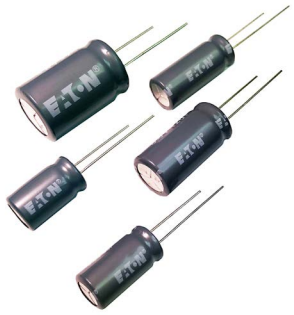

Photo is representative

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)

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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

Environmental compliance

Agency information

*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

Powering Business Worldwide

Ratings

Capacitance	5 F to 220 F
Maximum rated working voltage	3.8 V
Minimum rated working voltage	2.5 V
Minimum allowed working voltage	2.2 V
Surge voltage	4.2
Operating temperature range	HSL: -25 °C to +70 °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)	Capacitance tolerance	Part number	Maximum DC ESR @ +25 °C[1] (mΩ)	Maximum ESR, 1 kHz @ +25 °C[1] (mΩ)	Maximum leakage current[1,2] (µA) HS/HSL	Stored energy[3] (mWh)	Peak power[4] (W)	Rated charge/ discharge current (A)	Maximum charge/ discharge current[5] (A)	Short circuit current[6] (A)
5	-20%/+50%	HS/HSL0612-3R8505-R	6000	2000	2.0/2.5	6.67	0.60	0.025	0.15	0.633
10	±20%	HS/HSL0814-3R8106-R	1500	500	2.0/3.0	13.3	2.4	0.05	0.5	2.5
25	±20%	HS/HSL0820-3R8256-R	650	300	2.5/3.3	33.3	5.5	0.125	0.8	5.8
30	0/+50%	HS/HSL1016-3R8306-R	550	250	3.0/4.0	40	6.6	0.15	1.0	7.0
50	±20%	HS/HSL1020-3R8506-R	450	200	4.0/5.0	67	8.0	0.25	2.0	9.0
70	±20%	HS/HSL1025-3R8706-R	250	100	5.0/8.0	93	14	0.35	3.0	15
120	±20%	HS/HSL1225-3R8127-R	200	70	7.0/12	160	18	0.75	6.0	19
150	±20%	HS/HSL1040-3R8157-R	140	80	9.0/16	200	26	0.60	5.0	27
220	±20%	HS/HSL1625-3R8227-R	100	60	12/25	293	36	1.1	8.0	38

1. Capacitance, Equivalent series resistance (ESR) and Leakage current are measured according to internal specifications.
2. Leakage current at +25 °C after 72 hour charge and hold.
3. Stored energy (mWh) = $\frac{0.5 \times (V^2_{rated} - V^2_{min}) \times C}{3600}$
4. Peak power (W) = $\frac{V^2}{4 \times DC\ ESR}$
5. Discharge current for 3 seconds from 3.8 V to 2.5 V
6. Short circuit current is for safety information only. Do not use as operating current.
Testing and verification of product under end application conditions is recommended
Note: *Do not discharge supercapacitors below minimum allowed working voltage*

Performance

Parameter	Capacitance change (% of initial value)	ESR AC (% of maximum initial value)
Lifetime: (1000 hours, [HS/HSL]: +70 °C, 3.8 Vdc, [HS]: +85 °C, 3.5 Vdc)	≤ 30%	≤ 200%
Charge/discharge cycles*: HS: (500,000 at +20 °C), HSL: (250,000 at +20 °C)	≤ 30%	≤ 200%
Storage: (3 years, uncharged, <+25 °C)	≤ 15%	≤ 150%

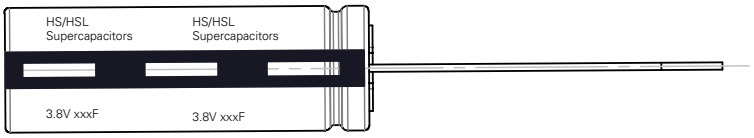
*Cycle: 3.8 V to 2.5 V, 5 s rest @ +20 °C

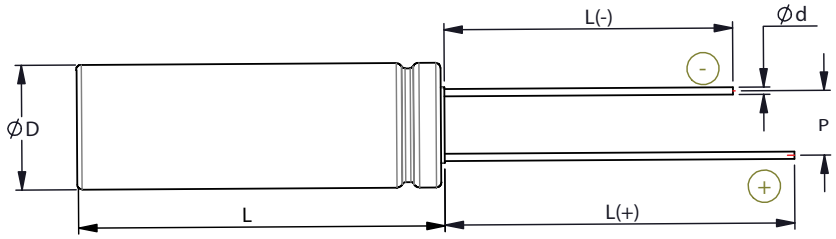
Safety and certifications

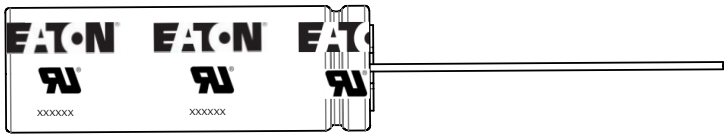
Agency information	UL810a, UL recognized file number MH46887
Shock and vibration	MIL-STD 202G
Environmental compliance	RoHS, REACH, lead free, halogen free
Warnings	Do not overvoltage, do not reverse polarity
Shipping	Per UN 3508

Dimensions (mm)

Part number	ØD ±0.5	L ±2.0	P ±0.5	Ød ±0.05	L (+) ±3.0	L (-) ±3.0	Voltage/ capacitance marking	RU Mark	Weight(ref) (g)
HS/HSL0612-3R8505-R	6.3	12.0	2.6	0.5	27.0	22.0	3.8V 5F	Yes	0.8
HS/HSL0814-3R8106-R	8.0	14.0	3.5	0.6	27.0	22.0	3.8V 10F	Yes	1.4
HS/HSL0820-3R8256-R	8.0	20.0	3.5	0.6	27.0	22.0	3.8V 25F	Yes	1.8
HS/HSL1016-3R8306-R	10.0	16.0	5.0	0.6	27.0	22.0	3.8V 30F	Yes	2.5
HS/HSL1020-3R8506-R	10.0	20.0	5.0	0.6	27.0	22.0	3.8V 50F	Yes	3.2
HS/HSL1025-3R8706-R	10.0	25.0	5.0	0.6	27.0	22.0	3.8V 70F	Yes	3.8
HS/HSL1225-3R8127-R	12.5	25.0	5.0	0.6	27.0	22.0	3.8V 150F	Yes	5.4
HS/HSL1040-3R8157-R	10.0	40.0	5.0	0.6	27.0	22.0	3.8V 120F	Yes	6.0
HS/HSL1625-3R8227-R	16.0	25.0	7.5	0.8	27.0	22.0	3.8V 220F	Yes	9.4







Packaging information-(Bulk package)

Part number	Unit pack (Inner box) External dimensions-mm L	W	H	Package QTY pcs	Shipping case (Carton) External dimensions-mm L	W	H	Package QTY pcs	Gross weight kg
HS0612-3R8505-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	2.8
HS0814-3R8106-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	3.5
HS0820-3R8256-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	4.2
HS1016-3R8306-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	4.8
HS1020-3R8506-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	5.7
HS1025-3R8706-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	6.4
HS1040-3R8157-R	160.0	152.0	75.0	60	335.0	335.0	245.0	720	6.0
HS1225-3R8127-R	212.0	115.0	70.0	50	440.0	250.0	230.0	600	5.2
HS1625-3R8227-R	212.0	115.0	70.0	36	440.0	250.0	230.0	432	5.6
HS1625-3R8227-1	212.0	115.0	70.0	36	440.0	250.0	230.0	432	5.6
HSL0612-3R8505-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	2.8
HSL0814-3R8106-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	3.5
HSL0820-3R8256-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	4.2
HSL1016-3R8306-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	4.8
HSL1020-3R8506-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	5.7
HSL1025-3R8706-R	175.0	170.0	65.0	100	370.0	360.0	215.0	1200	6.4
HSL1040-3R8157-R	160.0	152.0	75.0	60	335.0	335.0	245.0	720	6.0
HSL1225-3R8127-R	212.0	115.0	70.0	50	440.0	250.0	230.0	600	5.2
HSL1625-3R8227-R	212.0	115.0	70.0	36	440.0	250.0	230.0	432	5.6

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		

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.

Part marking: (reference only)

Manufactuer
RU logo
Polarity
Family code or part number
Supercapacitors
Voltage, capacaitance
Lot code

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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