HSH Supercapacitors

Hybrid high density 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 and up to +70 °C.

Features

- 3.8 V operating voltage for high power and high energy
- Up to 10 times energy density compared to standard supercapacitors
- Low ESR for high power density
- UL recognized
- Low self discharge ideal for use with batteries

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	3.0 F to 1400 F
Maximum rated working voltage	3.8 V
Minimum rated working voltage	2.5 V
Minimum allowed working voltage	2.2 V
Surge voltage	4.35 V
Operating temperature range	-25 °C to +70 °C

Specifications

Capacitance (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)	Stored energy[3] (Wh)	Peak power[4] (W)	Rated charge/ discharge current (A)	Maximum charge/ discharge current[5] (A)	Short circuit current[6] (A)	UL recgnition (RU)
3.0	-20%/+50%	HSH0512-3R8305-R	9000	4000	1.8	0.003	0.40	0.015	0.10	0.42	x
8.0	-20%/+50%	HSH0612-3R8805-R	2600	1200	2.0	0.009	1.39	0.04	0.25	1.46	x
22	±20%	HSH0622-3R8226-R	1000	450	3.5	0.025	3.61	0.11	0.70	3.80	x
25	±20%	HSH0814-3R8256-R	900	400	2.5	0.028	4.01	0.125	0.80	4.22	x
40	±20%	HSH0820-3R8406-R	550	250	3.2	0.046	6.56	0.20	1.2	6.91	x
55	±20%	HSH0825-3R8556-R	450	200	5.0	0.063	8.02	0.275	1.8	8.44	x
55	±20%	HSH1016-3R8556-R	450	200	5.0	0.063	8.02	0.275	1.8	8.44	x
85	±20%	HSH1020-3R8856-R	250	120	8.0	0.097	14.4	0.425	3.5	15.2	x
110	±20%	HSH1025-3R8117-R	220	90	9.0	0.125	16.4	0.55	4.0	17.3	x
150	±20%	HSH1030-3R8157-R	140	70	15	0.171	25.8	0.75	6.0	27.1	x
200	±20%	HSH1040-3R8207-R	120	60	22	0.228	30.1	1.0	7.0	31.7	x
200	±20%	HSH1225-3R8207-R	135	65	18	0.228	26.7	1.0	6.0	28.1	x
300	±20%	HSH1235-3R8307-R	100	50	30	0.341	36.1	1.5	10	38.0	x
350	±20%	HSH1240-3R8357-R	90	45	35	0.398	40.1	1.75	11	42.2	x
400	±20%	HSH1245-3R8407-R	80	45	70	0.455	45.1	2.0	12	47.5	x
450	±20%	HSH1630-3R8457-R	60	40	70	0.512	60.2	2.25	15	63.3	x
850	±20%	HSH1840-3R8857-R	70	35	70	0.967	51.6	4.25	28	54.3	x
1000	0 /+50%	HSH1850-3R8108-R	65	30	100	1.138	55.5	5.0	30	58.5	x
1400	±20%	HSH1860-3R8148-R	50	28	120	1.593	72.2	7.0	31	76.0	-

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 (Wh) = $\frac{0.5 \times C \times (V^2_{\text{rated}} - V^2_{\text{min rated}})}{3600}$
4. Peak power (W) = $\frac{V^2}{4 \times \text{DC ESR}}$
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 at +70 °C, 3.8 Vdc)	≤ 30%	≤ 200%
High temperature storage: (1000 hours, uncharged, @ +70 °C)	≤ 30%	≤ 200%
Charge/Discharge Cycles*: (250,000 at +20 °C)	≤ 30%	≤ 200%
Humidity, +40 °C, 90% to 95% RH, 240 hours	≤ 30%	≤ 200%
High temperature, +70 °C	<=10%	<=100%
Low temperature, -25 °C	<=50%	<=1000%

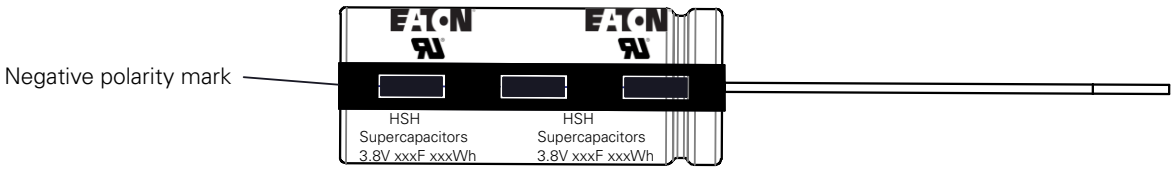
* Cycling between 3.8 V and 2.5 V, 5 second rest at +20 °C.

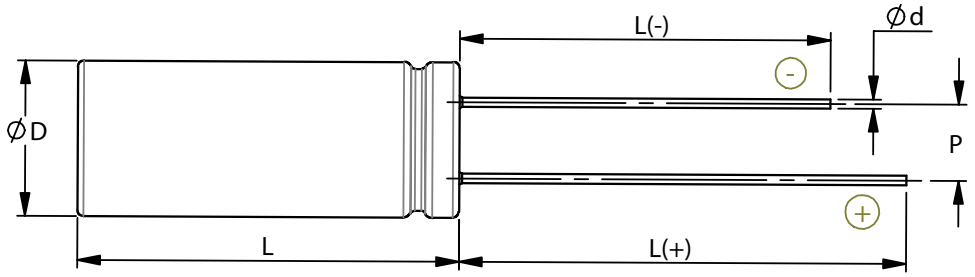
Safety and certifications

Regulatory	UL810a, UL recognized file number MH46887
Environmental	RoHS, REACH, Halogen free, Lead free
Shock and vibration	MIL-STD 202G
Warnings	Do not overvoltage, do not reverse polarity
Shipping	Per UN3508

Dimensions (mm) and mass (g)

Part number	ØD ±0.5	L	P ±0.5	Ød ±0.05	L (+) ±3.0	L (-) ±3.0	Stored energy marking	Mass (g typical)
HSH0512-3R8305-R	5.0	12.0±2.0	2.0	0.5	27.0	22.0	--	0.5
HSH0612-3R8805-R	6.3	12.0±2.0	2.6	0.5	27.0	22.0	--	0.8
HSH0622-3R8226-R	6.3	22.0±2.0	2.6	0.5	27.0	22.0	--	1.3
HSH0814-3R8256-R	8.0	14.0±1.5	3.5	0.6	27.0	22.0	--	1.4
HSH0820-3R8406-R	8.0	20.0±2.0	3.5	0.6	27.0	22.0	--	2.0
HSH0825-3R8556-R	8.0	25.0±2.0	3.5	0.6	27.0	22.0	--	2.2
HSH1016-3R8556-R	10.0	16.0±2.0	5.0	0.6	27.0	22.0	--	2.5
HSH1020-3R8856-R	10.0	20.0±2.0	5.0	0.6	27.0	22.0	--	3.2
HSH1025-3R8117-R	10.0	25.0±2.0	5.0	0.6	27.0	22.0	--	3.8
HSH1030-3R8157-R	10.0	30.0±2.0	5.0	0.6	27.0	22.0	--	5.0
HSH1040-3R8207-R	10.0	40.0±2.0	5.0	0.6	27.0	22.0	--	6.4
HSH1225-3R8207-R	12.5	25.0±2.0	5.0	0.6	27.0	22.0	0.23Wh	6.0
HSH1235-3R8307-R	12.5	35.0±2.0	5.0	0.6	27.0	22.0	0.34Wh	9.0
HSH1240-3R8357-R	12.5	40.0±2.0	5.0	0.6	27.0	22.0	0.40Wh	9.8
HSH1245-3R8407-R	12.5	45.0±2.0	5.0	0.6	27.0	22.0	0.46Wh	11
HSH1630-3R8457-R	16.0	30.0±2.0	7.5	0.8	27.0	22.0	0.51Wh	12.5
HSH1840-3R8857-R	18.0	40.0±2.0	7.5	0.8	27.0	22.0	0.97Wh	21
HSH1850-3R8108-R	18.0	50.0±2.0	7.5	0.8	27.0	22.0	1.14Wh	27
HSH1860-3R8148-R	18.0	60.0±2.0	7.5	0.8	27.0	22.0	1.59Wh	30





Packaging information-(Bulk package)

	Unit pack (Inner box)				Shipping case (Carton)				
	External dimensions-mm			Package QTY	External dimensions-mm			Package QTY	Gross weight
Part number	**L**	**W**	**H**	**pcs**	**L**	**W**	**H**	**pcs**	**kg**
HSH0512-3R8305-R	175	170	65	100	370	360	215	1200	2.5
HSH0612-3R8805-R	175	170	65	100	370	360	215	1200	2.8
HSH0622-3R8226-R	175	170	65	100	370	360	215	1200	3.4
HSH0814-3R8256-R	175	170	65	100	370	360	215	1200	3.5
HSH0820-3R8406-R	175	170	65	100	370	360	215	1200	4.2
HSH0825-3R8556-R	175	170	65	100	370	360	215	1200	4.5
HSH1016-3R8556-R	175	170	65	100	370	360	215	1200	4.8
HSH1020-3R8856-R	175	170	65	100	370	360	215	1200	5.7
HSH1025-3R8117-R	175	170	65	100	370	360	215	1200	6.4
HSH1030-3R8157-R	175	170	65	100	370	360	215	1200	7.8
HSH1040-3R8207-R	160	152	75	60	335	335	245	720	6.0
HSH1225-3R8207-R	212	115	70	50	440	250	230	600	5.2
HSH1235-3R8307-R	240	127	85	50	505	280	270	600	7.5
HSH1240-3R8357-R	240	127	85	50	505	280	270	600	8.0
HSH1245-3R8407-R	240	127	85	50	505	280	270	600	8.7
HSH1630-3R8457-R	240	127	85	40	505	280	270	480	8.1
HSH1840-3R8857-R	240	127	85	40	505	280	270	480	12.2
HSH1850-3R8108-R	240	127	100	40	505	280	220	320	10.2
HSH1860-3R8148-R	240	127	100	40	505	280	220	320	11.1

Part numbering system

HSH	**0512**		**-3R8**	**30**	**5**	**-R**
Family code	Size reference (mm)		Voltage (V) R= decimal	Capacitance (µF) value	Multiplier	Standard product
HSH = Family code	Diameter = 5	Length = 12	3R8=3.8 V	Example 305= 30 x 10^5 µF or 3.0 F		

Manual solder (Wave and reflow soldering not recommended)

+350 °C maximum, 5 seconds maximum (by soldering iron)

Cleaning/Washing

No clean soldering recommended. Do not wash the supercapacitors.

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