

HVH Supercapacitors

High density cylindrical cells



Photo is representative

Description

Eaton high density supercapacitors are high reliability, high power, ultra-high capacitance energy storage devices utilizing electric double layer capacitor (EDLC) construction combined with proprietary materials and processes with approximately 20% higher energy density. This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to applications IoT, metering, communications, memory cache to flash, industrial controls and many more applications requiring long life, wide temperature range energy storage. There are also new sizes and capacitance to meet specific design requirements. Eaton high density supercapacitors are maintenance-free with design lifetimes up to 20 years* and operating temperatures down to -40 °C and up to +85 °C.

Features

- 20% high energy density – smaller size or more energy in the same size
- Long life time – 500k charge/discharge cycles
- Longer backup times, higher power
- UL recognized

Applications

- Metering
- Mesh networks
- Industrial controls
- Flash server
- RAID storage
- Solar capture
- Transportation video recorders and trackers

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

Ratings

Capacitance	2.0 F to 120 F
Maximum working voltage	2.7 V
Surge voltage	2.85 V
Operating temperature range	-40 °C to +70 °C
Extended temperature range	-40 °C to +85 °C (with linear voltage derating to 2.3 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)	Stored energy ³ (mWh)	Peak power ⁴ (W)	Continuous current ⁶ (A)	Pulse current ⁵ (A)	Short circuit current ⁷ (A)
2.0	-20%/+50%	HVH0812-2R7205-R	240	160	10	2.0	7.6	0.47	1.82	11.3
3.0	-20%/+50%	HVH0816-2R7305-R	180	120	12	3.0	10	0.61	2.63	15
4.0	-20%/+50%	HVH0820-2R7405-R	150	100	15	4.1	12	0.74	3.38	18
7.0	-20%/+20%	HVH1020-2R7705-R	113	75	20	7.1	16	0.97	5.29	24
10	-20%/+20%	HVH1025-2R7106-R	90	60	30	10	20	1.20	7.11	30
12	-20%/+20%	HVH1030-2R7126-R	60	40	36	12	30	1.60	9.42	45
15	-20%/+20%	HVH1220-2R7156-R	68	45	40	15	27	1.42	10	40
18	-20%/+20%	HVH1225-2R7186-R	60	40	50	18	30	1.66	11.7	45
20	-20%/+20%	HVH1230-2R7206-R	53	35	55	20	34	1.92	13	51
30	-20%/+20%	HVH1625-2R7306-R	38	25	72	30	48	2.40	18.9	71
35	-20%/+20%	HVH1630-2R7356-R	30	20	80	35	61	2.92	23	90
70	-20%/+20%	HVH1840-2R7706-R	23	15	125	71	79	4.05	36	117
120	-20%/+20%	HVH1860-2R7127-R	20	13	280	122	91	5.23	47.6	135

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) = $\frac{0.5 \times C \times V^2}{3600} \times 1000$

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

5. Pulse current in Amps (A), 1 second discharge from rated voltage to half rated voltage = $\frac{1/2 \times C \times V}{(1 + \text{DC ESR} \times C)}$

6. Continuous current with a 15 °C temperature rise.

7. 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

Performance

Parameter	Capacitance change (% of rated value)	ESR AC (% of maximum initial value)
Life (1500 hours @ +70 °C/2.7 Vdc)	≥ 70%	≤ 200%
Life (1000 hrs @ +85 °C/2.3 Vdc)	≥ 70%	≤ 300%
Charge/Discharge cycles (500,000 cycles @+25°C)*	≥ 70%	≤ 200%
Low temperature @ -40 °C	≥ 70%	≤ 200%
High temperature @ +70 °C	≥ 70%	≤ 200%
Humidity, 240 hours @ +40 °C/90% RH	≥ 70%	≤ 200%
Storage, uncharged, 1500 hours @ +70 °C	≥ 70%	≤ 200%
Shelf life, uncharged, @ +25 °C, <50% RH) 3 years		

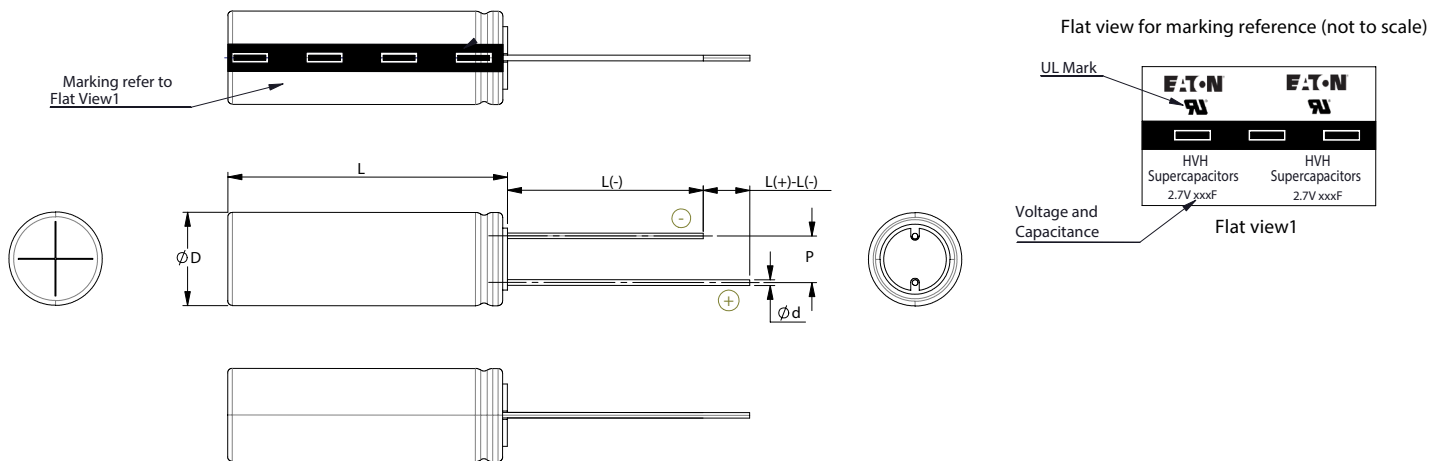
* Cycle: 2.7 V to 1.35 V, 1s rest @ +25 °C.

Safety and certifications

Regulatory	UL810a, UL recognized file number MH46887
Environmental	RoHS, REACH, Halogen free, Lead free
Warnings	Do not overvoltage, do not reverse polarity
Shipping	UN3499, <0.3Wh, Non-hazardous goods

Dimensions (mm) and mass (g)

Part number	$\varnothing D \pm 0.5$	$L \pm 2.0$	$\varnothing d \pm 0.05$	$P \pm 0.5$	$L (-) \text{ min}$	$L (+) - L (-) \text{ min}$	Voltage/Capacitance marking	Mass (g typical)
HVH0812-2R7205-R	8.0	12.0	0.6	3.5	15.0	4.0	2.7V 2F	0.95
HVH0816-2R7305-R	8.0	16.0	0.6	3.5	15.0	4.0	2.7V 3F	1.24
HVH0820-2R7405-R	8.0	20.0	0.6	3.5	15.0	4.0	2.7V 4F	1.56
HVH1020-2R7705-R	10.0	20.0	0.6	5.0	15.0	4.0	2.7V 7F	2.2
HVH1025-2R7106-R	10.0	25.0	0.6	5.0	15.0	4.0	2.7V 10F	2.9
HVH1030-2R7126-R	10.0	30.0	0.6	5.0	15.0	4.0	2.7V 12F	3.3
HVH1220-2R7156-R	12.5	20.0	0.6	5.0	15.0	4.0	2.7V 15F	3.5
HVH1225-2R7186-R	12.5	25.0	0.6	5.0	15.0	4.0	2.7V 18F	4.3
HVH1230-2R7206-R	12.5	30.0	0.6	5.0	15.0	4.0	2.7V 20F	4.8
HVH1625-2R7306-R	16.0	25.0	0.8	7.5	15.0	4.0	2.7V 30F	7.2
HVH1630-2R7356-R	16.0	30.0	0.8	7.5	15.0	4.0	2.7V 35F	8.2
HVH1840-2R7706-R	18.0	40.0	0.8	7.5	15.0	4.0	2.7V 70F	13
HVH1860-2R7127-R	18.0	60.0	0.8	7.5	15.0	4.0	2.7V 120F	21



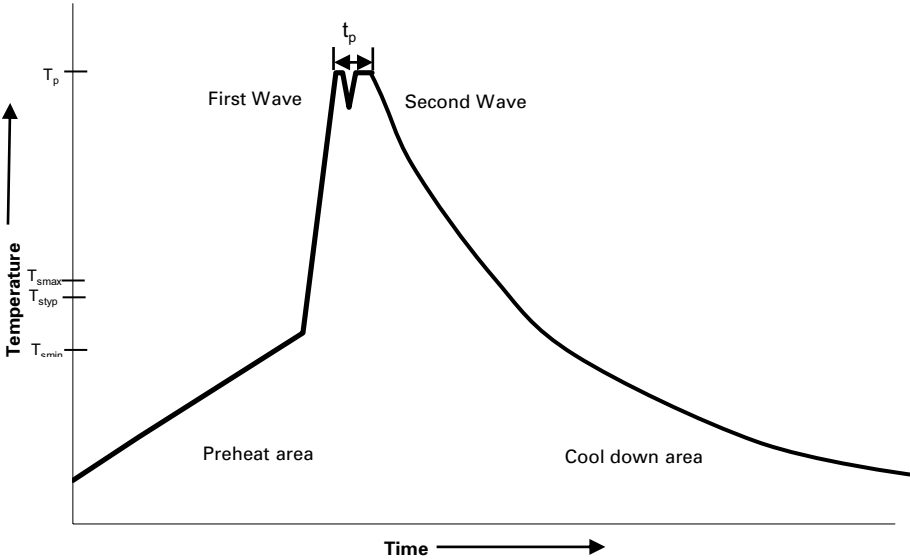
Packaging information-(Bulk package)

Part number	Unit pack (Inner box)				Shipping case (Carton)					
	External dimensions-mm			Package QTY pcs	External dimensions-mm			Box QTY (pcs)	QTY (pcs) Carton	Gross weight g
	L	W	H		L	W	H			
HVH0812-2R7205-R	340	200	140	4000	415	360	170	2	8000	8958
HVH0816-2R7305-R	340	200	140	3500	415	360	170	2	7000	10022
HVH0820-2R7405-R	340	200	140	3000	415	360	170	2	6000	10686
HVH1020-2R7705-R	340	200	140	2000	415	360	170	2	4000	10158
HVH1025-3R0106-R	340	200	140	1600	415	360	170	2	3200	10638
HVH1030-2R7126-R	340	200	140	1200	415	360	170	2	2400	9246
HVH1220-2R7156-R	340	200	140	1200	415	360	170	2	2400	9726
HVH1225-2R7186-R	340	200	140	1000	415	360	170	2	2000	9990
HVH1230-2R7206-R	340	200	140	800	415	360	170	2	1600	9038
HVH1625-2R7306-R	338	197	68	220	415	360	170	4	880	8080
HVH1630-2R7356-R	338	197	68	220	415	360	170	4	880	8960
HVH1840-2R7706-R	338	197	68	152	415	360	170	4	608	9648
HVH1860-2R7127-R	338	197	68	106	415	360	170	4	424	10648

Part numbering system

HVH	0812	-2R7	20	5	-R
Family code	Size reference (mm)		Voltage (V) R= decimal	Capacitance (µF) value	Multiplier
HVH = Family code	Diameter = 8	Length = 12	2R7=2.7 V	Example 205= 20 x 10 ⁵ µF or 2.0 F	Standard product

Wave solder profile



Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and soak • Temperature max. (T_{smax}) • Time max.	100 °C 60 seconds	100 °C 60 seconds
Δ preheat to max temperature	160 °C max.	160 °C max.
Peak temperature (T_p)*	220 °C – 260 °C	250 °C – 260 °C
Time at peak temperature (t_p)	10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate	~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25 °C to 25 °C	4 minutes	4 minutes

Manual solder

+350 °C, 4-5 seconds. (by soldering iron), generally manual, hand soldering is not recommended.

Cleaning/Washing

Avoid cleaning of circuit boards, however if the circuit board must be cleaned use static or ultrasonic immersion in a standard circuit board cleaning fluid for no more than 5 minutes and a maximum temperature of +60 °C. Afterwards thoroughly rinse and dry the circuit boards. In general, treat supercapacitors in the same manner you would an aluminum electrolytic capacitor.

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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