TVH 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 approximatley 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

- 3.0 V operating volatge
- 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

Pb HALOGEN HF FREE RoHS

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	1.0 F to 30 F
Maximum working voltage	3.0 V
Surge voltage	3.15 V
Operating temperature range	-40 °C to +65 °C
Extended temperature range	-40 °C to +85 °C (with linear voltage derating to 2.5 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)	Stored energy[3] (mWh)	Peak power[4] (W)	Continuous current[6] (A)	Pulse current[5] (A)	Short circuit current[7] (A)
1.0	-10%/+100%	TVH0812-3R0105-R	300	220	7.0	1.3	9.38	0.47	1.2	12.5
2.0	-10%/+50%	TVH0816-3R0205-R	200	150	12	2.5	12.5	0.61	2.2	16.7
7.0	-10%/+30%	TVH1020-3R0705-R	105	70	24	12.5	21.4	1.0	6.1	28.6
10	-10%/+30%	TVH1025-3R0106-R	83	55	30	12.5	27.1	1.3	8.2	36
10	-10%/+30%	TVH1220-3R0106-R	68	45	36	12.5	33.1	1.4	8.9	44
30	-10%/+50%	TVH1630-3R0306-R	30	20	90	37.5	75	2.9	23.7	100

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) $= \frac{0.5 \times C \times V^2}{3600} * 1000$
4. Peak power (W) $= \frac{V^2}{4 \times DC\ ESR}$
5. Pulse current in Amps (A), 1 second discharge from rated voltage to half rated voltage $= \frac{1/2 * C * V}{(1+DC\ ESR * C)}$
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 (1000 hours @ +65 °C/3.0 Vdc)	≥ 70%	≤ 300%
Life (1000 hrs @ +85 °C/2.5 Vdc)	≥ 70%	≤ 300%
Charge/Discharge cycles (500,000 cycles @+25°C)*	≥ 70%	≤ 200%
Low temperature @ -40 °C	≥ 70%	≤ 200%
High temperature @ +65 °C	≥ 70%	≤ 200%
Humidity, 240 hours @ +40 °C/90% RH	≥ 70%	≤ 200%
Storage, uncharged, 1000 hours @ +65 °C	≥ 70%	≤ 300%
Shelf life, uncharged, @ +25 °C, <50% RH) 3 years		

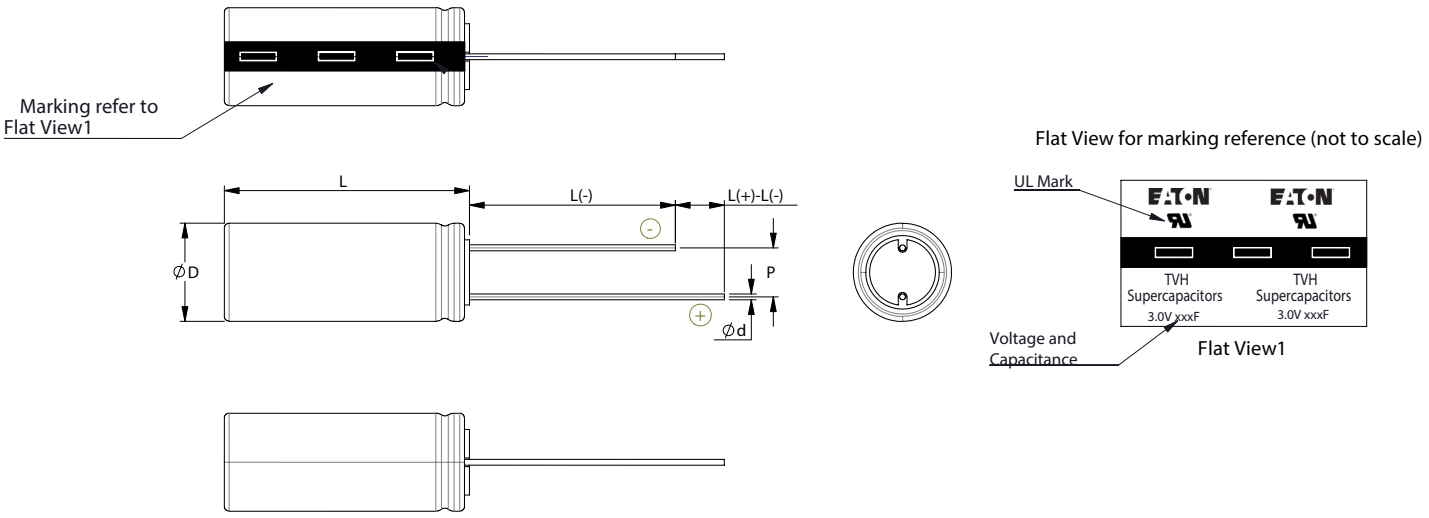
* Cycle: 3.0 V to 1.5 V, 1s rest @ +25 °C.

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	ØD +0.5	L ±2.0	Ød ±0.05	P ±0.5	L (-) min	L (+) - L(-) min	Voltage/Capacitance marking	Mass (g typical)
TVH0812-3R0105-R	8.0	12.0	0.6	3.5	15.0	4.0	3.0V 1F	1.0
TVH0816-3R0205-R	8.0	16.0	0.6	3.5	15.0	4.0	3.0V 2F	1.28
TVH1020-3R0705-R	10.0	20.0	0.6	5.0	15.0	4.0	3.0V 7F	2.3
TVH1025-3R0106-R	10.0	25.0	0.6	5.0	15.0	4.0	3.0V 10F	2.9
TVH1220-3R0106-R	12.5	20.0	0.6	5.0	15.0	4.0	3.0V 10F	3.55
TVH1630-3R0306-R	16.0	30.0	0.8	7.5	15.0	4.0	3.0V 30F	8.3



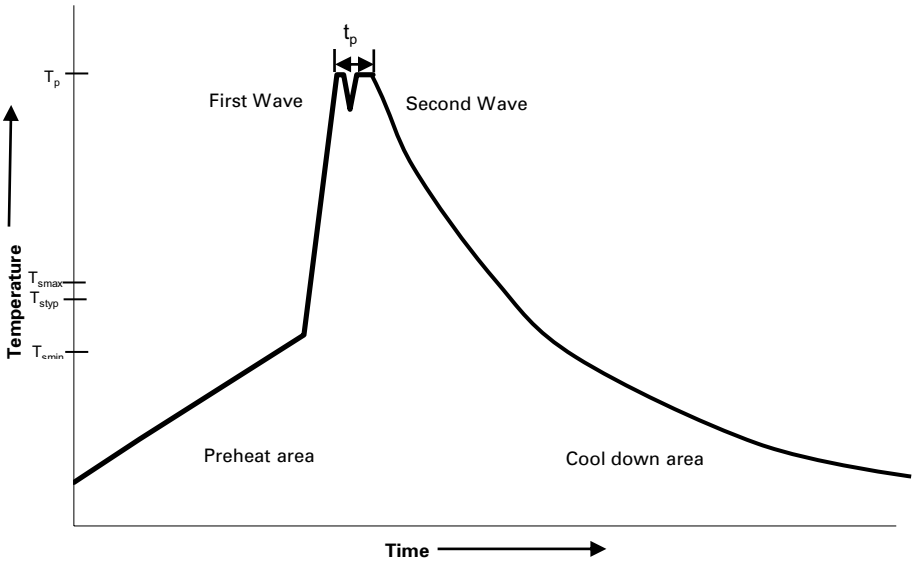
Packaging information-(Bulk package)

	Unit pack (Inner box)				Shipping case (Carton)					
	External dimensions-mm			Package QTY	External dimensions-mm			Box QTY	QTY (pcs)	Gross weight
Part number	**L**	**W**	**H**	**pcs**	**L**	**W**	**H**	**(pcs)**	**Carton**	**g**
TVH0812-3R0105-R	340	200	140	4000	415	360	170	2	8000	9358
TVH0816-3R0205-R	340	200	140	3500	415	360	170	2	7000	10302
TVH1020-3R0705-R	340	200	140	2000	415	360	170	2	4000	10558
TVH1025-3R0106-R	340	200	140	1600	415	360	170	2	3200	10638
TVH1220-3R0106-R	340	200	140	1200	415	360	170	2	2400	9726
TVH1630-3R0306-R	338	197	68	220	415	360	170	2	880	9048

Part numbering system

TVH	**0812**		**-3R0**	**10**	**5**	**-R**
Family code	Size reference (mm)		Voltage (V) R= decimal	Capacitance (µF) value	Multiplier	Standard product
TVH = Family code	Diameter = 8	Length = 12	3R0=3.0 V	Example 105= 10 x 10^5 µF or 1.0 F		

Wave solder profile



Profile Feature		Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and soak	• Temperature max. (T_{smax})	100 °C	100 °C
	• Time max.	60 seconds	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.

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