

TVA Supercapacitors

Automotive grade cylindrical cells

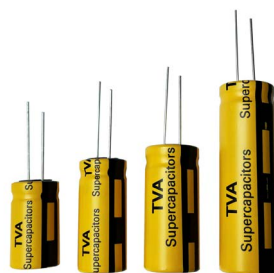


Photo is representative

Description

Eaton 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. 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 megawatts. 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 -40 °C and up to +85 °C.

Features

- 3.0 V operating voltage for high power and high energy
- Ultra low ESR for high power density
- Large capacitance for high energy density
- Tested according to AEC-Q200
- UL recognized

Applications

Automotive:

- e-latch
- e-call
- Boardnet stabilization
- Car video recorder

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

Ratings¹⁰

Capacitance	10 F to 100 F
Maximum working voltage	3.0 V
Surge voltage	3.3 V
Capacitance tolerance	-10% to +30% (+20 °C)
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 (F)	Part number	Maximum initial ESR ¹ (Ω)	Nominal leakage current ^{1,2} (μA)	Stored energy ³ (mWh)	Peak power ⁴ (W)	Pulse current ⁵ (A)	Continuous current ⁶ (A)	Typical thermal resistance ⁷ Rth (°C/W)	Short circuit current ⁸ (A)
10	TVA1030-3R0106-R	0.046	25	12.5	48.9	10.27	-	-	65.2
34	TVA1245-3R0346-R	0.026	75	42.5	86.5	27	-	-	115.3
15	TVA1325-3R0156-R	0.034	35	18.75	66.2	14.9	-	-	88.2
25	TVA1625-3R0256-R	0.019	60	31.3	118	25.4	4.2	47	157.9
35	TVA1635-3R0356-R	0.015	90	43.8	150	34	5.1	39	200**
60	TVA1840-3R0606-R	0.013	135	75	173	51	6.7	26	231**
100	TVA1860-3R0107-R	0.011	225	125	225	71	11.7	10	273**

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

Performance

Parameter	Capacitance change (% of initial value)	ESR (% of maximum initial value)
Lifetime: (1000 hours at 3.0 V, +65 °C)	≤ 30%	≤ 200%
Lifetime: (1000 hours at 2.5 V, +85 °C)	≤ 30%	≤ 250% (TVA10xx, TVA12xx, TVA13xx) ≤ 200% (TVA16, TVA18xx)
Charge/Discharge Cycles ⁹ : (500,000 at +20 °C)	≤ 30%	≤ 200%
Storage: (3 years, uncharged, <35 °C)	≤ 5%	≤ 110%
High temperature storage:: uncharged	≤ 30%	≤ 400% at +85 °C (TVA10xx, TVA12xx, TVA13xx) ≤ 200% at +65 °C (TVA16xx) ≤ 600% at +85 °C (TVA16xx) ≤ 200% at +85 °C (TVA18xx)
Thermal shock: 1000 cycles, -40 °C to +85 °C	≤ 30%	≤ 200% at 2.5 V (TVA10xx, TVA12xx, TVA13xx) ≤ 800% at 0.0 V (TVA16xx) ≤ 300% at 0.0 V (TVA18xx)

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

2. Leakage current at +20 °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) = $\frac{V^2}{4 \times ESR}$

5. Pulse current for 1 second from full rate voltage to half voltage.(A) = $\frac{0.5 \times V \times C}{(1 + ESR \times C)}$

6. Continuous current with a 15 °C temperature rise. Continuous current (A) = $\sqrt{\frac{P}{ESR \times Rth}}$

7. Thermal resistance (Rth) cell body temperature to ambient in open air in degrees C per Watt (°C/W).

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

9. Cycling between rated voltage and half voltage, 3 second rest at +20 °C.

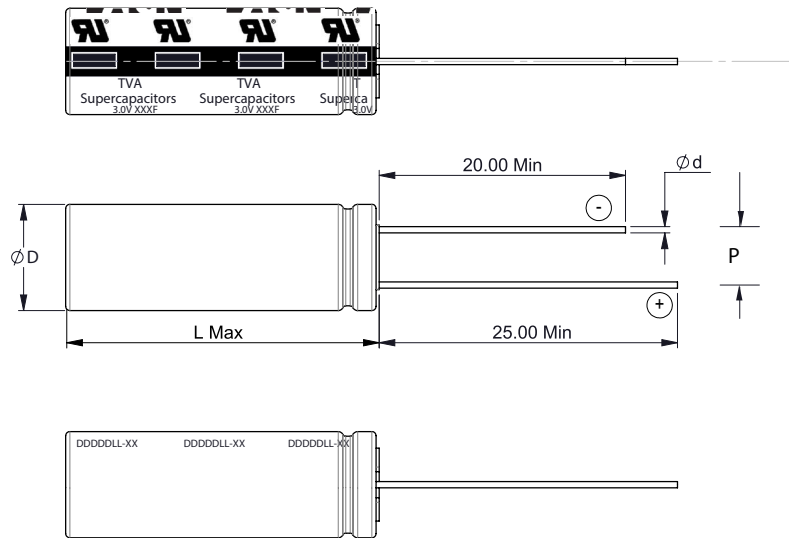
10. Testing and verification of product under end application conditions is recommended

Safety and certifications

Environmental compliance and general specifications	RoHS, REACH, AEC-Q200 Grade 3 (Meets Eaton's internal AEC-Q200 test plan)
Agency information	UL810a, UL recognized file number MH46887
Shock and vibration	MIL-STD 202G
Warnings	Do not overvoltage, do not reverse polarity
Shipping	No restrictions, per UN3499 with all cells <0.3 watt-hours

Dimensions (mm) and mass (g)

Part number	ØD maximum	L maximum	P ±0.5	Ød ±0.02	Mass (typical)
TVA1030-3R0106-R	10.5	31.5	5.0	0.6	8.7
TVA1245-3R0346-R	12.9	49	5.0	0.6	-
TVA1325-3R0156-R	13.5	28.4	5.0	0.6	-
TVA1625-3R0256-R	16.5	28.9	7.5	0.8	7.3
TVA1635-3R0356-R	16.5	38	7.5	0.8	9.3
TVA1840-3R0606-R	18.5	42	7.5	0.8	13
TVA1860-3R0107-R	18.5	60.5	7.5	0.8	20



Part numbering system

TVA	1840	-3R0	60	6	-R
Family code	Size reference (mm)		Voltage (V) R = decimal	Capacitance (µF) value	Multiplier
TVA = Family code	Diameter = 18	Length = 40	3R0 = 3.0 V	Example 606= 60 x 10 ⁶ µF or 60 F	
					Standard product

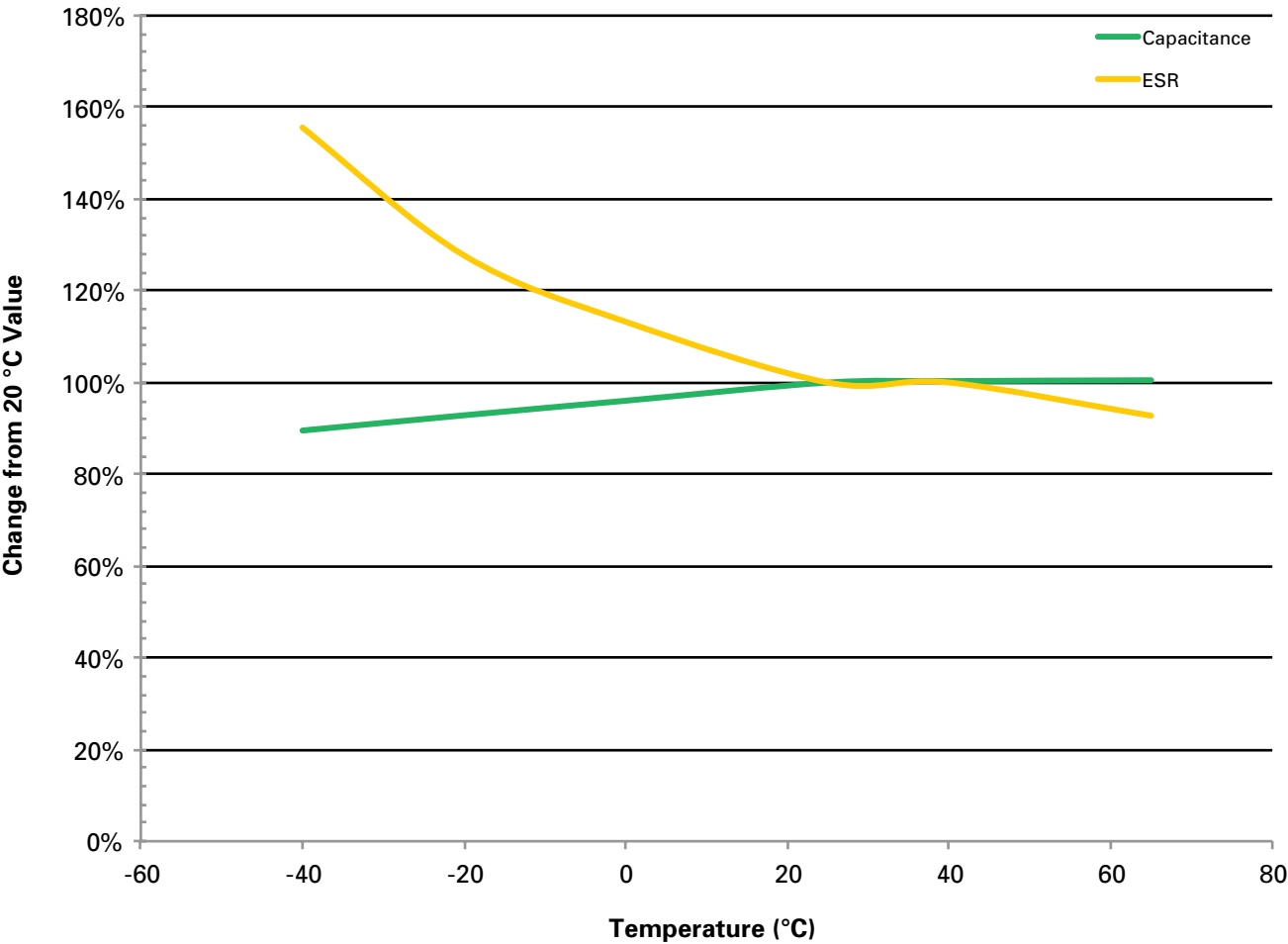
Packaging information

- Standard packaging: Bulk, 100 parts per bag (10 mm–13 mm diameter)
- 16 mm–18 mm diameter products: Bulk package quantity varies by size.

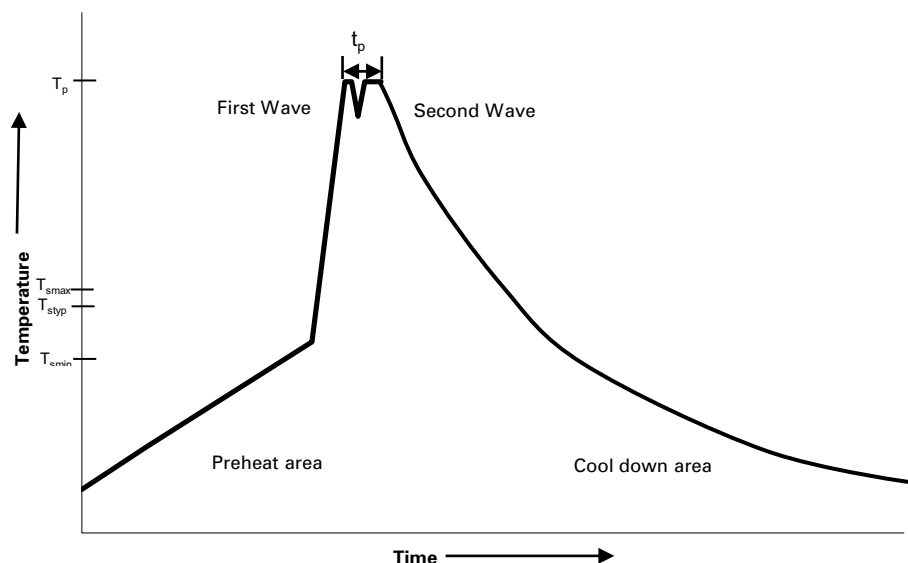
Part marking

- Eaton logo
- Capacitance value (F)
- Maximum operating voltage (V)
- TVA Supercapacitors
- Polarity mark
- date code DDDDDLL-xx.
DDDDD = Manufacturing date & family designation
LL = Manufacturing location code
xx = batch identifier

Temperature vs. capacitance and ESR



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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