XT Supercapacitors

Snap-in cylindrical cells

Features and benefits

- 3.0 V operating voltage for high power and energy
- Ultra low ESR for very high power density
- Large capacitance for high energy density
- UL recognized

Applications

- Industrial backup/ridethrough
- Energy storage for UPSs
- Automotive pulse power
- Medical equipment pulse power

Description

Eaton supercapacitors are unique, ultra-high capacitance devices utilizing electrochemical double layer capacitor (EDLC) construction combined with new, high performance materials.

This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to specific applications that range from a few micro-amps for several days to several amps for seconds.

The XT family advances the energy density by 20% and power density by 10%. These advances allow longer operating life and/or lower cost systems.

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Ratings

Capacitance	275 F to 555 F
Working voltage	3.0 V
Surge voltage	3.3 V
Capacitance tolerance	-5% to +20% (+20 °C)
Operating temperature range	-40 °C to +65 °C
Extended operating temperature range	-40 °C to +85 °C (with linear voltage derating to 2.6 V @ +85 °C)

Specifications

Capacitance[1] (F)	Part Number	Maximum initial ESR[1] (mΩ)	Continuous current[6] (A)	Peak current[5] (A)	Nominal leakage current[2] (mA)	Peak power[4] (W)	Stored energy[3] (mWh)	Typical thermal resistance[7] Rth (°C/W)	Short circuit current**,[8] (A)
275	XT3550-3R0287-R	4.5	20.4	184	0.60	500	344	8	670
370	XT3560-3R0377-R	3.2	25.9	254	0.85	700	463	7	940
555	XT3585-3R0567-R	2.6	33.0	341	1.30	870	694	5	1150

** Short circuit will cause permanent damage to the leads

Performance

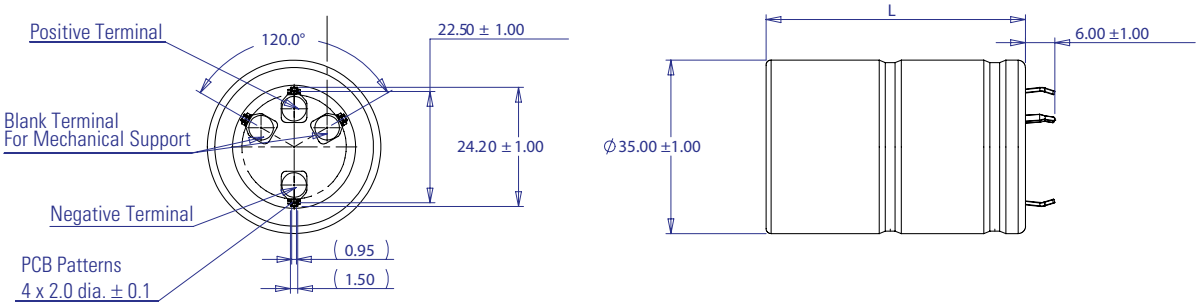
Parameter	Capacitance Change (% of initial value)	ESR (% of initial maximum value)
Lifetime — 1,500 hours at maximum rated voltage and operating temperature	≤ 20%	≤ 200%
Charge/discharge cycling[9] — 500,000 at +20 °C	≤ 20%	≤ 200%
Storage, uncharged, up to +35 °C — 3 years	≤ 5%	≤ 10%

1. Capacitance, Equivalent Series Resistance (ESR) and Leakage current are measured according to IEC62391-1.
2. Leakage current at +20 °C after 72 hour charge and hold.
3. Stored Energy (mWh) $= \frac{0.5 \times C \times V^2 * 1000}{3600}$
4. Peak Power (W) $= \frac{V^2}{4 \times ESR}$
5. Peak 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) $= \sqrt{\frac{\Delta T}{ESR \times Rth}}$
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 maximum working voltage and half voltage with 3 seconds rest at +20 °C.

Safety and Certifications

Agency information	UL810a
Shock and vibration	MIL-STD-202G
Environmental	RoHS and REACH compliant, lead free, halogen free,
Warnings	Do not overvoltage, do not reverse polarity
Shipping	No restrictions, per UN3499 with all cells <10 watt-hours

Dimensions (mm) and Mass (g)



Part Number	L (±1.0)	Typical Mass (g)
XT3550-3R0287-R	53	62
XT3560-3R0377-R	63	72
XT3585-3R0567-R	87.5	108

Part numbering system

XT	3560		–3R0	37	7	-R
Family code	Size reference (mm)		Voltage (V) R = decimal	Capacitance (µF) Value	Multiplier	Standard product
XT = Family Code	Diameter = 35	Length= 60	3R0 = 3.0 V	Example 377= 37 x 10^7 µF or 275 F		

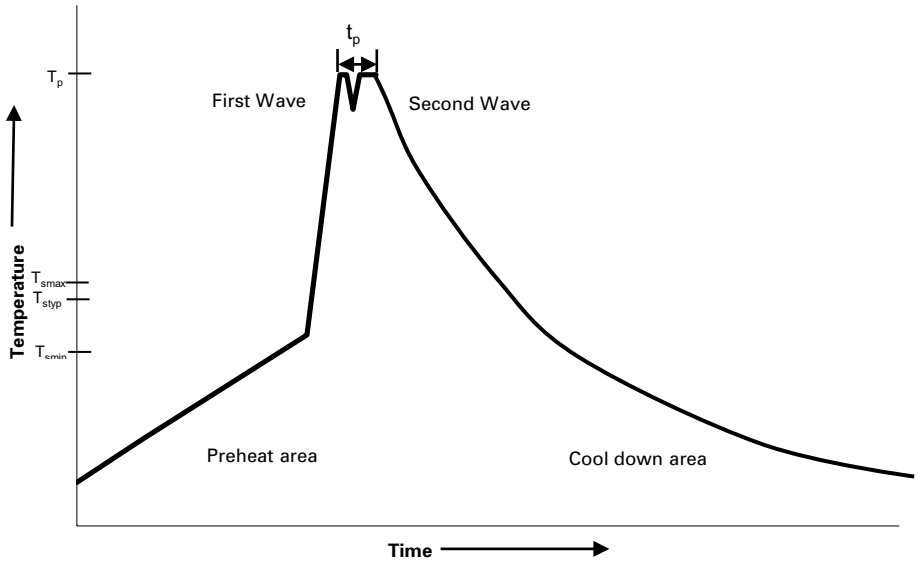
Packaging information

- Standard packaging: Bulk, 20 parts per box

Part Marking

- Manufacturer
- Capacitance (F)
- Maximum working voltage (V)
- Family code or part number
- Polarity
- 2D matrix serial code

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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Printed in USA
Publication No. 10762 BU-MC18002
February 2018

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