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.

Powering Business Worldwide

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

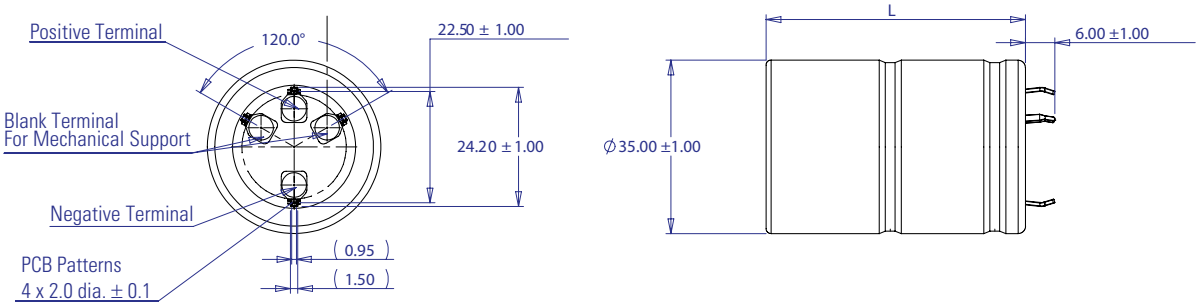
Parameter	Capacitance Change (% of initial value)	ESR (% of initial maximum value)
Lifetime — 1,500 hours at maximum rated voltage and operating temperature	≤ 20%	≤ 200%
Charge/discharge cycling[9] — 500,000 at +20 °C	≤ 20%	≤ 200%
Storage, uncharged, up to +35 °C — 3 years	≤ 5%	≤ 10%

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		

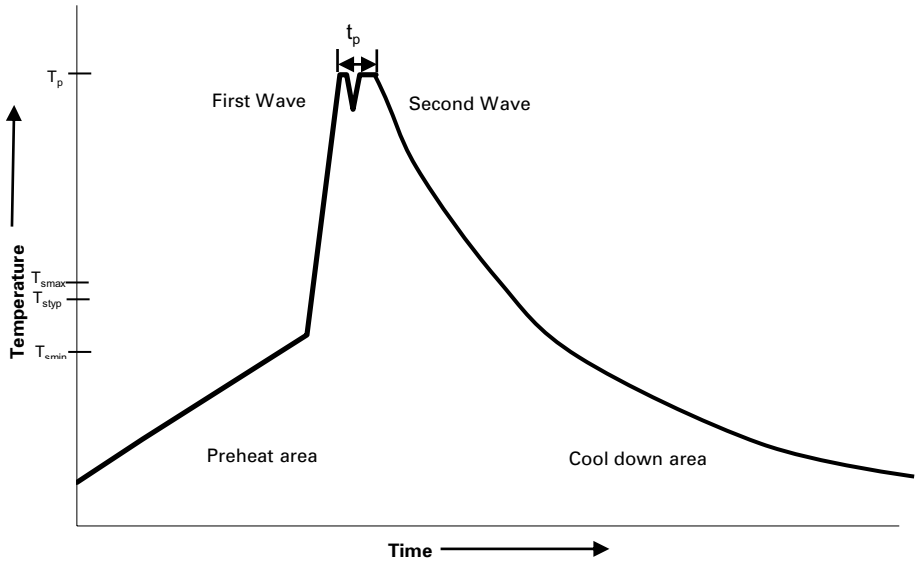
Packaging information

- 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.

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.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin

Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/electronics

© 2018 Eaton
All Rights Reserved
Printed in USA
Publication No. 10762 BU-MC18002
February 2018

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

Powering Business Worldwide