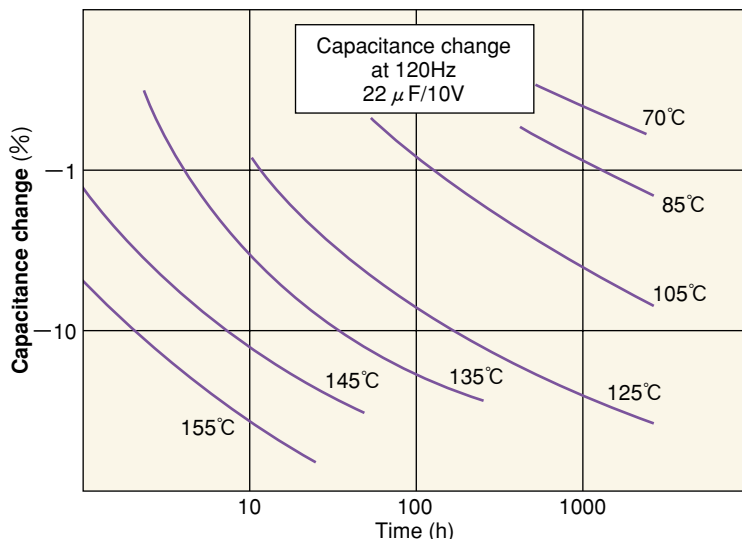


1. Temperature acceleration test (Endurance)



The decrease in capacitance of **OS-CON** depends on temperature.

The left figure shows the speed of capacitance decrease at each temperature. This graph indicates that temperature coefficient of **OS-CON** lifetime is 10 times by 20°C reduction.

Compare with this, aluminum capacitor lifetime is 2 times by 10°C reduction.

Estimation of life time

OS-CON	Aluminum electrolytic capacitor
105°C → 2,000h	105°C → 2,000h
95°C → 6,324h	95°C → 4,000h
85°C → 20,000h	85°C → 8,000h
75°C → 63,245h	75°C → 16,000h

※ Guarantee temperature of **OS-CON** is 105°C, except for SEQP, SVQP and SVPD series.

※ The following life time are not guaranteed but presumptive values.

Even if **OS-CON** and an aluminum electrolytic capacitor are guaranteed on 2,000 hours at 105°C, The life span results in differences as temperature drops.

OS-CON has a longer life span compared with an aluminum electrolytic capacitor.

2. Reliability presumption of life

The capacitance of **OS-CON** is getting smaller as time goes by on Endurance.

This means wear-failure of **OS-CON** is open mode, which is a main failure factor.

The life time is different by each operating temperature and self-heating by ripple current.

The following formula outline could make it possible to estimate the presumptive lifetime of **OS-CON** at ambient temperature Tx (°C).

The result of the following page estimation is not guaranteed but presumptive values based on actual measurement. The estimated life-span is limited up to 15 years.

2-1. Conductive polymer electrolyte type

$$L_x = L_o \times 10^{\frac{T_o - T_x}{20}}$$

L_x : Life expectancy (h) in actual use (temperature T_x)

L_o : Guaranteed (h) at maximum temperature in use

T_o : Maximum operating temperature

T_x : Temperature in actual use (ambient temperature of OS-CON) (°C)

Please contact us about the presumptive lifetime of OS-CON used at the ambient temperature of 125°C (SVQP, SVPD, SEQP series), when the heat-proof characteristics of sealing rubber have to be factored in.

※The estimated life expectancy of conductive polymer electrolyte type can be calculated without consideration of self-heating under application of the ripple current

※SVPS series: Self-heating temperature by allowance ripple current (°C)

The self-heating temperature under application of the rated ripple current

series	size	Self-heating
SVP, SVPA, SVPC, SVPS*	Except for A5, B6	approx. 20°C
SVP, SVPA, SVPC, SVPS*	A5, B6	approx. 10°C
SVPB, SVPE, SVPF, SEP, SEPC	All	approx. 20°C
SVQP, SEQP, SVPD	All	approx. 2°C

2-2. Organic semiconductive electrolyte type

$$L_x = L_o \times 10^{\frac{T_o - (T_x + \Delta T_x)}{20}}$$

L_x : Life expectancy (h) in actual use (temperature T_x)

L_o : Guaranteed (h) at maximum temperature in use

T_o : Maximum operating temperature

T_x : Temperature in actual use (ambient temperature of OS-CON) (°C)

ΔT_x : Self-heating temperature by Ripple current (°C)

$$\Delta T_x = (I_x / I_o)^2 \times \Delta T \quad I_x \leq I_o$$

I_o : Allowable ripple current at 45°C or less (Arms)

I_x : Actual flow of ripple current (Arms)

Note : The value of I_x should be below the value of I_o with the coefficient

Ambient temp. (°C)	≤45	45 < T _x ≤ 65	65 < T _x ≤ 85	85 < T _x ≤ 95	95 < T _x ≤ 105
Coefficient	1.0	0.85	0.7	0.4	0.25

Self-heating value ΔT by maximum allowable ripple current (45°C or less) varies according to case size. Refer to the rough values in the chart below :

Case size	A, A'	B, B'	C, C'	D	E, E', E1	F, F', F _o , G, H
ΔT (°C)	8	10	15	16	18	20

3. Factors of short circuit mode

The factors of short circuit are as follows.

- (1) Applying voltage over the rated voltage.
- (2) Applying reverse voltage
- (3) Excessive mechanical stress
- (4) Applying an excessive surge current by sudden charge or discharge over the specification.