

3. Reliability Presumption of life

The **OS-CON**, as pointed out in on P47 about High-temperature load, loses capacitance as time goes by as shown in fig.6-1.

From this, the wear-out failure of **OS-CON** leads to an open mode by decrease of the capacitance.

This wear-out failure by decrease of the capacitance mainly causes failure of **OS-CON**.

The occurrence time of this wear-out failure (lifetime) varies according to the ambient temperature in which the products are used, also self-heating temperature through the flow of Ripple current. Estimate of **OS-CON**'s life is approx. 10 times at 20°C reduction.

The estimated life Lx (hours) of an **OS-CON** at ambient temperature Tx (°C) may be roughly expressed by the following equation :

$$Lx = Lo \times 10^{\frac{To - (Tx + \Delta Tx)}{20}}$$

Lx : Life expectancy (Hrs.) in actual use (temperature Tx)

Lo : Guaranteed (Hrs.) at maximum temperature in use

To : Maximum operating temperature

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

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

$$\Delta Tx = (Ix/Io)^2 \times \Delta T \quad Ix \leq Io$$

Io : Maximum allowable Ripple current at +45°C or less (Arms)

Ix : Actual flow of Ripple current (Arms)

Note : The value of Ix apply to the following temperature co-efficient

Ambient Temp (°C)	to +45	+45<Tx≤+65	+65<Tx≤+85	+85<Tx≤+95	+95<Tx≤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',A5	B,B',B6	C,C',C6	E,E',E7	D	F,F',F0,F8,F12	G	H
ΔT (°C)	8	10	15	18	16	20	20	20

This estimation comes out of presumed values based on actual measurement results, which does not guarantee the entire production lots.

4. Factors of Short Circuit Mode

1. Applying more than rated voltage.
2. Applying reverse voltage more than spec.
3. Excessive mechanical stress.
4. Applying rush current by sudden discharge more than spec.