

## Solid Aluminum Capacitors with Organic Semiconductor Electrolyte

### TEMPERATURE ACCELERATION TEST (High-temperature load)

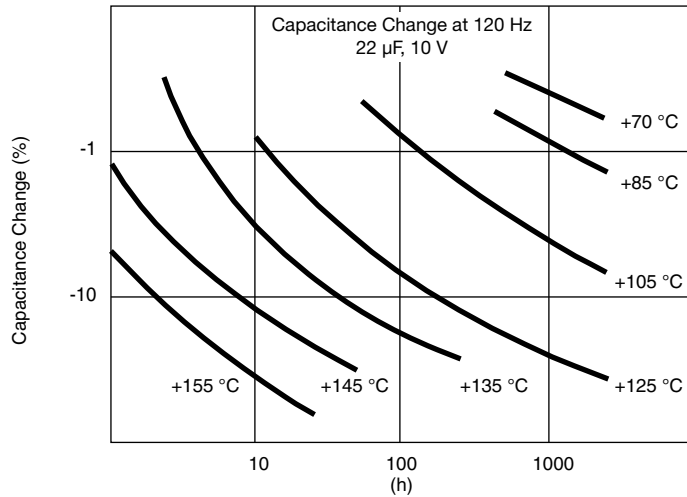


Fig. 1

The decrease of capacitance causes a failure in the lifetime of the Vishay OS-CON capacitor. The capacitance decreases mainly due to temperature. Fig. 2 shows the decreasing speed in capacitance at each temperature. From this, the temperature coefficient of the Vishay OS-CON capacitor's lifetime becomes 10 times at 20 °C reduction. The temperature coefficient of the aluminum electrolytic capacitor becomes twice at 10 °C reduction compared to that in the usual lifetime.

This indicates that, for instance, their deterioration at +105 °C x 2000 h, can be converted into those at +105 °C, +85 °C and +65 °C as follows:

Estimation of Life Time:	OS-CON	Aluminum Electrolytic Capacitor
	105 °C = 2000 h	105 °C = 2000 h
	95 °C = 6324 h	95 °C = 4000 h
	85 °C = 20 000 h	85 °C = 8000 h
	75 °C = 63 245 h	75 °C = 16 000 h

(These are estimated values, not actual amounts that can be guaranteed.)

This means that the Vishay OS-CON capacitor has extremely longer life in practical use even for +105 °C x 2000 h, guaranteed products.

### RELIABILITY PRESUMPTION OF LIFE

The capacitance of the OS-CON is getting smaller as time goes with endurance test.

This means wear-failure of the 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 is used to estimate the presumptive lifetime of the OS-CON at ambient temperature  $T_x$  (°C).

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

Calculation formula of estimated life expectancy:

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

$L_x$  = Life expectancy (h) in actual use (temperature  $T_x$ )

$L_o$  = Guaranteed (h) at maximum temperature in use

$T_o$  = Maximum operating temperature (°C)

$T_x$  = Temperature in actual use (ambient temperature of the OS-CON) (°C)

Please contact us separately about estimated life expectancy of SVPD series guaranteed at 125 °C.

#### Note

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