Solid Aluminum Capacitors  
with Organic Semiconductor Electrolyte

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

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:

<table>
<thead>
<tr>
<th>Temp. (°C)</th>
<th>Life Time (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>2000</td>
</tr>
<tr>
<td>95</td>
<td>6324</td>
</tr>
<tr>
<td>85</td>
<td>20000</td>
</tr>
<tr>
<td>75</td>
<td>63240</td>
</tr>
</tbody>
</table>

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.