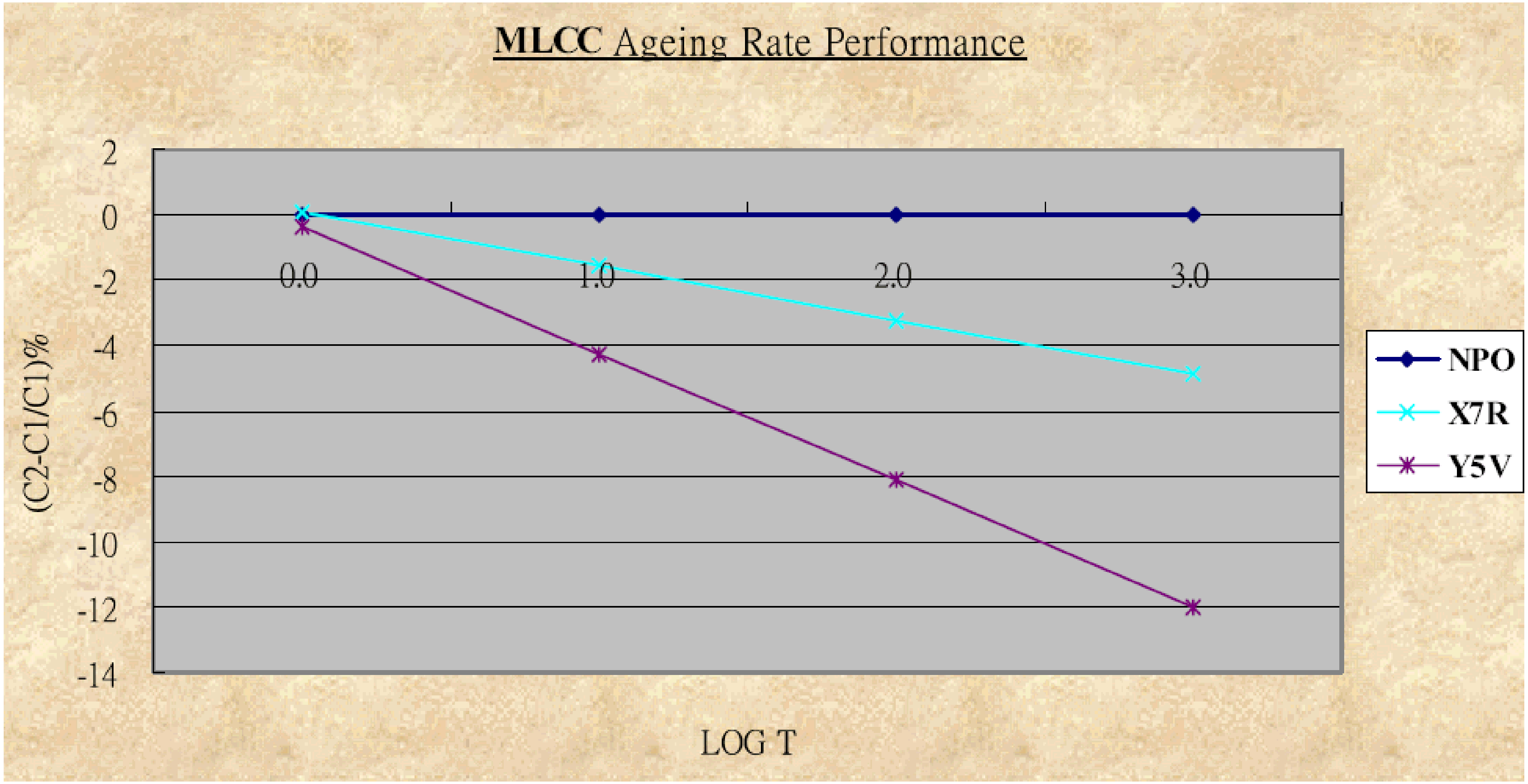
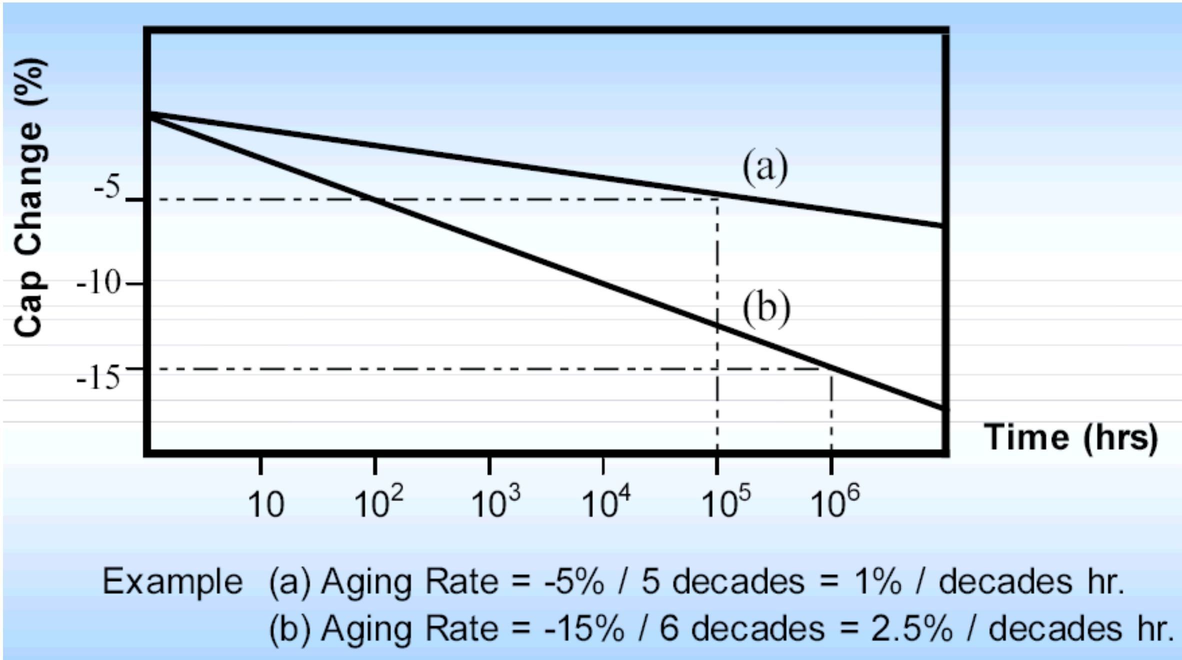
Aging Information

Roughly Trend about MLCC



Technical Brochure:



$K = K_0 - m \log t$

Where K = dielectric constant at any time t

K_0 = dielectric constant at time t_0 ($t_0 < t$)

m = rate of decay (衰退率) = $(K_0 - K)/\log t$

= aging rate (老化率) = cap change (%/log t) (decade)

Technical Brochure:

The loss of capacitance with time is unavoidable with ferroelectric formulations, although it Can be reversed heating the dielectric above the Curie Point and reverting the material back To a "Para electric" cubic state. On cooling, however, spontaneous polarization will again occur As the material transforms to the tetragonal crystal habit, and new domains recommence the Ageing process. As is expected, no ageing is observed only in Para electric formulations, such As NPO, which do not possess the mechanism of spontaneous polarization.

The rate at which ageing may occur can be influenced by "voltage conditioning" of capacitors. It is found that units stressed by a DC voltage at elevated temperature (below the Curie Point) Will experience a loss of capacitance, but with a consequently lower ageing rate. It is Theorized that the voltage stress at the elevated temperature accelerates the domain Relaxation process. This voltage conditioning effect is, of course, eliminated if the unit ever Experiences temperature exceeding the Curie Point.

Capacitor manufacturers compensate for capacitance loss of ferroelectrics by adjustment of The testing limits, such that units do not age out of tolerance over a ling time period. For Example, for a dielectric with a 1.5% / decade ageing rate, the testing limits are raised 3%, i.e. Two decades of time. Units tested 100 hours after last exposure to the Curie Temperature Therefore will remain within tolerance for another two decades or 10,000 hours.

De-Aging Condition:

Before initial measurement (Class ll only) : Perform 150+0/100C for 1 hour and then set form 48±4 hours at room temp.