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## Shelf Life Guidelines for Ceramic Multilayer Capacitors

### Contents:

1. Considerations
2. Storage
3. Shelf Life

### 1. Considerations

The shelf life of ceramic capacitors depends on storage conditions and method of packaging. The ceramic dielectric will not exhibit either intrinsic or extrinsic failures due to shelf storage. The three concerns with ceramic surface mount capacitors in storage are solderability, tape and reel degradation, and aging of class II dielectric (X7R, Z5U, and Y5V).

The terminations will slowly oxidize with time degrading the solderability. Storage of the capacitors in free air and any contact with either sulfur dioxide or chlorine gas will excel the oxidation of the terminations.

Tape & Reel product should be protected from direct sunlight and used on a “first-in, first-out” basis. All forms of immediate packaging should not be opened until the capacitors are required for use with any residual product resealed as soon as practicable if not completely used.

Class II ceramic capacitors are manufactured with a ferroelectric formulation that exhibits a decay of capacitance with time in any storage condition. This phenomenon is called aging. The loss of capacitance with time is unavoidable with ferroelectric formulation. The aging can be reversed by heating the dielectric above the Curie Point (120°) and reverting the crystal structure back to its original state. This process can be repeated and will occur during the soldering process.

### 2. Storage

NOVACAP recommends all products be stored under the following conditions:

- 1) Parts are to be stored indoors in the original container.
- 2) Temperature from +5°C to +35°C (41°F to 95°F).
- 3) Relative Humidity between 40% to 75%.

### 3. Shelf Life

NOVACAP recommends the properly stored ceramic capacitors be used within two years of receipt.