

## Soldering Recommendation for Through Hole Mounted Film Capacitors

### Recommended Wave Soldering Profile

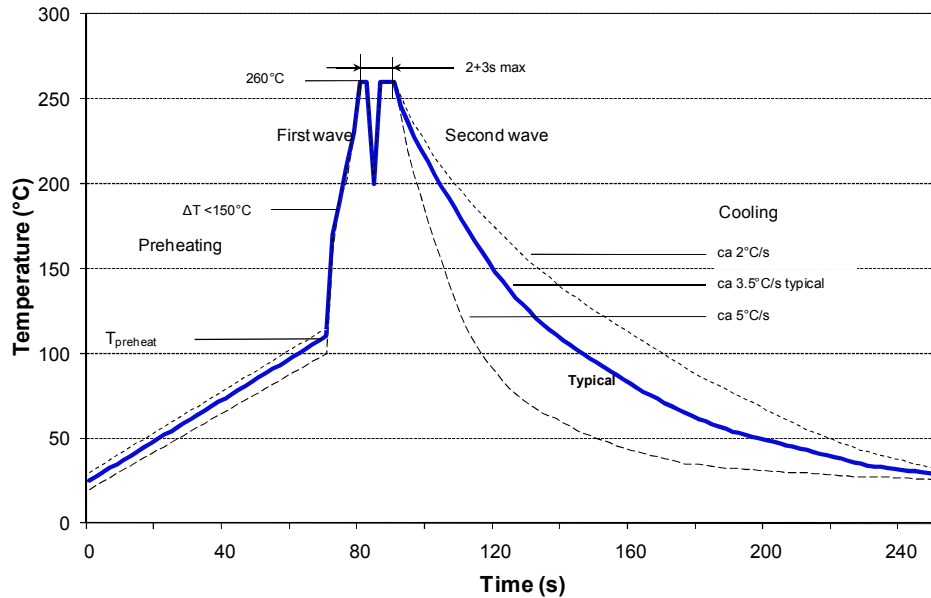


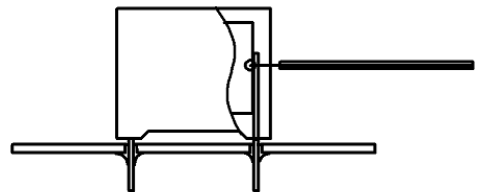
Figure 1

1. The table indicate the maximum set-up temperature of the soldering process

Dielectric Film Material	Maximum preheat Temperature			Maximum peak soldering temperature	
	Capacitor pitch ≤ 10mm	Capacitor pitch =15mm	Capacitor pitch >15mm	Capacitor pitch ≤ 15mm	Capacitor pitch >15mm
Polyester	130°C	130°C	130°C	270°C	270°C
Polypropylene	<b>100°C</b>	<b>110°C</b>	130°C	260°C	270°C
Paper	130°C	130°C	140°C	270°C	270°C
Polyphenylene sulphide	150°C	150°C	160°C	270°C	270°C

2. The maximum temperature measured inside the capacitor:  
 Set the temperature so that inside the element the maximum temperature is below the limit:-

Dielectric Film Material	Maximum temperature measured inside the element
Polyester	160°C
Polypropylene	110°C
Paper	160°C
Polyphenylene sulphide	160°C



Temperature monitored inside the capacitor.

**Caution:**

The implementation of RoHS Directive has forced to select SnAgCu (SAC) alloys or SnCu alloys as primary solder. This has increased the liquidus temperature from that of 183 °C for SnPb eutectic alloy to 217–221 °C for the new alloys. This means that the heat stress to the components, even in Wave Soldering, has increased considerably due to higher pre-heat and wave temperatures. The Polypropylene Capacitors are especially sensitive to heat (melting point of Polypropylene is 160 – 170 °C). The Wave Soldering can be destructive especially for mechanically small Polypropylene Capacitors (Lead spacing 5mm to 15 mm), and great care has to be taken when soldering them. The recommended solder profiles from KEMET should be used. In case of doubt, KEMET should be consulted. In general the Wave Soldering curve from IEC Publ. 61760-1 edition 2 gives a good guideline for successful soldering. See Figure 1.

Leaded film capacitors are not recommended for reflow soldering process. Exposing the capacitors to a soldering profile in excess of the above the recommended limits may result to degradation or permanent damage to the capacitors.

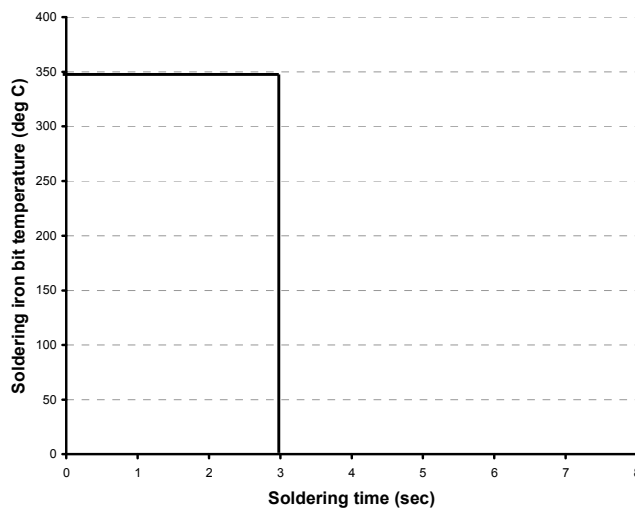
Do not place the polypropylene capacitor through an adhesive curing oven to cure resin for the SMD components. Insert leaded parts after the curing of SMD parts. Consult KEMET to discuss the actual temperature profile in the oven, if through hole components definitely have to pass the adhesive curing process.

Maximum two (2) soldering cycles, please allow time for capacitor surface temperature to return to normal temperature before the second soldering cycle.

**Recommended manual condition for lead type film capacitors:**

Following is the recommendation for manual soldering with soldering iron.

**Recommended Soldering Temperature**



Soldering iron tip temperature should set at 350 °C (+10°C max) with the soldering duration not more than 3 seconds.

### **Selective Soldering**

A special case of flow soldering is so called selective dip soldering. In this method the printed board with through-hole components to be soldered is preheated and transported over the solder bath as in normal flow soldering, but not touching the solder. When the board is over the bath, it is stopped and pre-designed solder pots are lifted from the bath with molten solder only at the places of the selected components, and pressed against the lower surface of the board to solder the components.

The temperature profile for selective soldering is similar to the double wave flow soldering given in this document, **but instead of two baths there is only one with time from 3s to 10s.**

In selective soldering risk of overheating is greater than in double wave flow soldering, and great care must be taken that the parts are not overheated.