

KEMET Hand Soldering Procedures

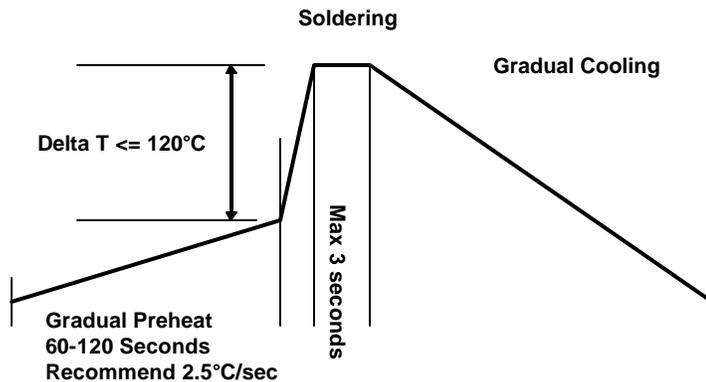
In hand soldering of the MLCC SMT capacitors, a manufacturer can utilize two hand soldering methodologies that include pre-heating or no pre-heating of the capacitors. KEMET recommends utilizing a pre-heating technique. However, due to the large temperature gradient between the capacitors and the tip of the soldering iron and the general lack of strenuous process control techniques manual soldering is not typically recommended. The thermal stresses from the large thermal gradients and the propensity of the operator touching the tip of the soldering iron to the device can lead to mechanical damage such as cracking or breaking of the devices and can ultimately end up on electrical failures.

When manually soldering, it is important that the soldering process be carefully monitored and carried out so that the temperature gradient falls within the recommended conditions below. KEMET has also published recommended touch-up guidelines and techniques in the technical bulletin F2103A, *Surface Mount Technology Repair Touch Up Hand Solder Can These Be Controlled?*, authored by Jim Berganthal that is available on www.kemet.com.

Process 1 with Preheating

1. Utilize 1.0mm thread eutectic solder with soldering flux in the core. Either a rosin-based or non-activated flux is recommended.
2. The capacitors shall be pre-heated so that the temperature gradient between the devices and the tip of the soldering iron is $\Delta T \leq 120^{\circ}\text{C}$ or below.
3. The temperature of the solder iron tip should not exceed 300°C .
4. The required amount of solder shall be melted in advance on the soldering tip.
5. After soldering the capacitors shall be cooled gradually at room ambient temperature. Forced air cooling is not permitted.

Manual Solder Profile with Pre-heating



Process 2 without Preheating

1. Soldering iron tip shall never directly touch the ceramic dielectrics and terminal electrodes of the capacitors.
2. Lands are sufficiently pre-heated with a soldering iron tip before sliding the soldering iron tip to the terminal electrode of the capacitor for soldering.

	Condition
Chip Size	0402-0805
Temperature of Soldering Iron	270°C Max
Wattage	20W Max
Shape of Soldering Iron	3mm Max
Soldering Time w/Soldering Iron	3 seconds Max