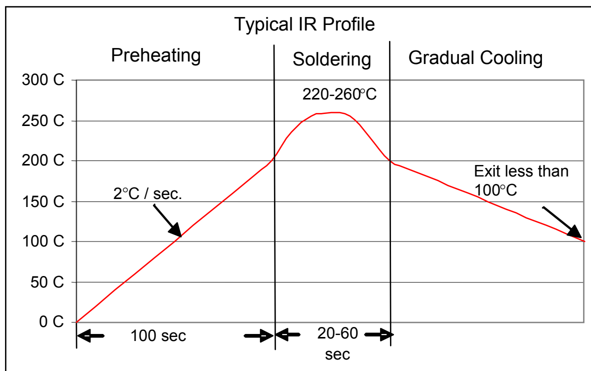
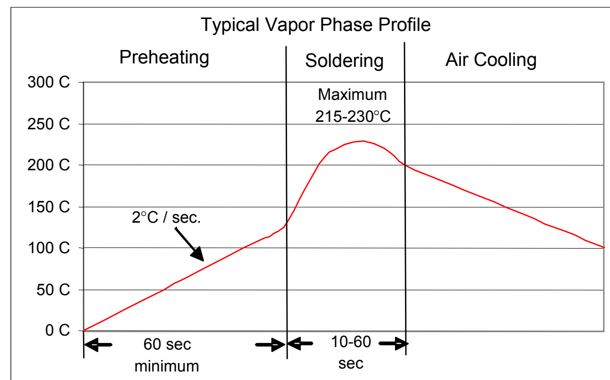
Recommended Solder Attachment Techniques for Multilayer Chip and Pre-Tinned Capacitors

DLI recommends three methods of reflow solder attachment: IR Reflow, Vapor Phase Reflow, and Hot Air Convection Reflow. Ideal profiles for any of the methods should exhibit a ramp up of approximately 2°C/second. It is advised not to exceed 4°C/second. In all applications, DLI recommends that the chip user employ a pre-heat temperature to within 100°C of the working temperature of the user's machine.

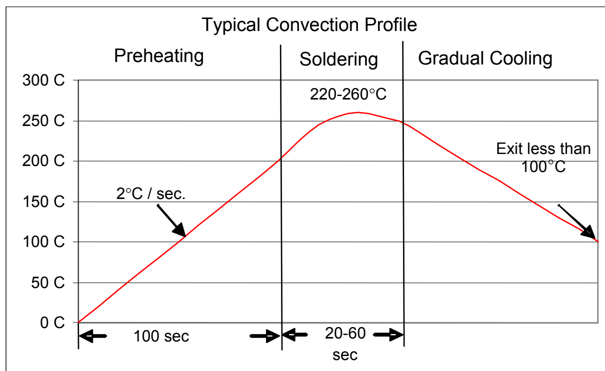
TYPICAL IR REFLOW PROFILE



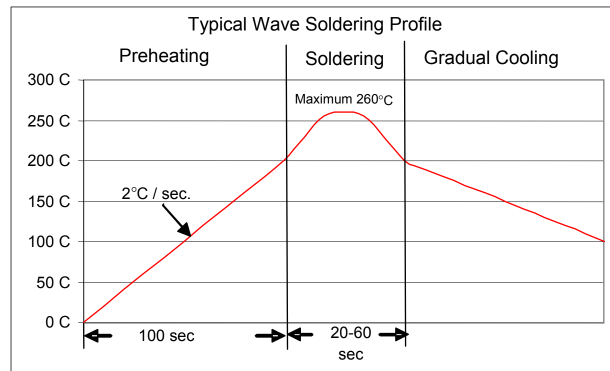
TYPICAL VAPOR PHASE REFLOW PROFILE



TYPICAL CONVECTION PROFILE



TYPICAL WAVE SOLDERING PROFILE



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Hand Soldering

Hand soldering with a soldering iron is an individual process, each solder connection can see different temperatures, stresses, and solder. The following hand soldering technique is recommended for proper installation of a chip capacitor across two lands of a printed circuit board.

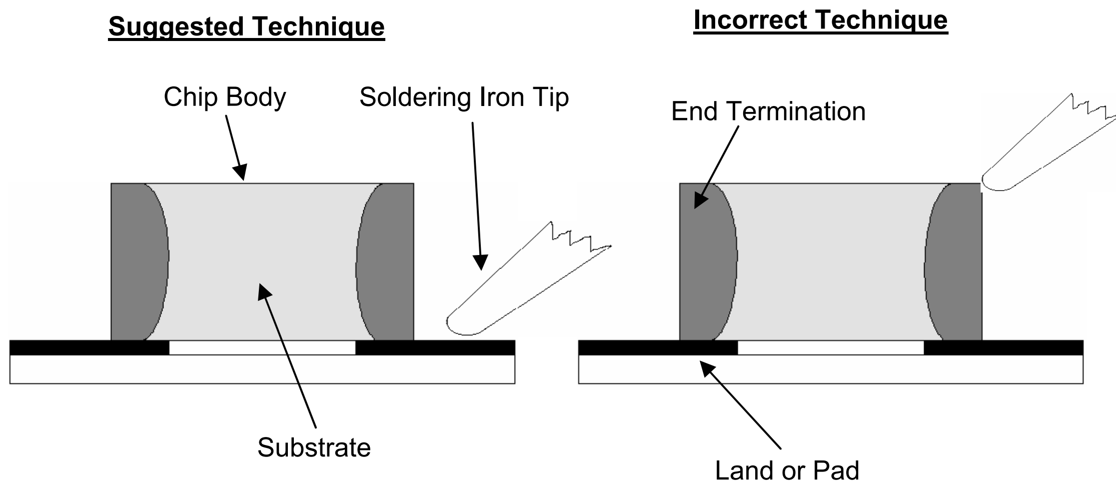
a. Carefully pick up the capacitor to be soldered with stainless steel tweezers, damage will not occur to the ceramic if handled carefully, and will act as a heat sink when soldering.

b. Place a drop of flux on each termination of the capacitor. Alpha 611 type RMA equivalent is recommended.

c. Place the capacitor on the circuit board across the two land areas. To prevent thermal shock, it is recommended to preheat the chip and the board or substrate to 50-70°C below the reflow temperature of the solder used. DLI recommends the use of SN60/SN62/SN63 type solders.

d. Determine which land is larger on the circuit board. The smaller land should be soldered first while holding the chip in place with tweezers. If necessary, apply solder past to the chip and land area.

e. Making sure that the capacitor is held flat on the board, place the soldering iron tip on the land at the chip termination-land interface. The soldering iron should have a temperature controlled tip not to exceed 310°C ±10°C. When the solder begins to flow, slowly move the tip of the soldering iron towards the chip, then quickly remove the iron.



f. After examination of the chip to assure that it is flat on the board, repeat the previous step.

g. The solder fillet should be evenly flowed and free of solder peaks and voids.

h. The assembly is complete, flux residue should now be removed by using 2-propanol or other flux removal solvents. If possible, use ultrasonic cleaning during this process.

Termination Systems

Part Number Code	Applications	Metal Layers	Typical Values
U	• High Volume Solder Assembly • SMD-SMT • Hand soldering	Ag Termination Ni Barrier Layer Sn-Pb Plated Solder	 Ni – 150µ" 90Sn-10Pb – 150µ" Solder Melting Point = 213°C
Z (Pb free)	• High Volume Solder Assembly • SMD-SMT • Hand Soldering	Ag Termination Ni barrier layer Sn Plated Solder	 Ni – 225µ" Sn – 250µ" Solder Melting Point = 232°C
S	• Epoxy Mounting • Specialty Solder Applications • Pb-Free Solder	Ag Termination Ni Barrier Layer Gold	 Ni – 150µ" Au – 10µ"
T	• Hand Soldering • Solder Assembly	Ag Termination Ni Barrier Layer Sn Plated Solder Hot Solder Dip	 Ni – 150µ" 90Sn-10Pb – 150µ" Sn62 Solder MP = 179ºC

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