



RESISTORS • CAPACITORS • COILS • DELAY LINES

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Recommended Soldering Guide for RCD SMT & THT Resistors and Capacitors

Note 1: Applies to typical resistor & capacitor products. For more sensitive devices such as larger sized and/or higher value ceramic capacitors, refer to sections in [red] below. Consult factory regarding custom/specialty/high-precision products.

Note 2: **PREHEAT** is a critical step of any soldering process. RCD recommends that thermal gradients not exceed 3°C per second [2°C/S on more sensitive devices such as larger sized and/or higher value ceramic capacitors]. Temperature change should be distributed as evenly as possible throughout the component body as applying heat or cold to a localized spot on the device may result in thermal gradients great enough to cause cracking.

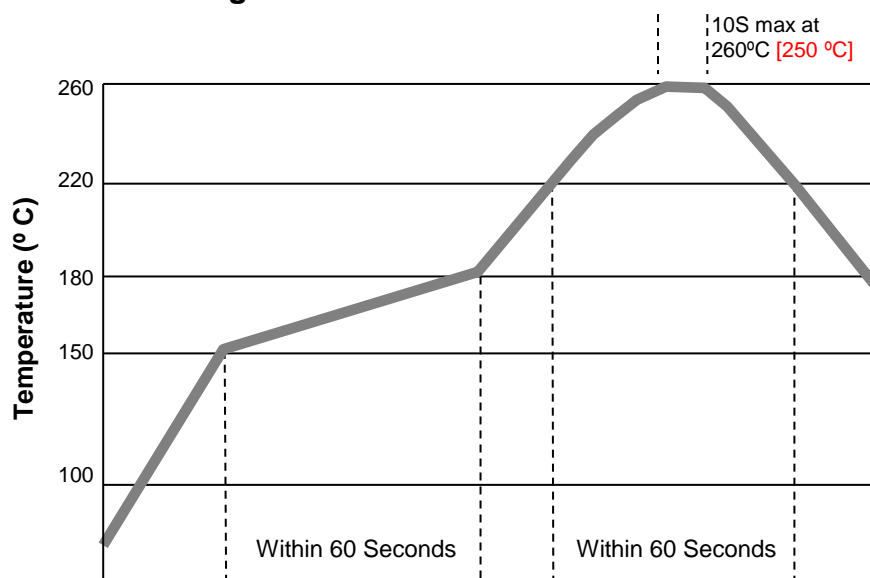
Note 3: **VAPOR PHASE REFLOW** produces consistent circuit heating with reflow occurring at a temperature determined by the boiling point of the liquid used, typically 215°C. Recommended temperature profile limits for vapor phase reflow are 1-2°C/S ramp up for 80S followed by dwell at 215°C for 40S max, and gradual cool down to room temperature over a period >=2 min.

Note 4 **HAND SOLDERING**: hand soldering is readily accomplished on most products but requires due diligence on more-sensitive products such as larger sized and/or higher value ceramic capacitors. On those items, the following precautions should be observed. The iron should be a low wattage type (30 watt max). The circuit and device must be pre-heated to 150°C at a rate $\leq 2^\circ\text{C}/\text{sec}$. The soldering iron tip must be placed on the circuit board pad, not on the device body or leadframe. Very large components may need to be preheated separately. One method is to preheat the capacitors in a convection oven, remove one at a time (use insulated tongs or similar to retain heat evenly), place on preheated board and solder using flux-core wire solder and a soldering iron just large enough to reflow the solder. This operation must take place quickly so that the component does not have a chance to cool down more than 100°C below the peak soldering temperature. An alternate method of keeping the components at the preheat temperature is to remove them from the oven and place them under an IR lamp until ready to solder.

Note 5 **COOL DOWN**: After the solder reflows properly the assembly should be allowed to cool gradually, again maintaining the thermal gradient of 3°C/sec [2°C/sec] maximum at room ambient conditions. Attempts to speed this cooling process or immediate exposure of the circuit to cold cleaning solutions increase the possibility of thermal shock cracking of the component.

Note 6: All temperatures refer to topside of the package, measured on the package body surface.

Reflow Soldering



REFLOW SOLDERING is accomplished by several common methods including infra-red, convection and radiant heating. Recommended temperature profile limits for these are as illustrated. Peak temp to be 220° to 260° C [250 °C] based on solder paste melting point and termination finish. RoHS (termination W) products generally require higher peak soldering temperatures of 250-260°C [250 °C], compared to SnPb (termination Q) product 220-245°C. Dwell at peak temp to be 5-10 seconds.
Avg Ramp-Up Rate: 3°C/sec max [<2°C/sec]
Time to Peak: 3.5-5min typ
No. of reflow cycles: 3
Ramp-Down Rate: 3°C/sec preferable, 6°C/sec max [<2°C/sec]

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Wave Soldering

Not applicable to Precision WW resistors such as Series SA, MA, PC, Q which require 230°C peak temp. Also not recommended for more sensitive products such as larger sized and/or higher value ceramic capacitors since the preheat requirements generally make this process very difficult to accomplish (due to the incompatibility of the chip's mass with the steep temperature gradient typically present in this process).

