

Using Convection Ovens for Attaching Z-COMM VCOs

Introduction:

This application note is to provide a basic SMT process guideline for solder reflowing Z-Communications voltage-controlled oscillators. The data provided complies with JEDEC J-STD-020 specification for peak reflow requirements. Each board must be characterized to establish reliable profile and to ensure high quality yields and product reliability. Both SnPb and Pb-free devices are covered in this document.

Printing Process:

The printing process for SnPb and Pb-free solder are identical. Various solder paste alloys are available in the industry. SAC305 is a widely used Pb-free paste formulation due to its low melting temperature, good fatigue resistance, and low cost. It is important to follow the specific requirements recommended by the paste manufacturer.

Reflow Profile:

The convection oven reflow process involves careful setup to optimally shape the heating zones. By following the suggested time and temperature profile (Figure AN-112:1), poor quality joints can be minimized.

Figure 1: Oven Time-Temperature Reflow Profile

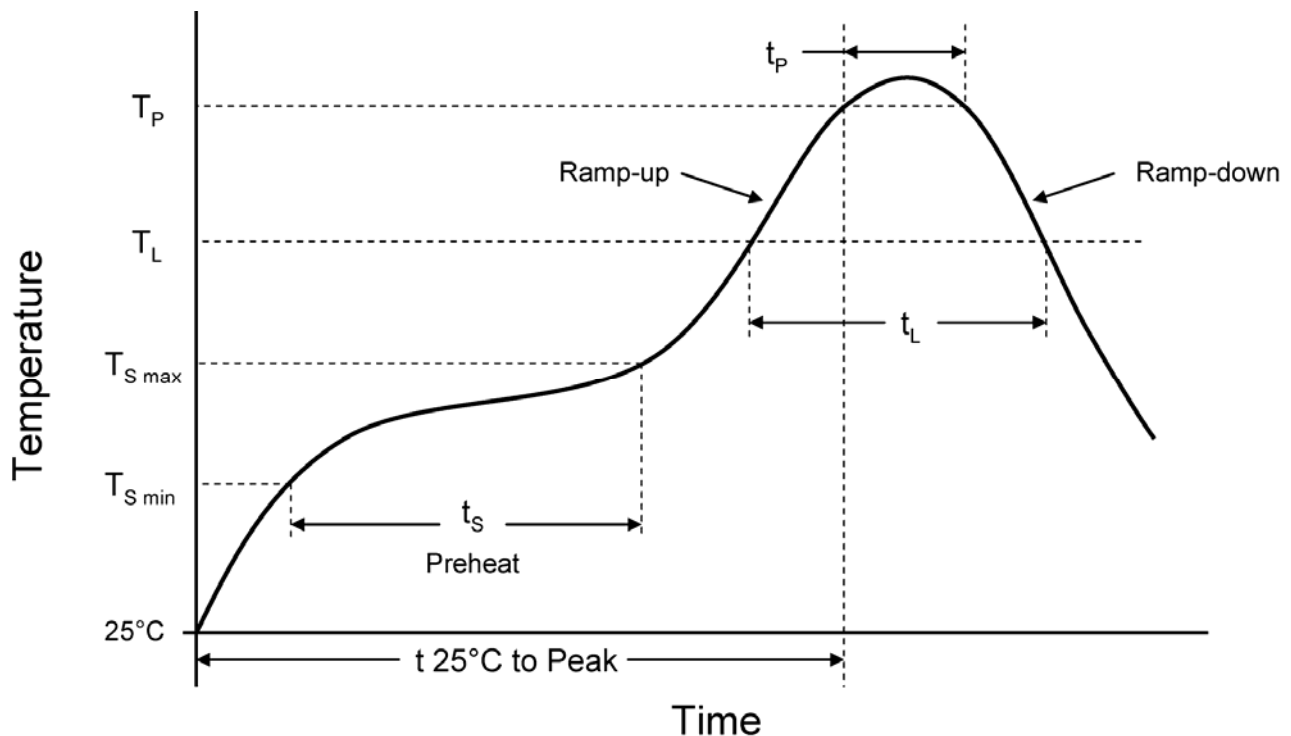


Table 1: Reflow Profile Recommendation

Feature	SnPb	Pb-Free
Ramp-up rate	3 °C/second max.	3 °C/second max.
Preheat Minimum Temperature (T_{Smin})	100 °C	150 °C
Preheat Maximum Temperature (T_{Smax})	150 °C	200 °C
Preheat Time (t_s)	60 to 120 seconds	60 to 180 seconds
Liquidus Temperature (T_L)	183 °C	217 °C
Time above Liquidus Temp (t_L)	60 to 150 seconds	60 to 150 seconds
Time within 5 °C of Peak Temperature (t_p)	10 to 30 seconds	20 to 40 seconds
Ramp-down rate	6 °C/second max.	6 °C/second max.
Time from 25 °C to Peak Temperature	6 minutes max.	8 minutes max.

Table 2: Peak Reflow Temperature (T_P)

Solder Type	Package Thickness	Volume <350 mm³	Volume >350 mm³
SnPb	≥ 2.5 mm	225 +0/-5 °C	
Pb-Free	≥ 2.5 mm	250 +0/-5 °C	245 +0/-5 °C

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