

## Recommended Soldering Profiles

### INTRODUCTION

In general, all standard mounting methods and solution cleaners practiced in the industry for resistors are applicable to Bulk Metal Foil resistors as well.

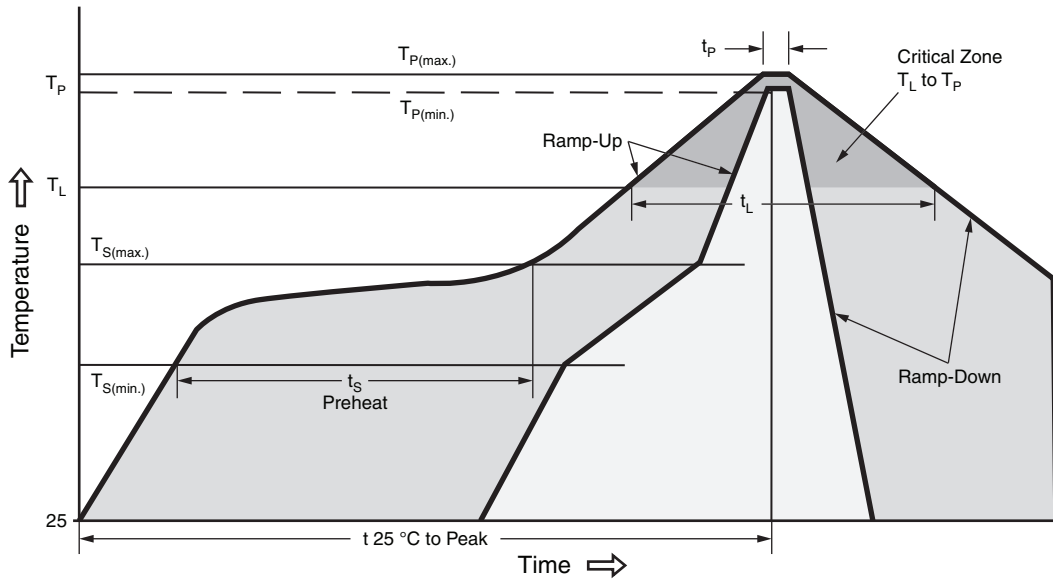
Normally, the user adopts the method and the process best suited for their own application, taking into account such factors as type, the manufacturer's recommendation on soldering test and proximity of components on the PCB, equipment, etc.

The same criteria are applicable for lead (Pb)-free terminals. Obviously, the standards should be pertinent to lead (Pb)-free mounting pastes.

The eutectic temperature of the plating alloy determines the minimum limits of the soldering process temperature. The minimum soldering temperature range should be at least 5 °C to 10 °C higher than the eutectic temperature of the plating alloy (per technical literature).

The devices must be held at the peak soldering temperature long enough to ensure the proper wetting of the solder connections. However, keeping the peak soldering time to a minimum to avoid the possibility of damage to the devices is recommended (per technical literature).

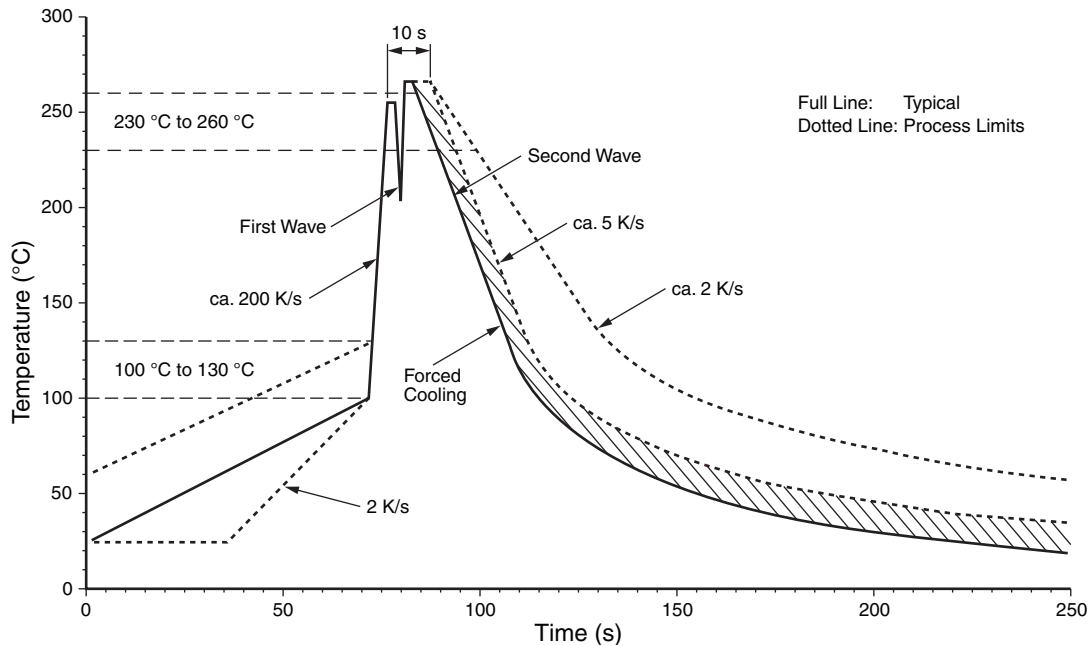
### REFLOW SOLDERING PROFILES



Classification Reflow Profile

CLASSIFICATION OF REFLOW PROFILES		
PROFILE FEATURE	Sn - Pb EUTECTIC ASSEMBLY	LEAD (Pb)-FREE ASSEMBLY (e.g. SnAgCu)
Average ramp-up rate ( $T_{S(max.)}$ to $T_P$ )	3 °C/s maximum	3 °C/s maximum
<b>Preheat</b>		
- Temperature minimum ( $T_{S(min.)}$ )	100 °C	150 °C
- Temperature maximum ( $T_{S(max.)}$ )	150 °C	200 °C
- Time ( $T_{S(min.)}$ to $T_{S(max.)}$ ) (ts)	60 s to 120 s	60 s to 180 s
<b>Time maintained above</b>		
- Temperature minimum ( $T_L$ )	183 °C	217 °C
- Time ( $T_L$ )	60 s to 150 s	60 s to 150 s
Minimum peak temperature ( $T_{P(min.)}$ )	215 °C	235 °C
Recommended peak temperature ( $T_P$ )	235 °C	250 °C
Maximum peak temperature ( $T_{P(max.)}$ )	260 °C	260 °C
Time within 5 °C of actual peak temperature ( $t_p$ )	10 s to 40 s	20 s to 40 s
Ramp-down rate	6 °C/s maximum	6 °C/s maximum
Time 25 °C to peak temperature	6 min maximum	8 min maximum

### WAVE SOLDERING PROFILE



Double-Wave-Soldering, Temperature/Time - Profile (Lead-Temperature)

#### Notes

- This document should serve as recommendation only. Other parameters may also affect soldering, so these profiles do not guarantee absolute success.
- Soldering profile should be determined by the manufacturer of the solder paste, providing there is no contradiction with the recommendations in this document.