

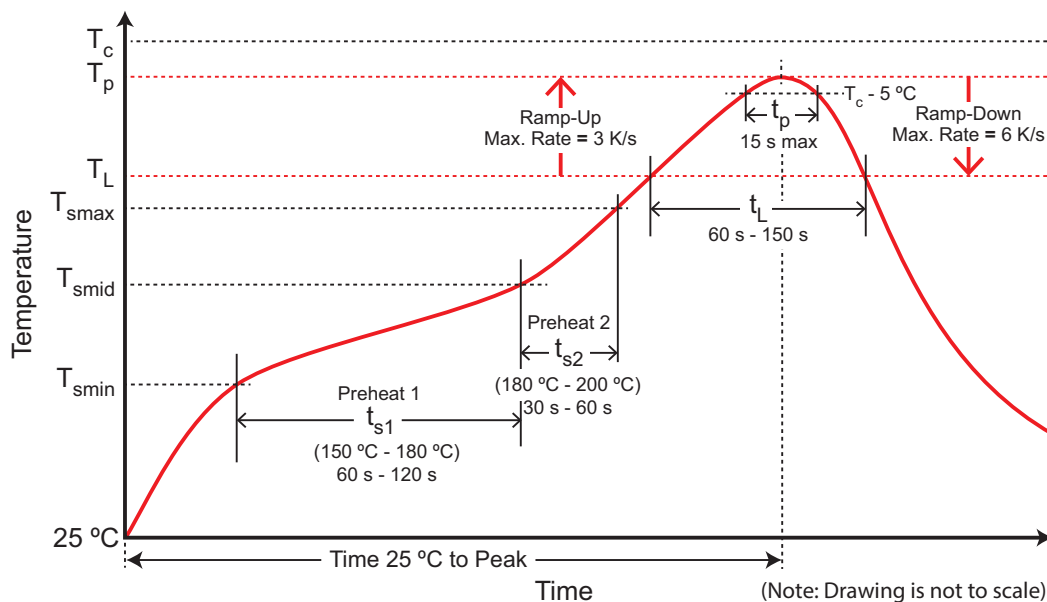
# Pb-Free Solder Reflow Profile for Selected Devices

Littelfuse is providing the following lead-free solder reflow temperature profile for a small number of optically coupled devices which data sheet specifies the solder reflow profile given in this technical brief

**TB-200 "Pb-Free Solder Reflow Profile for Selected Devices"** must be followed. This profile is similar to that provided in J-STD-020 with a few subtle differences to minimize damage during the reflow process caused by moisture retention of the package. One modification splits the preheat stage into two sections, preheat 1 and preheat 2. Preheat 1 is used to improve water vapor removal from the package while preheat 2 rounds out the preheat temperature increase specified in J-STD-020. The other modification to the JEDEC profile is the reduction of the maximum time the body temperature of the device is within 5 K of the classification temperature. This dwell time, identified as  $t_p$  in the profile below, is limited to 15 seconds.

In addition to these modifications the maximum ramp-up rate over any time during the interval "Time 25 °C to Peak" marked in the image below, is restricted to 3 K/s.

## Solder Reflow Profile



1.  $T_c$  - Classification temperature: maximum body temperature rating of the device as given in the data sheet.
2.  $T_p$  = Peak package body temperature during the soldering reflow process,  $T_p < T_c$ .
3.  $T_L$  = 217 °C = Liquidus temperature of Pb-free solder.
4. Preheat / Soak period:
  - $T_{smin}$  = 150 °C = Body temperature at the beginning of the preheat step.
  - $T_{smid}$  = 180 °C = Temperature marking end of Preheat 1 and the beginning of Preheat 2.
  - $T_{smax}$  = 200 °C = Body temperature attained at the end of the preheat period.
5.  $t_L$  = Time maintained above  $T_L$ .
6. Time 25 °C to Peak  $\leq$  8 minutes.
7.  $t_p$  = time within 5 K of classification temperature.
8. Maximum ramp rates are true maximums over any time range (not average).

**Note:** Body temperature is based on temperature sensor positioned at the center of the package surface facing upward during the solder reflow procedure.

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