Magnetetics soldering profile

Solder reflow profile - Surface mount components
Wave soldering not recommended

Table 1 - Standard SnPb Solder ($T_C$)

<table>
<thead>
<tr>
<th>Package Thickness</th>
<th>Volume mm³</th>
<th>Volume mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;350</td>
<td>&gt;350</td>
</tr>
<tr>
<td>&lt;2.5mm</td>
<td>235°C</td>
<td>220°C</td>
</tr>
<tr>
<td>≥2.5mm</td>
<td>220°C</td>
<td>220°C</td>
</tr>
</tbody>
</table>

Table 2 - Lead (Pb) Free Solder ($T_C$)

<table>
<thead>
<tr>
<th>Package Thickness</th>
<th>Volume mm³</th>
<th>Volume mm³</th>
<th>Volume mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;350</td>
<td>&gt;350</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>&lt;1.6mm</td>
<td>280°C</td>
<td>280°C</td>
<td>280°C</td>
</tr>
<tr>
<td>1.6 – 2.5mm</td>
<td>280°C</td>
<td>250°C</td>
<td>245°C</td>
</tr>
<tr>
<td>&gt;2.5mm</td>
<td>250°C</td>
<td>245°C</td>
<td>245°C</td>
</tr>
</tbody>
</table>

Reference JDEC J-STD-020D

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Standard SnPb Solder</th>
<th>Lead (Pb) Free Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat and Soak</td>
<td>100°C</td>
<td>150°C</td>
</tr>
<tr>
<td>Temperature min. ($T_{\text{min}}$)</td>
<td>150°C</td>
<td>200°C</td>
</tr>
<tr>
<td>Temperature max. ($T_{\text{max}}$)</td>
<td>60 – 120 Seconds</td>
<td>60 – 120 Seconds</td>
</tr>
<tr>
<td>Average ramp up rate ($T_{\text{max}}$ to $T_p$)</td>
<td>3°C/Second Max.</td>
<td>3°C/Second Max.</td>
</tr>
<tr>
<td>Liquidus temperature ($T_l$)</td>
<td>183°C</td>
<td>217°C</td>
</tr>
<tr>
<td>Time at liquidus ($t_l$)</td>
<td>60 – 150 Seconds</td>
<td>60 – 150 Seconds</td>
</tr>
<tr>
<td>Peak package body temperature ($T_p$)</td>
<td>Table 1</td>
<td>Table 2</td>
</tr>
<tr>
<td>Time ($t_p)$ within 5°C of the specified classification temperature ($T_C$)</td>
<td>20 Seconds**</td>
<td>30 Seconds**</td>
</tr>
<tr>
<td>Average ramp-down rate ($T_p$ to $T_{\text{max}}$)</td>
<td>8°C/Second Max.</td>
<td>8°C/Second Max.</td>
</tr>
<tr>
<td>Time 25°C to Peak Temperature</td>
<td>6 Minutes Max.</td>
<td>6 Minutes Max.</td>
</tr>
</tbody>
</table>

* Tolerance for peak profile temperature ($T_p$) is defined as supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature ($t_p$) is defined as supplier minimum and a user maximum.
Wave solder profile - Through-hole components

Reflow soldering not recommended

Reference EN 61760-1:2006

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Standard SnPb Solder</th>
<th>Lead (Pb) Free Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Temperature min. (T_{min})</td>
<td>100°C</td>
<td>100°C</td>
</tr>
<tr>
<td>* Temperature typ. (T_{typ})</td>
<td>120°C</td>
<td>120°C</td>
</tr>
<tr>
<td>* Temperature max. (T_{max})</td>
<td>130°C</td>
<td>130°C</td>
</tr>
<tr>
<td>* Time (T_{min} to T_{max}) (t_p)</td>
<td>70 seconds</td>
<td>70 seconds</td>
</tr>
<tr>
<td>Δ preheat to max Temperature</td>
<td>150°C max</td>
<td>150°C max</td>
</tr>
<tr>
<td>Peak temperature (t_p)*</td>
<td>235°C – 260°C</td>
<td>250°C – 280°C</td>
</tr>
<tr>
<td>Time at peak temperature (t_p)</td>
<td>10 seconds max</td>
<td>10 seconds max</td>
</tr>
<tr>
<td></td>
<td>5 seconds max each wave</td>
<td>5 seconds max each wave</td>
</tr>
<tr>
<td>Ramp-down rate</td>
<td>~ 2 K/s min</td>
<td>~ 2 K/s min</td>
</tr>
<tr>
<td></td>
<td>~ 3.5 K/s typ</td>
<td>~ 3.5 K/s typ</td>
</tr>
<tr>
<td></td>
<td>~ 5 K/s max</td>
<td>~ 5 K/s max</td>
</tr>
<tr>
<td>Time 25°C to 25°C</td>
<td>4 minutes</td>
<td>4 minutes</td>
</tr>
</tbody>
</table>

Manual solder

350°C, 4-5 seconds. (by soldering iron), generally manual, hand soldering is not recommended.