

This document provides instructions of storage, handling, reconditioning and soldering for common plastic SMT devices.

OPTOI guarantee doesn't cover damage, which may occur during processing, especially during soldering process.

## General precautions with MSD (Moisture Sensitive Devices)

OPTOI SMT devices are sensitive to temperature shocks and especially to reflow soldering (the popcorn effect). The cause of the popcorn effect is the enclosed moisture, which can lead to cracks in the package with a sudden rise in temperature. All shapes and sizes of package for surface-mounted components are sensitive to this effect; the sensitivity increases with the thermal stress from respective process.

OPTOI delivers devices sealed in damp-proof bags with a drying agent and moisture indicator. Even in the case of unfavourable storage conditions, such as temperatures of up to 40°C and 90% relative humidity (RH), devices in dry packs can be stored for at least 12 months from their sealing date. If the indicated residual moisture inside the dry pack exceeds 10% RH, the devices should be baked before soldering.

## Baking procedure before soldering / Preconditioning

After opening the dry pack, devices must be mounted within the time specified on the label (in factory conditions of maximum 30°C/60%RH).

Devices require baking before mounting if the Humidity Indicator Card shows > 10% when read at 23°C ±5°C or if the conditions mentioned above are not met.

OPTOI, according to IPC/JEDEC J-STD-033, recommends to bake the devices, according to the moisture sensitive level, which is indicated on the sealed pack.

| Package Body  | Level | Bake @ 125 °C +10/-0 °C       |   | Bake @ 90 °C +8/-0 °C<br>≤5% RH |   | Bake @ 40 °C +5/-0 °C<br>≤5% RH |   |
|---|-------|-------------------------------|---|---------------------------------|---|---------------------------------|---|
|   |       | Exceeding Floor Life by >72 h | Exceeding Floor Life by ≤72 h                     | Exceeding Floor Life by >72 h   | Exceeding Floor Life by ≤72 h                     | Exceeding Floor Life by >72 h   | Exceeding Floor Life by ≤72 h                     |
| Thickness ≤1.4 mm                                     | 2     | 5 hours                       | 3 hours   | 17 hours                        | 11 hours  | 8 days                          | 5 days  |
|   | 2a    | 7 hours                       | 5 hours   | 23 hours                        | 13 hours  | 9 days                          | 7 days  |
|   | 3     | 9 hours                       | 7 hours   | 33 hours                        | 23 hours  | 13 days                         | 9 days  |
|   | 4     | 11 hours                      | 7 hours   | 37 hours                        | 23 hours  | 15 days                         | 9 days  |
|   | 5     | 12 hours                      | 7 hours   | 41 hours                        | 24 hours  | 17 days                         | 10 days   |
|   | 5a    | 16 hours                      | 10 hours  | 54 hours                        | 24 hours  | 22 days                         | 10 days   |
| Thickness >1.4 mm<br>≤2.0 mm                          | 2     | 18 hours                      | 15 hours  | 63 hours                        | 2 days  | 25days                          | 20 days   |
|   | 2a    | 21 hours                      | 16 hours  | 3 days                          | 2 days  | 29 days                         | 22 days   |
|   | 3     | 27 hours                      | 17 hours  | 4 days                          | 2 days  | 37 days                         | 23 days   |
|   | 4     | 34 hours                      | 20 hours  | 5 days                          | 3 days  | 47 days                         | 28 days   |
|   | 5     | 40 hours                      | 25 hours  | 6 days                          | 4 days  | 57 days                         | 35 days   |
|   | 5a    | 48 hours                      | 40 hours  | 8 days                          | 6 days  | 79 days                         | 56 days   |
| Thickness >2.0 mm<br>≤4.5 mm                          | 2     | 48 hours                      | 48 hours  | 10 days                         | 7 days  | 79 days                         | 67 days   |
|   | 2a    | 48 hours                      | 48 hours  | 10 days                         | 7 days  | 79 days                         | 67 days   |
|   | 3     | 48 hours                      | 48 hours  | 10 days                         | 8 days  | 79 days                         | 67 days   |
|   | 4     | 48 hours                      | 48 hours  | 10 days                         | 10 days   | 79 days                         | 67 days   |
|   | 5     | 48 hours                      | 48 hours  | 10 days                         | 10 days   | 79 days                         | 67 days   |
|   | 5a    | 48 hours                      | 48 hours  | 10 days                         | 10 days   | 79 days                         | 67 days   |
| BGA package >17 mm x 17 mm or any stacked die package | 2-5a  | 96 hours (See Note 2)         | As above per package thickness and moisture level | Not applicable                  | As above per package thickness and moisture level | Not applicable                  | As above per package thickness and moisture level |

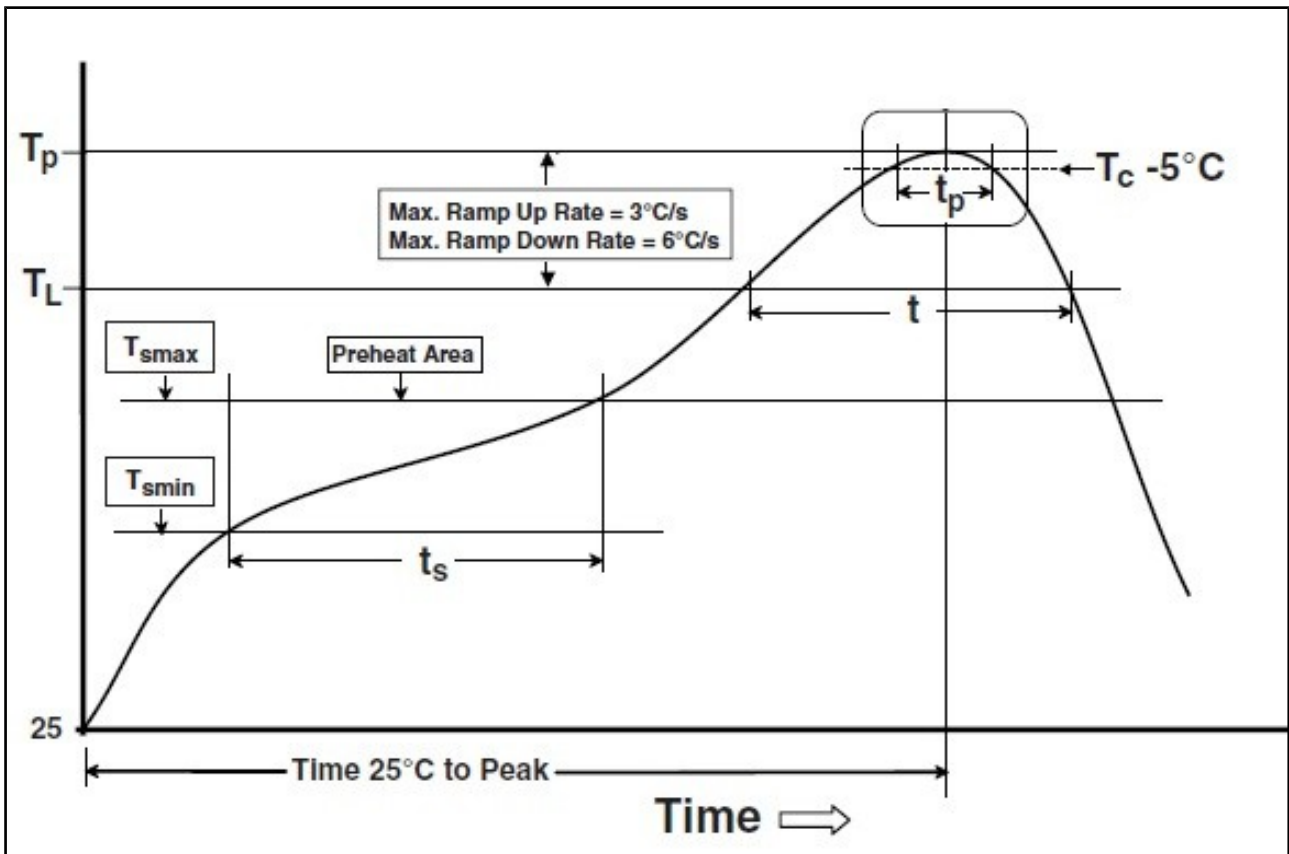
Table according to J-STD-033C

The reel and tubes containers cannot be subjected to baking at 125°C: a different high temperature container must be used in case of baking.

## Soldering safe conditions using convection reflow process

With reference to IPC/JEDEC J-STD-020, OPTOI recommends the following indications <sup>1</sup>:

| PROFILE FEATURE  | Pb-Free ASSEMBLY  |
|--|---|
| Preheat/Soak<br>Temperature MIN ( $T_{SMIN}$ )<br>Temperature MAX ( $T_{SMAX}$ )<br>Time ( $t_s$ ) from $T_{SMIN}$ to $T_{SMAX}$ | 150°C<br>200°C<br>60-120 seconds  |
| Ramp-up rate $T_L$ to $T_P$  | 3°C/second max.   |
| Liquidous temperature ( $T_L$ )<br>Time ( $t_l$ ) maintained above $T_L$   | 217°C<br>60-150 seconds   |
| Peak package body temperature ( $T_P$ )<br><small>(see Moisture Sensitive Caution Label present on dry pack)</small>             | For users $T_P$ must not exceed the $T_C$<br>For suppliers $T_P$ must equal or exceed the $T_C$ |
| Time ( $t_p$ ) within 5°C of the specified classification temperature $T_C$  | 30seconds   |
| Ramp-down rate $T_P$ to $T_L$  | 6°C/second max  |
| Time 25°C to peak temperature  | 8 minutes max   |



<sup>1</sup> all the tests have been performed using Pb Free solder paste SAC305.