INTELLIGENT MEMORY

Application Note

AN-2022-01: Lead free(Pb-free) soldering reflow guideline

1.1 Introduction

This guideline defines recommended soldering reflow profile used on assembly with IM component products. The information given can help prevent possible damage to the semiconductor package during the soldering process. Following this guideline can help ensure product quality and reliability.

1.2 Moisture Sensitive Devices (MSD) and Floor Life control

All IM component products are MSD which have MSL (Moisture Sensitivity Level) classified and packed in Moisture Barrier Bags (MBB) for shipment and storage. In each MBB, there are Humidity Indicator Card (HIC) and silica desiccant to ensure the moisture absorption by the semiconductor devices under control. Customer is recommended to follow the instructions given on the HIC if any abnormality is detected. After opening the MBB for use, customer is recommended to control the floor life of the component devices according to the following table (in compliance with IPC/JEDEC J-STD-020 Moisture/Reflow Sensitivity Classification for Non-hermetic Surface Mount Devices):

MSL	Recommended Floor Life	Recommended Floor Condition
1	Unlimited	≤ 30°C / 85% RH
2	1 year	≤ 30°C / 60% RH
3	168 hours or 1 week	≤ 30°C / 60% RH
4	72 hours or 3 days	≤ 30°C / 60% RH
5	48 hours or 2 days	≤ 30°C / 60% RH

If the exposure time of MSD has exceeded the recommended floor life, customer is recommended to re-bake the components cautiously prior to soldering reflow. For detailed instructions, please refer to IPC/JEDEC J-STD-033 Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices or contact IM Sales/Customer Support for assistance.

1.3 Pb-free soldering reflow profile

All IM standard component products are green with Pb-free solder balls/leads for assembly:

Package Type	Standard material used on external connects
All TSOP packages	Pure tin surface finish
All BGA, FBGA packages	SnAgCu solder balls

Convection reflow equipment is the preferred equipment type for soldering reflow. It uses hot air with nitrogen purging (minimizing oxidation and assure wettability) to heat the assembly to required reflow temperature. It is good in thermal uniformity and at a controlled rate. Since IM components are qualified for

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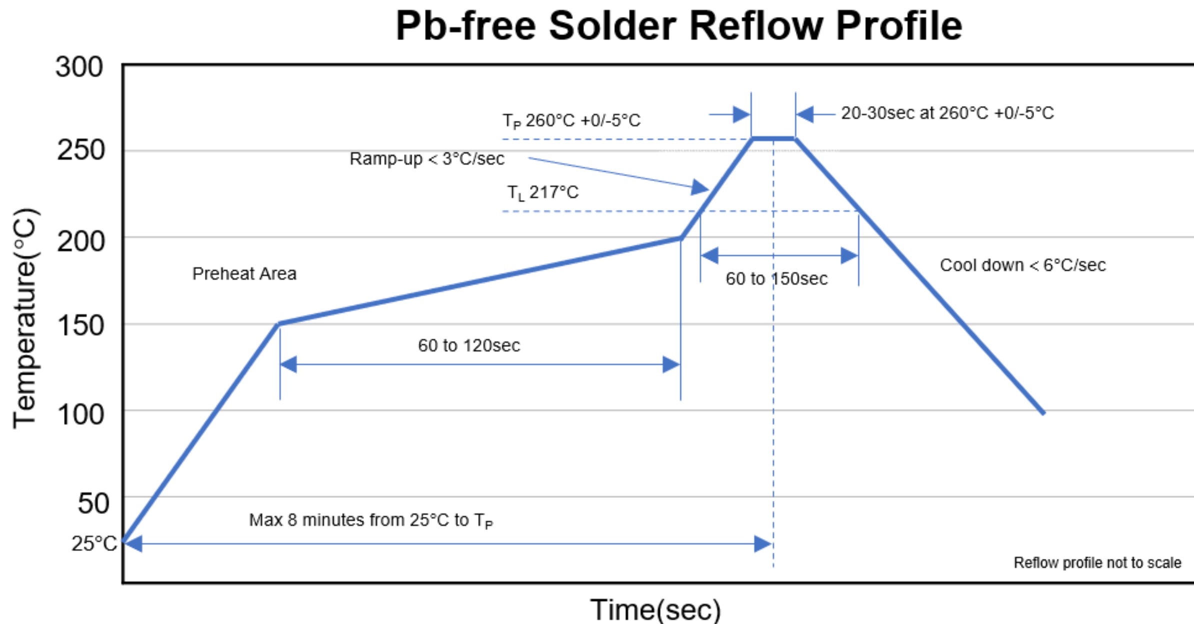
SMT reflow, wave soldering or immersion soldering is not recommended as the temperature control is rather difficult.

According to J-STD-020, customer is recommended to follow the solder reflow profile with features and values as indicated below:



Profile Feature	**Pb-free Assembly**
Preheat Area Temperature minimum (T_{smin}) Temperature maximum (T_{smax}) Time from T_{smin} to T_{smax}	 150°C 200°C 60-120 seconds
Ramp-up rate (T_L to T_P)	3°C/second max.
Liquidous temperature (T_L) Time maintained above T_L	217°C 60-150 seconds
Peak package body Temperature (T_P)	260°C +0/-5°C
Time within 5°C of T_P	30 seconds max.
Cool down rate	6°C/second max.
Time 25°C to T_P	8 minutes max.

Notes:

- The above Pb-free solder reflow is applicable for package thickness <1.6mm regardless of package volume
- All temperatures refer to the centre of the package, measured on the package body surface that is facing up during assembly reflow
- Actual board assembly reflow profiles should be developed based on specific process needs and board designs and should not exceed the parameters specified in this guideline

Disclaimer

IM reserves the right to make changes without further notice to customers documented in this guideline. IM does not assume any liability arising out of the application or use of any products described herein. For any enquiries, please contact IM Sales/Customer Support at info@intelligentmemory.com for support.

REVISION HISTORY

Revision	Description	Date
01	Initial release	21-Nov-2022