TECHNICAL REFERENCE DOCUMENT: SOLDERING

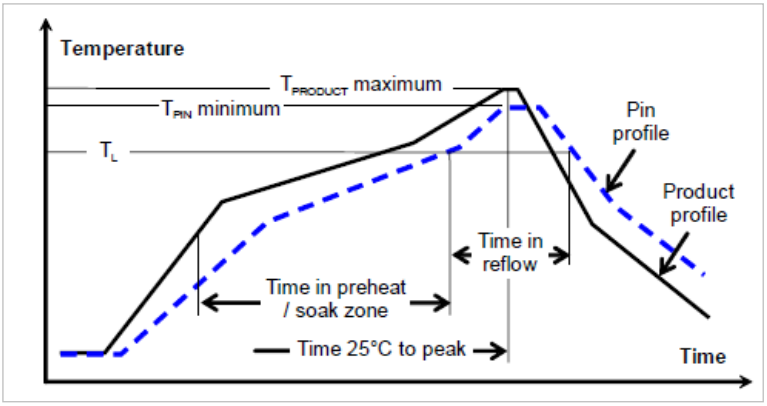
Reflow soldering - surface mount

Products intended for surface mount assembly are qualified for use in a Pb-free forced convection or vapor phase reflow soldering process.

The reflow profile should be optimised to avoid excessive heating of the product. It is recommended to have a sufficiently extended preheat time to ensure an even temperature across the host PCB and it is also recommended to minimize the time in reflow.

A no-clean flux is recommended to avoid entrapment of cleaning fluids in cavities inside the product or between the product and the host board, since cleaning residues may affect long time reliability and isolation voltage.

General reflow process specification			Pb-free
Average temperature ($T_{product}$)			3 °C/s max
Typical solder melting temp.	T_L		221 ° C
Min. Reflow time above T_L	T_{pin}		60 s
Min. pin temp.	T_{pin}		235 °C
Peak product temp.	$T_{product}$		245 °C
Average ramp-down ($T_{product}$)			6 °C/s max
Max. time 25° C to peak			8 minutes



Typical soldering profile

For Pb-free solder processes, a pin temperature (T_{pin}) in excess of the solder melting temperature (TL, 217 to 221°C for SnAgCu solder alloys) for more than 60 seconds and a peak temperature of 245 °C on all pins is recommended to ensure a reliable solder joint.

Thermocoupler attachment

$T_{PRODUCT}$ is measured on the baseplate top side since this will likely be the warmest part of the product during the reflow process.
T_{PIN} temperature is measured on the power module output power pins solder joints at the customer board.

Product reflow classification

The product has been tested for the following:

Pb-free solder classification
For Pb-free solder processes, the product is qualified for MSL 3 according to IPC/JEDEC standard J-STD-020E.

Dry pack information

Products intended for Pb-free reflow soldering processes are delivered in standard moisture barrier bags according to IPC/JEDEC standard J-STD-033 (handling, packing, shipping and use of moisture/reflow sensitivity surface mount devices).

Using products in high temperature Pb-free soldering processes requires dry pack storage and handling. In case the products have been stored in an uncontrolled environment and no longer can be considered dry, floor life according to MSL 3, the modules must be baked according to J-STD-033.

Surface mount assembly and repair

The LGA of the product require particular care during assembly since the LGAs are hidden between the host board and the product's PCB. Special procedures are required for successful rework of these products.

Assembly

Automatic pick and place equipment should be used to mount the product on the host board. The use of a vision system, utilizing the fiducials on the bottom side of the product, will ensure adequate accuracy. Manual mounting of solder bump products is not recommended.

This module is not recommended for assembly on the bottom side of a customer board. If such an assembly is attempted, components may fall off the module during the second reflow process.

Repair

For a successful repair (removal and replacement) of an LGA product, a dedicated rework system should be used. The rework system should preferably utilize a reflow station and a bottom side heater might also be needed for the operation.

The product is a base plate design with a pick-up surface on a large central component (in this case the ferrite). However, use of this pick up surface for removal of the module when it's hot is not recommended. The best method is to use a tool to lift the module by its bottom PCB.