Application Note: Manufacturing Implementation of PNI Sensors and ASIC

Introduction

Implementation of a manufacturing line to install PNI's magneto-inductive sensors and ASIC is fairly straightforward. However, there are important considerations to ensure optimal sensor performance. Below is a discussion of handling considerations and soldering requirements.

Handling

While attached to a PCB, PNI's magneto-inductive sensors have survived testing to MIL-STD 202 Method 213 (shock) and Method 214 (vibration). When properly mounted and soldered, PNI sensors can withstand shock of 100 g over 6 ms and vibration of 5.0 g at 10 Hz to 2 kHz. Note that due to the height of the z- axis sensor (Sen-Z), if this sensor is directly impacted or pushed during handling its solder joint can easily break.

Soldering

The recommended solder reflow profile and processing parameters for PNI's magneto-inductive sensor components are given below. After soldering PNI components to a board, it is possible to wave solder the opposite side of the PCB.

IMPORTANT: PNI sensors require the use of halide-free solder pastes and processes for reflow and cleaning. Please contact PNI if you would like recommendations.
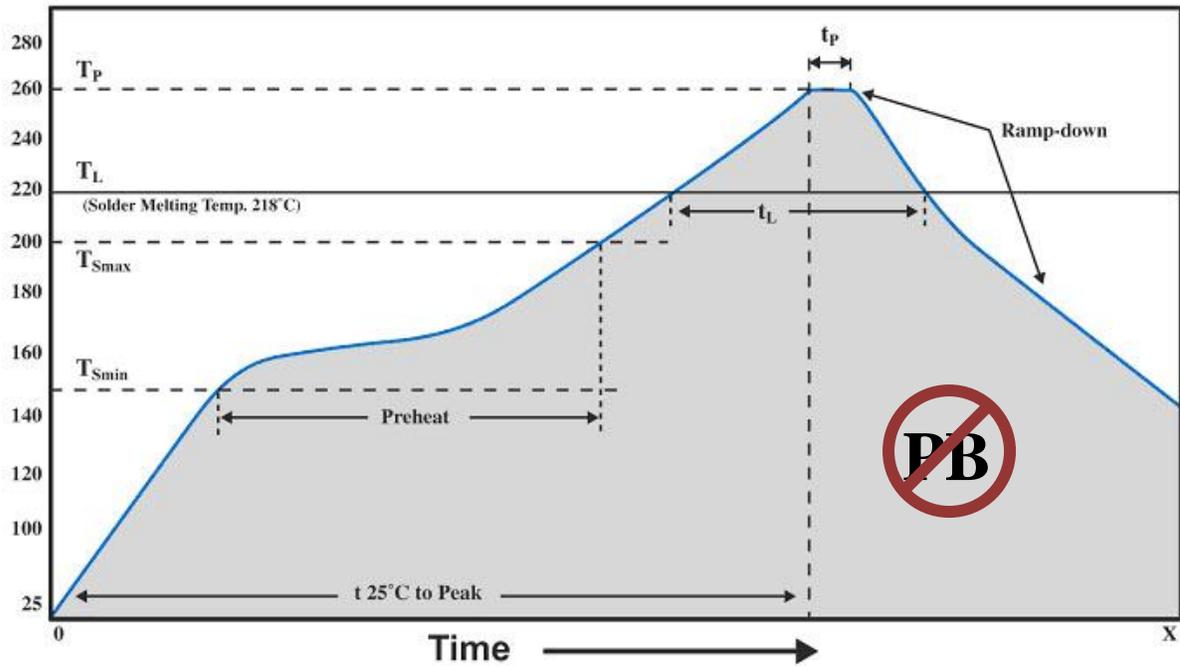
Parameter	Symbol	Value
Preheat Temperature, Minimum	T_{Smin}	150°C
Preheat Temperature, Maximum	T_{Smax}	200°C
Preheat Time (T_{Smin} to T_{Smax})		60 – 180 seconds
Solder Melt Temperature	T_L	>218°C
Ramp-Up Rate (T_{Smax} to T_L)		3°C/second maximum
Peak Temperature	T_P	<260°C
Time from 25°C to Peak (T_P)		6 minutes maximum
Time above T_L	t_L	60 – 120 seconds
Soak Time (within 5°C of T_P)	t_P	10 – 20 seconds
Rampdown Rate		4°C/second maximum