Application Note

Topic:	**Change in Soldering Recommendations: TIM, LEA and NEO Modules**
	GPS.G4-MS4-07021
Author:	Tom Grieve
Date:	8/05/2007

We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express permission is strictly prohibited. © 2007 u-blox AG

1 Introduction

With changes to the RoHS (**R**estriction **o**f the use of certain **H**azardous **S**ubstances in electrical and electronic equipment) regulations, the use of lead alloy solder in new electronic equipment has been banned. The RoHS compliant solders that are currently available on the market typically have a melting temperature 30-40° C higher than that of lead solders. This has implications with respect to the processing of our products in that it can appear that following soldering the module is bent. This is in fact not the case. The problem lies in the fact that the modules can be lifted by excessive solder flowing underneath the module. The below recommendations are provided to remove this problem.

2 Soldering recommendations

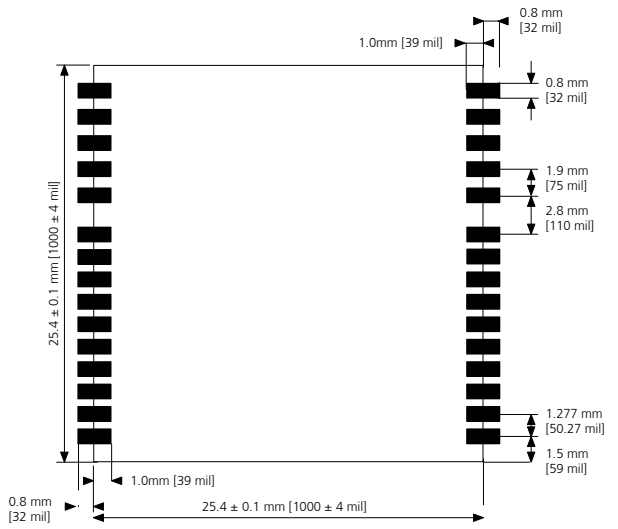
The processing recommendations in the *TIM-Lx System Integration Manual* [1] are currently based on a Solder melting temperature of 183°C or lower. The current RoHS compliant solders have a melting temperature of 216 - 221°C.

After a year of testing in mass production it has become evident that these higher temperatures may require a change in the processing procedures. Clearly if customers have not experienced any problems when following the old recommendations there is no need for them to alter their existing practices. Otherwise refer to the processing recommendations listed in the *ANTARIS®4 System Integration Manual* [1], chapter 5.3. These recommendations apply to all TIM, LEA and NEO Modules.

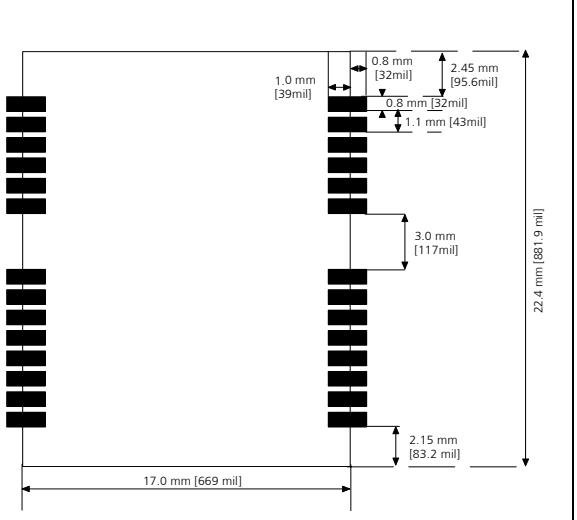
3 Footprint and Paste Mask

In addition to the new soldering recommendations we have updated the footprint and paste mask for the TIM, LEA and NEO Modules. The recommended footprint for these modules is given in Figure 1.

TIM modules



LEA modules



NEO modules

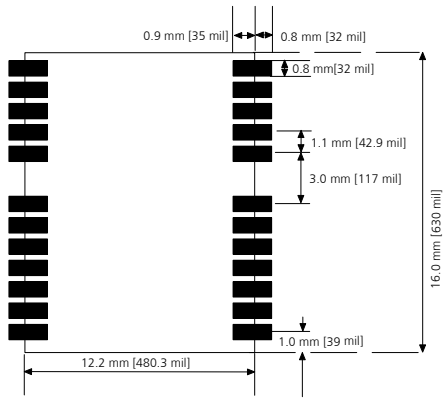


Figure 1: Recommended footprint for TIM, LEA and NEO modules

Figure 2 and Table 1 demonstrate the recommended positioning of Cu, Solder and Paste Masks, as well as the suggested distances. Note that these are recommendations only and not specifications. The exact geometry, distances and solder paste volumes must be adapted to the specific production processes (e.g. soldering etc.) of the customer.

To improve the wetting of the half vias it is recommended to reduce the amount of paste mask under the module and to increase the amount of paste mask outside the module by using a step stencil and exceeding the paste mask beyond the Cu Mask as shown in Figure 2. If a step stencil is not used it is still recommended to employ the same volume of solder paste **outside** the module to attain the desired level of wetting. This will have to be done by modifying the shape of the paste mask outside the module.

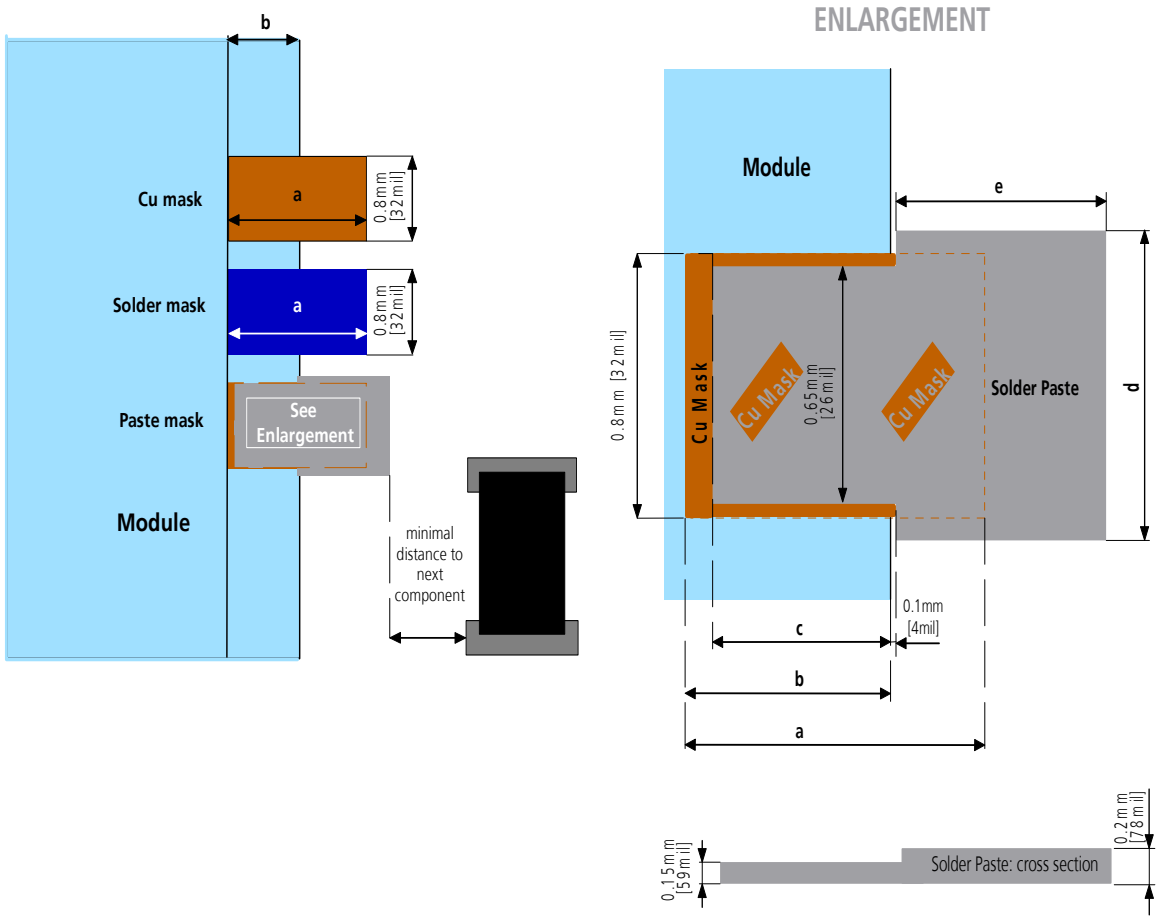


Figure 2: Solder and paste mask with enlargement showing positioning and cross section of underlying solder paste

	TIM	LEA	NEO
a	1.8mm [70mil]	1.8mm [70mil]	1.7mm [66mil]
b	1.0mm [39mil]	1.0mm [39mil]	0.9mm [35mil]
c	0.65mm [26mil]	0.65mm [26mil]	0.65mm [26mil]
d	0.9mm [35mil]	0.8mm [32mil]	0.8mm [32mil]
e	1.3mm [51mil]	1.5mm [59mil]	1.5mm [59mil]

Table 1: Paste Mask Dimensions for TIM, LEA and NEO

! Note The exact geometry, distances, stencil thicknesses, step heights and solder paste volumes must be adapted to the specific production processes (e.g. soldering etc.) of the customer.

Related Documents

[1] TIM-Lx System Integration Manual, Doc No GPS.G3-MS3-01001-B

[2] ANTARIS®4 System Integration Manual, Doc No GPS.G4-MS4-05007-A1