



Decreasing Bend Radius and Improving Reliability- Part II

FLEX | RIGID FLEX | HEATERS | ASSEMBLY

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Application: Design guidelines to improve the flexibility and reliability of flexible circuits.

Many of the issues that arise when using a flex circuit come from a lack of knowledge about how to properly design one, especially when the circuit is required to bend. Many novices will design a circuit that calls for bending the flex in too tight of a bend radius, which can cause damage to the circuit and lower the reliability of the end product. This series of articles will focus on the seven key aspects to consider when designing for maximum durability and maximum “flexibility”. It is important to know that because flexibility is a relative term this study will instead use the term reducing bend radius. Below are two of the seven design strategies, please see Part I and Part III for more tips!

Do not allow electroless copper as a seed layer prior to plating vias.

Also an area to be concerned about is the type of plating your vendor uses. Some copper plating requires a seed layer of electroless copper, this seed layer becomes an ED copper layer and can lead to conductor cracking. For a tight bend radius direct metallization is the preferred plating method.

Use only Polyimide covers in the flexing area.

There are two options for applying dielectric material over copper:

- Polyimide cover material: This is the preferred material in areas where parts will be bent. As a general rule, you will want to specify a dielectric thickness and adhesive thickness separately. A rule of thumb is that for every 1 ounce of copper thickness there is 1 mil of adhesive thickness.
- Flexible Solder Mask: Flexible solder mask has a minimum bend radius of 0.4" and is not recommended for any dynamic flexing application or application where the bend radius will be tighter than 0.4"

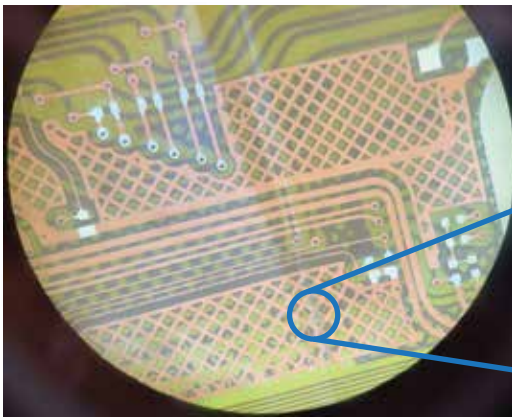


Fig. 1

- Flex circuit with soldermask after flexing.



Fig. 2

- Zoomed in view of the crease that is starting to crack in the soldermask layer.



Fig. 3

- A cross-section view of the crease from Fig 2 highlighting the soldermask crack.

Disclaimer: Data presented for informational purposes only. Actual values and/or usage is for reference.

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