

Aspocomp sees growing demand for High-Density

At Finnish PCB-manufacturer Aspocomp Oulu OY, customer needs for an increased number of layers in a PCBs is steadily growing. This however, does not mean that the PCBs are getting thicker, rather imagine a change from 2.0 to about 2.4 mm. Inner layer laminates become thinner - down to 0.063 mm for volume production and down to 0.05 mm for prototypes.

PCB | Increasing numbers of layers in the PCBs makes registration very demanding and Aspocomp has worked hard to optimise this process. Registration is needed to make the pattern of each layer fit the others and as such - the more layers and the thinner the inner layers are the more difficult the process gets. Since the layers change during the curing process it is important to know the properties of the materials used in the product. The higher the number of used prepreg is, the more difficult it will be to get the process right.

The requirements also evolve with decreasing hole diameter and or a decreasing pad area. The smallest drills used today come with a diameter of 0.15mm (standard is 0.2 to 0.3mm). The laser drilled holes are minimum 75 micron in diameter and 100-150 micron by default.

Today, Aspocomp is manufacturing PCBs with an aspect ratio of 10 to 12 normally, and 15 as the most. Two years ago an aspect ratio of 6 to 8 was the most common. It does not stop with this, but the company sees a further increase of aspect ratio in the future. Aspocomp has a vertical plating line for hole plating to meet these increasing demands. As many volume providers often use horizontal lines for mass production, a transfer process can be rather difficult.

Today, PCBs are often of HDI-type; 1+18b+1, i.e. 20-layers with hidden vias between layers 2 - 18 (and with laser vias between 1 - 2 and 19 - 20). The via structure has become much more difficult and more complicated over the last decade. (In the early 2000s the most common structure was 1+12+1). Some customers may also want to have a mixed build-up. The reason is usually to have both radio properties and high-speed digital on the same board. For example, you can have ceramic filled laminate, Rogers 4350, mixed with FR4. In these cases, the core is made of Rogers and the outer layers of FR4, which is easier to laser drill. However, there are products which are made the opposite way.

Aspocomp currently offers customers HDI designs with stacked and filled microvias and hidden vias, 3+2b+3, in five working days. Some test runs with "anylayer" are currently being conducted at the facility in Oulu, all of those are expected to be completed within the next few months. The first 'real' test with a customer's product is scheduled for later this autumn. "Anylayer" is a via-technology, where all layers are connected only with laser vias, i.e. there are no hidden mechanical vias in the core.

"The demand for printed circuit board with 0.4 spacing increases and in order to meet 'routing' - stacked microvias are needed. We can see increasing demand not only from the telecom segment, but also from others too", says Tore Wiberg, Sales & Marketing Manager at Aspocomp in Oulu to evertiq.

When the spacing of the component becomes dense (0.5 or 0.4), placing laser holes in only one layer become insufficient. In order to get signals from inner pads in the BGAs, the laser vias must be stacked. This means that the internal laser vias have to be filled with copper.

Aspocomp currently does not offer a process for embedded components - simply because customers have not asked for it. The closest Aspocomp gets to this kind of technology is embedded heat sinks; here the company has done some test runs, using a thick outer layer of copper for cooling (coin technology) and copper heat sinks embedded in the outer layer (sunked).

The company has also done tests with rigid-flex (but no other types of flex PCBs), because Aspocomp has no customer demand for it. In the case of rigid-flex (semi-flex), they are used as flex-cable between a pair of PCBs, which simplifies installation and reduces the total product cost.

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