

# Gentler and Faster

Infineon's Subsidiary eupec uses the Water-Jet Laser (LaserMicrojet) for Separating

It is almost impossible to take a look at production plants in the semiconductor industry. This is an industry that doesn't like to tip its hand., and that's no different with high-performance semiconductors. One of the major reasons for it's success on the market is it's type of production. For instance, we know that lasers have occasionally been used in various places during the last 20 years to separate wafers, but nobody has ever seen these systems.

To let you know right off the bat, nobody allowed us to see anything of the production plants when we visited Eupec GmbH in Warstein. That's a pity actually, considering the fact that they have had a laser cutting machine from Synova there for somewhat more than one year. Synova's CEO Dr. Bernold Richerzhagen reported on the amazing potential of the technology of water-jet guided laser cutting in our last issue, notably in the semiconductor industry and we wanted to take a look at that when we visited Infineon's Subsidiary Eupec.

However, even if they kept their doors shut tight, the project manager, Michael Kesten, and Uwe-Rolf Simon, Head of technical services at Eupec, took the time to answer our questions on how the LaserMicrojet is used. Of course, they didn't answer all our questions. After all, in EuroLaser, the competition is also reading this article.

First of all, let's say something about the company. Eupec stands for European Power Semiconductors & Electronics Company and it was set up 12 years ago by Siemens AG and AEG AG. Since then, Eupec has been a 100 % subsidiary of Infineon with branches in France, Hungary and the United States. It employs a total of 1,160 persons, 960 of which work at the headquarters in Warstein. Eupec's products are high-power wafer and module semiconductors, subassemblies and drivers. Eupec moves in a growth market that has not been ravaged by most of the latest market meltdowns in the semiconductor industry.

There are other economic cycles that have a bearing on high-power semiconductors in comparison to micro-electronics. Uwe-Rolf Simon has the following to say about this: „We follow more the trends in machine tooling, meaning we continue to be a profitable business unit of Infineon.“ Eupec is number one in high-power semiconductors in Europe and ranks number two on the world market. Their customers come from energy systems, transportation, automation, domestic appliances, regenerative energy and from the business environment of the automobile industry. To state it clearly, their range of products is in the medium and lower power range within the high power area.

As far as lasers are concerned, separating wafers in the semiconductor industry is still the provenience of sawing technology to a great extent. The fact that lasers are the more elegant way to do things hasn't changed that up to now. No matter how you look at it, it gets difficult when contours have to be cut and that's where lasers are the top choice, and that's been known for a while, as some lasers have been in use for years.

More than anywhere else, this is the case with high-power semiconductors. The reason is the fact that they are based upon silicon wafers. The ideal geometries here are circles, since any edges might produce undesired

*a: eupec GmbH's business is high-performance semiconductors. | b: A Laser-Microjet unit from Synova. The unit in Warstein probably looks similar.*



**„In the final analysis, we need a round contour to define the characteristics of a component part.“**

*Michael Kesten, the head of technical services at eupec GmbH*



*Fig.: eupec GmbH*

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project manager Uwe-Rolf Simon



field strengths. The diameter and thickness of the wafer have a direct impact upon the electrical characteristics, meaning that the separating process is of major importance. Diameters vary between 15 and 119 mm while thicknesses vary between 200 and 1,500 micrometers. The wafers are cut out of 4" or 5" wafers. Uwe Simon commented on this: „In the final analysis, we need a round contour to define the characteristics of a component part.“ Laser MicroJet technology has been succeeding at this job for more than one year.

Keston and Simon answered our question as to whether there is only one or several units of this sort in Warstein with a friendly, but definite, „No comment“. They're also

not forthcoming with information on the potential output of the unit or units. Eupec's two specialists also don't let us nail them down on the benefits of Laser MicroJet, although there were a few things they stated unequivocally. „In the final analysis, it's a question of precision. Cutting with a Laser MicroJet is definitely gentler on the material since it produces less stress. A major benefit is also the useable working length of the jet that is approximately 4 cm, making the entire process more reliable and easier.“ When we take a look at other generally accepted benefits of Laser MicroJet; we are privy to more details of work at Eupec. An example is edges without burrs, cutting without leaving deposits, no microcracks and a high cutting velocity in comparison to conventional laser cutting, therefore very valid reasons for using it.

Even if Keston and Simon are reticent to divulge any details, both agree that „This technology is excellent and altogether we have also been able to gather a lot of good experience with it“. Keston particularly expounded on how well they have worked with

Synova's team. „One of the major factors in the success of this project was the fact that everybody in-volved wanted to make it successful. After all, what was important was being in control of this process with a reliable production machine and Synova is a business partner that did what we wanted“.

So, the message from our visit was that the people in Warstein have apparently found the ideal way to cut wafers and they have even streamlined its production to an extent where they are very satisfied with it. Unfortunately, we don't have any further details such as photographs from production.

But, if you do have the opportunity to talk with insiders at a semiconductor production facility; you shouldn't forget to ask about other potentials that the Laser MicroJet has. Uwe-Rolf Simon had the following to say on this: „We shouldn't forget that conventional processes have also developed further, but I could imagine that this process would be able to replace saws to a great extent. For instance, chips could be cut more gently, which would also be interesting.“

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Fig.: SINOVA SA

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