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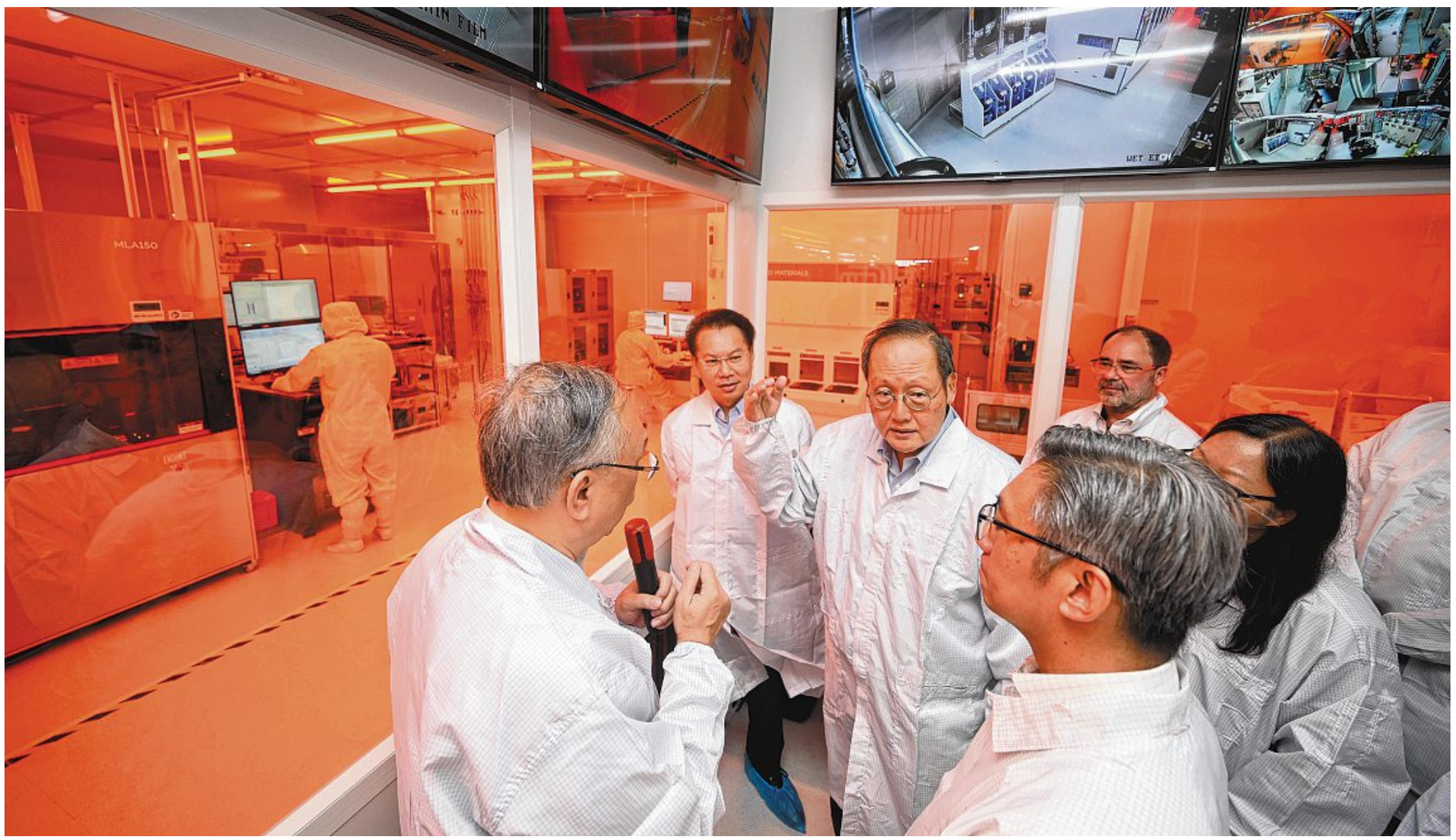

Minister-in-charge of Energy and Science & Technology Tan See Leng (centre) getting a tour of the cleanroom at the newly launched National Semiconductor Translation and Innovation Centre for Gallium Nitride at one-north on June 26. ST PHOTO: AZMI ATHNI

Local chip firms to get a boost from new $123m innovation centre

They will have access to advanced wafer fabrication, prototyping infrastructure

Sarah Koh

A new $123 million facility that enables Singapore to produce advanced semiconductors for the designing of more compact and larger-capacity electronics and communications systems opened its doors on June 26 under an ambitious national plan.

The National Semiconductor Translation and Innovation Centre for Gallium Nitride – dubbed NSTIC (GaN) – at one-north is slated to start commercial services in mid-2026.

Speaking at the centre's launch, Minister-in-charge of Energy and Science & Technology Tan See Leng said the local semiconductor industry has the potential to be more competitive globally. It currently accounts for close to 6 per cent of Singapore's gross domestic product and employs about 35,000 people.

"With a surging demand for such systems, the global radio frequency gallium nitride device market is projected to double to over US$2.7 billlion (S$3.4 billion) from 2022 to 2028," said Dr Tan, adding that the new centre aims to capture some of these opportunities.

Gallium nitride (GaN) can operate at higher voltages and generate less heat compared with traditional silicon. These properties allow for smaller and more energy-efficient devices crucial for the development of 5G and 6G communications and satellite systems, commonly used for autonomous vehicle navigation and remote surveillance.

"In today's volatile global environment, marked by supply chain fragmentation and strategic competition, what we're doing reinforces the importance of investing and developing world-leading capabilities," said Dr Tan.

"It is only by building a deep technological differentiation can we then achieve our objectives of driving the next bound of high-growth value add... and position ourselves at the forefront of next generation semiconductor technologies."

In 2023, NSTIC (GaN) received $123 million in funding over five years to set up production lines and pay for manpower costs and expertise.

A partnership between A*Star, DSO National Laboratories and Nanyang Technological University, NSTIC (GaN) aims to provide companies and researchers with local access to advanced wafer fabrication and prototyping infrastructure.

It is part of a broader NSTIC initiative led by A*Star, which aims to uplift the local semiconductor industry.

Other NSTIC centres include NSTIC (Advanced Photonics), which focuses on R&D in flat optics and silicon photonics, and NSTIC (R&D Fab), a $500 million national advanced packaging facility at JTC nanoSpace @ Tampines.

NSTIC (GaN) is the first in Singapore to host both 6-inch GaN-on-Silicon Carbide and 8-inch GaN-on-Silicon wafer fabrication lines.

A wafer is a thin circular semiconductor material that is used as the base of hundreds to thousands of chips. The diameter of the wafer determines the number of chips that can be fabricated, which impacts production efficiency and cost.

Having both production lines will allow the centre to serve a range of applications, from common consumer products to advanced satellite communication systems, said Dr Tan.

NSTIC (GaN)'s commercial services will allow companies to overcome high capital costs, which is often a pain point in research translation, he added.

"Our small and medium-sized enterprises and start-ups would be able to access these services locally to accelerate their product development and fabrication, and achieve speed-to-market," Dr Tan said.

Several memorandums of understanding and research collaboration agreements were signed on June 26.

One of them is between NSTIC (GaN), DSO National Laboratories and local start-up WaferLead to develop high-quality silicon carbide substrates, which is a key component in GaN wafer production.

WaferLead's chief executive Sunil Wickramanayaka said that creating a high volume production line for components in Singapore requires a huge capital, which budget-strapped start-ups may not be able to access.

Here is where NSTIC (GaN) comes in handy. Using NSTIC (GaN)'s equipment instead of buying its own is projected to save WaferLead around $6 million to $10 million in capital costs, he said.

WaferLead produces bare silicon carbide and epitaxial silicon carbide wafers, which can be used in power devices such as electric cars, solar inverters and wind generators, Dr Sunil added.

"We can use that money instead for other applications, such as market and product development, and that helps us a lot," he said.

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A LEG-UP

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DR TAN SEE LENG, Minister-in-charge of Energy and Science & Technology, on companies being able to overcome high capital costs – often a pain point in research translation – by tapping the NSTIC (GaN) facility's commercial services.