

Intel is struggling with chip production capacity

Intel is struggling with yield rates for its latest silicon manufacturing technologies and processes.

Intel is still one of the big guns in the CPU space (and now GPUs too), but it's struggled to keep up with the new era. The company has struggled with yield on its latest silicon technologies and manufacturing processes—which, if you've been following Intel for a while, isn't too surprising.

Intel's next-generation manufacturing process, called 18A, is suffering from low yields, according to sources familiar with the company's internal data. The Panther Lake chips expected to launch this year will be made on the 18A process. If Intel succeeds in mass-producing them and bringing them to market, it will leapfrog TSMC, which has yet to mass-produce any chips using its upcoming 2nm process.



However, as of late last year, Panther Lake's yield rate—the percentage of usable chips from a silicon wafer—was reportedly as low as 5%. While that number improved to around 10% this summer, it's still well below what's needed for profitable mass production. Historically, Intel has aimed for yields above 50% before ramping up production to avoid hurting margins, and true profitability for a complex chip isn't achieved until yields reach around 70% to 80%.

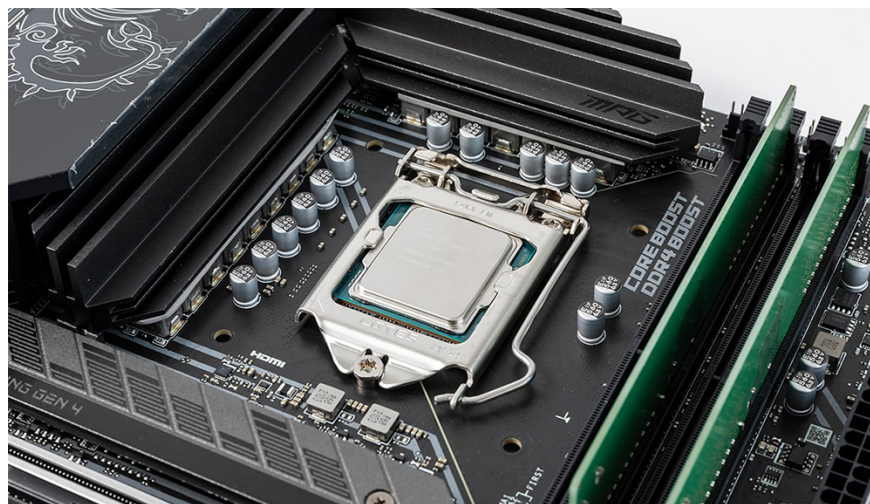
Panther Lake chips made on the 18A process are said to have a defect density that is approximately three times higher than what is acceptable for volume production. Without a significant improvement before the expected launch, Intel could be forced to sell these new chips at significantly lower profit margins, or even at a loss.

Intel executives have pushed back against these negative assessments, however. In a July interview, CFO David Zinsner disputed specific productivity numbers, claiming that 'the productivity rate is better than that,' though he declined to provide an exact figure.



One of the reasons this happened seems to be because Intel was so focused on regaining the performance advantage that it ended up using a lot of unproven technology at the same time.

This includes a new generation of transistor designs and a completely new way of powering the chips. The company has publicly warned that it could exit advanced chipmaking altogether if its next manufacturing process, 14A, fails to gain traction outside of the company.



This is not a new story for Intel, which has struggled for years to keep up with rivals like TSMC in shrinking, speeding up, and improving the efficiency of its silicon.

An older example is that Intel's 2021 11th-gen desktop chips will continue to use the company's 14nm process, even as competitors like AMD have moved to 10nm and are in the process of moving to 7nm. Intel has been trying to catch up and overtake its competitors for years, and if it does this year, it will likely be after a tough and potentially costly fight.

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