# Samsung pushes ahead of Apple with ultra-high-resolution LEDoS for next-gen AR headsets



# Samsung Accelerates Development of Next-Gen AR Microdisplay Technology

As augmented reality (AR) continues to capture the imaginations of technology giants, Samsung is positioning itself as a significant player in this burgeoning field. The company is ramping up its efforts to develop innovative microdisplay technology, namely LED on Silicon (LEDoS). This new advancement promises to enhance the visual quality and performance of AR headsets, a market that is rapidly heating up amidst competition from industry stalwarts like Apple, Google, and Meta.

According to reports from The Korea Economic Daily, Samsung’s semiconductor division has embarked on the aggressive development of LEDoS, which is a compact display platform utilizing micro-LEDs mounted on silicon wafers. This approach aims to overcome critical limitations associated with existing technologies, particularly in terms of brightness and lifespan. With a planned pixel density between 6,600 and 7,000 pixels per inch (PPI), Samsung's LEDoS is set to surpass the 3,400 PPI resolution found in Apple’s Vision Pro headset, potentially setting a new benchmark in visual clarity for AR applications.

The implications of this technology extend beyond Samsung's own product lines. The company reportedly aims to supply its LEDoS technology to both Apple and Meta for use in their forthcoming AR devices. Such collaborations could significantly alter the dynamics of the AR headset landscape, driving innovation and competition. Notably, Samsung also plans to unveil its second-generation AR glasses in 2027, coinciding with commercial production of the LEDoS technology.

The momentum behind AR is palpable across the tech industry, as evidenced by the diverse array of devices showcased at recent technology expos, such as CES 2025. Companies ranging from established giants like Sony to start-ups have begun exploring the possibilities of AR, designing innovative products that promise to reshape user experiences. Despite a history of setbacks—most famously within Google’s own ill-fated foray into smart glasses with Google Glass—the industry is revitalising confidence through fresh releases and concepts.

Meta, for example, has recently introduced its first prototype AR glasses, dubbed "Orion," which also harnesses LEDoS technology. These glasses, weighing a mere 98 grams, feature a sophisticated optical design aimed at developers and testers, although mass production remains on the horizon. While the prototype represents a promising leap forward, challenges regarding cost—potentially nearing $10,000 each—and technical constraints pertaining to resolution remain.

Apple, too, is taking significant steps in this realm. The company has requested that Samsung develop micro OLED panels for its upcoming AR/VR glasses, signalling a keen interest in diversifying its technological offerings. With a projected launch window for its first headset already anticipated as early as January 2023, and a follow-up device expected by 2025, Apple is clearly keen to stake its claim in this competitive market.

As Samsung, Google, Apple, and Meta intensify their focus on AR technology, the stakes have never been higher. The potential for transformative applications in both consumer and professional spaces is inspiring a renewed wave of innovation, challenging legacy narratives while inviting new technological pathways. Though the AR market has seen its share of initial failures, the commitment from these tech powerhouses underscores a collective belief that augmented reality is indeed the future of interactive technology.

With LEDoS on the horizon, Samsung's advancements may well play a pivotal role in shaping the next generation of AR headsets, marking a significant evolution in a field that has long been considered the frontier of digital interaction.

## Reference Map:

* Paragraph 1 – [[1]](https://mashable.com/article/samsung-ar-headset-smart-glasses-microdisplay-led-on-silicon-ledos), [[2]](https://www.sammobile.com/news/samsung-developing-ledos-displays-next-gen-ar-headsets)
* Paragraph 2 – [[2]](https://www.sammobile.com/news/samsung-developing-ledos-displays-next-gen-ar-headsets), [[5]](https://www.ledinside.com/news/2023/7/2023_07_17_02)
* Paragraph 3 – [[1]](https://mashable.com/article/samsung-ar-headset-smart-glasses-microdisplay-led-on-silicon-ledos), [[3]](https://www.trendforce.com/news/2024/09/26/meta-unveils-first-ar-glasses-prototype-orion-that-employs-ledos-technology-says-trendforce), [[4]](https://www.macrumors.com/2022/07/11/apple-asks-samsung-micro-led-ar-headset)
* Paragraph 4 – [[5]](https://www.ledinside.com/news/2023/7/2023_07_17_02), [[6]](https://www.ledinside.com/news/2022/10/samsung_display_says_microled_will_be_used_in_ar_over_oled)
* Paragraph 5 – [[7]](https://www.gsmarena.com/samsung_is_developing_bright_microled_on_silicon_displays_for_ar_headsets-news-56182.php)

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## Bibliography

1. <https://mashable.com/article/samsung-ar-headset-smart-glasses-microdisplay-led-on-silicon-ledos> - Please view link - unable to able to access data
2. <https://www.sammobile.com/news/samsung-developing-ledos-displays-next-gen-ar-headsets> - Samsung Display is developing LEDoS (LED on Silicon) microdisplay technology for augmented reality (AR) devices. Unlike OLEDoS, which uses organic light-emitting diodes on silicon panels, LEDoS employs micro LEDs on silicon, aiming to overcome limitations in brightness and lifespan. Samsung plans to produce LEDoS panels with pixel densities of 6,600-7,000 pixels per inch (PPI), surpassing the 3,400 PPI of Apple's Vision Pro headset. This advancement is expected to enhance the visual experience in AR applications. Additionally, Samsung is working on its own mixed-reality headset, potentially releasing it next year to compete with Apple's Vision Pro. ([sammobile.com](https://www.sammobile.com/news/samsung-developing-ledos-displays-next-gen-ar-headsets?utm_source=openai))
3. <https://www.trendforce.com/news/2024/09/26/meta-unveils-first-ar-glasses-prototype-orion-that-employs-ledos-technology-says-trendforce> - Meta unveiled its first full-color AR glasses prototype, 'Orion,' at Meta Connect 2024. These glasses utilize LEDoS (silicon-based Micro LED) technology and weigh just 98 grams. The optical design incorporates a diffraction-type waveguide made from silicon carbide (SiC) and JBD's three-panel full-color LEDoS technology, achieving a 70-degree field of view. While intended for developers and testers, mass production is not planned yet. Challenges include high costs associated with LEDoS micro-display panels and resolution constraints linked to SiC waveguides, with production costs potentially reaching nearly $10,000 per unit. ([trendforce.com](https://www.trendforce.com/news/2024/09/26/meta-unveils-first-ar-glasses-prototype-orion-that-employs-ledos-technology-says-trendforce/?utm_source=openai))
4. <https://www.macrumors.com/2022/07/11/apple-asks-samsung-micro-led-ar-headset> - Apple has requested Samsung Display to develop micro OLED panels for its upcoming AR/VR glasses. This move aims to diversify Apple's supply chain ahead of the headset's anticipated launch. Micro OLED displays, built directly onto chip wafers, offer thinner, smaller, and more power-efficient displays with pixel sizes ranging from four to 20 micrometers. These characteristics make them ideal for AR/VR applications. Apple's first headset is expected to be unveiled in January 2023, with a follow-up device likely launching in 2025. ([macrumors.com](https://www.macrumors.com/2022/07/11/apple-asks-samsung-micro-led-ar-headset/?utm_source=openai))
5. <https://www.ledinside.com/news/2023/7/2023_07_17_02> - Samsung Display has initiated the development of LED on silicon (LEDoS) microdisplay technology for augmented reality (AR) devices. Vice President Gong Min Kim highlighted that LEDoS could replace OLED on silicon (OLEDoS) as the dominant display technology for AR devices. The focus is on miniaturizing LEDs while maintaining their performance, with efforts to produce LEDs smaller than 10 micrometers and even 5 micrometers. This advancement aims to address limitations in brightness, form factor, and lifespan associated with OLEDoS displays. ([ledinside.com](https://www.ledinside.com/news/2023/7/2023_07_17_02?utm_source=openai))
6. <https://www.ledinside.com/news/2022/10/samsung_display_says_microled_will_be_used_in_ar_over_oled> - Samsung Display has stated that MicroLED displays are likely to be used over OLED panels in augmented reality (AR) devices due to the higher brightness required for AR applications. The company is developing On Silicon panels that use silicon instead of glass to create the microdisplays needed for AR devices. Samsung's long-term goal is to develop LEDoS displays with 6,600 pixels per inch resolution, surpassing the 5,000 PPI minimum required for AR displays. ([ledinside.com](https://www.ledinside.com/news/2022/10/samsung_display_says_microled_will_be_used_in_ar_over_oled?utm_source=openai))
7. <https://www.gsmarena.com/samsung_is_developing_bright_microled_on_silicon_displays_for_ar_headsets-news-56182.php> - Samsung Display is developing bright MicroLED on Silicon (LEDoS) displays for augmented reality (AR) headsets. Unlike OLED displays, which have been used in VR headsets, MicroLED displays offer higher brightness, making them more suitable for AR applications. Samsung's long-term goal is to develop LEDoS displays with 6,600 pixels per inch (PPI) resolution, exceeding the 5,000 PPI minimum required for AR displays. The company is also working on OLED on Silicon (OLEDoS) panels, but MicroLED is considered more appropriate for AR due to its brightness. ([gsmarena.com](https://www.gsmarena.com/samsung_is_developing_bright_microled_on_silicon_displays_for_ar_headsets-news-56182.php?utm_source=openai))