

Horizon Robotics VS Black Sesame, who will win the title of “China’s No. 1 Intelligent Driving Chip Stock”?

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How can Horizon Robotics (地平线机器人) and Black Sesame (黑芝麻智能), both Chinese innovative chipmakers targeting the smart car market, rush to be listed on the Hong Kong stock market at the same time? Plus, what development logic does the smart driving chip track follow?

Both are registered in the Cayman Islands, and they are both unicorns. One has a valuation of 63 billion (RMB) and is headquartered in Beijing, and the other has a valuation of 16 billion and is headquartered in Wuhan. Horizon and Black Sesame were registered less than a year apart, received mixed external support, and had gaps in strength, but both chose to stand on the same historical dividing line at this time.

In the past year of 2023, China's new energy vehicle exports ranked first in the world for the first time. Both companies are focused on this explosive growth industry. Whoever can cross this line first in 2024 and lead the development trend of China's intelligent driving chip industry will attract market attention.

Although the self-expression in the prospectus is different, Horizon said, "We are a market-leading provider of advanced driver assistance systems (ADAS) and advanced autonomous driving (AD) solutions for passenger cars, with proprietary software and hardware technologies." Black Sesame said, "We are a supplier of automotive-grade computing SoC and SoC-based smart car solutions. SoC is a chip that integrates a central processing unit, memory, I/O interfaces, and other key electronics." But in the eyes of some market participants, both companies are in the intelligent driving chip or car-grade SoC (computing chip) track. The

prospectuses also show that the two companies not only produce car-grade SoCs (computing chips), but also provide overall solutions based on the chips.

As for who can become "China's No. 1 Smart Driving Chip Stock", Caijing E-Law asked about the listing progress of the two companies respectively, and the responses they received were that they were in a silent period and it was inconvenient to respond.

Both are innovative smart car chip manufacturers. What are the similarities and differences between Horizon and Black Sesame? How can they break through? What kind of competitive situation does this track present? What is the survival situation of Chinese smart driving chip companies that are not yet in the spotlight? Let's keep reading together.

01. Horizon VS Black Sesame, a review of the fundamentals

On June 30, 2023, Black Sesame submitted its prospectus for the first time on the Hong Kong Stock Exchange, which subsequently expired. In March 22, 2024, the main board listing application was resubmitted to the Hong Kong Stock Exchange.

Four days later, on March 26, Horizon also submitted its Hong Kong stock listing application.

From the data disclosed in the prospectuses, we can estimate the fundamentals of these two companies' sprint for IPO.

Let's look at revenue first. In the past three years, Horizon has grown steadily—466.7 million RMB, 905.7 million, and 1.5516 billion in 2021, 2022, and 2023 respectively. Black sesame seeds are also on an upward trend, with sales of 60.5 million RMB, 165.4 million, and 312.4 million in 2021, 2022, and 2023 respectively.

Behind the high revenue growth, China's two leading smart driving chip manufacturers have not yet turned a profit.

Data shows that from 2021 to 2023, Horizon's operating losses were approximately 1.335 billion RMB, 2.132 billion, and 2.03 billion respectively, with a cumulative operating loss of 5.497 billion RMB over three years.

Black Sesame's operating losses from 2021 to 2023 are approximately 720 million RMB, 1.053 billion, and 1.697 billion respectively, with a cumulative operating loss of 3.47 billion RMB in three years.

One of the important reasons for their losses is their huge investment in research and development. In 2023, Horizon's R&D expenditure will reach 2.37 billion RMB, and Black Sesame's will be 1.363 billion RMB.

Horizon's commercialization performance is relatively good. As of April 2024, it has delivered more than 5 million chips in total. Its solutions have been adopted by 31 automobile brands and installed on more than 230 models. In 2023 alone, Horizon obtained more than 100 new car model designations (as customers).



Horizon customers. Source: Prospectus

Black Sesame disclosed that as of December 31, 2023, the total shipment volume of the flagship chip A1000 series SoC exceeded 152,000 pieces, and the number of customers increased to 85. As of the submission of the form, Black Sesame has cooperated with more than 49 automobile brands and Tier 1 suppliers such as FAW, Dongfeng, JAC, Hechuang Smart Technology, Yikatong Technology, Baidu, Bosch, ZF, Marelli, etc. .

In terms of gross profit margin, Horizon maintains a high level, reaching 70.5% in 2023, while Black Sesame's figure is 24.7% during the same period.

Regarding the difference in gross profit margin between the two companies, car industry analyst A (who wishes to remain anonymous) told Caijing E-Law that the gross profit of hardware will generally remain within a fixed range, and the difference between different companies will not be too big. The final gap in gross profit margin is likely due to the software algorithm segment.

It is worth mentioning that although both companies currently need listing financing to expand their scale, the scale of funds on hand is different. Data show that as of the end of 2023, Horizon's cash and cash equivalents on its books were 11.36 billion RMB, and Black Sesame's was 1.298 billion RMB.

There is also a certain gap in the expectations placed on them by the capital market. According to the prospectus data, as of the completion of the D round of financing in 2022, Horizon has raised a total of US\$2.36 billion (equivalent to approximately RMB 17.08 billion), and its valuation has reached US\$8.71 billion (equivalent to approximately RMB 63.04 billion).

Black Sesame completed the C+ round of financing in August 2022, with a cumulative financing of US\$696 million (equivalent to approximately RMB 5.04 billion), and a post-investment valuation of US\$2.218 billion (equivalent to approximately RMB 16.05 billion).

As the vanguard of China's smart driving chip industry, they are two forces that cannot be underestimated. So the question is, why is it that these two companies can be the first to knock on the door of the Hong Kong Stock Exchange?

02. What are smart driving chipmakers competing for?

Why can Horizon and Black Sesame break out from the crowd of chipmakers? The aforementioned analyst A told Caijing E-Law that the core capabilities of the two companies can be summarized into three points: the first is mass production experience; the second is focus on ecosystem cooperation; the third is software capabilities. After a chip is manufactured, whether it can be used or whether it is effective to use depends largely on the support of software capabilities.

Let's look at the three aspects in turn. First, we will analyze the mass production experience based on specific products and vehicle models.

Currently, Horizon has launched the Journey 2, Journey 3, and Journey 5 chips for advanced driver assistance systems (ADAS). The soon-to-be-released Journey 6 chip has a flagship computing power of up to 560TOPS (trillions of operations per second) and will be launched in 2024. The first batch of mass-produced models will be delivered in the fourth quarter of the year.

Horizon's mass production capabilities have been fully verified by Li Auto (理想汽车) - the 2021 Journey 3 will be mass-produced and launched on the Li Auto ONE, and the 2022 Journey 5 will be mass-produced and launched on the Li Auto L8 Pro. For the subsequent L7 and L9 models, Li Auto has also consistently chosen to cooperate with Horizon. As stated in Horizon's prospectus, "the production of Li Auto's L series models has increased significantly, and the installed capacity of our solutions has also increased."

*****Did not translate passage about the experience of driving a L8 Pro vehicle.**

Black Sesame's prospectus shows that it has launched the Huashan series and Wudang series of chips, among which the low-computing power chips that have been mass-produced are mainly Huashan A1000 and A1000L. There are also 3 chips that have been disclosed but have not yet been mass-produced. —Among them, the A1000 Pro is expected to be mass-produced this year, the Wudang C1200, which focuses on cross-domain integration of smart cockpits and smart driving, is expected to be mass-produced next year, and the high-computing power chip A2000 is expected to be mass-produced in 2026.

A Black Sesame director told Caijing E-law that Huashan A2000 chip is planned to be released within 2024, and more cooperation projects with Wudang C1200 chip will be disclosed during the 2024 Beijing Auto Show.

Black Sesame's chip capabilities have been proven on a large scale in the Geely Lynk & Co (joint venture between Geely and Volvo) 08 model. It is equipped with two Black Sesame A1000 chips, with a chip computing power of 116TOPS, supporting L2+ level intelligent assisted driving systems, including high-speed NOA (navigate on autopilot), automatic emergency braking, smart parking and other functions.

As for other models that have been mass-produced, such as the Hechuang V09, Geely Galaxy E8, and Dongfeng eπ007, since they have not yet begun large-scale sales, and the launch of new cars is relatively close to now, it will take a while for the market to ferment.

It can be seen from the above data that Horizon has shown a certain leading advantage in terms of mass production progress. Another analyst familiar with the smart car industry ("analyst B"), told Caijing E-Law that Horizon has taken the lead in achieving mass production verification through the Li Auto ONE model, and there is a "human-to-human" effect within the OEM — when choosing domestic chipmakers, OEMs will give priority to such companies with mature experience, which will make it easier for Horizon to get contracts for other models in the future.

Secondly, it is ecosystem cooperation with other partners. According to the prospectus, Horizon positions itself as a Tier 2 supplier. They not only cooperate directly with the OMEs but also work with them through Tier 1 suppliers. At the same time, Horizon also provides a series of basic models, tool chains, frameworks and reference solutions to help customers and ecosystem partners develop application software that meets customized needs.

As for why it does not directly position itself as a Tier 1 supplier, Horizon founder and CEO Yu Kai said in a previous interview with the media, "Because we (Horizon) cannot do so many specific deliveries, and there are too many models that need to be adapted and customized. There is a lot of integration, testing, and delivery work. I don't think it would be possible without partners."

Black Sesame also positions itself as a Tier 2 supplier. Black Sesame CMO Yang Yuxin once publicly stated, "As a chip company, we want to create an open platform and stimulate more innovation capabilities of downstream partner software suppliers through separating the

software components. This helps us achieve more differentiated products based on our platform that can provide computing power and functions."

Analyst A told Caijing E-Law that there is a certain gap between Black Sesame's ecological layout capabilities and Horizon, and Black Sesame has gradually discovered this in the past two years.

Finally, capabilities in software algorithms are very important, which can be seen intuitively through the prospectus.

Data shows that Horizon and Black Sesame's revenue mainly comes from two parts, one is SoC-based solutions, and the other is licensing and services (called "algorithm-based solutions" in Black Sesame's prospectus). Here, "licensing and services" refers to the use of algorithms, software, and development tool chains by authorized customers.

From 2021 to 2023, the revenue of Horizon product solutions increased from 208.1 million RMB to 506.4 million RMB, and the proportion of this revenue dropped from 44.6% to 32.7%; the revenue from licensing and services increased from 202.1 million RMB to 964 million RMB. The proportion of this revenue increased from 43.3% to 62.1%, which is more than half of the total revenue.

By comparison, Black Sesame shows a different trend of changes - from 2021 to 2023, the revenue of product solutions increased from 1.615 million RMB to 194 million RMB, and the revenue share increased from 2.6% to 62%; Revenue from licensing and services increased from 32.646 million RMB to 82.705 million RMB, and the proportion of this revenue decreased from 54% to 26.5%.



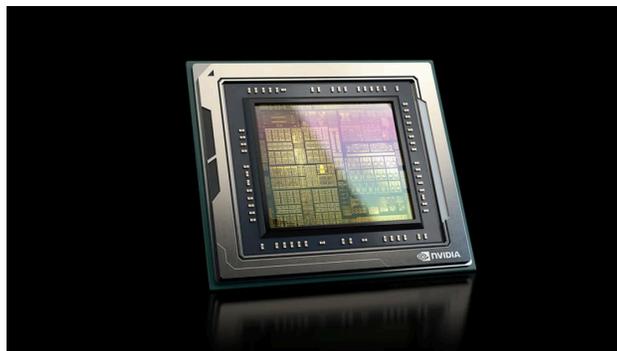
Source: Caijing E-Law's collection of data from prospectuses

Presenting the reasons behind this gap, Analyst B revealed to Finance E Law that Horizon has a larger algorithm team than Black Sesame.

03. The industry reshuffle is accelerating. How can latecomers counterattack?

There are various types of automotive chips. In the "Guidelines for the Construction of National Automotive Chip Standard System" released by the Ministry of Industry and Information Technology on December 29, 2023, automotive chips can be divided into microcontrollers (MCU), system-on-chip (SoC), and power chips based on different functions. There are a total of 10 categories of chips (IGBT, MOSFET, etc.), sensor chips, communication chips, memory chips, security chips, driver chips, power management chips and other types of chips. The system-on-chips here include smart cockpit and smart driving chips.

Horizon and Black Sesame mainly target the system-on-chip category, that is, car-grade SoC. To be more specific, aside from the C1200, a cross-domain computing chip that Black Sesame has not yet released, the two companies are currently promoting car-grade intelligent driving SoC (also known as "autonomous driving SoC"), that is, through their SoC and SoC-based solutions provide core technologies for advanced assisted driving and high-level autonomous driving of passenger cars.



Smart driving chip "top-notch" NVIDIA Orin

The so-called advanced driver assistance system (ADAS) refers to L1 to L2 level autonomous driving, which usually refers to functions such as lane centering, adaptive cruise, lane departure warning, and automatic emergency braking. It mainly provides drivers with driving assistance and improves safety. Drivers still need to stay focused at all times. High-level autonomous driving, or AD, refers to L3 level and above autonomous driving, including conditional

autonomous driving and fully autonomous driving. High-speed NOA and urban NOA, which are much discussed in the industry, both fall into the category of high-level autonomous driving.

What is the current competitive landscape in the car-grade intelligent driving SoC track?

According to the Horizon prospectus, based on the installed capacity of solutions in 2023, among China's advanced assisted driving and high-end autonomous driving solution providers: the first place is Mobileye, with a market share of 29.2%; the second place is Xilinx (acquired by AMD), with a market share of 24%; third place is Renesas Electronics (Japanese semiconductor manufacturer), with a market share of 19.9%; fourth place is Horizon, with a market share of 9.3%; fifth place is Texas Instruments, with a market share of 5.1%. The top five companies together account for 87.5% of the market share.

What needs to be noted here is that if you focus only on high computing power smart driving chips, you will see a completely different ranking situation.

According to Frost & Sullivan data cited by Black Sesame, Nvidia ranks first in China's ranking of high computing power (computing power of 50+TOPS) autonomous driving SoC shipments (by chip) in 2022, with market share reaching 81.6%; Horizon ranks second, with a market share of 6.7%; Black Sesame ranks third, with a market share of 5.2%; Huawei HiSilicon ranks fourth, with a market share of 0.7%; Qualcomm ranks fifth, with a market share of 0.4%, and the top five occupy a total of 94.6% of the market share. In 2022, China's high-computing power autonomous driving chip market will reach 2.6 billion RMB, accounting for 29.9% of China's total autonomous driving SoC market size.

排名	供应商	2022年 在中国的市场份额	2022年 在全球的市场份额
1	英伟达	81.6%	82.5%
2	地平线	6.7%	6.2%
3	黑芝麻智能	5.2%	4.8%
4	华为海思	0.7%	0.7%
5	高通	0.4%	0.5%
合计		94.6%	94.7%

Source: Frost Sullivan

No matter which method is used to make statistics, the commonality that can be observed is that in the car-grade smart driving SoC track, the suppliers are still dominated by foreign manufacturers, and the top three chipmakers eat up the vast majority of the market share.

It should be pointed out that some Chinese automobile OEMs and smart driving chip startups that develop their own chips are still in the early research and development stage of their

products. The large-scale mass production and installation of cars is still limited, so they have not yet appeared in the rankings. On the list. For example, the commercialization progress of SemiDrive (芯驰科技) is mainly focused on smart cockpit chips and MCU chips, and there is less news about its smart driving chip V9; the smart driving chip AD1000 of Geely chip company Siengine Technology has just been released recently; Houmo.AI launched the Hongtu H30 smart driving chip with integrated storage and computing in May last year. News on mass production and model selection have not yet been announced; EVAS Intelligence, newly established in 2022, is still preparing for the large-scale mass production of smart driving chips.

The main reason behind this phenomenon, according to the Black Sesame's prospectus, is that the development of smart driving chips has huge technical barriers, requires large investments in research and development, and has a long development cycle. Analyst A told Finance E Law that it takes about 3-4 years for a chip to be developed and deployed. If a company emerges now, then the gap between it and the Horizon may be three years or even longer. Moreover, the iteration speed of intelligent driving technology is very fast, making it difficult to catch up.

But this does not mean that latecomers have no hope, because there is still a lot of room for market development.

Lin Shi, secretary-general of the intelligent connected vehicle branch of the China-Europe Association for Technical and Economic Cooperation (CEATEC), told Caijing E-Law that the intelligentization trend in the automobile industry was clear. Although domestic smart driving chip companies started relatively late and are not very well-known, if the technology achieves a breakthrough, there will still be plenty of room for development. "The same is true for latecomers. As long as the technology is advanced enough and the products presented are more powerful, they will still have opportunities," he said.

For specific data, we can refer to the Horizon prospectus. China is the world's largest new passenger car market. The new passenger car sales in 2023 will be 21.7 million units, of which 12.4 million smart cars will be sold, with a penetration rate of 57.1%. According to data from China Insights Consultancy (CIC), it is expected that by 2026 and 2030, China's smart car sales will reach 20.4 million and 29.8 million respectively, with penetration rates reaching 81.2% and 99.7% respectively. Chinese OEMs, especially Chinese new energy vehicle OEMs, are at the forefront of the trend of adopting high-end autonomous driving solutions. It is expected that by 2027, nearly half of the driving automation solutions deployed in China's passenger cars will be high-end autonomous driving solutions, and by 2030, this proportion will further increase to more than 80%, much faster than the penetration of the global market speed.

Specific to the number of chips carried by each vehicle, the China Association of Automobile Manufacturers has estimated that the number of chips per traditional fuel vehicle will reach 934 in 2022, and the average number of chips in a new energy vehicle will be as high as 1,459. In the future, the demand for chips for more advanced smart cars is expected to increase to 3,000 per car.

According to CIC data cited by Horizon, the global market size of ADAS and high-end autonomous driving solutions will grow from 61.9 billion RMB in 2023 to 1,017.1 billion RMB in 2030, with a compound annual growth rate of 49.2%. In China, the total market size of ADAS and high-end autonomous driving solutions will be 24.5 billion RMB in 2023, and is expected to reach 407 billion RMB at a compound annual growth rate of 49.4% by 2030.

Wang Bo, research manager of IDC China, expressed a similar view to Caijing E-Law. The passenger car market's driving assistance functions have indeed developed rapidly in the past few years, and the proportion of new cars that meet L2 autonomous driving standards has increased rapidly. However, Wang Bo believes that there is still room for further improvement, especially for entry-level models. The penetration rate of driving assistance functions will further increase as technology costs decrease. At the same time, there are similarities in the underlying logic between the field of intelligent driving and fields such as robots and drones in terms of perception, calculation, decision-making, and control. The technology accumulation of technology companies in the industry chain also has high cross-industry value.

In addition, the willingness of Chinese car companies to cooperate with domestic smart driving chip manufacturers is increasing. According to the Horizon prospectus, "Chinese OEMs (automotive OEMs) are more inclined to choose domestic suppliers to better cater to the needs and preferences of Chinese customers." The Black Sesame prospectus stated that "Chinese automotive OEMs are actively cooperating with local autonomous driving SoC suppliers to establish a secure and reliable local supply chain. Domestic autonomous driving SoC suppliers are likely to be more favored by Chinese automotive OEMs in the Chinese market as geographical proximity allows domestic companies to respond to the latest market demands and customer demands in a more efficient manner."

Moreover, in addition to making smart driving SoCs for passenger cars, chipmakers can also make corresponding transformations in order to seek development. Industry analyst A told Caijing E-Law that L4-level autonomous commercial vehicles, garden patrol vehicles, industrial vehicles, etc. have lower processing requirements for chips. For these smaller tracks, manufacturers can also make some arrangements.

The chance of counterattack is by no means slim. Black Sesame, which has already launched a sprint to the Hong Kong Stock Exchange, may be able to provide some reference for latecomers. In an interview with the media in 2023, Shan Jizhang, founder and CEO of Black Sesame, pointed out three challenges facing the company. The first is the continuous expansion of the company's scale and how to make employees work happily and efficiently; the second is intelligent driving technology The iteration speed is very fast, how to define car-grade chip products that can be used in the future; thirdly, there are many newly established companies in the country, including self-developed chips by automobile OEMs, and how to maintain their lead.