



Flash Memory Summit



NVM Technology & Opportunity in China 2019 (amid US-China High Tech Show-down?)

Michael Wang
GigaDevice Semiconductor



What have happened since US-China Tariff War started 2018/Mar?

- It started from structural trade imbalance, leading to tariff war, between the world's 2 largest economies
- A truce agreement seems stalled after a year and half ...

Trump Increases China Tariffs as Trade Deal Hangs in the Balance



President Trump praised the effects of tariffs, on the same day as a key round of trade talks between United States and Chinese officials. Agence France-Presse — Getty Images

With Higher Tariffs, China Retaliates Against the U.S.



The Yangshan Deep Water Port in Shanghai, China. The Chinese government said on Monday that it would raise tariffs on goods from the United States as of June 1, giving negotiators from the two countries time to strike a deal. Aly Song/Routers

U.S. Tech Suppliers, Including Google, Restrict Dealings With Huawei After Trump Order



A Huawei store in Beijing. The Chinese company's products have effectively been blocked in the United States, but its business has grown rapidly in Africa, Asia and Europe. Lam Yik Fei for The New York Times

For the U.S. and China, a Technology Cold War That's Freezing Over



The Apple Store in Shanghai. A fight between the United States and China is cleaving the high-tech realm. Imaginichina, via Associated Press

Future high tech positioning becomes the new Battle Field

Quickly, positioning in future high tech dominance has become the sticking points.....

- ❑ US alleged China for IP theft & trade violation, forcing technology transfer w JV model, and heavy subsidies on selected tech areas
- ❑ Citing “National Security”
- ❑ US CFIUS extended jurisdiction that effectively block all investment funding & M&A/JV possibility with China, esp. in high tech
- ❑ *(Note: Various Export Control, Economic Sanctions and related laws exist for decades, yet did not selectively focusing on China till now ...)*



Are they Economic only? Or Legal? Or Political? Or all of above ...

- ❑ Trade secret theft charge case :
JinHua blocked ...
- ❑ Trade sanction & criminal indictment cases : ZTE spared after huge \$\$\$ fines; Huawei still on DoC Entity_List...
- ❑ Army of US government agencies & regulators mobilized :
 - ❑ Dept of State (ITAR),
 - ❑ Dept of Commerce (EAR, BIS "Blacklist"),
 - ❑ Dept of Treasury (OFAC, FCPA),
 - ❑ ITC & judicial courts for IP litigations,
 - ❑ CFIUS





How a prolonged trade war may slow down NVM tech growth for China?

Typical Development Flow Steps What US may restrict?

- #1: Material/Device Research Fundamental IP
- #2: Process Development Process equipment/recipe/knowhow
- #3: Chip/Product Design Design IP, EDA software
- #4: Host SoC Design-in Restrict collaboration
- #5: System/Application validation Restrict collaboration & SW platform
- #6: Mass production & delivery Process equipment/chemical/tools
- #7: Technology scaling for performance improvement & cost-down Restrict technology/talent/knowhow flow, and market access

(Loop around for new process nodes, and/or product/biz development)



Behind dark cloud, any silver lining Opportunity for Chinese or US NVM players?

- ❑ China, citing “national security” as well, will strongly support domestic Chinese tech companies.
 - ❑ If one made it to the Chinese “national team”, many hidden opportunities may become available.
- ❑ China will be forced to invest/fund more in fundamental R&D, core SW, fab equipment etc, which will blossom eventually.
- ❑ Explore collaboration away from US.
 - ❑ If legally & economically available, work more w 3rd-location partners

Where do China stand in 2019 for Flash & Emerging NVM in view of these threats?

- Flash in China : one of the best entry point for China to achieve self-reliant and a global supplier
 - NOR □ most established & experienced in production
 - NAND □ good progress, ready for market debut
- Emerging NVM in China : opportunity to keep abreast at the infant stage
 - Startup in MRAM, ReRAM, PCM



Takeaway Messages

- ❑ “Trade War” between US and China since last year, which turns into battle of high tech positioning, will hurt and slow down China’s budding semiconductor industry, including Flash and emerging NVM.
- ❑ High tech industry in China, including semiconductor supply, can no longer afford to downplay Legal, Political or trusted Supply concerns, in addition to traditional Technology, Economy & Application aspects.
- ❑ The silver lining for Chinese NVM company may be the stronger support from government policies and domestic opportunities.
- ❑ NVM, or semiconductor memory manufacturing in general, still presents one of the best entry point for China to achieve self-reliant and a potential global player.



Flash Memory Summit



Thank You