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 …
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
- #1: Material/Device Research
- #2: Process Development
- #3: Chip/Product Design
- $4: Host SoC Design-in
- #5: System/Application validation
- #6: Mass production & delivery
- #7: Technology scaling for performance improvement & cost-down
  (Loop around for new process nodes, and/or product/biz development)

What US may restrict?
- Fundamental IP
- Process equipment/recipe/knowhow
- Design IP, EDA software
- Restrict collaboration
- Restrict collaboration & SW platform
- Process equipment/chemical/tools
- Restrict technology/talent/knowhow flow, and market access
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
“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.
Thank You