AIStorm's AI-in-Imager Solutions Use Tower Semiconductor's Hi-K VIA Capacitor Memory to Enable High Density Imager “Always On” Processing

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AIStorm’s charge domain AI-in-Sensor technology uses Tower Semiconductor's Hi-K VIA capacitor memory to enable best-in-class real-time machine learning for the $7B edge imager market.

HOUSTON, Tx. and Migdal HaEmek, Israel—May 6, 2021—AIStorm and Tower Semiconductor today announced that AIStorm’s new AI-in-Imager products will use AIStorm’s electron multiplication architecture and Tower’s Hi-K VIA capacitor memory instead of digital calculations to perform AI computation at the pixel level. This saves the silicon real estate, multiple die packaging costs and power required of competitive digital systems including eliminating the need for input digitization. The Hi-K via capacitors reside in the metal layers and thus allow the AI to be built directly into the pixel matrix without any compromise on pixel density or size.

Always-on-Imagers are capable of drawing negligible power in idle mode until detection of specific situations such as “wakeup on… fingerprint… face… action…behavior… gesture… person… or driving event”. In addition, they perform machine learning within the device after wakeup, eliminat the need for additional components or co-packaged processors. The AI edge market is expected to grow from $6.72 billion in 2022 to $66.3 billion by 2025 in deep chip learning. Next generation handsets, IoT devices, cameras, laptops, VR, gaming devices and wearables will directly benefit from AIStorm’s AI-in-sensor technology with superior cost and performance compared to other AI edge solutions on the market.

“This new imager technology opens up a whole new avenue of “always on” functionality. Instead of periodically taking a picture and interfacing with an external AI processor through complex digitization, transport and memory schemes, AIStorm’s pixel matrix is itself the processor & memory. No other technology can do that,” said Dr. Avi Strum, SVP of Sensors and Displays BU at Tower Semiconductor.

In existing solutions, AI processors usually reside outside of the pixel matrix. This is the reason “Always On” imaging solutions need to continuously detect pixel changes and forward digital information to memory and an AI subsystem located outside the imager. This causes many false alerts and high-power consumption. Whether GPU based or PIM based, significant silicon area is associated with memory storage, hence high cost. AIStorm's solution is different. Electrons are multiplied directly instead of being converted to a digital numbers through the use of memory which is suspended above the silicon in the metals, a feature enabled by using Tower Semiconductor's low leakage VIA Capacitor technology. This capability for local AI pixel coupling adds a new dimension to edge imaging allowing immediate intelligent (AI) response to pixel changes for the first time.

To complement its hardware, AIStorm has built mobile models, under the MantisNet & Cheetah families, that use the direct pixel coupling of the AI matrix to offer sub-100uW “always on” operation with best-in-class latencies, and post wakeup processing of up to 200 TOPs/W.

About AIStorm
AIStorm is the pioneer and leader in AI-in-Sensor charge domain processing, which eliminates the latency, power and cost associated with competitive AI solutions at the EDGE. AIStorm is headquartered in Houston, Texas, with offices in Graz, Austria, Budapest, Hungary, Chardon, Ohio, Nashua New Hampshire, Toronto, Canada and Hsinchu, Taiwan. For more information, visit https://aistorm.ai.

About Tower Semiconductor
Tower Semiconductor Ltd. (NASDAQ: TSEM, TASE: TSEM), the leader in high-value analog semiconductor foundry solutions, provides technology and manufacturing platforms for integrated circuits (ICs) in growing markets such as consumer, industrial, automotive, mobile, infrastructure, medical and aerospace and defense. Tower Semiconductor’s focuses on creating positive and sustainable impact on the world through long term partnerships and its advanced and innovative analog technology offering, comprised of a broad range of customizable process platforms such as SiGe, BiCMOS, mixed signal/CMOS, RF CMOS, CMOS image sensor, non-imaging sensors, integrated power management (BCD and 700V), and MEMS. Tower Semiconductor also provides world-class design enablement for a quick and accurate design cycle as well as Transfer Optimization and development Process Services (TOPS) to IDMs and fabless companies. To provide multi-fab sourcing and extended capacity for its customers, Tower Semiconductor operates two manufacturing facilities in Israel (150mm and 200mm), two in the U.S. (200mm) and three facilities in Japan (two 200mm and one 300mm) through TPSCo. For more information, please visit www.towersemi.com.

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