



Ambarella Introduces CV22AQ Automotive Camera SoC for Advanced Driver Assistance Systems (ADAS)

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CV22AQ CVflow™ Open Platform Computer Vision Architecture delivers high performance at low power consumption

SANTA CLARA, Calif.--(BUSINESS WIRE)--Dec. 17, 2018-- Ambarella, Inc. (NASDAQ: AMBA), a leading developer of high-resolution video processing and computer vision semiconductors, today introduced the CV22AQ automotive camera System-on-Chip (SoC), featuring the Ambarella CVflow computer vision architecture for powerful Deep Neural Network (DNN) processing. Target applications include front ADAS cameras, electronic mirrors with Blind Spot Detection (BSD), interior driver and cabin monitoring cameras, and Around View Monitors (AVM) with parking assist. The new SoC provides the performance necessary to exceed New Car Assessment Program (NCAP) requirements for applications such as lane keeping, Automatic Emergency Braking (AEB), intelligent headlight control, and speed assistance functions. Fabricated in advanced 10nm process technology, its low power consumption supports the small form factor and thermal requirements of windshield-mounted forward ADAS cameras.

This press release features multimedia. View the full release here: <https://www.businesswire.com/news/home/20181217005135/en/>



Target applications for the new Ambarella CV22AQ SoC include front ADAS cameras, electronic mirrors with Blind Spot Detection (BSD), interior driver and cabin monitoring cameras, and Around View Monitors (AVM) with parking assist. (Graphic: Business Wire)

"To date, front ADAS cameras have been performance-constrained due to power consumption limits inherent in the form factor," said Fermi Wang, CEO of Ambarella. "CV22AQ provides an industry-leading combination of outstanding neural network performance and very low typical

power consumption of below 2.5 watts. This breakthrough in power and performance, coupled with best-in-class image processing, allows tier-1 and OEM customers to greatly increase the performance and accuracy of ADAS algorithms."

The CV22AQ's CVflow architecture provides computer vision processing in 8-Megapixel resolution at 30 frames per second, to enable object recognition over long distances and with high accuracy. CV22AQ supports multiple image sensor inputs for multi-FOV (Field of View) cameras and can also create multiple digital FOVs using a single high-resolution image sensor to reduce system cost. It enables DNNs for object detection, classification (i.e. of pedestrians, vehicles, traffic signs, and traffic lights), tracking, as well as high-resolution semantic segmentation for applications such as free space detection.

The CV22AQ's high-performance Image Signal Processor (ISP) provides outstanding imaging in low-light conditions while High Dynamic Range (HDR) processing extracts maximum image detail in high-contrast scenes, further enhancing the computer vision capabilities of the chip. It includes efficient 8-Megapixel encoding in both AVC and HEVC video formats, allowing customers to add video recording and streaming capabilities to their automotive cameras. The SoC's advanced cyber security features, which include secure boot, TrustZone™ and I/O virtualization, enable over-the-air updates (OTA) and also protect against hacking.

A complete set of tools is provided to help customers easily port their own neural networks onto the CV22AQ SoC. The toolkit includes a compiler, debugger, and support for industry-standard machine learning frameworks such as Caffe™ and TensorFlow™, with extensive guidelines for DNN performance optimizations.

CV22AQ is currently sampling to leading tier-1 customers and tier-2 algorithm providers. Chip samples with ASIL-B support are targeted to be available in 2019.

CV22AQ SoC Key Features:

- CVflow architecture with DNN support
- AEC-Q100 grade 2 (-40C to +105C operating temperature)
- High-speed SLVS/MIPI/LVCMOS interfaces
- Support for RGG, RCCB, RCCC, and RGB-IR sensor formats
- Quad-core 756 MHz ARM™ Cortex A53 with NEON DSP extensions and FPU
- Multi-channel ISP with up to 576 Megapixel/s input pixel rate
- Multi-exposure HDR processing and LED flicker mitigation
- Real-time hardware-accelerated fish-eye dewarping and Lens Distortion Correction (LDC)
- 4K/8-Megapixel AVC and HEVC encoding for video logging and wireless video streaming
- Rich set of interfaces includes Gigabit Ethernet, USB 2.0 host and device, dual SD card controllers with SDXC support, HDMI v2.0, MIPI DSI/CSI-2 4-lane output
- Advanced security features, including OTP for secure boot, TrustZone, and IO virtualization

- 10nm process technology

The URL for this news release is www.ambarella.com/about/news-events.html.

The URL for the related image is <https://www.ambarella.com/about/news-events/press-images/CV22AQ-press-image>.

CV22AQ will be demonstrated in a variety of applications during CES 2019. To book an appointment for a demonstration, please contact Ambarella.

About Ambarella

Ambarella's products are used in a wide variety of human and computer vision applications, including surveillance, Advanced Driver Assistance Systems (ADAS), electronic mirror, drive recorder, driver/cabin monitoring, autonomous driving, and robotic applications. Ambarella's low-power and high-resolution video compression, image processing, and deep neural network processors and software enable cameras to become more intelligent by extracting valuable data from high-resolution video streams. For more information, please visit www.ambarella.com.

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