

Enhancing the sensing landscape in Industry

Technologies for Industry 5.0 applications

Access control & security monitoring



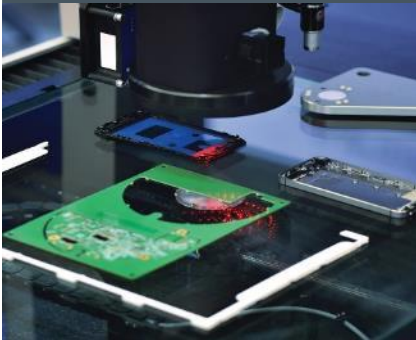
Industrial IoT & automation



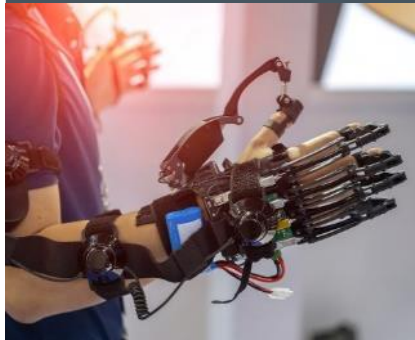
Near-infrared spectroscopy



Industrial imaging, machine vision



Robotics



UV-C disinfection



Industry

Near-infrared Spectroscopy, LiDAR, IRED, EEL, VCSEL, UV-C

Factory automation, robotics & Industry 5.0

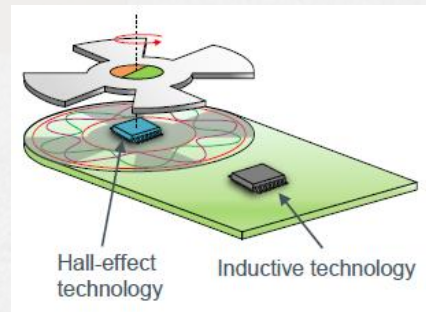
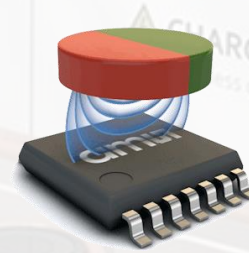
Factory automation, robotics & Industry 5.0

- Sensors for Robotics, Internet of Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML)
- Autonomous guided vehicles (AGV) and warehouse robots
- Collaborative robots (cobot) for human interaction
- Medical robots
- Consumer robots
- Industrial controls (knobs, potentiometer, stepper motors, Brushless DC motors (BLDC))
- Machine vision (Image sensors and illuminators) for factory inspection and automation.



Position/Capacitive/Temperature Sensing: Factory automation, Robotics & Industry 5.0

- Magnetic Position Sensors
AS5600-ASOM 12-bit on-axis rotary position sensor for robotics, drones, industrial. *LONGEVITY program with availability until 2031!*
AS5047D-ATSM 14-bit high speed position sensor. Immune to stray magnetic fields.
- Inductive Position Sensors
AS5715R-ZTST Inductive, off-axis, motor control position sensor.
- Capacitive Sensors
AS8579-ASSM 10-channel cap presence detection. Can be used for fluid level, pressure, proximity and force.
- Digital Temperature Sensors
AS6221-AWLT-S High accuracy, ultra low-power, small size temp sensor with alarm. Now with shorter lead times (as low as 9 weeks).



Time-of-Flight Sensing:

Factory automation, Robotics & Industry 5.0

- **TMF8801** (TMF8801-1BM) 1D Direct Time-of-Flight Sensor. Integrated VCSEL laser and photon detector.

- **Distance Ranging (ToF)**

- ✓ Autonomous User Presence Detection
- ✓ Object Detection
- ✓ Collision Avoidance

Proximity Detection

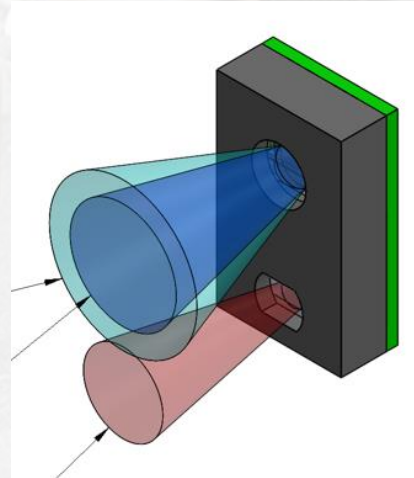
- ✓ Turn on/off of Display based on User Presence
- ✓ Motion/Proximity sensing (shut off system if too close or dead object)

Trigger Sensing

- ✓ Drone - Ceiling /Floor detection, Landing
- ✓ Door open / presence detection

Simple Gesture Recognition

- ✓ Swipe and Tap gestures



Machine vision for automation

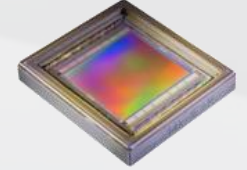


Machine vision for automation

- Leading global shutter CMOS imaging technology for high-speed machine vision, inspection and factory automation
 - High resolution, high frames per second, and image quality
 - Automatic optical inspection for quality control
- Leading VCSEL and high quantum efficiency NIR image sensors
- Near infrared illumination combined with sensitive NIR image sensors
- Enables compact, cost effective and high-performance 3D systems immune to uncontrolled illumination conditions
- Accurate 2D and 3D surroundings visualizations of for more complex tasks

Image Sensing: Machine vision for automation

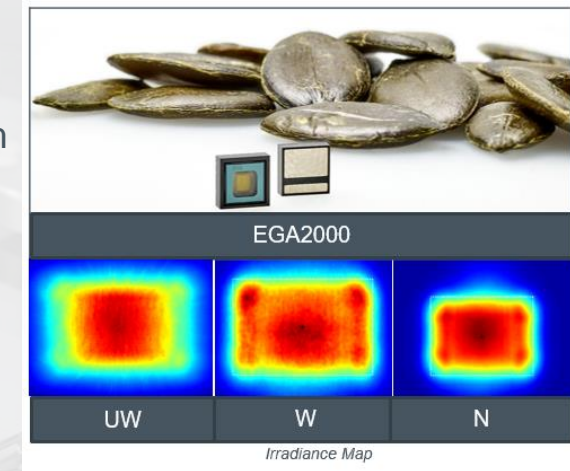
- CMOS Image Sensors feature a global shutter to capture high speed motion. Sensors support high frame rates.
- Available in various resolutions (e.g. 2.2MP, 4.2MP, 12MP, 20MP, 47.6MP, 71 MP).
- [CMV20000-1E5C1PA](#) 20MP 35mm, global shutter CMOS Image Sensor
[CSG14K-1E5M1LA](#) 14MP 1" Optical Size, CMOS Image Sensor
- Near IR Image Sensor
[Mira130](#) (MIRA130 BARE DIE), 1.3MP global shutter image sensor
Camera module with very high quantum efficiency (36%@940nm)



Illumination: Machine vision for automation

- Illuminator pairs with Image sensor or ToF
- Use cases:

3D Machine Vision, Smart Warehouse Management
Optimized logistic storage, Volume Measurement System
Enhanced Night Surveillance, Contactless Door Lock
Smart Cleaning Robot, Smart Refrigerator
Smart Speaker, Secure Payment, Smart Banking,
Home Delivery Robot, Human Traffic Monitoring
Building Access Control, Fast Airport Access
Object Avoidance, VR/ AR Glass



- **EGA2000** Flood Illuminator (ASBX-00-MQ)
High power (4W) uniform NIR flood illuminator @ 850 nm or 940 nm
- **PMSILplus** (MPN tbd) NIR flood illuminator for 2D imaging
+ Rectangular, highly uniform field of illumination, Best in class VCSEL for high efficiency enabling long battery life, Includes integrated eye safety
- **Belago1.1** (AQAA-20) High contrast, focus free 5k random dot pattern projector.
Built with micro lens array (MLA), Integrated eye safety

The background image shows a large, modern industrial or warehouse space. On the left, there are tall, yellow shelving units filled with cardboard boxes. Some boxes have Chinese text labels. The floor is dark grey with a pattern of glowing yellow and blue circular lights. The ceiling is high with a series of parallel white slats. The overall lighting is warm and modern.

Infrared Lasers for Industry Applications

Infrared Lasers for Industry Applications

- Automated Guided Vehicles for last mile delivery. Works in conjunction with 3D sensing systems.
- Industrial sensing for distance and object detection as well as size and shape control.
- Traffic surveillance for toll systems and speed enforcement
- Vacuum cleaning robots for environment mapping and object detection
- Laser rangefinder for golfers, hunters and military



Infrared Lasers for Industry Applications

- **Edge Emitter Lasers**

- Radial T1 3/4, SPL PL90** [here](#)

- @25W, 905 nm, (THT Plastic)

- Radial Smart Laser, SPL LL90_3** [here](#)

- @70W, 905 nm, 3xEmitters, (THT Plastic)

- Metal Can® TO56, SPL UL90AT08** [here](#)

- @125W, 905nm, (T056 metal can)

- Chip, SPL DS90A_3** [here](#)

- @125W, 905nm, (bare die SMT)

- **Near IR Image Sensor**

- [Mira130](#)** (MIRA130 BARE DIE), 1.3MP global shutter image sensor with very high quantum efficiency.

- **1D Direct Time-of-Flight Sensor**

- [TMF8801](#)** (TMF8801-1BM) Presence detection, distance, ranging and collision avoidance

Precise Industrial X-ray & CT Imaging

The background image shows an industrial X-ray scanner in a factory or airport setting. A dark-colored suitcase is placed on a white conveyor belt that is moving through the scanner's frame. The scanner has blue and white panels with yellow warning lights on top. The image is slightly blurred to emphasize the motion and the industrial environment.

Precise Industrial X-ray & CT Imaging

- X-ray for security and safety: airports, factory production lines, non-destructive quality control of engine components, food inspection, security inspection, precise quality assurance
- Solutions include current-to-digital converters for line and CT scanners and flat panel readout ICs for industrial X-ray applications
- Enables high-precision and fast image acquisition, reliability, high-sensitivity, and low power consumption

Precise Industrial X-ray & CT Imaging

(Coming soon to Disti)

- SECURITY X-RAY

- Carry-on & Checked Luggage

[AS5850A](#) Digital X-Ray
Flat Panel Readout IC

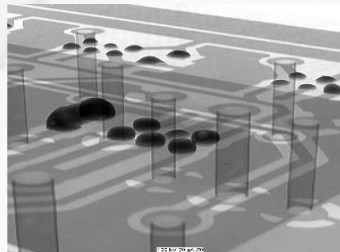


- INDUSTRIAL CT (Computed Tomography)

- Oil & Gas Welding Non-Destructive Testing (NDT)
- Semiconductor NDT
- X-Ray Food Inspection

[AS5900](#) Multichannel CT Detector Interface

[AS5950](#) Multichannel Low-noise CT Sensor Chip



3D sensing for factory automation



3D sensing for factory automation

- 3D sensing technology with cobots (collaborative robots) to avoid collision and for human-machine interaction
- Automated guided vehicles (AGVs) in production areas and warehouses
- All 3D architectures: Active Stereo Vision (ASV), Time-of-Flight (ToF), and Structured Light (SL)
- Innovative NIR global shutter image sensing and advanced illumination technologies
- Best-in-class fast high-resolution cameras with advanced global shutter pixels enable high speed monitoring
- Image acquisition without moving artifacts
- 1D/2D sensors for factory automation, e.g. image sensors for quality control

“Hermes” – 3D Eval Kit for testing depth-map quality

- USB 3D camera evaluation kit
- Supports 1 – 3 meter range
- Runs on Windows10
- Supports Active stereo vision (ASV) and Structured light (SL) methods



3D sensing for factory automation

Belago1.1 (AQAA-20) **dot projector** for 3D imaging

- + High contrast, focus free 5k random dot pattern
- + Built with micro lens array (MLA) to provide unique cost/performance ratio
- + Integrated eye safety

PMSILplus (tbd) **flood illuminator** for 2D imaging

- + Rectangular, highly uniform field of illumination
- + Best in class VCSEL for high efficiency, hence long battery life
- + Integrated eye safety

Mira130 (MIRA130 BARE DIE)

1.3MP global shutter image sensor

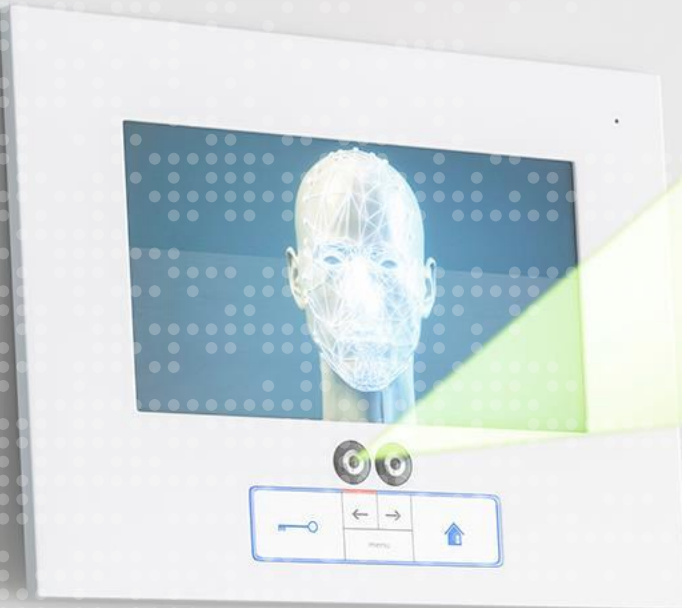
- + Camera module
- + Very high quantum efficiency (36% @940nm) for optimized range and power consumption

TMF8801 (TMF8801-1BM)

1D Direct Time-of-Flight Sensor

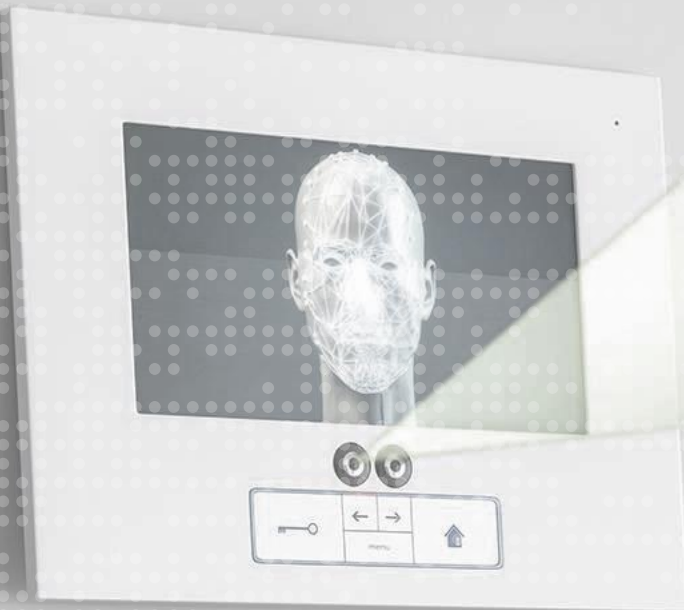
- + Presence detection for system wake-up
- + High sensitivity & Fast time-to-conversion

Secure access control & security monitoring



Secure access control & security monitoring

- 3D face ID authentication sensing solutions for use in residential or commercial building access
- Different 3D sensing architectures: Active Stereo Vision (ASV), Time-of-Flight (ToF), Structured Light (SL)
- Compact Infrared illumination products for camera systems enable wide-range security monitoring benefitting public safety
- CCTV, video cameras, vehicle registration plate recognition



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