The NSI9000

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Wide 3D eTOF™ CMOS Image Sensor Chip

Designed for advanced 3D vision for automotive, smart city, and mobile applications, that require early detection of events to provide adequate real-time response.
The NSI9000 is developed to address these requirements. The event recognition is pulled back to the pixel array, the frame rate is adjusted to events rate, thus decreasing redundant data.
The NSI9000 is an event-driven advanced mixed design 3D CMOS image sensor chip, using 1024x480 of 5µm x 5µm pixels. It is designed for global shutter operation and column-parallel output. The sensor supports programmable frame rates, Multiline Triangulation, eTOF 3D distance measurement per pixel, automatic exposure control to avoid saturation from close or bright objects and enhance sensitivity to distant or dark objects, automatic peak detection for Triangulation, and per-frame configuration to allow on-the-fly reactions to events.

NSI9000 features:

- Matrix of 1024 x 480 global shutter pixels (5µmx5µm)
- Integrated configurable direct A/D converter with up to 12 bits parallel digital output
- Dynamic event detection, output only lines where events are noticed (programmable threshold pre-programmed value)
- Per-frame configuration and scenario scheduler
- Optional automatic exposure control
- Optional automatic Triangulation peak detection per each line (center of mass algorithm in HW)
- Solid-state eTOF support (enhanced Time of Flight)
- Multi-Triangulation support, up to 480 concurrent vertical points, center-of-mass calculated inside
- Integrated CDS for temporal noise reduction
- Output speed/ internal processing at up to 100 MHz
- Programmable frame rate up to 200 fps (full frames) and over 50,000 fps (small number of events)

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Additional NSI9000 features:

- Can sync with other camera units, avoid interference
- Laser Range-Gated Imaging – slice the scenery to observe through obscurants (rain, fog, smoke, haze)
- Optional shut down of frame clock (between frames) for reduced power consumption
- Double buffer mode for high frame rate
- Ambient light subtraction support
- Continuous or single frame capture modes
- Tristate on data out pins for multiple parallel sensor connections
- Dual Power Supply: 3.3v (analog) and 1.8v (digital)

Pixel output interfaces:

3 options: Parallel synchronous data out (pixel values), parallel peak triangulation values only, serial peak triangulation values.

serial CONFIG interfaces:

Either I²C or Proprietary simple serial I/F.