GW5

Camera Video Processor

Features

- RGB-IR support
- eWARP Geometric Processor
- 120 dB HDR ISP
- Graphics Overlay Engine
- Low Power
- AEC-Q100 Grade 2
- ASIL-B

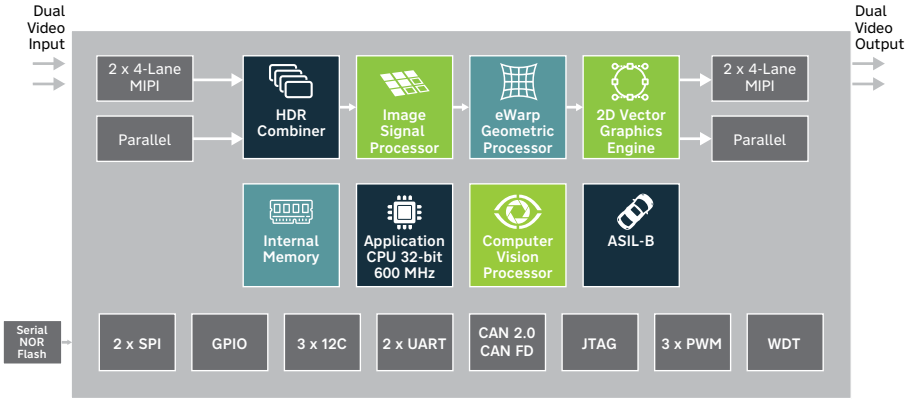
Applications

- Occupant/Driver Monitoring (OMS/DMS)
- ADAS camera
- Backup cameras
- eMirror
- Surround-view monitoring
- Car Digital Video Recorder
- Head up display (HUD)

The GW5 is an advanced Camera Video Processor (CVP) System-on-Chip (SoC) designed for advanced driver assistance systems (ADAS) and RGB infrared (RGB-IR) in-cabin sensing. The GW5 includes an innovative High Dynamic Range (HDR) Image Signal processor (ISP), indie's proprietary 5th-generation eWARP® geometric processor, 2D graphics functionality, and a computer vision processor. Designed in a 28nm process to enable small, low-power automotive cameras on the edge, the GW5 supports ASIL-B and AEC Q100 Grade 2.

The GW5 supports up to 8MP for conventional sensors and up to 5MP for RGB-IR sensors.

RGB-IR processing uses a proprietary de-mosaic algorithm that processes 4x4 RGB-IR filter array patterns. The RGB output mode is optimized for correct color and full IR removal. The IR-only output mode features resolution recovery achieving comparable performance to monochrome IR sensors with 4X the pixel count. Video output(s) are configurable between a dual RGB + IR output or a signal to noise ratio (SNR) optimized day/night mode switching output.



Ordering Information (All products are RoHS Compliant)

Device Name	CPU Speed	HDR ISP	RGB-IR	CVP	MIPI Output	Package	Pins
GW5200	500 MHz	2.5 MP	No	No	1x	169-ball TFBGA	7x7mm 0.50mm pitch
GW5210	500 MHz	2.5 MP	No	No	2x	196-ball TFBGA	10x10mm 0.65mm pitch
GW5300	500 MHz	8 MP	No	No	1x	169-ball TFBGA	7x7mm 0.50mm pitch
GW5310	500 MHz	8 MP	No	No	2x	196-ball TFBGA	10x10mm 0.65mm pitch
GW5400	600 MHz	8 MP	Yes	Yes	1x	169-ball TGBGA	7x7mm 0.50mm pitch
GW5410	600 MHz	8 MP	Yes	Yes	2x	196-ball TGBGA	10x10mm 0.65mm pitch

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The HDR ISP supports the most advanced HDR, and LED Flicker Mitigation (LFM) techniques available on the latest automotive sensors. The Vector Graphics Engine renders high resolution real-time graphics to overlay on the video stream enabling compelling user interfaces.

The GW5 reduces system component count by requiring no external double data rate (DDR) memory and incorporating dual camera inputs. GW5 based designs can be rapidly brought to market by leveraging indie's software design and evaluation kits.

eWarp® Geometric Processor

- 5th-gen eWARP® geometric processor
- Ultra-wide field of view (FOV) lens distortion correction
- Dynamic Electronic Pan/Tilt/Zoom (ePTZ)
- Digital calibration for single and multiple camera systems
- Ultra-low latency (typically 1/6th of a frame)
- Highly flexible programmable warp maps

HDR Image Signal Processor

- ISP supporting the following modes:
  - Up to 8M30 or 5MP60 single image sensor input (HDR combiner in image sensor)[2,3]
  - Up to 2MP60 single image sensor input[1]
  - Up to 2MP60 each dual image sensor input[1]
  - Up to 2MP60 4x4 RGB-IR processing[3]
  - Up to 5MP60fps single RGB-IR image sensor input (IR remosaic in image sensor)[3]
- High Dynamic Range (HDR) processing
  - 2, 3 and 4 exposure on-chip combining
  - Up to 20-bit HDR processing
  - Advanced Local Tone Mapping
- Advanced spatial (2D) noise reduction
- Zone-based statistics for automatic exposure (AE) and automatic white-balance (AWB)
- Non-linear two-dimensional sharpening
- Dynamic defect and lens shading correction
- Color Noise Reduction
- Defog support

32-bit Xtensa® Processor

- Operation up to 600[3]/500[1,2] MHz
- 32kB Instruction and Data Caches
- Single precision FPU

[1] - GW5200; [2] - GW5300; [3] - GW5400

Computer Vision Processor[3]

- Scalar and vector units
- Very long instruction word (VLIW) and single instruction multiple data (SIMD) functions
- Native instruction set for non-linear math operations

Graphics Overlay Engine

- 2D-Vector Graphics Accelerator
  - 1920x1080 at 60fps
  - On-the-fly rendering support
  - Tessellation Engine for lines, quadratic and cubic Bezier curves
  - Imaging and Pixel Engines for rendering and compositing image
- Animated bitmap support
  - Up to 4096x2048 OSD resolution
  - Eight layers of graphics
  - 256 colors selectable from 24bpp true color range
  - Anti-aliasing support using color by color alpha

Video I/O Interfaces

- Input: 2x MIPI CSI-2 4-lane (1.5Gbps/lane)
- GW5x00 Output: 1x MIPI CSI-2 4-lane (1.5Gbps/lane)
- GW5x10 Output: 2x MIPI CSI-2 4-lane (1.5Gbps/lane)
- Input: 16-bit Parallel interface (150MHz Interface Clock)
- Output: 16-bit Parallel (150MHz Interface Clock)

System Features

- CAN 2.0B and FD controller interface
- 3xI2C, 2xSPI, 2x UART, 15x GPIO, 3x PWM
- JTAG Debug
- eFuse (128 bits)

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Automotive Safety

- Supports ASIL-B Systems
- ECC support for all processor code spaces
- Built-in robustness support on the host control interface
- Watch Dog Timer
- Embedded video and system statistics in output stream
- Process, Voltage and Temperature Sensors

Electrical Specifications

- Core supply voltage: 0.9V ±5%
- I/O supply voltages: 1.8V or 2.5V or 3.3V ±5% (Only one required)
- PLL supply voltage: 1.8V ±5%
- MIPI supply voltage: 1.8V ±5%
- Automotive grade: AEC Q100 Grade 2