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visionICs

VI4331 Sensor Datasheet

VI4331 is a direct Time-of-Fight (ToF) imaging sensor integrated with 240x96 single-photon avalanche photodiode (SPAD) pixel array, front-end time to digital converters (TDC), and depth DSP processor. With combination of pulsed laser emitter, the sensor can return a 240x96 depth image. The sensor offers MIPI CSI-2 interface supporting both histogram mode and DSP mode pixel data format. Also, it integrates an illumination controller and four laser triggers to support addressable VCSEL setup up to four illumination channels.

The sensor contains a micro-controller (MCU) to enable software patch and enhance sensor programmability. It also integrates a SPI interface that allows to configure down-stream LDD (laser diode driver) in ToF system, and allows sensor to access module calibration data and firmware code directly on module memory such as EEPROM or Flash.

The sensor requires logic power 1.5V/3.3V supply, and Geiger-mode VSPAD supply can be generated from internal DCDC or external DCDC. Break-down voltage detection (BVD) is implemented to adapt VSPAD supply voltage in both scenarios.

Functions and Features

- 240x96 time-of-flight imaging sensor
- Effective pixel pitch 25x25um^2
- I2C slave interface for sensor configuration
- SPI master SPI for LDD and module memory access
- Laser repetition rate up to 10MHz with interference suppression modulator (ITS)
- Breakdown voltage detection (BVD)
- Depth-DSP Gen2 for depth calculation
- Full histogram readout

Applications

• Vacuum cleaning robot
• Service robot
• 3D machine vision
• Security and surveillance
• Gesture controls
• Collisions avoidance for UAV (Unmanned Aerial Vehicle） & AGV (Automated Guided Vehicle)