

PA136PD MotionEngine® With 2D-to-3D Conversion



Pixelworks® Post Processing Solutions are the driving force behind the outstanding picture quality and innovative features required by the next generation of LCD, PDP, Rear Projection and digital televisions.

Pixelworks products dramatically enhance the quality of video images by combining multiple Pixelworks video processing technologies to deliver clear, natural-looking video images. Pixelworks' technologies combine sophisticated digital video processing techniques — advanced scaling, motion-adaptive deinterlacing, noise reduction, dynamic edge enhancement, and smoothing of moving lines — to deliver a lifelike picture.

Applications

- LCD TV
- Projectors
- Set Top Box
- Video Conferencing



Basic Characteristics

Temperature Range: 0 - 70 °C
Power Supply: 1.0V, 1.8V, 2.5V, 3.3V

Pixelworks' PA136PD MotionEngine® device is the industry's leading single chip post-processor, integrating real-time motion adaptive 2D-to-3D conversion, support for up to 100/120 Hz displays and 2D local dimming for Edge-lit LED backlight displays. In addition, the PA136PD retains full support for Pixelworks' proprietary n2m™ technology which is a ground breaking video processing technology that allows superior video playback of low frame-rate and variable frame-rate internet content.

The PA136PD supports Full HD and WUXGA resolutions and incorporates a number of advanced features that simplify design and significantly reduce the overall system cost. The PA136PD is easy to integrate into any platform: Panels, TVs, Projectors, Network Monitors, Over-The-Top STB's, Video Conferencing equipment, etc. as a standalone module or on the main board.

Notable features enabled by Pixelworks' cutting edge technology include:

- Content Adaptive MEMC significantly reduces film-judder and blur caused by slow LCD response time
- Support for up to 100Hz/120Hz refresh rate at 1080p and WUXGA resolutions
- Integrated support for Pixelworks' proprietary motion-adaptive 2D to 3D conversion
- Integrated Overdrive to improve pixel response time and reduce ghosting
- Proprietary n2m™ adaptive frame rate conversion for processing low and variable frame rate internet video content
- Integrated 2D local dimming control for Edge-lit LED panels to improve dynamic contrast and content adaptive power saving
- Reliable film mode detection including random cadence detection for variable frame rate content
- High-speed LVDS I/O reduces EMI concerns and improves noise immunity
- Integrated MCU yields smaller PCB design and quicker time to market

The PA136PD allows customers to provide compelling differentiation in their products, resulting in significantly improved video performance at an affordable price point.

Fourth Generation MotionEngine Technology

- Significantly improved Content Adaptive Motion Estimation and Motion Compensation (MEMC) using Pixelworks' proprietary technology
- Support for up to 120 Hz displays at 1080p and WUXGA resolutions
- Support for Cinematic format (CSHD – 21:9) for up to 120 Hz displays
- Integrated 2D Local Dimming LED backlight control for Edge-lit LED displays
- Progressive hardware film mode detection with 3:2/2:2 inverse pull down and programmable random cadence detection
- Support for horizontal and vertical flip and 180 degree rotation
- 10-bit Full HD Video processing in 4:2:2 format
- 10-bit graphics in 4:4:4 format
- Integrated Overdrive
- Programmable OSD region protection (up to 5 OSD regions)

- Automatic OSD/logo detection and protection
- Support for demo modes

Input Port

- 24/30-bit LVDS receiver, 2 channels, up to 647.5 Mbps per channel
- Spread-spectrum supported
- Control Interfaces: Two-wire serial interface, GPIO, UART and SPI

Integrated MCU

- Master mode: no external CPU is needed. PA136PD operates as the main controller chip
- Slave mode: PA136PD controlled by an external CPU
- Watch-dog
- Multiple timers
- SPI Flash controller
- Interrupt controller
- UART
- JTAG

(Key Features Continued Next Page)

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PRODUCT FEATURES	PA136PDG *
Full HD/WUXGA 50/60 Hz, 100/120 Hz	Yes
21:9 (2560x1080) @ 120 Hz	Yes
Video Format	422 10-bit
Graphics Format	444 10-bit
Memory Clock	366 MHz
Integrated MCU	Yes
Real-time 2D-to-3D conversion	Yes
PWM and SPI Interfaces	Yes
Color Management	Yes
x4 Standard LVDS Output	Yes
Integrated LCD Overdrive	Yes
Package	208-lead eLQFP 28 mm x 28 mm

Memory Controller

- 16-bit DDR2 up to 366 MHz clock rate
- 256Mb/512Mb/1Gb
- Spread-spectrum supported

Color Space Conversion (CSC) with Dithering

- Color space conversion
- Support for xvYCC color space
- Support for BT.601 and BT.709

LED Backlight Control

- Advanced Local Dimming algorithm
- Black frame insertion

Output Port

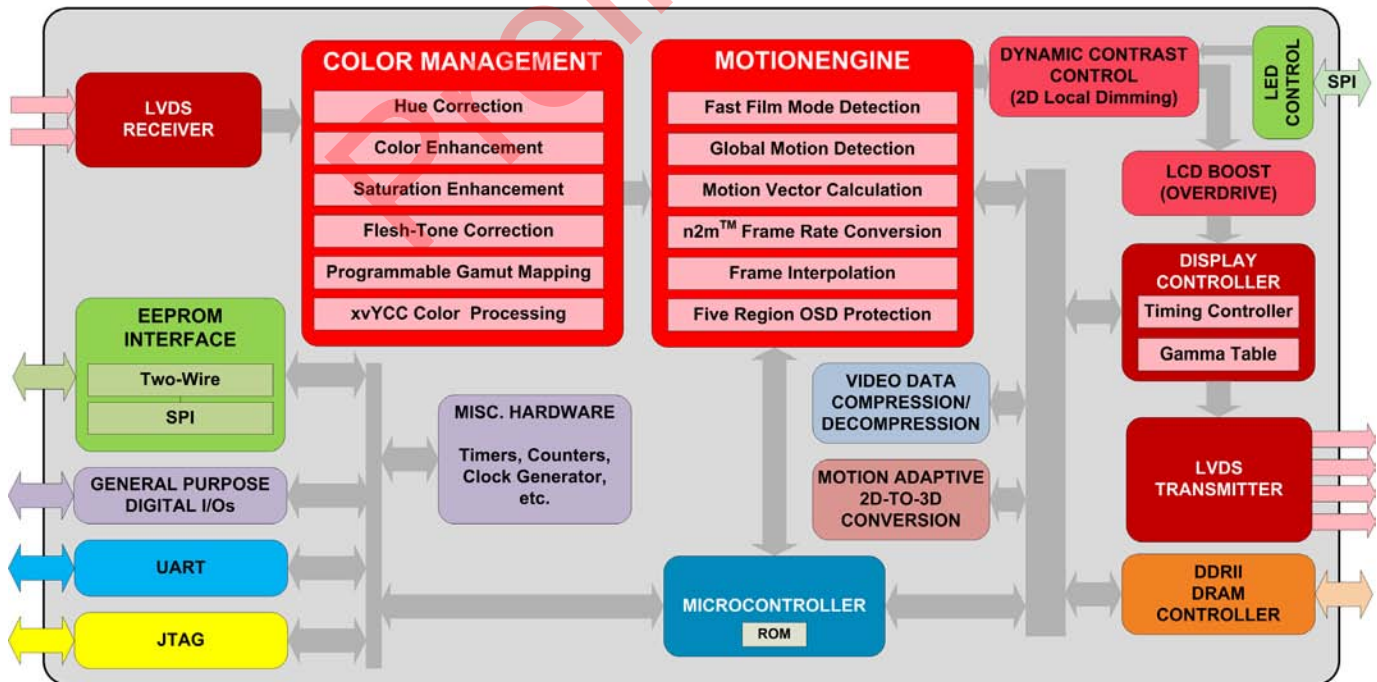
- 4 channel LVDS transmitter up to 1,050 Mbps per channel
- Supports dual-frame output
- Support for Spread-spectrum

Color Management

- Full support for xvYCC color space
- Hue and flesh-tone correction
- Color and saturation enhancement
- Gamut mapping
- Wide color range support

Pixelworks has been certified as a Sony Green Partner since 2003.

* Green. RoHS compliant. Lead (Pb)-free and Halogen-free.



PA136PD Block Diagram



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