# **3D Graphics Experience**

Volari V3 Graphics Processors



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**XGI** Volari V3 offering originates from our team extensive experience and pioneering leadership in supplying high quality 3D graphics solutions for entry level graphics solution. By employing advanced graphics algorithm that optimizes for smallest gate count, XGI Volari family delivers similar features and performance, such as Microsoft DirectX 8.1 and 9.0, while using only HALF the number of transistors of the competitive equivalent. This key advantage directly translates to much smaller die size and cost for all entry level platform and results in not only low cost but also high performance in both D3D and OpenGL application.

- Software compatible to Microsoft DirectX 9.0
- **BrightPixel<sup>™</sup>** 3D graphics engine with DirectX 8.1 Vertex and Pixel Shaders in hardware
- CoolPower™ power management technology
- SmartTile™ 128-bit memory architecture with 500MHz DDR memory
- UltraClear™ TFT image quality at UXGA panel resolution
- (1600x1200)
- Integrated TMDS drivers for TFT and DVI display
- Multiple simultaneous output displays with TFT, DVI, CRT and TV AGP-4X or AGP-8X host interface

**DirectX 9.0** is Microsoft latest application programming interface (API) for 3D software in both consumer and commercial market. DirectX 9.0 enables a new generation of PC games with both photo-realistic image quality and functional flexibility never before possible. The XP5 device driver software is compatible to DirectX 9.0

**BrightPixel** is the Volari V3 fully-programmable 3D graphics engine which implements all features of Microsoft DirectX 8.1 Vertex and Pixel Shaders in hardware for highest 3D performance. DirectX 8.1 marks a key milestone in the advances of graphics hardware architecture which evolves from the use of fixed 3D functions into full programmability for better image quality and rendering flexibility. With the 3D rendering rate of 2 pixels per clock and 2 tri-linear textures per pixel, the Volari V3 can operate at up to 300MHz engine clock. Also included is 16:1 anisotropic mapping for best viewing of 3D objects at an angle.

**CoolPower** is XGI proprietary power management technology for reducing both active and standby power consumption of the Volari V3 to a minimum. *CoolPower* employs a combination of software and hardware techniques which permit the end-user to select either highest performance or longest battery life while running their applications of interest.



**SmartTile** is the new memory interface architecture that optimizes for maximum bandwidth utilization by storing pixels in 4x4 rectangular tiles instead of traditional scan lines. Since these tiles can be cascaded to cover the entire display area, memory bandwidth efficiency up to 90% can be achieved. Such high efficiency is a pre-requisite for high 3D graphics performance. With a 128-bit memory bus, the Voalri V3 can support a peak data transfer rate of 8.0 Gbytes/sec.

**UltraClear** is the Volari V3's special LCD display technology that greatly improves the image quality of a standard TFT panel in real-time video applications. *UltraClear* eliminates typical "ghosting" effects in watching DVD on a LCD screen and produces clearer and sharper image often found in much more expensive panels.

**Software** support for Volari V3 is complete with WHQL-certified drivers for Windows® XP, Windows® 2000, Windows® ME, Windows® 98, OpenGL<sup>™</sup> 1.3, and Linux.

# Volari V3 Graphics Processor Specifications



# Overview

- Performance 3D graphics solution entry level solution
- CoolPowerTM management (4.5 watts maximum dissipation)
- Power supply: Core 1.2 1.5V , AGP 1.5V, DDR 2.5V, others 3.3V
- 25 million transistors in 0.13um CMOS process
- 709 balls 31 mm x 31 mm PBGA package

#### Performance

- Up to 300 MHz graphics engine clock
- Pixel fill rate: 600 million pixels/sec (peak)
- Texel processing rate: 4.8 billion texels/sec
- 9.6 GBytes/sec memory bandwidth (peak)

#### SmartTile<sup>™</sup> Memory Architecture

- 64/128-bit Double-Data Rate (DDR) memory at up to 600Mbps
- Up to 128MBytes of local frame buffer with 8Mx32 memory
- Supports 8Mx32, 4Mx32, 16Mx16, 8Mx16 and 4Mx16
- Supports hierachical pixel tiling

# **Output Displays**

- Four simultaneous outputs: TFT, CRT, DVI and TV out
- Integrated dual-channel LVDS for interface to TFT up to 1600x1200
- Integrated TMDS for interface to DVI up to 1280x1024
- Digital interface to external TMDS for DVI up to 1600x1200
- Integrated Trident's TVX2 NTSC/PAL encoder up to 1024x768
- 350 MHz RAMDAC for CRT up to 2048x1536

# **CoolPower™ Management**

- Unified software & hardware architecture for power management
- Dynamic clock gating, frequency scaling, work load balancing
- Supports INTEL-defined Device Performance States (DPS)
- Optional battery optimizer under user control

### DirectX 8.1/9.0

- MICROSOFT® graphics standard for Windows® XP, 2000
- DX8.1 Vertex Shader and Pixel Shader hardware
- DX9.0 software compatible
- Special Low-Resolution edge correction for better image quality

# BrightPixel<sup>™</sup> Graphics Engine

- Up to 300 MHz engine clock
- Based on hierachical pixel tiling for rasterization
- Two independent pixel pipelines (256-bit wide)
- 2 pixels/clock with 2 tri-linear textures/pixel
- Texture size up to 4Kx4K and non-power of 2
- Bi-linear, tri-linear and anisotropic texture filtering
- Full anti-aliasing support for texts, lines, scenes
- · Special hardware acceleration for silhouette anti-aliasing
- Special multi-resolution depth buffer
- Special bandwidth reduction hardware via compression
- Multi-level caches
- Fully OpenGL-compliant blending including fog & depth cueing

## **Video Engine**

- Special hardware for UltraClear TFT LCD image quality
- State-of-the-art video de-interlacing (beyond Bob-and-Weave)
- Supports HDTV resolution up to 1080i
- TrueVideo® provides bilinear interpolation with proprietary
- edge recovery scaling
- Dual apertures for simultaneous access to graphics and video area

#### **DVD Support**

- Microsoft's DirectX Video Acceleration (DXVA)
- Includes both Motion Compensation and IDCT hardware
- Real-time playback (30 fps) of 9.8 Mbps MPEG-2 video bitstream with 85% CPU headroom for other applications

# Software

- Windows® XP, 2000, ME, 98, NT 4.0 and 5.0
- DirectX 9.0, 8.1 and 7.0
- DirectX Video Acceleration (DXVA)
- DirectShow 3.0 and 4.0
- OpenGL ICD 1.2 and 1.3
- Linux



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