



Mobile Graphics Solutions



Think Silicon was founded in 2007 with the vision to provide silicon proven, highly configurable IP semiconductor modules for complex SoCs according to industry standards. Our customers include leading fabless chip companies for communication and multimedia applications.



Today's demand for devices that support both multimedia and communication applications creates the need for more complex digital SoCs. At the same time an increasing number of consumer products support graphical display and require graphics processing and acceleration.



Think Silicon specializes in designing and developing Mobile Computer Graphics Solutions ideally suited for low-end and mid-end devices. Having significant experience in critical areas of IC design and embedded systems, we provide complete IP solutions and become part of our partners product roadmap.



Think Silicon Think2D and ThinkVG products are high performance 2D bitmap Graphics Accelerators that support the DirectFB software library and the Khronos Group OpenVG, OpenWF cross platform API standards which add graphical power to mobile and embedded systems.

Graphics Accelerator Cores

Graphics Core	Think2D	Think VG	Think 3D
Processing Cores	-	1	4
Max Rate	2 pixel / cycle	2 pixel / cycle	8 pixel / cycle
Blending	✓	✓	✓
Antialiasing		✓	✓
Texture Mapping		✓	✓
Compression		✓	✓
Available	now	now	contact us

Operating System support

- ▶ Linux
- ▶ Qt

APIs accelerated

- ▶ DirectFB 1.4
- ▶ OpenVG 1.1

Features

- ▶ Unique Parallel Vector Shading Processor
- ▶ C/C++ Compiler support
- ▶ Low gatecount and Low power Design
- ▶ Asynchronous command list based minimises processor overhead
- ▶ Multisample Antialiasing

VShader

- ▶ Unified Shader Architecture minimised wasted resources
- ▶ Fully Programmable under C/C++
- ▶ Parallel Floating point Vector Processor
- ▶ Colour conversions
- ▶ Streaming Ports

Texture Mapping Engine

- ▶ Any texture resolution
- ▶ Any texture colour depth
- ▶ Texture Caching
- ▶ Point Sample / Bilinear texture filters
- ▶ Support for proprietary differential texture compression (4bpp) suitable for gradients
- ▶ Optional support for DXT1

PixelBlender Processor

- ▶ Fully Programmable streaming pixel blending processor supports any blending mode
- ▶ Parallel multiplications/reciprocal
- ▶ Parallel RGB and Alpha computations units
- ▶ Gamma/Degamma support

Bus Master Interface

- ▶ AHB bus interface standard
- ▶ Optional AXI interface
- ▶ Streaming concentration ensures minimal bus bandwidth
- ▶ Configurable Endianness

Polygon Processor

- ▶ Direct rasterisation of Bezier curves
- ▶ Triangle rasterisation with gouraud interpolators

Features

- ▶ 32-bit pixel fetching burst DMA
- ▶ Configurable Pixel FIFO size (64x32/128x32/256x32/512x32)
- ▶ AMBA AHB bus
- ▶ Resolutions up to 32768x32768 (640x480, 800x600, 1024x768, 1280x1042, 1600x1200 etc) any step
- ▶ Configurable Stride/Pitch allowing Panning
- ▶ RGBX8888, XRGBR8888 (32-bit)
- ▶ RGBX5551, RGB565 (16-bit)
- ▶ RGB232, LUT8, Grayscale (8-bit)
- ▶ 8-bit palette (optional-requires 256x24 memory)
- ▶ Fixed Cursor (optional)
- ▶ Programmable 32x32 Cursors (optional-requires 128x32, 16x24 CLUT memories)
- ▶ Programmable HSYNC, VSYNC, DE Polarity
- ▶ HSYNC, VSYNC, CSYNC, DE, 8-bit parallel RGB, 8-bit serial RGB
- ▶ Interrupt on VSYNC/HSYNC
- ▶ Linux Framebuffer Kernel Drivers
- ▶ Can be customized to user requirements (i.e. Deep Colour, custom displays etc)

Display Cores

Core	Think LCD	Think LCD/ML	Think LCD/DP
Resolution	any	any	any
24-Bit Parallel	✓	✓	✓
18-bit w/Dithering	✓	✓	✓
HW cursor	✓	✓	✓
LUT Palette	✓	✓	✓
Gamma adjust	✓	✓	✓
DMA Engine	✓	✓	✓
AHB Bus	✓	✓	✓
AXI Bus	optional	optional	optional
Multiple Layer		✓	✓
Display Port			✓
Available	now	contact us	contact us

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