

Graphics LSI for Digital Dashboards and Car Navigation

MB86298

A graphics LSI equipped with a rendering function delivering the industry's leading performance and conforming to OpenGL ES2.0; it offers four display output functions and four video input functions.

Overview

In recent years, drivers and passengers have been provided with information and entertainment to increase their safety and comfort and reduce the environmental impact of driving. These include, for example, car navigation systems that provide real-time traffic information, blind-spot camera displays, streaming TV and DVD to passenger seat displays, and so-called "eco-drive" functions that support low fuel consumption by displaying information pertaining to the car's fuel efficiency and running condition.

Also emerging are high-function automotive video systems that have multiple displays (for both the driver's seat and the rear passenger seat) to provide different information to the driver and the passengers and multiple cameras to enable easy viewing around the vehicle.

These automotive video systems require real-time processing of several different images and videos. They also demand high-performance graphics LSIs capable of processing large volumes of imaging data at high speed.

"MB86298" is an automotive graphics LSI that contains four display outputs and four video inputs as well as a high-speed video data processing function to correspond to these inputs and outputs on a single chip for the first time in the industry. By adopting this product, it is possible to address not only the conventional function to present navigation images to the driver while presenting TV to the passenger displays but also real-time synthesis and resizing of the streaming images of the four cameras (front, back, right, and left) as a

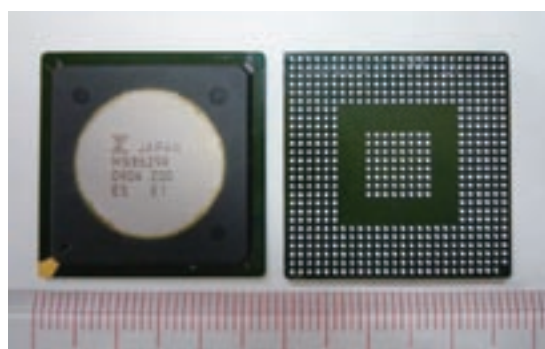
single video image on the meter panel display. Furthermore, for 3D navigation mapping, this product can output to high-resolution 1,600×600 pixel displays, enabling rich image detail not just of intersections but also of surrounding buildings and scenery.

Figure 1 presents the application image for this product.

Specifications

Table 1 presents the main specifications, and **Figure 2** the block diagram for this product.

Photo 1 External View



Product Features

Built-in OpenGL® ES2.0 graphics acceleration

This product includes an OpenGL ES2.0 acceleration function that makes it simpler to construct an in-vehicle entertainment environment. We also plan to provide OpenVG™1.0 support.

Rendering performance of 400M pixels/sec.

This product addresses the industry-leading performance of 400M pixels/sec. by adopting a unified programmable shader with 17G FLOPS operation performance. It renders real-life maps smoothly with high resolution.

Built-in 4×4 full scene anti-aliasing function

The 4×4 full scene anti-aliasing function eliminates the aliasing even on low-resolution displays and enables high-quality rendering with little jag.

Four built-in display output functions

It is possible to output two screen images to each of the two display ports, addressing up to four display outputs. It also has eight display levels, an interlayer blending function, a dither function, and a gamma correction function to realize high-quality images on displays with different resolution levels and color properties.

Four built-in video capture functions

The four video input ports enable simultaneous processing of various different images. The input function up to 1,280 ×720 pixels, the enlargement/reduction function, and the interlace-progressive conversion function for motion*1 enables generation of progressive images with little noise.

Table 1 Main Specifications

Process technology	CMOS 90nm
Operating voltage	Internal: 1.2±0.1V, I/O: 3.3±0.3V DDR2 memory: 1.8±0.1V
Operating frequency (Max.)	Internal 266MHz DDR2 800MHz
Power consumption	4.0W (Typ.)
Package	TEBGA 543-pin

Figure 1 Application Image

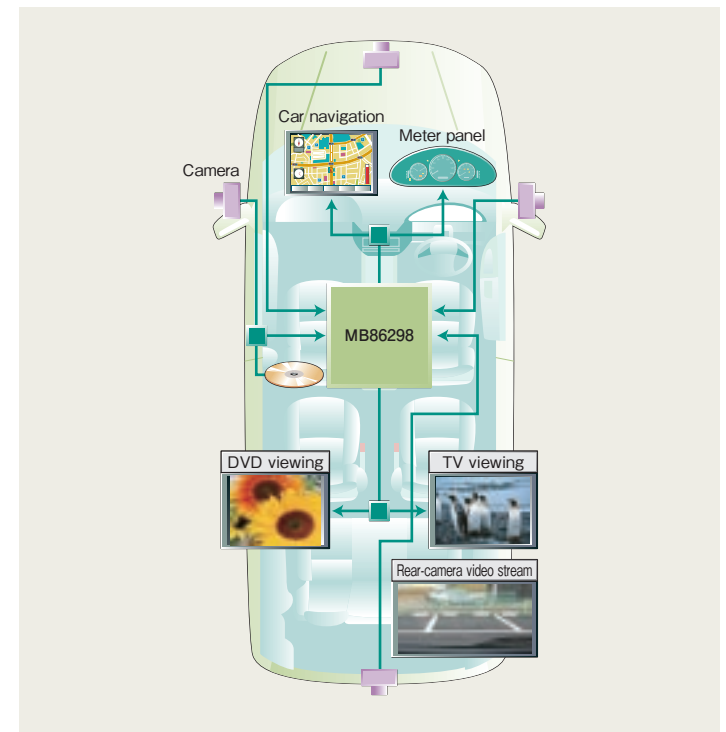


Figure 2 Block Diagram

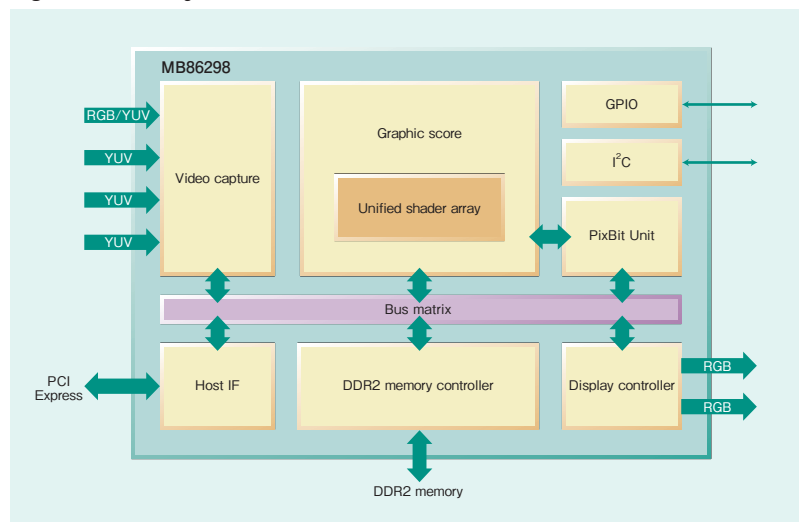


Photo 2 Evaluation Board



PCI Express adopted as the host interface

This product contains a PCI Express port as the host interface. It is capable of transmitting large volumes of data to the graphics memory at high speed with a data transfer rate of up to 160Mbytes/sec. for downstream and up to 40Mbytes/sec. for upstream.

DDR2 SDRAM 800MHz adopted as the graphics memory

This product is connected to a DDR2 DRAM at 64-bit or 32-bit data width. It is capable of the superimposition of several layers at high resolution with a maximum data transfer rate of 6.4Gbytes/sec.

**1: A function to improve the moving image quality when converting interlace images into progressive images.*

Development Environment

FUJITSU plans to provide the following development environments:

MB86298 evaluation board

It comes in the form of a PCI Express card and it can be used by connecting it to the PCI Express bus of a PC with a Microsoft® Windows® XP Professional operating system.

Graphics Controller Access Library

A set of drivers will be provided to simply access the rendering peripherals such as the display controller and video capture on this product.

OpenGL ES2.0 Library

With the use of OpenGL ES, the standard graphics API optimized for embedded applications, embedded systems with real 3D graphics can be realized.

OpenVG 1.0 Library

With the use of this library, the functions of this product can be used to their fullest extent to render high-quality vector graphics.

Summary

Figure 3 presents the roadmap for our graphics solutions. FUJITSU will continue to provide optimal graphics LSIs for various automotive display terminals including center consoles such as car navigation and driver information to address more advanced HMI and support improved driving safety and comfort. *

NOTES

- * OpenGL is a trademark or registered trademark of Silicon Graphics, Inc. in the U.S. and other countries.
- * OpenVG is a trademark of The Khronos Group, Inc.
- * Microsoft and Windows are registered trademarks or trademarks of the U.S. Microsoft Corporation in the U.S. and other countries.

Figure 3 Roadmap of Graphics Solutions

