PRODUCT INFORMATION

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Virtual Dolby Surround IC Developed

VASIL™ algorithm processing implemented on a single chip

LV1018

Overview

The Dolby ProLogic Surround System developed by Dolby Laboratories has been widely adopted in movie theaters as a multi-channel audio system. Furthermore, due to the development of Dolby ProLogic decoder ICs, use of this system is growing in the home audio market as well, mainly in the US. Recently, the Dolby Digital, also developed by Dolby Laboratories, has been adopted as the standard format for multi-channel audio in digital media such as DVD, ATV, and cable TV, and is expected to exhibit strong growth in the home entertainment market. However, multi-channel audio systems have the problem that they require multiple speakers, and this requirement is a problem preventing their more rapid growth in the consumer market.

Virtual surround technology has been proposed to overcome this problem. This technology can create an audio effect close to that of a true multi-channel audio system using only the two speakers from an existing audio system. In particular, it is able to do this by only providing an optimal listening point over a limited area, a limitation that is reasonable for spaces used by small numbers of people such as homes. Thus virtual surround technology can contribute to the spread of the easy enjoyment of the surround effect, which provides a feeling of presence and reality, in the homes of ordinary consumers.

In September of 1998, Sanyo announced the development of the VASIL™ (Virtual Acoustic Surround Image Localizer) virtual surround algorithm that supports multi-channel audio systems and is based on Sanyo-developed audio image positioning algorithms. This algorithm responds to several problems with earlier virtual surround systems, and features reproduction with even more natural sound colorings and a wide “sweet spot.” It achieves these with a minimal amount of signal processing and has been well-received by audio equipment manufacturers.

Sanyo has now developed a single-chip passive decoder IC, the LV1018, that incorporates the VASIL™ algorithm implemented in a analog/digital hybrid technology based on Sanyo’s unique BiCMOS process technology. Sanyo has now acquired approval for virtual Dolby surround from Dolby Laboratories and will begin sample shipment of the LV1018 in May 1999.

The LV1018 can be combined with Sanyo’s existing Dolby ProLogic matrix decoder, the LA2787, to

form a system that provides both a Dolby ProLogic surround system and a virtual signal-processing system in just two chips.

Since the LV1018 also implements pseudo-stereo from the monaural surround channel using pseudo-pitch shifting and matrix processing, it can, when combined with the LA2787, provide simulated 5-channel playback from a 4-channel Dolby Surround source, and thus achieve a sound with an even more natural sense of breadth.

Furthermore, the LV1018 provides an internal function switch that can easily switch between external input signals, such as Dolby digital signals (5.1 channel signals) from a DVD and provide virtual processing for these external signals as well. In addition, it supports the set up of a wide range of digital surround modes that take advantage of its pseudo-tap function, and thus can easily implement many surround modes.

At first, the LV1018 will be marketed for the audio equipment such as receivers and "mini-components". For those applications, Sanyo now holds a commanding market share in the Dolby ProLogic surround market. In the future, Sanyo plans to develop multimedia application products that can take advantage of the VASIL™ technology.

Features

- Virtual Dolby surround implemented using analog/digital hybrid technology
- A Dolby ProLogic surround system can be easily formed by combining the LV1018 with the LA2787.
- A pseudo-five-channel system can be formed by combining the LV1018 with the LA2787.
- Built-in 5-channel external input function for use in combination with the LA2787.
- Clock, data, and enable signals can be shared between the LV1018 and LA2787 for serial data transfers from the system microcontroller.

Specifications

1. Functions
   - Dolby surround passive decoder
   - On-chip memory (8K SRAM)
   - Variable delay time — Dolby surround mode: 15, 20, 25, and 30 ms
     Pseudo-surround mode: 7.5, 15, 20, 25, 30, 40, and 50 ms
   - Modified Dolby B noise reduction
   - Surround trim function (0 to –31 dB in 1-dB steps) for the LS and RS channels

- On-chip input and output filters
  (Output - Dolby surround mode: 7 kHz, pseudo-surround mode: 5 kHz)
- On-chip Vdd circuit
- Pseudo-surround function
  — Fixed matrix: L + R, L – R
  — Front addition: 0, –2, –4, and –6 dB, inverting and noninverting addition
  — Reverb function
- Monaural/stereo switching function for the rear channels
  — Rear addition: 0, –2, –4, and –6 dB, inverting and noninverting addition
- Pseudo-tap function
- Left, right, LS, and RS input switch
- Muting function
- Virtual surround function

2. Recommended supply voltage (V_{CC}): 9.0 V
   Operating supply voltage range (V_{CCOP}): 8.0 to 10.0 V
3. Package: DIP-42S

VASIL™ is a trademark for the virtual 3D algorithms developed by Sanyo. Sanyo has applied for registration of this trademark.

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Sample Availability

Sample of the LV1018 will be available in May 1999; production quantities will be anticipated in October 1999.

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