

# SOUND SIGNAL PROCESSOR

Surround Processor-B

## YM3428 SP-B

### ■ OUTLINE

The YM3428, a 16-pin DIP CMOS LSI, permits to implement quality digital surround sound capabilities realized by Yamaha's digital audio technology.

As the LSI includes A/D and D/A converters, you can easily implement digital surround functions without any additional analog devices.

It has four delay lines each of which may be set for the maximum delay time of 30.24 msec, and outputs are two channels each of which is produced in each pair of delay channels added up digitally. So, the range of application is wide.

### ■ FEATURES

- Three kinds of surround mode are possible as preset modes without the use of any microcomputers.
- With a use of microcomputer, it is possible to set the four delay lines at different delay times and different volumes and to define parameters of a primary IIR digital low-pass filter.
- The internal signal format is of 14-bit floating point numbers.
- The built-in A/D and D/A converters are of floating type with high linearity.
- The built-in reference voltage generator for A/D Converter permits an easy interface with analog circuits.
- The sampling frequency of A/D conversion is 24.9 kHz, so the bandwidth needed for surround sounds is secured.
- The D/A converter operates at the sampling frequency of 99.4 kHz, following a built-in quadruple oversampling digital filter, so that high cost external output low-pass filter is not needed.
- Distortion is as low as 0.22% (typical) at the maximum output at 1 kHz.

### ■ ELECTRICAL CHARACTERISTICS

#### 1. Absolute Maximum Ratings (VSS=0.0V)

Item	Symbol	Rating	Unit
Terminal voltage	VDD-VSS	-0.3 ~ 7.0	V
Operating temperature	TOP	0 ~ 70	°C
Storage temperature	Tstg	-50 ~ 125	°C

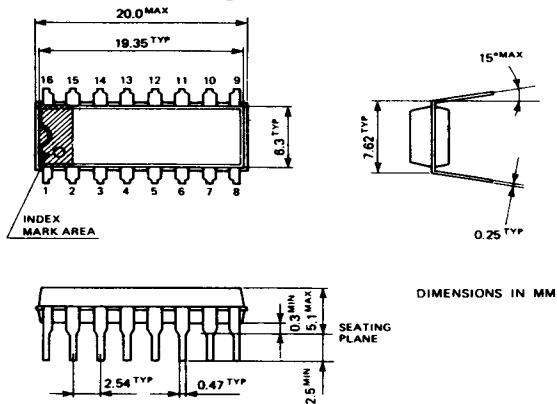
#### 2. Recommended Operating Conditions (VSS=0.0V, TOP=0 ~ 70 °C)

Item	Symbol	MIN.	TYP.	MAX.	Unit
Supply voltage	VDD	4.75	5.00	5.25	V
	VSS, AGND	0	0	0	V

#### 3. DC Characteristics(VDD=4.75 ~ 5.25V, TOP=0 ~ 70 °C)

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Low-level input voltage	VIL		-0.3		0.8	V
High-level input voltage	VIH	Except XI	2.0		VDD	V
High-level input voltage	VIH	XI	4.0		VDD	V
Low-level output voltage	VOL	XO : IOL=0.2 mA	-0.3		0.4	V
High-level output voltage	VOH	XO : IOH=0.4 mA	4.0			V
Input current leak	ILK	VI=5V			10	μA
Supply current	IDD			20.0	30.0	mA
Input capacitance	CI	f=1 MHz			10	pF
Output capacitance	CO				10	pF
Pullup resistance	RPU	/IC, MD0, MD1	50		400	KΩ

## ■ OUTLINE DIMENSIONS



## ■ BLOCK DIAGRAM

