

YSS247

ASR

Analog Surround

■ OUTLINE

The YSS247 is a stereo signal processing LSI with Yamaha's original wide surround "YMERSION[™]" and tone control/loudness circuit.

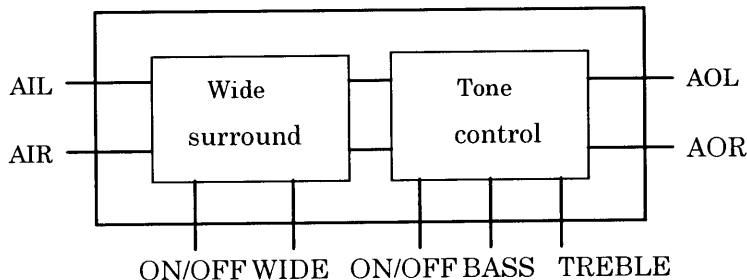
With this LSI, it is possible to emphasize diffusion feeling of the sound when reproducing the stereo sound with a compact type audio equipments such as a mini-component set and an amplifier built-in speaker. Also, since this LSI processes analog signals as they are, no micro-processor, A/D, D/A or memory is required.

■ FEATURES

- **Wide surround** Surround by amplitude phase conversion circuit
- **Tone control** BASS (100Hz ± 10dB)、TREBLE (10KHz ± 10dB) — recommended
- **Loudness** Either tone control or loudness selectable
- **Others** Wide surround ON/OFF switch
Wide surround wide control
Tone control ON/OFF switch
Tone control BASS, TREBLE control
All functions controlled by pin voltage
- **Operating voltage** Wide operating voltage range from 3.0V to 5.5V
- **Package** 20 SSOP (YSS247-E) and 24DIP (YSS247-D) packages available
- **Process** Silicon gate CMOS process

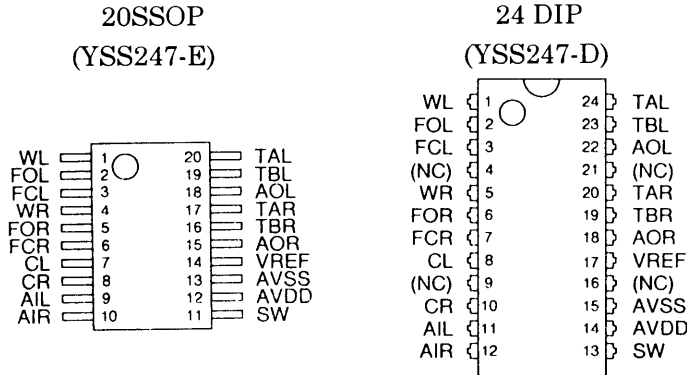
■ BLOCK DIAGRAM

Wide surround + tone control



YMERSION[™] is YAMAHA's registered trademark.

■ PIN CONFIGURATION



Two types of compact packages, 20SSOP(YSS247-E) and 24DIP(YSS247-D) are available.

■ PIN FUNCTION

| Pin No. | | Pin name | Function |
|---------|--------|----------|--------------------------|
| 20 SSOP | 24 DIP | | |
| 1 | 1 | WL | 3D Lch Wide Input |
| 2 | 2 | FOL | 3D Lch Filter Output |
| 3 | 3 | FCL | 3D Lch Capacitor |
| 4 | 5 | WR | 3D Rch Wide Input |
| 5 | 6 | FOR | 3D Rch Filter Output |
| 6 | 7 | FCR | 3D Rch Capacitor |
| 7 | 8 | CL | 3D Lch Capacitor |
| 8 | 10 | CR | 3D Rch Capacitor |
| 9 | 11 | AIL | Lch Input |
| 10 | 12 | AIR | Rch Input |
| 11 | 13 | SW | 3D & Tone Control ON/OFF |
| 12 | 14 | AVDD | Power Supply |
| 13 | 15 | AVSS | GND |
| 14 | 17 | VREF | Voltage Reference |
| 15 | 18 | AOR | Rch Output |
| 16 | 19 | TBR | Rch Tone Control(B) |
| 17 | 20 | TAR | Rch Tone Control(A) |
| 18 | 22 | AOL | Lch Output |
| 19 | 23 | TBL | Lch Tone Control(B) |
| 20 | 24 | TAL | Lch Tone Control(A) |

Note) Keep Nos. 4, 9, 16 and 21 pins of 24 DIP unconnected or connect them to AVSS.

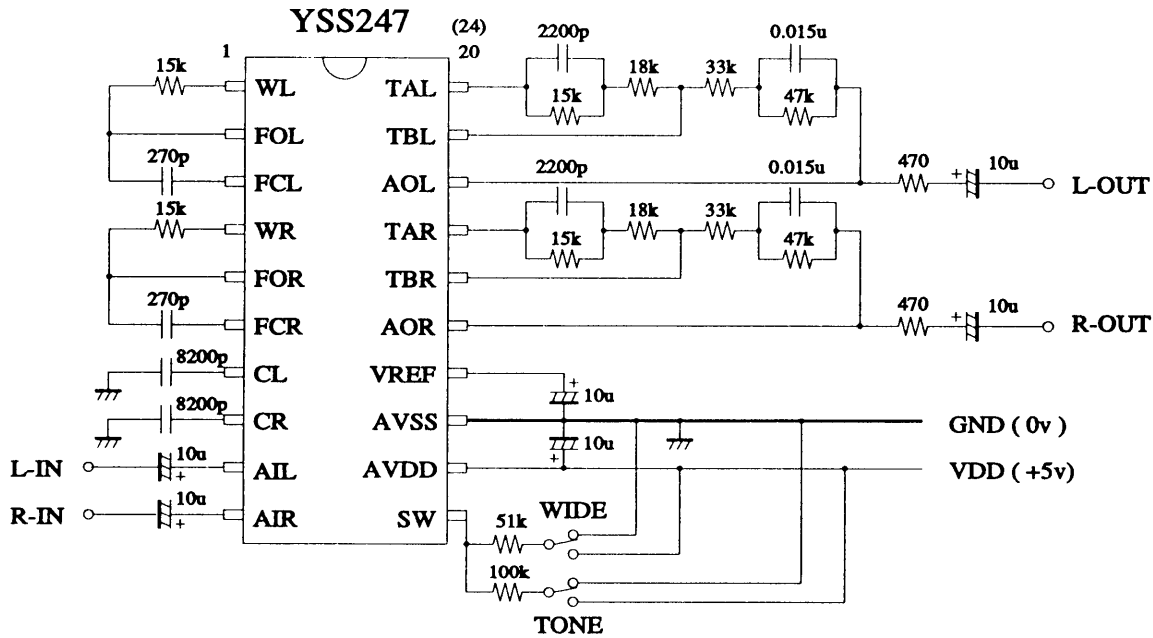
■ DESCRIPTION OF PIN FUNCTION

Pin name (Pin No. of 20 SSOP / Pin No. of 24 DIP)

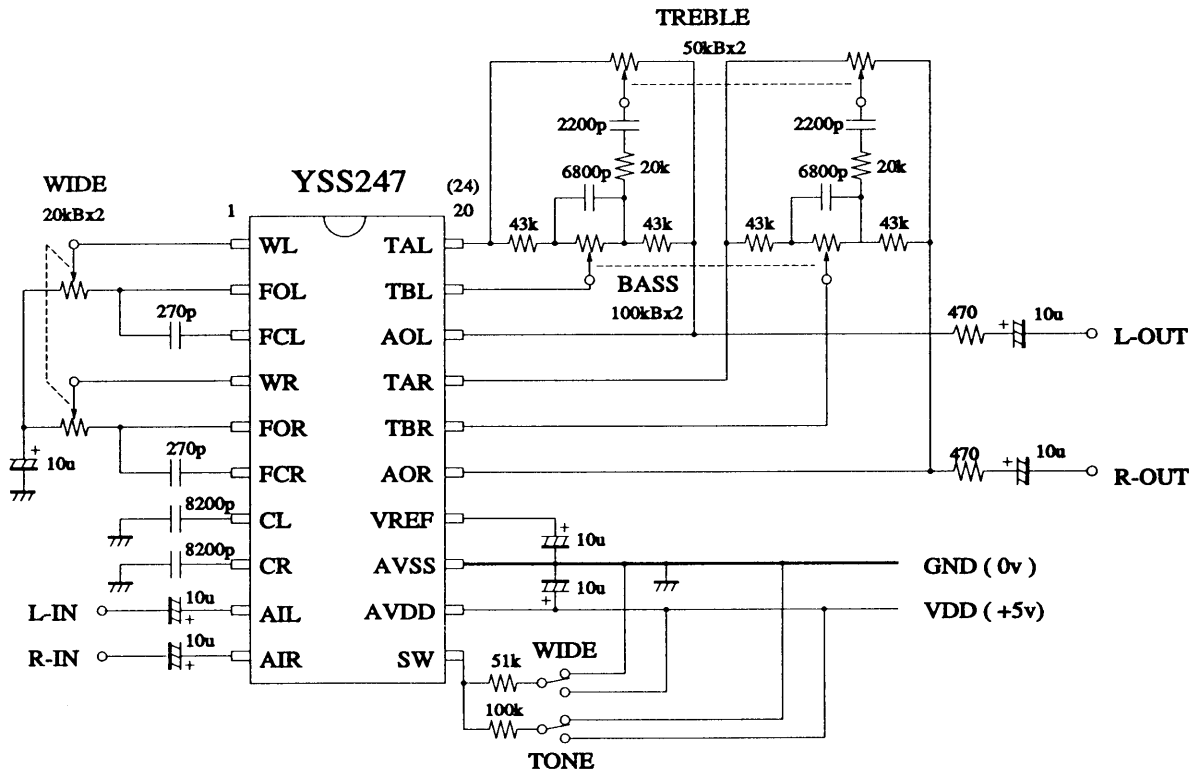
1. WL (1/1 pin) Lch Wide input terminal
 WR (4/5 pin) Rch Wide input terminal
 The surround effect is provided when the FOL output is inputted to WL and the FOR output to WR, both after the level adjustment.
2. FOL (2/2 pin) Lch Filter output terminal
 FOR (5/6 pin) Rch Filter output terminal
 Connect a capacitance between FOL and FCL and between FOR and FCR.
3. FCL (3/3 pin) Lch filter capacitance connection terminal
 FCR (6/7 pin) Rch filter capacitance connection terminal
 Refer to the above paragraph.
4. CL (7/8 pin) Lch filter capacitance connection terminal
 CR (8/10 pin) Rch filter capacitance connection terminal
 Connect a capacitance between CL and GND and between CR and GND.
5. AIL (9/11 pin) Lch analog input terminal
 AIR (10/12 pin) Rch analog input terminal
 To AIL, connect a capacitor and input the Lch signal.
 To AIR, connect a capacitor and input the Rch signal.
6. SW (11/13 pin) Surround, tone control function on/off terminal
 With 2 resistors (51k Ω , 100k Ω) connect one ends to this pin and connect the other ends to AVDD (ON) or AVSS (OFF) surround (51k Ω) and tone control (100k Ω) function ON/OFF can be controlled.
7. AVDD (12/14 pin) Power supply terminal
 Apply +3.0 to +5.5V voltage to the AVSS potential.
 Connect a capacitance between AVDD and AVSS.
8. AVSS (13/15 pin) GND terminal
 Analog signal reference voltage pin
9. VREF (14/17 pin) Operating voltage
 (AVDD, AVSS) terminals are connected to provide the center voltage of the internal circuit.

■ APPLICATION CIRCUIT EXAMPLE

Simple circuit example using ON/OFF switch



Circuit example with volume variable surround and tone control effects.



The YSS247 can be used by changing the constant of the external parts according to application and conditions.

■ ELECTRICAL CHARACTERISTICS

1. Absolute maximum ratings

| Item | Symbol | min. | max. | Unit |
|----------------------|--------|----------|----------|------|
| Power supply voltage | AVDD | AVSS-0.5 | AVSS+7.0 | V |
| Input voltage | Vin | AVSS-0.5 | AVDD+0.5 | V |
| Output voltage | Vout | AVSS-0.3 | AVDD+0.3 | V |
| Storage temperature | Tstg | -50 | 125 | °C |

2. Recommended operating conditions

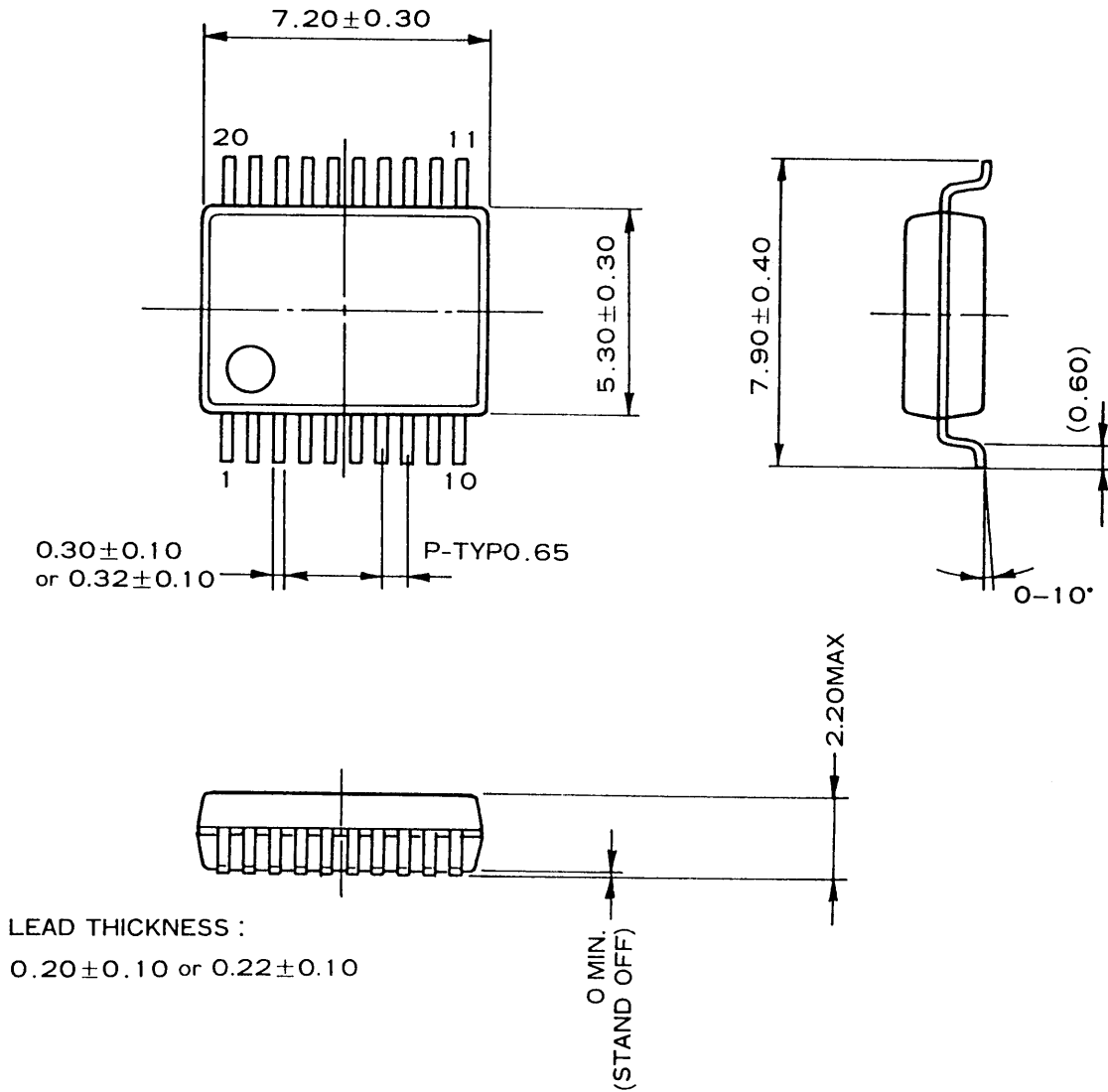
| Item | Symbol | min. | typ. | max. | Unit |
|-----------------------|--------|------|------|------|------|
| Power supply voltage | AVDD | 3.0 | 5.0 | 5.5 | V |
| Operating temperature | Top | 0 | 25 | 70 | °C |

3. Analog characteristics (Conditions : Ta=25°C, VDD=5.0V)

| Item | Symbol | min. | typ. | max. | Unit |
|--------------------------|--------------------------------|------|--------|------|------|
| Power supply current | VDD=5.0V | — | 10 | — | mA |
| Analog input voltage | | — | 1.0 | — | Vrms |
| Analog output voltage | | — | 1.0 | — | Vrms |
| Signal noise ratio | IHF-A | — | 95 | — | dB |
| Distortion rate | 1 Vrms input Wide, Tone off | — | 0.0025 | — | % |
| Gain deviation | | — | — | 0.5 | dB |
| Frequency characteristic | 10 Hz~50 kHz | -3.0 | — | 0.5 | dB |
| Input impedance | | — | 30 | — | k Ω |
| Input capacitance | | — | — | 15 | pF |
| Center voltage | | — | 2.5 | — | V |

■ EXTERNAL DIMENSIONS

- YSS247-E (SSOP specification)



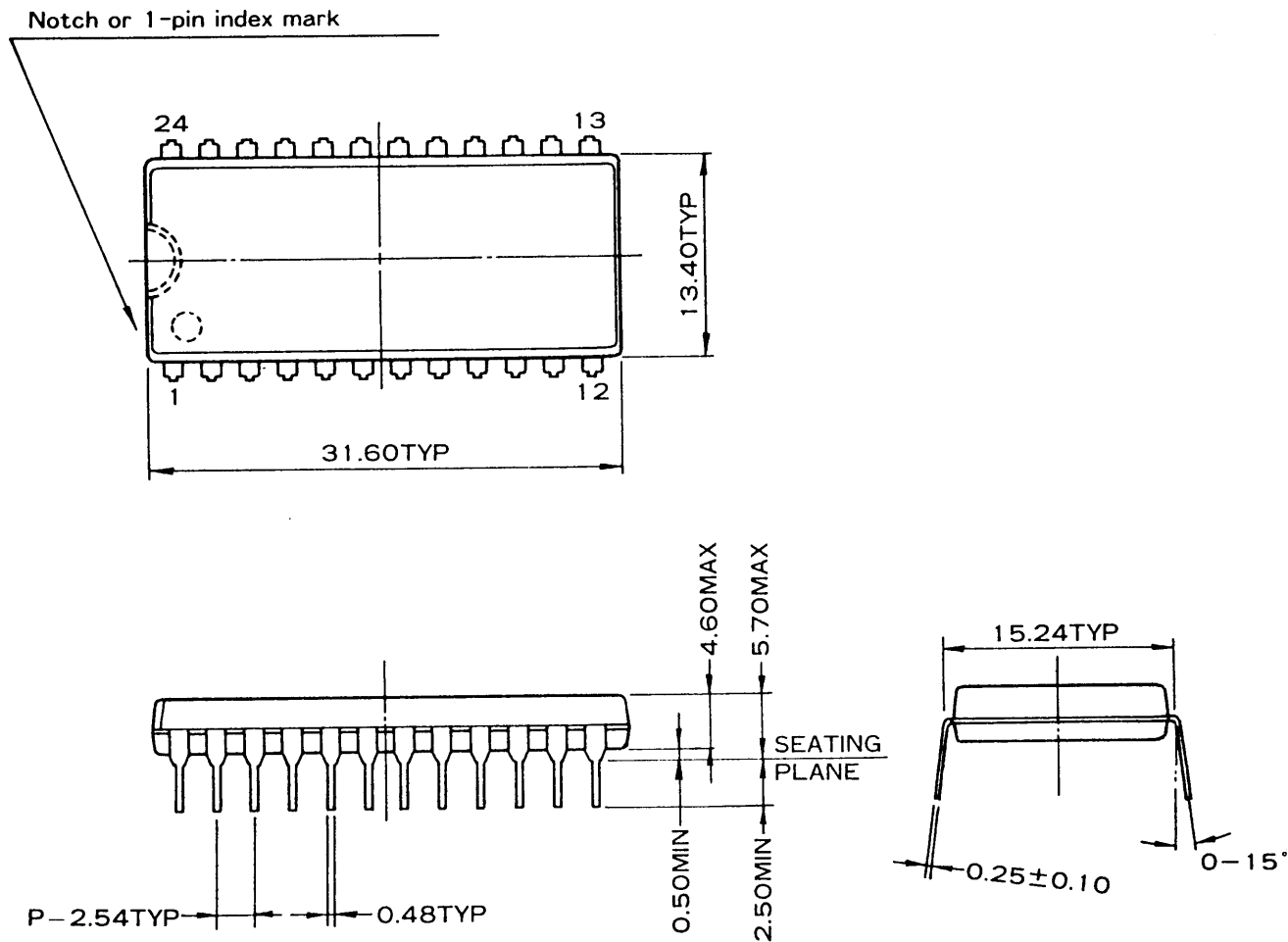
LEAD THICKNESS :
 0.20 ± 0.10 or 0.22 ± 0.10

The figure in the parenthesis () should be used as a reference.
 Plastic body dimensions do not include burr of resin.
 UNIT: mm

Note: The LSIs for surface mount need especial consideration on strage and soldering conditions. For detailed information, please contact your nearest agent of yamaha.

EXTERNAL DIMENSIONS

- YSS247-D (DIP specification)



Plastic body dimensions do not include burr of resin.
UNIT: mm

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_____ AGENCY _____

YAMAHA CORPORATION

**Address inquiries to:
Semiconductor Sales & Marketing Department**

- Head Office 203, Matsunokijima, Toyooka-mura,
Iwata-gun, Shizuoka-ken, 438-0192
Tel. +81-539-62-4918 Fax. +81-539-62-5054

- Tokyo Office 2-17-11, Takanawa, Minato-ku,
Tokyo, 108-8568
Tel. +81-3-5488-5431 Fax. +81-3-5488-5088

- Osaka Office Namba Tsujimoto Nissei Bldg. 4F
1-13-17, Namba Naka, Naniwa-ku,
Osaka City, Osaka, 556-0011
Tel. +81-6-6633-3690 Fax. +81-6-6633-3691

- U.S.A. Office YAMAHA Systems Technology
100 Century Center Court, San Jose,
CA 95112
Tel. +1-408-467-2300 Fax. +1-408-437-8791