YAMAHA LSI

YSS247

ASR

Analog Surround

■ OUTLINE

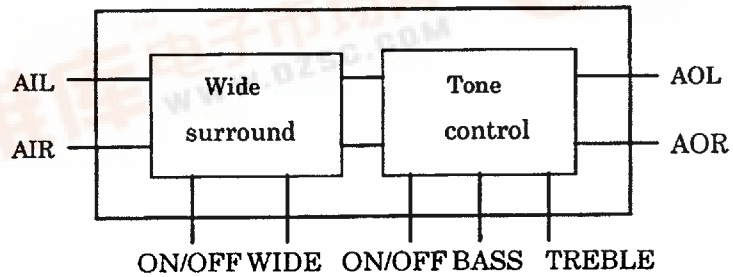
The YSS247 is a stereo signal processing LSI with Yamaha's original wide surround "YMERSION™" and tone control/loudness circuit.
With this LSI, it is possible to emphasize diffusion feeling of the sound when reproducing the stereo sound with a compact type audio equipments such as a mini-component set 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

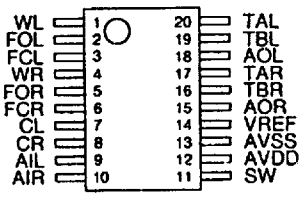
Wide surround + tone control



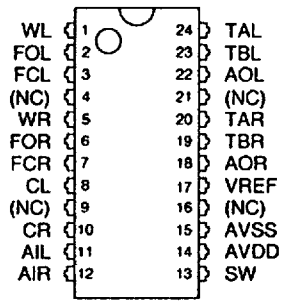
YMERSION™ is YAMAHA's registered trademark.

■ PIN CONFIGURATION

20SSOP
(YSS247-E)



24 DIP
(YSS247-D)



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

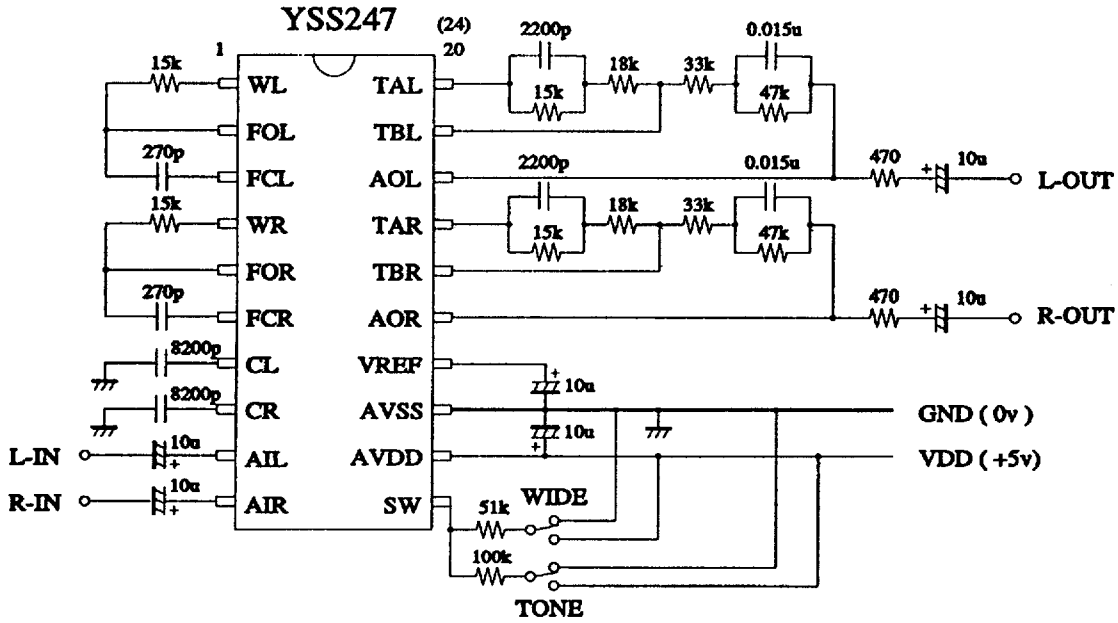
9. VREF (14/17 pin) Operating voltage
   (AVDD-AVSS)/2 potential is generated to provide the center voltage of the internal circuit.
   Connect a capacitance between this pin and AVSS.

10. AOR (15/18 pin) Rch analog output terminal
    AOL (18/22 pin) Lch analog output terminal
    With a capacitance connected to AOR and AOL, analog signals are output.

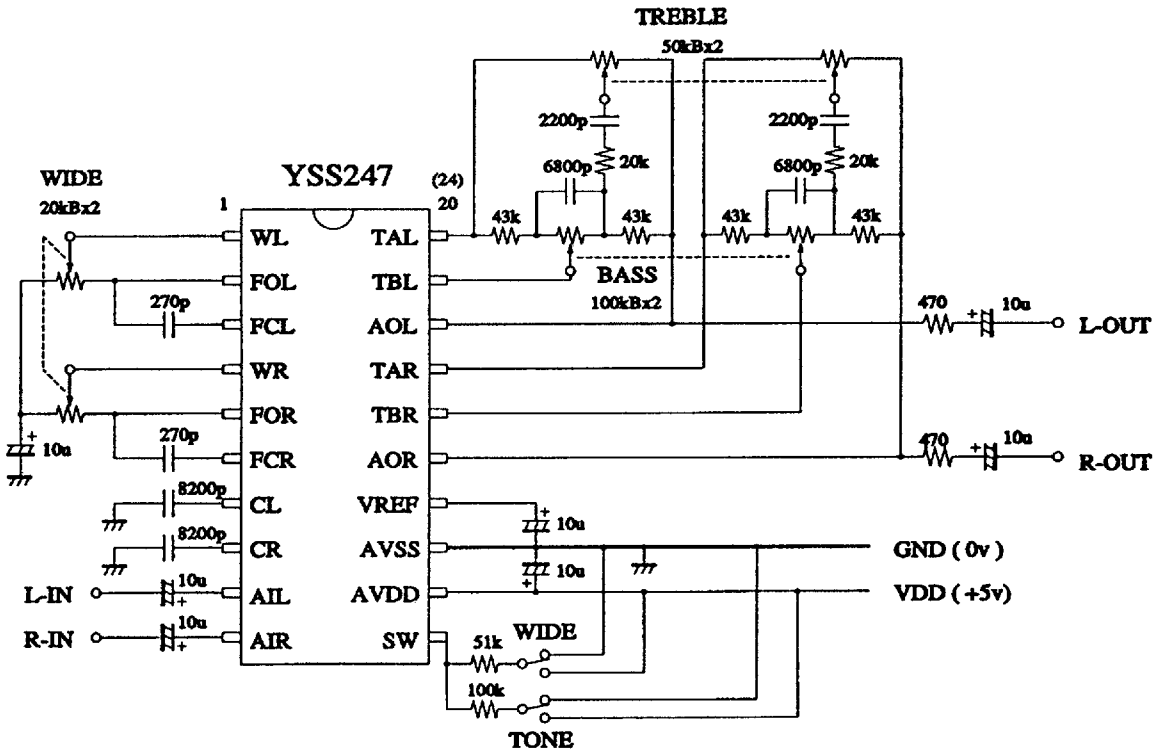
11. TBR (16/19 pin), TAR (17/20 pin) Rch tone control input terminals
    TBL (19/23 pin), TAL (20/24 pin) Lch tone control input terminals
    The Rch tone control circuit is formed by using the CR circuit among AOR, TBR and TAR.
    The Lch tone control circuit is formed by using the CR circuit among AOL, TBL and TAL.
    (Refer to the application circuit example.)

■ 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	℃

2. Recommended operating conditions

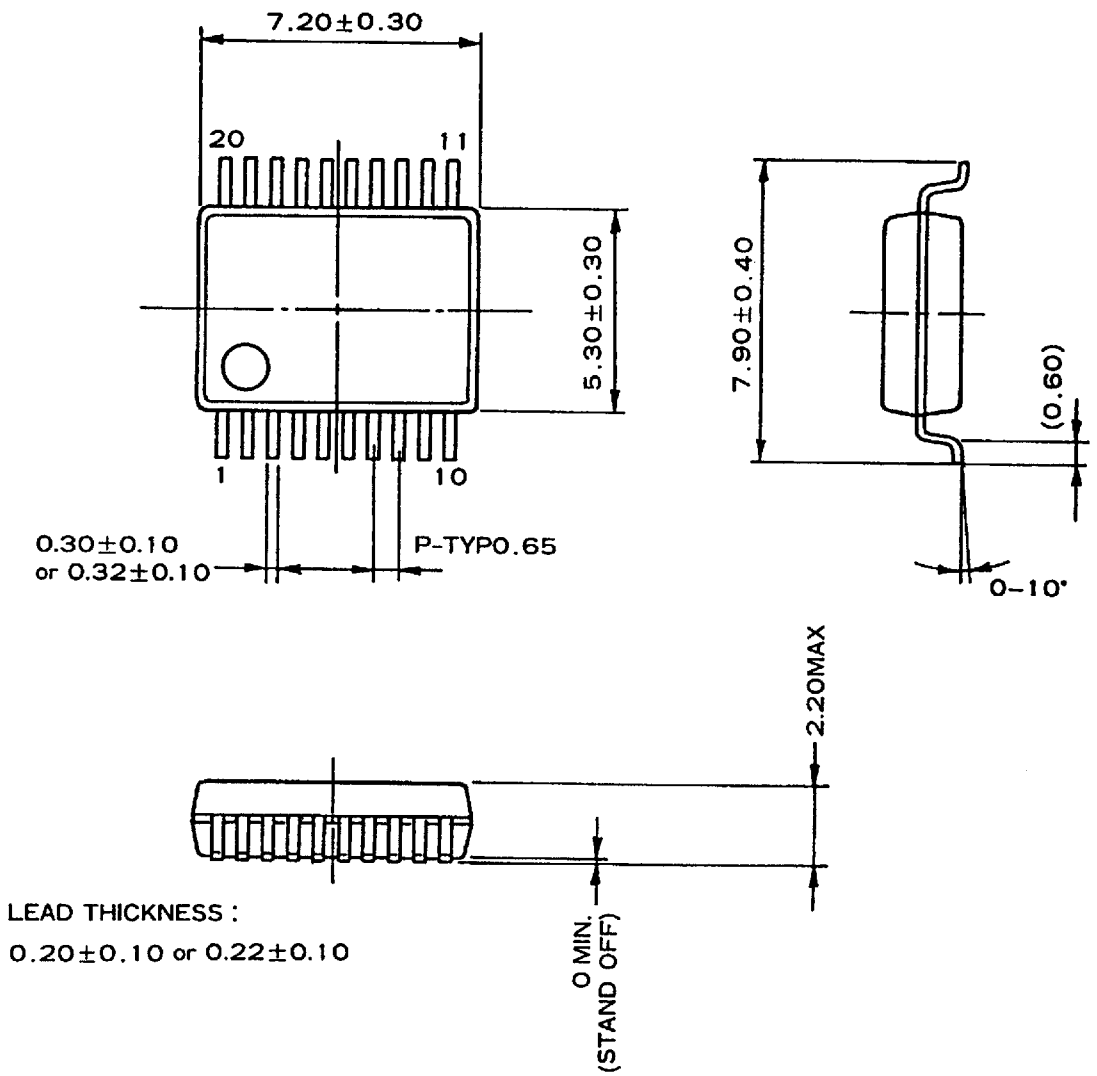
Item	Symbol	min.	typ.	max.	Unit
Power supply voltage	AVDD	3.0	5.0	5.5	V
Operating temperature	Top	0	25	70	℃

3. Analog characteristics (Conditions : Ta=25℃, 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)

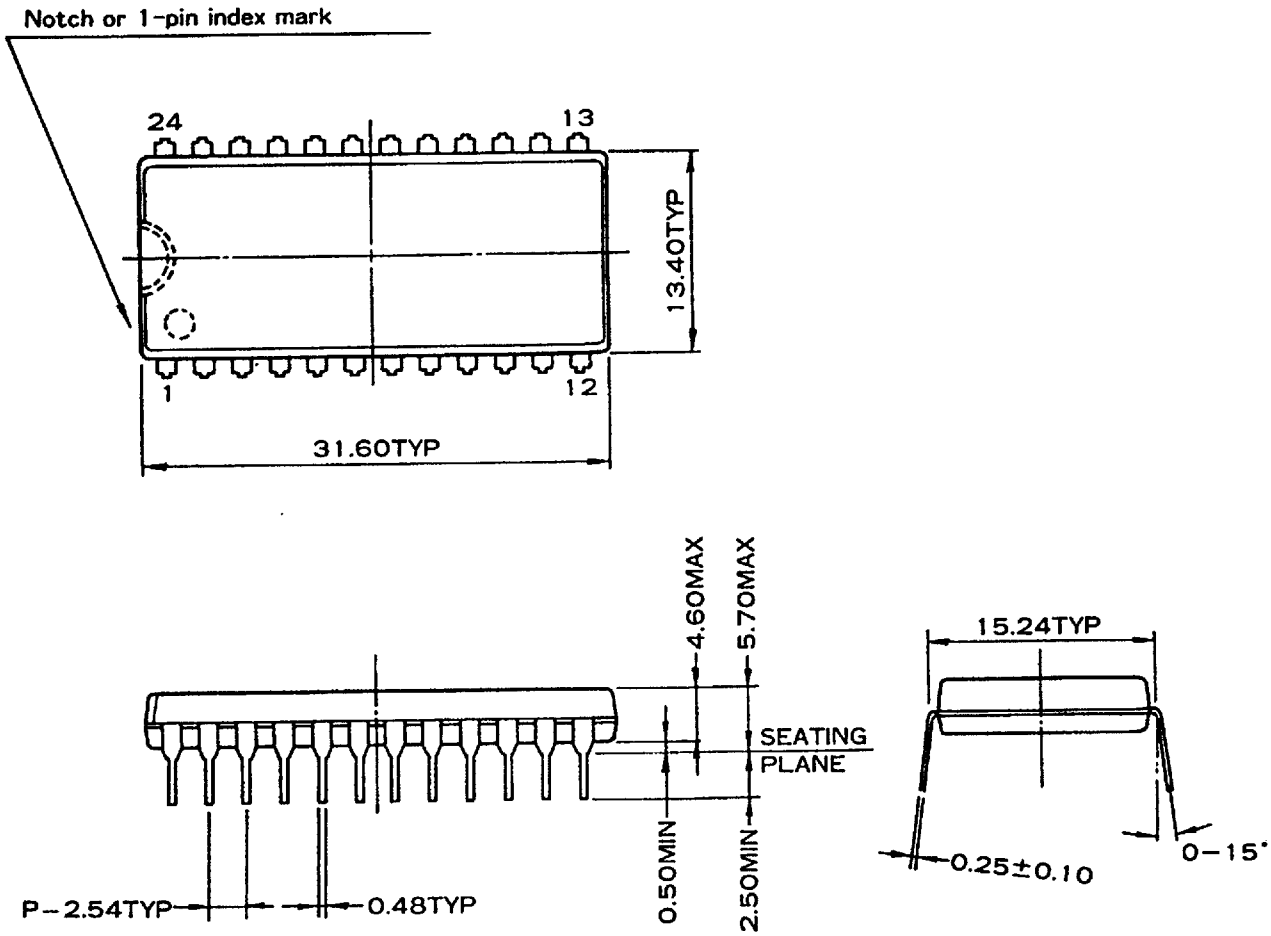


The figure in the parenthesis ( ) should be used as a reference.
Plastic body dimensions do not include burr of resin.
UNIT: mm

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