TOSHIBA Bipolar Liner Integrated Circuit Silicon Monolithic

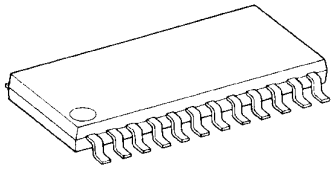
TA2136FG,TA2136NG

Sound Retrieval System; 3D Sound IC

The device incorporated the SRS; Sound Retrieval System under license from SRS Labs, Inc.

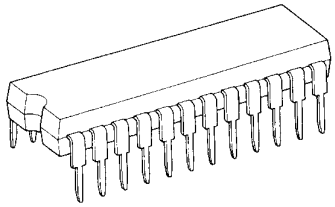
The TA2136FG/TA2136NG is the IC with the Sound Retrieval System to make 3D sound. It supports both stereo and monaural signal inputs. This allows TA2136FG/TA2136NG to be suitable for various audio systems such as TVs, stereo equipments, radio cassette recorders, video game machines, electronic organs, and PC units.

TA2136FG



P-SSOP24-300-1.00

TA2136NG



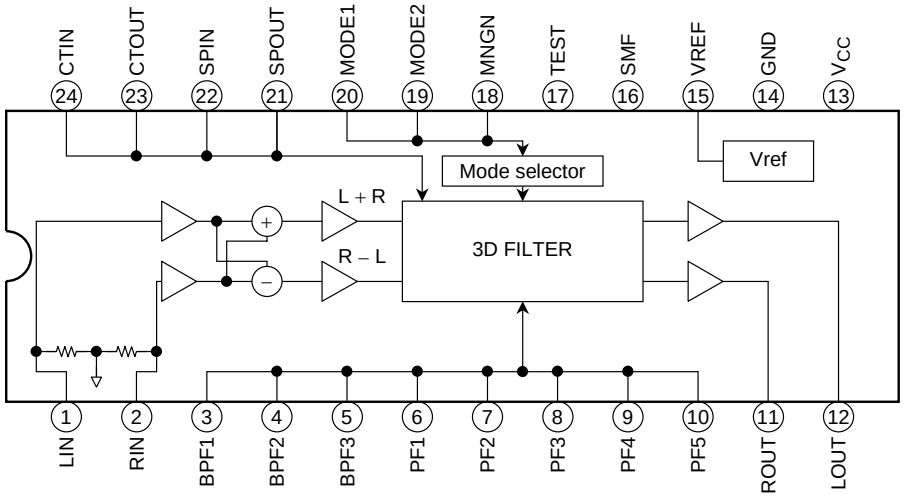
P-SDIP24-300-1.78

Weight
P-SSOP24-300-1.00 : 0.31 g (typ.)
P-SDIP24-300-1.78 : 1.2 g (typ.)

Features

- Incorporates three mode selectors.
  (1) Monaural mode (SRS 3D mono)
  (2) Stereo mode (SRS 3D stereo)
  (3) Bypass mode (bypass mode)
- Center and space controlling functions
- Wide operation supply voltage
  : $V_{CC\ (ope.)}$ = 4.5 to 12 V (Ta = 25℃)

Block Diagram



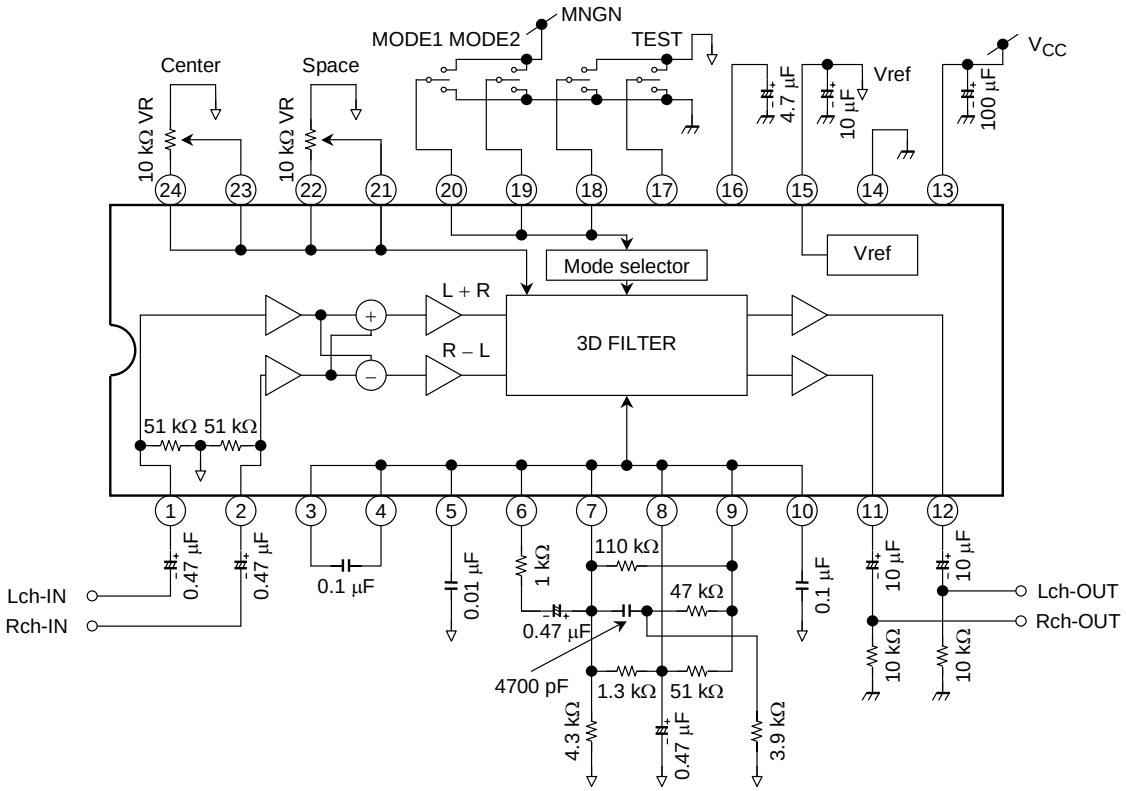
Note 1: This device is vulnerable to surge voltages. Take it into account when using this device in your system.

The SRS; Sound Retrieval System and SRS are registered trademarks of SRS Labs, Inc.

Pin Function

Pin No.	Symbol	I/O	Function	Remarks
1	LIN	I	L channel signal input pin.	
2	RIN	I	R channel signal input pin.	
3	BPF1	—	BPF1 pin for band pass filter.	
4	BPF2	—	BPF2 pin for band pass filter.	
5	BPF3	—	BPF3 pin for band pass filter.	
6	PF1	—	PF1 pin for 3D filter.	
7	PF2	—	PF2 pin for 3D filter.	
8	PF3	—	PF3 pin for 3D filter.	
9	PF4	—	PF4 pin for 3D filter.	
10	PF5	—	PF5 pin for 3D filter.	
11	ROUT	O	R channel signal output pin.	
12	LOUT	O	L channel signal output pin.	
13	V_{CC}	—	Power supply pin.	
14	GND	—	Ground pin.	
15	VREF	I	Reference voltage pin.	
16	SMF	—	SMF pin for smoothing filter.	
17	TEST	I	Test pin, normally fixed “L” level.	
18	MNGN	I	MNGN pin for monoral signal input gain selector. Normally fixed “L” level.	
19	MODE2	I	MODE2 pin for mode selector.	
20	MODE1	I	MODE1 pin for mode selector.	
21	SPOUT	O	Output pin for space control.	
22	SPIN	I	Iutput pin for space control.	
23	CTOUT	O	Output pin for center control.	
24	CTIN	I	Input pin for center control.	

Application Circuit



Mode	Mode1	Mode2
Bypass	L	—
3D mono	H	L
3D stereo	H	H

Level	Test (Note 2)	MNGN (Note 3)
L	−3dB	0dB
H	0dB	−6dB

Note 2: Usually, it is used by fixing to “L” level.

Note 3: Usually, it is not concerned with an L channel input or L and R channel input, but is used by fixing to “L” level.

Note 4: The Sound Retrieval System (SRS) technology rights incorporated in the TA2136FG/NG are owned by SRS Labs, a US Corporation and licensed to Toshiba Semiconductor. The Sound Retrieval System (SRS) is protected under US and foreign patents used and/or pending. The Sound Retrieval System (SRS), the ◖●◗ and SRS symbol, are trademarks of SRS Labs, Inc. in the United States and selected foreign countries. Neither the purchase of the TA2136FG/NG, nor the corresponding sale of audio enhancement equipment conveys the right to sell commercialized recordings made with any SRS technology. SRS Labs requires that all users of the TA2136FG/NG must enter into a license agreement directly with SRS Labs and comply with all rules and regulations as outlined in the SRS Trademark Usage Manual.

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating		Unit
Supply voltage	V_{CC}	12		V
Power dissipation	P_d	TA2136FG (Note 5)	*400	mW
		TA2136NG (Note 6)	*1200	
Operating temperature	T_{opr}	−40 to 85		°C
Storage temperature	T_{stg}	−55 to 150		°C

Note 5: Derated above 25°C in the proportion of 3.2 mW/°C

Note 6: Derated above 25°C in the proportion of 9.6 mW/°C

Electrical Characteristics

(unless otherwise specified, V_{CC} = 9 V, f = 1 kHz, RL = 10 kΩ, V_{in} = −10dBV, Rg = 600 Ω, bypass mode, Ta = 25°C)

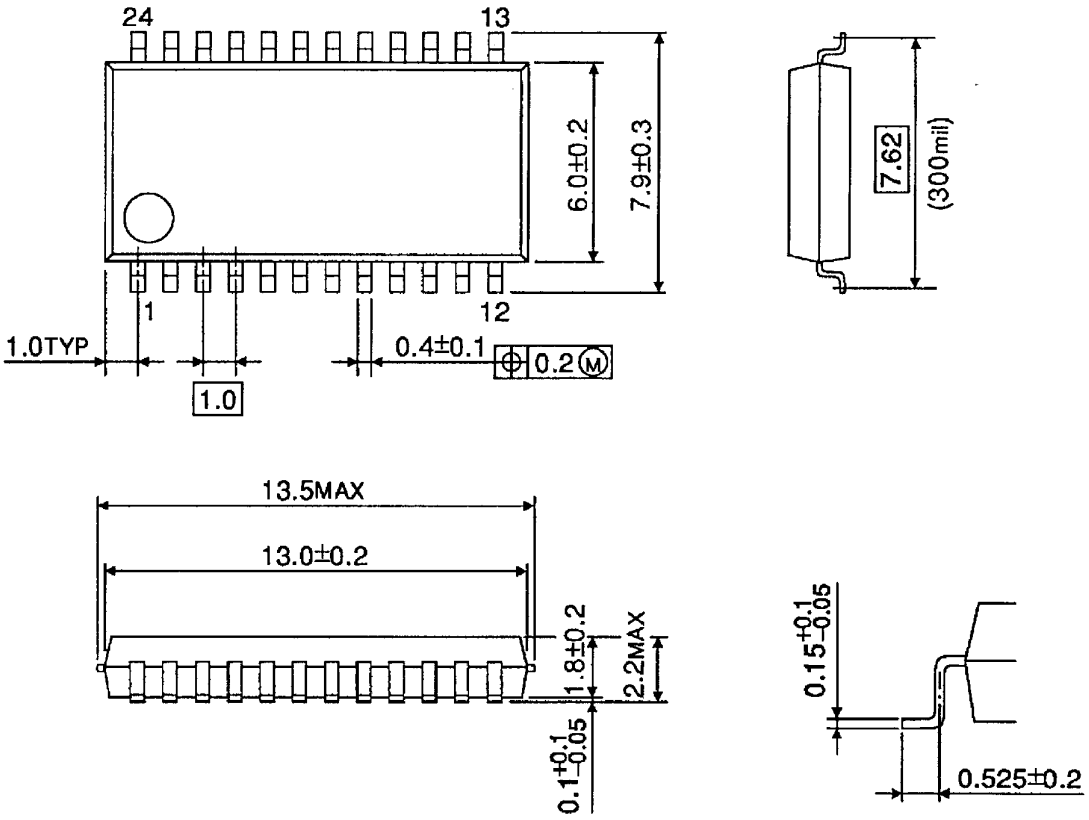
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Supply voltage	V_{CC}	—	V_{in} = 0	4.5	9	12	V
Supply current	Iccq (BYP)	—	V_{in} = 0	—	4	7	mA
	Iccq (SRS)	—	V_{in} = 0, SRS STEREO	—	8	14	
	Iccq (MONO)	—	V_{in} = 0, SRS MONO	—	8	14	
Input resistance	Rin	—	—	40	50	60	kΩ
Output clipping voltage	V_{OCL}	—	THD = 1%	1.4	1.7	—	Vrms
Total harmonic distortion	THD (SRS)	—	SRS STEREO, Space&Center: max	—	0.15	—	%
	THD (MONO)	—	SRS MONO	—	0.2	—	
	THD (BYP)	—	SRS BYPASS, TEST = "H"	—	0.004	—	
Bypass gain	G_V (BYP)	—	—	−5	−3	−1	dB
Output noise voltage	V_{ON} (SRS)	—	Input = GND, Space&Center: MID BW = 20 Hz to 20 kHz	—	35	50	μVrms
Mode select control voltage	V_{CH}	—	High level	2	—	V_{CC}	V
	V_{CL}	—	Low level	GND	—	1	

<Mode Select>

Mode	Mode1	Mode2
Bypass	L	—
3D stereo	H	H
3D mono	H	L

Package Dimensions

P-SSOP24-300-1.00 Unit : mm

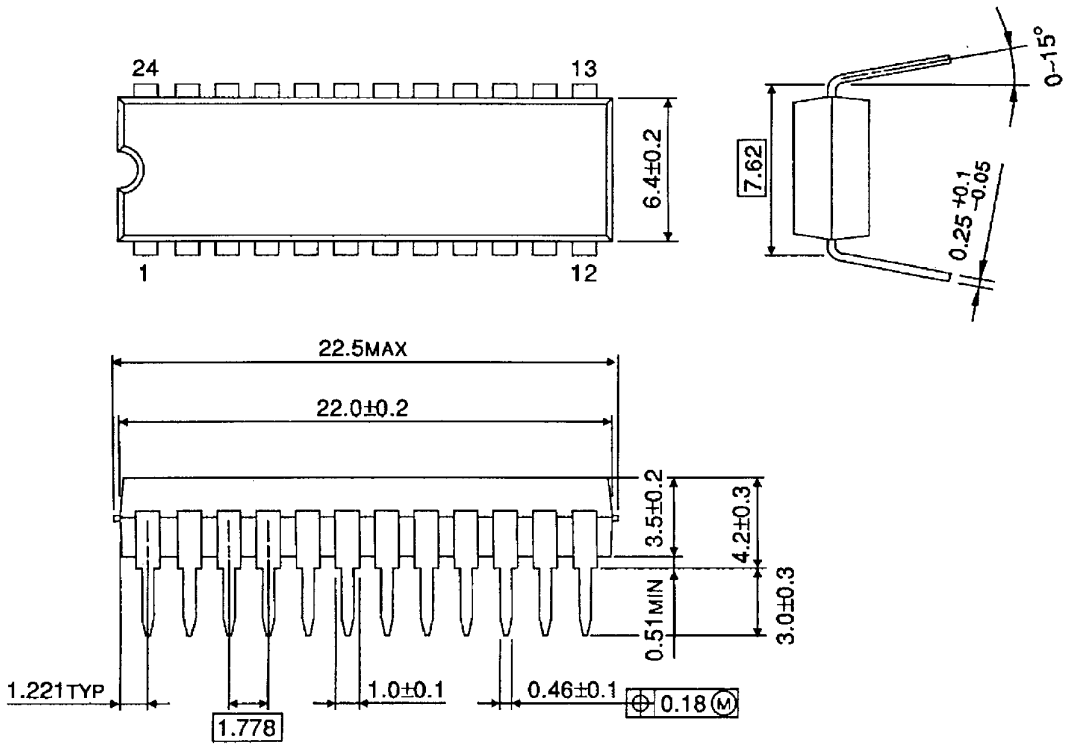


(Note) Sn-Ag plate

Weight: 0.31 g (typ.)

Package Dimensions

SDIP24-P-300-1.78 Unit : mm



(Note) Sn-Ag plate

Weight: 1.2 g (typ.)

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About solderability, following conditions were confirmed

- Solderability

  (1) Use of Sn-37Pb solder Bath
  - solder bath temperature = 230°C
  - dipping time = 5 seconds
  - the number of times = once
  - use of R-type flux

  (2) Use of Sn-3.0Ag-0.5Cu solder Bath
  - solder bath temperature = 245°C
  - dipping time = 5 seconds
  - the number of times = once
  - use of R-type flux