AN7395K, AN7395S

Spatializer IC (3-D Surround)

■ Overview

Spatializer Audio Processor is a signal processing technology, monopolized by Desper Products, Inc., that was developed for commercial electronics and multimedia markets, and is based on Desper's “PRO Spatializer” that is a 3-D audio production system for business use. The AN7395K, AN7395S utilizes the innovative technology adopted in that system, and provides sound enhancement effect and sound expansion with the conventional 2-speaker stereo system.

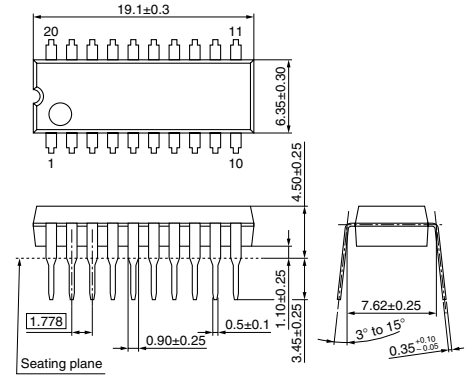
■ Features

- Provides deep 3-D sound with conventional 2-speaker system.
- The audio signal recorded through this IC can be reproduced with usual stereo system.
- Performs optimal processing to the sound source recorded with surround-effect so as not to give double effects.
- Sound expansion effect can be varied.
- A pseudo stereo effect for the monaural audio signal is achieved.
- Positions and moves each sound source on 270° arc in real time.

■ Applications

- Televisions, videos, audio equipment, personal computers, and game machines

AN7395K Unit: mm



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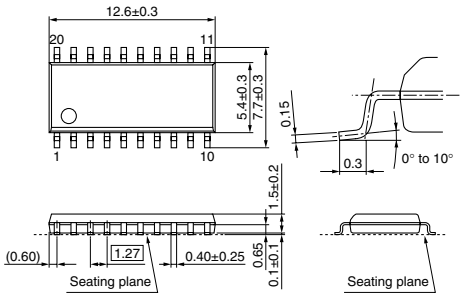
AN7395S Unit: mm



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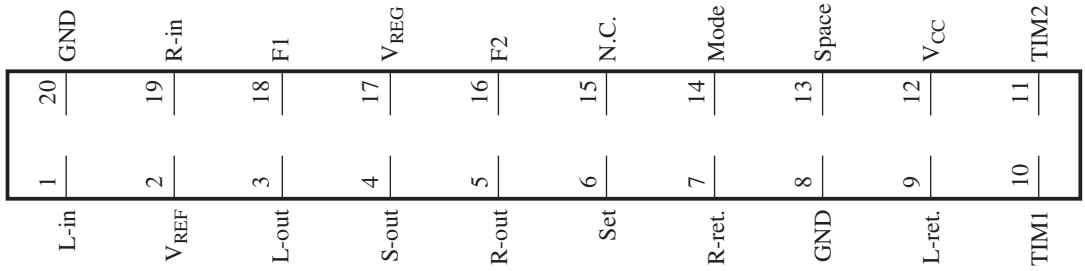
■ Pin Assignment



Note) Spatializer® and the device trademark of circle-in-square ◙ are owned by Desper Products Inc..
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■ Pin Descriptions

Pin No.	Descriptions	Pin No.	Descriptions
1	L-in	11	TIM2
2	V_{REF}	12	V_{CC}
3	L-out	13	Space
4	S-out	14	Mode
5	R-out	15	N.C.
6	Set	16	F2
7	R-ret.	17	V_{REG}
8	GND	18	F1
9	L-ret.	19	R-in
10	TIM1	20	GND

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	11	V
Supply current	I_{CC}	100	mA
Power dissipation *2	P_D	230	mW
Operating ambient temperature *1	T_{opr}	–25 to +75	°C
Storage temperature *1	T_{stg}	–55 to +125	°C

Note) *1: Except for the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.
*2: The power dissipation shown is the value for T_a = 75°C

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	6.0 to 10.0	V

■ Electrical Characteristics at V_{CC} = 9 V, f = 1 kHz, T_a = 25°C ± 2°C

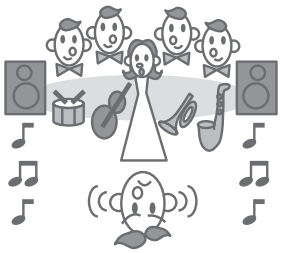
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Total circuit current	I_{TOTAL}	V_{IN} = 0 mV	5	11	17	mA
Maximum output voltage *3	V_{OUT1}	L-in, R-in THD = 1%	2.0	2.8	—	V[rms]
Output noise voltage 1 *1, 4	V_{NO1}	L-out, R-out R_G = 4.7 kΩ	—	20	100	μV[rms]
Voltage gain 1 *3	G_{V1}	L-out, R-out V_{IN} = 400 mV	–2	0	2	dB
Total harmonic distortion 1 *2, 3	THD_1	L-out, R-out V_{IN} = 400 mV	—	0.05	0.3	%
Output noise voltage 2 *1, 5	V_{NO2}	S-out R_G = 4.7 kΩ	—	160	600	μV[rms]
Voltage gain 2 *6	G_{V2}	S-out V_{IN} = 60 mV	200	280	400	mV[rms]
Total harmonic distortion 2 *2, 6	THD_2	S-out V_{IN} = 60 mV	—	0.05	0.3	%
Mono mode switching voltage	V_M		4.2	—	V_{CC}	V
Off mode switching voltage	V_{OFF}		0	—	0.9	V
Stereo mode switching voltage	V_{ST}		2.1	—	2.8	V

Note) ∗1: In measuring, the filter with A-characteristic curve is used.
∗2: In measuring, the filter for the range of 15 Hz to 30 kHz (12 dB/OCT) is used.
∗3: Mode: ST, L-in + R-in, VCA min.
∗4: Mode: ST, VCA min.
∗5: Mode: ST, VCA max.
∗6: Mode: ST, VCA max. for either L-in or R-in.

■ Conceptual Explanation of Spatializer Operation

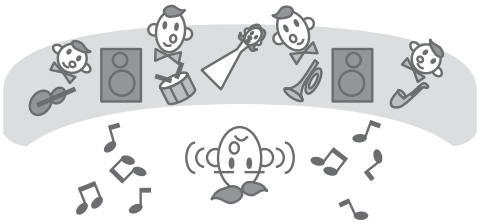
• Normal stereo

All sounds are heard from only between two speakers, right and left.



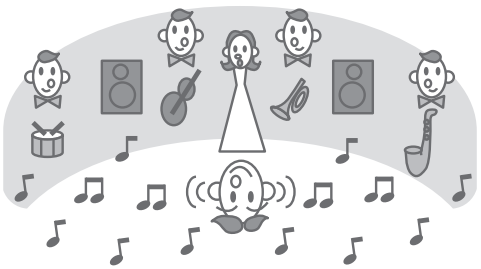
• Conventional surround

The sound expands toward the outside of the speaker system, but the sound position comes apart mostly in the conventional systems.

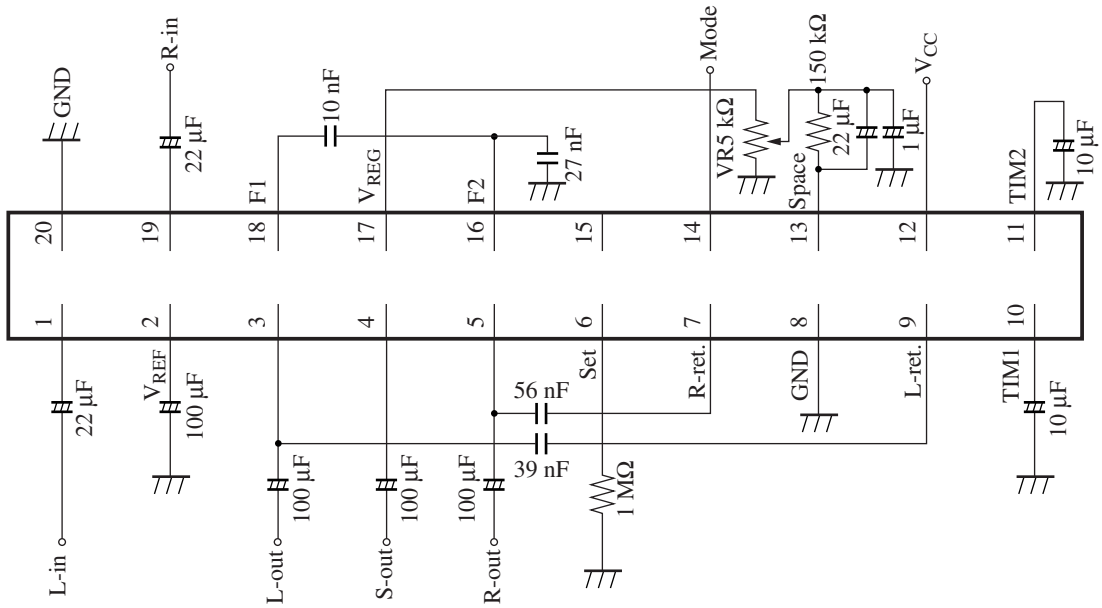


• Spatializer

The sound expands toward the outside of the two speakers, and yet their positions are stable and an expanded, deep sound are gotten.



■ Application Circuit Example (Basic circuitry)



Note) When switching noise occurs at mode switching, insert a capacitor between pin 14 and GND.

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