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.

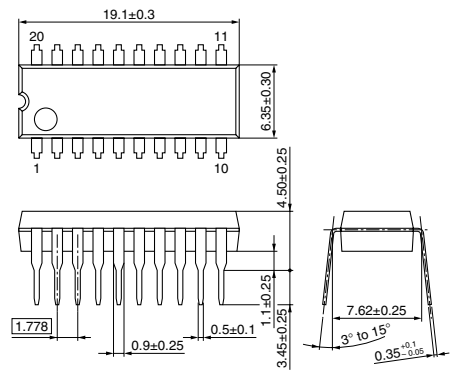
■ Features

- 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

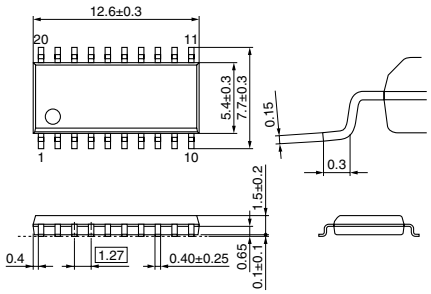
- Televisions, videos, audio equipment, personal computers, and game machines

AN7395K Unit: mm



SDIP020-P-0300

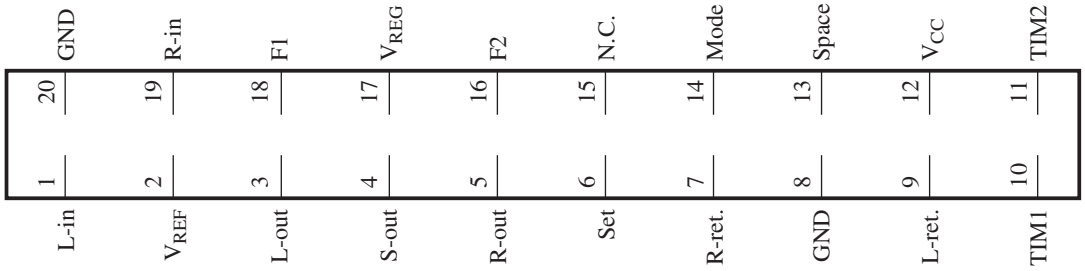
AN7395S Unit: mm



SOP020-P-0300B

Note) The packages (SDIP020-P-0300 and SOP020-P-0300B) of this product will be changed to lead-free type (SDIP020-P-0300A and SOP020-P-0300E). See the new package dimensions section later of this datasheet.

■ Pin Assignment



Note) Spatializer® and the device trademark of circle-in-square ◉ are owned by Desper Products Inc.
This product can be used with the consent of the Desper Products Inc.
Under the terms of the agreement between Matsushita Electric and Desper Products Inc., no technical information on the Spatializer, which is applied to this product, shall be provided.

■ 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

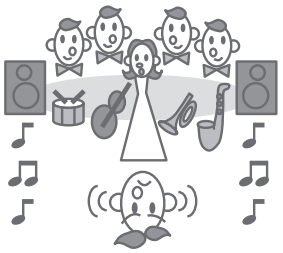
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Total circuit current	I_{TOTAL}	V_{IN} = 0 mV	5	11	17	mA
Maximum output voltage *3	V_{OUT1}	L-in, R-in THD = 1%	2.0	2.8	—	V[rms]
Output noise voltage 1 *1, 4	V_{NO1}	L-out, R-out R_G = 4.7 kΩ	—	20	100	μV[rms]
Voltage gain 1 *3	G_{V1}	L-out, R-out V_{IN} = 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

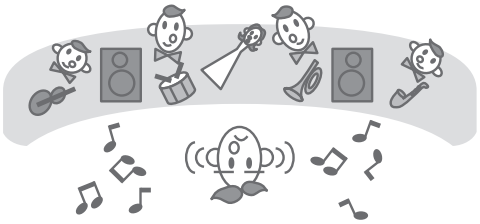
• Normal stereo

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



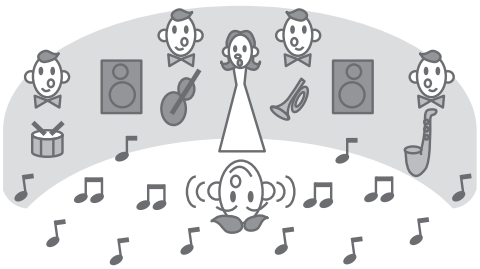
• Conventional surround

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

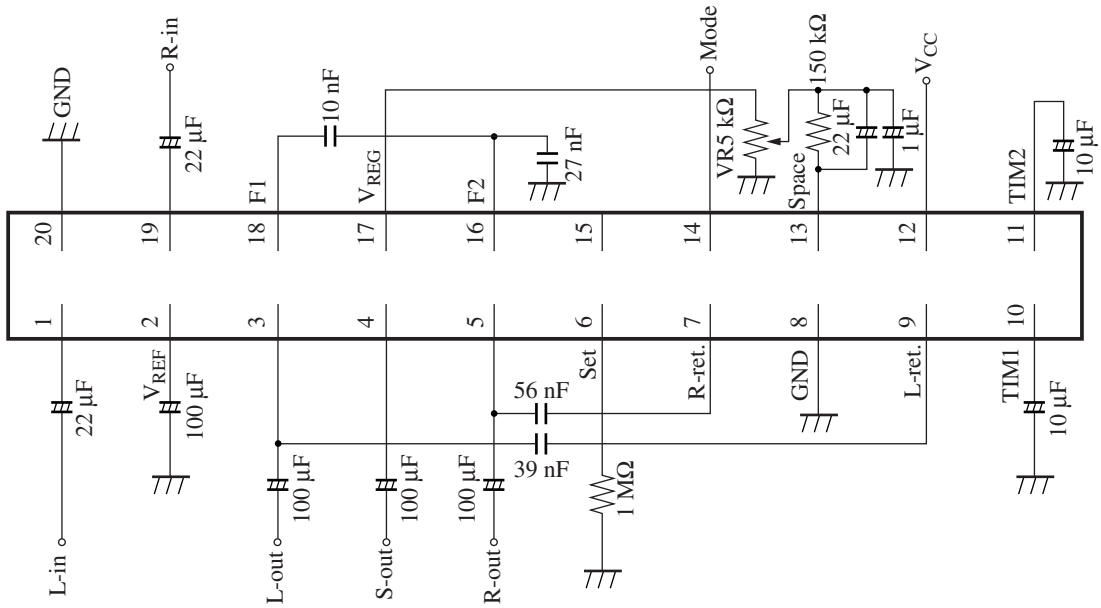


• Spatializer

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



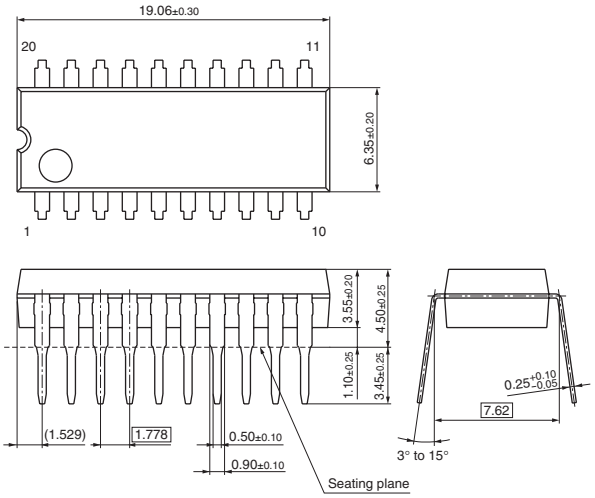
■ Application Circuit Example (Basic circuitry)



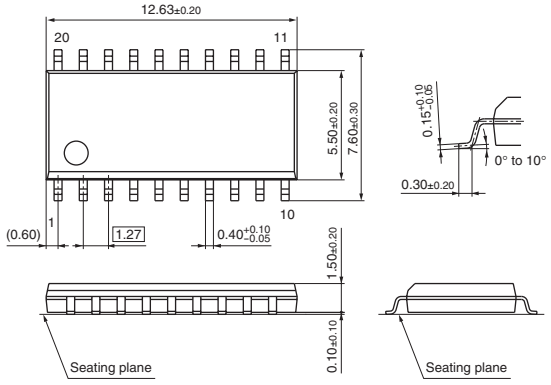
Note) When switching noise occurs at mode switching, insert a capacitor between pin 14 and GND.

■ New Package Dimensions (Unit: mm)

• SDIP020-P-0300A (Lead-free package)



• SOP020-P-0300E (Lead-free package)



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