N55PA01

Data Sheet

1W PWM Power Amplifier

For additional information or questions, please contact: Nuvoton Technology Corporation.

www.nuvoton.com

1. General Description

The N55PA01 is an amplifier to amplify output signal (max. 1W @5.5V) from PWM and/or MIC Line-in. It supports Nuvoton Speech/MIDI/NuVoice IC PWM output without extra components. The gain is adjustable by external resistor.

2. Features

- Operation Voltage:
  - 2.0V ~ 5.5 V
- Accept both PWM signal without external components
- Mute Function
- Standby current: typical 1.8uA
- Adjustable gain by external R
- Auto power on/off
- Support MIC Line In
- Max. output power: 1W @5.5V (THD+N: 1%), 8Ω.
- Package form:
  - SOP8
  - Package is Halogen-free, RoHS-compliant and TSCA-compliant.

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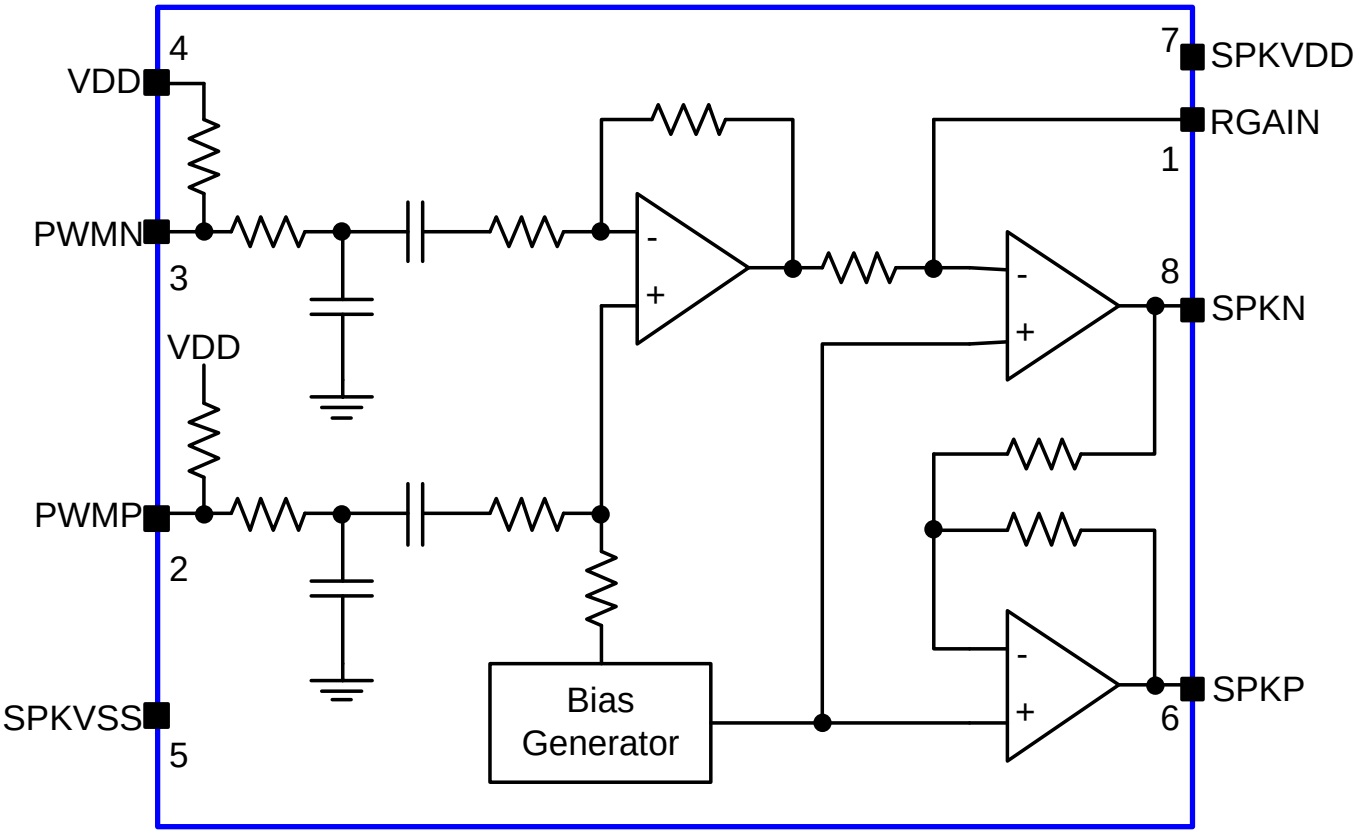
4.

5.

6. Block Diagram



7. Pin Description

Name	I/O	Power Supply	Description
VDD	P	-	Positive power for IC internally
PWMP	I	VDD	PWM driver positive signal input
PWMN	I	VDD	PWM driver negative signal input
RGAIN	I	-	Gain control pin
SPKVDD	P	-	Positive power supply for speaker driving
SPKP	O	SPKVDD	Positive speaker signal amplified output
SPKN	O	SPKVDD	Negative speaker signal amplified output
SPKVSS	P	-	Negative power supply for speaker driving

Note: VDD, SPKVDD must have same voltage power input.

8. Electrical Characteristics

8.1 Absolute Maximum Ratings

Parameter	Symbol	Conditions	Rated Value	Unit
Input Voltage	VIN	All Inputs	VSS -0.3 to VDD +0.3	V
Storage Temp.	TSTG	-	-55 to +150	°C
Operating Temp.	TOPR	-	-20 to +85	°C

Note: Exposure to conditions beyond those listed under the Absolute Maximum Ratings table may adversely affect the life and reliability of the device.

8.2 D.C. Characteristics

(VDD – VSS = 4.5V, TA = 25° C, No Load unless otherwise specified)

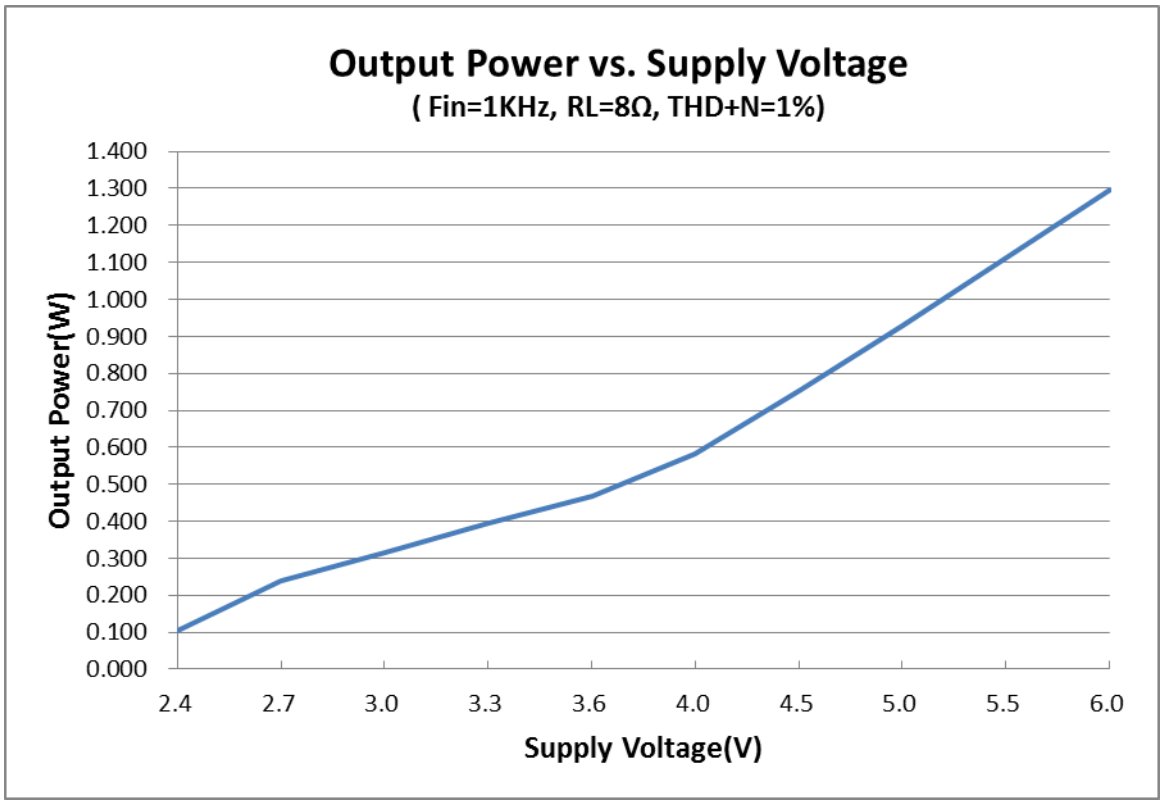
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	UNIT
Operating Voltage	VDD		2.0	-	5.5	V
Operating Current	I_{OP}	No load, VDD=5.5V	-	1.5	2	mA
Standby Current	I_{STB}	No load, VDD=5.5V (PWMP=floating PWMN=floating)	-	1.8	3	µA
Pull high Resistor (PWMP/PWMN)	R_{PH}	VDD=3.3V	1.4	2	2.6	MΩ

8.3 A.C. Characteristics

(VDD = 4.5V, TA = 25°C, No Load unless otherwise specified)

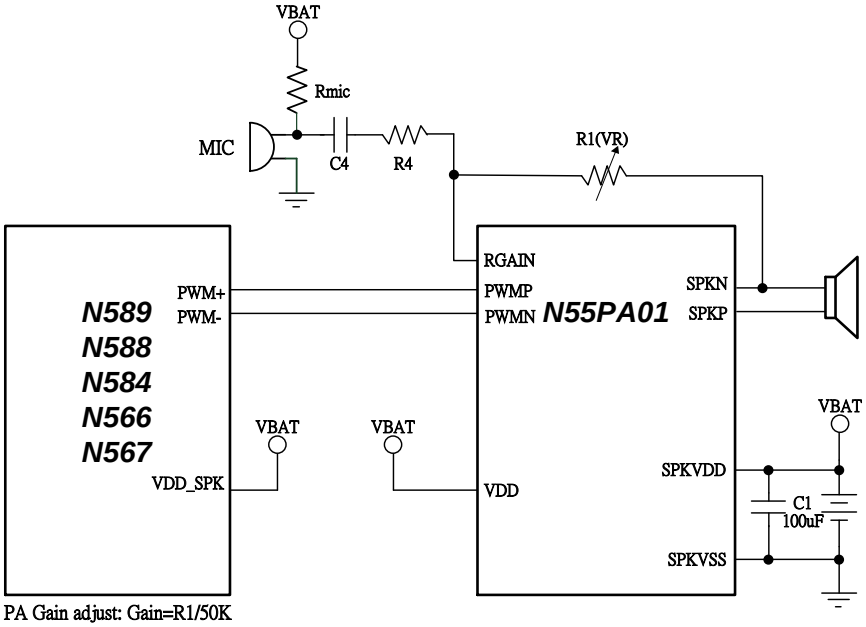
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	UNIT
Standby time	St	Ton			25	mS
		Toff			200	
Output power	Pout	VDD=5.5V, THD+N=1%, RL=8Ω		1		W
THD+Noise	THD+N	VDD=5.5V, Pout=1W, RL=8Ω		1%		

9. Output Power vs. Supply Voltage



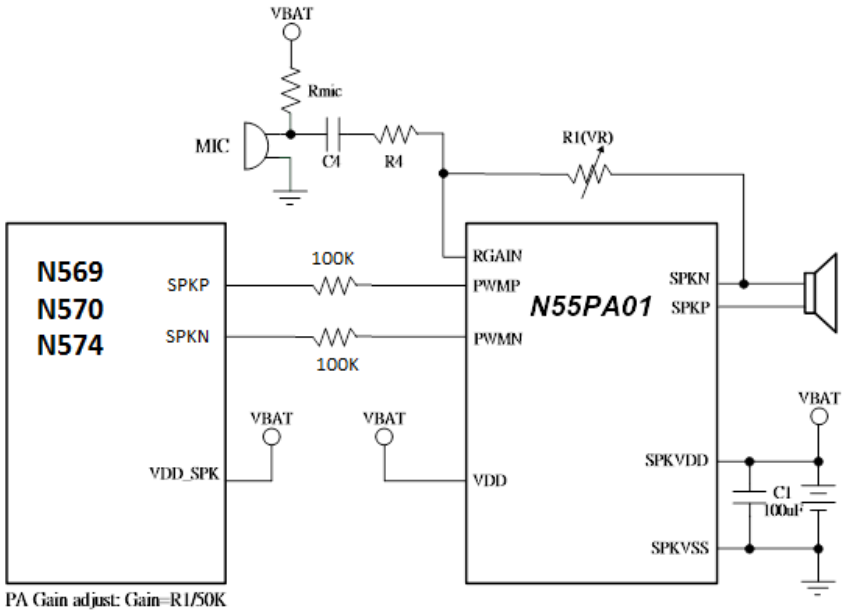
10. Typical Application Circuit

N58x, N56x with N55PA01 Application Circuit



PA Gain adjust: Gain=R1/50K
MIC Gain adjust: Gain=R1/R4
Rmic: 2.2K~4.7K

N569, N57x with N55PA01 Application Circuit



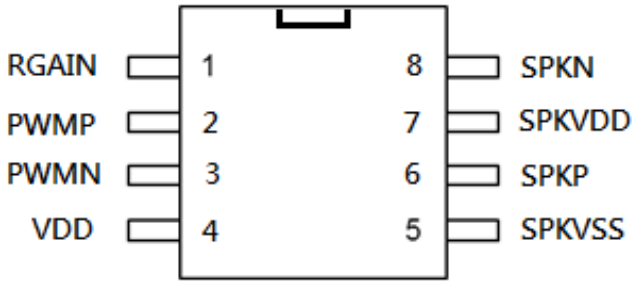
PA Gain adjust: Gain=R1/50K
MIC Gain adjust: Gain=R1/R4
Rmic: 2.2K~4.7K

Note: the 100KΩ between NuVoice SPKP/N and N55PA01 PWMP/N are necessary to reduce DPWM power noise

11. Package Information

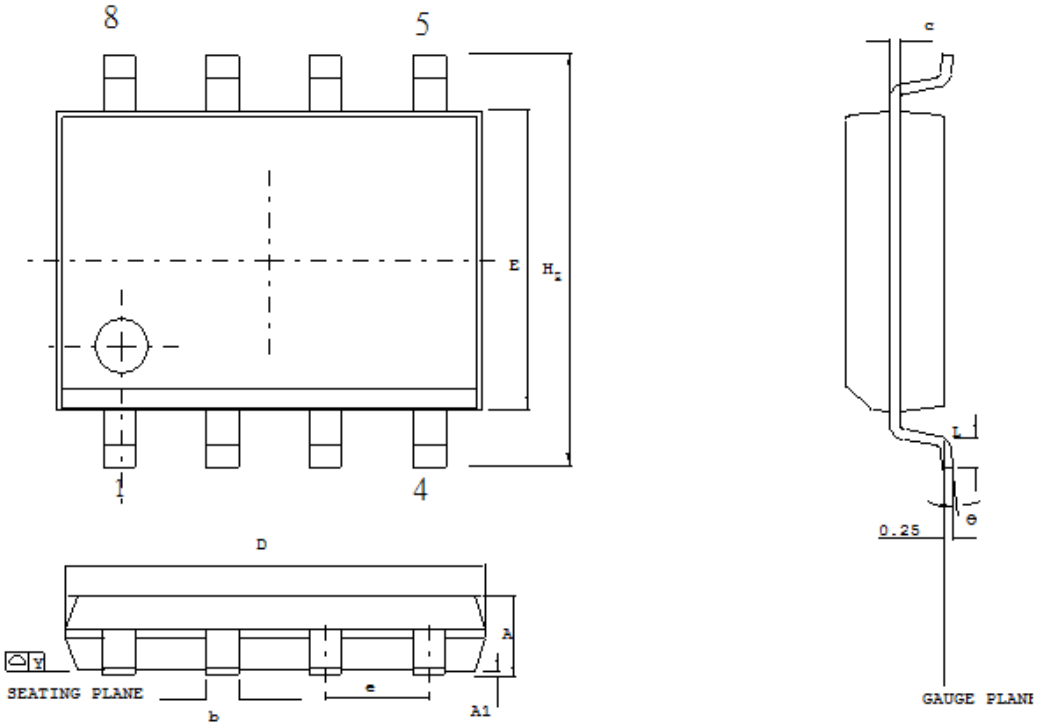
11.1 PIN Assignment

N55PA01, SOP8 (150 mil)



11.2 Package Dimension

SOP8, 150 mil



Control demensions are in milmeters.

SYMBOL	DIMENSION IN MM		DIMENSION IN INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.35	1.75	0.053	0.069
A1	0.1	0.25	0.004	0.01
B	0.33	0.51	0.013	0.02
C	0.19	0.25	0.008	0.01
E	3.8	4	0.15	0.157
D	4.8	5	0.188	0.196
e	1.27 BSC		0.050 BSC	
H_E	5.8	6.2	0.228	0.244
Y	–	0.1	–	0.004
L	0.4	1.27	0.016	0.05
θ	0	10	0	10

12. Ordering Information

Part No.	Shape	Type
N55PA01A	E	Package: SOP8 (150mil)

13. Revision History

Revision	Date	Substantial Changes	Page
1.0	Dec. 2020	Initial Release	All
2.0	Jan. 2021	Update Application Circuit	8
2.1	Mar. 2021	Add NuVoice Application Circuit	8

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