

Product Overview

The NSC6280 is a pre-amplifier for MEMS Microphone. The NSC6280 has integrated low noise bias circuit for MEMS microphone, and high performance analog pre-amplifier deliver the genuine sound quality and support flexible microphone systems. Both of the bias voltage and the analog pre-amplifier gain can be trimmed by the internal fuse banks (OTP), so the NSC6280 can support MEMS transducers with different parameters. It also improves the yield and provide better consistency of sensitivity. The NSC6280 has two output pads for bias voltage with different location, either of which is chosen depending on the location of top plate of MEMS microphone.

Key Features

- Operation voltage: 1.6V~3.6V
- Current Consumption: 120uA typ
- Input equivalent noise: 4uVrms(-108dBV)
- 10%THD (VDD:1.6V-2.2V): 419mVrms (-7.6 dBV)
- 10%THD (VDD:2.3V-3.6V): 703mVrms (-3 dBV)
- Gain(OTP trimming): -1.5dB~11dB with 0.5dB/Step
- Frequency response: 20Hz~20kHz
- Bias Voltage: 6V~15.5V
- Operating temperature: -40°C~85°C
- Package: Chip(Wafer)
- RoHS compliance

Applications

- Portable audio equipment
- MEMS microphone module
- Cellular phone

Block Diagrams

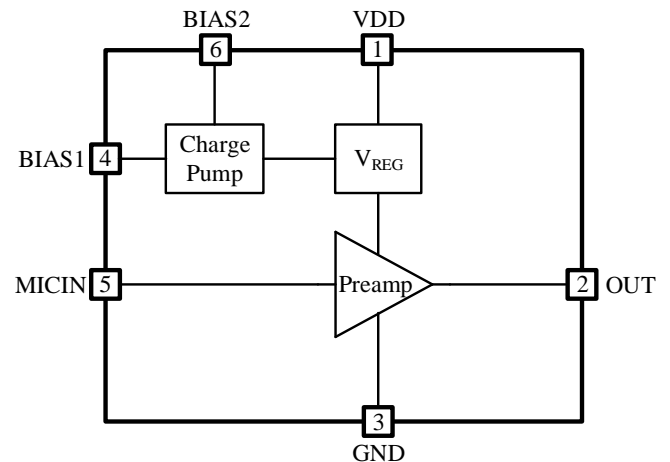


Figure 1. NSC6280 Block Diagram

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1. Pad Configuration and Functions

Chip Size: 0.586mmx0.6mm (Exclude Scribe Line)

Chip Thickness: >200um

Pad Size: 60um x 60um

Pad Thickness: 2.2um

Scribe Line: 60um

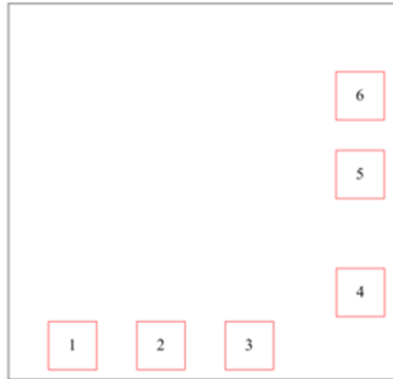


Figure 1.1 NSC6280 Pad Configuration Diagram

Table 1.1 NSC6280 Pad Configuration and Description

Pad NO.	Pad Name	Function	Pad Coordinates (X,Y)[um]	
1	VDD	Power Supply	-89.998	-238.974
2	OUT	Analog Output	21.137	-238.974
3	GND	Ground	148.697	-238.974
4	BIAS1	First Bias Voltage Output	242.270	-158.756
5	MICIN	Microphone Input	242.265	51.716
6	BIAS2	Second Bias Voltage Output	242.260	168.295

Note: The center of the chip is the origin.

2. Absolute Maximum Ratings

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Power Supply Voltage	V _{DD}	-0.3		4.2	V	
Operation Temperature	T _{opr}	-40		85	°C	
Storage Temperature	T _{stg}	-40		125	°C	

Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only. Functional operation of the devices at these or any other conditions greater than those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

3. ESD Ratings

		Ratings	Value	Unit
Electrostatic Discharge	Human Body Model (HBM)	• VDD and OUT	±4.0	kV
	Charged Device Model (CDM)	• VDD and OUT	±250	V

4. Recommended Operating Conditions

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Operating Voltage	V _{DD}	1.6		3.6	V	

5. Specifications

5.1. General Electrical Characteristics

(T_a=25°C, VDD=1.8V, Input Capacitance=1pF, V_{in}=-39.0dBV, f=1kHz, R_L=100kΩ unless otherwise specified)

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Current Consumption	I _{DD}		120		uA	
Input Equivalent Noise Voltage	V _{EQ}		4		uV	A-weighted when Gain=3.5dB
Gain	V _G	-1.5		11.0	dB	OTP Trimming, 0.5dB/Step. Default is 3.5dB
Total Harmonic Distortion	THD+N		0.1	1	%	V _{in} =50mV _{rms} (-26dBV)
Maximum Output Voltage			419 (-7.6)		mV _{rms} dBV	THD<10% VDD:1.6V-2.2V
Maximum Output Voltage			703 (-3)		mV _{rms} dBV	THD<10% VDD:2.3V-3.6V
Low Cut Off Frequency	f _{CL}			20	Hz	
High Cut Off Frequency	f _{CH}	20			kHz	
Power Supply Rejection Ratio	PSRR		-70		dB	1KHz, 0.1V _{pp} SIN on VDD
Bias Voltage	V _{bias}	6		15.5	V	OTP Trimming, 0.3V/Step. Default is 6V
Output DC Voltage	V _{out,dc}		1		V	
Output DC Impedance	R _{out}		160	250	ohm	
Input DC Voltage	V _{in,dc}		600		mV	

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Start Up Time	trbs		10		msec	Bias Voltage 90% rising

6. Application Note

6.1. System Connection

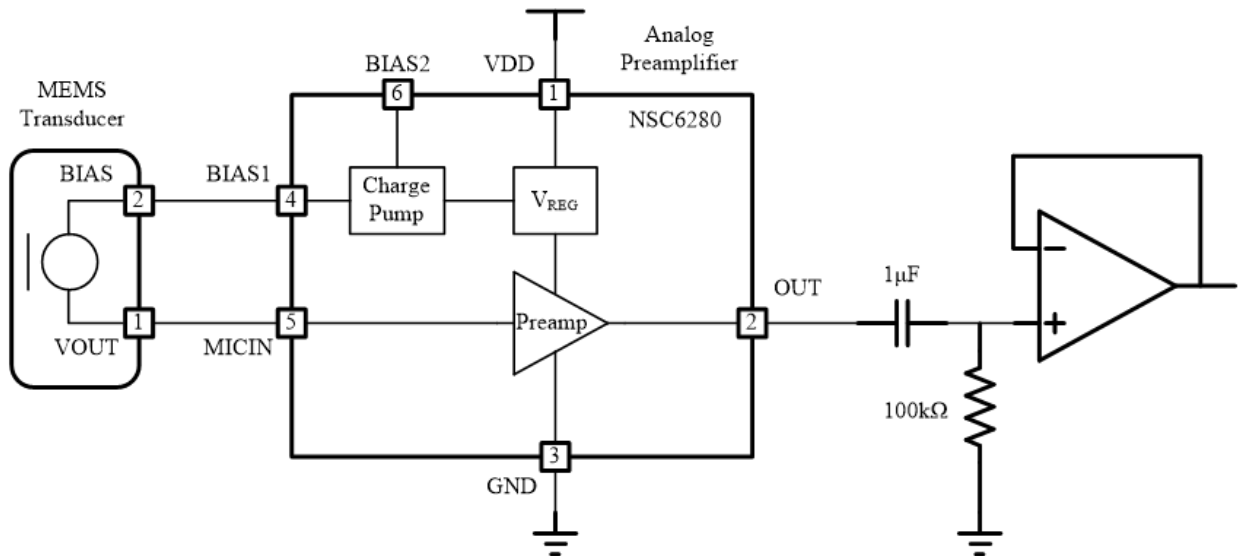


Figure 6.1 System Connection

Note:

Since the DC voltage of MICIN is 0.6V, the voltage actually loaded to the MEMS is about 0.6V lower than the programmed value. For example, when Vbias is programmed to be 12.9V, the actual voltage of the MEMS is 12.3V. Customers need to pay attention to the note.

7. Ordering Information

Part Number	Package	Wafer Size	Minimum Ordering Quantity(MOQ)
NSC6280-0634D	Whole Wafer	8 inches	1pcs wafer

8. Revision History

Revision	Description	Date
1.0	Initial Version.	2021/09/01
1.1	Update the template, pad thickness, ordering information	2024/1/18

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