

## Product Overview

The NSC6272 is a pre-amplifier for MEMS Microphone. The NSC6272 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 NSC6272 can support MEMS transducers with different parameters. It also improves the yield and provide better consistency of sensitivity. The NSC6272 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.

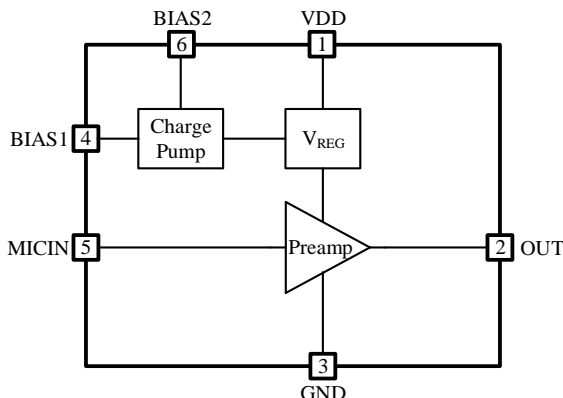
## Key Features

- Operating Voltage 1.6V~3.6V
- Current Consumption 125uA typ.
- Input equivalent noise  $4\mu V_{rms}$  (-108dBV)
- Maximum output Voltage 550mVrms (-5.5dBV) at THD < 10%
- Gain (OTP trimming) -4.0dB ~ 11dB with 0.5dB/Step
- Frequency response 20Hz ~ 20kHz
- Bias Voltage 7.5V~16V
- Operating temperature -40°C ~ 85°C
- Package Chip (Wafer)

## Applications

- Portable Audio equipment
- MEMS Microphone module
- Cellular Phone

## Block Diagram



1	VDD	Power Supply
2	OUT	Output (Analog output)
3	GND	Ground
4	BIAS1	First Bias Voltage Output
5	MICIN	Microphone Input (Analog input)
6	BIAS2	Second Bias Voltage Output

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## 1.0 ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Power Supply Voltage	VDD	-0.3		4.2	V	
Maximum Input Voltage	VIN	-0.4		+0.4	V	
Operating Temperature	Topr	-40		85	°C	
Storage Temperature	Tstg	-40		125	°C	

### ESD Ratings

Electrostatic discharge	HBM		±4		kV	VDD/OUT to GND
	HBM		±3		kV	OUT to VDD
	HBM		±100		V	AIN to GND
	HBM		±50		V	VPUMP to GND
	CDM		±250		V	VDD/OUT/GND

## 2.0 RECOMMENDED OPERATING CONDITIONS (TA=25°C)

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Operating Voltage	VDD	1.6		3.6	V	

## 3.0 ELECTRICAL CHARACTERISTICS

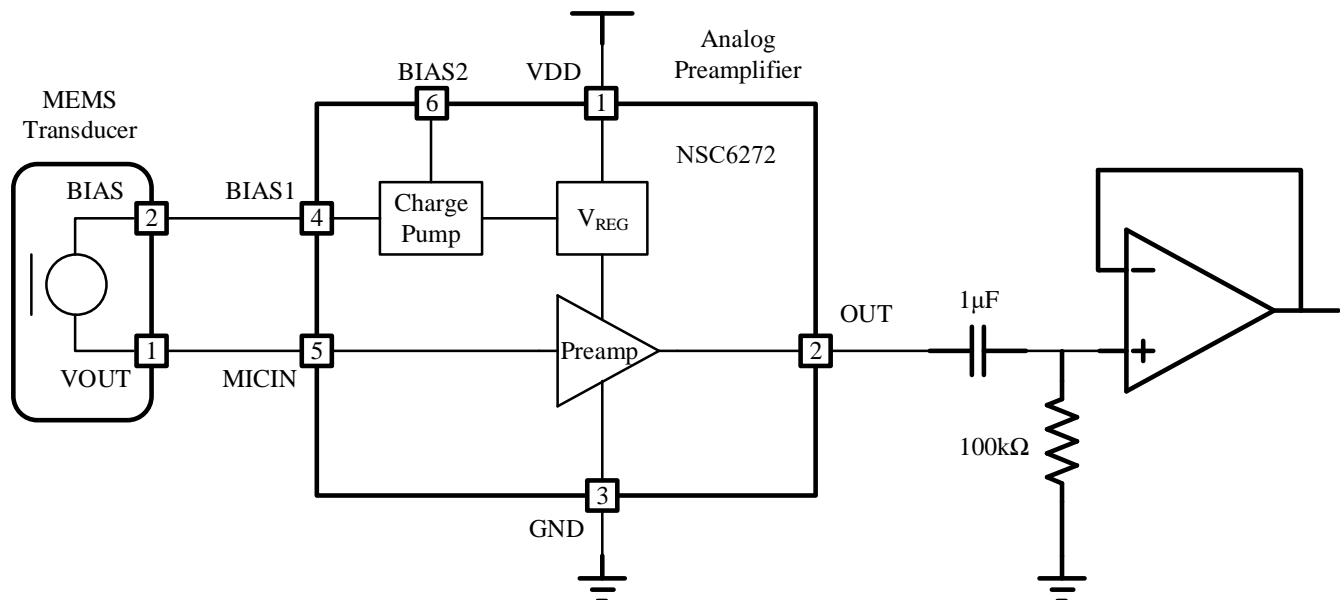
(Ta=25°C, VDD=1.8V, Input Capacitance=1pF, VIN=-39.0dBV, f=1kHz, RL=100kΩ unless otherwise specified)

Parameters	Symbol	Min	Typ	Max	Unit	Comments
Current Consumption	IDD		125	160	μA	
Output Noise Voltage	VNO		6		μV	A-weighted when Gain=3.5dB
ain	VG	-4.0		11.0	dB	OTP Trimming, 0.5dB/Step. Default is 3.5dB
Total Harmonic Distortion	THD+N		0.2	1	%	Vin=50mVrms (-26dBV)
Maximum Output Voltage	VOM		550 (-5.5)		mVrms dBV	THD<10%
Low Cut Off Frequency	fCL			20	Hz	
High Cut Off Frequency	fCH	20			kHz	
Power Supply Rejection Ratio	PSRR		-70		dB	1KHz, 0.1Vpp SIN on VDD
Bias Voltage	Vbias	7.5		16	V	OTP Trimming, 0.3V/Step. Default is 7.5V. Extra step is 16V when fuse<10:6> code is '11101'.

# NSC6272

Output DC Voltage	$V_{out,dc}$		0.75		V	
Output DC Impedance	$R_{out}$		180	250	ohm	$V_{dd}=1.8V, f=1Kz, \text{input connected to MEMS}$
Load resistor	$R_L$	8			Kohm	AC coupled
Load capacitance	$C_L$			100	pf	DC coupled
Start Up Time	trbs		10		msec	Bias Voltage 90% rising

## 4.0 APPLICATION CIRCUIT



**NOTE:** Since the DC voltage of MICIN is 0.3V, the voltage actually loaded to the MEMS is about 0.4V lower than the programmed value. For example, when  $V_{bias}$  is programmed to be 12.4V, the actual voltage of the MEMS is 12.1V. Customers need to pay attention to the note.

## 5.0 CHIP OUTLINE

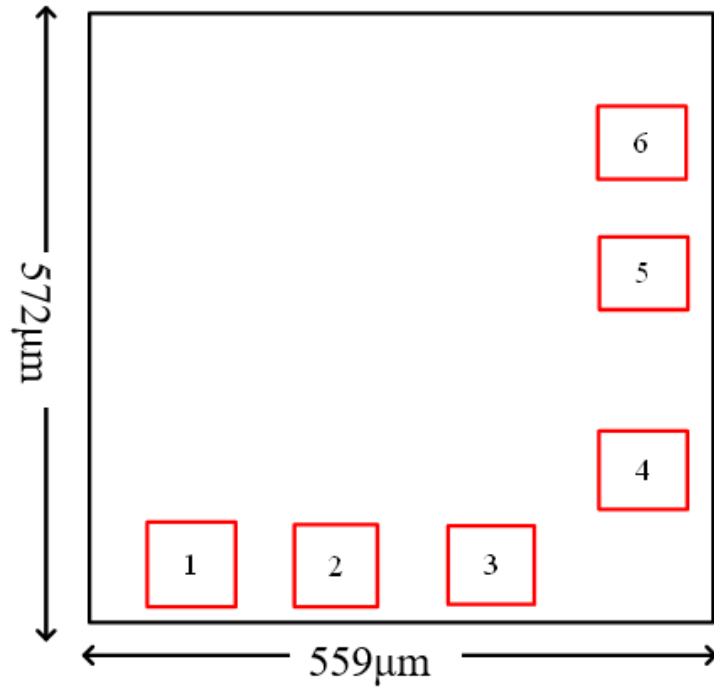
Chip Size: 0.559mm x 0.572mm (Exclude Scribe Line)

Chip Thickness: >200µm

Pad Size: 60µm x 60µm

Pad Thickness: 0.9µm

Scribe Line: 60µm



<i>PIN NO.</i>	<i>SYMBOL</i>	<i>FUNCTION</i>	<i>X</i>	<i>UNIT</i>	<i>Y</i>	<i>UNIT</i>
1	VDD	Power Supply	176.00	µm	60.00	µm
2	OUT	Analog output	287.00	µm	60.00	µm
3	GND	Ground	414.00	µm	60.00	µm
4	BIAS1	First Bias Voltage Output	508.00	µm	141.00	µm
5	MICIN	Microphone Input	508.00	µm	351.00	µm
6	BIAS2	Second Bias Voltage Output	508.00	µm	468.00	µm

## 6.0 ORDER INFORMATION

Please refer to “NSC6272\_Part\_Selection\_Guide.xlsx”.

## 7.0 REVISION HISTORY

Revision	Description	Date
1.0	Initial Version	2021/12/8