

## Pre-Amplifier for MEMS Microphone

### ■GENERAL DESCRIPTION

The **NJU72084** is a pre-amplifier for MEMS microphone. The **NJU72084** 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.

### ■PACKAGE OUTLINE



CHIP

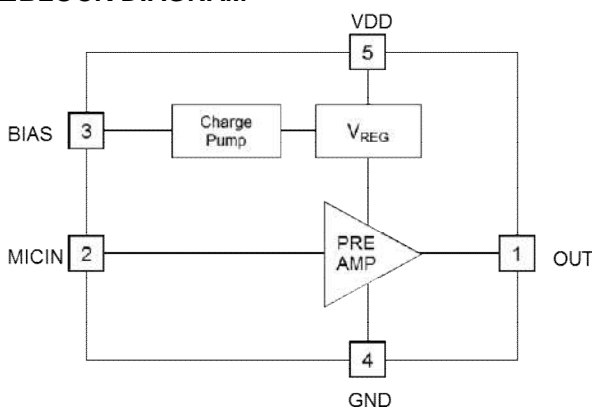
### ■APPLICATIONS

- Portable Audio equipment
- MEMS Microphone module
- Cellular Phone

### ■FEATURES

- Operating Voltage 1.5V to 3.60V
- Current Consumption 80 $\mu$ A typ.
- Input equivalent noise 3 $\mu$ Vrms (-110dBV)
- Maximum output Voltage 281mVrms (-11dBV) at THD < 5%
- Gain -3dB
- Frequency response 20Hz to 20kHz
- Bias Voltage +12.5V
- Operating temperature -40°C to 85°C
- Package Chip (Wafer)

### ■BLOCK DIAGRAM



1	OUT	Output (Analog output)
2	MICIN	Microphone input (Analog input)
3	BIAS	Bias Voltage Output
4	GND	Ground
5	VDD	Power Supply

## ■ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Power Supply Voltage	V <sub>DD</sub>	5	V
Operating temperature	T <sub>opr</sub>	-40 to 85	°C
Storage temperature	T <sub>stg</sub>	-40 to 125	°C
Maximum input Voltage	V <sub>IM</sub>	±0.4	V

### CAUTION

ESD Tolerance: Human Body Model 2000V, ( MICIN and BIAS terminals : 500V )

## ■RECOMMENDED OPERATING CONDITIONS (Ta =25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V <sub>DD</sub>		1.5	1.8	3.6	V

## ■ELECTRICAL CHARACTERISTICS

(Ta=25°C, V<sub>DD</sub> =1.8V, Input Capacitance=1pF, Vin=-39.0dBV, f=1kHz, R<sub>L</sub>=100kΩ unless otherwise specified)

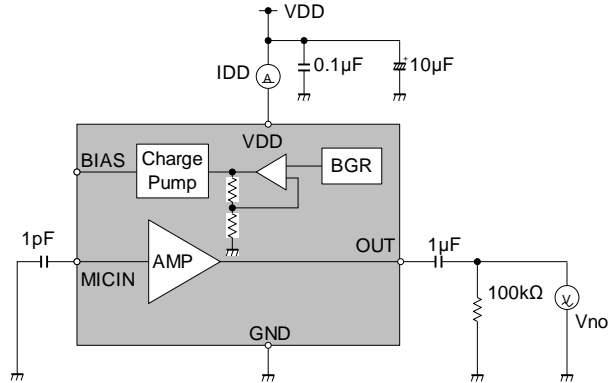
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Consumption	I <sub>DD</sub>		50	80	120	μA
Output Noise Voltage	V <sub>NO</sub>	A-weighted	-	3 (-110)	-	μVrms (dBV)
Gain	V <sub>G</sub>		-4.0	-3.0	-2.0	dB
Total Harmonic Distortion	THD+N	Vin=50mVrms(=-26dBV), filter=400Hz to 30kHz	-	0.2	1	%
Maximum Output Voltage	V <sub>OM</sub>	THD<5%, filter=400Hz to30kHz	150 (-16.5)	281 (-11)	-	mVrms (dBV)
Cut Off Frequency	f <sub>CL</sub>		-	-	20	Hz
Cut Off Frequency	f <sub>CH</sub>		20	-	-	kHz
Power Supply Rejection Ratio	PSRR	f=217Hz, 0.1Vpp Square	-	-56	-	dB
Bias Voltage	V <sub>bias</sub>		11.8	12.5	13.2	V
Output DC Impedance	Z <sub>o</sub>	R <sub>L</sub> =2.2kΩ	-	150	300	Ω
Start Up Time	tr <sub>bs</sub>	Bias Voltage 90% rising	-	4	10	msec

## ■ TERMINAL DESCRIPTION

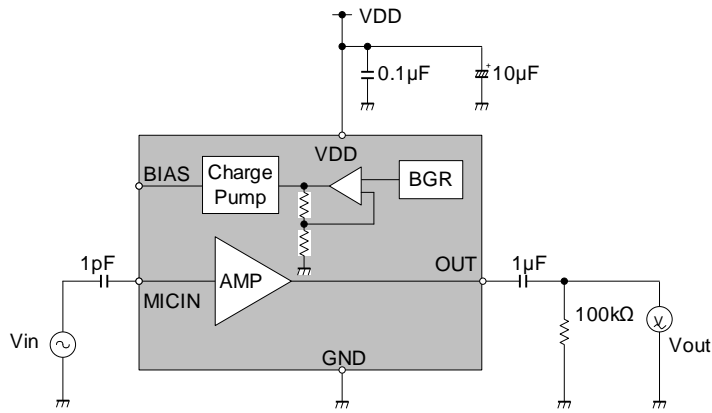
PIN NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE
5 4	VDD GND	Power Supply Ground		VDD 0V
2 1	MICIN OUT	Microphone input (Analog input)  Output (Analog output)		0V 0.9V
3	BIAS	Bias Voltage Output		12.5V

## MEASUREMENT CIRCUIT

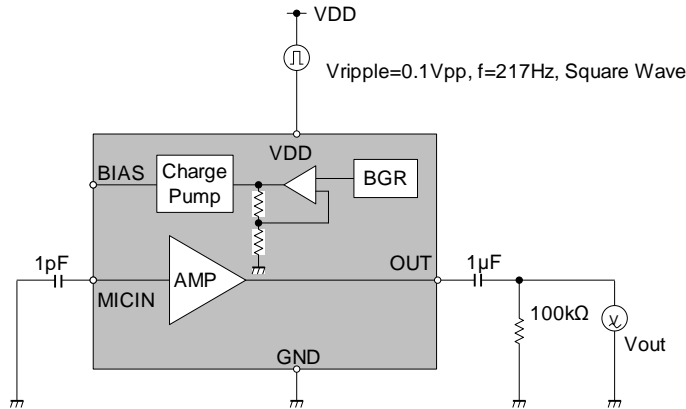
[IDD, V<sub>No</sub>]



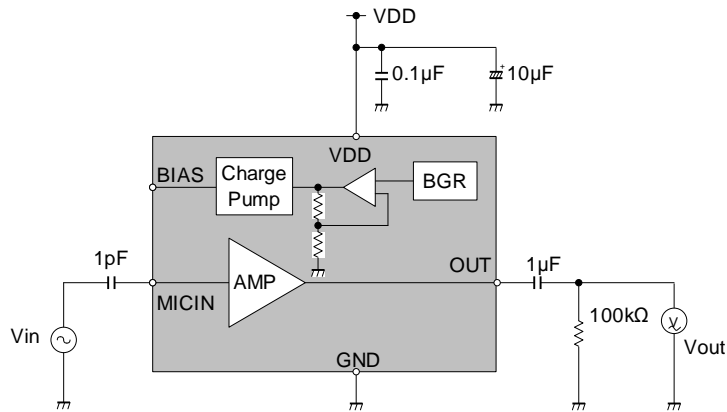
[V<sub>G</sub>, THD+N]



[PSRR]

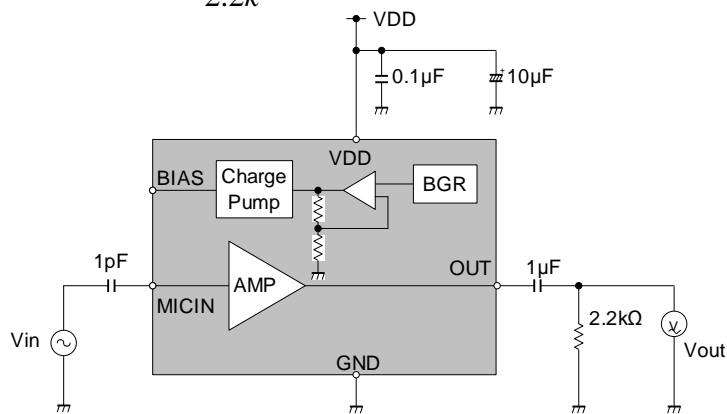


[ $V_{OM}$ ,  $f_{CL}$ ,  $f_{CH}$ ]

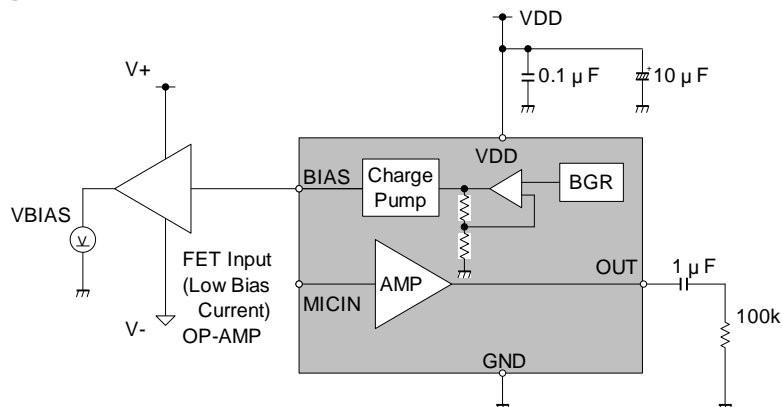


[ $Z_o$ ]

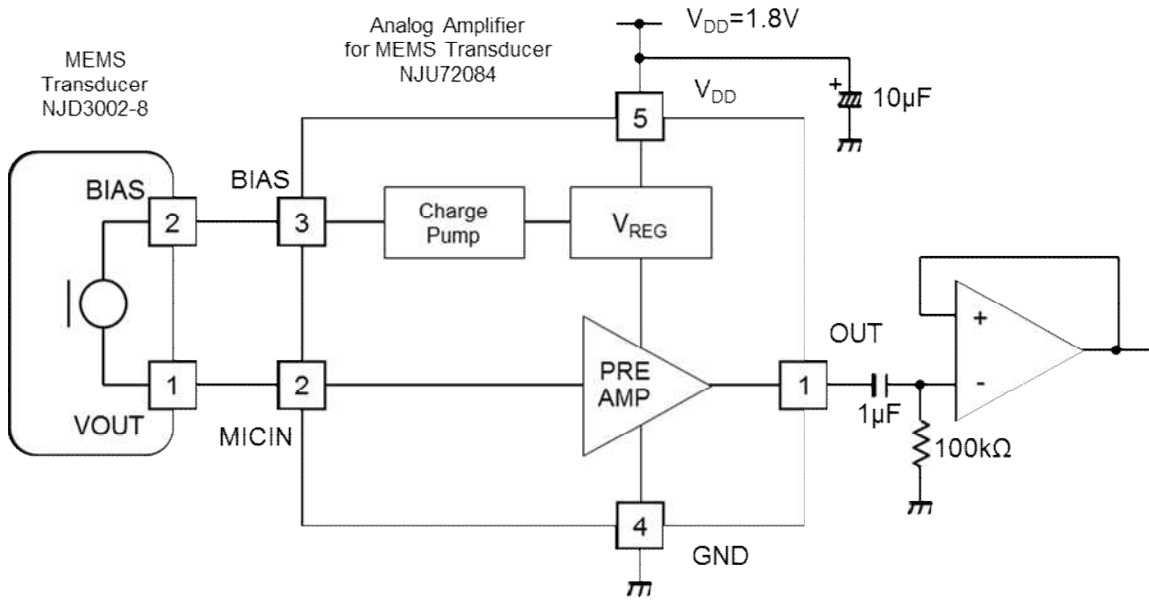
$$Z_o = 100k \times \frac{1 - \frac{V_G - \text{Measurement}}{20}}{\frac{V_G - \text{Measurement}}{20} - \frac{100k}{2.2k}}$$



[ $V_{bias}$ ]



## APPLICATION CIRCUIT

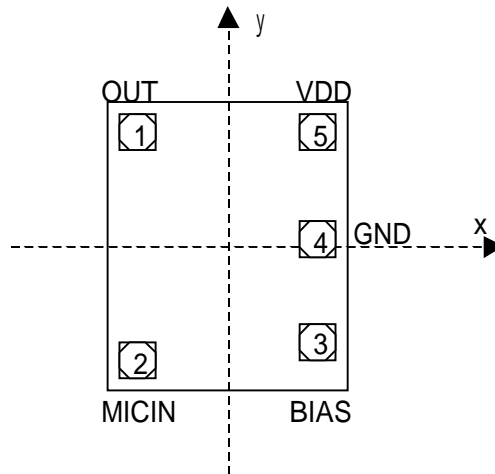


■CHIP OUTLINE

◆CHIP SIZE :            0.595mm x 0.780 mm

◆CHIP THICKNESS :       200 μm

◆PAD DIMENSION :



PIN NO.	SYMBOL	FUNCTION	X	UNIT	Y	UNIT
1	OUT	Output	-185	μm	+277.5	μm
2	MICIN	Microphone input	-185	μm	-277.5	μm
3	BIAS	Bias Voltage Output	+184.9	μm	-150.25	μm
4	GND	Ground	+184.9	μm	+27.8	μm
5	VDD	Power Supply	+184.9	μm	+277.5	μm

[CAUTION]  
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