

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

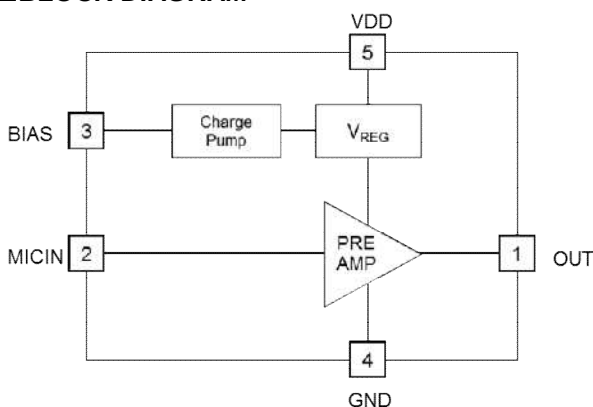
■APPLICATIONS

- Portable Audio equipment
- MEMS Microphone module
- Cellular Phone

■FEATURES

- Operating Voltage 1.5V to 3.60V
- Current Consumption 80 μ A typ.
- Input equivalent noise 3 μ 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 _{DD}	5	V
Operating temperature	T _{opr}	-40 to 85	°C
Storage temperature	T _{stg}	-40 to 125	°C
Maximum input Voltage	V _{IM}	±0.4	V

CAUTION

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

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

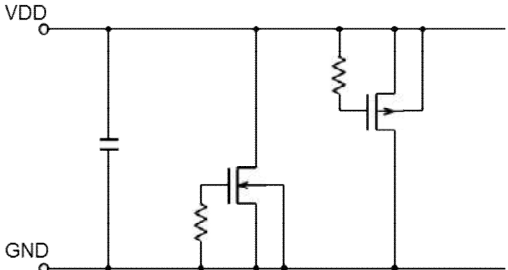
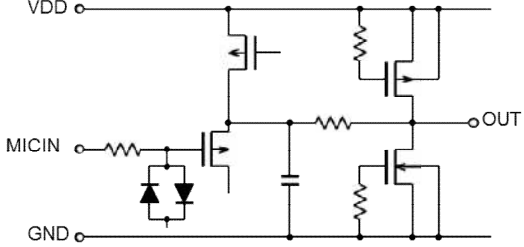
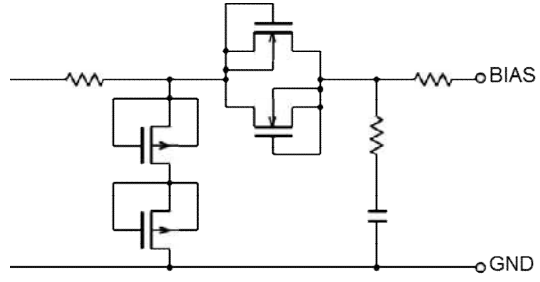
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V _{DD}		1.5	1.8	3.6	V

■ELECTRICAL CHARACTERISTICS

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

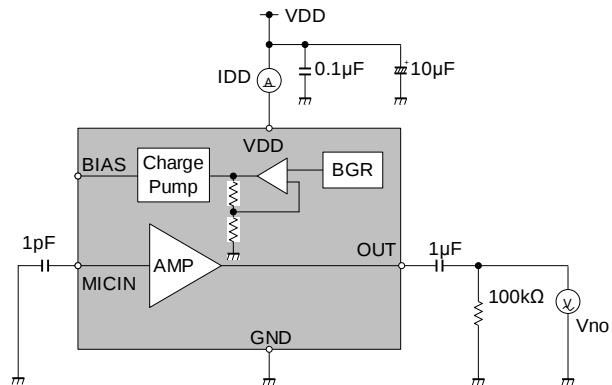
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Consumption	I _{DD}		50	80	120	μA
Output Noise Voltage	V _{NO}	A-weighted	-	3 (-110)	-	μVrms (dBV)
Gain	V _G		-4.0	-3.0	-2.0	dB
Total Harmonic Distortion	THD+N	Vin=50mVrms(=-26dBV), filter=400Hz to 30kHz	-	0.2	1	%
Maximum Output Voltage	V _{OM}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

■ TERMINAL DESCRIPTION

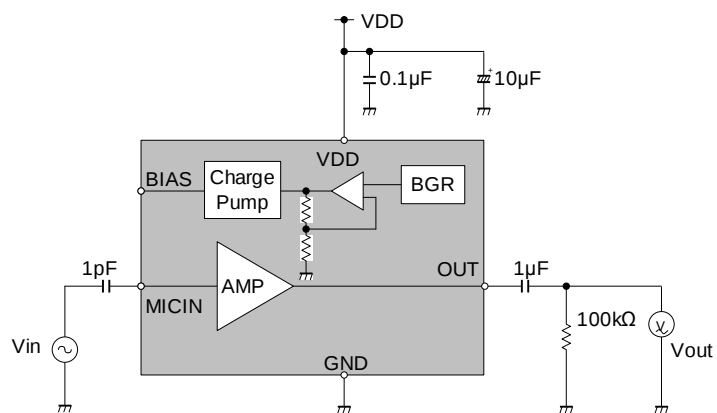
PIN NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE
5 4	VDD GND	Power Supply Ground		VDD 0V
2 1	MICIN OUT	Microphone input (Analog input) Output (Analog output)		0V 0.9V
3	BIAS	Bias Voltage Output		12.5V

■ MEASUREMENT CIRCUIT

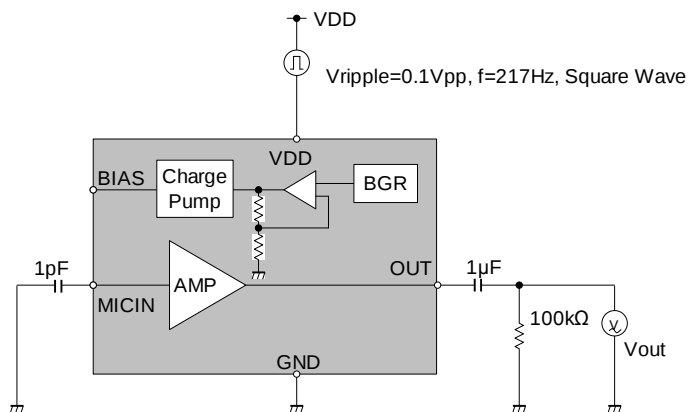
[I_{DD} , V_{NO}]



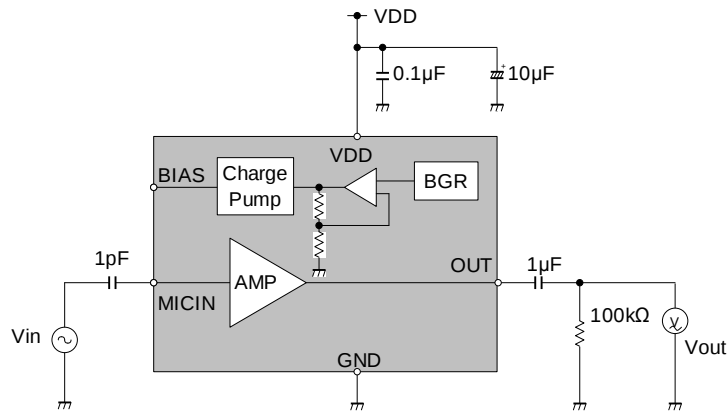
[V_G , THD+N]



[PSRR]

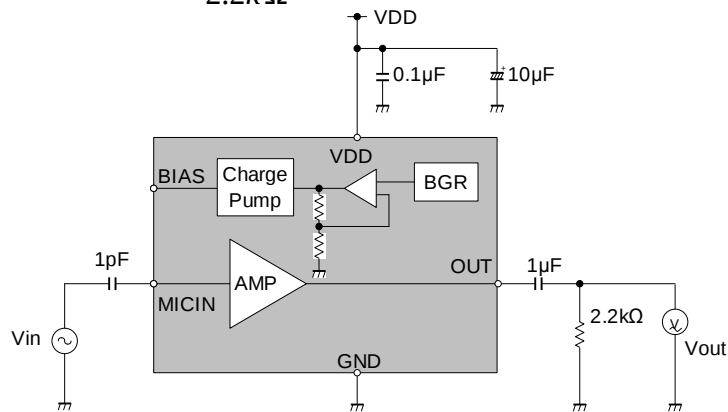


[V_{OM}, f_{CL}, f_{CH}]

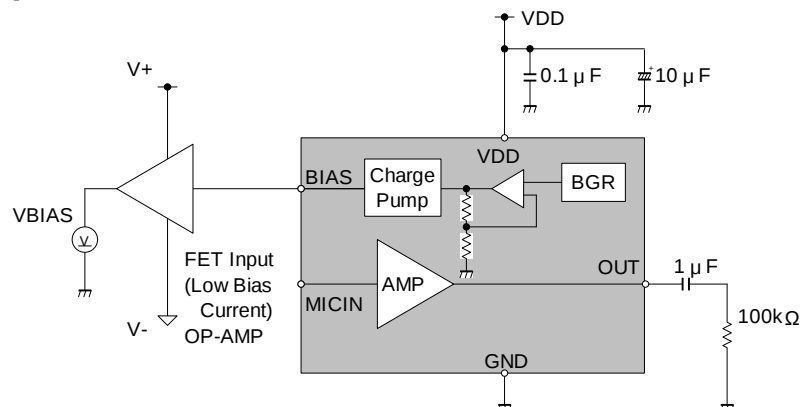


[Z_o]

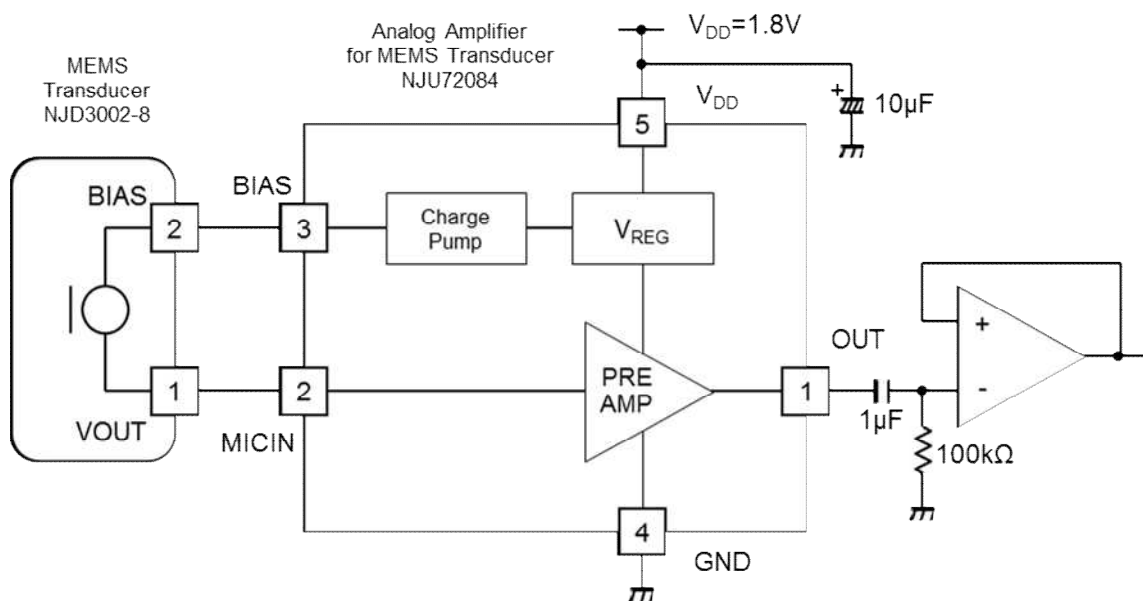
$$Z_o = 100k\Omega \times \frac{1 - 10 \frac{V_G - \text{Measurement}}{20}}{10 \frac{V_G - \text{Measurement}}{20} - \frac{100k\Omega}{2.2k\Omega}}$$



[V_{bias}]



■ APPLICATION CIRCUIT

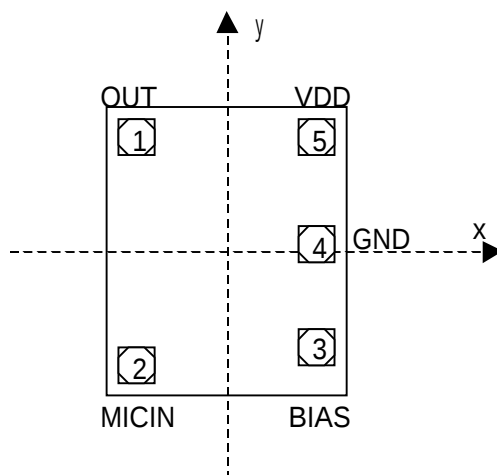


■CHIP OUTLINE

◆CHIP SIZE : 0.595mm x 0.780 mm

◆CHIP THICKNESS : 200 μm

◆PAD DIMENSION :



Top view

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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