



## ULV7084

Preliminary

CMOS IC

### PRE-AMPLIFIER FOR MEMS MICROPHONE

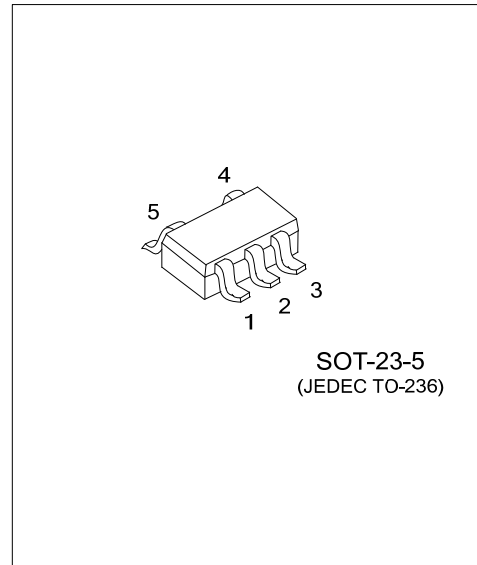
#### DESCRIPTION

The UTC **ULV7084** is a pre-amplifier for MEMS microphone.

The UTC **ULV7084** 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.

#### FEATURES

- \* Operating voltage: 1.5V ~ 3.60V
- \* Current consumption: 80µA typ.
- \* Bias Voltage: +12.5V
- \* Input equivalent noise: 3µVrms (-110dBV)
- \* Frequency response: 20Hz~20kHz
- \* Maximum output Voltage: 281mVrms (-11dBV) at THD < 5%
- \* Gain: -3dB
- \* Operating temperature: -40°C~85°C

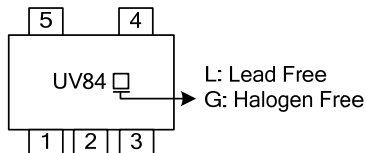


#### ORDERING INFORMATION

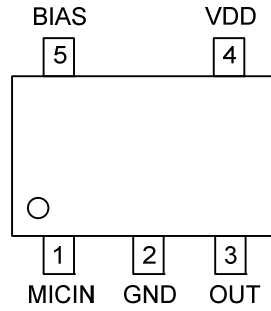
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV7084L-AE5-R	ULV7084G-AE5-R	SOT-23-5	Tape Reel

<p>ULV7084G-AE5-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AE5: SOT-23-5</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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#### MARKING



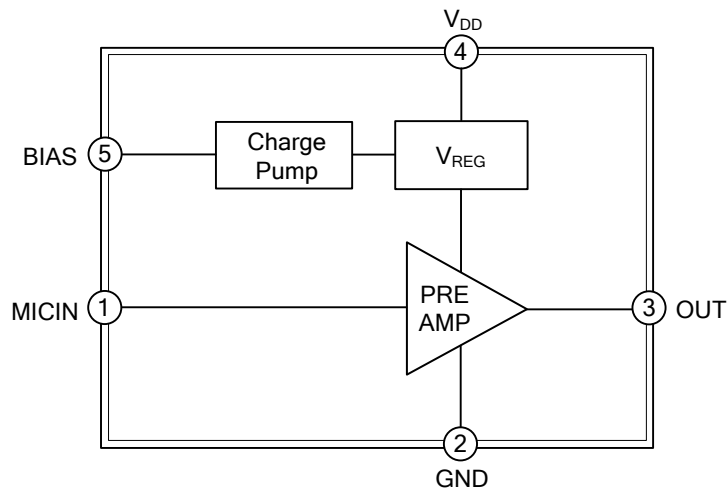
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	MICIN	Microphone input (Analog input)
2	GND	Ground
3	OUT	Output (Analog output)
4	V <sub>DD</sub>	Power Supply
5	BIAS	Bias Voltage Output

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	$V_{DD}$	5	V
Maximum Input Voltage	$V_{IM}$	$\pm 0.4$	V
Operating Temperature	$T_{OPR}$	-40 ~ +85	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-40 ~ +125	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{DD}$		1.5	1.8	3.6	V

■ ELECTRICAL CHARACTERISTICS

( $V_{DD}=1.8\text{V}$ , Input Capacitance=1pF,  $V_{IN}=-39.0\text{dBV}$ ,  $f=1\text{kHz}$ ,  $R_L=100\text{k}\Omega$ ,  $T_A=25^\circ\text{C}$ , unless otherwise specified)

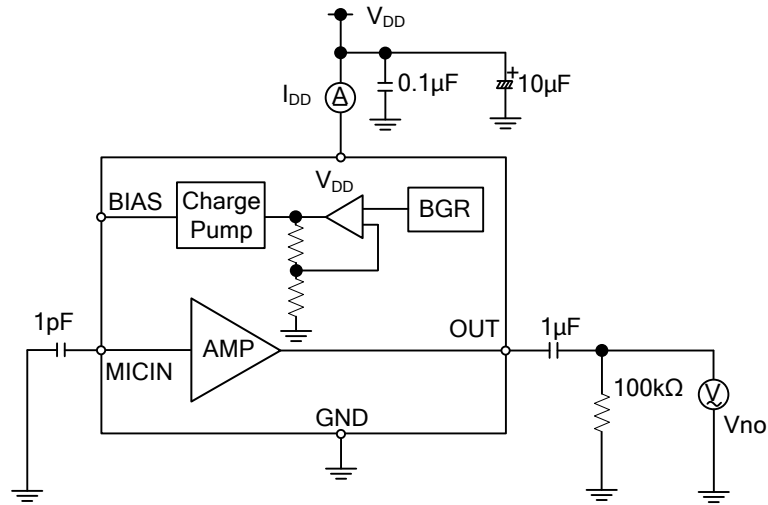
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Current Consumption	$I_{DD}$		50	80	120	$\mu\text{A}$
Output Noise Voltage	$V_{NO}$	A-weighted		3 (-110)		$\mu\text{Vrms}$ (dBV)
Gain	$V_G$			-0.2		dB
Total Harmonic Distortion	THD+N	$V_{in}=50\text{mVrms}$ (=-26dBV), filter=400Hz~30kHz		0.2	1	%
Maximum Output Voltage	$V_{OM}$	THD<5%, filter=400Hz~30kHz	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	$f=217\text{Hz}$ , 0.1Vpp Square		-56		dB
Bias Voltage	$V_{bias}$		11.8	12.5	13.2	V
Output DC Impedance	$Z_o$	$R_L=2.2\text{k}\Omega$		150	300	$\Omega$
Start Up Time	trbs	Bias Voltage 90% Rising		4	10	msec

■ TERMINAL DESCRIPTION

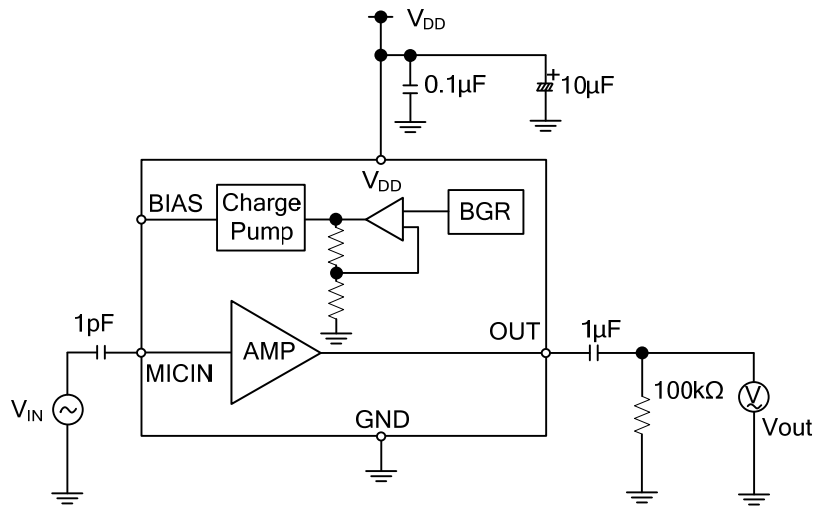
PIN NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE
1	MICIN	Microphone input (Analog input)		0V
3	OUT	Output (Analog output)		0.9V
2	GND	Ground		0V
4	V <sub>DD</sub>	Power Supply		V <sub>DD</sub>
5	BIAS	Bias Voltage Output		12.5V

■ TEST CIRCUIT

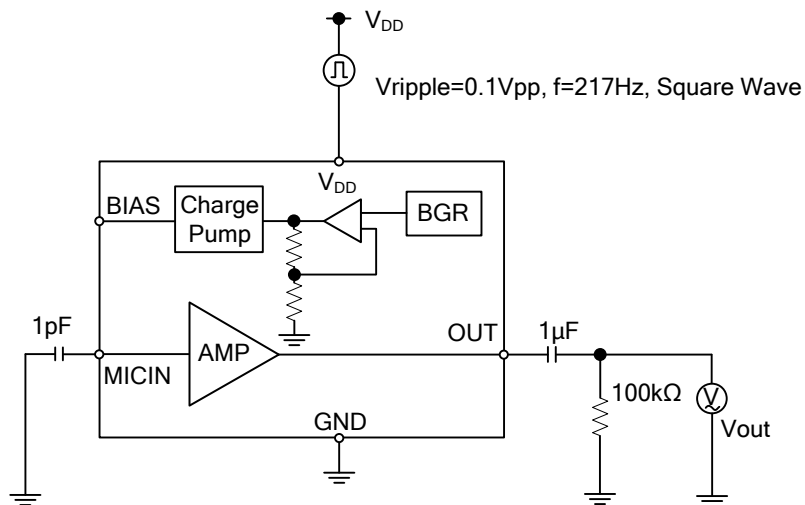
[ $I_{DD}$ ,  $V_{NO}$ ]



[ $V_G$ , THD+N]

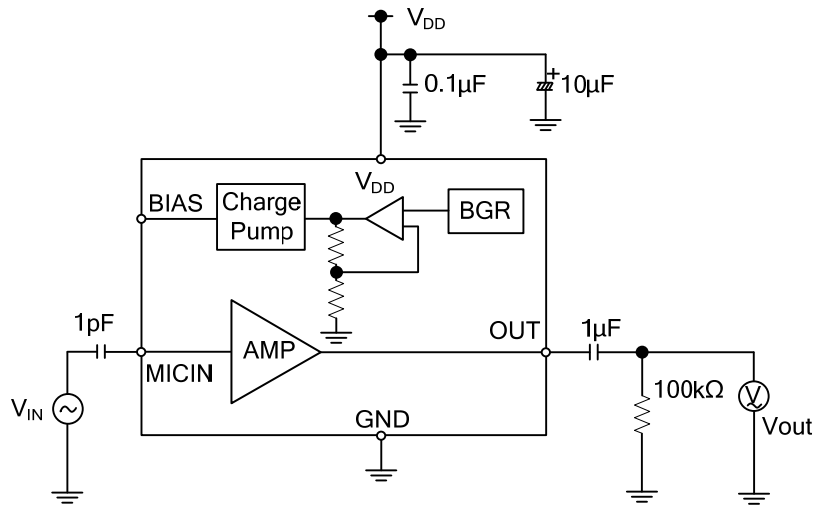


[PSRR]



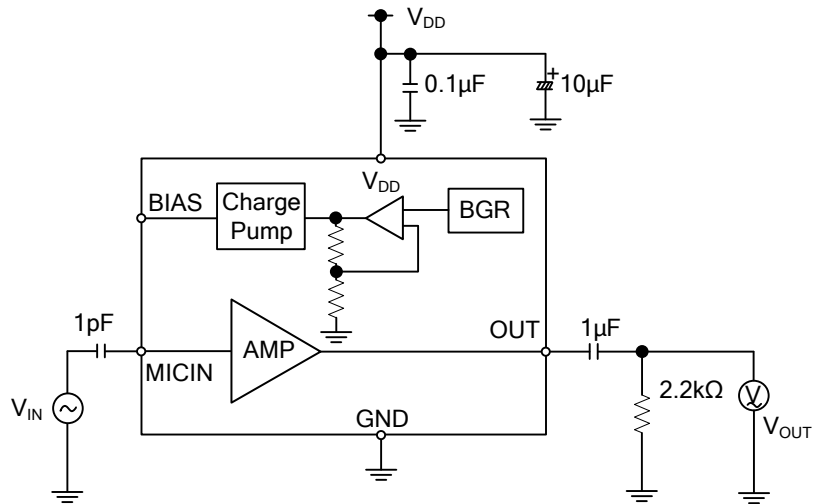
■ TEST CIRCUIT (Cont.)

[V<sub>OM</sub>, f<sub>CL</sub>, f<sub>CH</sub>]

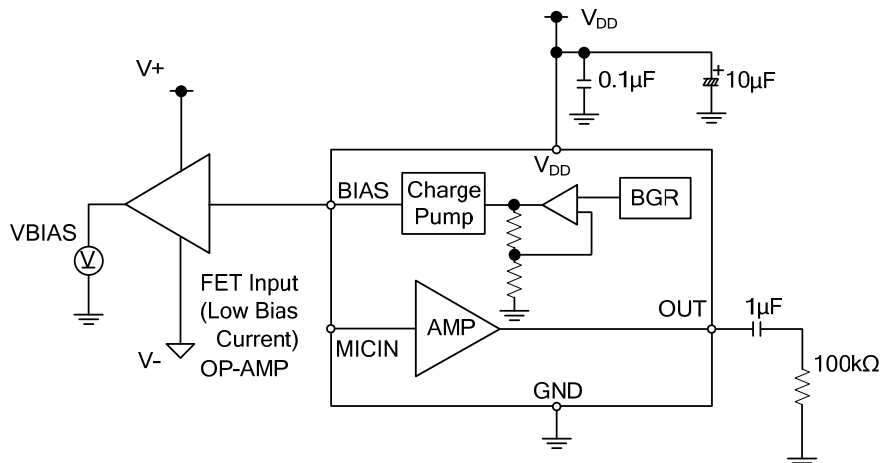


[Z<sub>O</sub>]

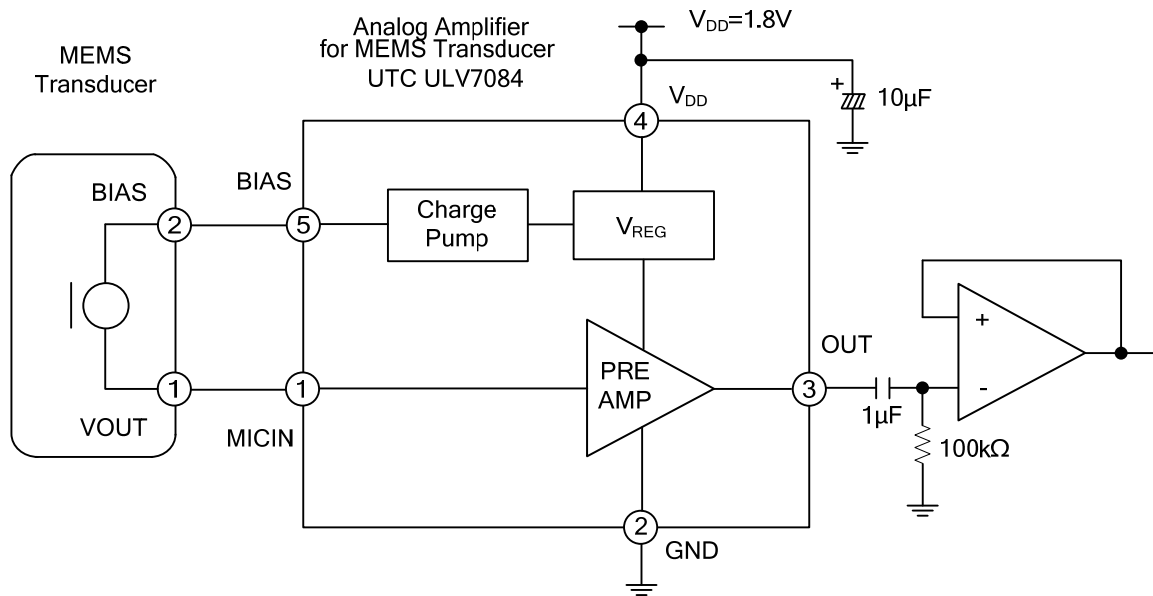
$$Z_O = 100k\Omega \times \frac{V_G\text{-Measurement} \cdot \frac{1-10}{20}}{V_G\text{-Measurement} \cdot \frac{100k\Omega}{2.2k\Omega}}$$



[V<sub>bias</sub>]



■ TYPICAL APPLICATION CIRCUIT



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