

AAP200X

ECM Microphone Pre-Amplifier

PRELIMINARY DATA

DESCRIPTION

The AAP200C is part of AAI's new family of specialty products for Portable Electronics applications, in this case aimed at two terminal ECMs requiring integrated pre-amplifiers. The AAP200X ECM pre-amplifiers offer ultra low noise, require low current and feature ultra low input capacitance.

The AAP200X family will be offered in a chip scale SMD package. The package size is a tiny 630 μ m x 530 μ m, and its height is 350 μ m including solder bumps.

The AAP200X is offered in a chip scale SMD package with a size and aspect ratio (630 μ m x 530 μ m) that is optimum for the smallest (2mm dia.) microphones. The lead free solder pads are nominally 110 μ m dia. The AAP200X is supplied in tape and reel packaging.

The AAP200X family has multiple operating voltage and gain options available, where the 'X' suffix designates the gain value. The following options available are:

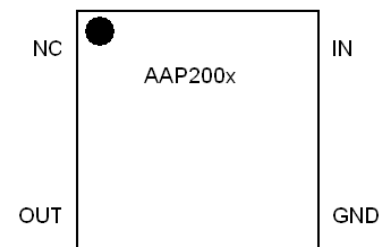
- AAP200A: Gain = 16dB $V_{op} = 1.25V$
- AAP200B: Gain = 19dB $V_{op} = 1.25V$
- AAP200C: Gain = 16dB $V_{op} = 1.33V$
- AAP200D: Gain = 19dB $V_{op} = 1.33V$



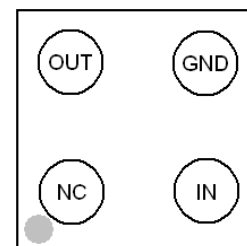
FEATURES

- Multiple gain options:
 - 16dB
 - 19dB
- Multiple output voltage options
 - 1.25V
 - 1.33V
- Low quiescent current, 200 μ A typical ($V_{DD}=1.8V$, $R_L=2.2k\Omega$)
- Low noise performance
- Low input capacitance, 0.35uA typical
- < 0.5% THD typical for output swing = 250mV peak to peak.
- Small die size: 630 μ m x 530 μ m
- Suitable for small microphones down to 2mm diameter

PIN CONFIGURATION: 4-Lead Micro SMD

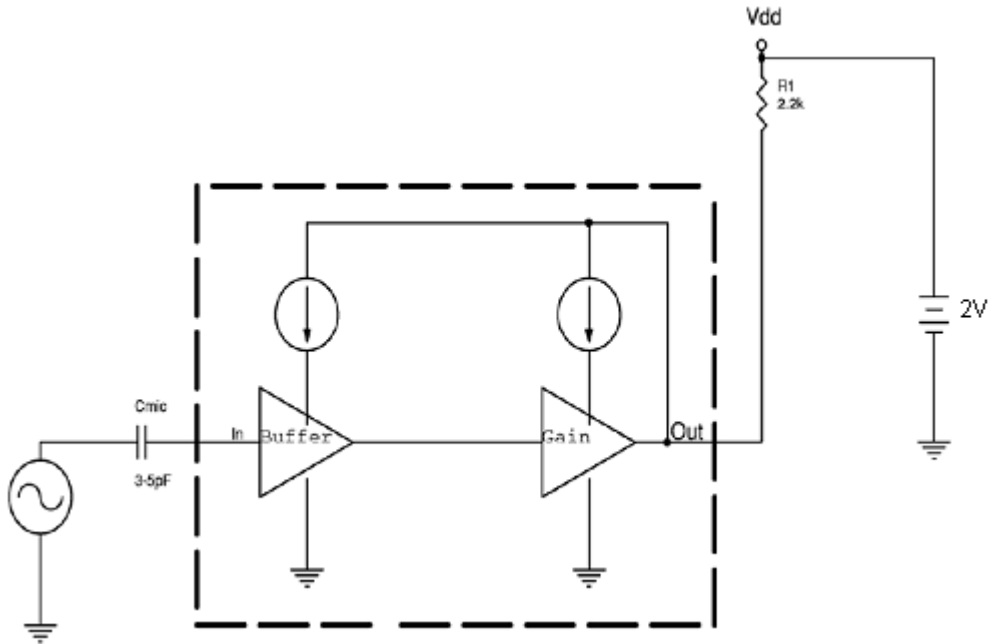


TOP VIEW

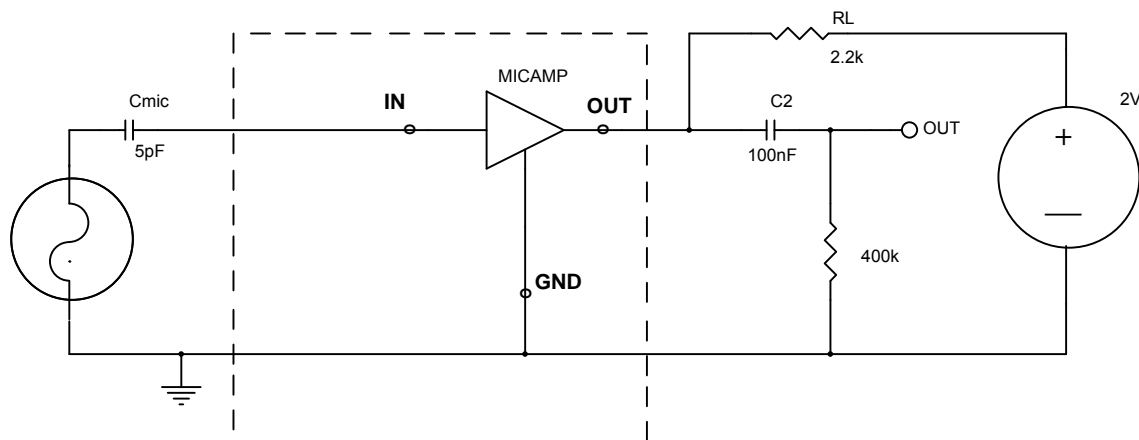


BOTTOM VIEW

Functional Block Diagram



Typical Test Conditions



MAXIMUM RATINGS

PARAMETER	SYMBOL	PARAMETERS		UNITS	CONDITIONS
		MIN.	MAX.		
Applied Voltage (all pins)		-0.5	2	V	Max voltage between pin and GND
Supply Voltage	VDD	-	$(I_{DD_{MAX}} * R_L) + V_{op}$	V	
Supply Current	IDD		2	mA	
ESD	$V_{esd,out}$	2500		V	OUT terminal
	V_{esd}	2000			Other terminals
Operating Ambient Temp		-40	85	°C	
Storage Temp Range		-40	100	°C	
Performance Operating Temp Range		-5	55	°C	

ELECTRICAL CHARACTERISTICS

Unless otherwise stated: T=25°C, VDD=1.8V, V_{in} =-44dBVrms, R_L =2.2kΩ, F=1kHz, C_{mic} =5pF

PARAMETER	SYMBOL	PARAMETERS			UNITS	CONDITIONS
		MIN	TYP	MAX		
OPERATING SUPPLY						
Quiescent Output (option A & B)	V_{op}	1.2	1.25	1.3	V	
Quiescent Output (option C & D)	V_{op}	1.3	1.33	1.4	V	
Supply Current (option A & B)	IDD		250		μA	
Supply Current (option C & D)	IDD		200		μA	
PSRR			60		dB	
AC CHARACTERISTICS						
Transfer Function (option A & C)	TF	16	16.5	17	dB	Source impedance = 500Ω
Transfer Function (option B & D)	TF	18.5	19.5	20.5	dB	Source impedance = 500Ω
Gain Variation over Temp	ΔAv			0.1	dB	-5°C < T < 55°C
Lower 3dB Frequency	f_{LOW}		20		Hz	$C_c = 82nF$, TF = 17dB
Upper 3dB Frequency	f_{HIGH}	20	100		kHz	TF = 16dB
Overload Margin, input	V_{inmax}			40	mVpp	1% distortion, TF=19dB
Overload Margin, output	V_{outmax}			400	mVpp	1% distortion, TF=19dB
Input Referred Noise	e_n		2.6		μV RMS	TF=19dB; C_{mic} shorted, A-weighted values
Input Referred Noise	e_n		3.0		μV RMS	TF=16dB; C_{mic} shorted, A-weighted values

PARAMETER	SYMBOL	PARAMETERS			UNITS	CONDITIONS
		MIN	TYP	MAX		
Total Harmonic Distortion	THD		0.3		%	
Input Capacitance	C _{IN}		0.3		pF	
Input Impedance	Z _{IN}	10			GΩ	
Output Impedance	Z _{OUT}			50	Ω	

PIN DESCRIPTION

PIN	NAME	DESCRIPTION
1	NC	Not connected
2	OUT	Output. Also used for 'phantom' power supply input.
3	GND	Ground
4	IN	Input

APPLICATION

VDD Supply Voltage

The AAP200x is designed to use the output pin as the power supply input. This is referred to as the 'phantom' power supply input to the OUT pin. A load resistor, R_L, must be used in series with the VDD supply. Refer to the table below for recommended R_L values that correspond to various supply voltage ranges.

PARAMETER	SYMBOL	VOLTAGE RANGE			UNITS	RECOMMENDED R _L	NOTES
		MIN	TYP	MAX			
Power Supply	VDD	1.5	1.6	2	V	R _L =250Ω	A & B versions only
		1.8	2	5	V	R _L =3.3kΩ	Applies to all versions
		1.6	1.8	3.6	V	R _L =2.2kΩ	
		3.5	5	10	V	R _L =10kΩ	

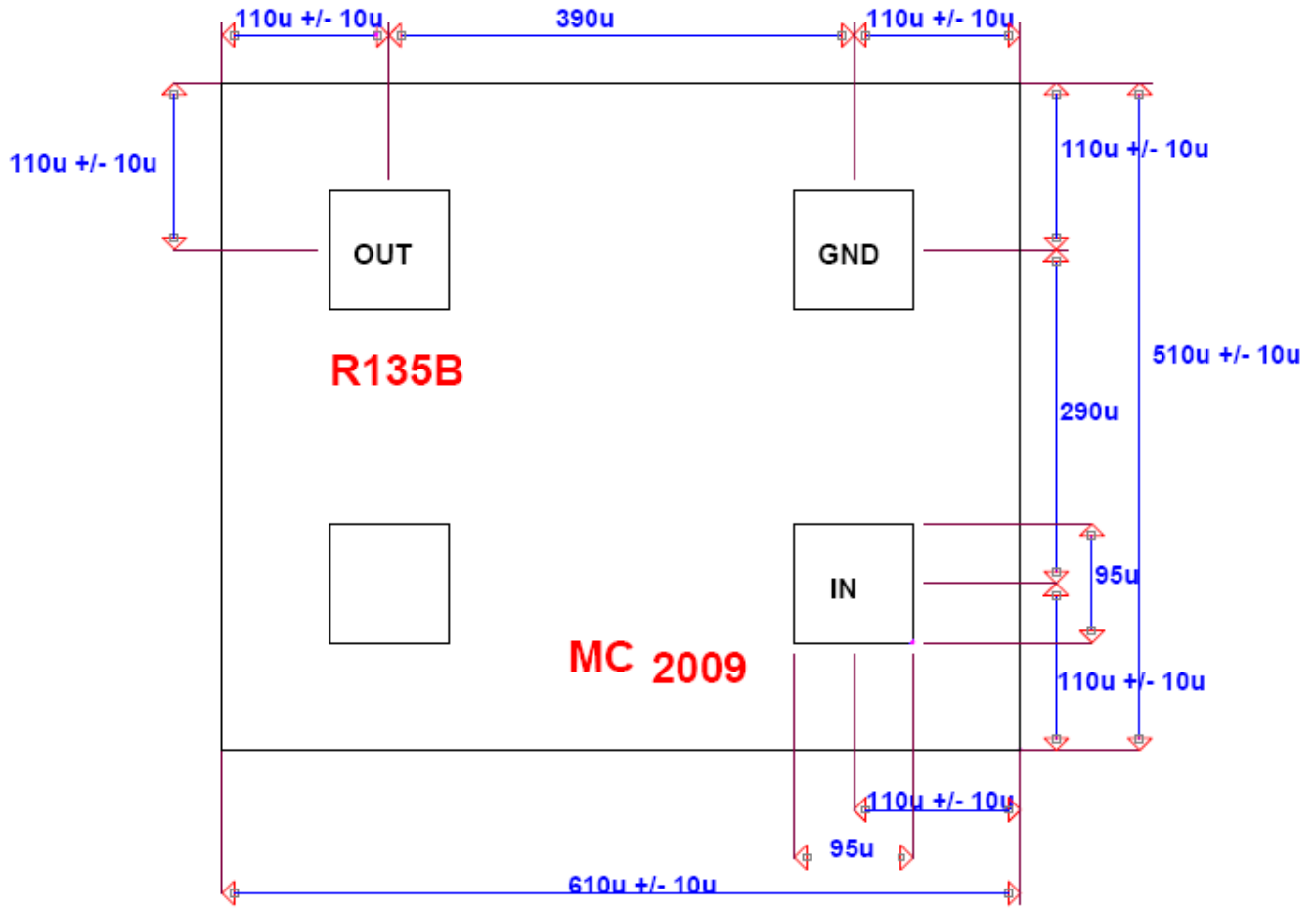
Light Sensitivity

If your particular application has the possibility of the AAP200x being exposed to direct or indirect light, we recommend the application of an opaque underfill to limit the devices exposure to light(on the solder bumped side). Light exposure to the device may or may not have negative effects on the device performance (varies per application).

ORDERING TABLE

Ordering PN	Description	Package	Packing Type	Packing Qty
AAP200A S-M4A-G-LF-W	ECM Pre-Amp, 16dB Gain, $V_{op} = 1.25V$	4-Pin Micro SMD	Waffle Pack	TBD
AAP200A S-M4A-G-LF-TR	ECM Pre-Amp, 16dB Gain, $V_{op} = 1.25V$	4-Pin Micro SMD	T&R	3500
AAP200B S-M4A-G-LF-W	ECM Pre-Amp, 19dB Gain, $V_{op} = 1.25V$	4-Pin Micro SMD	Waffle Pack	TBD
AAP200B S-M4A-G-LF-TR	ECM Pre-Amp, 19dB Gain, $V_{op} = 1.25V$	4-Pin Micro SMD	T&R	3500
AAP200C S-M4A-G-LF-W	ECM Pre-Amp, 16dB Gain, $V_{op} = 1.33V$	4-Pin Micro SMD	Waffle Pack	TBD
AAP200C S-M4A-G-LF-TR	ECM Pre-Amp, 16dB Gain, $V_{op} = 1.33V$	4-Pin Micro SMD	T&R	3500
AAP200D S-M4A-G-LF-W	ECM Pre-Amp, 19dB Gain, $V_{op} = 1.33V$	4-Pin Micro SMD	Waffle Pack	TBD
AAP200D S-M4A-G-LF-TR	ECM Pre-Amp, 19dB Gain, $V_{op} = 1.33V$	4-Pin Micro SMD	T&R	3500

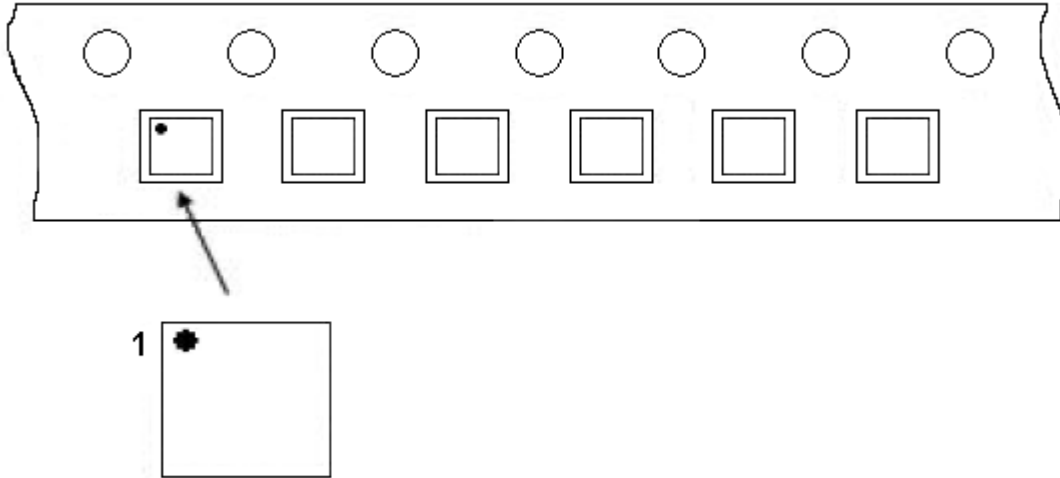
PACKAGE DIMENSIONS



Note: Not drawn to scale

Bottom View

TAPE AND REEL CONFIGURATION



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