

LM386 Audio Amplifier Module

FEATURES

- LM386 Audio Amplifier Module
- Input Voltage: 5.0V to 12V
- Power Indicator LED
- On-Board Speaker Wiring Connector
- Max Gain: 200

APPLICATIONS

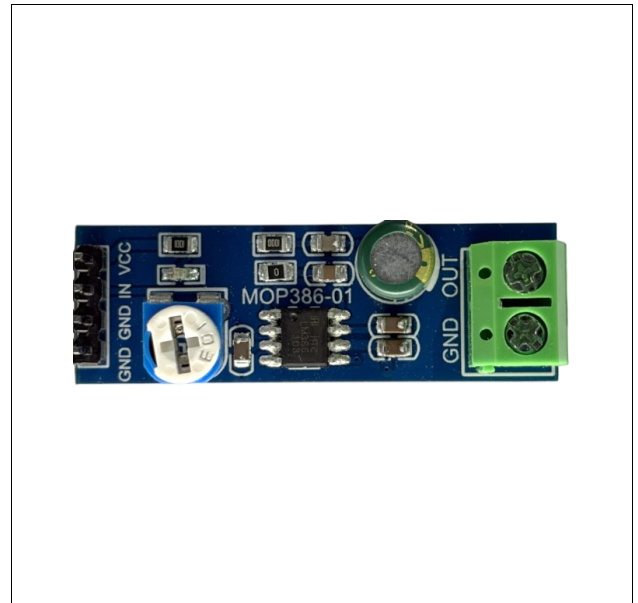
- AM-FM radio amplifier
- Portable tape player amplifiers
- Power converters

DESCRIPTION

The LM386 Audio Amplifier Module is a power amplifier designed for use in low voltage consumer applications.

APPLICATION GUIDE

The LM386 Audio Amplifier Module is a compact power amplifier designed for low-voltage audio applications. The onboard potentiometer allows easy gain adjustment, enabling convenient volume control for various audio sources.

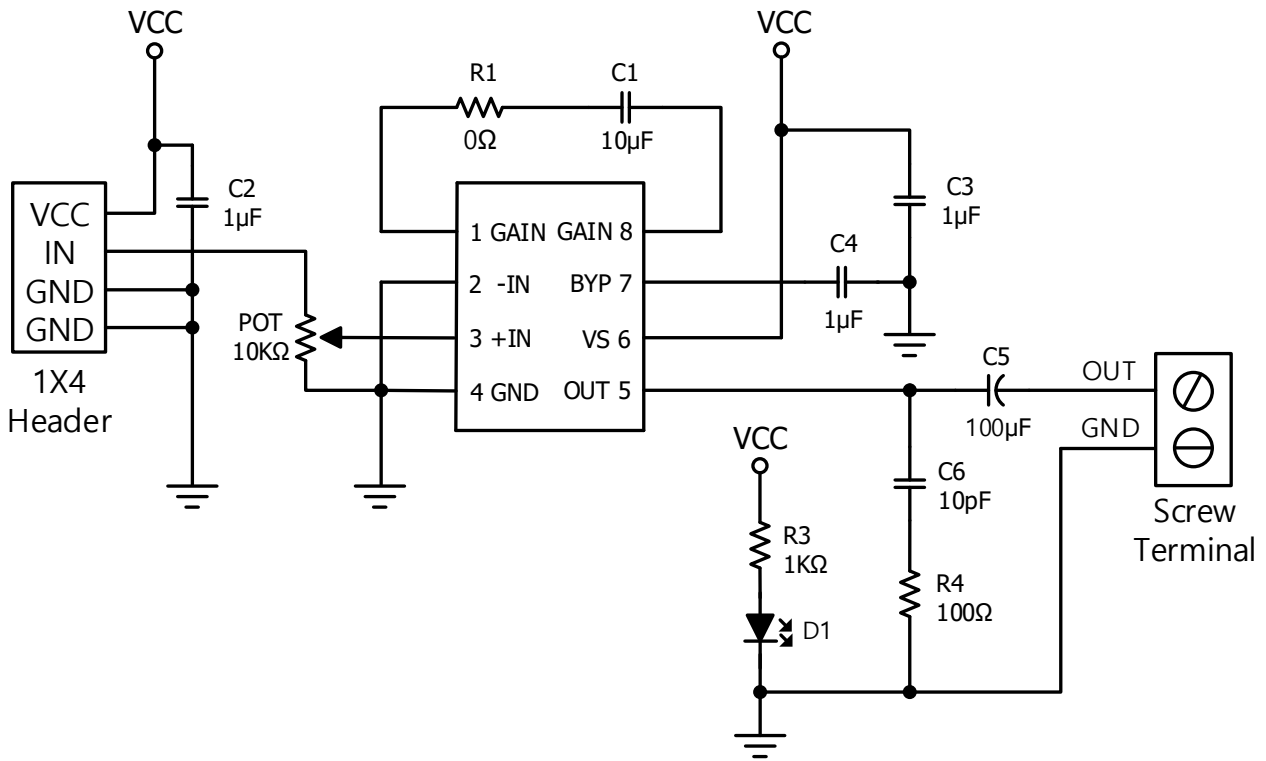


ORDERING INFORMATION

Part Number	MOP386-01
Device	LM386 Audio Amplifier Module
Package	Assembled Module (41mm X 19mm)

LM386 Audio Amplifier Module

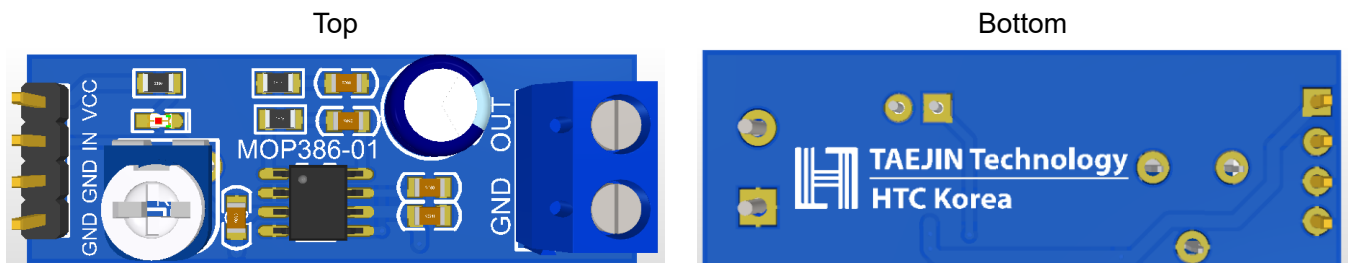
SCHEMATICS



* Adjustable Gain

	R1	C1	C3
Gain 200	0Ω	1uF	1uF
Gain 50	1.2KΩ	1uF	1uF
Gain 20	Open	Open	Open

LAYOUT

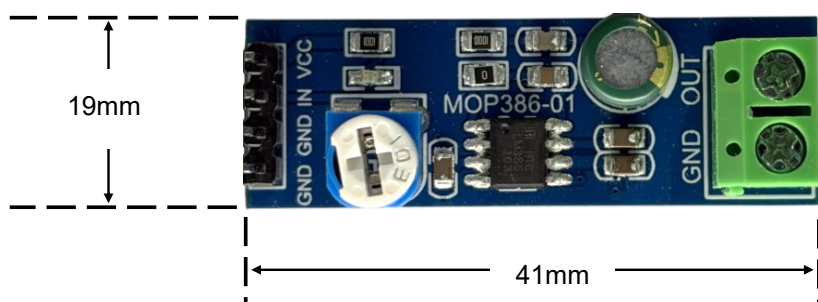


LM386 Audio Amplifier Module

PARTS LIST

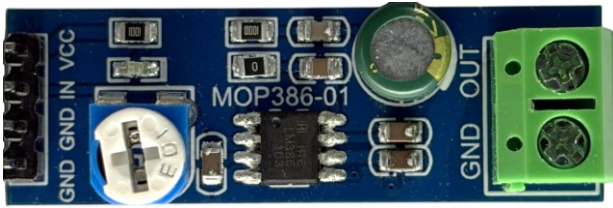
Name	Description	P/N	Qty.	Distributor
PCB	Printed Circuit Board	FR4 Lead-Free PCB	1	TAEJIN
IC	LM386, SOP-8	LM386D	1	TAEJIN
Pin Header	1*4 / 2.54mm pitch	Male Pin Header	1	Generic
Connector	Wire to Board Connector	KF301	1	Generic
Potentiometer	10k Adjustable Potentiometer	RM065	1	Generic
Resistor	0Ω Resistor	0Ω 5% Resistor, 2012(0805)	1	Generic
Resistor	1KΩ Resistor	1KΩ 1% Resistor, 2012(0805))	1	Generic
Resistor	100Ω Resistor	100Ω 1% Resistor, 2012(0805)	1	Generic
LED	LED for Indicator	LED, Green	1	Generic
Capacitor	100μF Capacitor	100μF / 35V Electrolytic Capacitor	1	Generic
Capacitor	1μF / 25V Capacitor	1μF / 25V Capacitor, 2012(0805)	3	Generic
Capacitor	10μF / 25V Capacitor	10μF / 25V Capacitor, 2012(0805)	1	Generic
Capacitor	10pF / 50V Capacitor	10pF / 50V Capacitor, 2012(0805)	1	Generic

SIZE INFORMATION



LM386 Audio Amplifier Module

PRODUCT IMAGE



I/O PORT CONFIGURATION AND DESCRIPTION



Designator	Port Name	Port Description
1	VCC / Audio Input Stage	VCC / Audio Input
2	Audio Output Stage	Speaker Output Terminal

LM386 Audio Amplifier Module

REVISION NOTICE

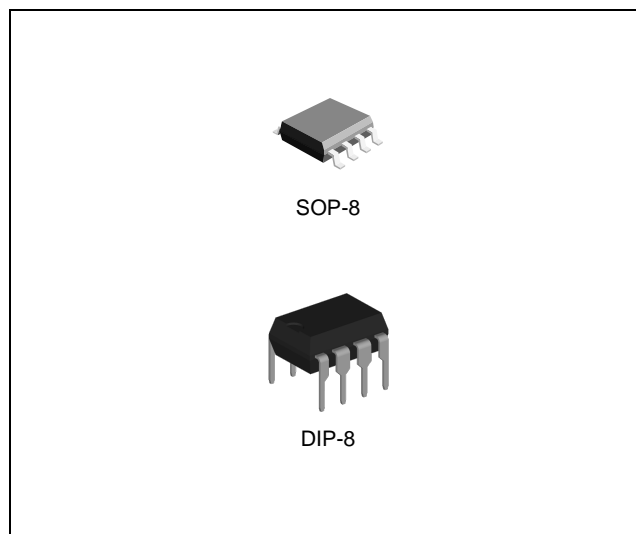
The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.

FEATURES

- Battery operation
- Minimum external parts
- Wide supply voltage range 4V to 12V
- Low quiescent current drain 4mA (Typ.)
- Voltage gains from 20 to 200
- ESD Protection 2kV
- Ground referenced input
- Self-centering output quiescent voltage
- Low distortion

APPLICATIONS

- AM-FM radio amplifier
- Portable tape player amplifiers
- Intercoms
- TV sound systems
- Line drivers
- Ultrasonic drivers
- Small servo drivers
- Power converters



ORDERING INFORMATION

Device	Package
LM386D	SOP-8
LM386N	DIP-8

DESCRIPTION

The LM386 is a power amplifier designed for use in low voltage consumer applications. The gain is internally set to 20 to keep external part count low, but the addition of an external resistor and capacitor between pins 1 and 8 will increase the gain to any value up to 200. The inputs are ground referenced while the output is automatically biased to one half the supply voltage. The quiescent power drain is only 24 milliwatts when operating from a 6V supply, making the LM386 ideal for battery operation.

ABSOLUTE MAXIMUM RATINGS (Note 1)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	-	15	V
Input Voltage	V_{IN}	-0.4	0.4	V
Operating Ambient Temperature Range	T_A	-40	85	°C
Junction Temperature	T_J	-	125	°C

Note1. Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS (Note 2)

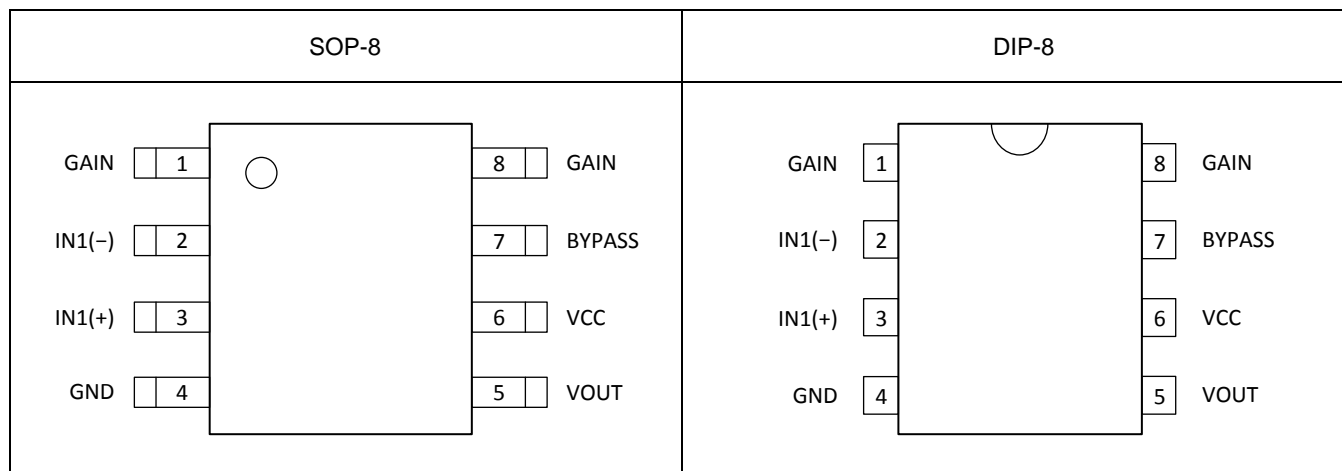
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	4	12	V
Operating Free-Air Temperature Range	T_A	0	70	°C

Note 2. The device is not guaranteed to function outside its operating ratings.

ORDERING INFORMATION

Package	Order No.	Description	Supplied As	Status
SOP-8	LM386D	Low Voltage Audio Power Amplifier	Tape & Reel	Active
DIP-8	LM386N	Low Voltage Audio Power Amplifier	Tube	Active

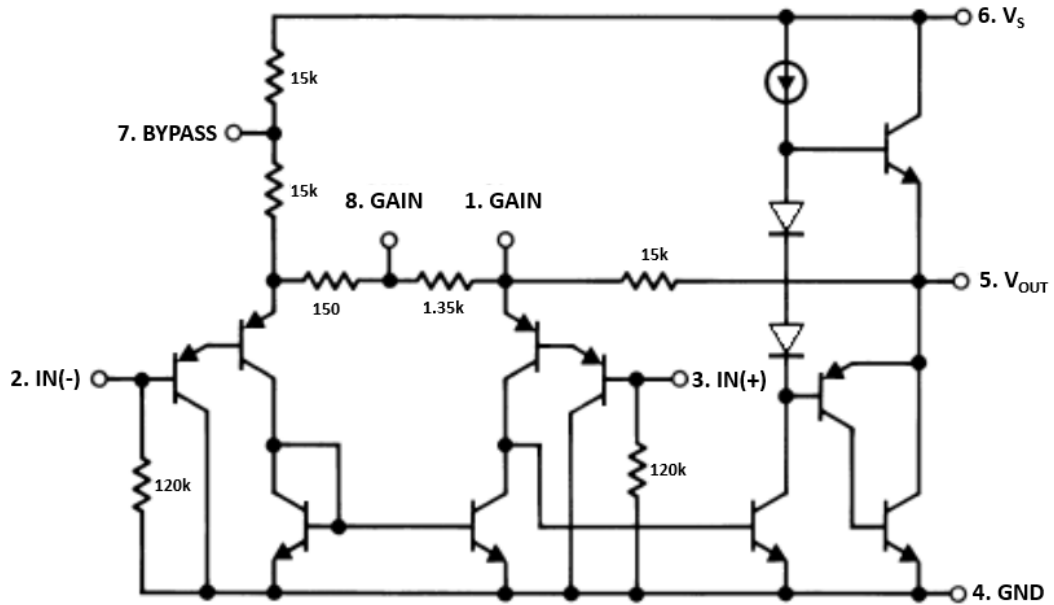
PIN CONFIGURATION



PIN DESCRIPTION

Pin No.		Pin Name	Pin Function
SOP-8	DIP-8		
1	1	GAIN	Gain Setting
2	2	INPUT (-)	Inverting Input
3	3	INPUT (+)	Noninverting Input
4	4	GND	Ground
5	5	VOUT	Output
6	6	VCC	Power Supply Voltage
7	7	BYPASS	Bypass Decoupling Path
8	8	GAIN	Gain Setting

FUNCTIONAL BLOCK DIAGRAM



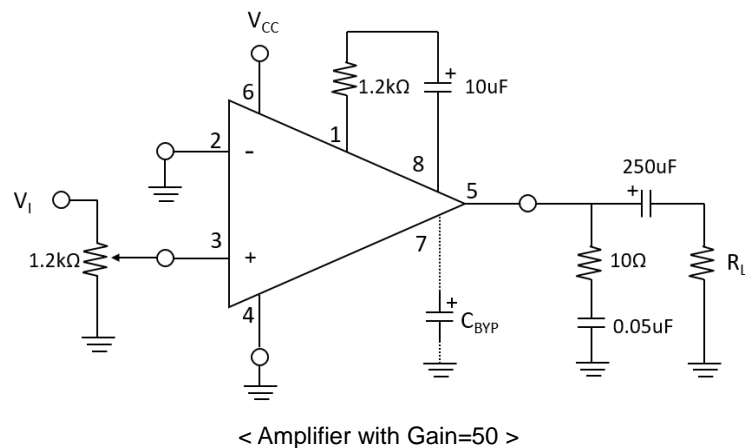
ELECTRICAL CHARACTERISTICS

Specifications with standard type face are for $T_A = 25^\circ\text{C}$, $R_L = 8\Omega$, $V_{CC} = 6\text{V}$, $f = 1\text{kHz}$ unless otherwise noted.

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
V_{CC}	Operating Supply Voltage		4	-	12	V
I_Q	Quiescent Current	$V_{IN} = 0\text{V}$	-	4	8	mA
P_{OUT}	Output Power	$V_{CC} = 6\text{V}$, THD = 10%	250	325	-	mW
		$V_{CC} = 9\text{V}$, THD = 10%	500	700	-	
A_V	Voltage Gain	Pin 1 and Pin 8 Open	-	26	-	dB
		10 μF from Pin 1 to Pin 8	-	46	-	
BW	Bandwidth	10 μF from Pin 1 to Pin 8	-	60	-	kHz
		Pin 1 and Pin 8 Open	-	300	-	
THD	Total Harmonic Distortion	$P_{OUT} = 125\text{mW}$, Pin 1 and Pin 8 Open	-	0.2	-	%
R_{IN}	Input Resistance		-	120	-	k Ω
I_{BIAS}	Input Bias Current	Pin 2 and Pin 3 Open	-	250	-	nA

APPLICATION INFORMATION

The LM386 is a mono low voltage amplifier that can be used in a variety of applications. It can drive loads from 4Ω to 32Ω . The gain is internally set to 20 but it can be modified from 20 to 200 by placing a resistor and capacitor between pins 1 and 8. This device comes in three different 8-pin packages as DIP-8 and SOP-8 to fit in different applications. As this is an Op Amp it can be used in different configurations to fit in several applications. The internal gain setting resistor allows the LM386 to be used in a very low part count system. In addition, a series resistor can be placed between pins 1 and 5 to modify the gain and frequency response for specific applications.



TYPICAL OPERATING CHARACTERISTICS

T.B.D.

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