108/108A 208/208A 308/308A

Precision Operational Amplifiers

GENERAL DESCRIPTION

The LM108A/LM108, LM208A/LM208 and LM308A/LM308 are Super Beta operational amplifiers fabricated on single silicon chips using the planar epitaxial process.

The LM108A/LM108 offer specifications an order of magnitude better than FET amplifiers over a temperature range −55°C to +125°C.

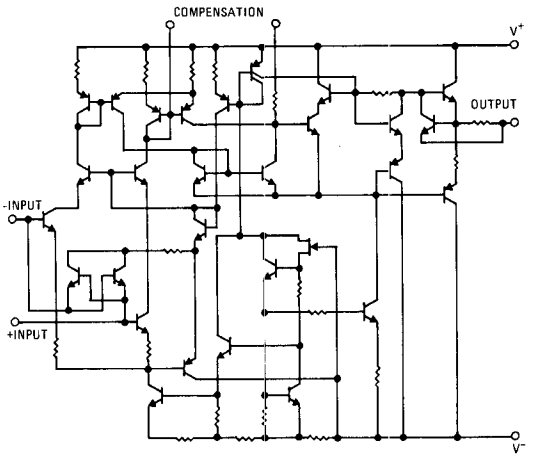
The LM208A/LM208 are identical to the LM108A/LM108 except their performance is guaranteed from −25°C to +85°C.

The LM308A/LM308 provide lower input offset voltage of 0.5mV maximum, and drift characteristics of 5.0μV/°C maximum. These devices can be compensated by the conventional technique used with the LM101/LM101A series.

DESIGN FEATURES

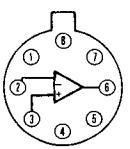
- Offset Voltage Over Temperature Range 0.5mV Maximum
- Input Current Over Temperature Range 3.0nA Maximum
- Offset Current Over Temperature Range 400pA Maximum
- Supply Current Only 400μA
- Guaranteed Drift Characteristics 5.0μV/°C Maximum
- Supply Voltage ±2V to ±20V

SCHEMATIC DIAGRAM



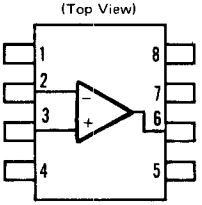
CONNECTION INFORMATION

TE
Metal Can Package
(Top View)



Order Part Nos.:
LM108AH, LM208AH,
LM308AH, LM108H,
LM208H, LM308H

DE and NB
Dual In-line Packages
(Top View)



Order Part Nos.:
LM108ADE, LM208ADE,
LM108DE, LM208DE
LM308DE, LM308ADE
LM308N

PIN	FUNCTION
1	COMP
2	−INPUT
3	+INPUT
4	V⁻
5	NC
6	OUTPUT
7	V⁺
8	COMP

NOTE: THE LM108A SERIES IS AVAILABLE ON SPECIAL ORDER IN THE 3C (14-PIN) CERAMIC DIP AND CQ (10-PIN) FLATPAK PACKAGES.

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ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... LM108A/LM108: ±20V, LM208A/LM208: ±20V, LM308A/LM308: ±18V
Power Dissipation (Note 1) 500mW
Differential Input Current (Note 3) ..... ±10mA
Input Voltage (Note 2) ..... ±15V
Output Short-Circuit Duration ..... Indefinite

Operating Temperature Range
LM108A/LM108 ..... −55°C to +125°C
LM208A/LM208 ..... −25°C to +85°C
LM308A/LM308 ..... 0°C to +70°C
Storage Temperature Range ..... −65°C to +150°C
Lead Temperature (Soldering, 60s) ..... 300°C

ELECTRICAL CHARACTERISTICS (Notes 4 and 5)

PARAMETER	CONDITIONS	LM108A/LM208A			LM308A			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	T_A=25°C		0.3	0.5		0.3	0.5	mV
Large Signal Voltage Gain	T_A=25°C, V_S=±15V, V_{out}=±10V, $R_L \geq 10k\Omega$	80	300		80	300		V/mV
Input Offset Voltage				1.0			0.73	mV
Average Temperature Coefficient of Input Offset Voltage			1.0	5.0		1.0	5.0	µV/°C
Large Signal Voltage Gain	V_S=±15V, V_{out}=±10V, $R_L \geq 10k\Omega$	40			60			V/mV
Common Mode Rejection Ratio		96	110		96	110		dB
Supply Voltage Rejection Ratio		96	110		96	110		dB

PARAMETER	CONDITIONS	LM108/LM208			LM308			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	T_A=25°C		0.7	2.0		2.0	7.5	mV
Input Offset Current	T_A=25°C		0.05	0.2		0.2	1.0	nA
Input Bias Current	T_A=25°C		0.8	2.0		1.5	7.0	nA
Input Resistance	T_A=25°C	30	70		10	40		MΩ
Supply Current	T_A=25°C		0.3	0.6		0.3	0.8	mA
Large Signal Voltage Gain	T_A=25°C, V_S=±15V, V_{out}=±10V, $R_L \geq 10k\Omega$	50	300		25	300		V/mV
Input Offset Voltage				3.0			10	mV
Average Temperature Coefficient of Input Offset Voltage			3.0	15		6.0	30	µV/°C
Input Offset Current				0.4			1.5	nA
Average Temperature Coeffiecient of Offset Current			0.5	2.5		2.0	10	pA/°C
Input Bias Current				3.0			10	nA
Supply Current	T_A=+125°C		0.15	0.4				mA
Large Signal Voltage Gain	V_S=±15V, V_{out}=+10V, $R_L \geq 10k\Omega$	25			15			V/mV
Output Voltage Swing	V_S=±15V, R_L=10kΩ	±13	±14		±13	±14		V
Input Voltage Range	V_S=±15V	±13.5			14			V
Common Mode Rejection Ratio		85	100		80	100		dB
Supply Voltage Rejection Ratio		80	96		80	96		dB

NOTES:

1. For operating at elevated temperatures, the device must be derated based on +150°C for LM108, +100°C for LM308 maximum junction temperature and a thermal resistance of 150°C/W junction to ambient or 45°C/W junction to case.
2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
3. The inputs are shunted with back-to-back diodes for overvoltage protection. Therefore, excessive current will flow if a differential input voltage in excess of 1V is applied between the inputs unless some limiting resistance is used.
4. These specifications apply for ±5V < V_S < ±20V and −55°C < T_A ≤ +125°C, LM108A/LM108; ±5V < V_S < ±20V and −25°C < T_A < +85°C, LM208A/LM208.
5. These specifications apply for ±5V < V_S < ±15V and 0°C < T_A < +70°C, LM308A/LM308.