

GENERAL DESCRIPTION

The LM118, LM218, and LM318 are precision operational amplifiers which offer fast slewing and wide bandwidth. They feature internal frequency compensation and ten times the speed of general purpose amplifiers.

External feedforward compensation may be used for an additional increase in speed. For inverting applications this will increase the slew rate to more than 150V/μs and almost double the bandwidth. (Feedforward is not used for non-inverting or differential applications.)

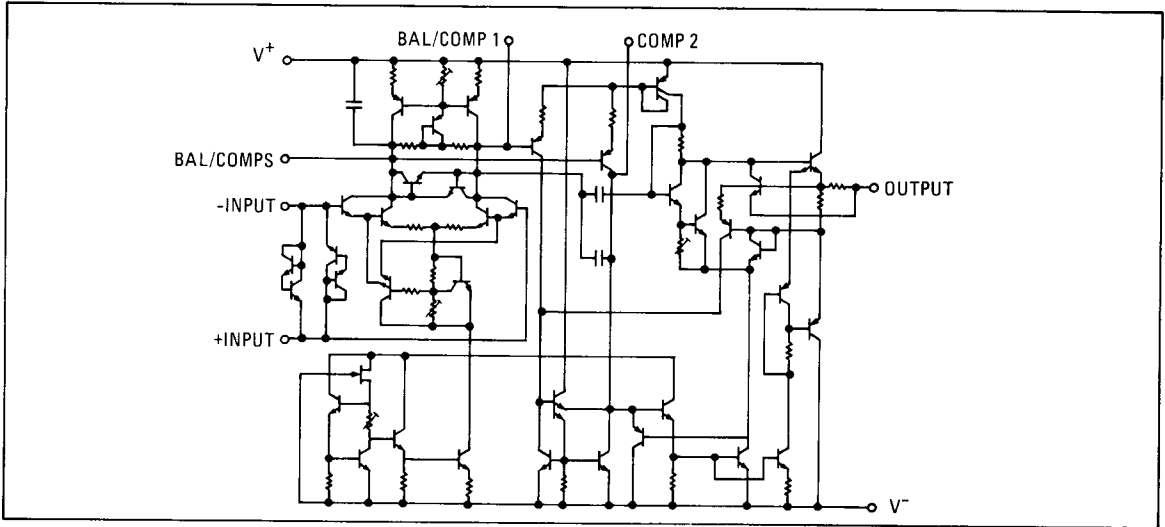
Their high speed and fast settling time make them ideal devices for A/D converters, oscillators, active filters, sample-and-hold circuits, as well as general purpose amplifiers.

The LM118 military version operates over a temperature range of -55°C to +125°C. The LM218 is the same as the LM118 except its performance is guaranteed from -25°C to +85°C. The LM318 operates from 0°C to +70°C.

DESIGN FEATURES

- 15MHz Small Signal Bandwidth
- Guaranteed 50V/μs Slew Rate
- Operates from ±5V to ±20V Supply
- Internal Frequency Compensation
- Input and Output Overload Protected
- Pin Compatible With General Purpose Op Amps

SCHEMATIC DIAGRAM



CONNECTION INFORMATION

T (TO-5)
Metal Can Package
(Top View)

Order Part Nos.:
LM118H, LM218H, LM318H

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

Order Part Nos.:
LM118DE, LM218DE,
LM318DE, LM318N

PIN	FUNCTION
1	BAL/COMP 1
2	-INPUT
3	+INPUT
4	V-
5	BAL/COMP 3
6	OUTPUT
7	V+
8	COMP 2

NOTE: THE LM118/318 IS AVAILABLE ON SPECIAL ORDER IN THE DC (14-PIN) CERAMIC DIP AND CQ (10-PIN) FLATPAK PACKAGES.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	±20V	Operating Temperature Range	
Power Dissipation (Note 1)	500mW	LM118	-55°C to +125°C
Differential Input Current (Note 2)	±10mA	LM218	-25°C to +85°C
Input Voltage (Note 3)	±15	LM318	0°C to +70°C
Output Short-Circuit Duration	Indefinite	Storage Temperature Range	-65°C to +150°C
		Lead Temperature (Soldering, 10s)	+300°C

ELECTRICAL CHARACTERISTICS (Note 4)

PARAMETER	CONDITIONS	LM118/LM218	LM318	UNITS	
Input Offset Voltage	$T_A = 25^\circ\text{C}$	4	10	mV	Max.
Input Offset Current	$T_A = 25^\circ\text{C}$	50	200	nA	Max.
Input Bias Current	$T_A = 25^\circ\text{C}$	250	500	nA	Max.
Input Resistance	$T_A = 25^\circ\text{C}$	1	0.5	MΩ	Min.
Supply Current	$T_A = 25^\circ\text{C}$	8	10	mA	Max.
Large Signal Voltage Gain	$T_A = 25^\circ\text{C}, V_S = \pm 15\text{V}, V_{OUT} = \pm 10\text{V}, R_L \geq 2\text{k}$	50	25	V/mV	Min.
Input Offset Voltage		6	15	mV	Max.
Small Signal Bandwidth	$T_A = 25^\circ\text{C}, V_S = \pm 15\text{V}$	15	15	MHz	Typ.
Slew Rate	$T_A = 25^\circ\text{C}, V_S = \pm 15\text{V}, A_V = 1, R_S = 10\text{k}\Omega$	50	50	V/μs	Min.
Input Offset Current		100	300	nA	Max.
Input Bias Current		500	750	nA	Max.
Supply Current	$T_A = T_{MAX}$	7		mA	Max.
Large Signal Voltage Gain	$V_S = \pm 15\text{V}, V_{OUT} = \pm 10\text{V}, R_L \geq 2\text{k}$	25	20	V/mV	Min.
Output Voltage Swing	$V_S = \pm 15\text{V}, R_L = 2\text{k}\Omega$	±12	±12	V	Min.
Input Voltage Range	$V_S = \pm 15\text{V}$	±11.5	±11.5	V	Min.
Common Mode Rejection Ratio		80	70	dB	Min.
Supply Voltage Rejection Ratio		70	65	dB	Min.

NOTES:

- The maximum junction temperature of the LM118 is +150°C, LM218 is +100°C and +85°C for the LM318. For operating at elevated temperatures, devices in the TO-5 package must be derated based on a thermal resistance of 150°C/W, junction to ambient, or 45°C/W, junction to case.
- The inputs are shunted with shunt 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.
- For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
- These specifications apply for $\pm 5\text{V} \leq V_S \leq \pm 20\text{V}$ and $-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$ for the LM118; $\pm 5\text{V} \leq V_S \leq \pm 20\text{V}$ and $-20^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$ for the LM218; $\pm 5\text{V} \leq V_S \leq \pm 20\text{V}$ and $0^\circ\text{C} \leq T_A \leq +70^\circ\text{C}$ for the LM318. Also, power supplies must be bypassed with 0.1 μF ceramic disc capacitors.

TYPICAL APPLICATIONS

Offset Balancing

Fast Voltage Follower

Compensation for Minimum Setting+ Time

Fast Sample and Hold

Feedforward Compensation for Greater Inverting Slew Rate+

*Slew and setting time to 0.1% for a 10V step change is 800ns.

*Slew rate typically 150V/μs