

## LM118 Series Operational Amplifiers

### REFERENCE TABLE

Type	Stock No.
LM118H	31049H
LM218H	31050X
LM318H	29588A
LM318D	31066F
LM318N	34463R

### GENERAL DESCRIPTION

The LM118, LM218 and LM318 are precision high speed operational amplifiers designed for applications requiring wide bandwidth and high slew rate. They feature internal frequency compensation and a factor of ten increase in speed over general purpose devices.

### FEATURES

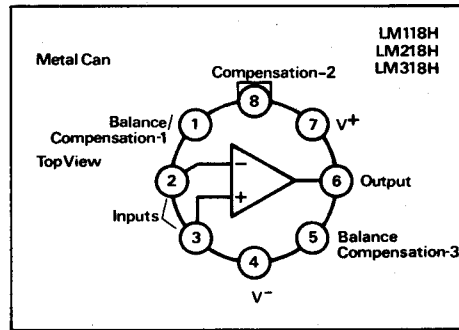
- 15MHz small signal bandwidth.
- Guaranteed 50V/ $\mu$ s slew rate.
- Operates from supplies of  $\pm 5$  to  $\pm 18$ V.
- Internal frequency compensation.
- Input and output overload protected.

Pin compatible with general purpose op amps. Although no external frequency compensation components are needed for operation, feedforward compensation may be used to further increase the speed. For inverting applications, feedforward compensation will boost the slew rate to over 100V/ $\mu$ s and almost double the bandwidth. However, for non-inverting or differential application feedforward cannot be used. The high speed and fast settling time of these op amps. make them useful in A/D converters, oscillators, active filters, sample and hold circuits, or general purpose amplifiers. These devices are easy to apply and offer an order of magnitude better AC performance than industry standards such as the LM709.

### ABSOLUTE MAXIMUM RATINGS

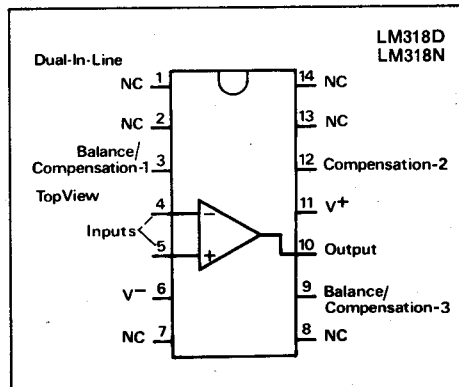
Supply voltage	$\pm 18$ V
Power dissipation (Note 1)	500mW
Differential input current (Note 2)	$\pm 10$ mA
Input voltage (Note 3)	$\pm 15$ V
Output short-circuit duration	Indefinite
Operating temperature range	
LM118	-55°C to 125°C
LM218	-25°C to 85°C
LM318	0°C to 70°C
Storage temperature range	-65°C to 150°C
Lead temperature (soldering, 10 sec)	300°C

### CONNECTION DIAGRAM



See outline drawing No. 97 for dimensions.

### CONNECTION DIAGRAM



See outline drawing No. 110 for dimensions.

Continued on next page

7

## ELECTRICAL CHARACTERISTICS (Note 4)

Parameter	Conditions	LM118	LM218	LM318	Units	
Input Offset Voltage	$T_A = 25^\circ\text{C}$	4	4	10	mV	Max
Input Offset Current	$T_A = 25^\circ\text{C}$	50	50	200	nA	Max
Input Bias Current	$T_A = 25^\circ\text{C}$	250	250	600	nA	Max
Input Resistance	$T_A = 25^\circ\text{C}$	1	1	0.5	M $\Omega$	Min
Supply Current	$T_A = 25^\circ\text{C}$	8	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	50	25	V/mV	Min
Input Offset Voltage		6	6	15	mV	Max
Small Signal Bandwidth	$T_A = 25^\circ\text{C}$ , $V_S = \pm 15\text{V}$	15	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	50	V/ $\mu\text{s}$	Min
Input Offset Current		100	100	300	nA	Max
Input Bias Current		500	500	1000	nA	Max
Supply Current	$T_A = T_{Max}$	7	7	10	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	25	20	V/mV	Min
Output Voltage Swing	$V_S = \pm 15\text{V}$ , $R_L = 2 \text{ k}\Omega$	$\pm 12$	$\pm 12$	$\pm 12$	V	Min
Input Voltage Range	$V_S = \pm 15\text{V}$	$\pm 11.5$	$\pm 11.5$	$\pm 11.5$	V	Min
Common Mode Rejection Ratio		80	80	70	dB	Min
Supply Voltage Rejection Ratio		70	70	65	dB	Min

**Note 1:** The maximum junction temperature of the LM118 is  $150^\circ\text{C}$ , of the LM218 is  $100^\circ\text{C}$ , and of the LM318 is  $85^\circ\text{C}$ . For operating at elevated temperatures, devices in the TO-99 package must be derated based on a thermal resistance of  $150^\circ\text{C}/\text{W}$ , junction to ambient, or  $45^\circ\text{C}/\text{W}$ , junction to case. The thermal resistance of the dual-in-line package is  $100^\circ\text{C}/\text{W}$ , junction to ambient.

**Note 2:** 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.

**Note 3:** For supply voltages less than  $\pm 15\text{V}$ , the absolute maximum input voltage is equal to the supply voltage.

**Note 4:** These specifications apply for  $\pm 5 \leq V_S \leq \pm 18\text{V}$  and  $-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ , for the LM118,  $-25^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$  for the LM218, and  $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$  for the LM318; unless otherwise specified. Also power supplies must be bypassed with 0.1 $\mu\text{F}$  disc capacitors.