

**LM318****LINEAR INTEGRATED CIRCUIT****HIGH SPEED OPERATIONAL  
AMPLIFIER****■ DESCRIPTION**

The UTC **LM318** is a precision, high speed, high gain operational amplifier that has been specifically designed for use in high slew rate and wide bandwidth applications. Unlike many wideband amplifiers, the UTC **LM318** is unity-gain stable since it has internal circuitry for frequency compensation. However, external components may be added for compensation to achieve optimum performance.

When used in inverting applications, feed-forward compensation can be used to achieve slew rate in excess of 150V/μs and almost double the bandwidth. For greater stability, using overcompensation with the amplifier is possible if maximum bandwidth is not needed. In general, by adding a single capacitor can reduce the settling time for 0.1% error band to under 1μs.

The typical applications of UTC **LM318** include A/D converters, fast integrator, oscillators, active filters, sample and hold circuits, or general purpose amplifiers.

**■ FEATURES**

- \* Unit gain stable (internal frequency compensation)
- \* 4mV typical input offset voltage
- \* 30nA typical input offset current
- \* Input bias current of 250nA (maximum)
- \* 15MHz bandwidth (small signal)
- \* 50V/μs slew rate (guarantee)
- \* Operates voltages of ±5V to ±20V
- \* Overload protection for Input and output
- \* Same pin assignment as general-purpose op amps

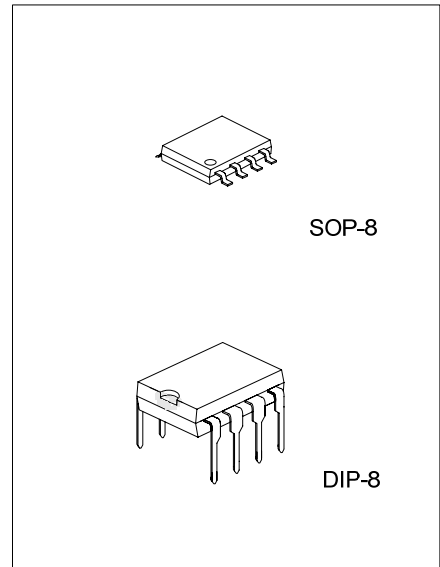
**■ ORDERING INFORMATION**

| Order Number |                   | Package | Packing   |
|--------------|-------------------|---------|-----------|
| Normal       | Lead Free Plating |         |           |
| LM318-D08-T  | LM318L-D08-T      | DIP-8   | Tube      |
| LM318-S08-R  | LM318L-S08-R      | SOP-8   | Tape Reel |
| LM318-S08-T  | LM318L-S08-T      | SOP-8   | Tube      |

LM318L-D08-T

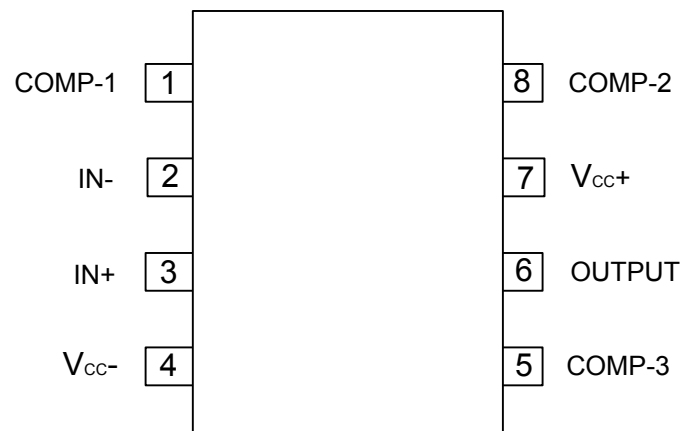
- (1)Packing Type
- (2)Package Type
- (3)Lead Plating

- (1) T: Tube, R: Tape Reel
- (2) S08: SOP-8, D08: DIP-8
- (3) L: Lead Free Plating, Blank: Pb/Sn

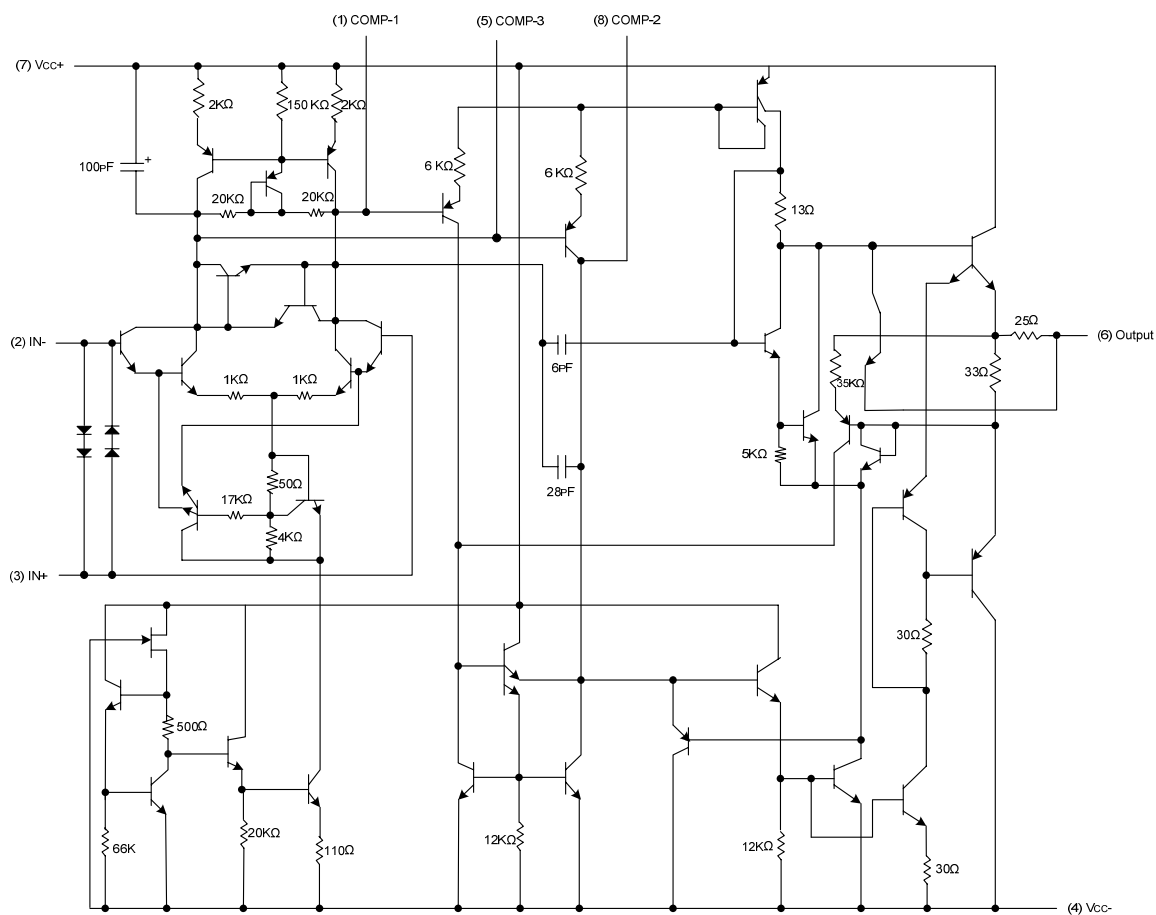


\*Pb-free plating product number: LM318L

## ■ PIN CONFIGURATIONS



# ■ SCHEMATIC DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER                           | SYMBOL        | RATINGS    | UNIT               |
|-------------------------------------|---------------|------------|--------------------|
| Supply Voltage                      | $V_{CC+}$     | +20        | V                  |
| Supply Voltage                      | $V_{CC-}$     | -20        | V                  |
| Input Voltage (Note 2)              | $V_{IN}$      | $\pm 15$   | V                  |
| Differential Input Current (Note 3) | $I_{I(DIFF)}$ | $\pm 10$   | mA                 |
| Power Dissipation                   | $P_D$         | 500        | mW                 |
| Output Short-Circuit Duration       |               | Continuous |                    |
| Maximum Junction Temperature        | $T_J$         | 110        | $^{\circ}\text{C}$ |
| Operating Temperature Range         | $T_{OPR}$     | 0 ~ +70    | $^{\circ}\text{C}$ |
| Storage Temperature Range           | $T_{STG}$     | -65 ~ +150 | $^{\circ}\text{C}$ |

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. For supply voltage less than  $\pm 15\text{V}$ , the absolute maximum input voltage is equal to the supply voltage.

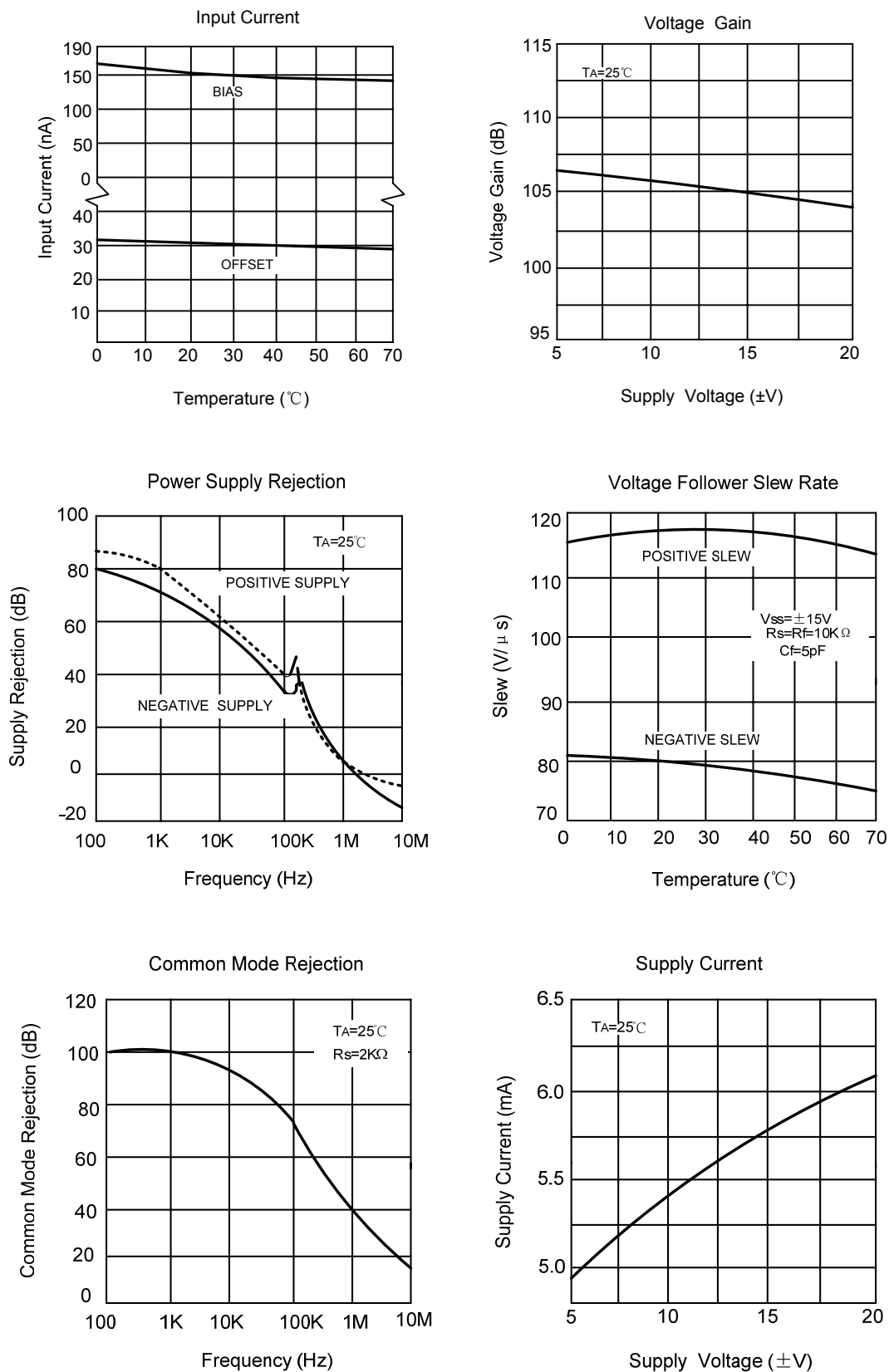
3. The inputs are shunted with two opposite-facing base-emitter diodes for over voltage protection. Therefore, excessive current flows if a differential input voltage in excess of 1V is applied between the inputs unless some limiting resistance is used.

## ■ ELECTRICAL CHARACTERISTICS ( $\pm 5\text{V} \leq V_{CC} \leq \pm 20\text{V}$ , $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$ , unless other specifics)

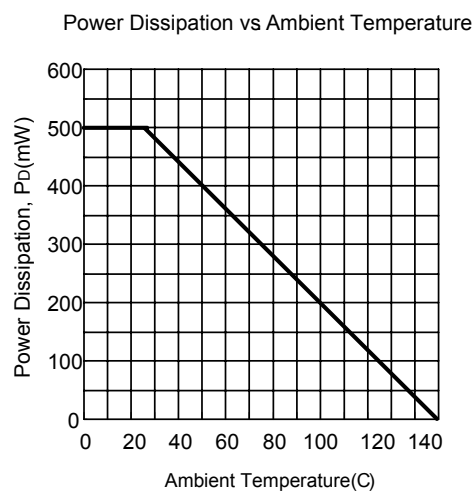
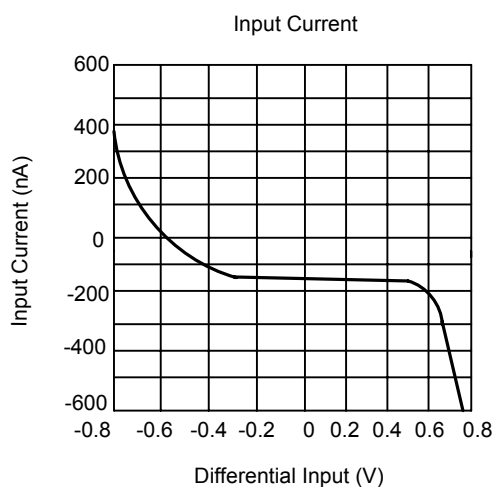
| PARAMETER                      | SYMBOL        | TEST CONDITION                                                                                                    | MIN        | TYP      | MAX | UNIT             |
|--------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------|------------|----------|-----|------------------|
| Input Voltage Range            | $V_{IN}$      | $V_{CC} = \pm 15\text{V}$                                                                                         | $\pm 11.5$ |          |     | V                |
| Output Voltage Swing           | $V_{OUT}$     | $V_{CC} = \pm 15\text{V}$ , $R_L = 2\text{K}\Omega$                                                               | $\pm 12$   | $\pm 13$ |     | V                |
| Input Offset Voltage           | $V_{I(OFF)}$  | $T_A = 25^{\circ}\text{C}$                                                                                        |            | 4        | 10  | mV               |
|                                |               |                                                                                                                   |            |          | 15  | mV               |
| Large Signal Voltage Gain      | $G_V$         | $T_A = 25^{\circ}\text{C}$ , $V_{CC} = \pm 15\text{V}$<br>$V_{OUT} = \pm 10\text{V}$ , $R_L \geq 2\text{K}\Omega$ | 25         | 200      |     | V/mV             |
|                                |               | $V_{CC} = \pm 15\text{V}$ , $V_{OUT} = \pm 10\text{V}$ , $R_L \geq 2\text{K}\Omega$                               | 20         |          |     | V/mV             |
| Input Offset Current           | $I_{I(OFF)}$  | $T_A = 25^{\circ}\text{C}$                                                                                        |            | 30       | 200 | nA               |
|                                |               |                                                                                                                   |            |          | 300 | nA               |
| Input Bias Current             | $I_{I(BIAS)}$ | $T_A = 25^{\circ}\text{C}$                                                                                        |            | 150      | 500 | nA               |
|                                |               |                                                                                                                   |            |          | 750 | nA               |
| Supply Current                 | $I_{SS}$      | $T_A = 25^{\circ}\text{C}$                                                                                        |            | 5        | 10  | mA               |
| Input Resistance               | $R_S$         | $T_A = 25^{\circ}\text{C}$                                                                                        | 0.5        | 3        |     | $\text{M}\Omega$ |
| Slew Rate                      | SR            | $T_A = 25^{\circ}\text{C}$ , $V_{CC} = \pm 15\text{V}$ , $G_V = 1$                                                | 50         | 70       |     | V/ $\mu\text{s}$ |
| Small Signal Bandwidth         | $SB_W$        | $T_A = 25^{\circ}\text{C}$ , $V_{CC} = \pm 15\text{V}$                                                            |            | 15       |     | MHz              |
| Common Mode Rejection Ratio    | CMRR          |                                                                                                                   | 70         | 100      |     | dB               |
| Supply Voltage Rejection Ratio | SVRR          |                                                                                                                   | 65         | 80       |     | dB               |

Note: These power supplies must be bypassed with 0.1 $\mu\text{F}$  (or larger) disc ceramic capacitor within an inch of the device.

## ■ TYPICAL CHARACTERISTICS



# ■ TYPICAL CHARACTERISTICS(Cont.)



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