

# μPC159

## High Speed Operational Amplifier

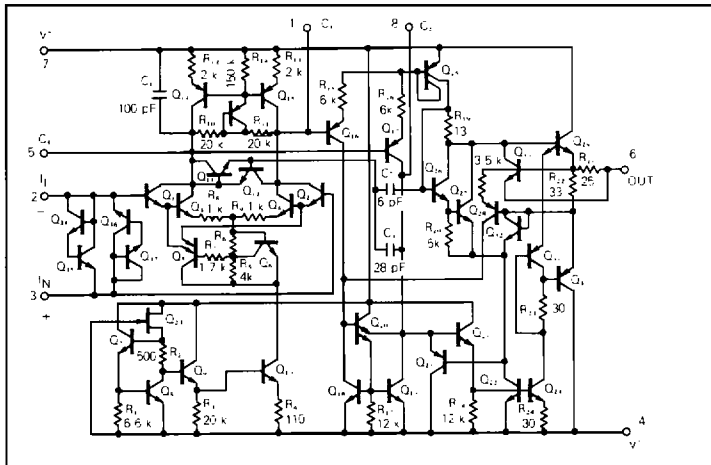
### GENERAL DESCRIPTION

The μPC159 is a precision high-speed operational amplifier designed for applications requiring wide bandwidth and high slew rate. It features a factor of ten increase in speed over general purpose devices without sacrificing DC performance. The μPC159 has internal unity gain frequency compensation. This simplifies its application since no external components are necessary for operation. The high speed and fast setting time of this device make it useful in D/A converters, oscillators and hold circuits.

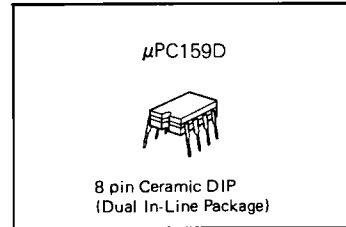
### FEATURES

- Very High Slew Rate
- Maximum Bias Current of 500 nA
- Operates from Supplies of ±5 V to ±20 V
- Internal Frequency Compensation
- Input and Output Overload Protected
- LM318 Direct Replacement

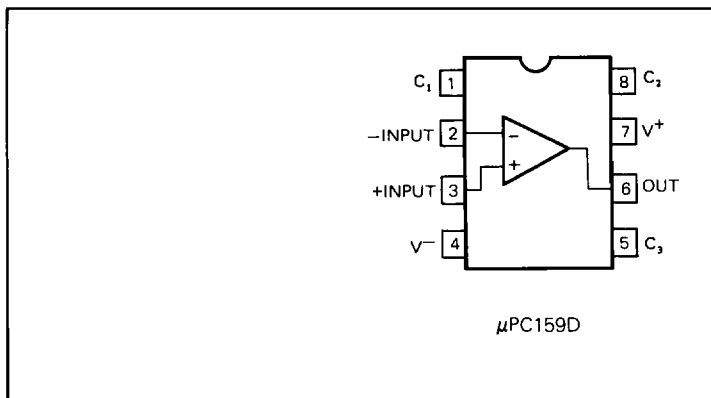
### EQUIVALENT CIRCUIT



### ORDERING INFORMATION



### CONNECTION DIAGRAM (Top View)



**ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)**

| PARAMETER   |           | μPC159      | UNIT |
|---|-----------|-------------|------|
| Voltage between V <sup>+</sup> and V <sup>-</sup> |           | 40          | V    |
| Power Dissipation*                                | D Package | 500         | mW   |
| Differential Input Current (Note 1)               |           | ±10         | mA   |
| Input Voltage (Note 2)                            |           | ±15         | V    |
| Output Short Circuit Duration                     |           | Indefinite  | s    |
| Operating Temperature Range                       | D Package | -20 to +80  | °C   |
| Storage Temperature Range                         | D Package | -55 to +150 | °C   |

Note 1: 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 1 V is applied between the inputs unless some limiting resistance is used.

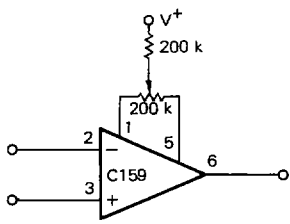
2: For supply voltages less than ±15 V, the maximum input voltage is equal to the supply voltage.

\* See thermal information in chapter 11.

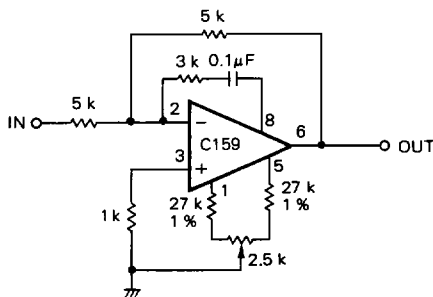
**ELECTRICAL CHARACTERISTICS (Ta = 25°C, V<sup>±</sup> = ±15 V)**

| CHARACTERISTIC                  | MIN.   | TYP.    | MAX. | UNIT | CONDITIONS                                    |
|---------------------------------|--------|---------|------|------|---|
| Input Offset Voltage            |        | 4       | 10   | mV   | R <sub>S</sub> = 100 Ω                        |
| Input Offset Current            |        | 30      | 200  | nA   |   |
| Input Bias Current              |        | 150     | 500  | nA   |   |
| Input Impedance                 | 0.5    | 3       |      | MΩ   |   |
| Large Signal Voltage Gain       | 25,000 | 200,000 |      |      | V <sub>O</sub> = ±10 V, R <sub>L</sub> ≥ 2 kΩ |
| Slew Rate                       | 50     | 70      |      | V/μs | A <sub>v</sub> = 1                            |
| Output Voltage Swing            | ±12    | ±13     |      | V    | R <sub>L</sub> ≥ 2 kΩ                         |
| Common Mode Input Voltage Range | ±11.5  |         |      | V    |   |
| Common Mode Rejection Ratio     | 70     | 100     |      | dB   |   |
| Supply Voltage Rejection Ratio  | 65     | 80      |      | dB   |   |
| Supply Current                  |        | 5       | 10   | mA   | R <sub>L</sub> = ∞, V <sub>O</sub> = 0V       |

Offset Balancing Circuit



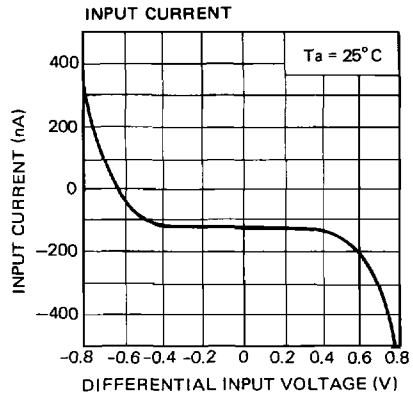
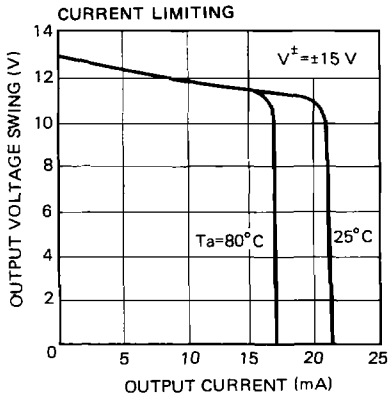
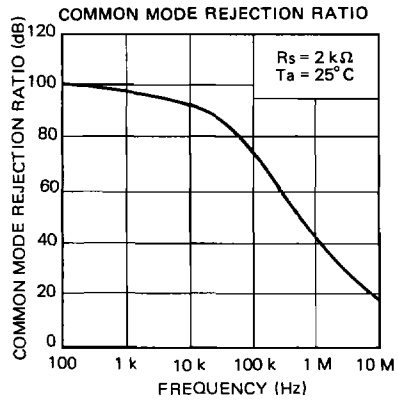
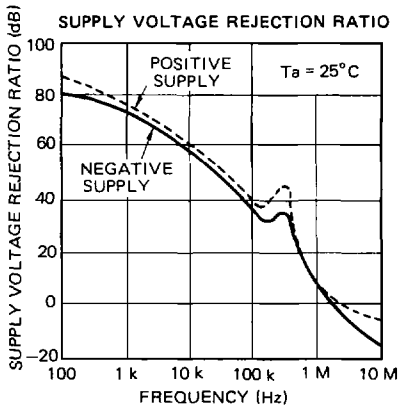
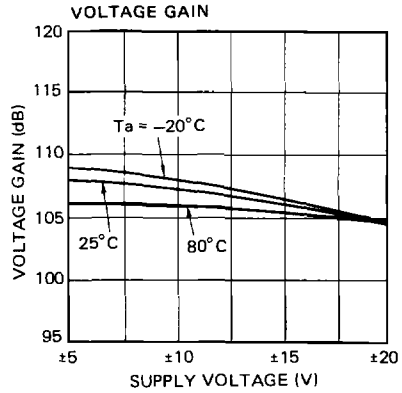
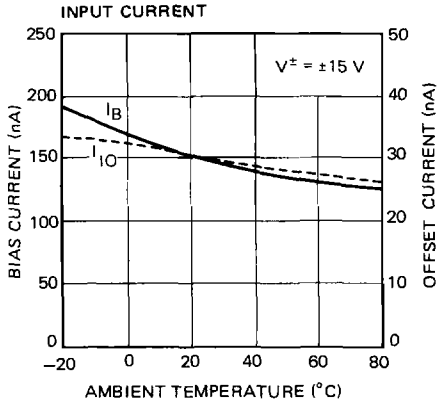
Feedforward Compensation for Greater Inverting Slew Rate

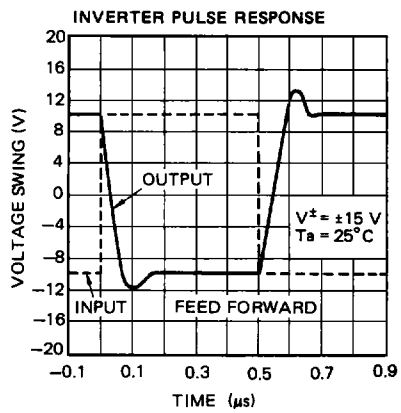
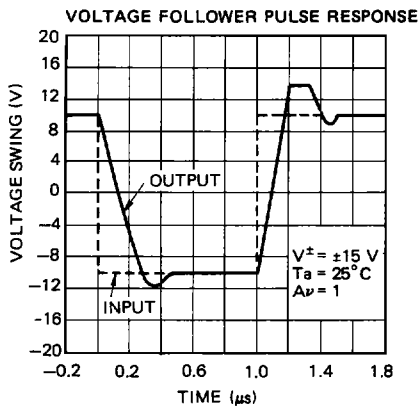
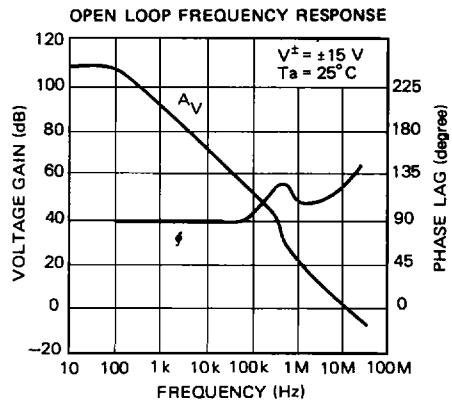
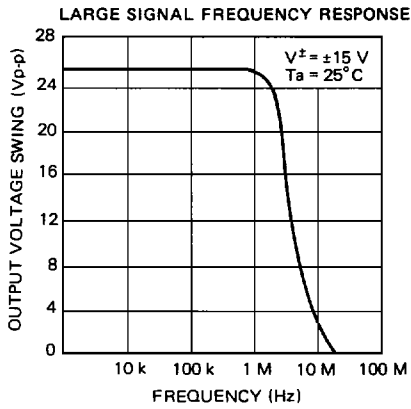


\*Slew rate typically 150 V/μs  
\*Balance circuit necessary for increased slew



**TYPICAL PERFORMANCE CHARACTERISTICS (Ta = 25°C)**





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