NEC
NEC Electronics Inc.

μPC318
HIGH-SPEED OPERATIONAL AMPLIFIER

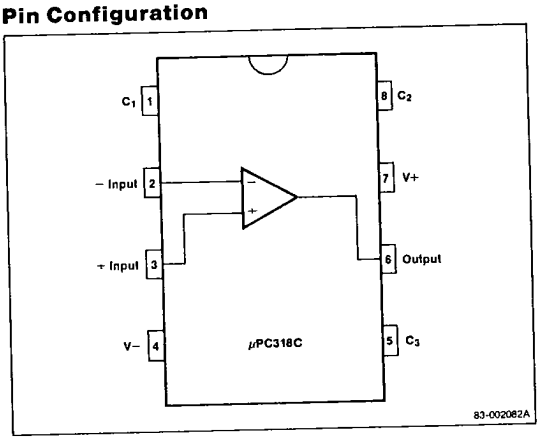
Description

The μPC318 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 compared to general purpose operational amplifiers, without degrading the DC performance. By incorporating internal unity gain frequency compensation, external compensation components are eliminated. The high-speed and fast settling time of the μPC318 make it ideal for use in D/A converters, oscillators, sample 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

Pin Configuration



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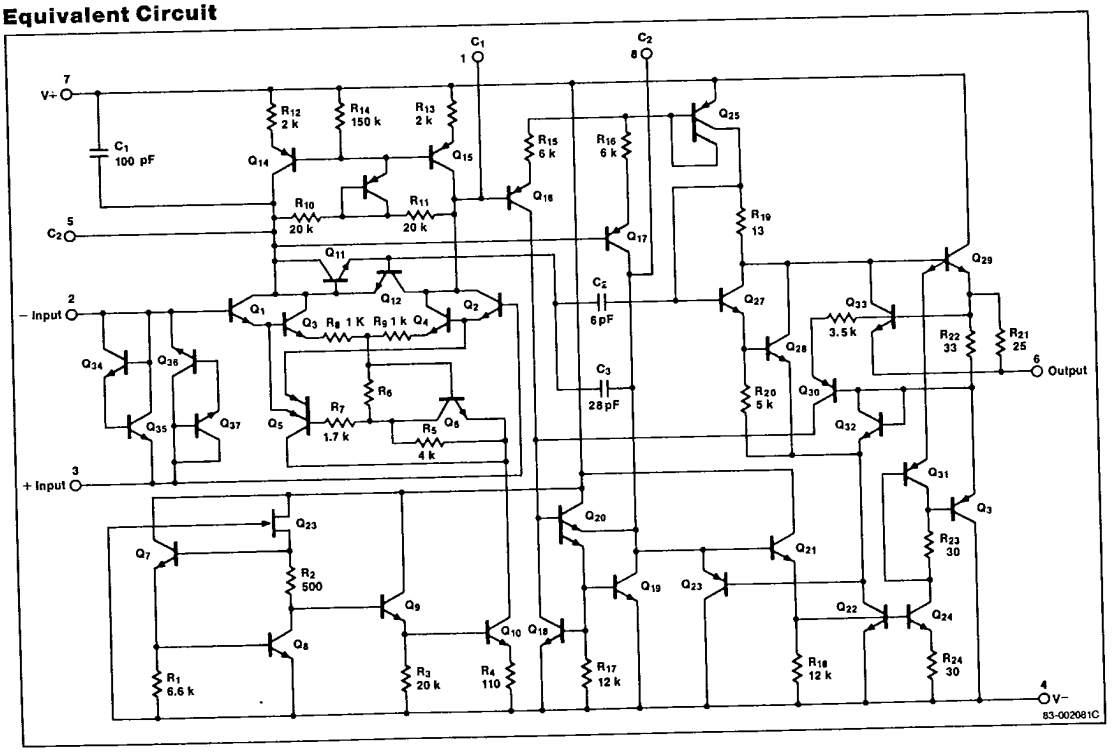
Equivalent Circuit



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Ordering Information

Part Number	Package	Operating Temperature Range
μPC318C	Plastic DIP	0°C to +70°C

Absolute Maximum Ratings

$T_A = 25°C$

Voltage Between V^+ and V^-	40 V
Power Dissipation	500 mW
Differential Input Current (Note 1)	±10 mA
Input Voltage (Note 2)	±15 V
Output Short Circuit Duration	Indefinite
Operating Temperature Range	0°C to +70°C
Storage Temperature Range	−55 to +150°C

Notes: 1. The inputs are shunted with back-to-back diodes for over-voltage 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 absolute maximum input voltage is equal to the supply voltage.

Comment: Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

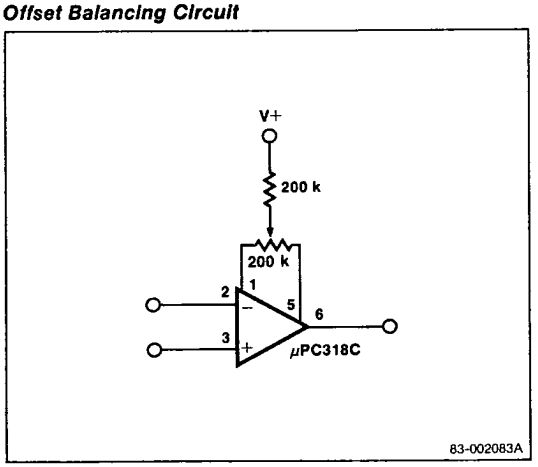
Electrical Characteristics

$T_A = 25°C$, $V^{\pm} = \pm 15$ V

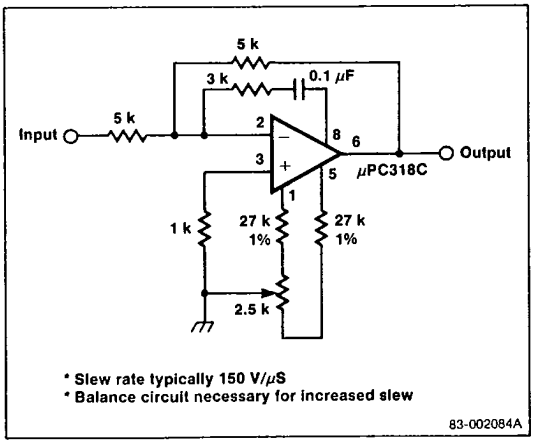
Parameter	Symbol	Limits Min.	Typ.	Max.	Unit	Test Conditions
Input Offset Voltage	V_{IO}		4	10	mV	$R_S = 100\ \Omega$
Input Offset Current	I_{IO}		30	200	nA	
Input Bias Current	I_b		150	500	nA	
Input Impedance	R_{IN}	0.5	3		MΩ	
Large Signal Voltage Gain	A_{VOL}	88	106		dB	$V_O = \pm 10$ V, $R_L \geq 2$ kΩ
Slew Rate	SR	50	70		V/μs	$A_V = 1$
Output Voltage Swing	V_{OM}	±12	±13		V	$R_L \geq 2$ kΩ
Common Mode Input Voltage Range	V_{ICM}	±11.5				
Common Mode Rejection Ratio	CMRR	70	100		dB	
Supply Voltage Rejection Ratio	SVRR	65	80		dB	
Supply Current	I_{CC}		5	10	mA	$R_L = \infty$, $V_O = 0$ V

Typical Applications

Offset Balancing Circuit



Feedforward Compensation for Greater Inverting Slew Rate



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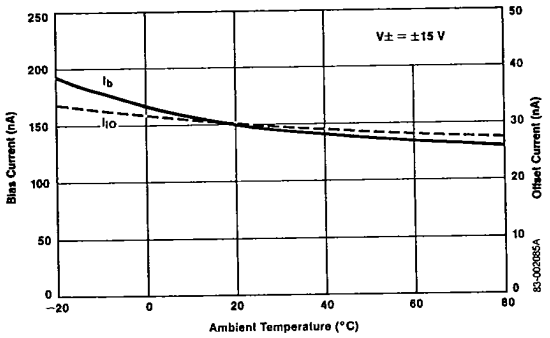
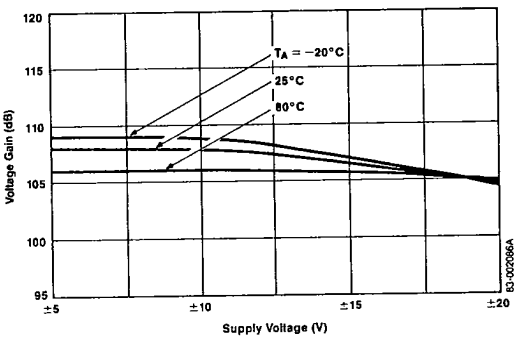
Operating Characteristics

$T_A = 25°C$

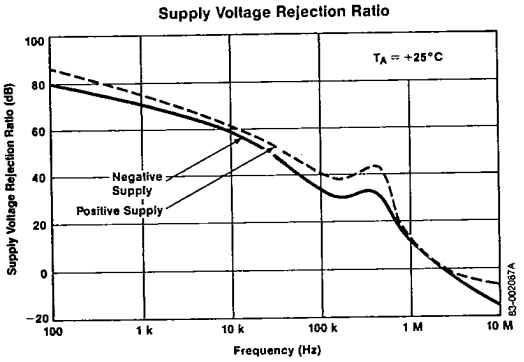
Input Current



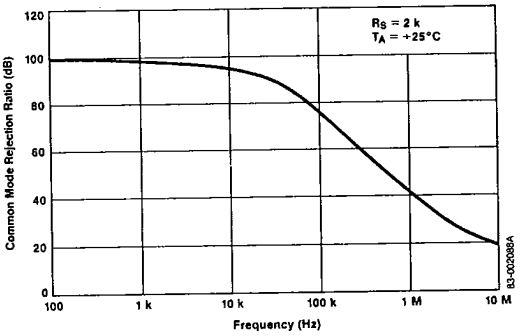
Voltage Gain



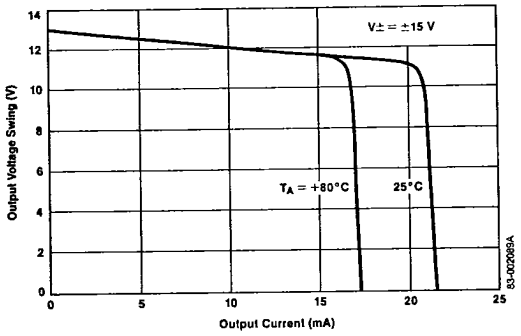
Supply Voltage Rejection Ratio



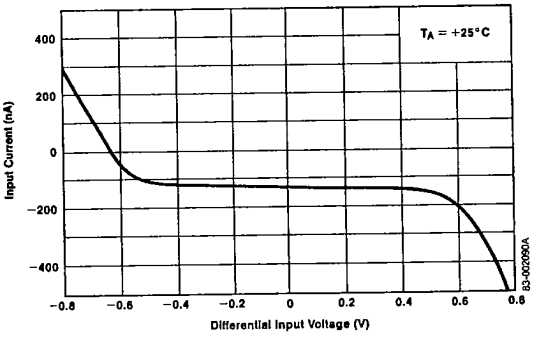
Common Mode Rejection Ratio



Current Limiting



Input Current



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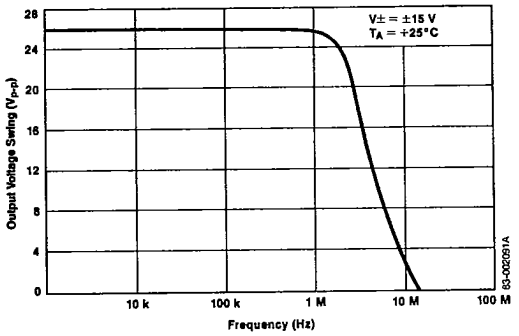
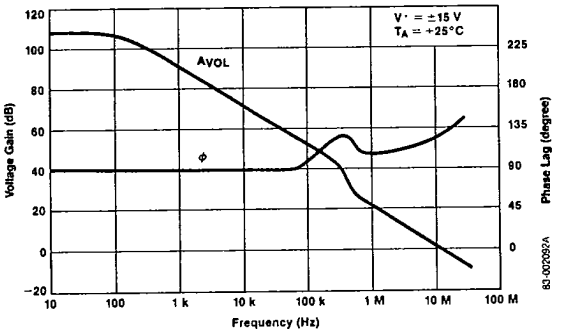
Operating Characteristics (Cont.)

$T_A = 25°C$

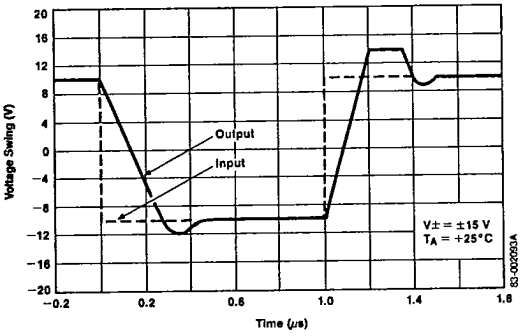
Large Signal Frequency Response



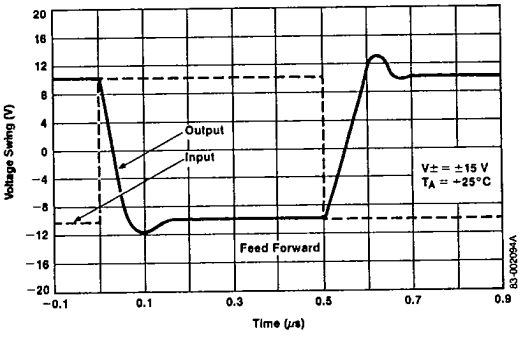
Open Loop Frequency Response



Voltage Follower Pulse Response



Inverter Pulse Response



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