PRECISION HIGH-SPEED OPERATIONAL AMPLIFIER

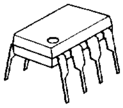
■ GENERAL DESCRIPTION

The NJM318 is precision high speed operational amplifiers which designed for applications requiring wide bandwidth and high slew rate. They feature a factor of ten increase in speed over general purpose devices without sacrificing DC performance.

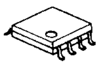
The NJM318 has internal unity gain frequency compensation. This considerably simplifies its application since no external components are necessary for operation. However, unlike most internally compensated Amplifiers, external frequency compensation may be added for optimum performance. For inverting applications, feedforward compensation will boost the slew rate to over 150V/ μs and almost double the bandwidth. Overcompensation can be used with the amplifier for greater stability when maximum bandwidth is not needed. Further, a single capacitor can be added to reduce the 0.1% setting time to under 1 μs.

The high speed and fast setting 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 NJM 741.

■ PACKAGE OUTLINE



NJM318D

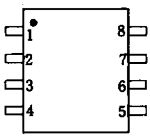


NJM318M

■ FEATURES

- Operating Voltage (±5V~±20V)
- Wide Unity Gain Bandwidth (15MHz typ.)
- High Slew Rate (50V/ μs typ.)
- Package Outline DIP8, DMP8
- Bipolar Technology

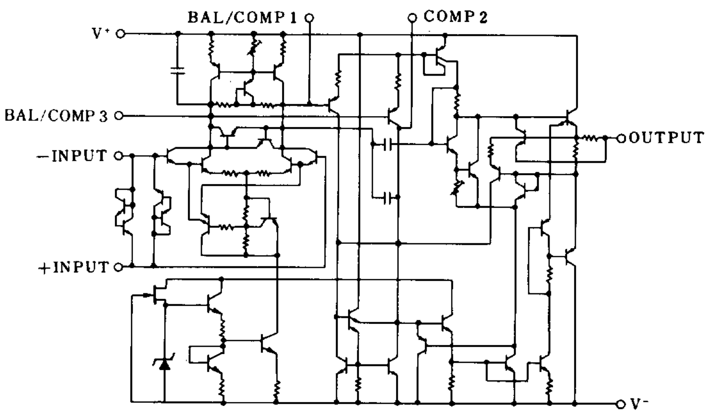
■ PIN CONFIGURATION



NJM318D
NJM318M

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

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	±20	V
Differential Input Voltage	V_{IO}	±10mA(note 1)	V
Input Voltage (note)	V_{ID}	±15V(note 2)	V
Power Dissipation	P_D	(DIP8) 500	mW
		(DMP8) 300	mW
Operating Temperature Range	T_{opr}	−20～+75	℃
Storage Temperature Range	T_{stg}	−40～+125	℃

(note 1) A current limiting resistance is required when the input voiyage is higher than 1V.
(note 2) For supply voltage less than ± 15V. the absolute maximum input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

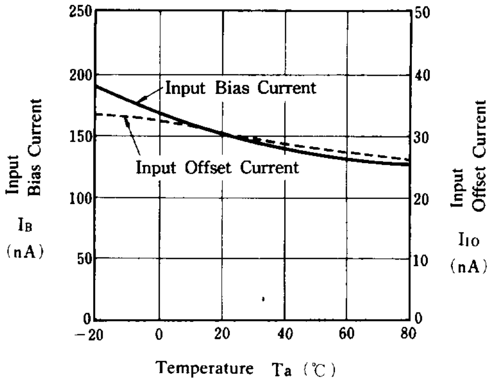
(Ta =+25℃, V^+/V^-=±15V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}		—	4	10	mV
Input Offset Current	I_{IO}		—	30	200	nA
Input Bias Current	I_{IB}		—	150	500	nA
Input Resistance	R_{IN}		0.5	—	—	MΩ
Operating Current	I_{CC}		—	5	10	mA
Large Signal Voltage Gain	A_V	R_L≧2kΩ, V_O=±10V	88	106	—	dB
Slew Rate	SR	A_V=1, R_S=10kΩ	50	70	—	V/μs
Unity Gain Bandwidth	f_T		—	15	—	MHz
Input Voltage Range	V_{ICM}		±11.5	—	—	V
Common Mode Rejection Ratio	CMR		70	100	—	dB
Supply Voltage Rejection Ratio	SVR		65	80	—	dB
Output Voltage Swing	V_{OM}	R_L=2kΩ	±12	±13	—	V

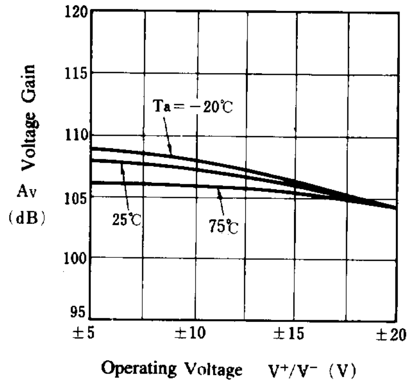
■ TYPICAL CHARACTERISTICS

Input Bias Current, Input Offset Current vs. Temperature

(V⁺/V⁻ = ± 15V)

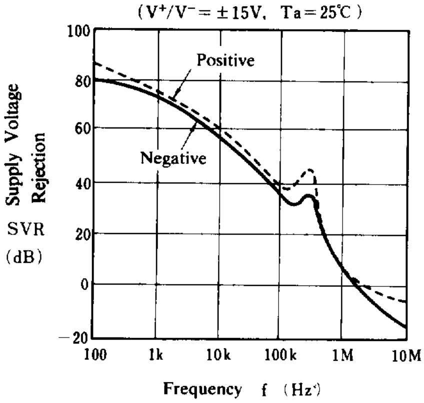


Voltage Gain vs. Operating Voltage



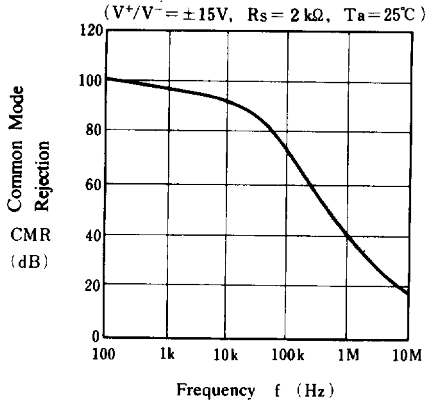
Supply Voltage Rejection vs. Frequency

(V⁺/V⁻ = ±15V, Ta = 25℃)



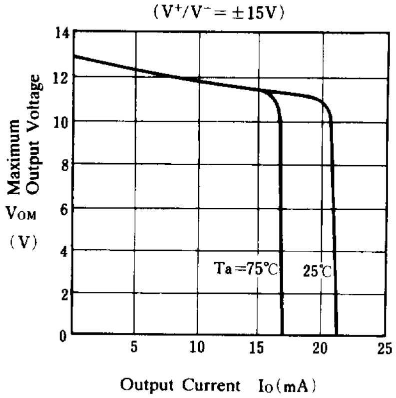
Common Mode Rejection vs. Frequency

(V⁺/V⁻ = ±15V, Rs = 2 kΩ, Ta = 25℃)



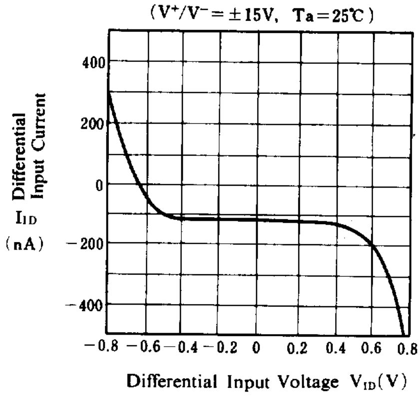
Current Limitting

(V⁺/V⁻ = ±15V)



Differential Input Current vs. Differential Input Voltage

(V⁺/V⁻ = ±15V, Ta = 25℃)

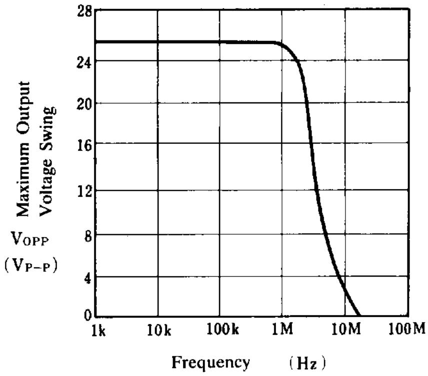


4

■ TYPICAL CHARACTERISTICS

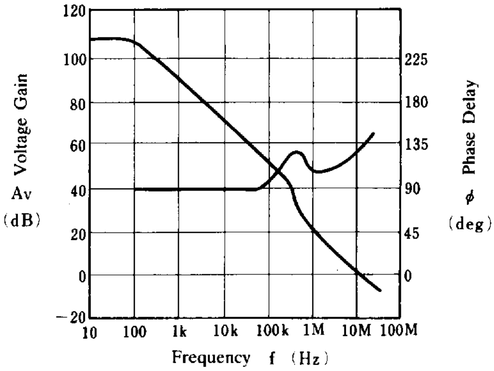
Maximum Output Voltage Swing

($V^+/V^-=\pm15V$, Ta=25°C)



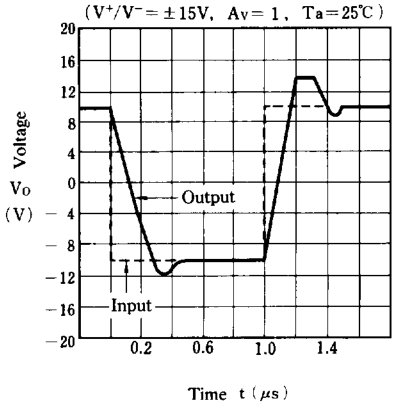
Voltage Gain, Phase vs. Frequency

($V^+/V^-=\pm15V$, Ta=25°C)



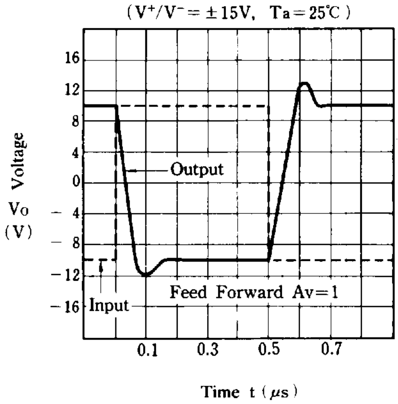
Pulse Response [I]

($V^+/V^-=\pm15V$, Av=1, Ta=25°C)

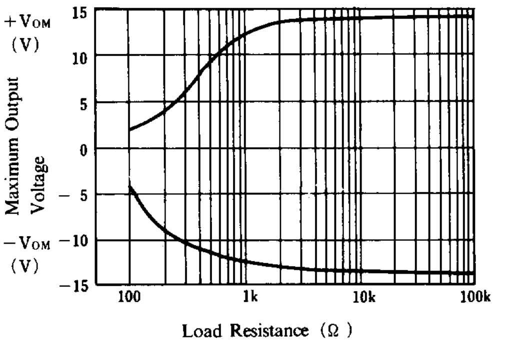


Pulse Response [II]

($V^+/V^-=\pm15V$, Ta=25°C)

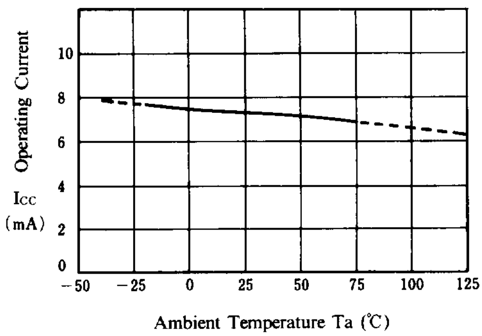


Maximum Output Voltage vs. Load Resistance

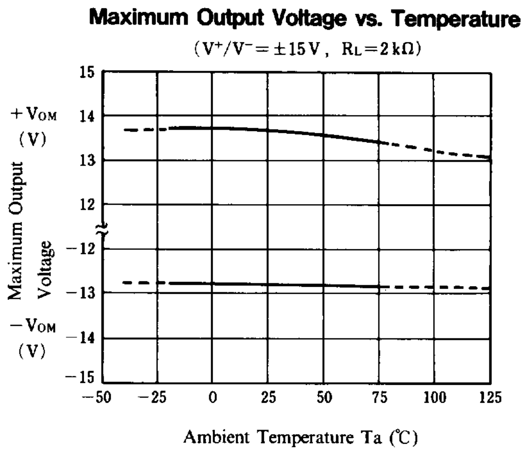


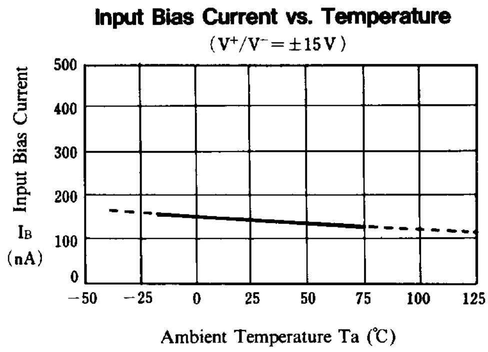
Operating Current vs. Temperature

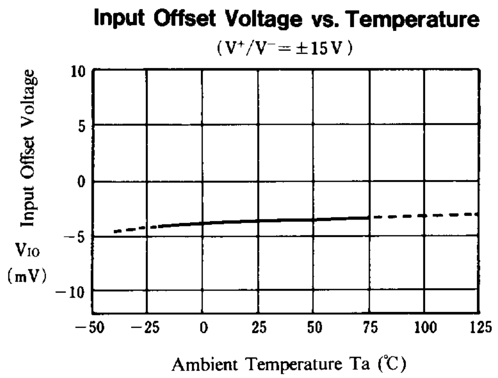
($V^+/V^-=\pm15V$)



■ TYPICAL CHARACTERISTICS

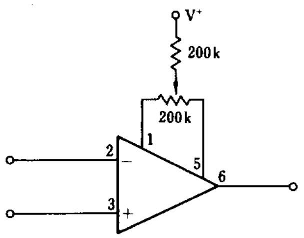






■ ADJUSTMENT METHOD

○ offset Adjustment



○ Feedforward Compensation