LOW VOLTAGE C-MOS OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

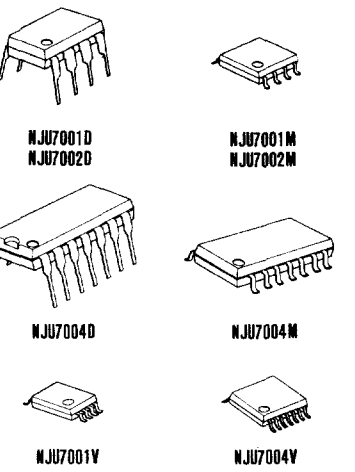
The NJU7001, 02 and 04 are single, dual and quad C-MOS Operational Amplifiers operated on a single-power-supply, low voltage and low operating current.

The minimum operating voltage is 1V and the output stage permits output signals to swing between both of the supply rails.

The input bias current is as low as less than 1pA, consequently the very small signal around the ground level can be amplified.

Furthermore, the operating current is also as low as 15 μA(typ) per circuit, therefore it can be applied especially to battery operated items.

■ PACKAGE OUTLINE



NJU7001D
NJU7002D

NJU7001M
NJU7002M

NJU7004D

NJU7004M

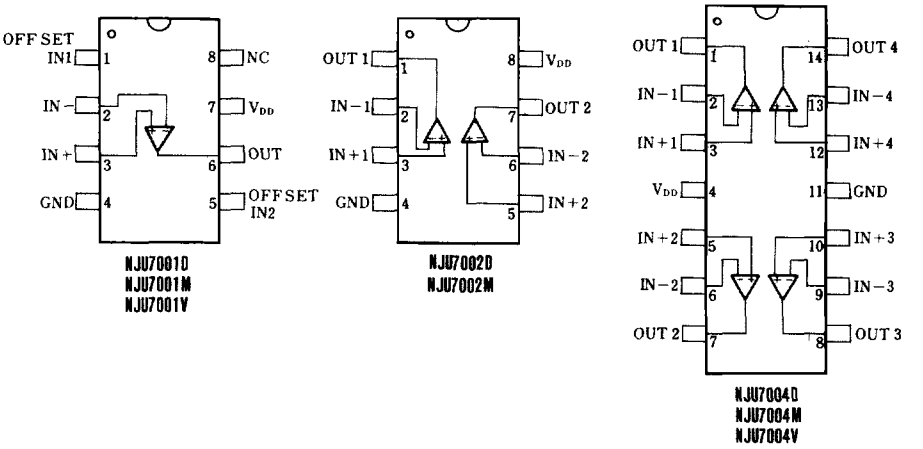
NJU7001V

NJU7004V

■ FEATURES

- Single-Power-Supply
- Wide Operating Voltage (V_{DD}=1～16V)
- Wide Output Swing Range (V_{OM}=2.94V typ. at V_{DD}=3V)
- Low Operating Current (15 μA/circuit)
- Low Bias Current (I_{IB}=1pA)
- Internal Compensation Capacitor
- External Offset Null Adjustment (Only NJU7001)
- Package Outline DIP/DMP/SSOP 8 (NJU7001)
  DIP/DMP 8 (NJU7002)
  DIP/DMP/SSOP 14 (NJU7004)
- C-MOS Technology

■ PIN CONFIGURATION

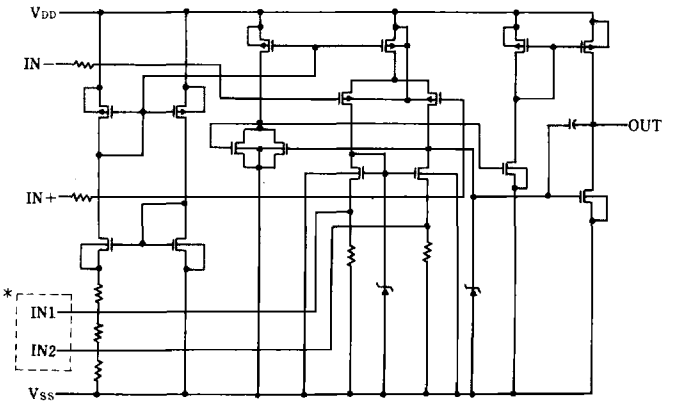


NJU7001D
NJU7001M
NJU7001V

NJU7002D
NJU7002M

NJU7004D
NJU7004M
NJU7004V

■ EQUIVALENT CIRCUIT



*IN1, IN2 are only for NJU7001(NJU7002/04 don't have these terminals).

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	18	V
Differential Input Voltage	V_{ID}	±18 *1	V
Common Mode Input Voltage	V_{IC}	−0.3～18	V
Power Dissipation	P_D	(DIP14) 700	mW
		(DIP8) 500	
		(DMP8,14) 300	
		(SSOP8,14) 300	
Operating Temperature	T_{opr}	−20～+75	℃
Storage Temperature	T_{stg}	−40～+125	℃

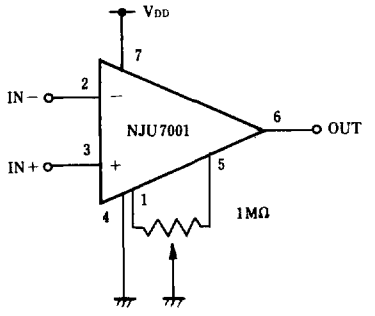
*1) If the supply voltage (V_{DD}) is less than 18V, the input voltage must not over the V_{DD} level though 18V is limit specified.

■ ELECTRICAL CHARACTERISTICS

(Ta=25℃, V_{DD}=3V, R_L=∞)

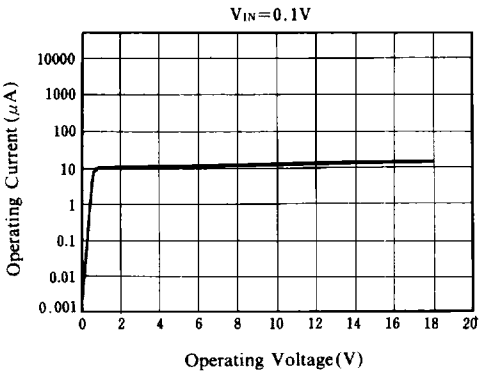
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	R_S=50Ω			10	mV
Input Offset Current	I_{IO}			1		pA
Input Bias Current	I_{IB}			1		pA
Input Impedance	R_{IN}			1		TΩ
Large Signal Voltage Gain	A_V		80	90		dB
Input Common Mode Voltage Range	V_{ICM}		0～2			V
Maximum Output Swing Voltage	V_{OM}	R_L=1MΩ	2.90	2.94		V
Common Mode Rejection Ratio	CMR		60	70		dB
Supply Voltage Rejection Ratio	SVR		60	70		dB
Operating Current / Circuit	I_{DD}			15	25	μA
Slew Rate	SR			0.05		V/μs
Unity Gain Bandwidth	F_t	A_V=40dB C_L=10pF		0.1		MHz

■ OFFSET ADJUSTMENT CIRCUIT (ONLY FOR NJU7001)

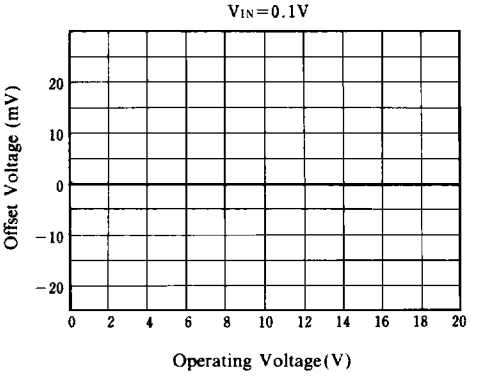


■ TYPICAL CHARACTERISTICS

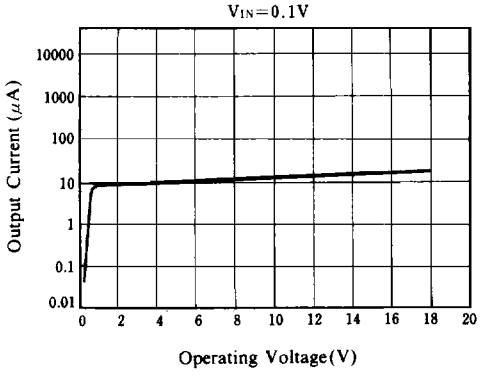
Operating Current vs. Operating Voltage



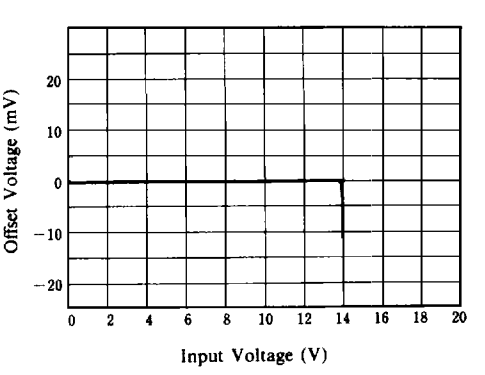
Offset Voltage vs. Operating Voltage



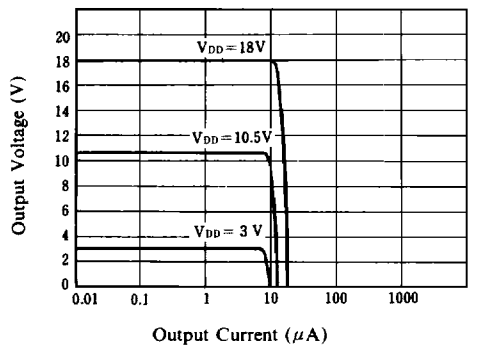
Output Current vs. Operating Voltage



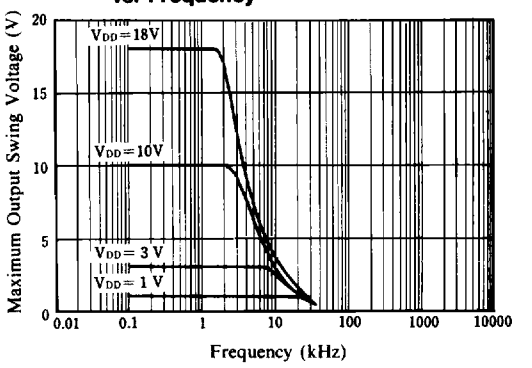
Offset Voltage vs. Input Voltage



Output Voltage vs. Output Current

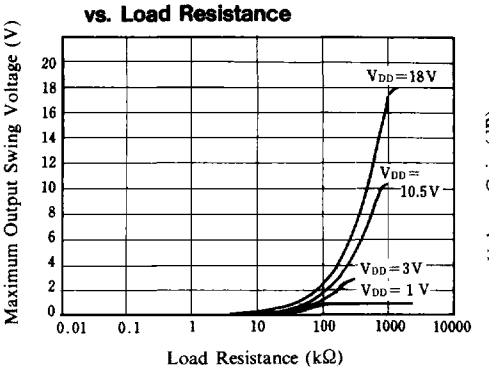


Maximum Output Swing Voltage vs. Frequency



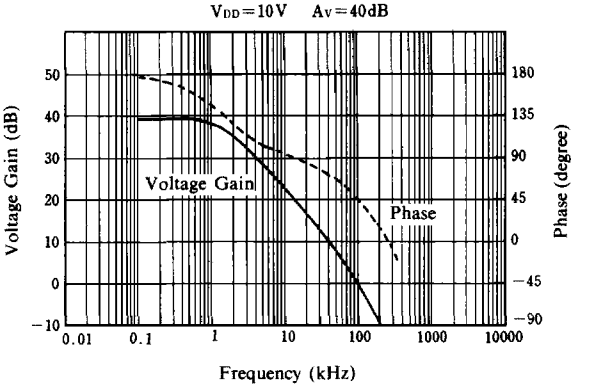
■ TYPICAL CHARACTERISTICS

Maximum Output Swing Voltage vs. Load Resistance



Voltage Gain · Phase vs. Frequency

VDD=10V Av=40dB



Equivalent Input Noise Voltage vs. Frequency

VDD=10V Av=40dB Rs=1kΩ