

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.

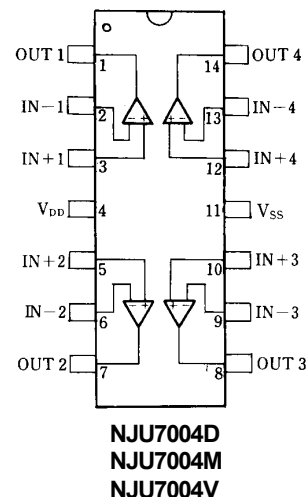
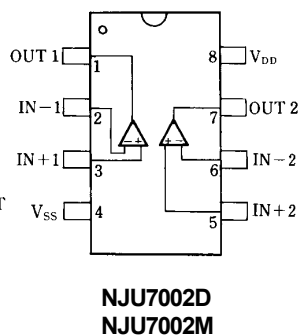
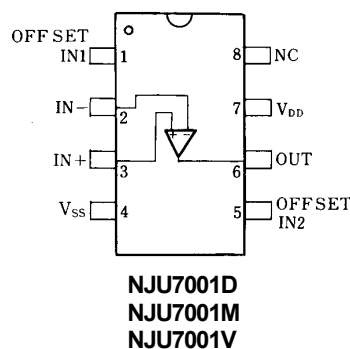
The input bias current is as low as less than 1pA, consequently the very small signal around the ground level can be amplified.

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

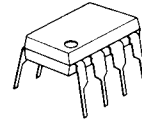
■ FEATURES

- Single-Power-Supply
- Wide Operating Voltage ($V_{DD}=1\sim 16V$)
- Wide Output Swing Range ($V_{OM}=2.94V$ typ.at $V_{DD}=3V$)
- Low Operating Current ($15\mu A/circuit$)
- Low Bias Current ($I_B=1pA$)
- Internal Compensation Capacitor
- External Offset Null Adjustment (Only NJU7001)
- Package Outline
 DIP/DMP/SSOP8 (NJU7001)
 DIP/DMP8 (NJU7002)
 DIP/DMP/SSOP14 (NJU7004)
- C-MOS Technology

■ PIN CONFIGURATION



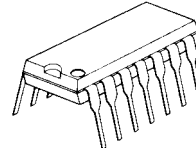
■ PACKAGE OUTLINE



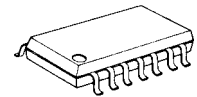
NJU7001U
NJU7002U



NJU7001M
NJU7002M



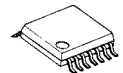
NJU7004D



NJU7004M

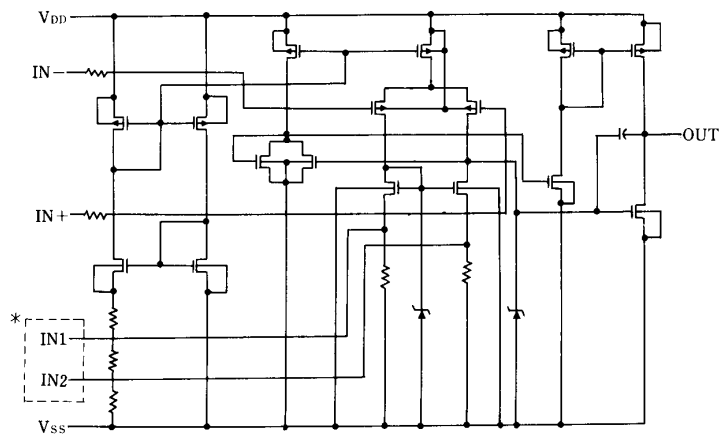


NJU7001V



NJU7004V

■ EQUIVALENT CIRCUIT



*The terminals IN1, IN2 are only for NJU7001 (NJU7002/7004 don't have these terminals).

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

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

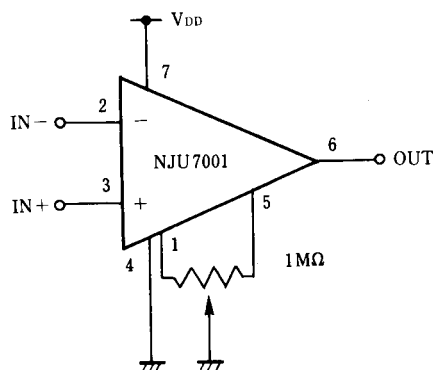
(note) If the supply voltage (V_{DD}) is less than 18V, the input voltage must not over the V_{DD} level though 18V is limit specified.

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, $V_{DD}=3V, R_L=\infty$)

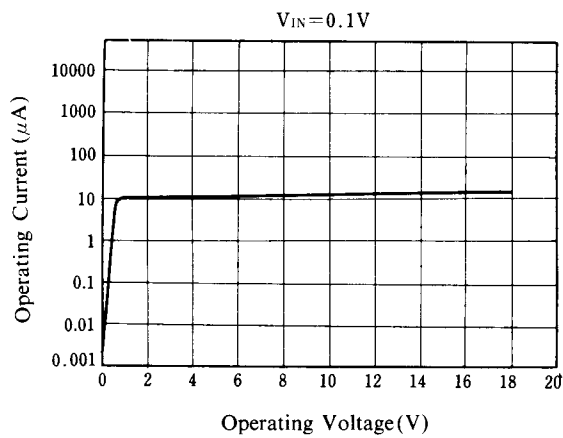
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	$R_S=50\Omega$	-	-	10	mV
Input Offset Current	I_{IO}		-	1	-	pA
Input Bias Current	I_{IB}		-	1	-	pA
Input Impedance	R_{IN}		-	1	-	TΩ
Large Signal Voltage Gain	A_V		80	90	-	dB
Input Common Mode Voltage Range	V_{ICM}		0~2	-	-	V
Maximum Output Swing Voltage	V_{OM}	$R_L=1M\Omega$	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)

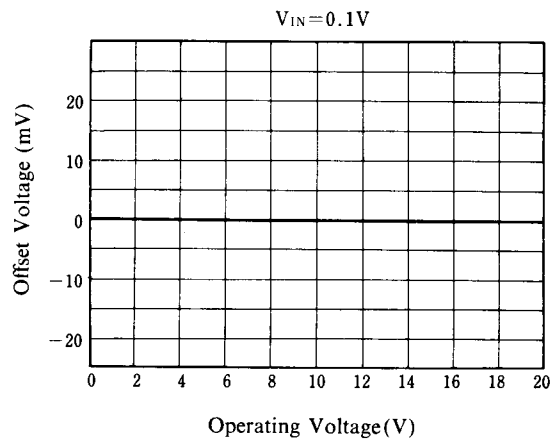


■ TYPICAL CHARACTERISTICS

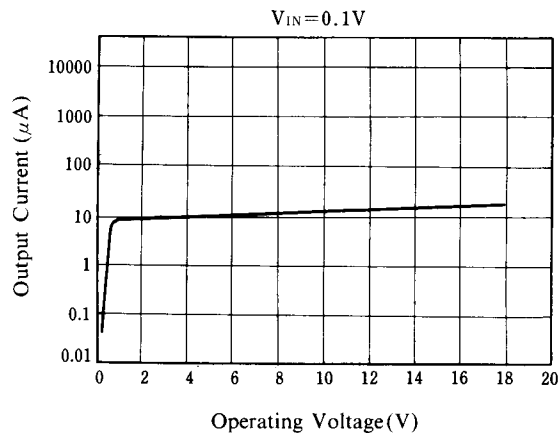
Operating Current vs. Operating Voltage



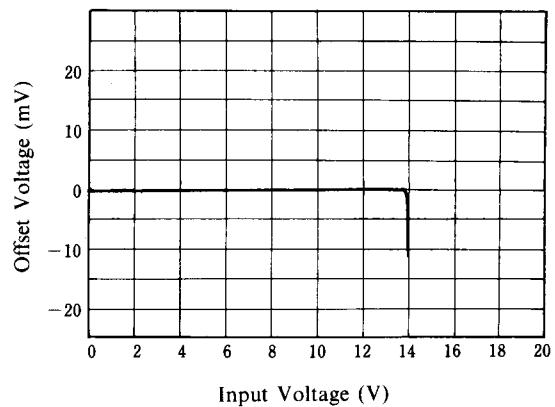
Offset Voltage vs. Operating Voltage



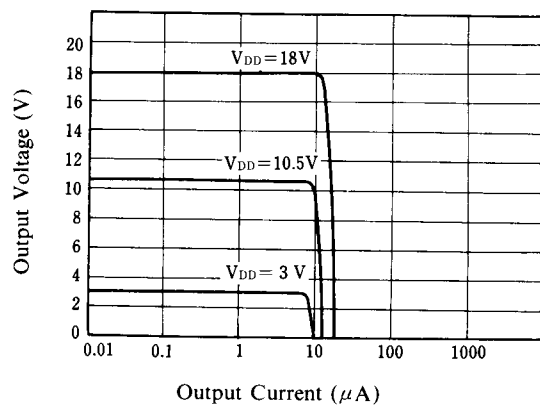
Output Current vs. Operating Voltage



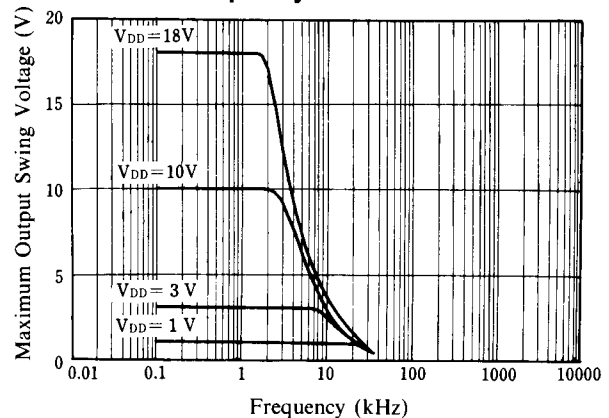
Offset Voltage vs. Input Voltage



Output Voltage vs. Output Current

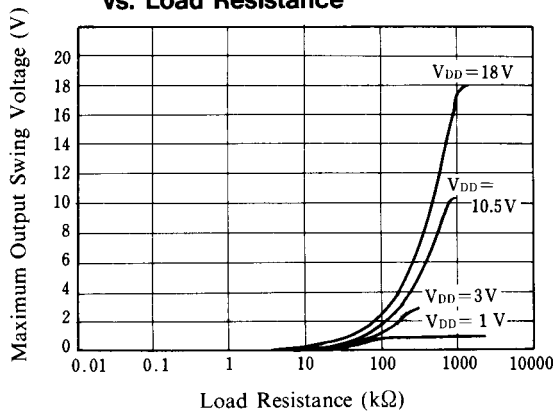


Maximum Output Swing Voltage vs. Frequency

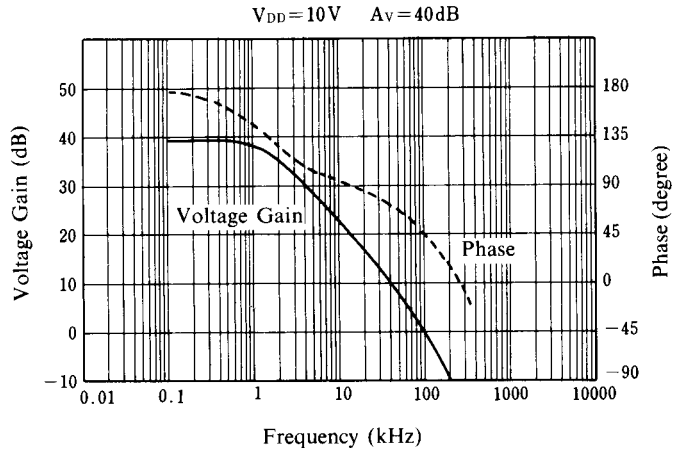


■ TYPICAL CHARACTERISTICS

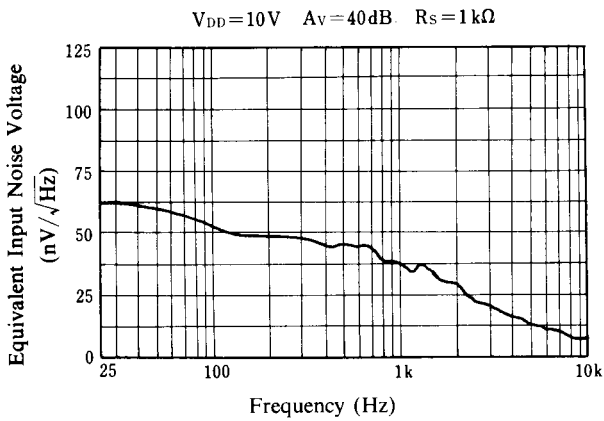
Maximum Output Swing Voltage vs. Load Resistance



Voltage Gain • Phase vs. Frequency



Equivalent Input Noise Voltage vs. Frequency



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