PRELIMINARY

LOW-POWER LOW-OFFSET-VOLTAGE C-MOS DUAL OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

The NJU7094, 95 and 96 are dual C-MOS Operational Amplifiers operated on a single-power-supply, low voltage and low operating current.

The input offset voltage is lower than 2mV.

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, this series is packaged with a various small one therefore it can be especially applied to portable items.

■ PACKAGE OUTLINE

NJU709XD

NJU709XM

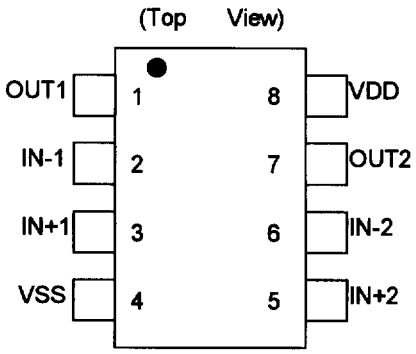
NJU709XV

NJU709XR

■ FEATURES

- Single-Power-Supply
- Wide Operating Voltage (V_{DD}=1～5.5V)
- Wide Output Swing Range ($V_{OM} \geqq$2.9V min. at V_{DD}=3.0V)
- Low Operating Current
- Low Offset Voltage (V_{IO}=2mV max)
- Low Bias Current (I_{IB}=1pA typ.)
- Compensation Capacitor incorporated
- Package Outline DIP 8/DMP 8/SSOP 8/VSP 8
- C-MOS Technology

■ PIN CONFIGURATION



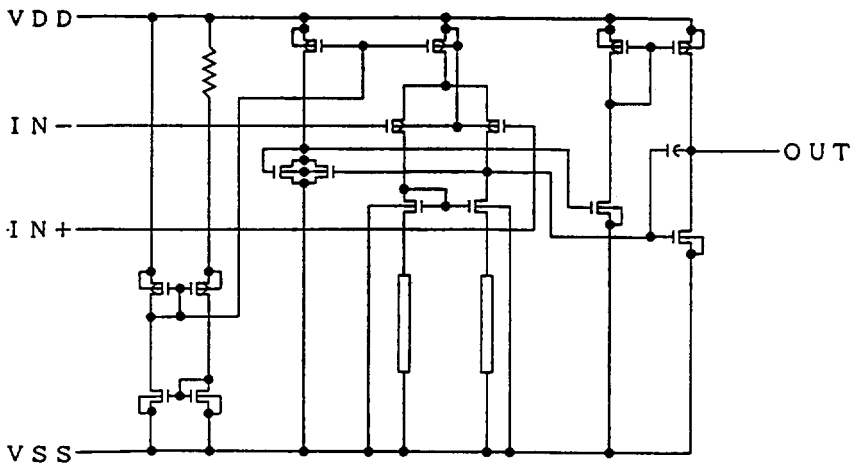
■ LINE-UP

(V_{DD}=3.0V)

	NJU7094	NJU7095	NJU7096	UNIT
operating current	15	80	200	μA (typ.)
Slew Rate	0.1	1.0	2.4	V/μs(typ.)
Unity Gain Bandwidth	0.2	1.0	1.0	MHz (typ.)

(Per a circuit)

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	6.5	V
Differential Input Voltage	V_{ID}	±6.5 Note1	V
Common Mode Input Voltage	V_{IC}	- 0.3~6.5	V
Power Dissipation	P_D	(DIP-8) 500 (DMP-8) 300 (SSOP-8) 300 (VSP-8) 300	mW
Operating Temperature	Topr	- 40~+ 85	℃
Storage Temperature	Tstg	- 55~+125	℃

Note1) If the supply voltage (V_{DD}) is less than 6.5V, the input voltage must not over the V_{DD} level though 6.5V is limit specified.

Note2) Decoupling capacitor should be connected between V_{DD} and V_{SS} due to the stabilized operation for the circuit.

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■ ELECTRICAL CHARACTERISTICS

NJU7094

(Ta=25℃, V_{DD}=3.0V, R_L=∞)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IO}	V_{IN}=1/2V_{DD}			2	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		60	70		dB
Input Common Mode Voltage Range	V_{ICM}		0~2.5			V
Maximum Output Swing Voltage	V_{OM}	R_L=1MΩ	VDD-0.1			V
	V_{OM}	R_L=1MΩ			VSS+0.1	
Common Mode Rejection Ratio	CMR	VIN=0~2.5V	55	65		dB
Supply Voltage Rejection Ratio	SVR	VDD=1.5~5.5V	60	70		dB
Operating Current(Per a circuit)	I_{DD}			15	25	μA
Slew Rate	SR			0.1		V/μs
Unity Gain Bandwidth	F_t	A_V=40dB C_L=10pF		0.2		MHz

NOTE3) The source current is required less than 2.9μA.

NJU7095 (Ta=25℃, V_{DD}=3.0V, R_L=∞)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IO}	V_{IN}=1/2V_{DD}			2	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		60	70		dB
Input Common Mode Voltage Range	V_{ICM}		0～2.5			V
Maximum Output Swing Voltage	V_{OM}	R_L=100kΩ	VDD-0.1			V
	V_{OM}	R_L=100kΩ			VSS+0.1	
Common Mode Rejection Ratio	CMR	VIN=0～2.5V	55	65		dB
Supply Voltage Rejection Ratio	SVR	VDD=1.5～5.5V	60	70		dB
Operating Current(Per a circuit)	I_{DD}			80	160	μA
Slew Rate	SR			1.0		V/μs
Unity Gain Bandwidth	F_t	A_V=40dB C_L=10pF		1.0		MHz

NOTE4) The source current is required less than 29μA.

NJU7096 (Ta=25℃, V_{DD}=3.0V, R_L=∞)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IO}	V_{IN}=1/2V_{DD}			2	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		60	70		dB
Input Common Mode Voltage Range	V_{ICM}		0～2.5			V
Maximum Output Swing Voltage	V_{OM}	R_L=50kΩ	VDD-0.1			V
	V_{OM}	R_L=50kΩ			VSS+0.1	
Common Mode Rejection Ratio	CMR	VIN=0～2.5V	55	65		dB
Supply Voltage Rejection Ratio	SVR	VDD=1.5～5.5V	60	70		dB
Operating Current(Per a circuit)	I_{DD}			200	400	μA
Slew Rate	SR			2.4		V/μs
Unity Gain Bandwidth	F_t	A_V=40dB C_L=10pF		1.0		MHz

NOTE5) The source current is required less than 58μA.