SINGLE LOW VOLTAGE C-MOS POWER AMPLIFIER

■ GENERAL DESCRIPTION

The NJU7081 is a single C-MOS Power Amplifier which is available to operate with single power supply and low voltage.

The NJU7081 realizes neary full-swing output with low voltage operation (2.4V). An output voltage is kept more than V_{DD}-0.3V or less than V_{SS}+0.3V when output current is 40mA, therefore it is suitable for an ear-set and a small size speaker driver of the battery operated audio items, especially cellular phone.

■ PACKAGE OUTLINE

NJU7081M

NJU7081V

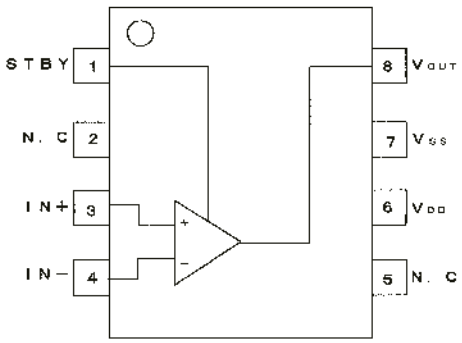
NJU7081R

NJU7081RB1

■ FEATURES

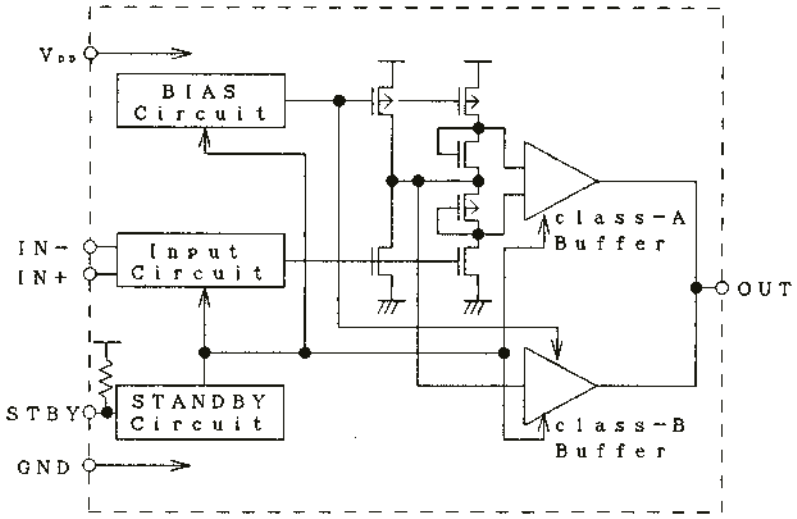
- Single Power Supply
- Wide Operation Voltage Range (V_{DD} 2.4V ~ 5.5V)
- Neary Full-Swing Output
  (V_{SS}+0.3V~V_{DD}-0.3V at Iout=±40mA)
- Low Distortion
  (0.05% at RL=38ohm, 1.0Vp-p)
- Low Operating Current
  (1.5mA at V_{DD}=3V)
- Stand-by Function
  (1.0μA at V_{DD}=3V)
- Package Outline — DMP8 / SSOP8 / VSP8 / TVSP8
- C-MOS Technology

■ PIN CONFIGURATION



Note1) STBY terminal
"H" or "OPEN" : Stand-by operation
"L" : Normal operation

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	7	V
Input Voltage	V_{ID}	V_{SS}- 0.3 ～ V_{DD}+0.3	V
Power Dissipation	P_D	250(VSP8, TVSP8, SSOP8) 300(DMP8)	mW
Operating Temperature	T_{opr}	- 25 ～ + 75	°C
Storage Temperature	T_{stg}	- 40 ～ +125	°C

■ ELECTRICAL CHARACTERISTICS 1

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V_{DD}		2.4		5.5	V

■ ELECTRICAL CHARACTERISTICS 2 (V_{DD}=3V)

(Ta=25°C, V_{DD}=3V, V_{SS}=0V, f=1kHz)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I_{DD}	No Load Condition : Voltage Follower V_O=1.5V		1.5	2	mA
Standby Current	I_{STB}				1.0	μA
Standby terminal Current	I_{PIN}	V_{DD}=3V, Vstb=0V		10		μA
Standby terminal Input Voltage	V_{STH}		0.8V_{DD}			V
	V_{STL}				0.2V_{DD}	
Input Offset Voltage	V_{IO}		-10		10	mV
Input Offset Current	I_{IO}			10		pA
Input Bias Current	I_{IB}			10		pA
Input Resistor	R_{IN}			10''		Ω
Input Common Mode Voltage Range	V_{ICM}		0.2～2			V
Maximum Output Voltage Range	V_{OM}	Iout= 40mA	2.6	2.7		V
		Iout=-40mA		0.3	0.4	
Maximum Output Current	I_{OM}	(D+N)/S<0.1% Source		30		mA
		(D+N)/S<0.1% Sink		-30		
Large-Signal Voltage gain	A_V		55			dB
Common Mode Rejection ration	CMRR	V_{ICM}=0.2～2.0V	53			dB
Supply Voltage Rejection ration	PSRR	V_{DD}=2.7～3.3V	55			dB
Total Harmonic Distortion	(D+N)/S	V_O=1.0Vp-p 0～10dB, 38Ω		0.05		%
Equivalent Input Noise Voltage	Ent	IEC-A		3		μVrms
Signal to Noise Ratio	S/N			110		dB
Unity Gain Bandwidth	Ft	CL=10pF, OPEN LOOP		1.5		MHz
Slew Rate	SR	Unity Gain Turn Over, CL=32pF RL=2kΩ		1		V/μs

NOTE2) The NJU7081 should be operated gaining of triple or more for stable operation.
NOTE3) When the NJU7081 using no-current-load and low gain application (voltage follower, etc.), oscillation will be worst. In this case, the stray capacitance of the output terminal should be less than 100pF.

■ ELECTRICAL CHARACTERISTICS 3 (V_{DD}=5V)

(Ta=25°C, V_{DD}=5V, V_{SS}=0V, f=1kHz)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I_{DD}	No Load Condition : Voltage Follower V_O=2.5V		3	4	mA
Standby Current	I_{STB}				1	μA
Standby terminal Current	I_{PIN}	V_{DD}=3V, Vstb=0V		30		μA
Standby terminal Input Voltage	V_{SIH}		0.8V_{DD}			V
	V_{SIL}				0.2V_{DD}	
Input Offset Voltage	V_{IO}		-10		10	mV
Input Offset Current	I_{IO}			10		pA
Input Bias Current	I_{IB}			10		pA
Input Resistor	R_{IN}			10^{11}		Ω
Input Common Mode Voltage Range	V_{ICM}		0.4～4			V
Maximum Output Voltage Range	V_{OM}	Iout= 40mA	4.6	4.7		V
		Iout=-40mA		0.3	0.4	
Maximum Output Current	I_{OM}	(D+N)/S<0.1% Source		30		mA
		(D+N)/S<0.1% Sink		-30		
Large-Signal Voltage gain	A_V		55			dB
Common Mode Rejection ration	CMRR	V_{ICM}=0.4～4.0V	53			dB
Supply Voltage Rejection ration	PSRR	V_{DD}=4.5～5.5V	55			dB
Total Harmonic Distortion	(D+N)/S	V_O=1.0Vp-p 0～10dB, 38Ω		0.05		%
Equivalent Input Noise Voltage	Ent	IEC-A		3		μVrms
Signal to Noise Ratio	S/N			110		dB
Unity Gain Bandwidth	Ft	CL=10pF, OPEN LOOP		1.5		MHz
Slew Rate	SR	Unity Gain Turn Over, CL=32pF RL=2kΩ		1		V/μs

NOTE4) The NJU7081 should be operated gaining of triple or more for stable operation.
NOTE5) When the NJU7081 using no-current-load and low gain application (voltage follower, etc.), oscillation will be worst. In this case, the stray capacitance of the output terminal should be less than 100pF.

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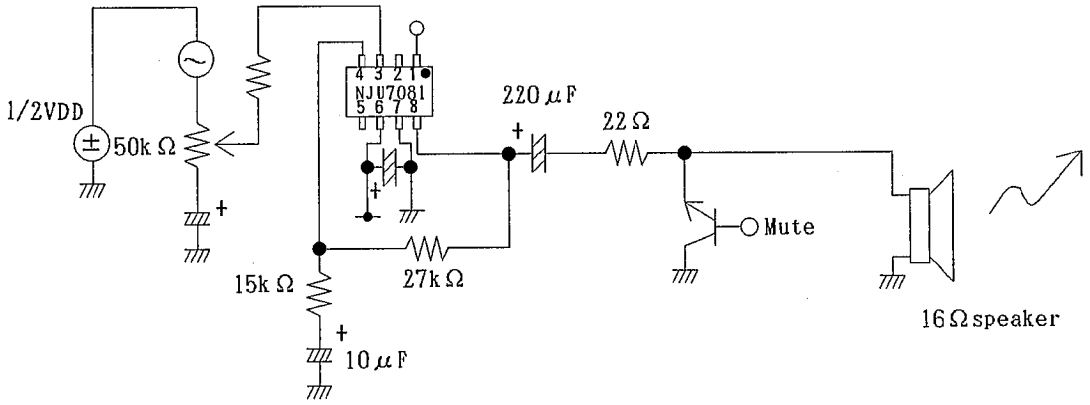
■ APPLICATION CIRCUIT



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