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New Japan Radio Co.,Ltd.

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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 nearly 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

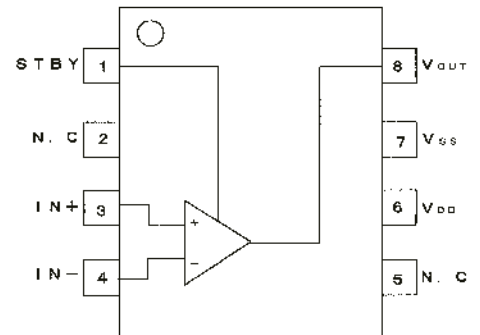


NJU7081RB1

■ FEATURES

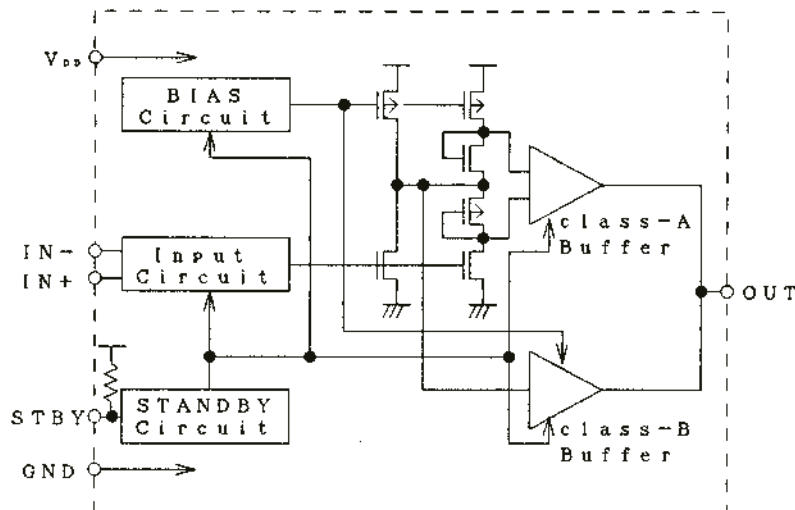
- Single Power Supply
- Wide Operation Voltage Range ( $V_{DD}$  2.4V ~ 5.5V)
- Nearly Full-Swing Output  
( $V_{SS}+0.3V \sim V_{DD}-0.3V$  at  $I_{out}=\pm 40mA$ )
- Low Distortion  
(0.05% at  $R_L=38\Omega$ , 1.0Vp-p)
- Low Operating Current  
(1.5mA at  $V_{DD}=3V$ )
- Stand-by Function  
(1.0 $\mu$ A 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 <sub>DD</sub>	7	V
Input Voltage	V <sub>ID</sub>	V <sub>SS</sub> -0.3 ~ V <sub>DD</sub> +0.3	V
Power Dissipation	P <sub>D</sub>	250 (VSP8, TVSP8, SSOP8) 300 (DMP8)	mW
Operating Temperature	T <sub>OPR</sub>	-25 ~ +75	°C
Storage Temperature	T <sub>STG</sub>	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS 1

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage Range	V <sub>DD</sub>		2.4		5.5	V

■ ELECTRICAL CHARACTERISTICS 2 (V<sub>DD</sub>=3V)

(Ta=25°C, V<sub>DD</sub>=3V, V<sub>SS</sub>=0V, f=1kHz)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Current	I <sub>OD</sub>	No Load Condition : Voltage Follower V <sub>o</sub> =1.5V		1.5	2	mA
Standby Current	I <sub>SRB</sub>				1.0	μA
Standby terminal Current	I <sub>PTN</sub>	V <sub>DD</sub> =3V, V <sub>stb</sub> =0V		10		μA
Standby terminal Input Voltage	V <sub>SIH</sub>		0.8V <sub>DD</sub>			V
	V <sub>SIL</sub>				0.2V <sub>DD</sub>	
Input Offset Voltage	V <sub>IO</sub>		-10		10	mV
Input Offset Current	I <sub>IO</sub>			10		pA
Input Bias Current	I <sub>IB</sub>			10		pA
Input Resistor	R <sub>IN</sub>			10 <sup>11</sup>		Ω
Input Common Mode Voltage Range	V <sub>ICM</sub>		0.2~2			V
Maximum Output Voltage Range	V <sub>OM</sub>	I <sub>out</sub> =40mA	2.6	2.7		V
		I <sub>out</sub> =-40mA		0.3	0.4	
Maximum Output Current	I <sub>OM</sub>	(D+N)/S<0.1% Source		30		mA
		(D+N)/S<0.1% Sink		-30		
Large-Signal Voltage gain	A <sub>v</sub>		55			dB
Common Mode Rejection ration	CMRR	V <sub>ICM</sub> =0.2~2.0V	53			dB
Supply Voltage Rejection ration	PSRR	V <sub>DD</sub> =2.7~3.3V	55			dB
Total Harmonic Distortion	(D+N)/S	V <sub>o</sub> =1.0V <sub>p-p</sub> 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 ( $V_{DD}=5V$ )

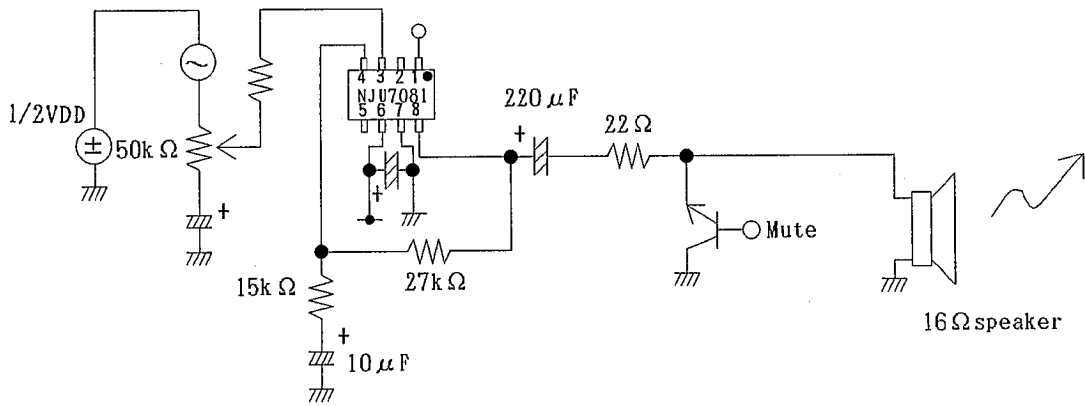
( $T_a=25^\circ C$ ,  $V_{DD}=5V$ ,  $V_{SS}=0V$ ,  $f=1kHz$ )

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	$\mu A$
Standby terminal Current	$I_{PIN}$	$V_{DD}=3V, V_{STB}=0V$		30		$\mu A$
Standby terminal Input Voltage	$V_{SIH}$		0.8 $V_{DD}$			V
	$V_{SIL}$				0.2 $V_{DD}$	
Input Offset Voltage	$V_{IO}$		-10		10	mV
Input Offset Current	$I_{IO}$			10		pA
Input Bias Current	$I_{IB}$			10		pA
Input Resistor	$R_{IN}$			$10^{11}$		$\Omega$
Input Common Mode Voltage Range	$V_{ICM}$		0.4~4			V
Maximum Output Voltage Range	$V_{OM}$	$I_{out}=40mA$	4.6	4.7		V
		$I_{out}=-40mA$		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	$V_{ICM}=0.4\sim 4.0V$	53			dB
Supply Voltage Rejection ration	PSRR	$V_{DD}=4.5\sim 5.5V$	55			dB
Total Harmonic Distortion	(D+N)/S	$V_o=1.0V_{p-p}$ 0~10dB, 38 $\Omega$		0.05		%
Equivalent Input Noise Voltage	$E_{nt}$	IEC-A		3		$\mu V_{rms}$
Signal to Noise Ratio	S/N			110		dB
Unity Gain Bandwidth	$F_t$	CL=10pF, OPEN LOOP		1.5		MHz
Slew Rate	SR	Unity Gain Turn Over, CL=32pF RL=2k $\Omega$		1		V/ $\mu s$

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.

■ APPLICATION CIRCUIT





## MEMO

[CAUTION]

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