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New Japan Radio Co.,Ltd.

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DUAL LOW VOLTAGE POWER AMPLIFIER

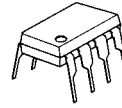
■ GENERAL DESCRIPTION

The NJM2076 is a dual power amplifier, which operates with 1.0V minimum supply voltage. The NJM2076 is suitable to small radio and head-phone of stereo and single BTL application.

■ FEATURES

- BTL operation $P_o=90mW$ type.
- Minimum external components
- Headphone stereo Amp. with external transistors
- Low Operation Voltage (1.0V MIN.)
- Low Operating Current (4.7mA TYP.)
- Package Outline DIP8, DMP8
- Bipolar Technology

■ PACKAGE OUTLINE

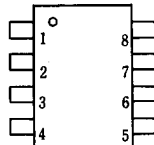


NJM2076D



NJM2076M

■ PIN CONFIGURATION



NJM2076D
NJM2076M

PIN FUNCTION

1. Inverting Amp. Input (A)
2. Non-Inverting Amp. Input(B)
3. V^+
4. Base(B)
5. (B) Output
6. GND
7. (A) Output
8. Base (A)

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V*	4.5	V
Maximum Input Signal	V _{IN}	200	mVrms
Power Dissipation	P _D	(DIP 8) 500 (DMP 8) 500	mW
Operating Temperature Range	T _{opr}	-20~+75	°C
Storage Temperature Range	T _{stg}	-40~+125	°C

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V*=1.5V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I _{cc}	Input: Open	—	4.7	7.0	mA

(I) Stereo Configuration (Test Circuit 1, R_L=16Ω)

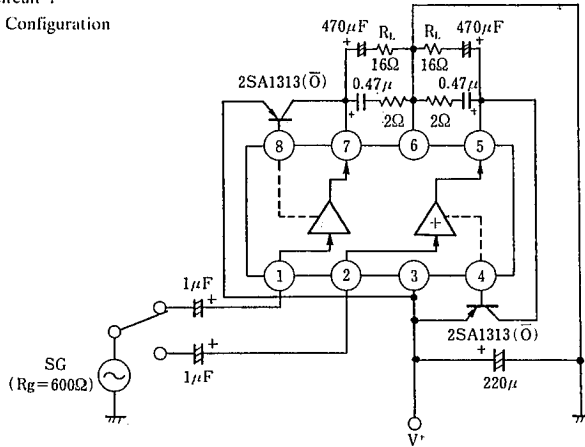
Voltage Gain	A _v	V _{IN} =10mVrms	26.5	28.0	29.5	dB
Max. Output Power	P _{O1}	THD=10%(D, M-Type)	15	17.5	—	mW
	P _{O2}	THD=10%, V ⁺ =1.0V	—	3	—	mW
Total Harmonic Distortion	THD ₁	P _O =1mW (126mVrms/16Ω)	—	0.4	0.8	%
Output Noise Voltage	V _{NO1}	R _g =0, A Curve	—	50	150	μV
Ripple Rejection Ratio	RR ₁	R _g =0, f _R =1kHz, V _R =30mvrms	25	35	—	dB
Input Resistance	R _{IN}		25	33	43	kΩ
Output Pin Voltage	V _O (DC)		0.62	0.70	0.77	V

(II) BTL Configuration (Test Circuit 2, R_L=8Ω)

Max. Output power	P _{O3}	THD=10% (D,M-Type)	75	90	—	mW
	P _{O4}	THD=10%. V ⁺ =1.0V(D, M-Type)	—	20	—	mW
Total Harmonic Distortion	THD ₂	P _O =10mW(283mVrms/8Ω)	—	1.5	4.5	%
Output Noise Voltage	V _{NO2}	R _g =0, A Curve	—	85	250	μV
Ripple Rejection Ratio	RR ₂	R _g =0, f _R =1kHz, V _R =30mVrms	20	25	—	dB
Voltage Difference between Two Output Pins	ΔV _O (DC)		—	—	50	mV

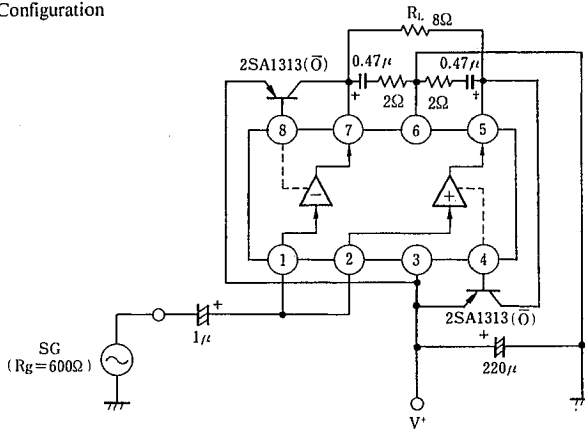
■ TEST CIRCUIT

· Test Circuit 1
Stereo Configuration



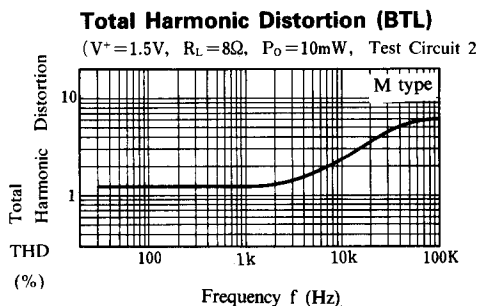
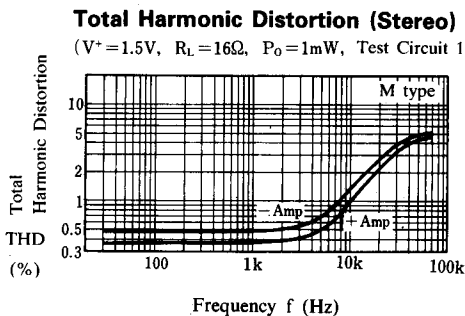
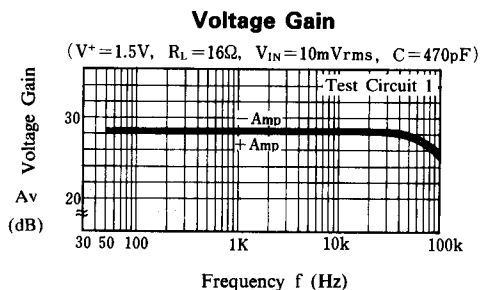
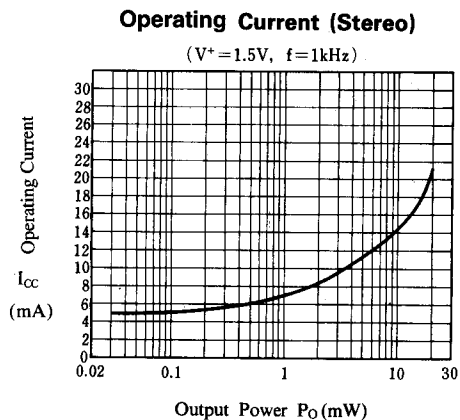
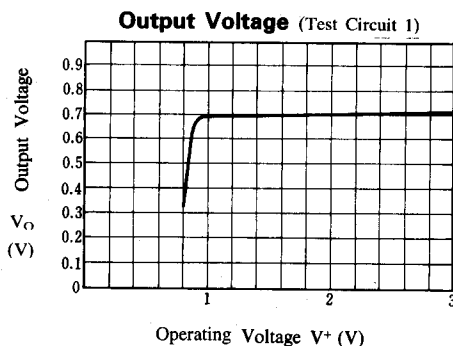
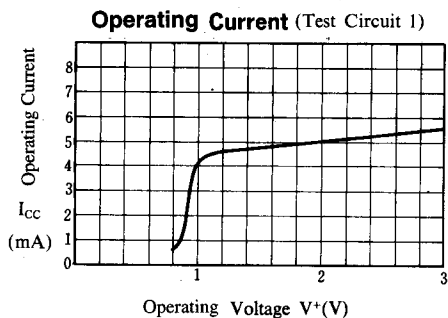
2SA1313(O): $h_{FE}=115\sim 125$
($I_c=100\text{mA}$)

· Test Circuit 2
BTL Configuration



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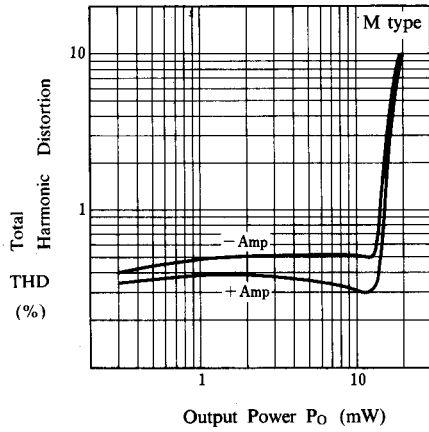
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS

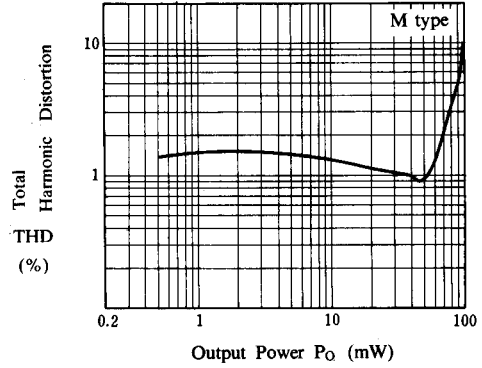
Total Harmonic Distortion (Stereo)

($V^+ = 1.5V$, $R_L = 16\Omega$, $f = 1kHz$, Test Circuit 1)



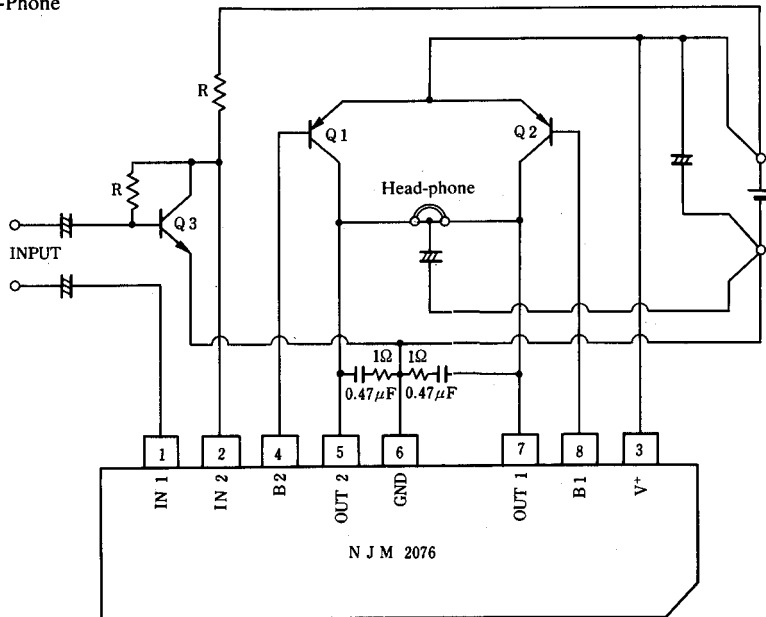
Total Harmonic Distortion (BTL)

($V^+ = 1.5V$, $R_L = 8\Omega$, $f = 1kHz$, Test Circuit 2)

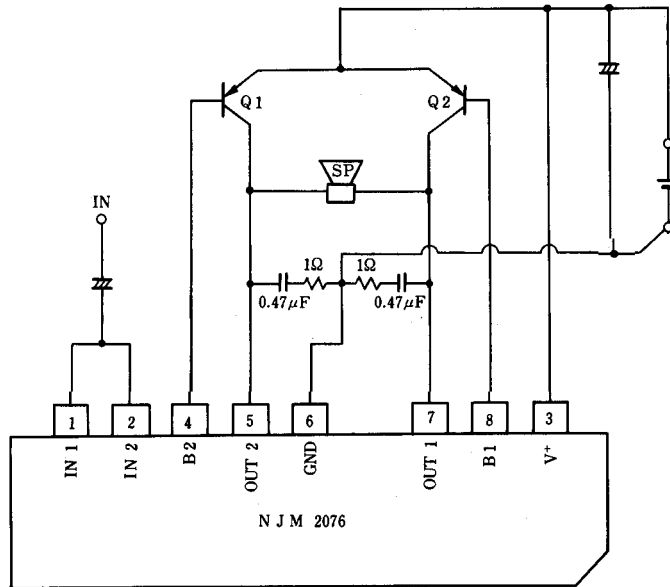


■ TYPICAL APPLICATION

1. For Stereo Head-Phone



2. BTL Amp. for Speaker



■ NOTICE**(1) External PNP Transistor**

Maximum output power becomes large with low saturation voltage transistor, and so select transistor of low saturation.
Saturation Voltage: less than 0.1V ($I_c=100\text{mA}$, $I_B=10\text{mA}$). $h_{FE}: 120$

(2) External Frequency Compensation

Recommend tantalum capacitor with low $\tan\delta$ (less than 0.25 at $f=10\text{kHz}$) and 1Ω resistor. Stable with large capacitor of less high frequency distortion and worse $\tan\delta$. For example: $1\mu\text{F}$, $\tan\delta \leq 0.6$

(3) Layout on PCB

Be careful to get maximum output power and low distortion set.

DIP/DMP: Signal ground has to be close to IC ground pin. Impedance of ground line must be low.

MEMO

[CAUTION]

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