HIGH PERFORMANCE LOW-NOISE OPERATIONAL AMPLIFIER

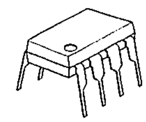
■ GENERAL DESCRIPTION

The NJM5534 is a high performance low noise operational amplifier. This amplifier features popular pin-out, superior noise performance, and high output drive capability.

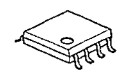
The amplifier also features guaranteed noise performance with substantially higher gain-bandwidth product, power bandwidth, and selw rate which far exceeds that of the NJM741 type amplifiers. The NJM5534 is internally compensated for a gain of three or higher and may be externally compensated for optimizing specific performance requirements of various applications such as unity-gain voltage followers, drivers for capacitive loads or fast setting.

The specially designed low noise input transistors allow the NJM5534 to be used in very low noise signal processing applications such as audio pre-amplifiers and servo error amplifiers.

■ PACKAGE OUTLINE



NJM5534D

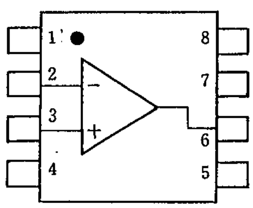


NJM5534M

■ FEATURES

- Operating Voltage (±3V~±22V)
- Single Circuit
- With Vio Trim Terminal
- Low Input Noise Voltage (3.3nV/$\sqrt{\text{Hz}}$ typ. @1kHz)
- Power Bandwidth (200kHz typ.)
- Slew Rate (13V/μs typ.)
- Package Outline DIP8, DMP8
- Bipolar Technology

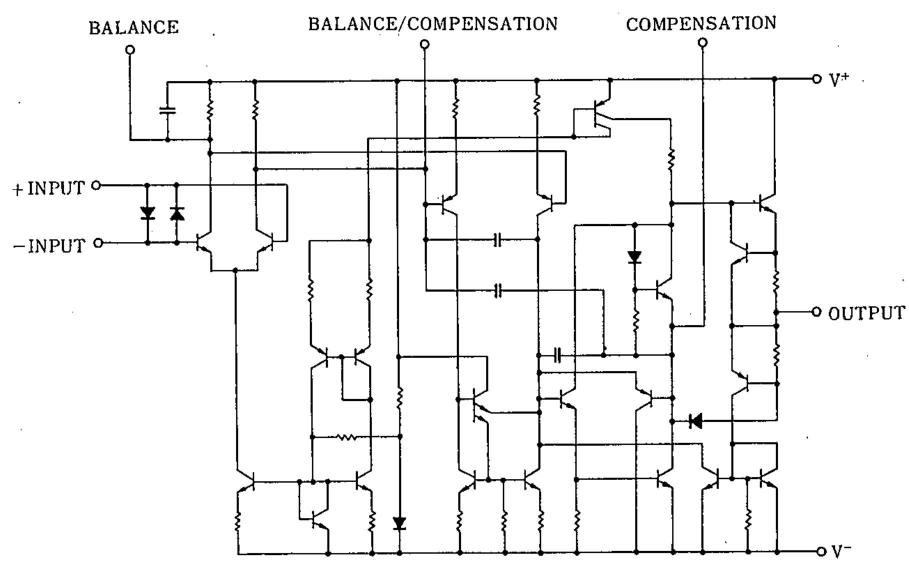
■ PIN CONFIGURATION



NJM5534D
NJM5534M

PIN FUNCTION
1. BALANCE
2. −INPUT
3. +INPUT
4. V^-
5. COMPENSATION
6. OUTPUT
7. V^+
8. BALANCE/COMPENSATION

■ EQUIVALENT CIRCUIT



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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	(V^+/V^-)	±22	V
Differential Input Voltage	V_{ID}	±0.5	V
Input Voltage	V_{IC}	V^+/V^-	V
Power Dissipation	P_D	(DIP8) 500	mW
		(DMP8) 300	mW
Operating Temperature Range	T_{opr}	−20~+75	℃
Storage Temperature Range	T_{stg}	−40~+125	℃

■ ELECTRICAL CHARACTERISTICS

($Ta=25℃, V^+/V^-=\pm15V$)

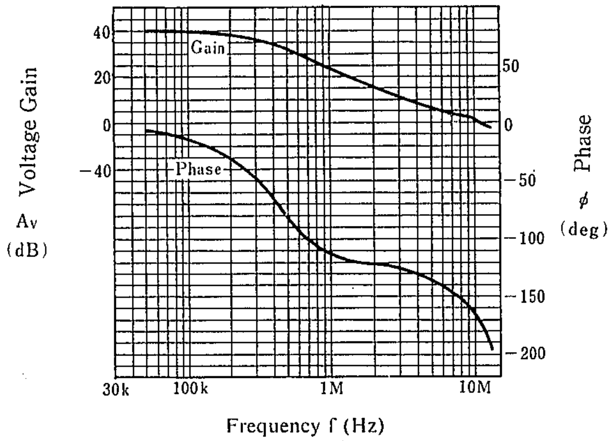
PARAMETER	SYMBOL	TEST CONDITION	NJM5534 MIN.	NJM5534 TYP.	NJM5534 MAX.	UNIT
Input Offset Voltage	V_{IO}	$R_S \leq 10k\Omega$	—	0.5	4	mV
Input Offset Current	I_{IO}		—	20	300	nA
Input Bias Current	I_B		—	500	1,500	nA
Input Resistance	R_{IN}		30	100	—	kΩ
Large Signal Voltage Gain	A_v	$R_L \geq 2k\Omega$, $V_o=\pm10V$	88	100	—	dB
Maximum Output Voltage Swing	V_{OM}	$R_L \geq 600\Omega$	±12	±13	—	V
Input Common Mode Voltage Range	V_{ICM}		±12	±13	—	V
Common Mode Rejection Ratio	CMR	$R_S \leq 10k\Omega$	70	100	—	dB
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10k\Omega$	80	100	—	dB
Operating Current	I_{CC}	$R_L=\infty$	—	4	8	mA
Transient Response Rise Time	t_R	$V_{IN}=50mV$, $R_L=600\Omega$, $C_L=100pF$, $C_c=22pF$	—	35	—	nsec
Overshoot		$V_{IN}=50mV$, $R_L=600\Omega$, $C_L=100pF$, $C_c=22pF$	—	17	—	%
Slew Rate	SR	$C_c=0$	—	13	—	V/µS
Gain Bandwidth Product	GB	$C_c=22pF$, $C_L=100pF$	—	10	—	MHz
Power Bandwidth	W_{PG}	$V_o=20V_{p-p}$, $C_c=0$	—	200	—	kHz
Equivalent Input Noise Voltage	V_{NI}	f=20Hz~20kHz	—	1.0	—	µVrms
Equivalent Input Noise Current	I_{NI}	f=20Hz~20kHz	—	25	—	pArms
Equivalent Input Noise Voltage 1	e_n 1	$f_o=30Hz$	—	5.5	—	$nV/\sqrt{Hz}$
Equivalent Input Noise Voltage 2	e_n 2	$f_o=1kHz$	—	3.3	—	$nV/\sqrt{Hz}$
Equivalent Input Noise Current 1	i_n 1	$f_o=30Hz$	—	1.5	—	$pA/\sqrt{Hz}$
Equivalent Input Noise Current 2	i_n 2	$f_o=1kHz$	—	0.4	—	$pA/\sqrt{Hz}$
Broadband Noise Figure	NF	f=10Hz~20kHz, $R_S=5k\Omega$	—	0.9	—	dB

Note: JRC's general selected products D rank are also prepared for the noise standard ($R_S=2.2k\Omega$, RIAA, $V_N=1.4\mu V$ Max.)

■ TYPICAL CHARACTERISTICS

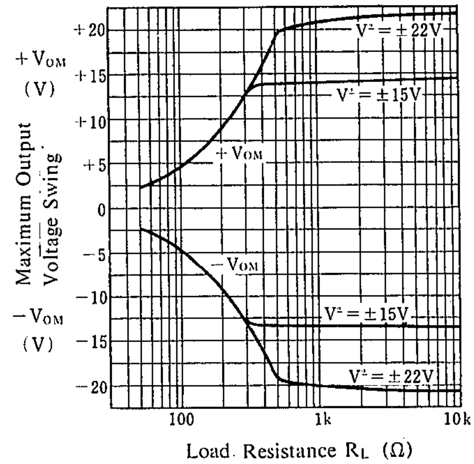
Voltage Gain, Phase vs. Frequency

(Ta = 25℃)



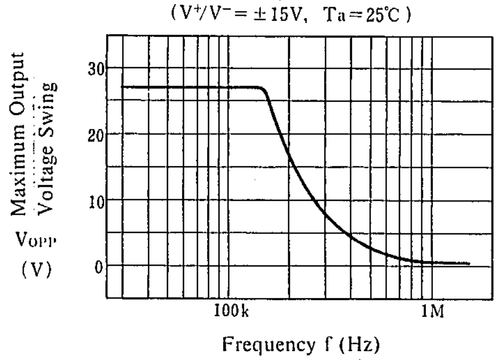
Maximum Output Voltage Swing vs. Load Resistance

(Ta = 25℃)



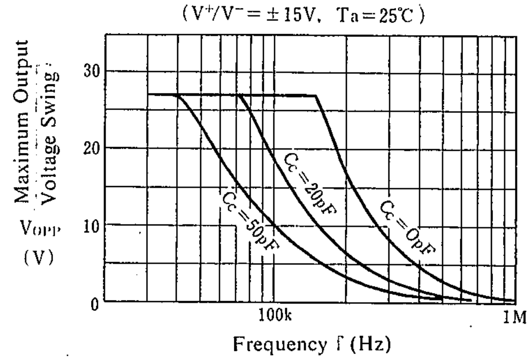
Maximum Output Voltage Swing vs. Frequency

(V+/V− = ±15V, Ta = 25℃)



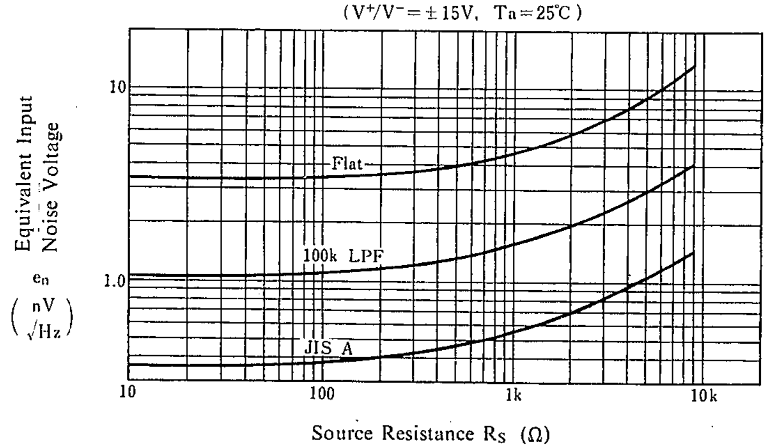
Maximum Output Voltage Swing vs. Frequency

(V+/V− = ±15V, Ta = 25℃)



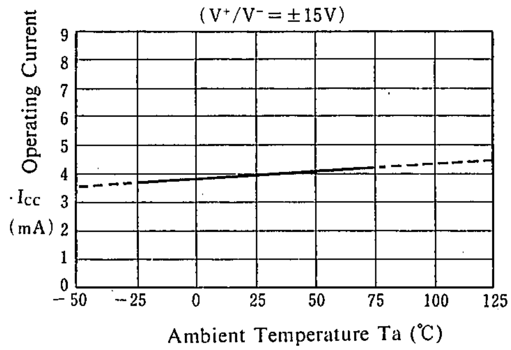
Equivalent Input Noise Voltage vs. Rs

(V+/V− = ±15V, Ta = 25℃)

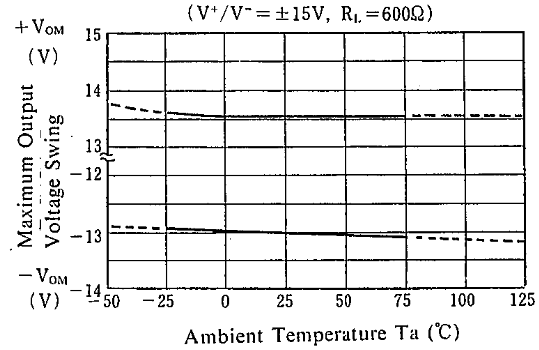


■ TYPICAL CHARACTERISTICS

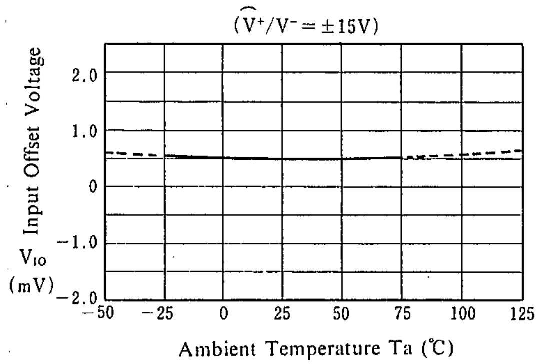
Operating Current vs. Temperature



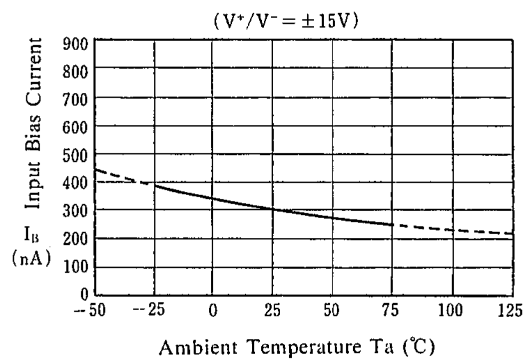
Maximum Output Voltage Swing vs. Temperature



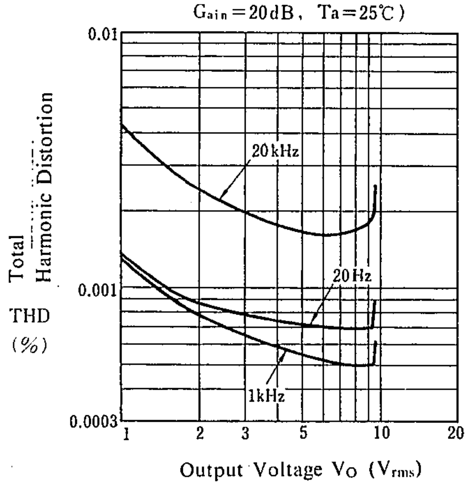
Input Offset Voltage vs. Temperature



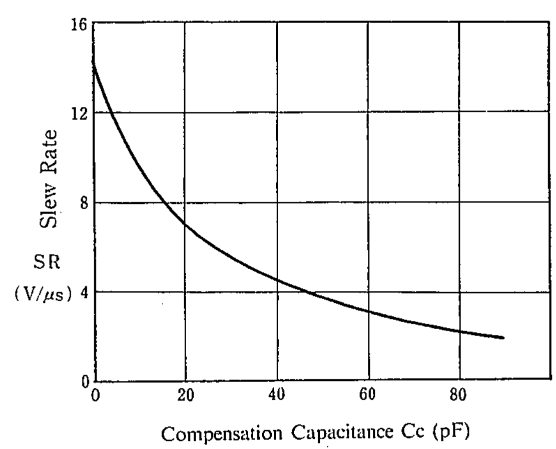
Input Bias Current vs. Temperature



Total Harmonic Distortion vs. Output Voltage

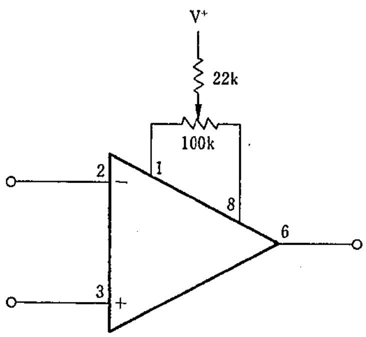


Slew Rate

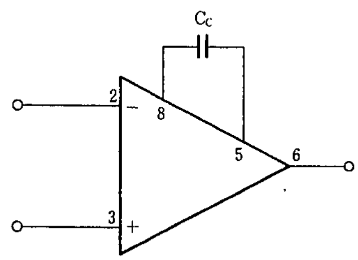


■ ADJUSTMENT METHOD

Offset Adjustment



Frequency Compensation



■ NOTICE

When used in voltage follower circuit, put a current limit resistor into non-inverting input terminal in order to avoid inside input diode destruction when the power supply is turned on. (ref. Fig. 1)

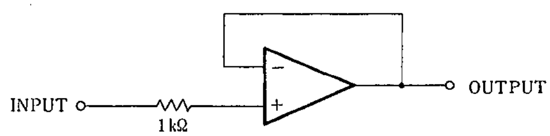


Fig. 1

MEMO

[CAUTION]
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