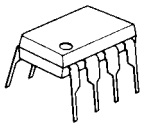
HIGH SPEED OPERATIONAL AMPLIFIER WITH SWITCH

■ GENERAL DESCRIPTION

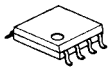
The NJM2121 is a dual operational amplifier of 2-INPUT and 1-OUTPUT with analog switch. The NJM2121 can be used as analog switch under the condition of G_V=0dB, as Switch + Amp in order that each gain (A or B) can be adjusted independently. Each amplifier of the NJM2121 has the same electrical characteristics as the NJM4560.

The NJM2121 is suitable for Audio, Video, Electrical musical instrument…etc.

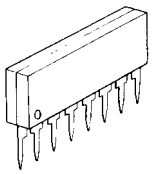
■ PACKAGE OUTLINE



NJM2121D



NJM2121M

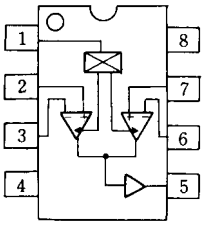


NJM2121L

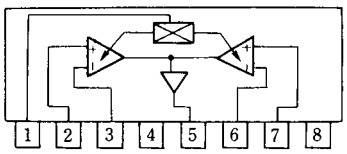
■ FEATURES

- Analog Switch Function
- Operating Voltage (±3V~±18V)
- Slew Rate (4V/μs typ.)
- Wide Unity Gain Bandwidth (14MHz typ.)
- Package Outline DIP8,DMP8,SIP8
- Bipolar Technology

■ PIN CONFIGURATION



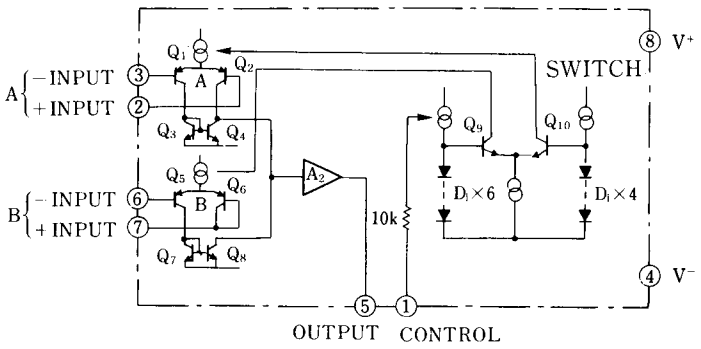
NJM2121D
NJM2121M



NJM2121L

PIN FUNCTION
1.SW.CONTROL
2.A +INPUT
3.A -INPUT
4.V^-
5.OUTPUT
6.B –INPUT
7.B +INPUT
8.V^+

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25˚C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	± 18 (36)	V
Differential Input Voltage	V_{ID}	± 30	V
Input Voltage	V_{IC}	± 15	V
Output Current	I_O	± 50	mA
Power Dissipation	P_D	(DIP8) 500 (DMP8) 300 (SIP8) 800	mW
Operating Temperature Range	T_{opr}	-20~+75	˚C
Storage Temperature Range	T_{stg}	-40~+125	˚C

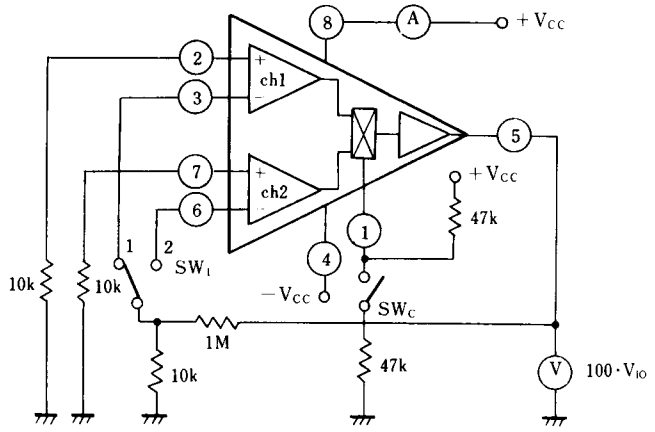
■ ELECTRICAL CHARACTERISTICS

(V^+/V^-=±15V,Ta=25˚C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	V_{IN} SW ON	-	2.3	6.0	mA
		SW OFF	-	2.1	6.0	mA
Input Offset Voltage	V_{IO}	R_S=10kΩ	-	0.8	6.0	mV
Input Bias Current	I_B		-	0.2	1.0	μA
Large Signal Voltage Gain	A_V	R_L=2kΩ	-	110	-	dB
Maximum Output Voltage Swing	V_{OM}	R_L≥10kΩ	± 12	± 14	-	V
Total Harmonic Distortion	THD	f=1kHz,V_O=5Vrms,G_V=20dB	-	0.002	-	%
Supply Voltage Rejection Ratio	SVR		-	20	150	μV/V
Channel Separation	CS	f=1kHz	-	82	-	dB
Unity Gain Bandwidth	f_T	G_V=0dB	-	14	-	MHz
Slew Rate	SR	G_V=0dB,R_L=2kΩ//100pF	-	4	-	V/μs
Equivalent Input Noise Voltage	V_{NI}	R_S=1kΩ,BW=10Hz~30kHz,Flat	-	2.0	-	μVrms

■ TEST CIRCUIT

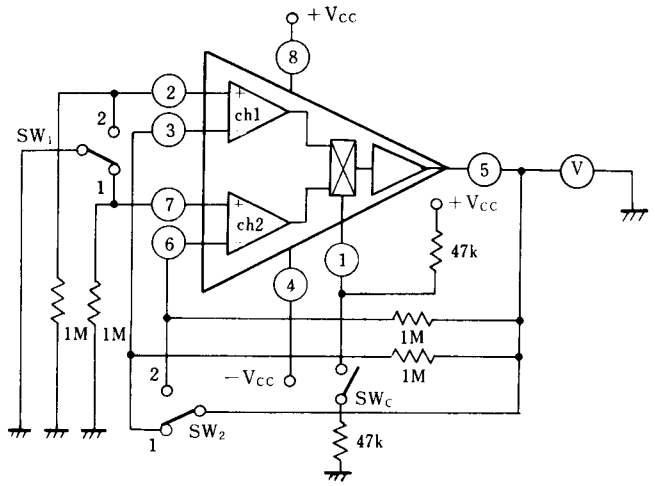
(1) I_{CC}, V_{IO}, SVR



	SW_C	SW_1	Select ch
I_{CC1}, V_{IO1}, SVR_1	OFF	1	ch 1
I_{CC2}, V_{IO2}, SVR_2	ON	2	ch 2

Unit Resistance : Ω
Capacity : F

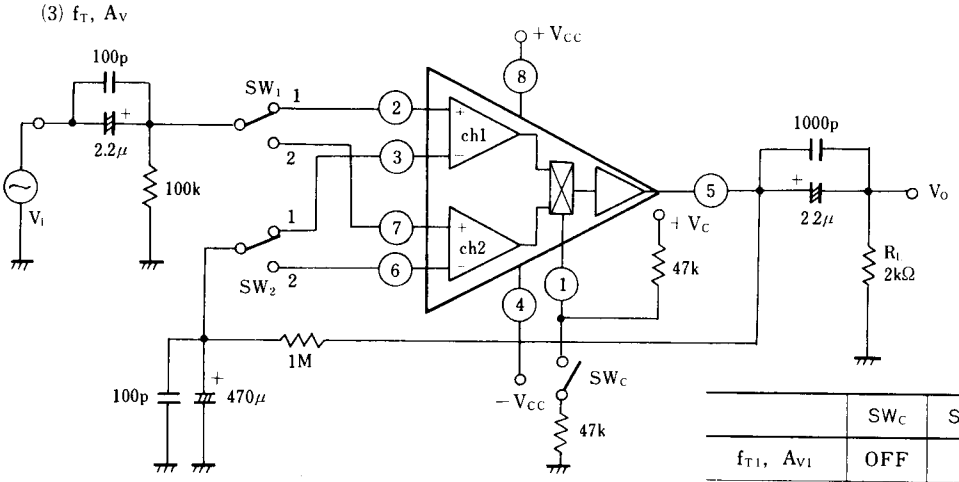
(2) I_B, I_{IO}



$I_B{}^+ = V_O{}^+ / 1M\Omega$
$I_B{}^- = V_O{}^- / 1M\Omega$
$I_{IO} = |I_B{}^+ - I_B{}^-|$

	SW_C	SW_1	SW_2	Select ch
V_{O1}	OFF	1	1	ch 1
V_{O1}	OFF	2	2	ch 1
V_{O2}	ON	2	2	ch 2
V_{O2}	ON	1	1	ch 2

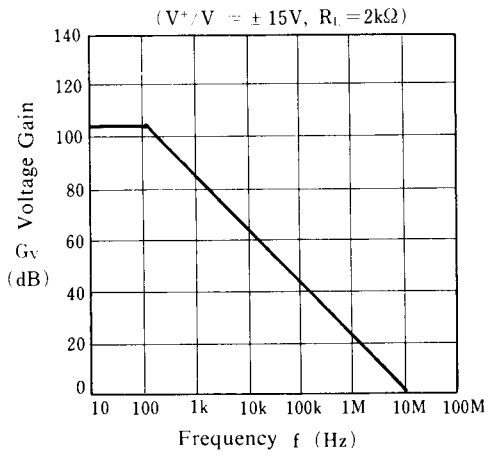
(3) f_T, A_V



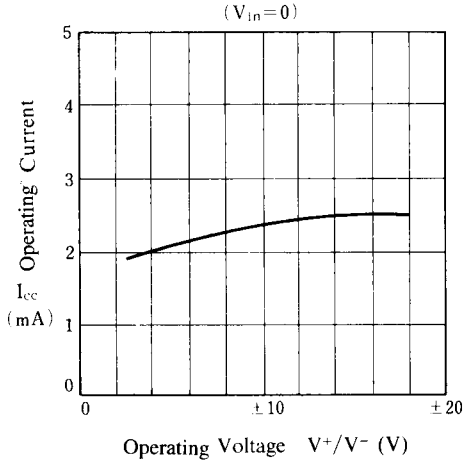
	SW_C	SW_1	SW_2	Select ch
f_{T1}, A_{V1}	OFF	1	1	ch 1
f_{T2}, A_{V2}	ON	2	2	ch 2

■ TYPICAL CHARACTERISTICS

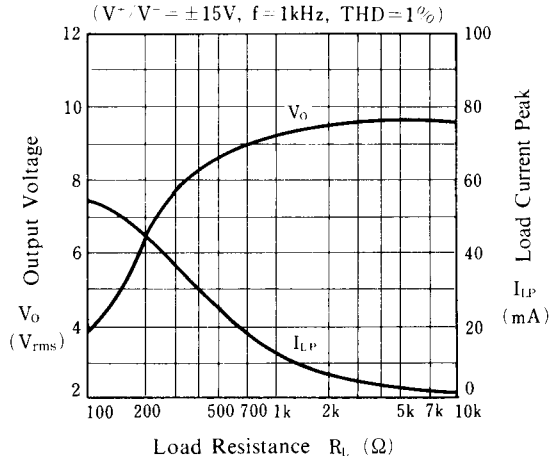
Voltage Gain vs. Frequency



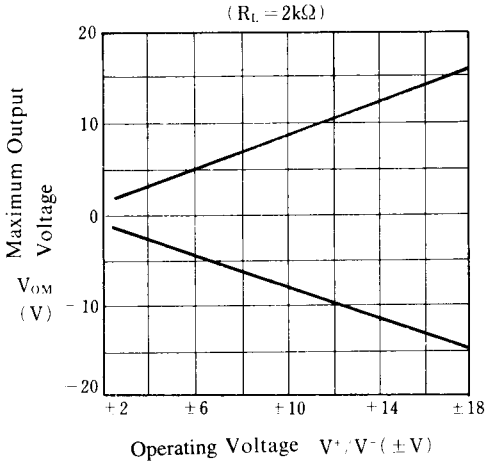
Operating Current vs. Operating Voltage



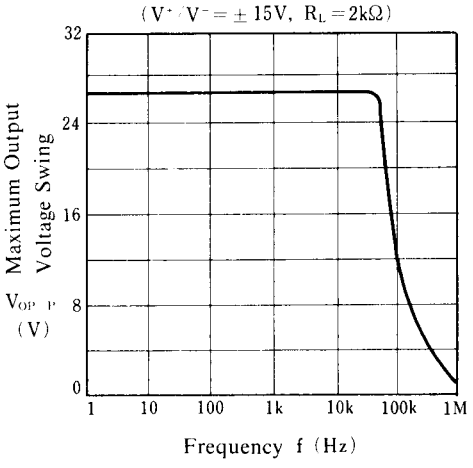
Output Voltage, Load Current Peak vs. Load Resistance



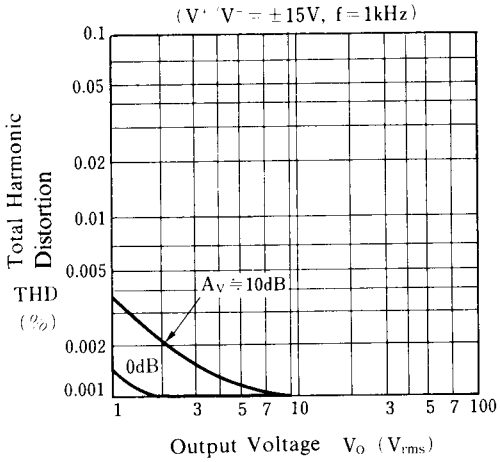
Maximum Output Voltage vs. Operating Voltage



Maximum Output Voltage Swing vs. Frequency

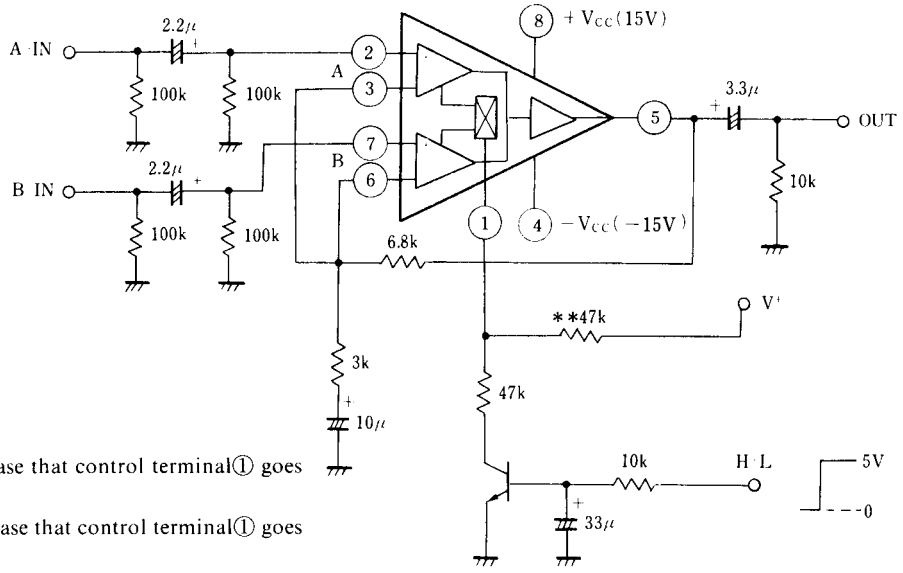


Total Harmonic Distortion vs.Output Voltage



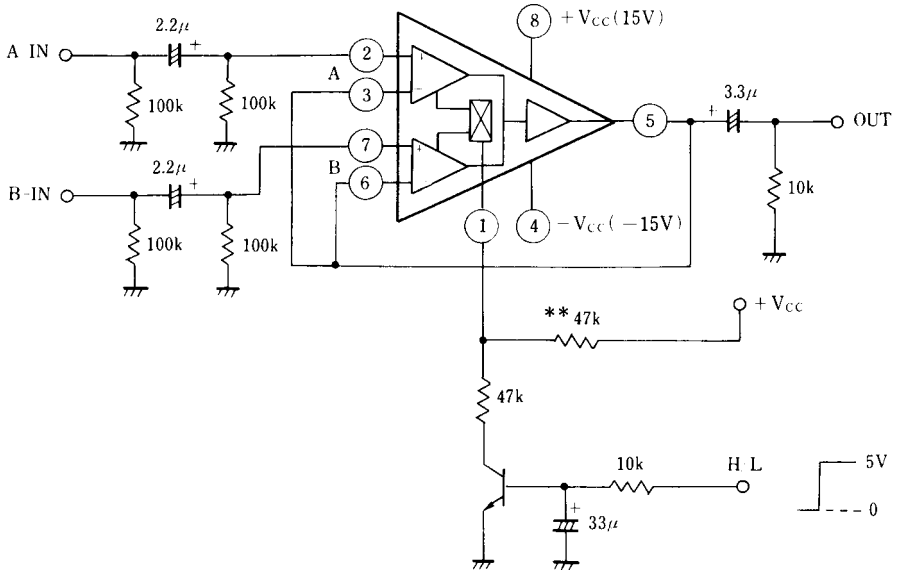
■ APPLICATION CIRCUIT

(1) G_V=10dB FLAT Amp+Analog Switch Circuit



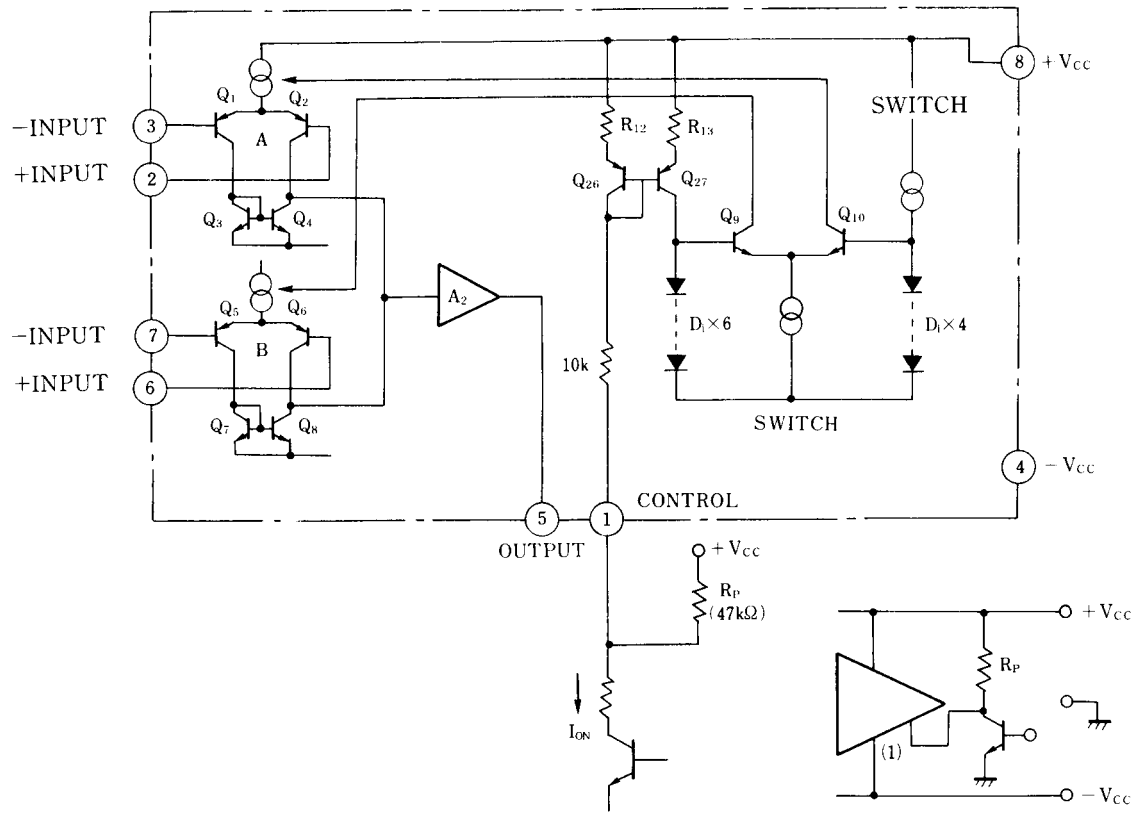
*ch B goes ON in case that control terminal① goes ON.
ch A goes ON in case that control terminal① goes OFF.

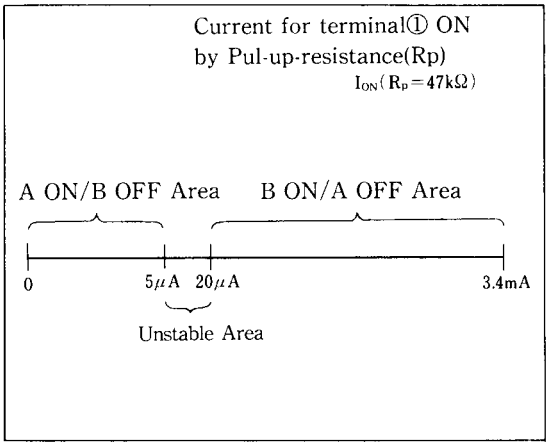
(2) Analog Switch Circuit (G_V=0dB Voltage Follower Amp)

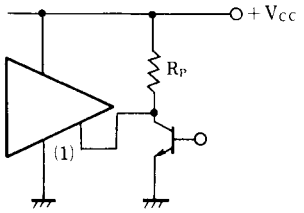


*Resistance(**) is Pull-up resistance for pervent from switching terminal① going ON by reakage of external circuit(TR...etc).

■ SWITCHING MECHANISM







Switching Mechanism of NJM2121 is as follows.

Switch signal is communicated in case that V_F of Q26 goes ON on current mirror which is composed with Q26 and Q27.Q10 goes ON by 4diodes of Q10 in case that terminal 1 goes OFF and Amp (ch A) goes active.Q9 goes ON by 6 diodes of Q9 in case that terminal 1 goes ON and Amp (ch B) goes active.So,NJM2121 have merit that drive system is controlled freely. Because drive system is not related to supply voltage system (Single supply type/Two supply type) in order that switch change by current ON/OFF.

But, this switch goes ON by very little current because of signal communicate system which depend on ON of V_F. So, please use NJM2121 under the condition of lowering sensitivity for current ON/OFF by external Pull-up-resistance (R_p)

[CAUTION]
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