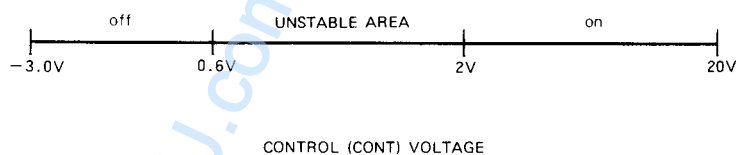


SINGLE POWER SOURCE PREAMPLIFIER WITH SWITCHING CIRCUITS**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V _{CC}	Supply voltage		20	V
V _{CONT}	Control voltage		-0.3 ~ 20	V
P _d	Power dissipation		700 (DIP) 550 (FP)	mW
K _θ	Thermal derating	Ta ≥ 25°C	7 (DIP) 5.5 (FP)	mW/°C
T _{opr}	Operating temperature		-20 ~ +75	°C
T _{stg}	Storage temperature		-55 ~ +125	°C

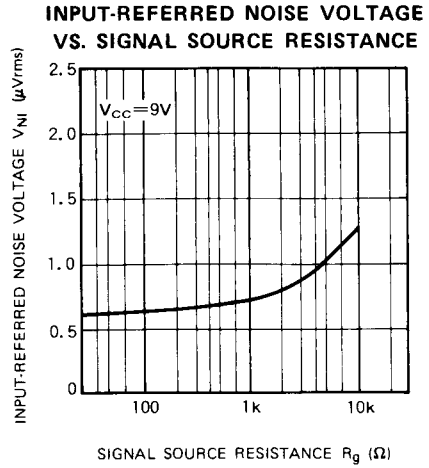
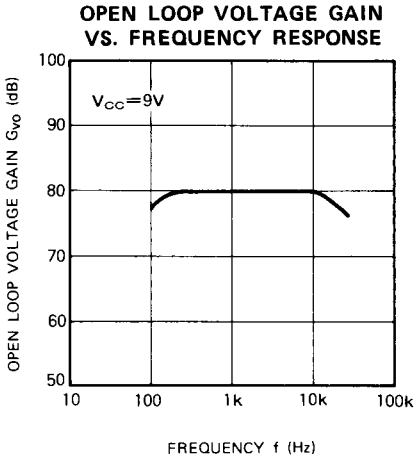
ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC} = 9V)

Symbol	Parameter	f (Hz)	Test conditions	Limits			Unit
				Min	Typ	Max	
I _{CC}	Circuit current	—	R _S = 2.2kΩ, R _R = 390kΩ, CONT = GND		3.9	8.0	mA
+I _B	Positive input bias current	—	R _S = 10kΩ		0.5	5	μA
-I _B	Negative input bias current	—	R _G = 390kΩ		50	500	nA
G _{VO}	Open loop voltage gain	400	V _O = -10dB	65	80		dB
THD	Total harmonic distortion	1k	V _O = 300mVrms, BW : 400Hz ~ 30kHz		0.025	1	%
V _{OM}	Maximum output voltage	1k	THD = 1%	0.5	0.7		Vrms
V _{Ni}	Input-referred noise voltage	—	R _S = 2.2kΩ, 30kHz		0.8	2.5	μVrms
CC	Channel separation	1k	V _O = 0dBm, 30kHz	55	75		dB
R _{on}	ON resistance	1k	V _O = 10mVrms		20	50	Ω
CT	Cross talk	1k	V _O = 0dBm, 30kHz	55	75		dB
S _{on}	Switch ON voltage	—	I _O = 5mA, COM = GND, V _{OL} ≤ 400mV	2.0		20	V
S _{off}	Switch OFF voltage	—	I _{leak} ≤ 10μA, COM = GND	-0.3		0.6	V
V _{OL}	Low output voltage	—	I _O = 5mA		100	400	mV
I _{leak}	Leak current	—	V _O = 20V, C _{ONT} = GND		2	10	μA
I _{sink}	Sink current	—	V _O = 1V, C _{ONT} = OPEN	5	25		mA

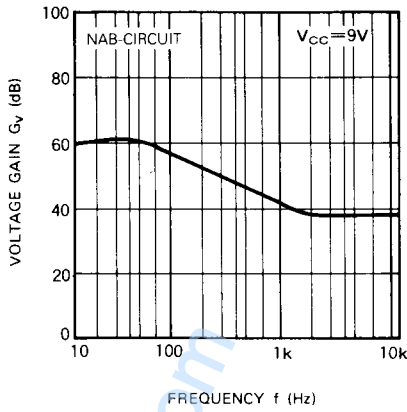
SWITCH ACTION (COM = GND)

SINGLE POWER SOURCE PREAMPLIFIER WITH SWITCHING CIRCUITS

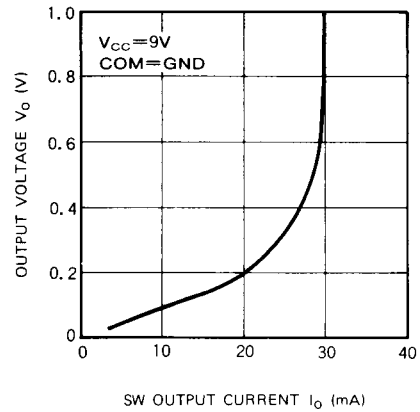
TYPICAL CHARACTERISTICS



VOLTAGE GAIN VS. FREQUENCY RESPONSE

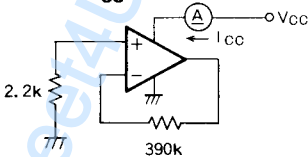


SW OUTPUT VOLTAGE VS. SW OUTPUT CURRENT

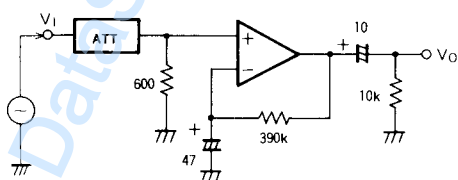


TEST CIRCUIT

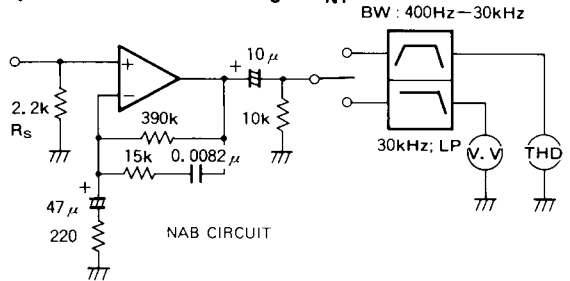
Circuit current I_{CC}



Open loop voltage gain G_{VO}



Total Harmonic distortion THD, Maximum output voltage V_{OM} , Input-referred noise voltage V_{NI}



Unit Resistance: Ω
Capacitance: F

SINGLE POWER SOURCE PREAMPLIFIER WITH SWITCHING CIRCUITS

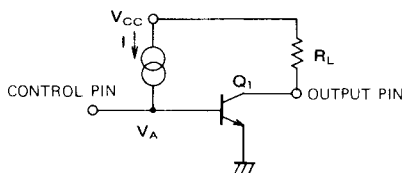
DESCRIPTION OF THE SWITCHING CIRCUIT OPERATIONS AND ITS USAGE

When constant current I is sent to the NPN transistor shown below, Q_1 becomes the bias status, V_A potential becomes the V_{BE} of Q_1 , and the potential of the output pin becomes the $V_{CE(sat)}$ of Q_1 .

At the point if the control pin is grounded, V_{BE} of Q_1 becomes off state and all the current flow to the GND. The output potential becomes V_{CC} .

In case of this circuit, the switching operation can be initiated by turning ON/OFF the V_{BE} of Q_1 .

1. BASIC CIRCUIT



In case that COM = GND and the R_L is inserted between SW OUT- V_{CC} :

If constant current is supplied, D_2 , D_3 , and Q_1 become ON, the potential of V_A becomes $2V_F + V_{BE}$, and all the current I becomes the drive current for Q_1 .

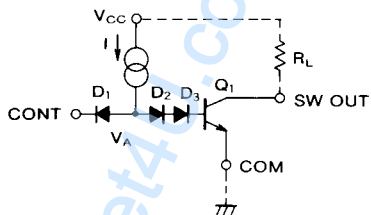
The SW OUT potential becomes the $V_{CE(sat)}$ of Q_1 .

At this point if the CONT pin is grounded, V_A becomes the V_F of D_1 and D_2 , D_3 , and Q_1 can not be set to ON so that I will flow through D_1 to the GND.

By controlling the potential of V_A , M5246 switches Q_1 .

Note: Each inserted diode is used for pressure compensation centering at the point V_A .

2. ACTUAL CIRCUIT



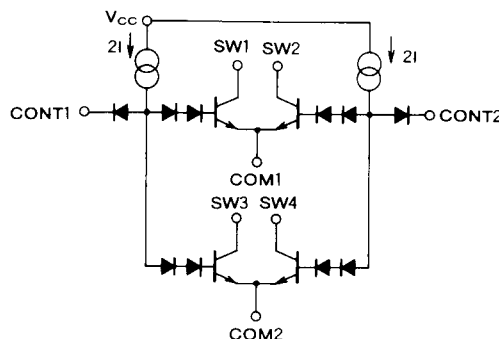
1. COM pin arbitrary sets the DC potential. (The above potential V_A is not determined if it is not DS biased.)
2. Because of the above, Q_1 ON/OFF will be set arbitrary. (The standard values for electrical characteristics is limited only to COM = GND.)
3. It is desirable that the switch control to be OPEN/GND as a standard.
4. AC input is available for both the COM and SW OUT sides.

5. Two circuits of emitters are shared (COM) so that it is best suitable for the selection, branch, and synthesis of 2-input/output.
6. Since SW1, 3/SW2, and 4 are common to the CONT, they cannot operate separately.

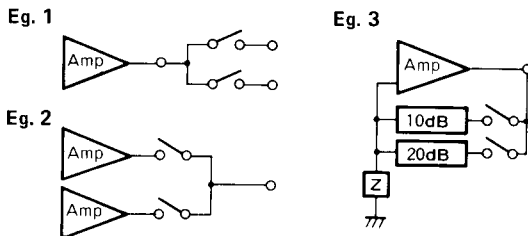
CONT1	OPEN	OPEN	GND	GND
CONT2	OPEN	GND	OPEN	GND
SW1	L	L	H	H
SW2	L	H	L	H
SW3	L	L	H	H
SW4	L	H	L	H

* When a R_L is inserted between each SW output pin and V_{CC} and each COM pin is grounded.

3. USAGE



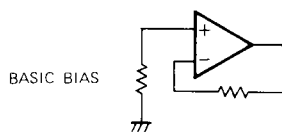
4. SAMPLE USAGES



NOTE ON THE USAGE:

1. DC bias voltage must be applied to the Amp. section.
2. Note that the reverse insertion of elements or supplying the source voltage under pin shifted status may degrade the performance or destroy the IC.

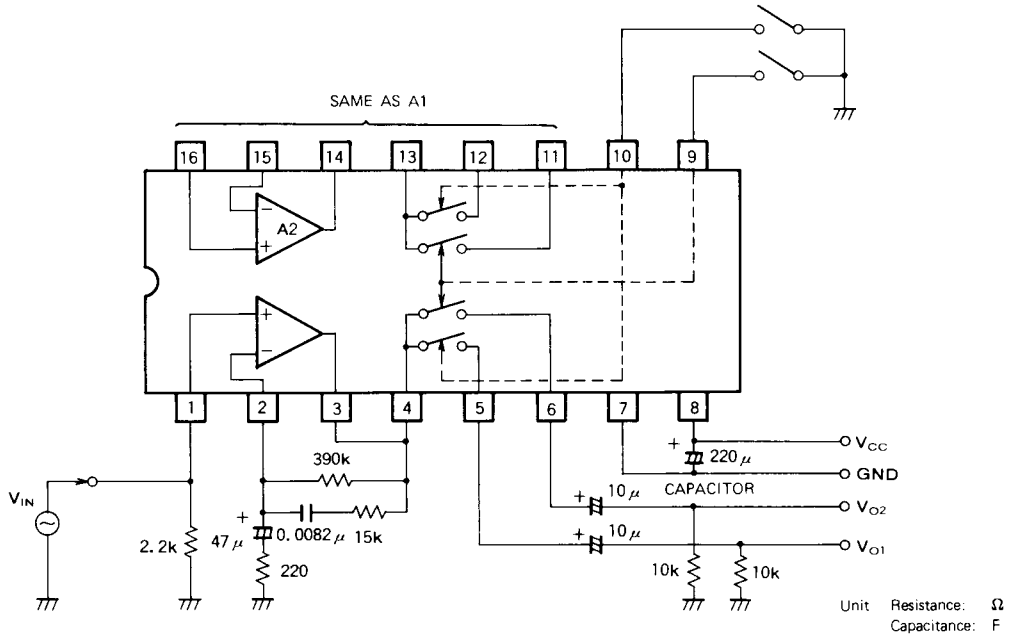
Moreover, the SW section can be used separately as a driver of LEDs.



M5246P,FP

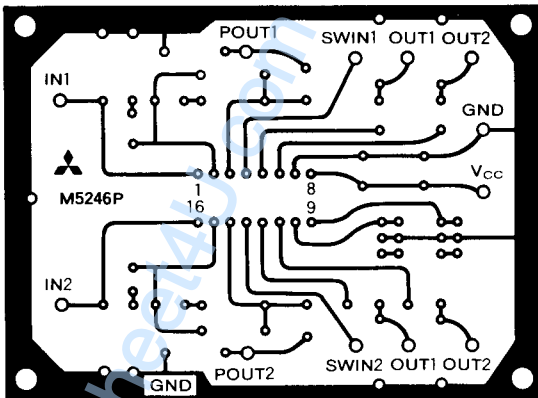
SINGLE POWER SOURCE PREAMPLIFIER WITH SWITCHING CIRCUITS

APPLICATION EXAMPLES



PCB FOR CIRCUIT TESTING (Typical application example)

PCB DIAGRAM (COPPER FOIL SIDE)



(PARTS INSERTION SIDE)

