

# BIPOLAR ANALOG INTEGRATED CIRCUIT

## $\mu$ PC1158H2

### LOW NOISE PREAMPLIFIER WITH AUTOMATIC LEVEL CONTROL

### SILICON BIPOLAR MONOLITHIC INTEGRATED CIRCUIT

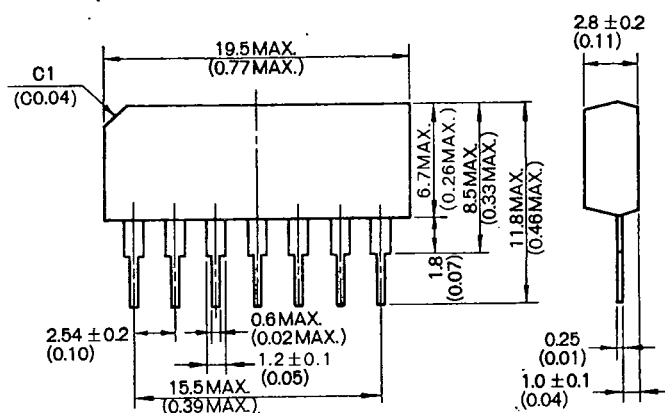
#### DESCRIPTION

The  $\mu$ PC1158H2 is a silicon monolithic integrated circuit designed for high gain, low noise preamplifier with Automatic Level Control (ALC).

As an advanced production process is used, the device has an excellent feature of very low pulsive noise characteristics.

It is ideally suitable for use as a recording and playing amplifier in a cassette tape recorder.

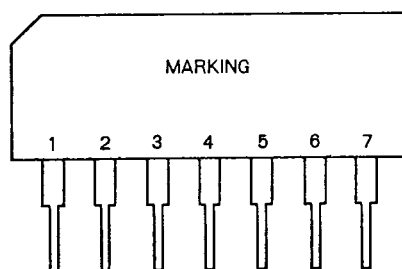
#### PACKAGE DIMENSIONS in millimeters (inches)



#### FEATURES

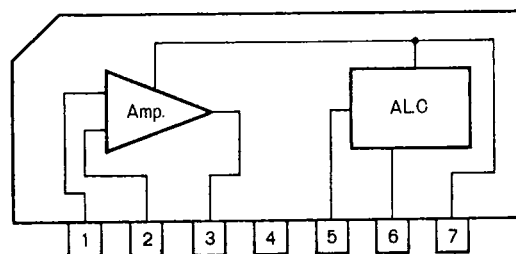
- Low noise, especially low pulsive noise.
- Wide supply voltage range ( $V_{CC} = 2.2 \sim 15V$ ).
- High gain:  $A_{VO} = 70dB$  TYP.
- High output voltage:  $V_{OM} = 1.0V_{r.m.s.}$  TYP.
- Low distortion.
- Wide ALC range.
- SIP assures easy mounting on printed circuit board.
- Fast build up power switch on.

#### CONNECTION DIAGRAM

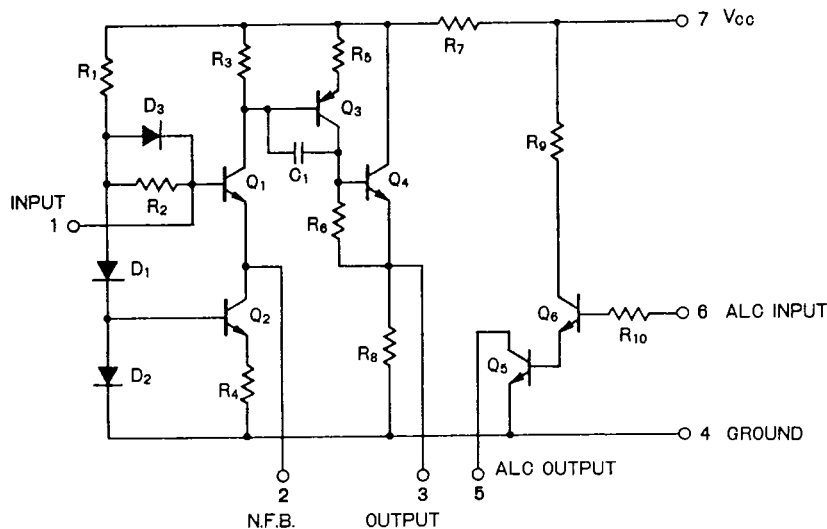


Pin No.	Electrical Connection
1	INPUT
2	N.F.B.
3	OUTPUT
4	GROUND
5	ALC OUTPUT
6	ALC INPUT
7	$V_{CC}$

#### BLOCK DIAGRAM



**EQUIVALENT CIRCUIT**



**ABSOLUTE MAXIMUM RATINGS (Ta=25°C)**

Supply Voltage	V <sub>CC</sub>	15.0	V
Package Dissipation (Ta=75°C)	P <sub>D</sub>	270	mW
Operating Temperature	T <sub>opt</sub>	-20 to +75	°C
Storage Temperature	T <sub>stg</sub>	-40 to +125	°C

**RECOMMENDED CONDITIONS (Ta=25°C)**

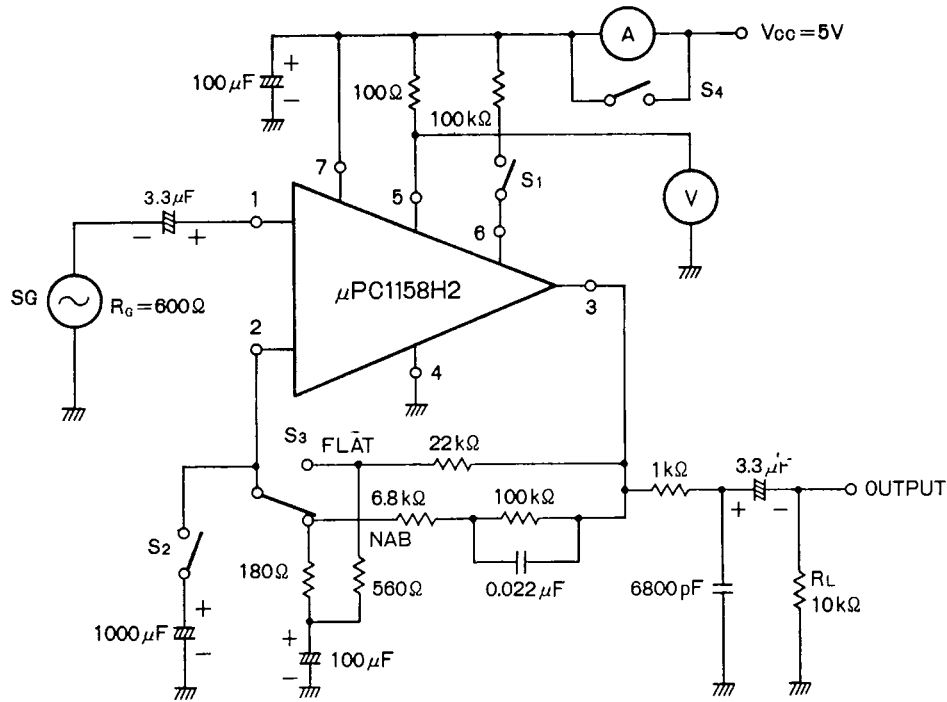
Operating Supply Voltage	5.0	V
Supply Voltage Range	2.2 to 15.0	V

**ELECTRICAL CHARACTERISTICS (Ta=25°C, V<sub>CC</sub>=5V, f=1kHz, R<sub>L</sub>=10kΩ)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Circuit Current	I <sub>CC</sub>	0.9	1.5	2.2	mA	v <sub>in</sub> =0
Open Loop Voltage Gain	A <sub>vo</sub>	64	70		dB	v <sub>in</sub> =-80dBm
Voltage Gain	A <sub>v</sub>		33.5		dB	v <sub>in</sub> =-50dBm
Maximum Output Voltage	V <sub>OM</sub>	0.7	1.0		V	T.H.D.=1%
Input Impedance	r <sub>i</sub>		100		kΩ	f=1kHz
Equivalent Input Noise Voltage	v <sub>nin</sub>		1.2	2.0	μVr.m.s.	R <sub>G</sub> =2.2kΩ, NAB Equalized 15~30kHz BPF+40dB Amp.
Collector Voltage of ALC Transistor	V <sub>5</sub>		0.7		V	Pin 7 to Pin 6: 100kΩ Pin 7 to Pin 5: 100Ω

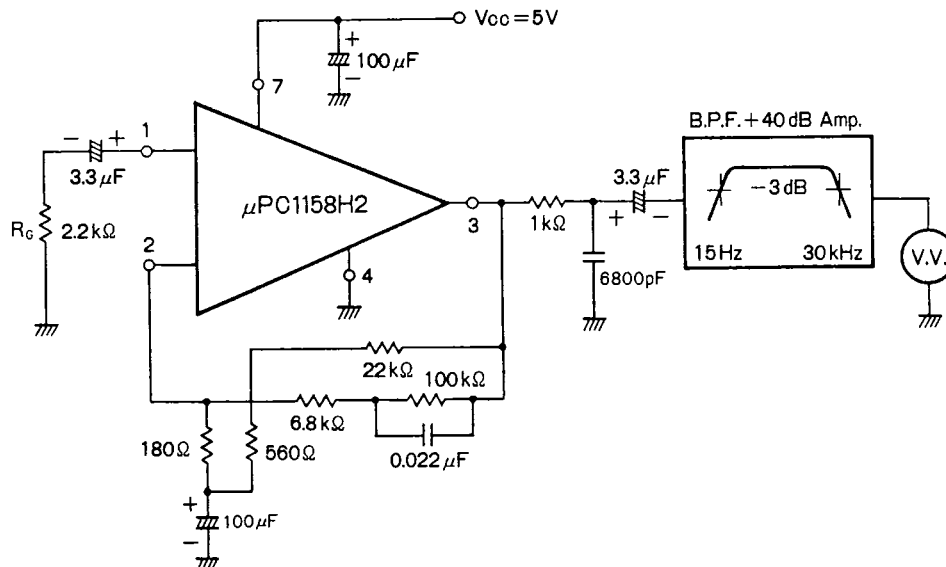
### TEST CIRCUITS

Test Circuit for General Characteristics Given in the Table Below.



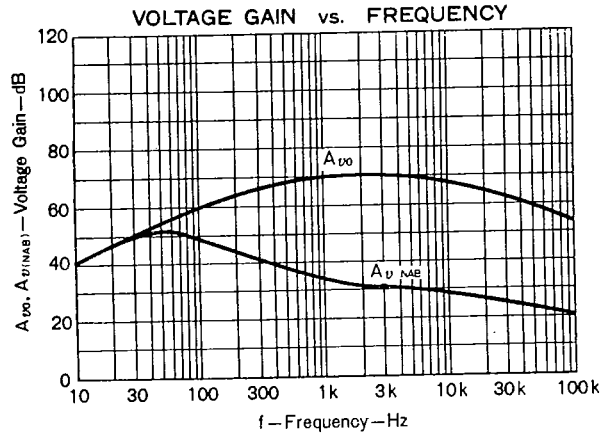
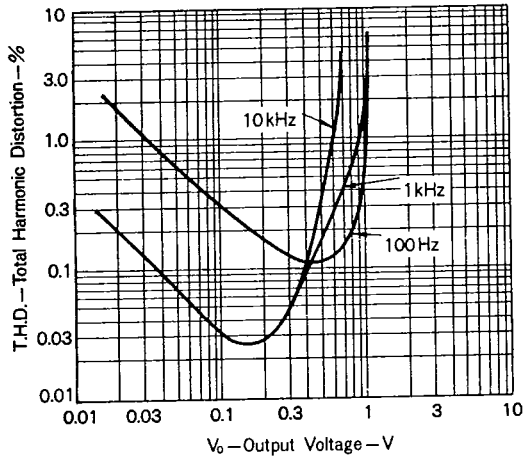
CHARACTERISTIC	SYMBOL	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	TEST POINT
Circuit Current	$I_{CC}$	OFF	OFF	NAB	OFF	Pin 7
Open Loop Voltage Gain	$A_{vo}$	OFF	ON	FLAT	ON	Pin 3
Voltage Gain	$A_v$	OFF	OFF	NAB	ON	Pin 3
Maximum Output Voltage	$V_{OM}$	OFF	OFF	NAB	ON	Pin 3
Collector Voltage of ALC Transistor	$V_5$	ON	OFF	NAB	ON	Pin 5

Test Circuit for Noise Voltage.

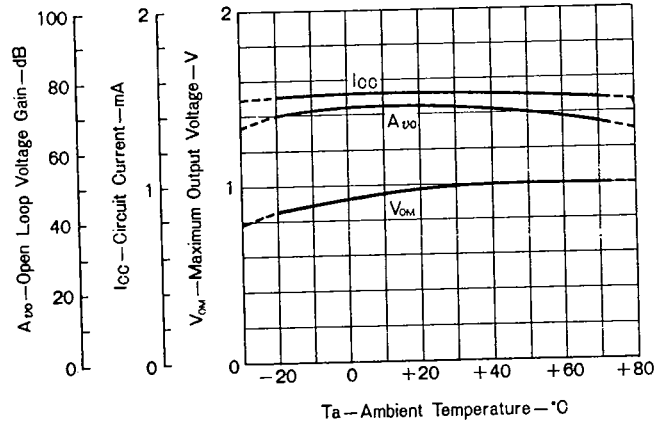
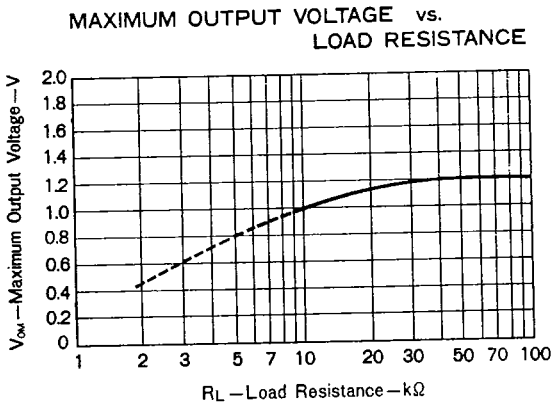


TYPICAL CHARACTERISTICS (Ta=25°C)

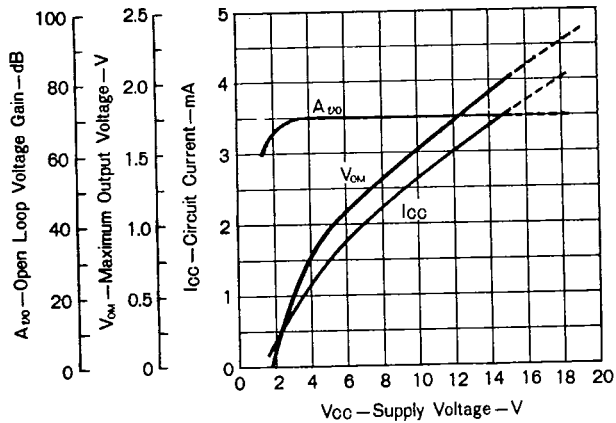
TOTAL HARMONIC DISTORTION vs. OUTPUT VOLTAGE



CIRCUIT CURRENT, MAXIMUM OUTPUT VOLTAGE, OPEN LOOP VOLTAGE GAIN vs. AMBIENT TEMPERATURE



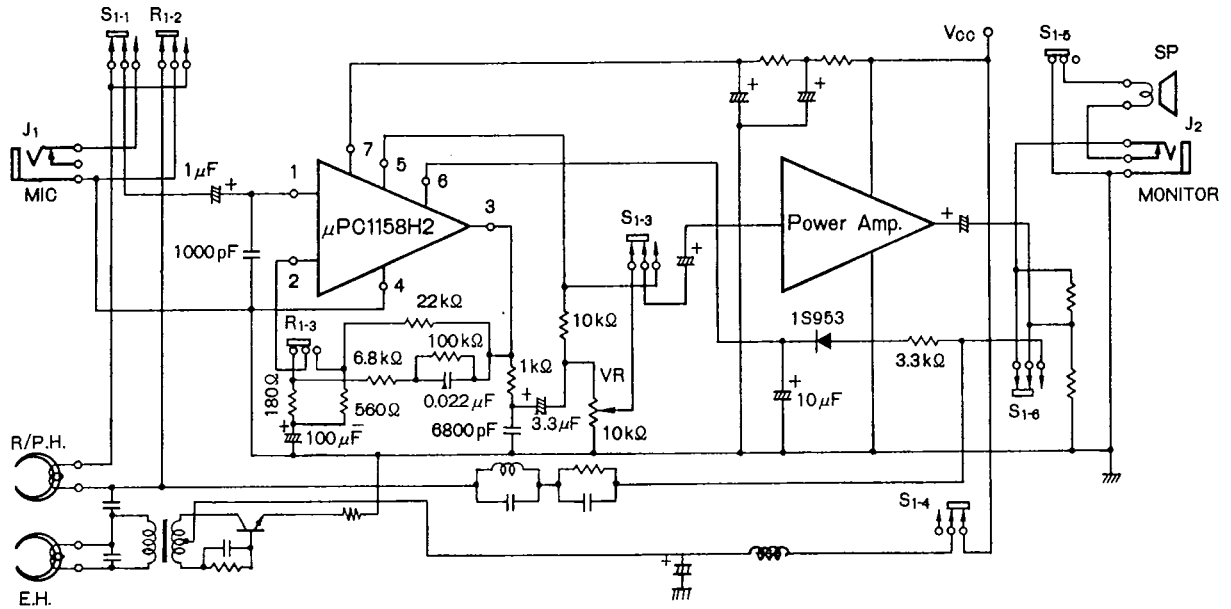
CIRCUIT CURRENT, MAXIMUM OUTPUT VOLTAGE, OPEN LOOP VOLTAGE GAIN vs. SUPPLY VOLTAGE



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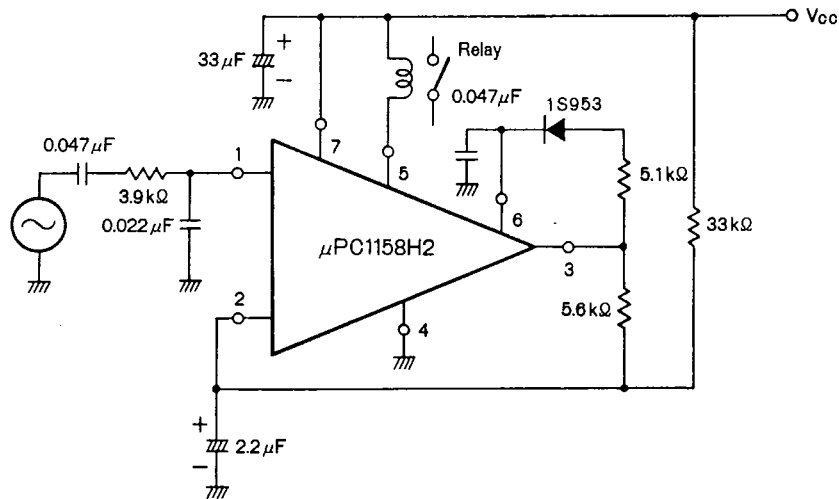
### TYPICAL APPLICATIONS

Pre Amplifier for Cassette Tape Recorder.



- \* Rec./Play Switch S<sub>1-1</sub> ~ S<sub>1-7</sub> are shown in play mode.
- \* Actual D.C. resistance of feed back element between pin 2 and pin 3 is advisable about 18 kΩ or more.

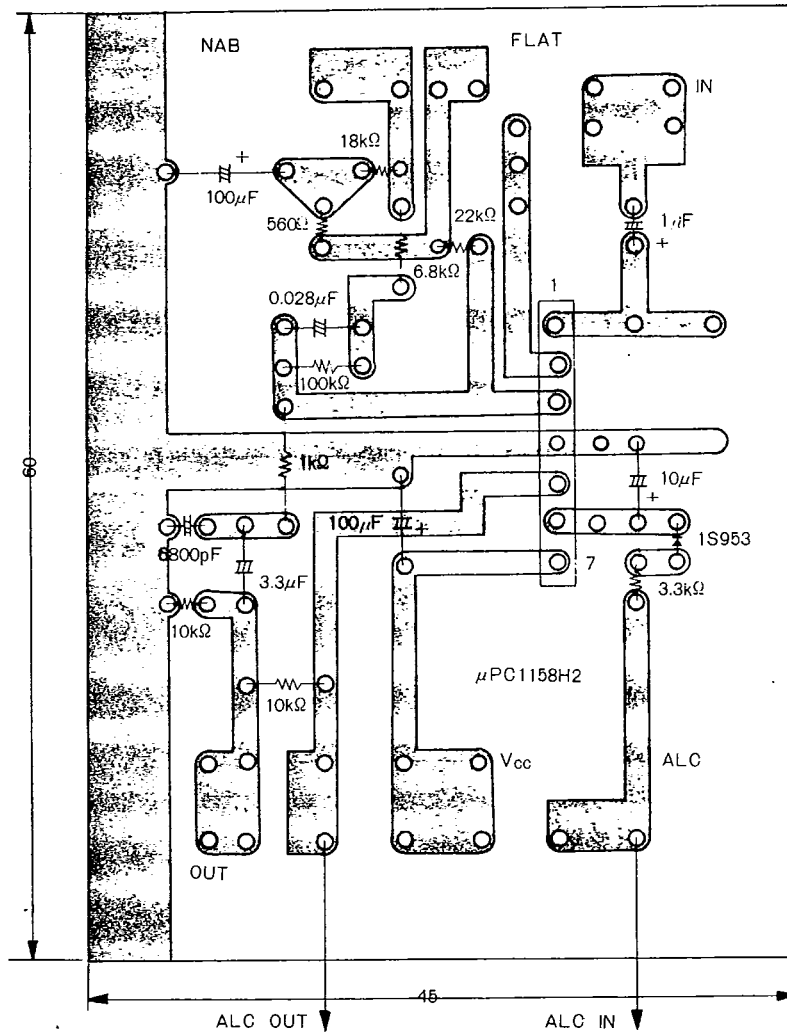
Relay Driver for Radio Control Equipment.



TYPICAL PRINTED CIRCUIT BOARD PATTERN

(1) Pre-Amplifier for Cassette Tape Recorder.

PRINTED CIRCUIT LAYOUT & COMPONENT LAYOUT (BOTTOM VIEW)



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