

BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC1252HA2

T-74-05-01

VCA FOR dbx NOISE REDUCTION SYSTEM

DESCRIPTION

The μ PC1252HA2 is dbx noise reduction system VCA (Voltage Controlled Amplifier), used in tape deck and other audio equipment.

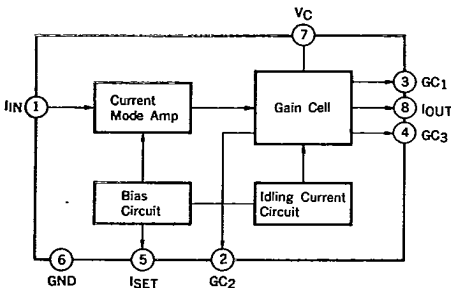
The μ PC1252HA2 features excellent linearity VCA for wider input level due to NEC's super low noise and high h_{FE} NPN PNP, complementary process.

Since the package is 8 pin SIP. It can be built in a compact set.

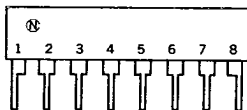
FEATURES

- Wide operating supply voltage $V_{CC} = \pm 4$ to ± 15 V (TYP. ± 12 V)
- Excellent linearity Control Constant $V_C = -5.9$ mV/dB ($A_v = -30$ dB to $+30$ dB)
- Low total harmonic distortion THD = 0.01 % TYP. ($V_{CC} = \pm 12$ V, $f = 1$ kHz, $V_O = 0$ dBV)
- Low noise $NV_O = -94$ dBV TYP. ($V_{CC} = \pm 12$ V, $R_{IN} = 33.2$ k Ω ,
 $A_v = 0$ dB, BPF = 10 Hz to 20 kHz)

BLOCK DIAGRAM



CONNECTION DIAGRAM



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ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage	V _{CC} , V _{EE}	±15	V
Supply Current	I _{CC}	30	mA
Power Dissipation	P _D	330*	mW
Operating Temperature Range	T _{opt}	-20 to +75	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

* Value at T_a = 75 °C

RECOMMENDED OPERATING CONDITIONS

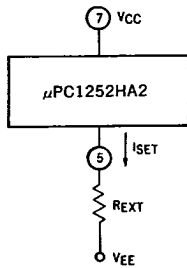
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Supply Voltage	V _{CC} , V _{EE} **	±4	±12	±15	V
Bias Current	I _{SET}	-	2.0	-	mA
Input Level Range	v _{in}	-40	-	+10	dBV

** See Note

ELECTRICAL CHARACTERISTICS (T_a = 25 °C, V_{CC} = +12 V, V_{EE} = -12 V, I_{SET} = 2 mA, R_{IN} = R_{OUT} = 33 kΩ, f = 1 kHz)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply Current	I _{CC}	1.0	2.0	3.0	mA	Non Signal
Equivalent Input Bias Current	I _{IJN}		6	20	nA	Non Signal
Gain Cell Idling Current	I _{DLE}		20		μA	Non Signal
Gain Cell Offset Voltage	V _{OFF}		±0.5		mV	A _V = 0 dB, THD ≤ 0.07 %
Control Constant	V _C	-5.8	-5.9	-6.1	mV/dB	A _V = -30 dB to +30 dB
Total Harmonic Distortion	THD1		0.007	0.07	%	A _V = 0 dB, V _O = 0 dBV, BPF = 400 Hz to 5 kHz
Total Harmonic Distortion	THD2		0.02	0.10	%	A _V = +20 dB, V _O = 0 dBV, BPF = 400 Hz to 5 kHz
Total Harmonic Distortion	THD3		0.02	0.15	%	A _V = -20 dB, V _{in} = 0 dBV, BPF = 400 Hz to 5 kHz
Output Noise Level	V _{N0}		-94	-84	dBV	A _V = 0 dB, R _{IJN} = 33 kΩ, BPF = 10 Hz to 20 kHz
Symmetry Control Voltage	V _{SYM}	-4	0	+4	mV	A _V = 0 dB, THD ≤ 0.07 %

Note) V_{CC}, V_{EE} and I_{SET} are defined as follows.



$$I_{SET} = \frac{V_{EE} - 4 \cdot V_{BE}}{R_{EXT}} = \frac{V_{EE} - 2.4}{R_{EXT}} = 2 \text{ mA}$$

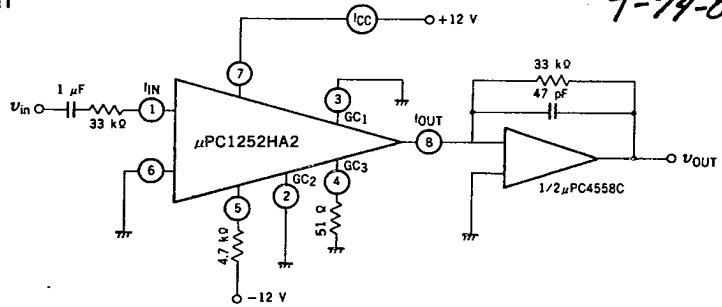
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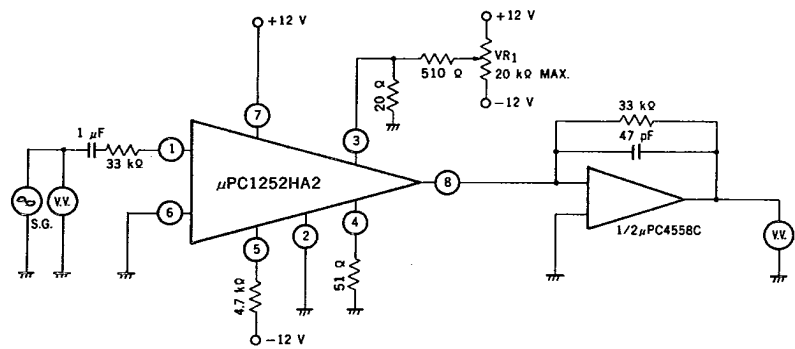
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TEST CIRCUIT

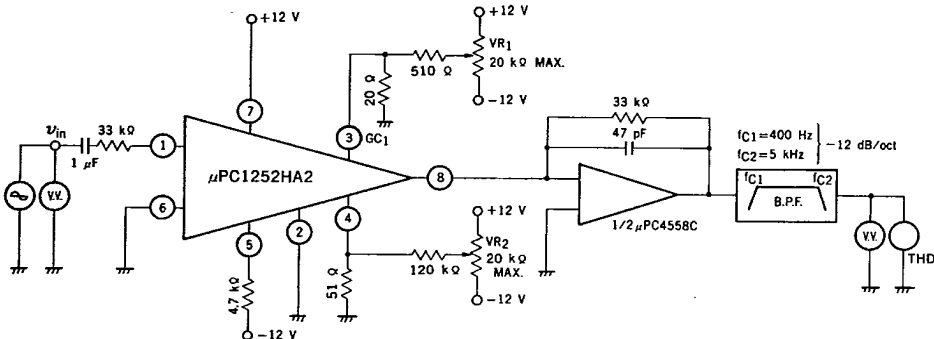
(1) I_{CC}



(2) V_C



(3) THD_{1 to 3}



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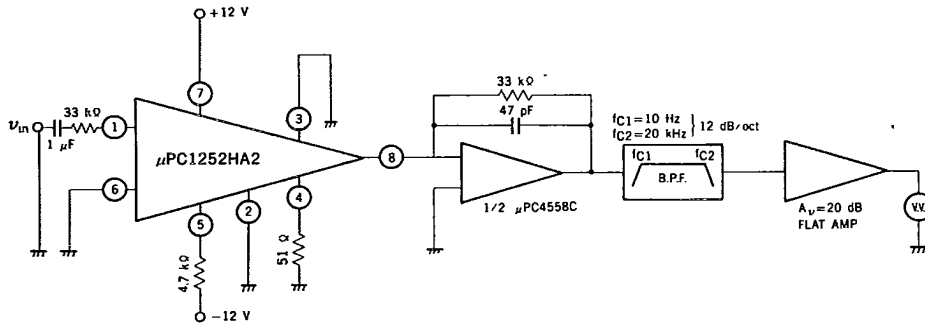
- THD₁: Make THD minimum with VR₂ after adjusting GC₁ = 0 mV with VR₁ at V_{in} = 0 dBV
- THD₂: Make THD minimum with VR₂ after adjusting GC₁ = -120 mV with VR₁ at V_{in} = -20 dBV
- THD₃: Make THD minimum with VR₂ after adjusting GC₁ = +120 mV with VR₁ at V_{in} = 0 dBV

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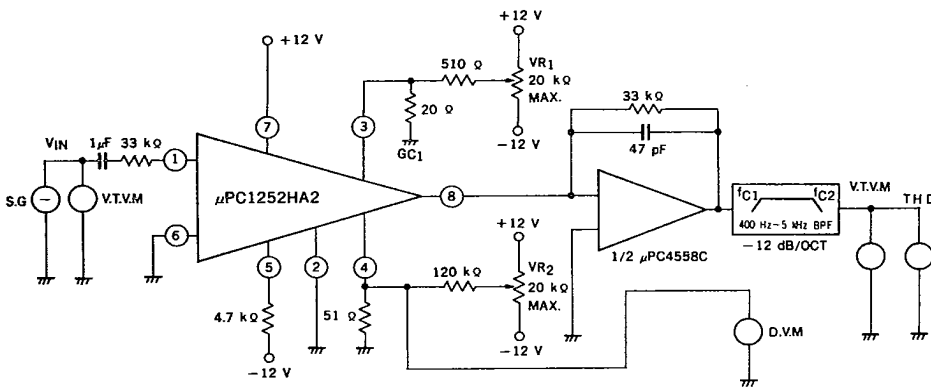
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(4) V_{NO}



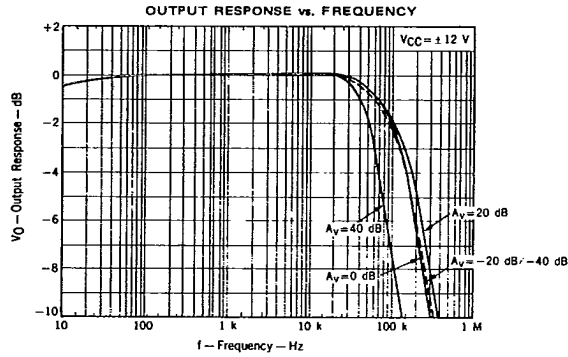
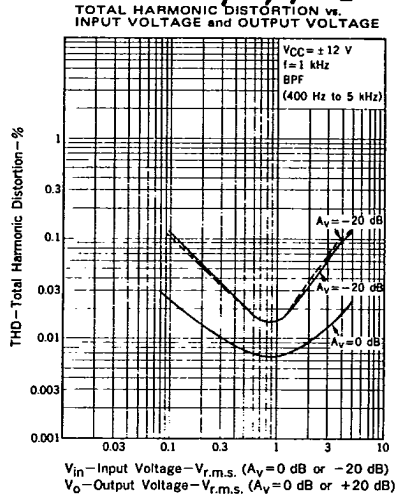
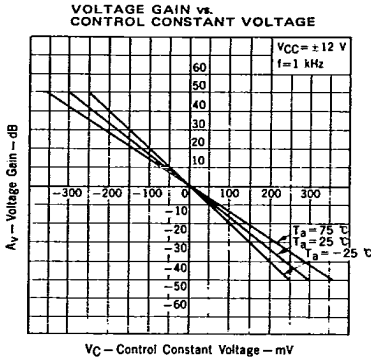
(5) V_{SYM}



Make THD minimum with VR_2 after adjusting $GC_1 = 0$ mV with VR_1 at $V_{in} = 0$ dBV and Measure Symmetry Control Voltage of 4 pin.

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T-74-05-01



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μ PC1252HA2

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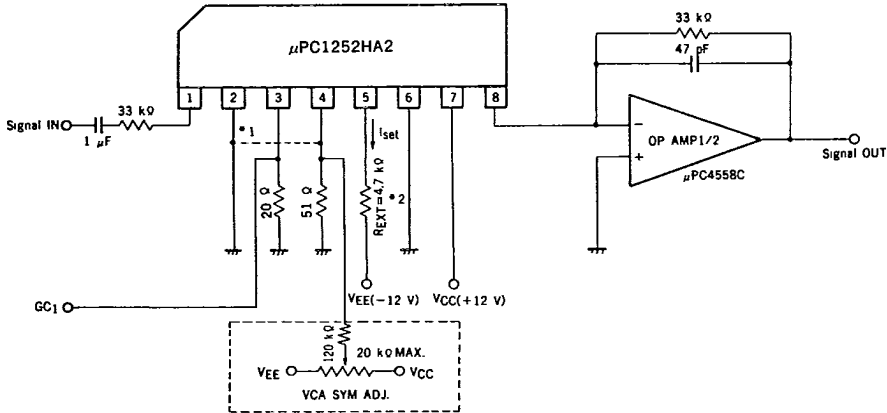
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Note for use

1. Since μ PC1252HA2 is designed for Noise Reduction System, recommend to use μ PC1252HA2 with μ PC1253HA2 (RMS Revel Sensor), which controls μ PC1252HA2, in case of composing dbx NR System.
2. Documents issued by dbx, in incorporated have priority over NEC, such as application note or data about dbx NR system.
3. If you plan to use μ PC1252HA2 except dbx NR system, inform NEC of it as soon as possible.

APPLICATION CIRCUIT



*1. Possible to connect 4 pin to GND in case of using this IC at THD \geq 0.05 %.

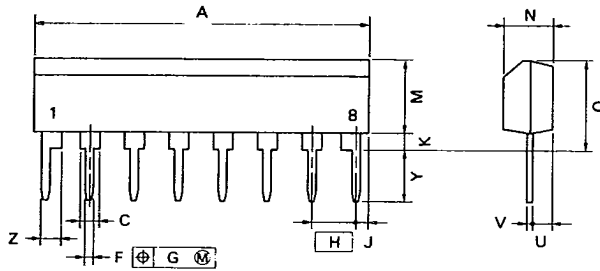
*2. I_{set} is set to be 2 mA at $R_{EXT} = 4.7 \text{ k}\Omega$, $V_{CC} = 12 \text{ V}$, $V_{EE} = -12 \text{ V}$, so readjust R_{EXT} in case that supply voltage is different from above.
GC1 is an input terminal of μ PC1252HA2 control voltage.

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8 PIN PLASTIC SLIM SIP

T-74-05-01



NOTE

Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

PBHA-254B

ITEM	MILLIMETERS	INCHES
A	20.32 MAX.	0.8 MAX.
C	1.1 MIN.	0.043 MIN.
F	0.5 ^{+0.1}	0.02 ^{+0.004}
G	0.25	0.01
H	2.54	0.1
J	1.27 MAX.	0.05 MAX.
K	0.51 MIN.	0.02 MIN.
M	5.08 MAX.	0.2 MAX.
N	2.8 ^{+0.2}	0.11 ^{+0.008}
Q	5.75 MAX.	0.227 MAX.
U	1.5 MAX.	0.059 MAX.
V	0.25 ^{+0.08}	0.01 ^{+0.003}
Y	3.2 ^{+0.5}	0.126 ^{+0.02}
Z	1.1 MIN.	0.043 MIN.

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