

BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC1316

DUAL AUDIO POWER AMPLIFIER

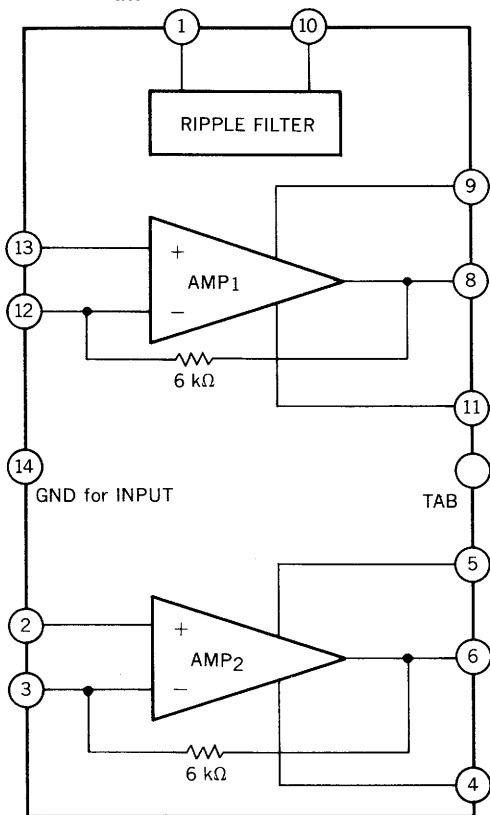
DESCRIPTION

The μ PC1316 is a dual audio power amplifier designed for portable audio sets.

FEATURES

- Wide operating voltage range. $V_{CC} = 3$ to 16 V
- High output power. $P_O = 2$ W TYP. @ 12 V / 8Ω / 10 %
 $P_O = 1.6$ W TYP. @ 9 V / 4Ω / 10 %
 $P_O = 1.2$ W TYP. @ 9 V / 8Ω / 10 %
 $P_O = 0.7$ W TYP. @ 6 V / 4Ω / 10 %
 $P_O = 0.5$ W TYP. @ 6 V / 8Ω / 10 %
 $P_O = 80$ mW @ 4.5 V / 32Ω / 10 %
 ($V_{CC} / R_L / THD$)
- High supply voltage rejection. SVR = 45 dB
- Low quiescent current. $I_{CC} = 12$ mA
- Low pop noise at power switch on and off.

BLOCK DIAGRAM



CONNECTION DIAGRAM

PIN NO	CONNECTION
1	Filter
2	Input 2
3	NFB 2
4	Compensation 2
5	Bootstrap 2
6	Output 2
7	NC
TAB	GND
8	Output 1
9	Bootstrap 1
10	V_{CC}
11	Compensation 1
12	NFB 1
13	Input 1
14	GND

ORDERING INFORMATION

PART NUMBER	PACKAGE	QUALITY GRADE
μPC1316C	14 PIN PLASTIC DIP WITH TAB (300 mil)	Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage (No Signal)	V _{CC1}	18	V
Supply Voltage (Operating)	V _{CC2}	16	V
Power Dissipation	P _D	2.4 *	W
Operating Temperature	T _{opt}	-20 to +70	°C
Storage Temperature	T _{stg}	-40 to +150	°C

* 50 x 50 x 0.035 mm Copper heat sink on PCB

RECOMMENDED OPERATING CONDITIONS (T_a = 25 °C)

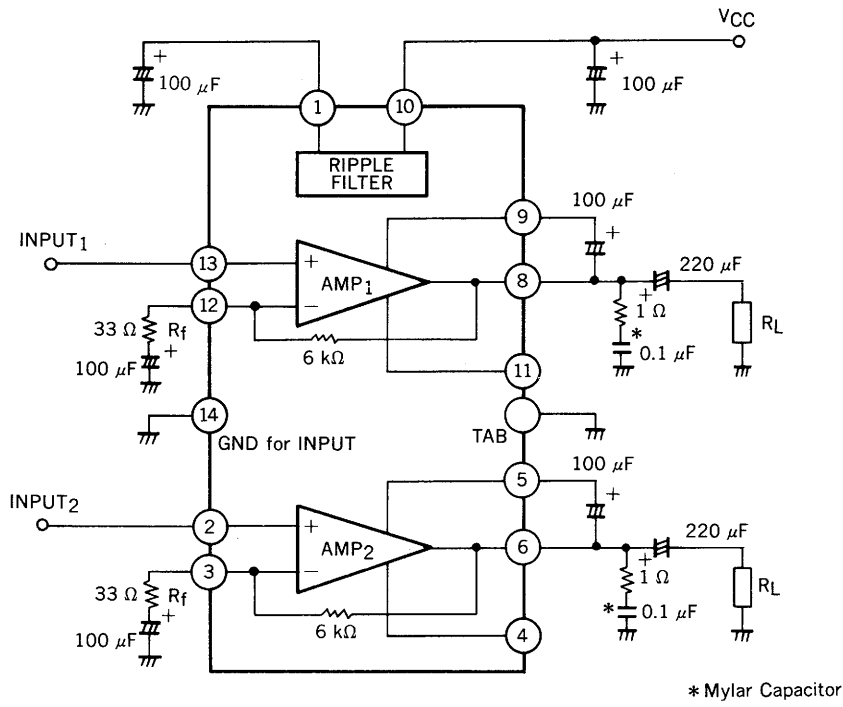
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage (R _L =16 Ω)	V _{CC} (16)	3		16	V
Supply Voltage (R _L =8 Ω)	V _{CC} (8)	3		13	V
Supply Voltage (R _L =4 Ω)	V _{CC} (4)	3		9	V
Load Impedance	R _L	4	8		Ω
Voltage Gain	A _v	34	44		dB

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

(V_{CC}=9 V, R_f=33 Ω, f=1 kHz, R_L=8 Ω)

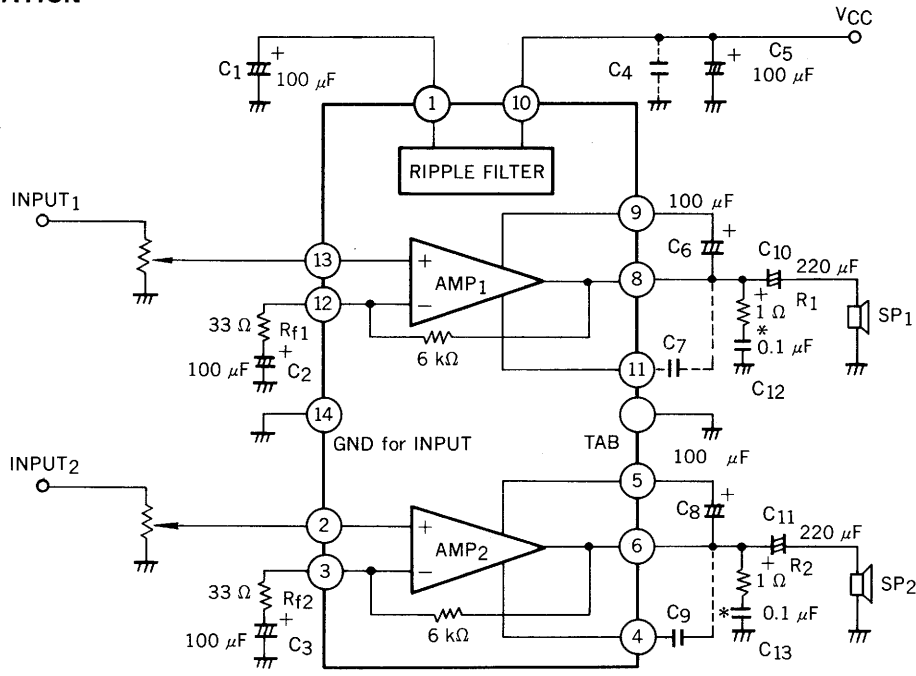
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Circuit Current	I _{CC}		12	25	mA	No Signal
Voltage Gain	A _{v1}	41	44	47	dB	P _O =0.25 W, R _f =33 Ω
	A _{v2}		34		dB	P _O =0.25 W, R _f =120 Ω
Output Power	P _{O1}		2		W	V _{CC} =12 V, R _L =8 Ω, THD = 10 %
	P _{O2}		1.6		W	V _{CC} =9 V, R _L =4 Ω, THD = 10 %
	P _{O3}	0.9	1.2		W	V _{CC} =9 V, R _L =8 Ω, THD = 10 %
	P _{O4}		0.7		W	V _{CC} =6 V, R _L =4 Ω, THD = 10 %
	P _{O5}		0.5		W	V _{CC} =6 V, R _L =8 Ω, THD = 10 %
	P _{O6}		80		mW	V _{CC} =4.5 V, R _L =32 Ω, THD = 10 %
Total Harmonic Distortion	THD1		0.4	1.6	%	P _O =0.5 W, R _f =33 Ω
	THD2		0.3		%	P _O =0.5 W, R _f =120 Ω
Output Noise Voltage	NL		0.9	1.5	mV _{r.m.s.}	R _G =10 kΩ
Supply Voltage Rejection	SVR	36	45		dB	R _G =0, f(ripple)=100 Hz, V(ripple)=0.3 V _{r.m.s.}
Cross Talk	CT	40	55		dB	R _G =0, P _O =0.25 W
Channel Balance	ChB	-2	0	2	dB	P _O =0.25 W
Input Impedance	Z _{in}		5		MΩ	

TEST CIRCUIT



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TYPICAL APPLICATION

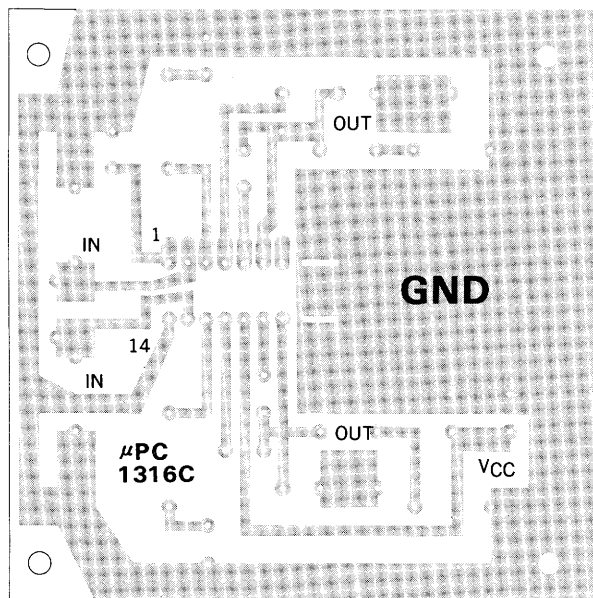


* Mylar Capacitor

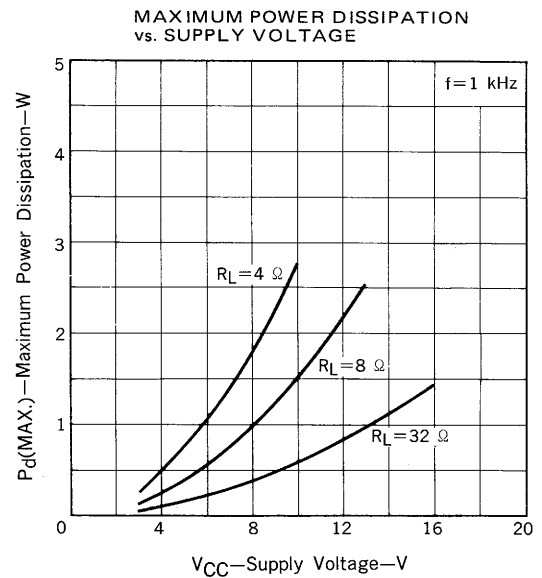
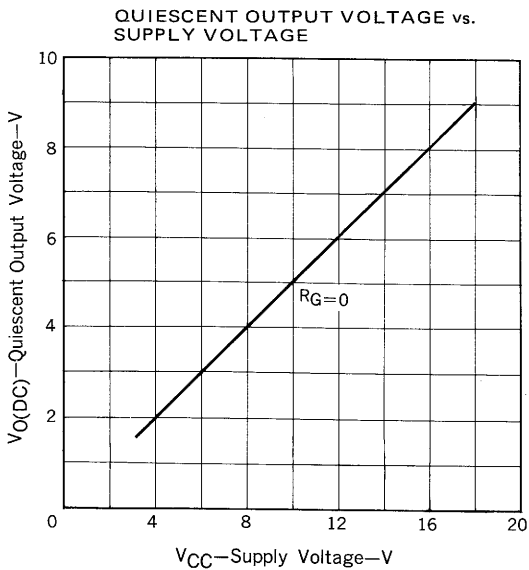
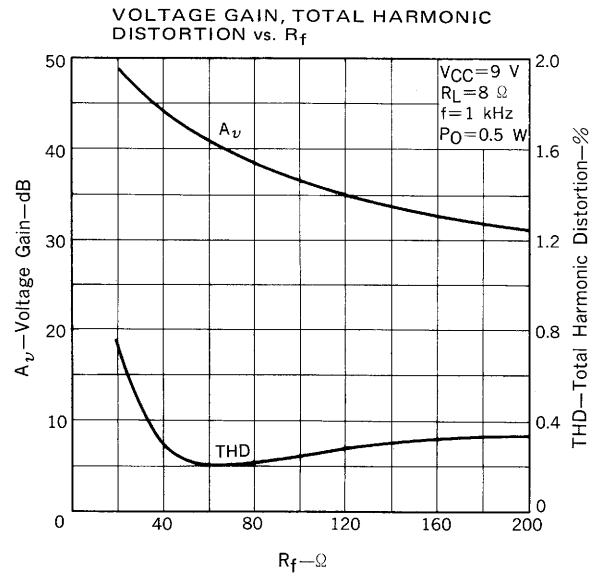
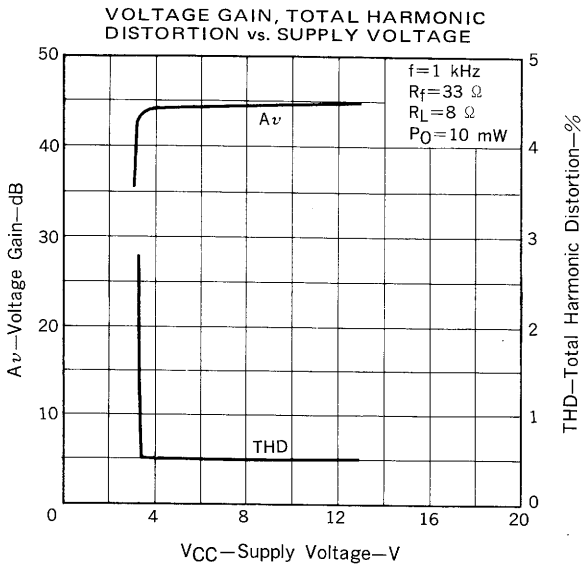
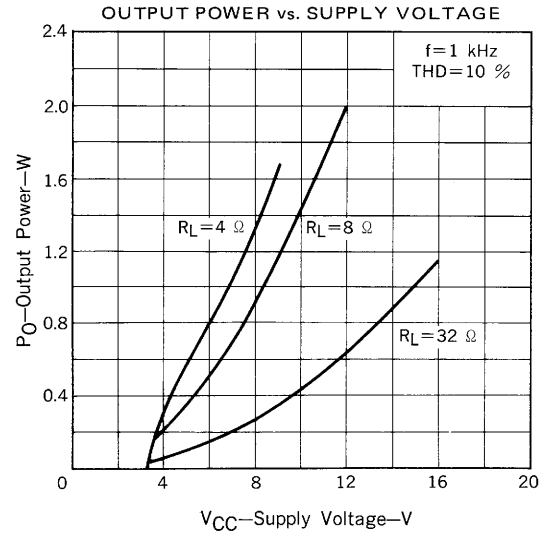
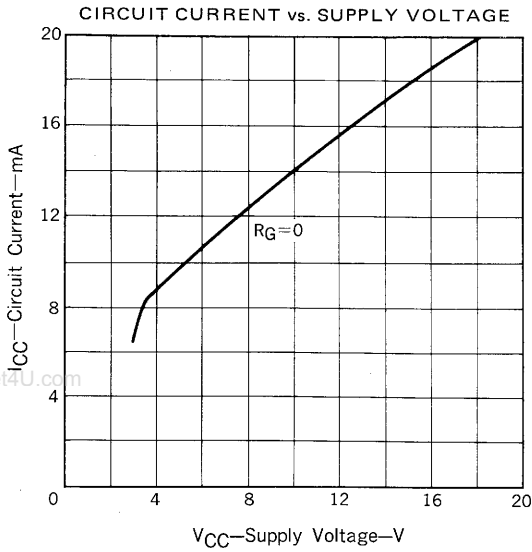
NOTE FOR USE

- (1) Mylar capacitor is recommended as C₁₂, C₁₃.
- (2) Add C₇, C₉, in the case of reducing voltage gain at high frequency.
- (3) Add C₄ or increase capacitance of C₁₂, C₁₃ when a oscillation may occur due to the pattern layout on PCB.
- (4) Voltage gain can be changed by value of R_{f1}, R_{f2}. The voltage gain should be set more than 34 dB.
- (5) When a input capacitor is connected the input terminal, a bias resistor should be connected between its terminal and GND.

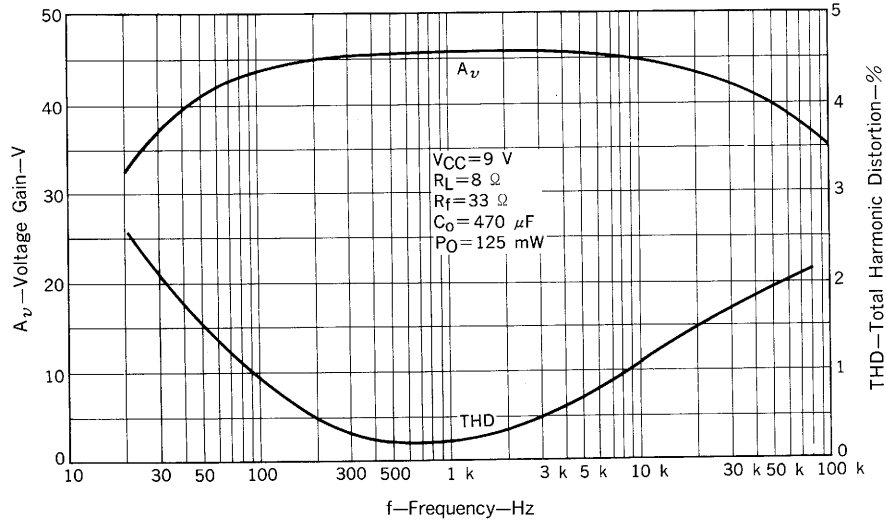
EXAMPLE FOR PRINTED CIRCUIT BOARD (Copper foil side)



TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

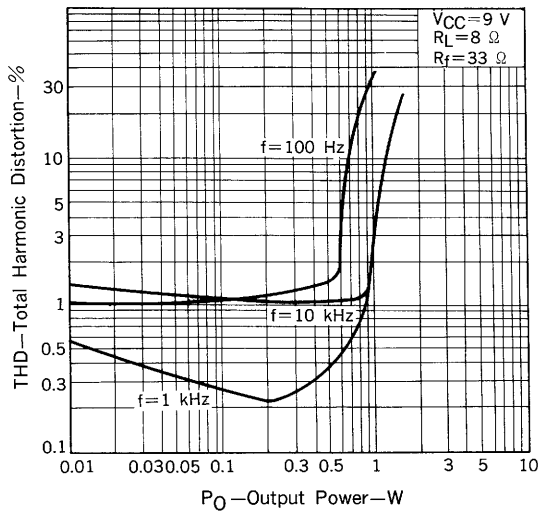


VOLTAGE GAIN, TOTAL HARMONIC DISTORTION vs. FREQUENCY

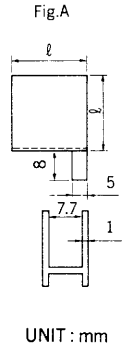
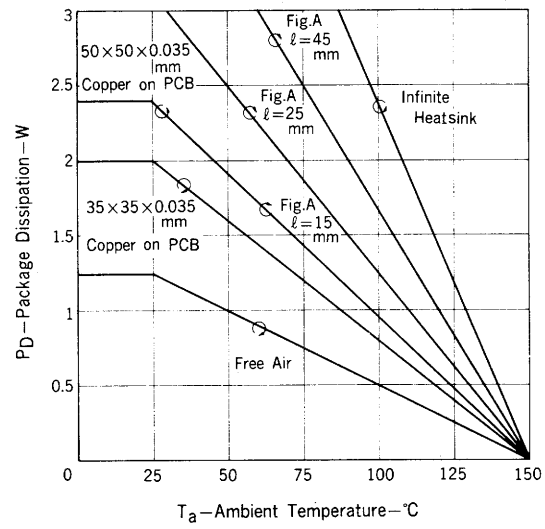


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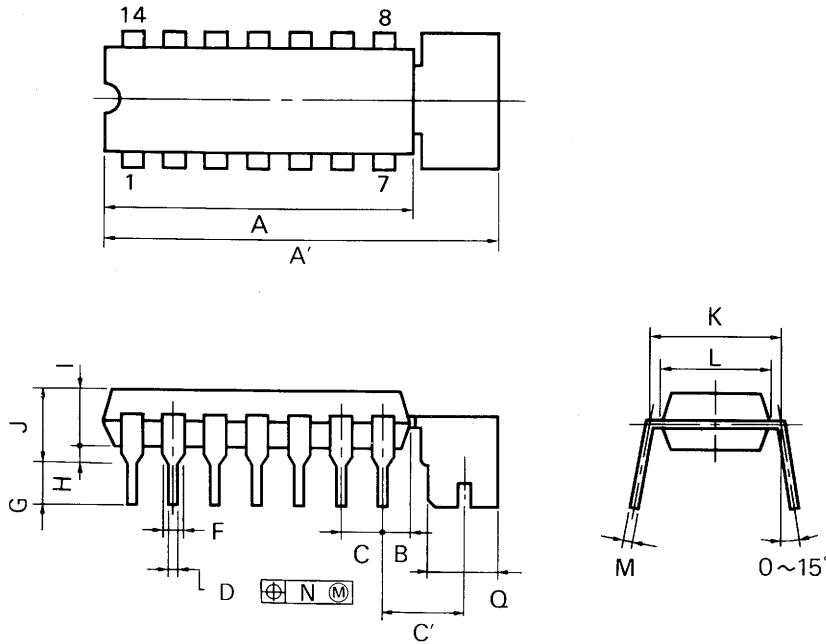
TOTAL HARMONIC DISTORTION vs. OUTPUT POWER



PACKAGE DISSIPATION vs. AMBIENT TEMPERATURE



14PIN PLASTIC DIP WITH TAB (300 mil)



P14CT-100-300B

NOTES

- 1) Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.
- 2) Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS	INCHES
A	20.32 MAX.	0.800 MAX.
A'	24.60 MAX.	0.969 MAX.
B	2.54 MAX.	0.100 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
C'	4.74	0.187
D	0.50 ^{-0.10}	0.020 ^{+0.004} _{-0.005}
F	1.1 MIN.	0.043 MIN.
G	3.4 ^{±0.3}	0.134 ^{±0.012}
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
M	0.30 ^{+0.10} _{-0.05}	0.012 ^{+0.004} _{-0.003}
N	0.25	0.01
Q	4.40 ^{±0.50}	0.173 ^{±0.020}

[MEMO]

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