

6427525 N E C ELECTRONICS INC 05E 22678 D  
**BIPOLAR ANALOG INTEGRATED CIRCUIT**  
 **$\mu$ PC1212C**

T-74-05-01

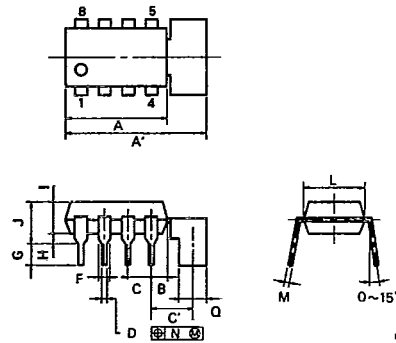
**AUDIO POWER AMPLIFIER**

**DESCRIPTION**

The  $\mu$ PC1212C is a silicon monolithic integrated circuit designed for an audio power amplifier used in a portable radio receiver or a portable cassette tape recorder which works at 6-volt power supply.

The  $\mu$ PC1212C is encapsulated in an 8-pin dual in line plastic package with a tab.

**8 PIN PLASTIC DIP WITH TAB (300 mil)**



PECT-100-3008

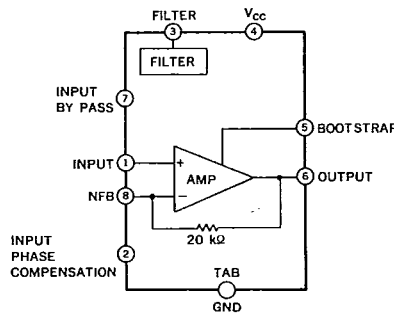
ITEM	MILLIMETERS	INCHES
A	12.70 MAX.	0.500 MAX.
A'	14.50 MAX.	0.571 MAX.
B	2.54 MAX.	0.100 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
C'	3.65	0.144
D	0.50 <sup>+0.10</sup>	0.020 <sup>+0.004</sup>
F	1.1 MIN.	0.043 MIN.
G	3.5 <sup>+0.2</sup>	0.138 <sup>+0.012</sup>
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
L	6.4	0.252
M	0.30 <sup>+0.08</sup>	0.012 <sup>+0.003</sup>
N	0.25	0.01
Q	2.62 <sup>+0.50</sup>	0.103 <sup>+0.020</sup>

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

**FEATURES**

- High output power.  $P_o = 1$  W (TYP.) at  $V_{CC} = 6$  V,  $R_L = 4 \Omega$ , T.H.D. = 10 %
- Wide operating voltage range.  $V_{CC} = 3.5$  to 6 to 9 V
- High ripple rejection ratio. R.R.R. = 55 dB (TYP.)
- Soft clipping waveform.
- Have a muting circuit so that no shock noise at power supply switch on and off.
- Have a terminal to reject interference noise in strong electric field. (pin 2)

**BLOCK DIAGRAM**



**CONNECTION DIAGRAM**

No.	CONNECTION	No.	CONNECTION
1	INPUT	5	BOOTSTRAP
2		6	OUTPUT
3	FILTER	7	FILTER
4	V <sub>CC</sub>	8	N. F. B.
TAB	GND		

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**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25 °C)**

Supply Voltage	V <sub>CC1</sub>	(No Signal)	11	V
Supply Voltage	V <sub>CC2</sub>	(Operating)	9	V
Allowable Power Dissipation	P <sub>d</sub>		2.4	W
Operating Temperature	T <sub>opt</sub>		-20 to 70	°C
Storage Temperature	T <sub>stg</sub>		-40 to 150	°C

\* 50 x 50 x 0.035 mm<sup>3</sup> copper heat sink on P.C.B.

**RECOMMENDED CONDITIONS (T<sub>a</sub> = 25 °C)**

Supply Voltage	V <sub>CC</sub> = 3.5 to 6 to 9 V
Load Impedance	R <sub>L</sub> = 4 Ω

**ELECTRIC CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

(Refer to the test circuits V<sub>CC</sub>=6 V, R<sub>L</sub>=4 Ω, 50 X 50 X 0.035 mm<sup>3</sup> copper heat sink on P.C.B. unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Quiescent Circuit Current	I <sub>CC</sub>	8	15	25	mA	No Signal
Open Loop Voltage Gain	A <sub>VO</sub>	55	65		dB	P <sub>O</sub> =0.25 W, f=1 kHz
Voltage Gain (Closed Loop)	A <sub>V</sub>	41	45 34	48	dB	R <sub>f</sub> =100 Ω f=1 kHz R <sub>f</sub> =360 Ω f=1 kHz
Output Power	P <sub>O</sub>	0.7	2.4 1.3 1.0 0.54 0.41 0.22		W	T.H.D.=10 % f=1 kHz, R <sub>f</sub> =100 Ω V <sub>CC</sub> =9 V, R <sub>L</sub> =4 Ω V <sub>CC</sub> =9 V, R <sub>L</sub> =8 Ω V <sub>CC</sub> =6 V, R <sub>L</sub> =4 Ω V <sub>CC</sub> =6 V, R <sub>L</sub> =8 Ω V <sub>CC</sub> =4 V, R <sub>L</sub> =4 Ω V <sub>CC</sub> =4 V, R <sub>L</sub> =8 Ω
Input Sensitivity	V <sub>i(rms)</sub>		16.4 47.4		mV	P <sub>O</sub> =1 W R <sub>L</sub> =4 Ω, f=1 kHz R <sub>f</sub> =100 Ω (A <sub>V</sub> =45 dB) R <sub>f</sub> =360 Ω (A <sub>V</sub> =34 dB)
Input Sensitivity	V <sub>i(rms)</sub>		2.5 8.9		mV	P <sub>O</sub> =50 mW R <sub>L</sub> =4 Ω, f=1 kHz R <sub>f</sub> =100 Ω (A <sub>V</sub> =45 dB) R <sub>f</sub> =360 Ω (A <sub>V</sub> =34 dB)
Total Harmonic Distortion	T.H.D.		0.4	1.5	%	P <sub>O</sub> =0.25 W
Output Noise Voltage	NL		0.2	0.8	mV <sub>r.m.s.</sub>	R <sub>G</sub> =0
Supply Voltage Rejection Ratio	S.V.R.	40	55		dB	R <sub>G</sub> =0, f <sub>ripple</sub> =100 Hz V <sub>ripple</sub> =0.3 V <sub>r.m.s.</sub>
Input Impedance	R <sub>i</sub>	10	20		kΩ	

NOTE: In case that only a TYP. value is specified, this specification is for helping to design.

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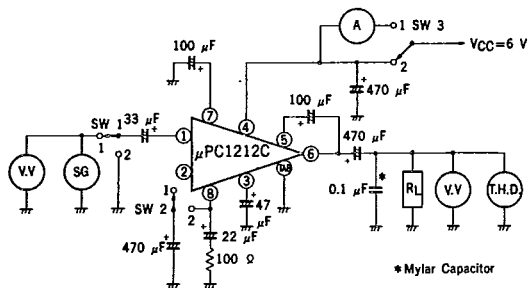
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TEST CIRCUIT

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Fig. 1 TEST CIRCUIT

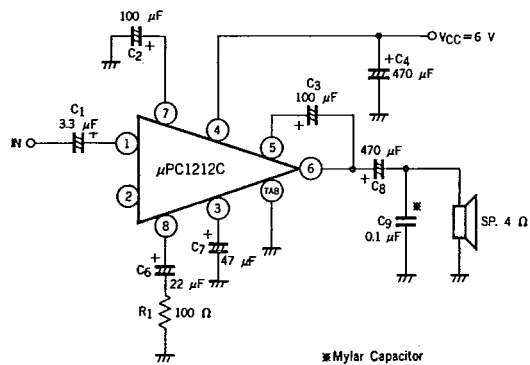


SWITCH POSITION

ITEM	SWITCH	SWITCH		
		SW1	SW2	SW3
Circuit Current	$I_{CC}$	.2	1	1
Open Loop Voltage Gain	$A_{VO}$	1	2	2
Voltage Gain	$A_V$	1	1	2
Output Power	$P_O$	1	1	2
Total Harmonic Distortion	T.H.D.	1	1	2
Output Noise Voltage	NL	2	1	2

TYPICAL APPLICATION

Fig. 2 SINGLE OPERATION



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Fig. 3 BTL OPERATION

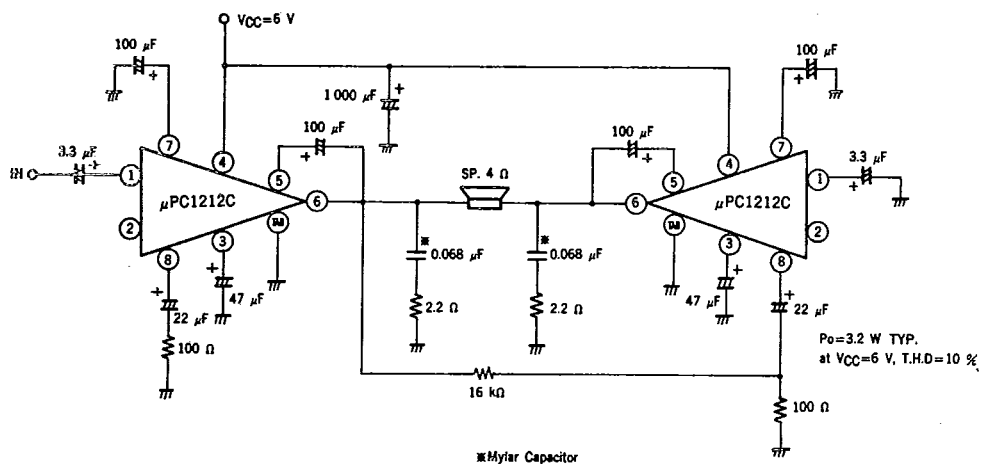
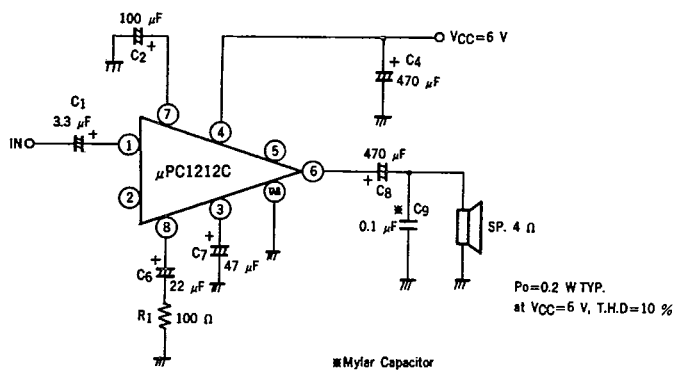


Fig. 4 SINGLE OPERATION WITHOUT BOOTSTRAP



NOTE FOR USE

- (1) Capacitor C<sub>9</sub> is for preventing the parasitic oscillation. A mylar capacitor is recommended for this position.
- (2) The ground side of C<sub>4</sub>, C<sub>9</sub> and the loud speaker should be attached at the place of the copper foil close to the tab of  $\mu$ PC1212C.
- (3) Interference noise rejection in a strong electric field can be achieved by adding a capacitor (about 1 000 pF) between pin 1 and pin 2.

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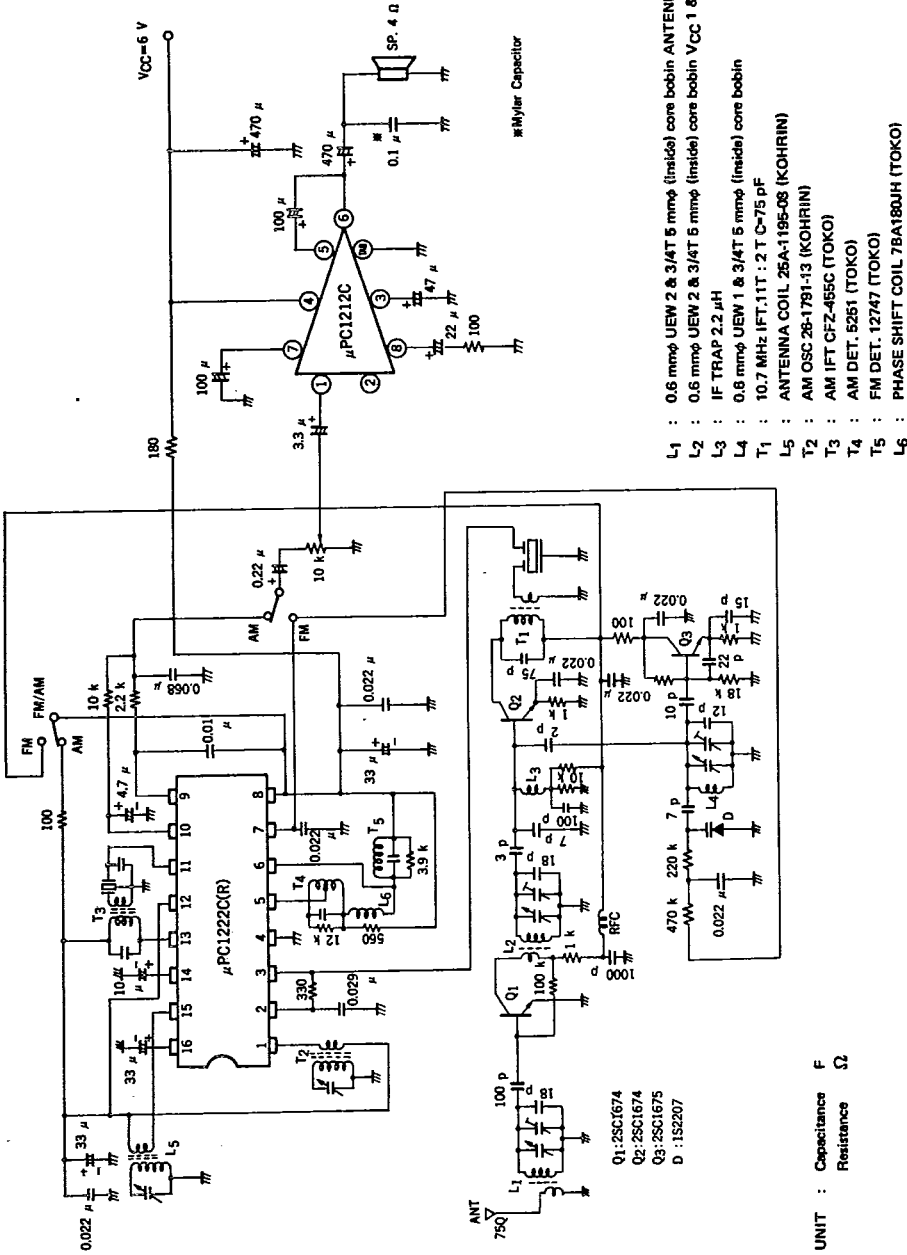
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APPLICATION INFORMATION  
Fig. 5 LOW COST FM-AM RADIO WITH 1.0W OUTPUT POWER (VCC=6 V)

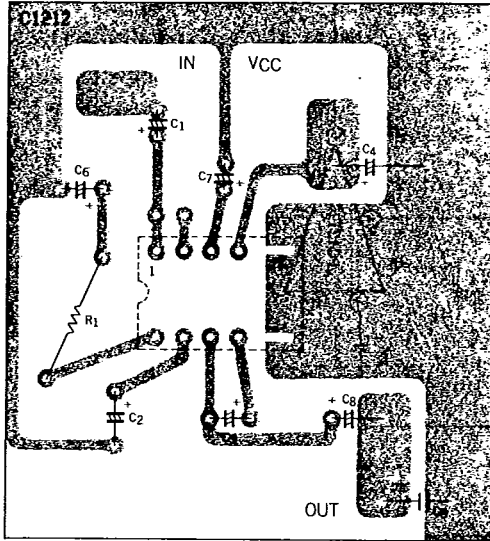


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P.C. BOARD PATTERN (COPPER SIDE)

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TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

Fig. 6 OUTPUT POWER vs. SUPPLY VOLTAGE

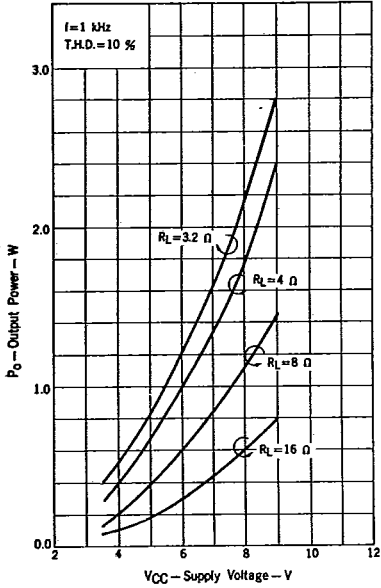


Fig. 7 TOTAL HARMONIC DISTORTION vs. OUTPUT POWER

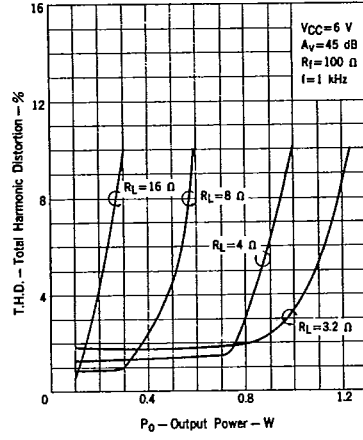
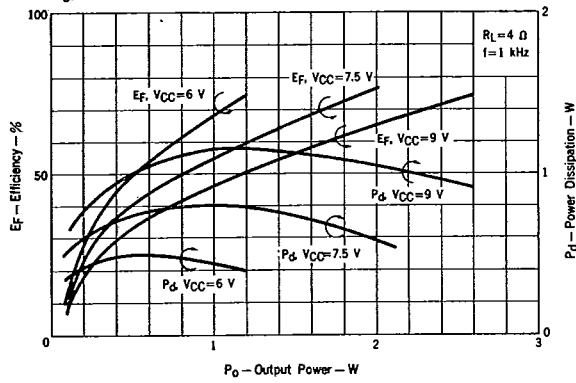


Fig. 8 POWER DISSIPATION AND EFFICIENCY vs. OUTPUT POWER



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Fig. 9 INPUT SENSITIVITY vs.  $R_f$

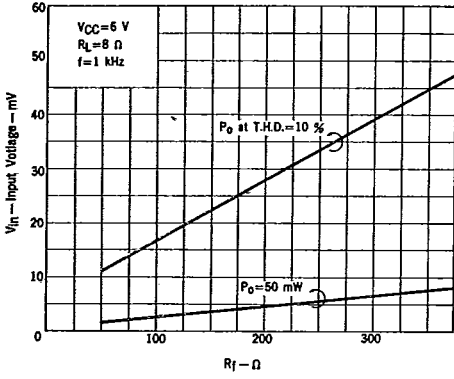


Fig. 10 VOLTAGE GAIN (CLOSED LOOP) vs.  $R_f$

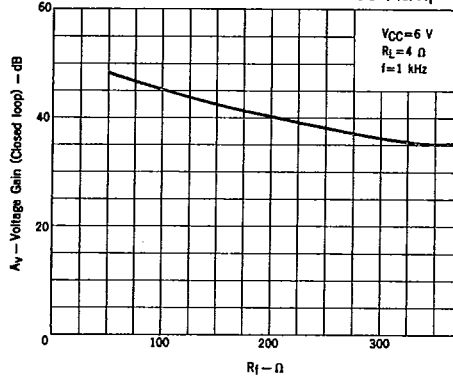


Fig. 11 QUIESCENT OUTPUT VOLTAGE AT PIN 6 vs. SUPPLY VOLTAGE

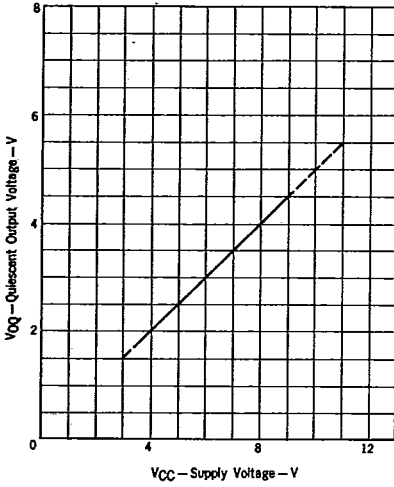
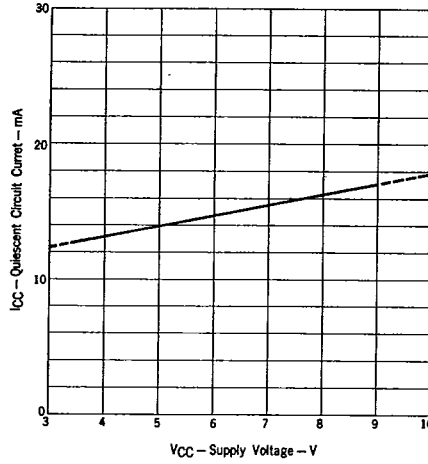


Fig. 12 QUIESCENT CIRCUIT CURRENT vs. SUPPLY VOLTAGE



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Fig. 13 OPEN LOOP VOLTAGE GAIN, VOLTAGE GAIN vs. FREQUENCY

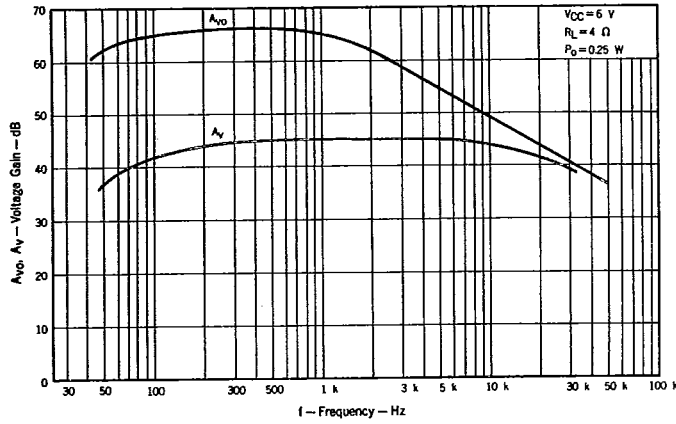


Fig. 14 TOTAL HARMONIC DISTORTION vs. FREQUENCY

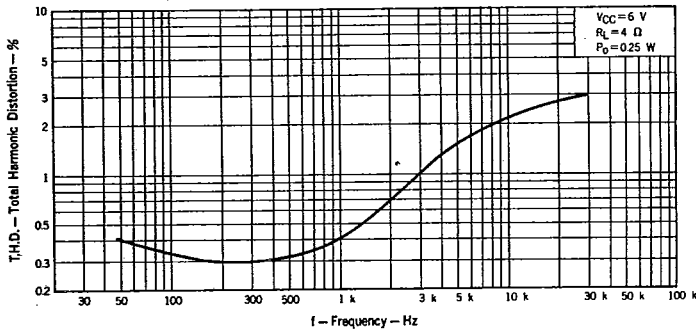
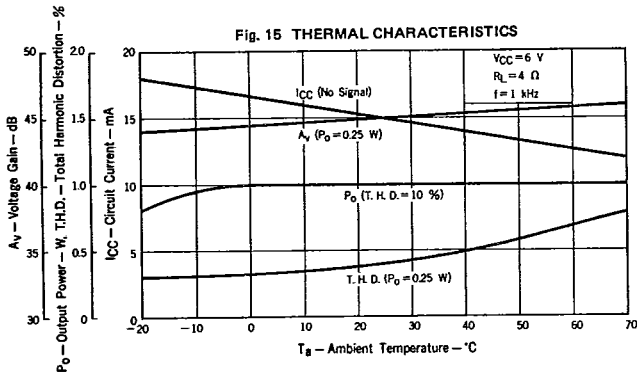


Fig. 15 THERMAL CHARACTERISTICS



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Fig. 16 OPEN LOOP VOLTAGE GAIN, VOLTAGE GAIN vs. SUPPLY VOLTAGE

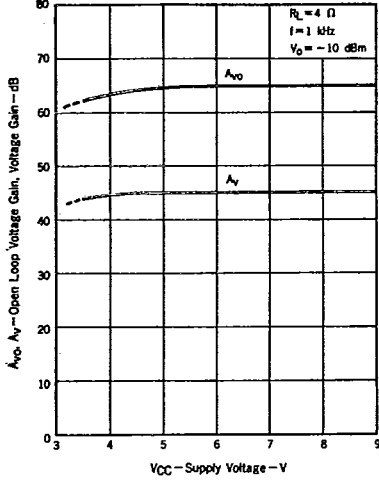


Fig. 17 TOTAL HARMONIC DISTORTION vs. SUPPLY VOLTAGE

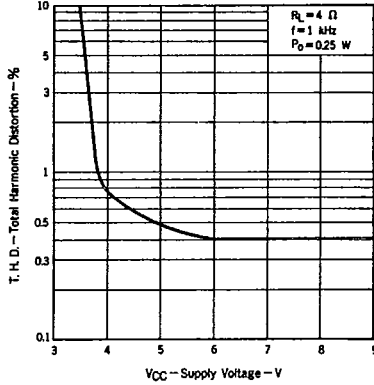
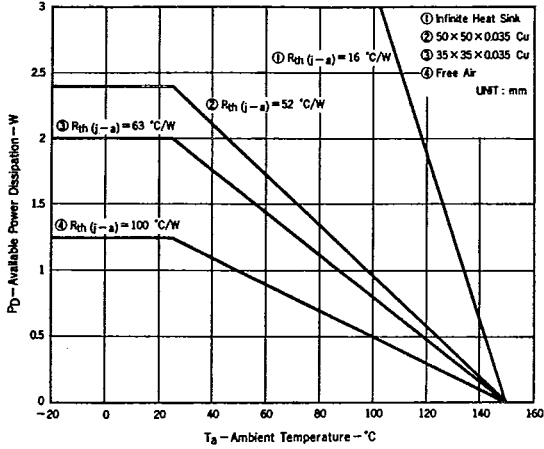


Fig. 18 AVAILABLE POWER DISSIPATION vs. AMBIENT TEMPERATURE



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