

6427525 N E C ELECTRONICS INC 05E 22678 D
BIPOLAR ANALOG INTEGRATED CIRCUIT
 μ PC1212C

T-74-05-01

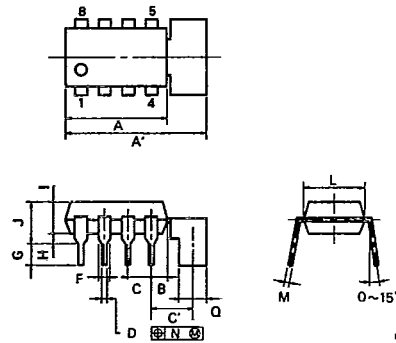
AUDIO POWER AMPLIFIER

DESCRIPTION

The μ 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 μ 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

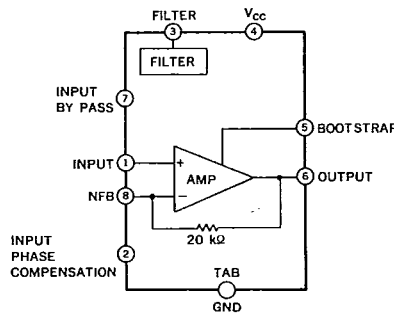
ITEM	MILLIMETERS	INCHES
A	12.70 MAX.	0.500 MAX.
A'	14.50 MAX.	0.571 MAX.
B	2.54 MAX.	0.100 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
C'	3.65	0.144
D	0.50 ^{+0.10}	0.020 ^{+0.004}
F	1.1 MIN.	0.043 MIN.
G	3.5 ^{+0.2}	0.138 ^{+0.012}
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
L	6.4	0.252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

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_{CC}	8	N. F. B.
TAB	GND		

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05E 22679 D

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Supply Voltage	V_{CC1}	(No Signal)	11	V
Supply Voltage	V_{CC2}	(Operating)	9	V
Allowable Power Dissipation	P_d		2.4	W
Operating Temperature	T_{opt}		-20 to 70	$^\circ\text{C}$
Storage Temperature	T_{stg}		-40 to 150	$^\circ\text{C}$

T-74-05-01

* 50 x 50 x 0.035 mm³ copper heat sink on P.C.B.RECOMMENDED CONDITIONS ($T_a = 25^\circ\text{C}$)

Supply Voltage	$V_{CC} = 3.5$ to 6 to 9 V
Load Impedance	$R_L = 4 \Omega$

ELECTRIC CHARACTERISTICS ($T_a = 25^\circ\text{C}$)(Refer to the test circuits $V_{CC}=6$ V, $R_L=4 \Omega$, 50 X 50 X 0.035 mm³ copper heat sink on P.C.B. unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Quiescent Circuit Current	I_{CC}	8	15	25	mA	No Signal
Open Loop Voltage Gain	A_{VO}	55	65		dB	$P_O=0.25$ W, $f=1$ kHz
Voltage Gain (Closed Loop)	A_V	41	45 34	48	dB	$R_f=100 \Omega$ $f=1$ kHz $R_f=360 \Omega$ $f=1$ kHz
Output Power	P_O	0.7	2.4 1.3 1.0 0.54 0.41 0.22		W	T.H.D.=10 % $f=1$ kHz, $R_f=100 \Omega$ $V_{CC}=9$ V, $R_L=4 \Omega$ $V_{CC}=9$ V, $R_L=8 \Omega$ $V_{CC}=6$ V, $R_L=4 \Omega$ $V_{CC}=6$ V, $R_L=8 \Omega$ $V_{CC}=4$ V, $R_L=4 \Omega$ $V_{CC}=4$ V, $R_L=8 \Omega$
Input Sensitivity	$V_i(rms)$		16.4 47.4		mV	$P_O=1$ W $R_L=4 \Omega$, $f=1$ kHz $R_f=100 \Omega$ ($A_V=45$ dB) $R_f=360 \Omega$ ($A_V=34$ dB)
Input Sensitivity	$V_i(rms)$		2.5 8.9		mV	$P_O=50$ mW $R_L=4 \Omega$, $f=1$ kHz $R_f=100 \Omega$ ($A_V=45$ dB) $R_f=360 \Omega$ ($A_V=34$ dB)
Total Harmonic Distortion	T.H.D.		0.4	1.5	%	$P_O=0.25$ W
Output Noise Voltage	NL		0.2	0.8	mV _{r.m.s.}	$R_G=0$
Supply Voltage Rejection Ratio	S.V.R.	40	55		dB	$R_G=0$, $f_{ripple}=100$ Hz $V_{ripple}=0.3$ V _{r.m.s.}
Input Impedance	R_i	10	20		k Ω	

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

μPC1212C

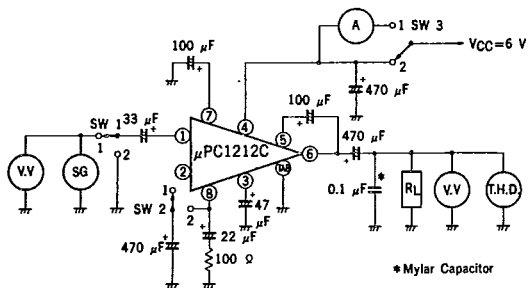
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TEST CIRCUIT

T-74-05-01

Fig. 1 TEST CIRCUIT

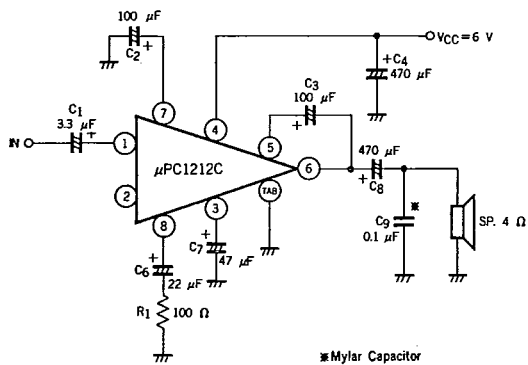


SWITCH POSITION

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



T-74-05-01

Fig. 3 BTL OPERATION

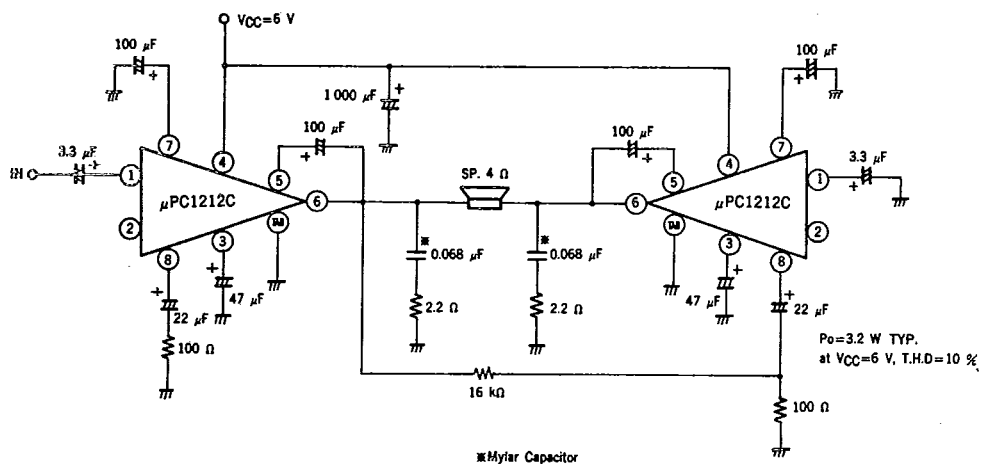
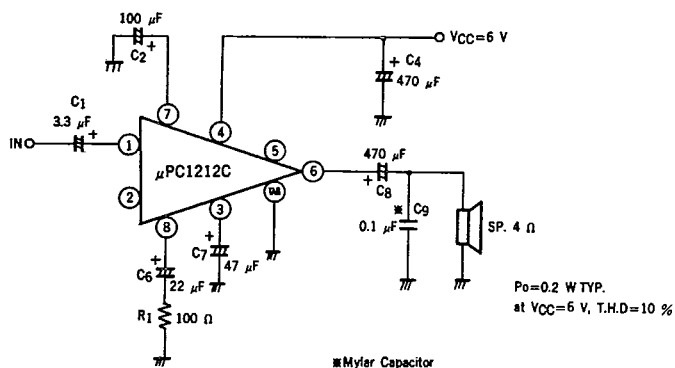


Fig. 4 SINGLE OPERATION WITHOUT BOOTSTRAP



NOTE FOR USE

- (1) Capacitor C₉ is for preventing the parasitic oscillation. A mylar capacitor is recommended for this position.
- (2) The ground side of C₄, C₉ and the loud speaker should be attached at the place of the copper foil close to the tab of μ 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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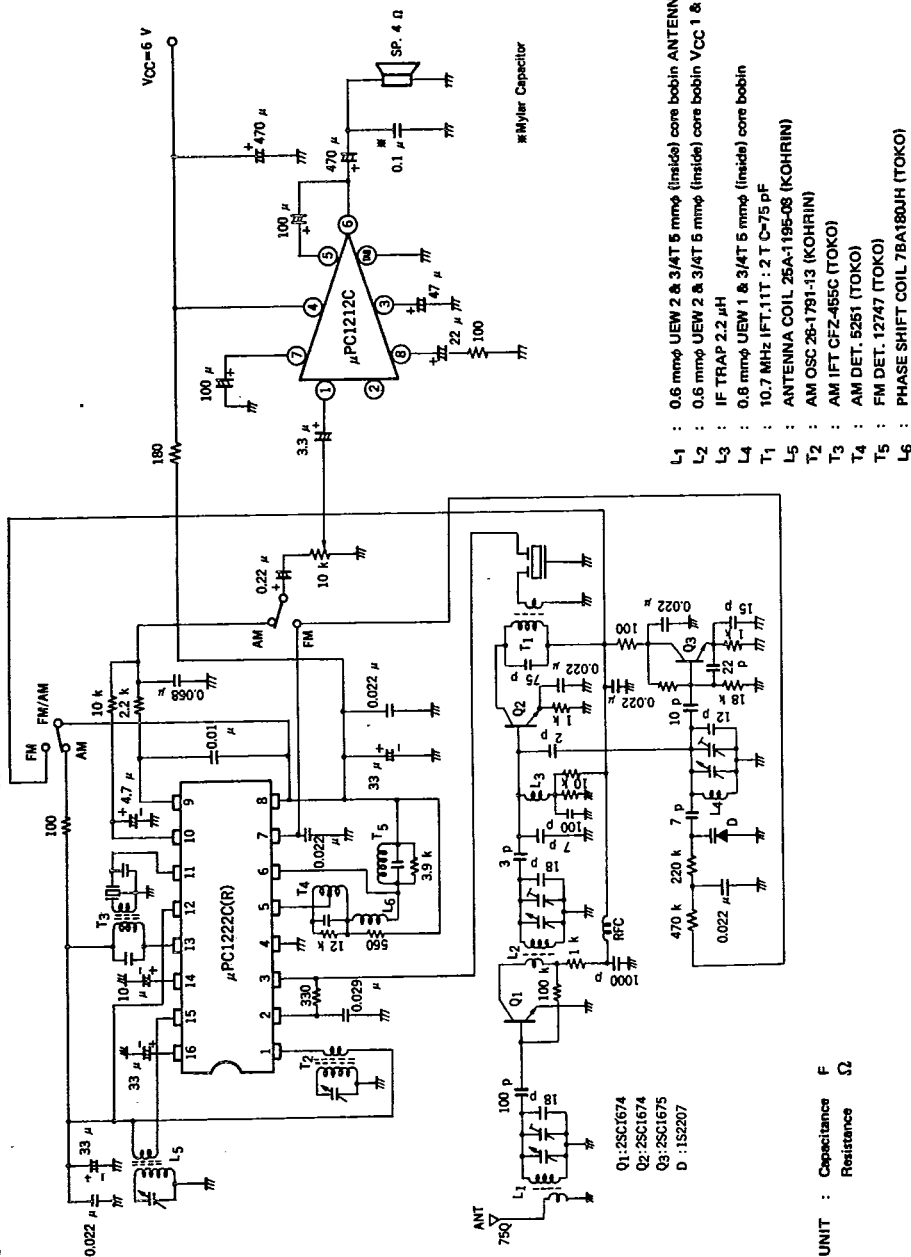
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T-74-05-01

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



- L1 : 0.6 mmφ UEW 2 & 3/4T 5 mmφ (inside) core bobbin ANTENNA 3/4T
- L2 : 0.6 mmφ UEW 2 & 3/4T 5 mmφ (inside) core bobbin VCC 1 & 3/4T
- L3 : IF TRAP 2.2 μH
- L4 : 0.8 mmφ UEW 1 & 3/4T 5 mmφ (inside) core bobbin
- T1 : 10.7 MHz IFT.11T : 2 T C=75 pF
- L5 : ANTENNA COIL 25A-1195-08 (KOHRLIN)
- T2 : AM OSC 26-1791-13 (KOHRLIN)
- T3 : AM IFT CFZ-4B5C (TOKO)
- T4 : AM DET. 5251 (TOKO)
- T5 : FM DET. 12747 (TOKO)
- L6 : PHASE SHIFT COIL 78A188JH (TOKO)

Q1:2SC1674
Q2:2SC1674
Q3:2SC1675
D :1S2207

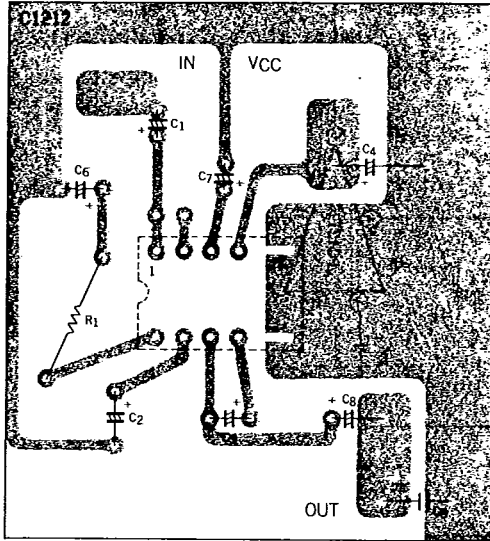
UNIT : Capacitance F
Resistance Ω

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P.C. BOARD PATTERN (COPPER SIDE)

T-74-05-01



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T-74-05-01

TYPICAL CHARACTERISTICS (T_a = 25 °C)

Fig. 6 OUTPUT POWER vs. SUPPLY VOLTAGE

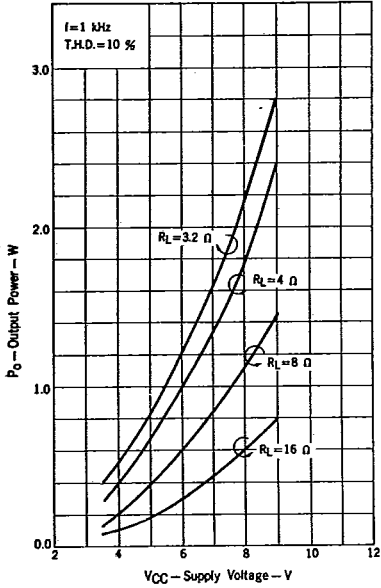


Fig. 7 TOTAL HARMONIC DISTORTION vs. OUTPUT POWER

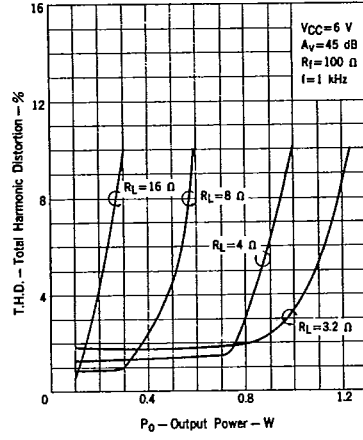
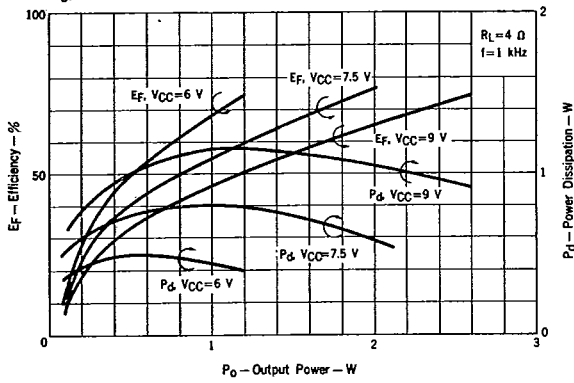


Fig. 8 POWER DISSIPATION AND EFFICIENCY vs. OUTPUT POWER



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05E 22685 D
T-74-05-01

Fig. 9 INPUT SENSITIVITY vs. R_f

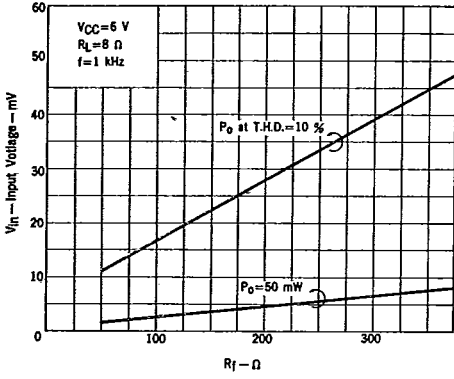


Fig. 10 VOLTAGE GAIN (CLOSED LOOP) vs. R_f

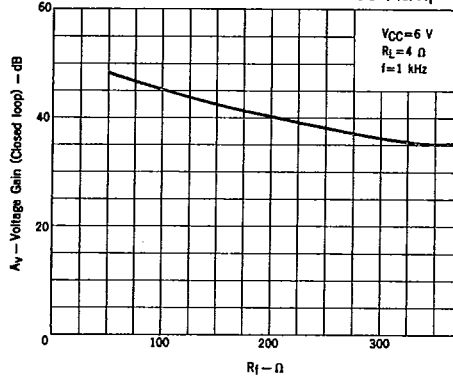


Fig. 11 QUIESCENT OUTPUT VOLTAGE AT PIN 6 vs. SUPPLY VOLTAGE

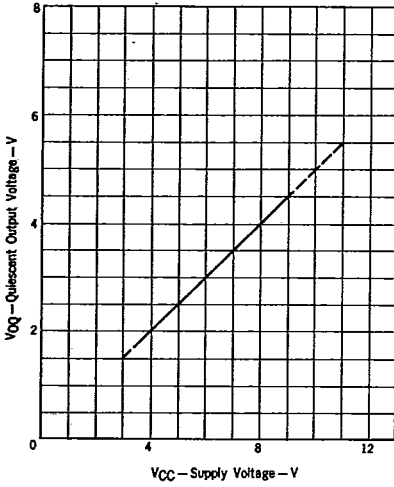
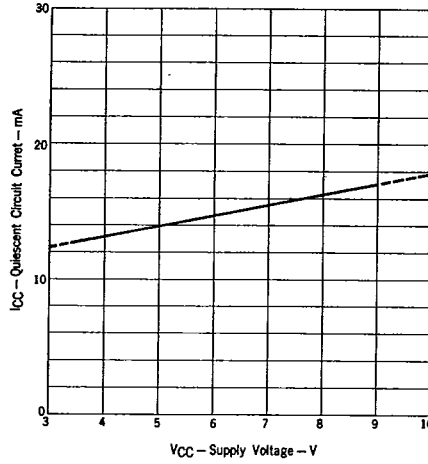


Fig. 12 QUIESCENT CIRCUIT CURRENT vs. SUPPLY VOLTAGE



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T-74-05-01

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

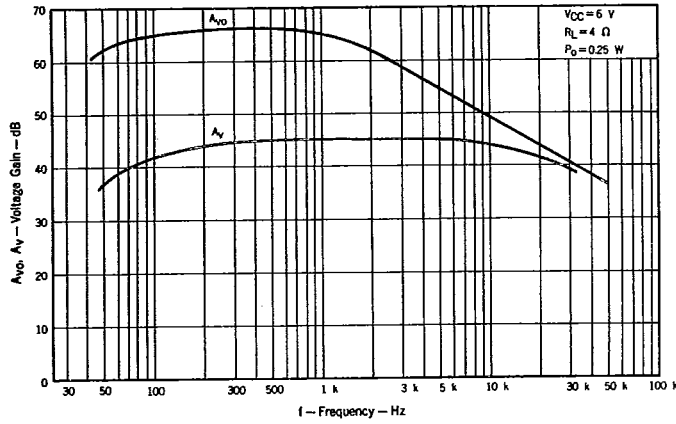


Fig. 14 TOTAL HARMONIC DISTORTION vs. FREQUENCY

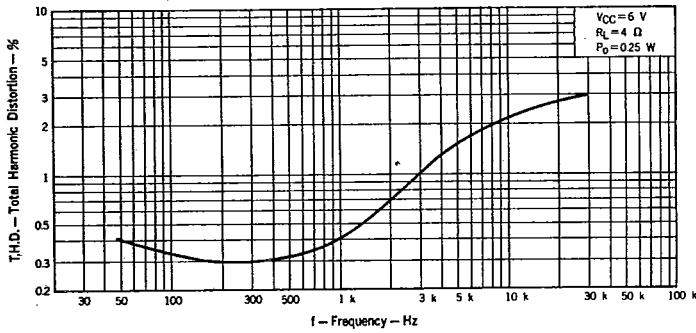
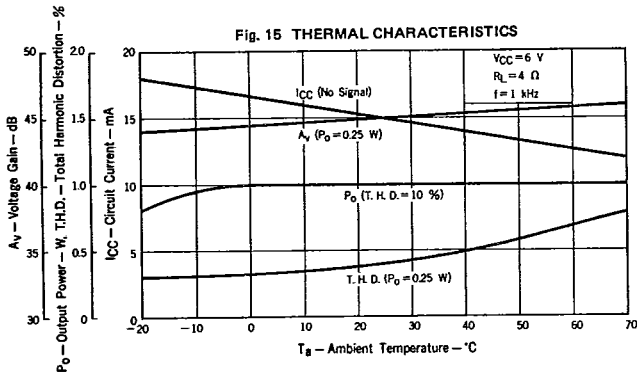


Fig. 15 THERMAL CHARACTERISTICS



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T-74-05-01

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

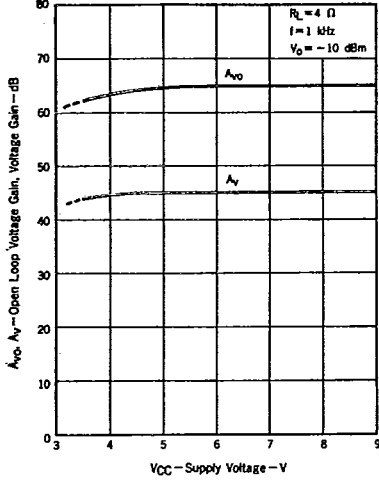


Fig. 17 TOTAL HARMONIC DISTORTION vs. SUPPLY VOLTAGE

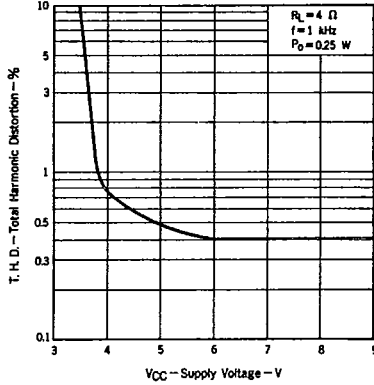
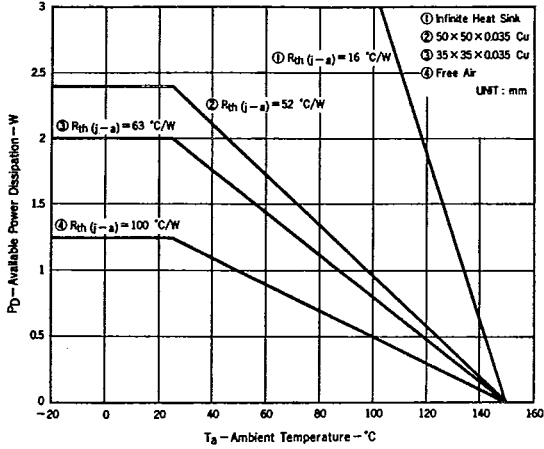


Fig. 18 AVAILABLE POWER DISSIPATION vs. AMBIENT TEMPERATURE



5