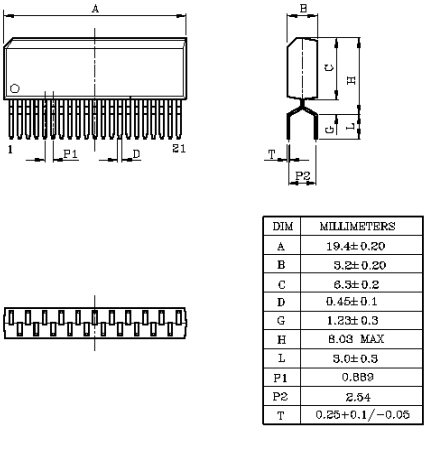
DUAL PRE AMPLIFIER SYSTEM

The KIA7417AP is a dual preamplifier system IC designed for radio cassette player of the low end class to the middle class.



DIM	MILLIMETERS
A	19.4±0.20
B	3.2±0.20
C	6.3±0.2
D	0.45±0.1
G	1.23±0.3
H	8.03 MAX
L	3.0±0.3
P1	0.889
P2	2.54
T	0.25+0.1/−0.05

ZIP−21

FEATURES

- Recording Amp with ALC.
- Play Back Amp.
- Mic Amp with ALC.
- Monitor Amp.
- Built-in Switch for Selecting REC/PLAY.
- Built-in Switch for Selecting TAPE input or RADIO(AUX) input.
- Built-in Recording Bias Circuit Control terminal.
- Follwing 4 modes can be Carried out by External two Switches Combination.
  - Radio Recording.
  - Mic Recording.
  - Radio Play.
  - Tape Play Back.
- Few External Parts.
- Small Package (ZIP-21)
- Operational Supply Voltage (Recommended)
  : V_{CC}=3.5~7V (Ta=25℃)

MAXIMUM RATINGS (Ta=25℃)

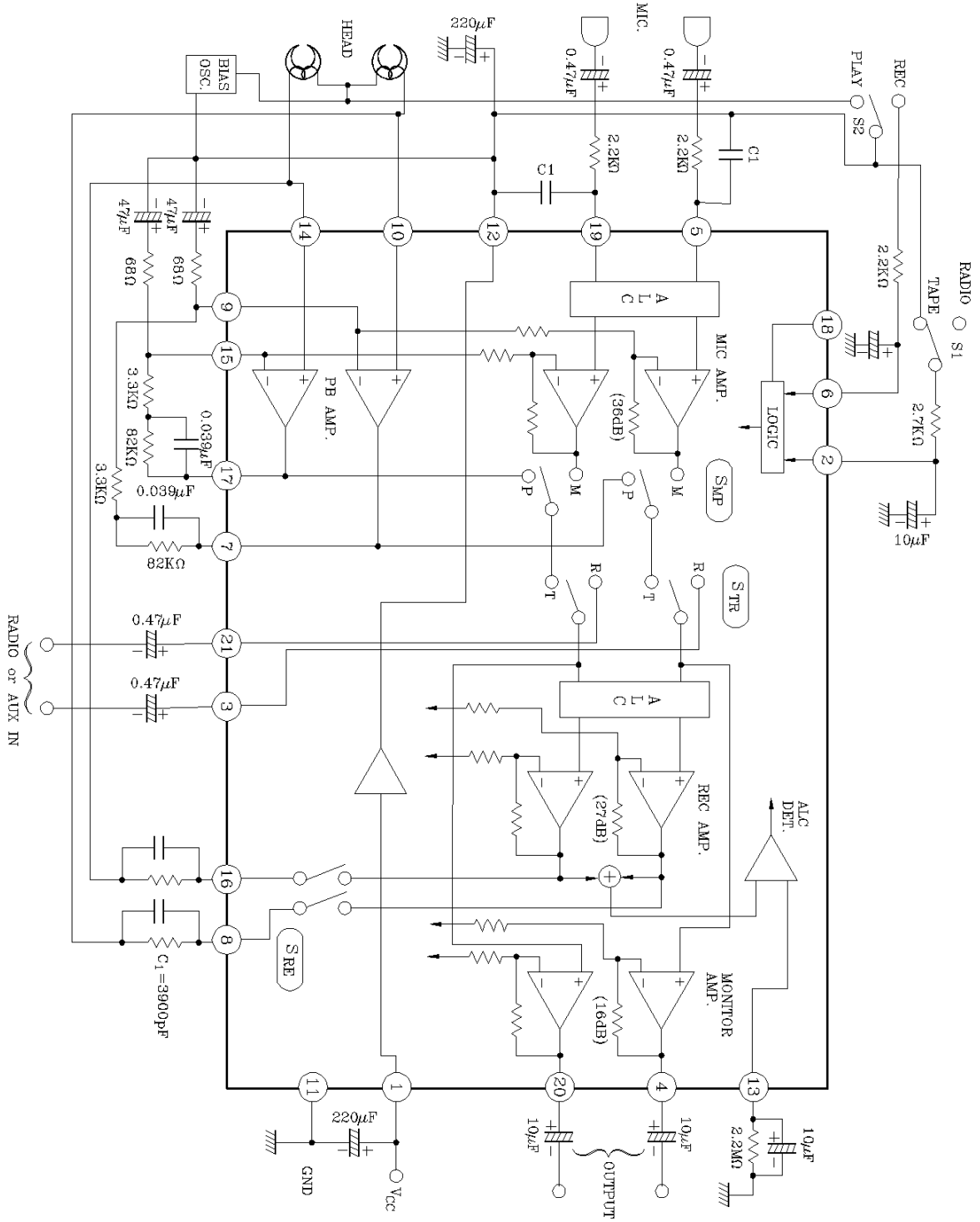
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	8	V
Power Dissipation (Note)	P_D	750	mW
Operating Temperature	T_{opr}	-25~75	℃
Storage Temperature	T_{stg}	-55~150	℃

Note : Derated above Ta=25℃ in the proportion of 6mW/℃.

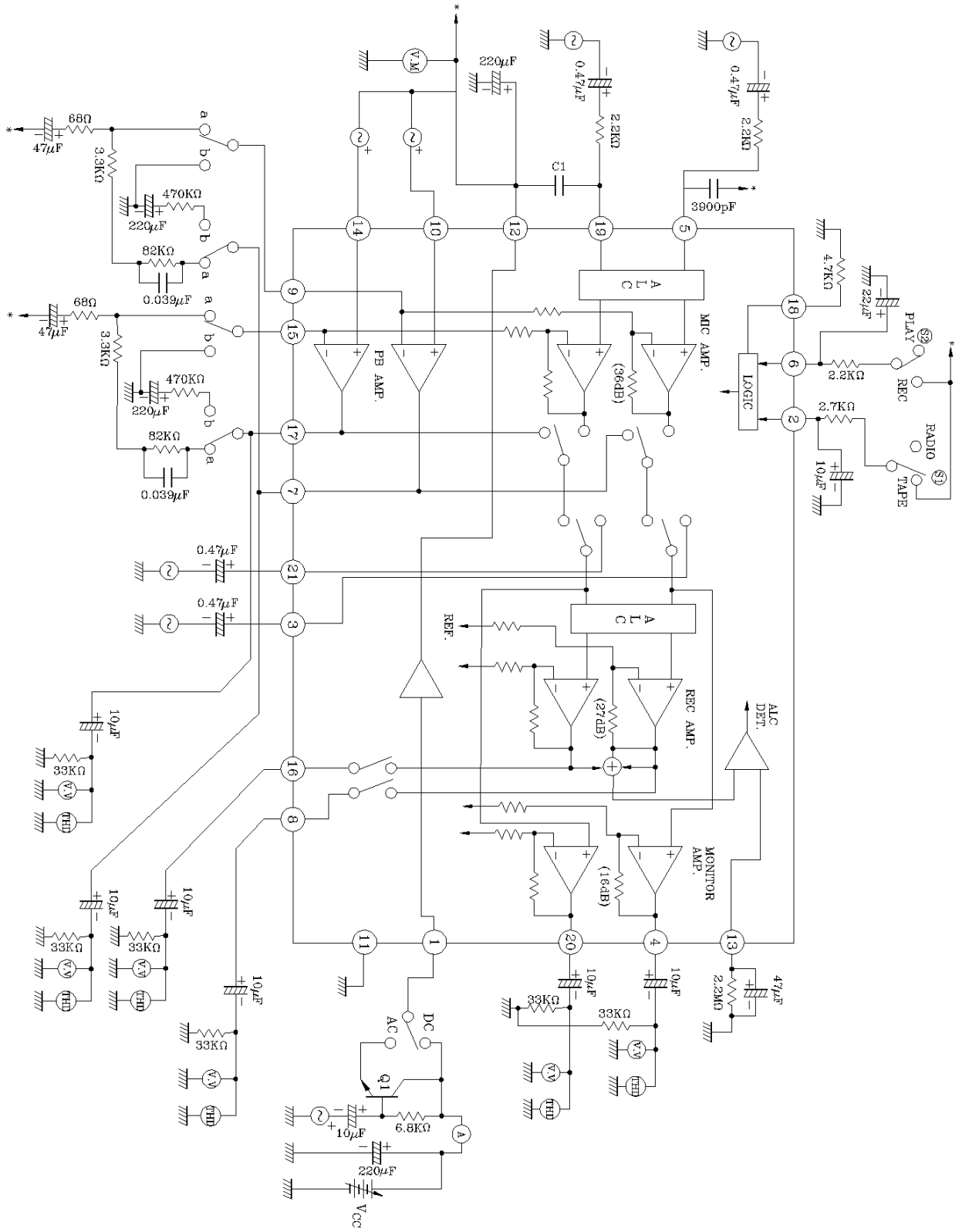
ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, V_{CC}=9V, f=1kHz, Ta=25℃)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current		I_{CC1}	S1=RADIO, S2=PLAY	-	11	16	mA
		I_{CC2}	S1=RADIO, S2=REC	-	14	19	
		I_{CC3}	S1=TAPE, S2=PLAY	-	11	16	
		I_{CC4}	S1=TAPE, S2=REC	-	10	15	
Reference Voltage		V_{ref}		1.8	2.0	2.3	V
MONITOR AMP	Voltage Gain	G_{V1}	V_{IN}=-50dBV	14	16	18	dB
	Maximum Output Voltage	V_{omax1}	THD=1%	-	1.3	-	V_{rms}
	Output Noise Voltage	V_{no1}	BW=5~30kHz	-	15	-	μV_{rms}
	Total Harmonic Distortion	THD1	V_{OUT}=-10dBV, BW=400~30kHz	-	0.06	-	%
	Cross Talk	CT1	V_{OUT}=0dBV, BW=400~30kHz	-	-66	-	dB
	Ripple Rejection Ratio	RR1	V_{ripple}=-20dBV, f=100Hz	-	-50	-	dB
PLAY BACK AMP	Voltage Gain	G_{V2}	V_{IN}=-50dBV	35	38	41	dB
	Open Loop Voltage Gain	G_{VO2}	V_{IN}=-90dBV		78		dB
	Maximum Output Voltage	V_{omax2}	THD=1%		1.3		V_{rms}
	Output Noise Voltage	V_{no2}	BW=5~30kHz		80	160	μV_{rms}
	Total Harmonic Distortion	THD2	V_{OUT}=-10dBV, BW=400~30kHz		0.02		%
	Cross Talk	CT2	V_{OUT}=0dBV, BW=400~30kHz		-77		dB
	Ripple Rejection Ratio	RR2	V_{ripple}=-20dBV, f=100Hz		-42		dB
REC AMP	Voltage Gain	G_{V3}	V_{IN}=-50dBV	24	27	30	dB
	Output Noise Voltage	V_{no3}	BW=5~30kHz		160		μV_{rms}
	Total Harmonic Distortion	THD3	V_{OUT}=-10dBV, BW=400~30kHz		0.04		%
	Cross Talk	CT3	V_{OUT}=-10dBV, BW=400~30kHz		-71		dB
	Ripple Rejection	RR3	V_{ripple}=-20dBV, f=100Hz		-42		dB
	ALC1	ALC31	V_{IN}=-25dBV, Dual OP	-6	-2	2	dBV
	ALC2	ALC32	V_{IN}=-15dBV, Dual OP		-1		dBV
	ALC3	ALC33	V_{IN}=-5dBV, Dual OP		-1		dBV
MIC AMP + REC AMP	Voltage Gain	G_{V4}	V_{IN}=-80dBV		63		dB
	Output Noise Voltage	V_{no4}	BW=5~30kHz		3.5	5.6	μV_{rms}
	Total Harmonic Distortion	THD4	V_{OUT}=-10dBV, BW=400~30kHz		0.7		%
	Cross Talk	CT4	V_{OUT}=-10dBV, BW=400~30kHz		-43		dB
	Ripple Rejection	RR4	V_{ripple}=-20dBV, f=100Hz		-28		dB
	ALC1	ALC41	V_{IN}=-60dBV, Dual OP	-6	-2	2	dBV
	ALC2	ALC42	V_{IN}=-40dBV, Dual OP		-1	-	dBV
	ALC3	ALC43	V_{IN}=-15dBV, Dual OP	-4	-1	2	dBV

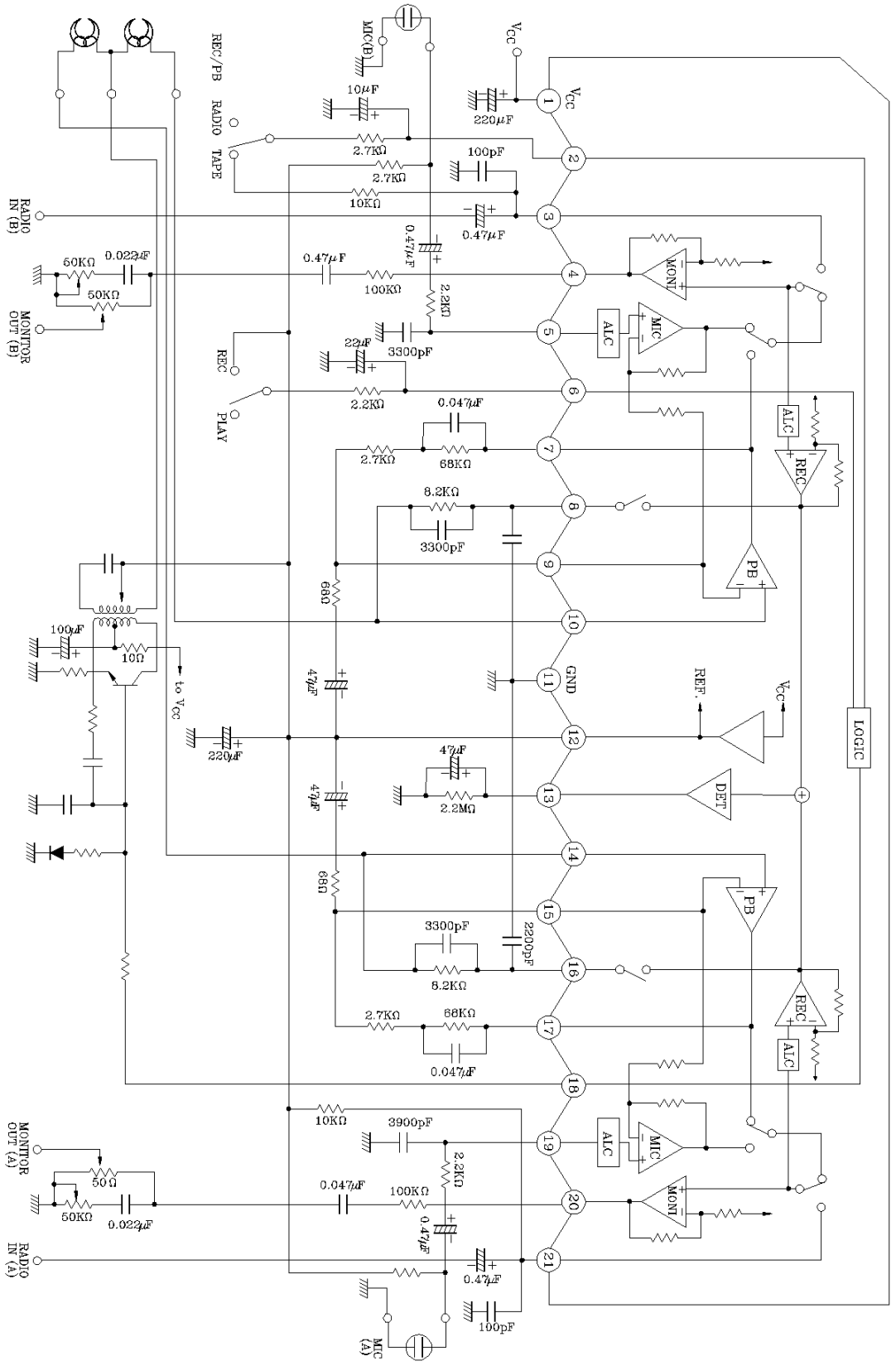
BLOCK DIAGRAM



TEST CIRCUIT



APPLICATION CIRCUIT (AC biasing type)

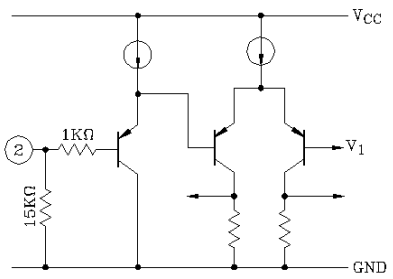
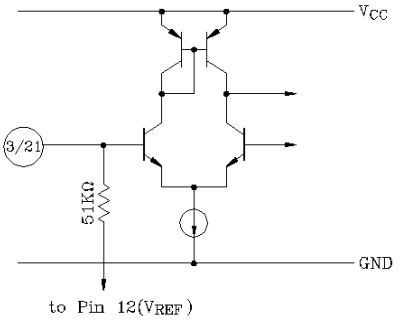
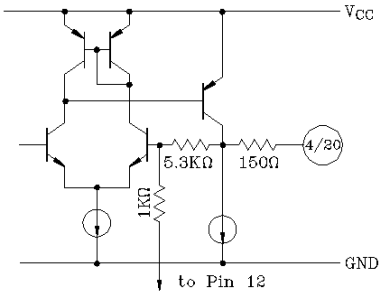
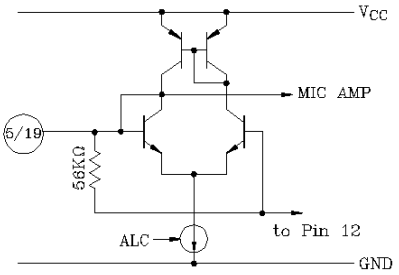


TEST METHOD (cf TEST CIRCUIT)

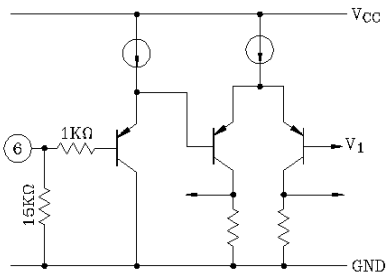
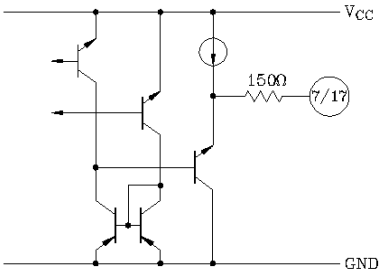
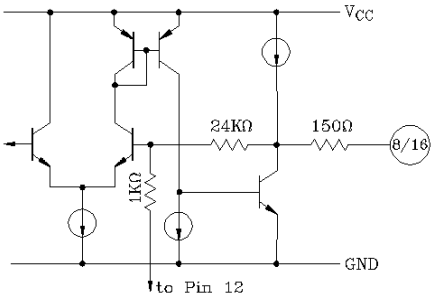
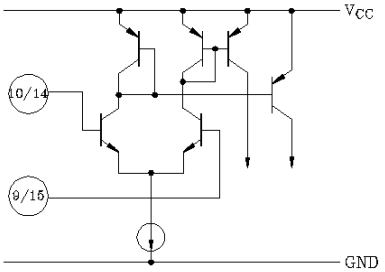
SYMBOL	S1	S2	S3	S4
I_{CC1}	RADIO	PLAY	a	DC
I_{CC2}	RADIO	REC	↓	↓
I_{CC3}	TAPE	PLAY		
I_{CC4}	TAPE	REC		
V_{ref}	-	-		
G_{V1}	RADIO	REC	a	DC
Vo max1	↓	↓	↓	↓
Vno1				
THD1				
CT1				
RR1	RADIO	REC	a	AC
Gvo2	TAPE	PALY	b	DC
Gv2	TAPE	PALY	a	DC
Vo max2	↓	↓	↓	↓
Vno2				
THD2				
CT2				
RR2	TAPE	PLAY	a	AC

SYMBOL	S1	S2	S3	S4
G_{V3}	RADIO	REC	a	DC
V_{no3}	↓	↓	↓	↓
THD3				
CT3				
RR3	RADIO	REC	a	AC
ALC31	RADIO	REC	a	DC
ALC32	↓	↓	↓	↓
ALC33				
Gv4	TAPE	REC	a	DC
Vno4	↓	↓	↓	↓
THD4				
CT4				
RR4	TAPE	REC	a	AC
ALC41	TAPE	REC	a	DC
ALC42	↓	↓	↓	↓
ALC43				

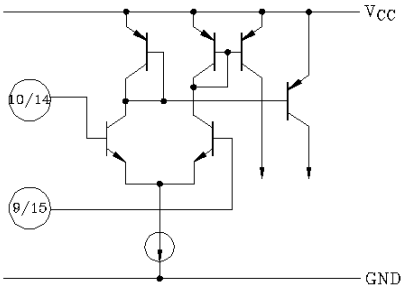
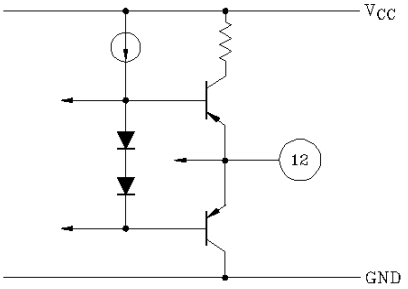
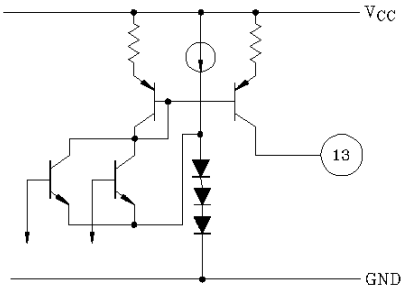
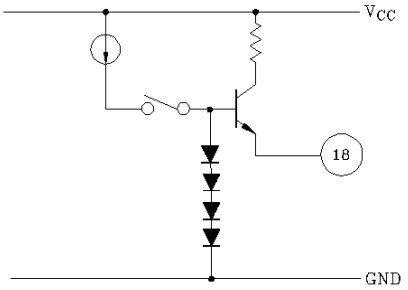
DESCRIPTION OF EACH TERMINAL

TERMINAL No.	TERMINAL NAME	FUNCTION	EQUIVALENT CIRCUIT
1	V_{CC}	V_{CC}	-
2	TAPE/RADIO SW	Change over switch for tape mode and radio mode. Tape Mode : Tape play MIC REC Radio Mode : Radio play Radio REC	
3/21	RADIO (AUX) IN	Radio or Aux. input	
4/20	MONITOR OUT	Monitor Amp output	
5/19	MIC IN	MIC Amp input	

DESCRIPTION OF EACH TERMINAL

TERMINAL No.	TERMINAL NAME	FUNCTION	EQUIVALENT CIRCUIT
6	REC/PLAY SW	Change over switch for REC mode and play mode. REC Mode : MIC REC Radio REC Play Mode : Tape play Radio play	
7/17	TAPE OUT	Tape Play back Amp (PB AMP) output	
8/16	REC OUT	Recording Amp output	
9/15	PB NF	Tape play back Amp (PB AMP) NF	

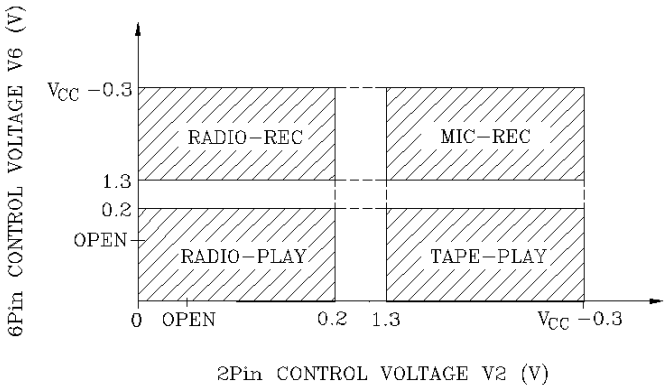
DESCRIPTION OF EACH TERMINAL

TERMINAL No.	TERMINAL NAME	FUNCTION	EQUIVALENT CIRCUIT
10/14	TAPE IN	Tape play back Amp (PB AMP) input	
11	GND	GND	-
12	REFERENCE	Reference voltage terminal	
13	AGC T.C	Actomatic level control (ALC) time constant terminal.	
18	Vstb	Recording bias circuit control signal output.	

OPERATION MODE BY EXTERNAL SWITCHES (S1, S2) COMBINATION

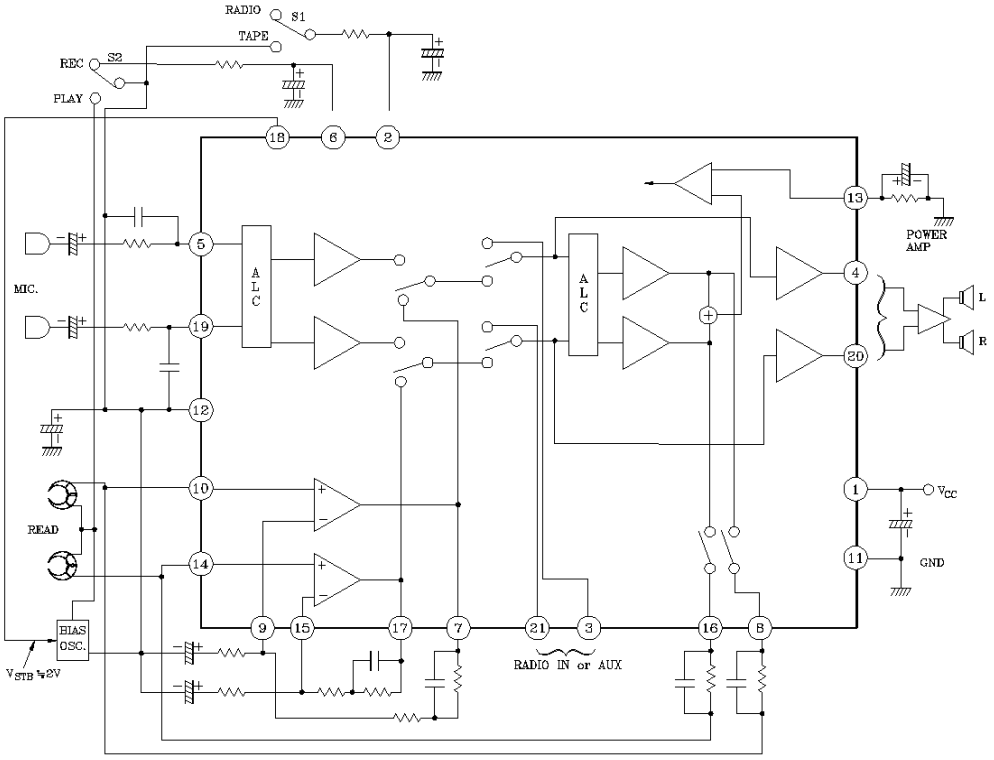
CIRCUIT BLOCK (S2 / S1)	S2=REC		S2=PLAY	
	S1-RADIO	S1=TAPE	S1=RADIO	S1=TAPE
MIC AMP	ON	ON	OFF	OFF
PB AMP	OFF	OFF	ON	ON
REC AMP	ON	ON	OFF	OFF
MONITOR AMP	ON	OFF	ON	ON
S_{MP}	M	M	P	P
S_{TR}	R	T	R	T
S_{RE}	ON	ON	OFF	OFF
OPERATION MODE	RADIO RECORDING	MIC RECORDING	RADIO PLAY	TAPE PLAY BACK

CONTROL SWITCH TERMINAL (2, 6pin) THRESHOLD VOLTAGE

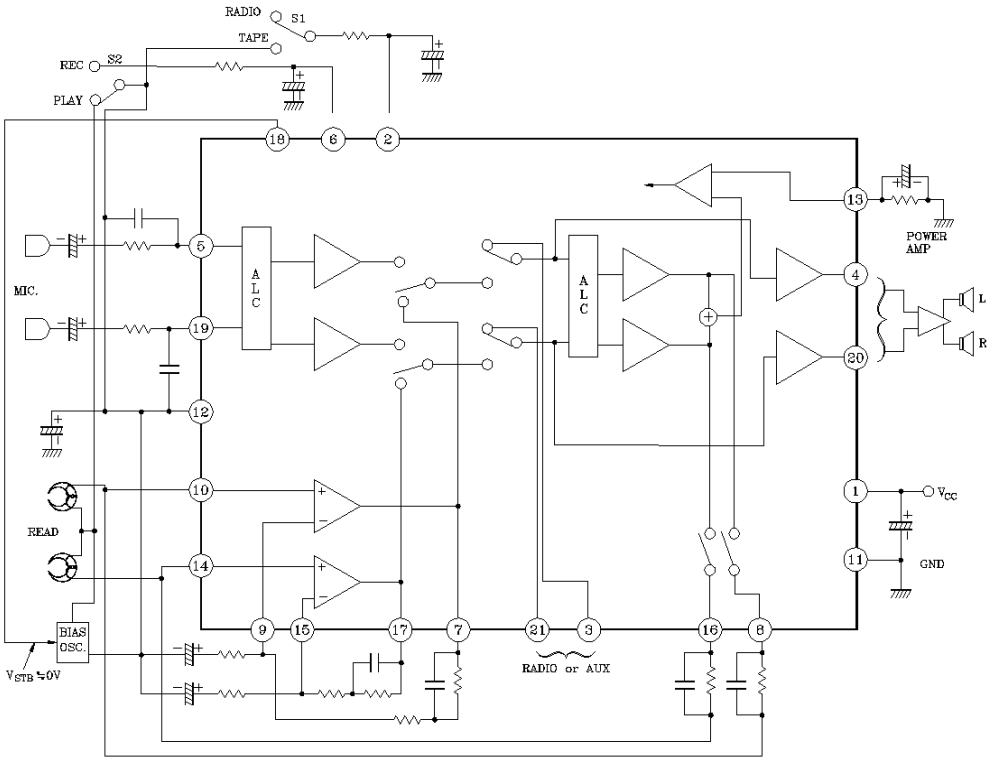


OPERATION IN EACH MODE

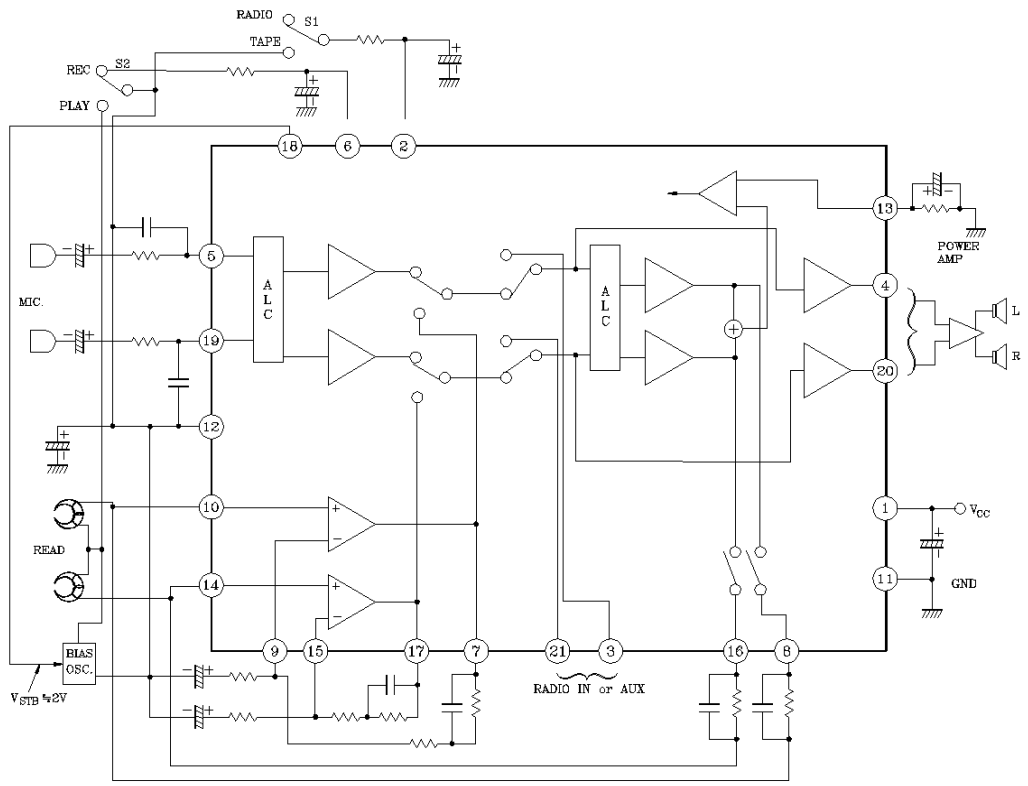
(1) RADIO-REC MODE



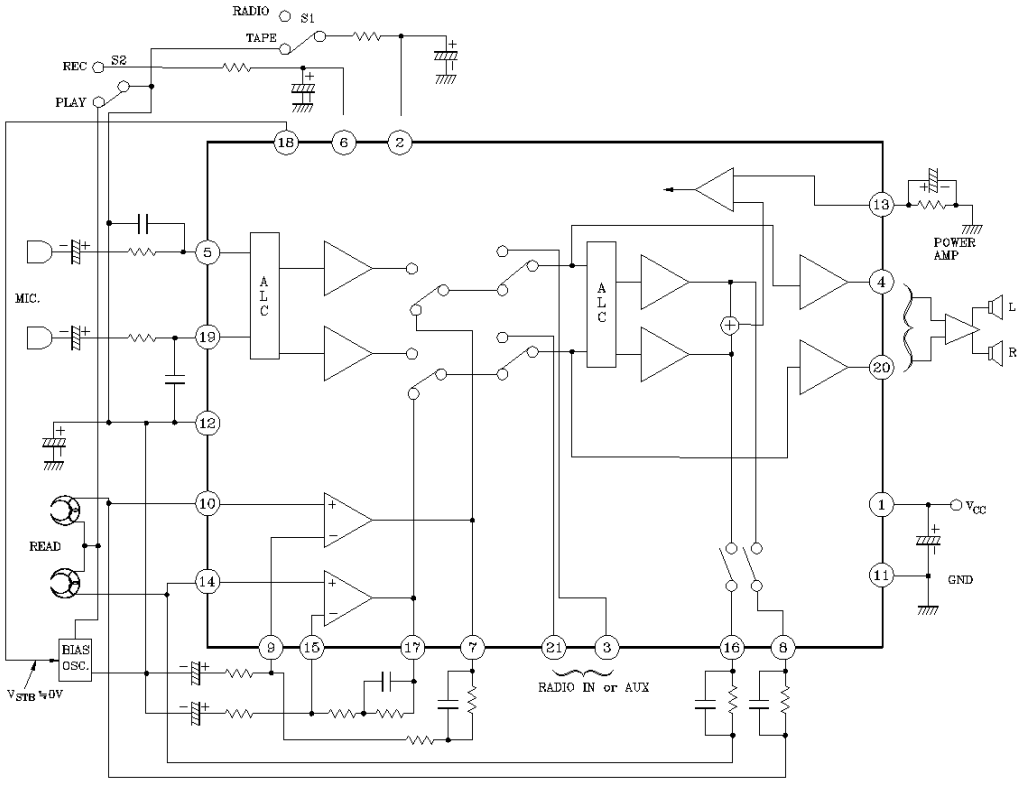
(2) RADIO-PLAY MODE



(3) MIC-REC MODE



(4) TAPE-PLAY MODE



DESCRIPTION OF BIAS OSC. CONTROL TERMINAL (⑱pin).

The equivalent circuit of ⑱ pin is shown in Fig. 1.
When this IC is in the REC MODE (RADIO REC or MIC REC), the switch Sa is in the "ON" state and the DC voltage 2.05V (Typ.) appears in this terminal.
The output current value of this terminal should be under 300μA.

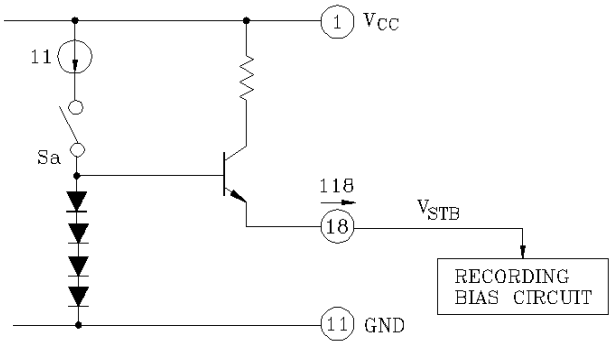
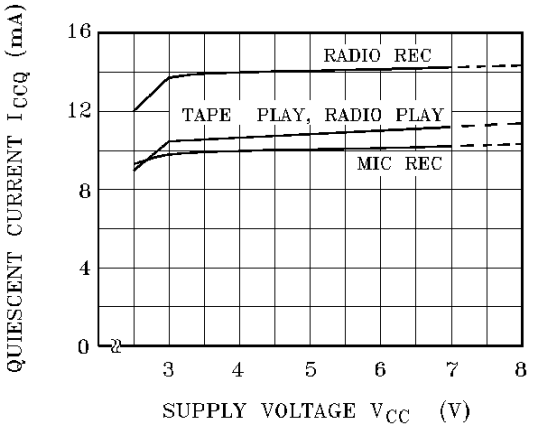
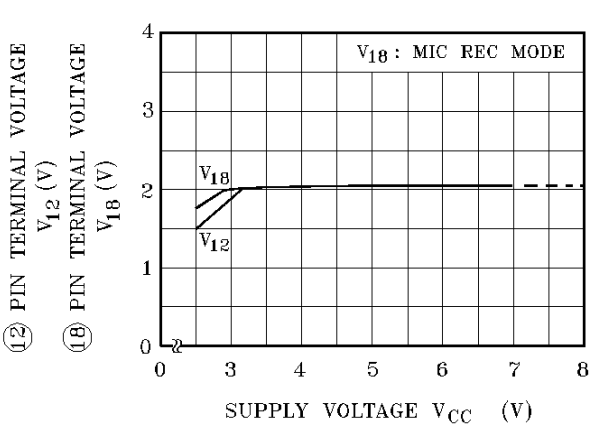


Fig. 1

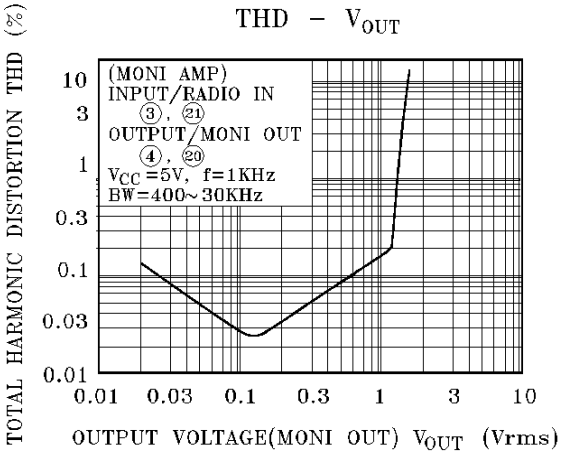
I_{CCQ} – V_{CC}



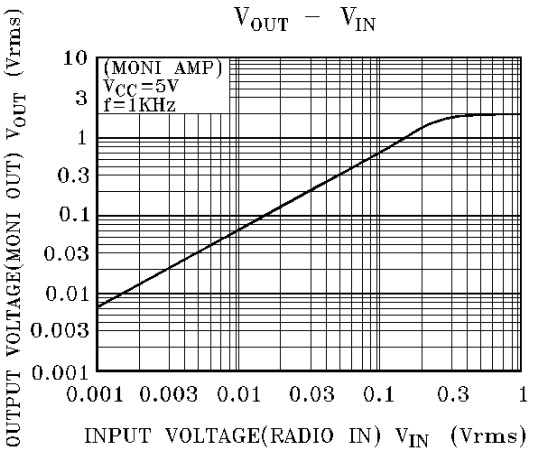
V_{12}, V_{18} – V_{CC}



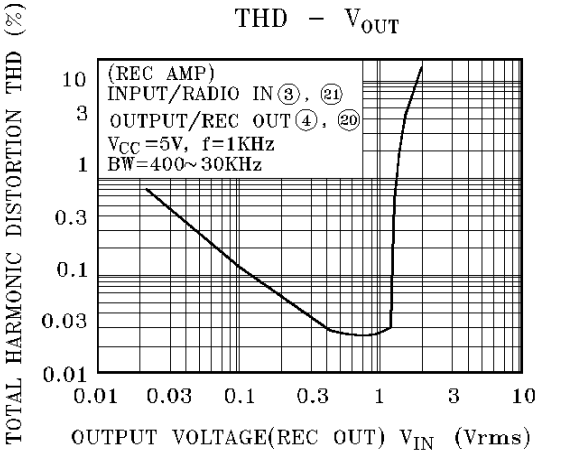
THD – V_{OUT}



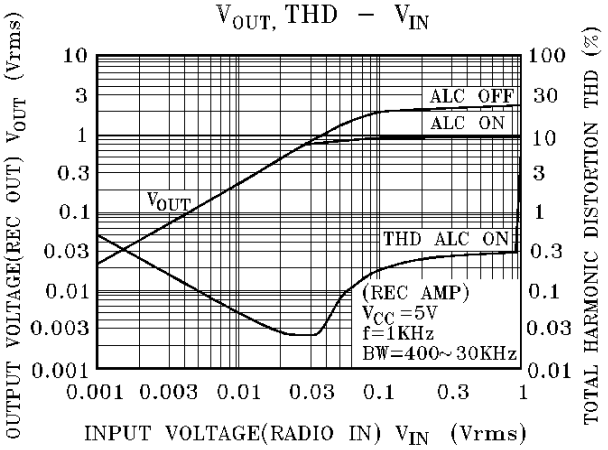
V_{OUT} – V_{IN}



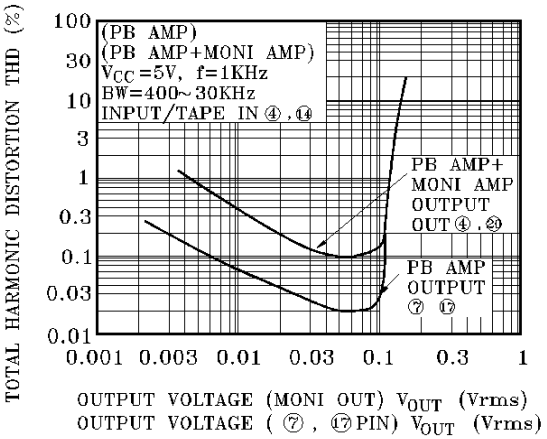
THD – V_{OUT}



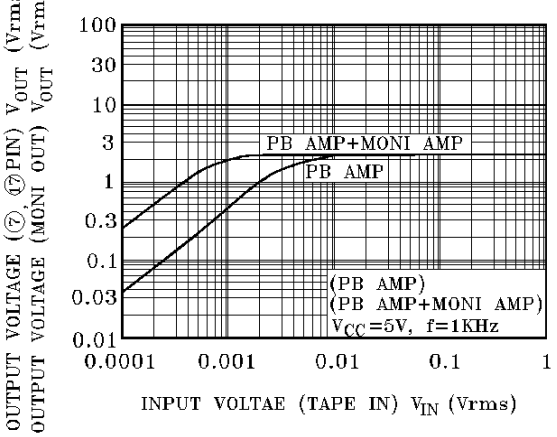
V_{OUT}, THD – V_{IN}



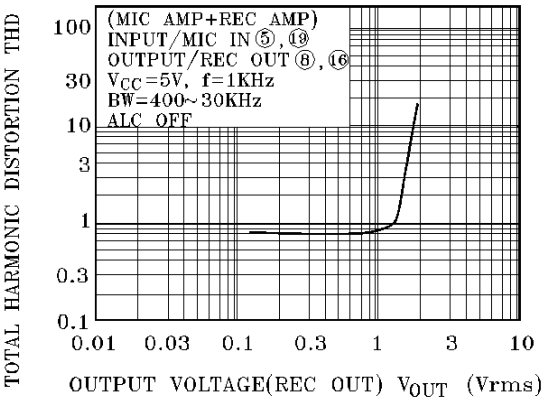
THD – V_{OUT}



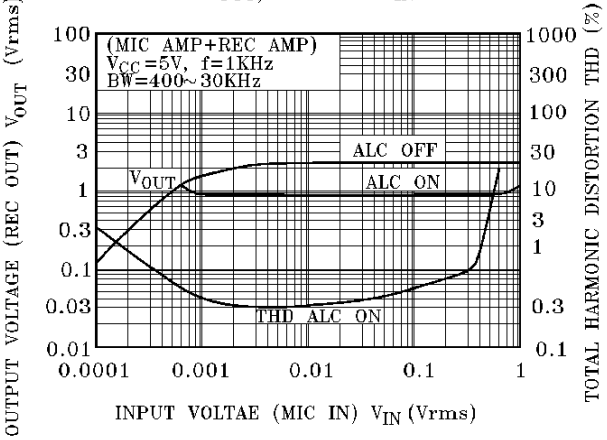
V_{OUT} – V_{IN}



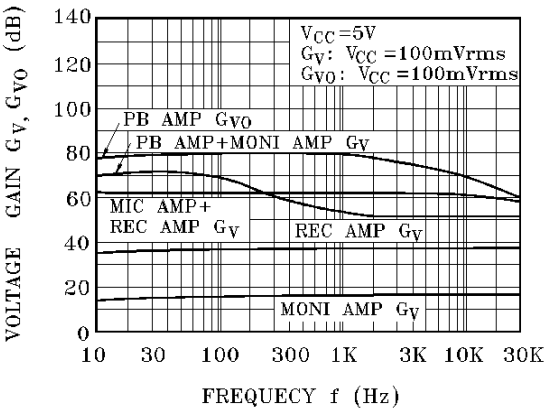
THD – V_{OUT}



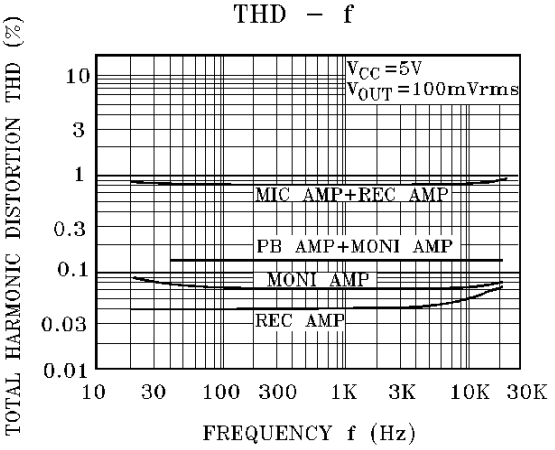
V_{OUT}, THD – V_{IN}



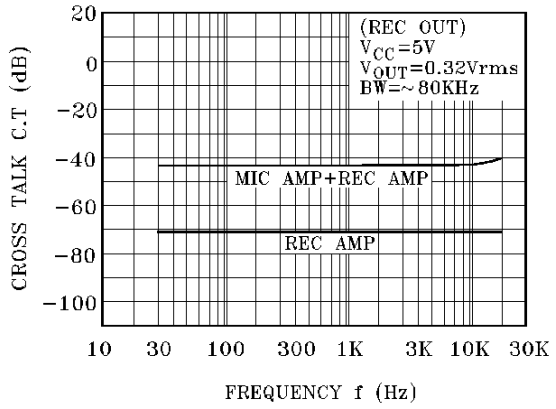
G_V, G_{VO} – f



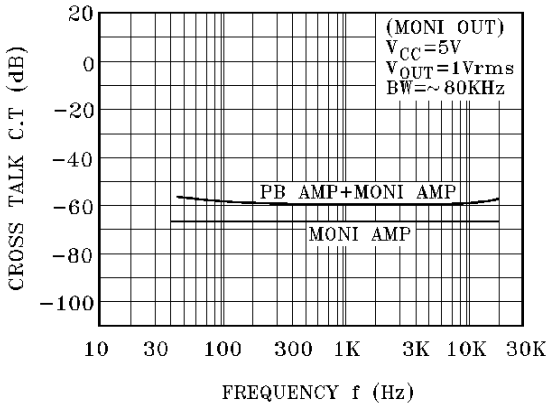
THD – f



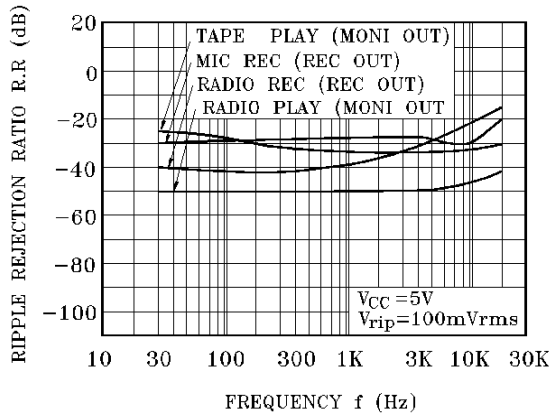
C.T – f



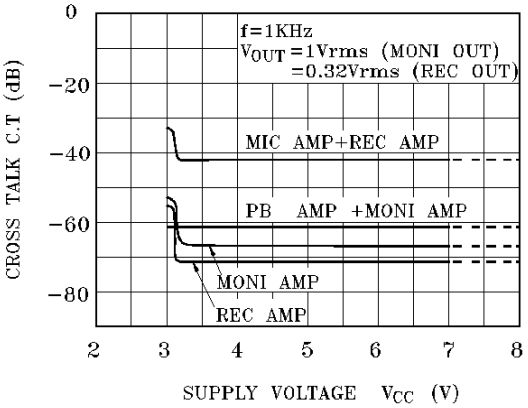
C.T – f



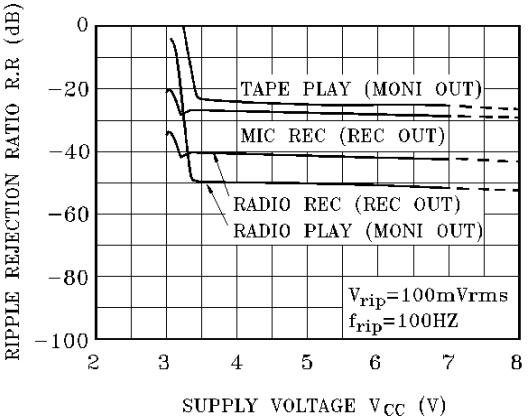
R.R – T



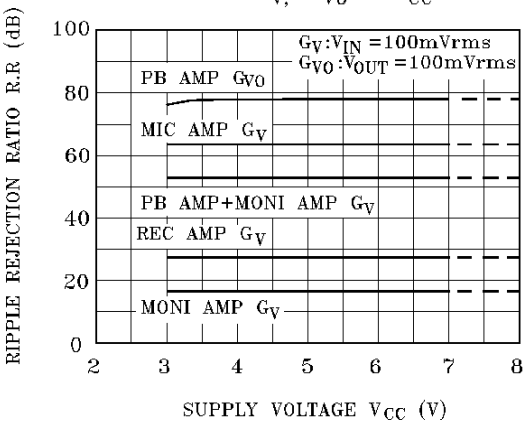
C.T – V_{CC}



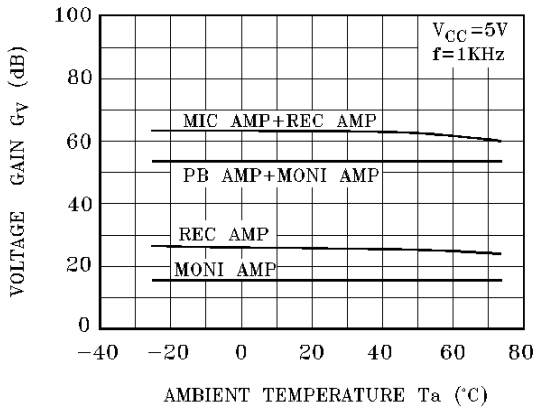
R.R – V_{CC}



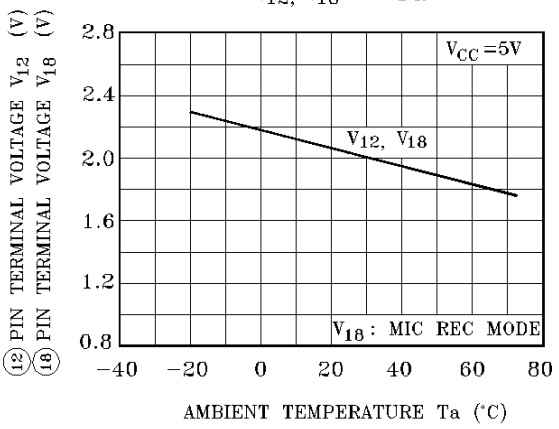
G_V, G_{VO} – V_{CC}



G_V – Ta



V_{12}, V_{18} – Ta



I_{CCQ} – Ta

