

PICTURE-IN-PICTURE SOUND SWITCHING

DESCRIPTION

The M51659L is packed in a 24-pin plastic zigzag in-line package. With use of this circuit, the VCR stereo sound processing circuit becomes smaller, because it has a built-in picture-in-picture sound switching circuit and AGC circuit, both in two channels, and does not need many external parts.

FEATURES

- Picture-in-picture sound switch
- Built-in AGC circuit
- Stereo (2-channel) construction

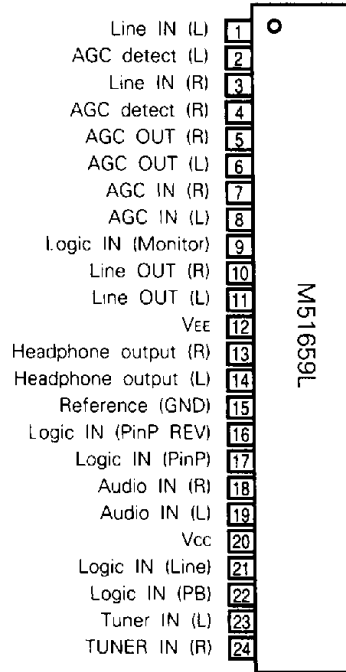
APPLICATIONS

Video cassette recorders and Hi-Fi video cassette recorders

RECOMMENDED OPERATING CONDITIONS

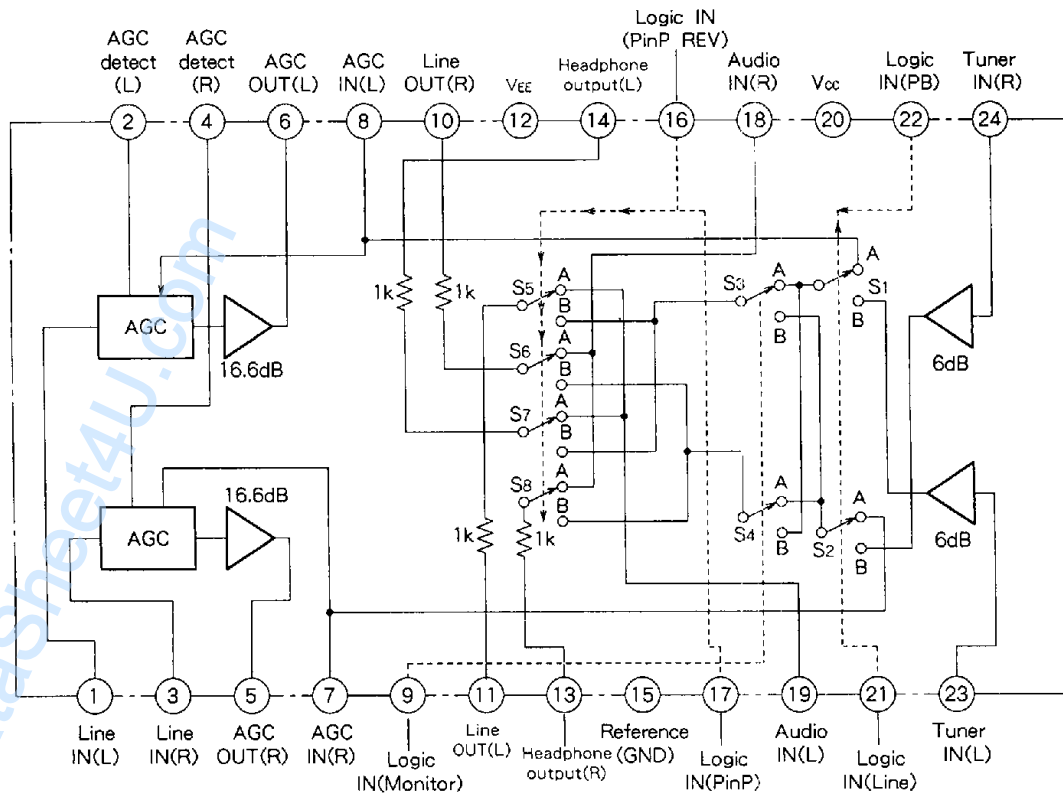
Rated supply voltage $V_{CC}+5V, V_{EE}-6V$
 Supply voltage $V_{CC}+4.5\sim 5.5V, V_{EE}-6.5\sim -5.5V$

PIN CONFIGURATION (TOP VIEW)



Outline 24P5A

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V _{CC}	Supply voltage	+7	V
V _{EE}		-7	V
I _{CC}	Circuit current	60	mA
I _{EE}		60	mA
P _d	Internal power dissipation	800	mW
K _θ	Thermal derating	8	mW/°C
T _{opr}	Operating temperature	-20~75	°C
T _{stg}	Storage temperature	-40~125	°C

ELECTRICAL CHARACTERISTICS (T_a = 25°C, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I _{CC}	PB mode no-signal circuit current	No signal	-9.0	15.5	22.0	mA
I _{EE}	PB mode no-signal circuit current	No signal	8.5	14.5	20.5	mA
V _{OLA}	Line system output signal level	V _{in} = -23dBs	-10.0	-8.0	-6.0	dBs
THDL	Line system distortion rate	V _{in} = -23dBs, 400Hz HPF, 30kHz LPF	*	0.2	0.6	%
N _{OL}	Line system output noise	R _g = 2kΩ, BW = 20Hz~20kHz	*	-85	-79	dBs
V _{OT}	Tuner system output signal level	V _{in} = -14dBs	-11.1	-9.6	-8.1	dBs
THDT	Tuner system distortion rate	V _{in} = -14dBs, 400Hz HPF, 30kHz LPF	*	0.05	0.2	%
N _{OT}	Tuner system output noise	R _g = 2kΩ, BW = 20Hz~20kHz	*	-90	-84	dBs
V _{OA}	AUD system output signal level	V _{in} = -4.8dBs	-7.4	-6.4	-5.4	dBs
THDA	AUD system distortion rate	V _{in} = -4.8dBs, 400Hz HPF, 30kHz LPF	*	0.05	0.1	%
N _{OA}	AUD system output noise	R _g = 2kΩ, BW = 20Hz~20kHz	*	-90	-84	dBs
V _{TH1}	Input threshold voltage 1	Voltage applied when mode is switched.	0.9	1.4	1.9	V
V _{TH2}	Input threshold voltage 2	Voltage applied when monitor is switched from L to M.	0.8	1.2	1.6	V
V _{TH3}	Input threshold voltage 3	Voltage applied when monitor is switched from M to H.	3.5	3.9	4.3	V

ELECTRICAL CHARACTERISTICS TEST METHOD

Symbol	⑨ Monitor	⑩ PinP REV	⑪ PinP	⑫ PinP S.C	⑬ PB	SW ₁	SW ₂ SW ₃	SW ₄ SW ₅	SW ₆ SW ₇	Measuring procedure	Note
I _{CC}	L	H	H	H	H	OFF	2	2	2	Read the no-signal circuit current with the ammeter during PB.	
I _{EE}	L	H	H	H	H	OFF	2	2	2	Read the no-signal circuit current with the ammeter during PB.	6
V _{OLA}	L	H L	H	H	H	ON	1	2	2	Measure output signal level during line input.	6
THDL	L	H L	H	H	H	ON	1	2	2	Measure output distortion rate during line input.	6
N _{OL}	L	H L	H	H	H	ON	2	2	2	BW = 20Hz~20kHz	6
V _{OT}	L	H L	H	L	H	ON	2	1	2	Measure output signal level during tuner input.	6
THDT	L	H L	H	L	H	ON	2	1	2	Measure output distortion rate during tuner input.	6
N _{OT}	L	H L	H	L	H	ON	2	2	2	BW = 20Hz~20kHz	
V _{OA}	L	L	L	H	H	ON	2	2	1	Measure output signal level during AUD input.	
THDA	L	L	L	H	H	ON	2	2	1	Measure output distortion rate during AUD input.	
N _{OA}	L	L	L	H	H	ON	2	2	2	BW = 20Hz~20kHz	

Note: 5 H, 5V; L, 0V.

: 6 Pin ⑩ PinP REV "H," line out; "L," H.P. out.

MODE SWITCH TRUTH VALUE TABLE

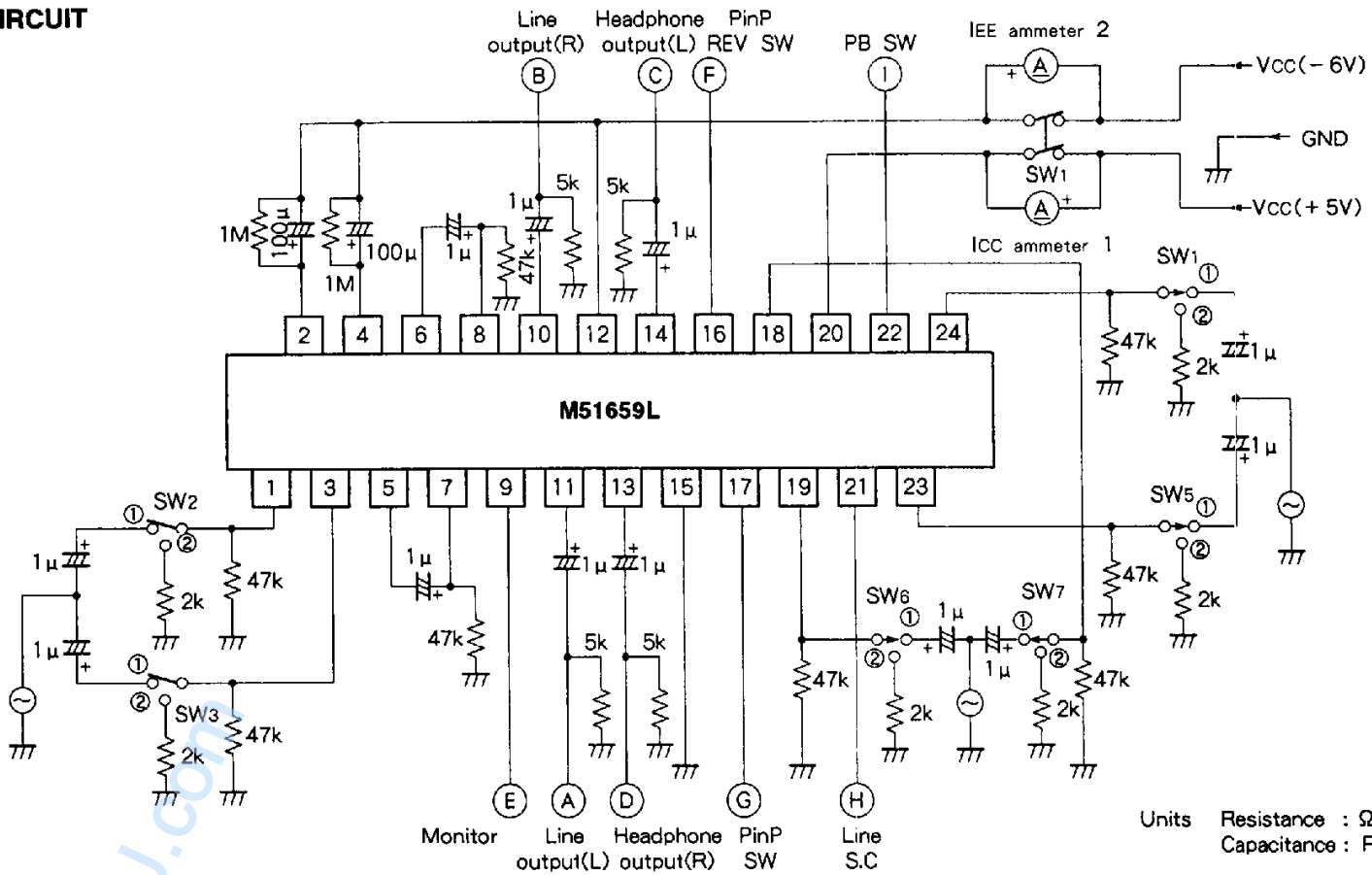
⑦ Line,S.C	⑧ PB	S ₁	S ₂	Remark
L	L	A	A	Line
L	H	B	B	Tuner
H	L	A	A	Line
H	H	A	A	Line

⑨ Monitor	S ₃	S ₄	Remark
L	A	A	Stereo
M	A	B	Lch
H	B	A	Rch

⑩ PinP REV	⑪ PinP	S ₅	S ₆	S ₇	S ₈	Remark
L	L	A	A	A	A	Normal
L	H	A	A	B	B	PinP
H	L	A	A	A	A	Normal
H	H	B	B	B	A	PinP REV

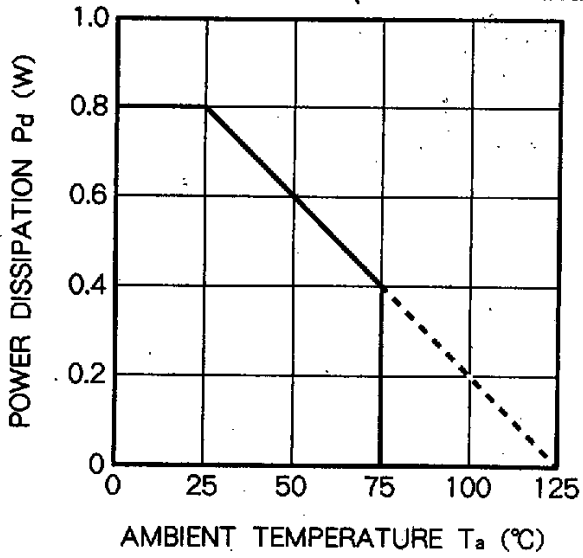
Note 7. H: 5V
M: 2.5V
L: 0V

TEST CIRCUIT

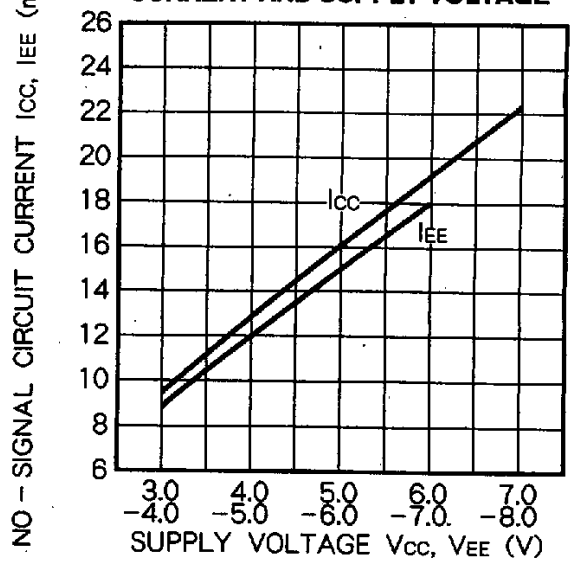


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$, unless otherwise noted)

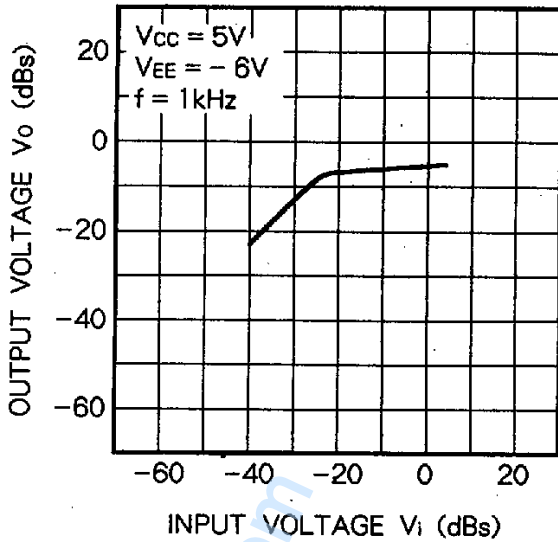
THERMAL DERATING (MAXIMUM RATING)



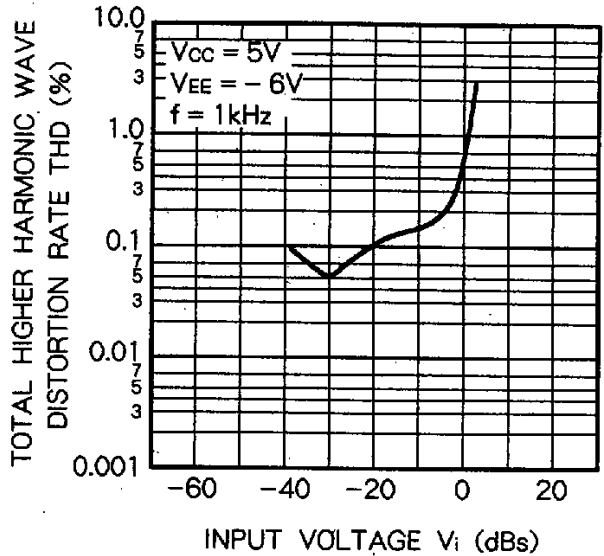
RELATION BETWEEN NO-SIGNAL CIRCUIT CURRENT AND SUPPLY VOLTAGE



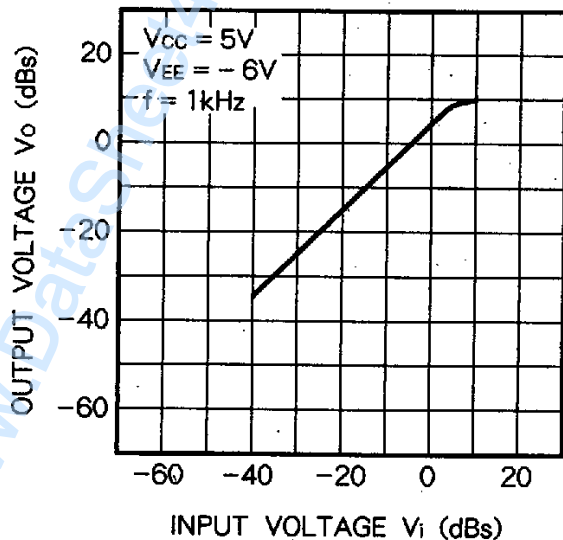
RELATION BETWEEN LINE OUTPUT VOLTAGE AND INPUT VOLTAGE



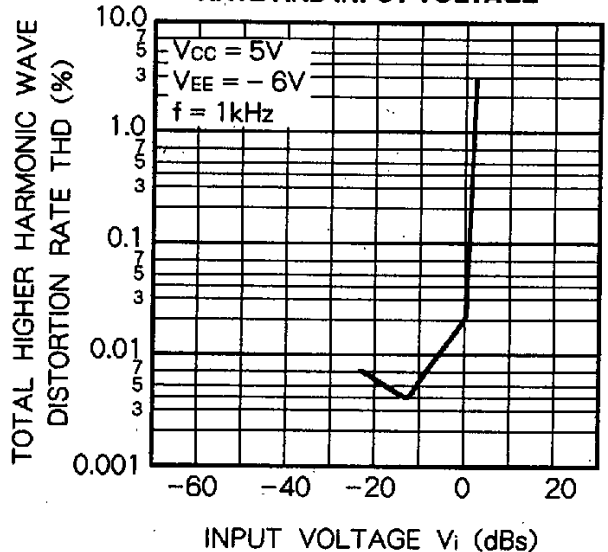
RELATION BETWEEN LINE DISTORTION RATE AND INPUT VOLTAGE



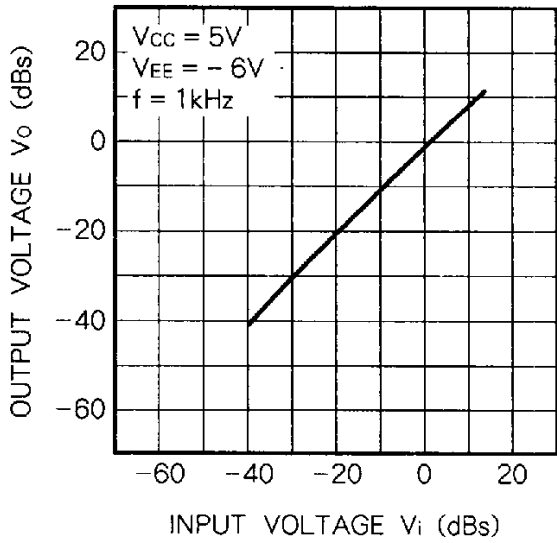
RELATION BETWEEN TUNER OUTPUT VOLTAGE AND INPUT VOLTAGE



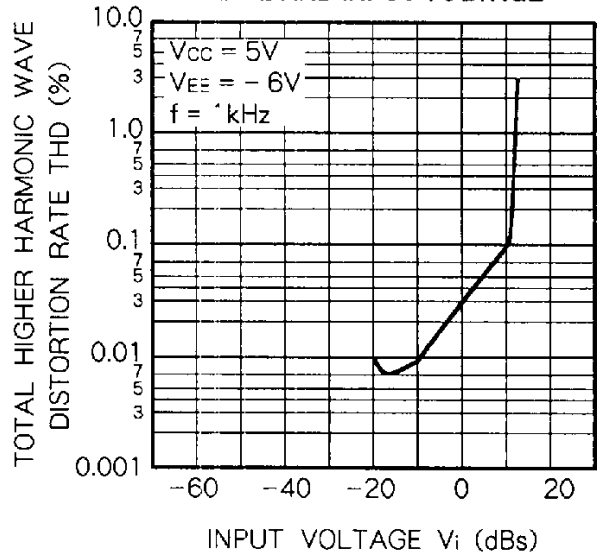
RELATION BETWEEN TUNER DISTORTION RATE AND INPUT VOLTAGE



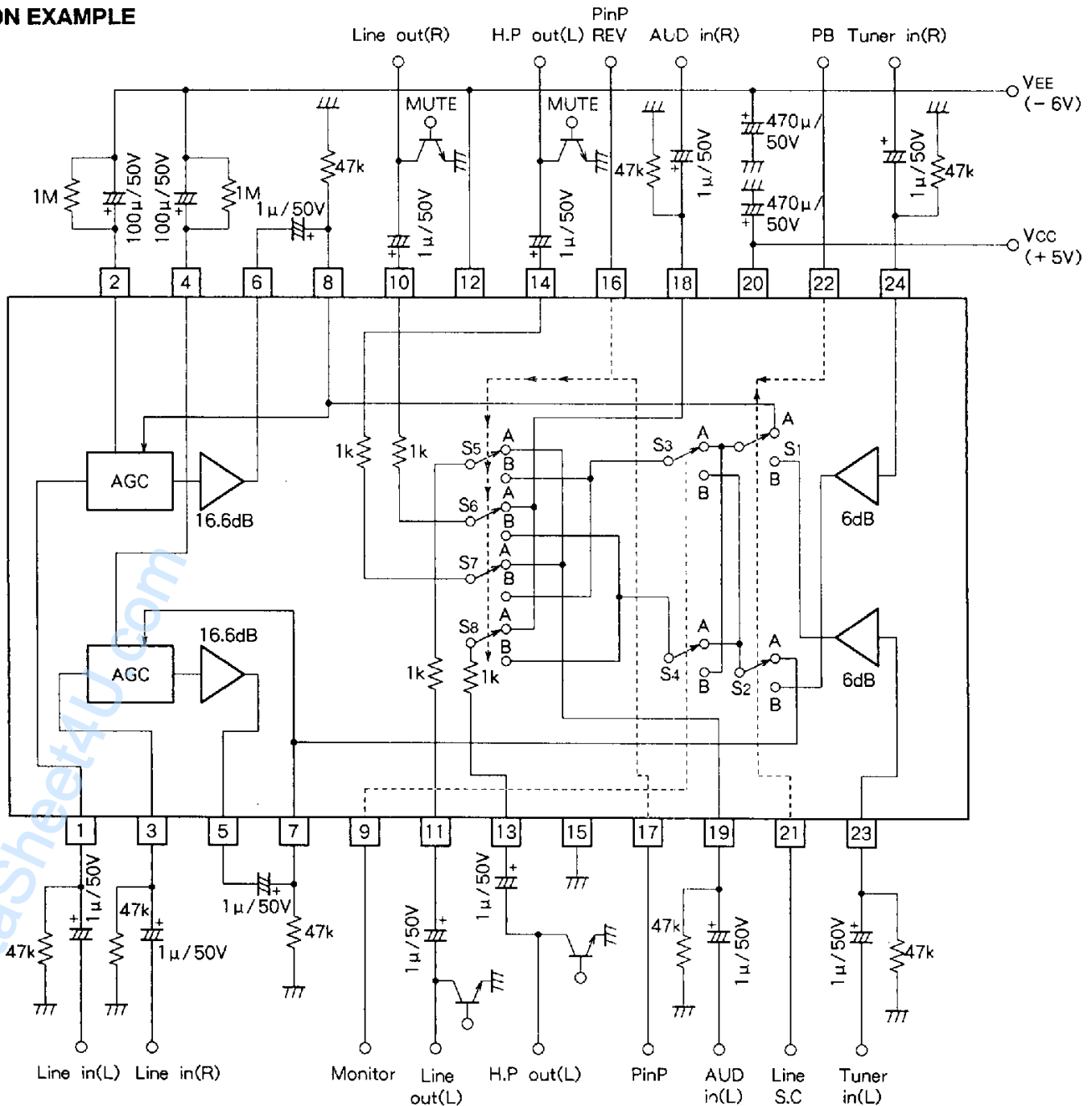
RELATION BETWEEN AUD OUTPUT VOLTAGE AND INPUT VOLTAGE



RELATION BETWEEN AUD DISTORTION RATE AND INPUT VOLTAGE



APPLICATION EXAMPLE



Units Resistance : Ω
Capacitance : F

DESCRIPTION OF PIN

Pin No.	Name	Description
①	Line in(L)	Line input pin(L)
②	AGC detection(L)	AGC rectified current voltage pin(Lch)
③	Line in(R)	Line input pin(Rch)
④	AGC detection(R)	AGC rectified current voltage pin(Rch)
⑤	AGC OUT(R)	AGC Amp output pin(Rch)
⑥	AGC OUT(L)	AGC Amp output pin(Lch)
⑦	AGC OUT in(R)	AGC Amp output signal input pin(Rch)
⑧	AGC OUT in(L)	AGC Amp output signal input pin(Lch)
⑨	Monitor	Logic input pin
⑩	Line out(R)	Line output pin(Rch)
⑪	Line out(L)	Line output pin(Lch)
⑫	VEE	Negative supply voltage pin
⑬	H.P out(R)	Headphone output pin(Rch)
⑭	H.P out(L)	Headphone output pin(Lch)
⑮	V _{ref}	Reference pin
⑯	PinP REV	Logic input pin
⑰	PinP	Logic input pin
⑱	AUD in(R)	Audio input pin(Rch)
⑲	AUD in(L)	Audio input pin(Lch)
⑳	V _{cc}	Positive supply voltage pin
㉑	Line, S.C	Logic input pin
㉒	PB	Logic input pin
㉓	Tuner in(L)	Tuner input pin(Lch)
㉔	Tuner in(R)	Tuner input pin(Rch)