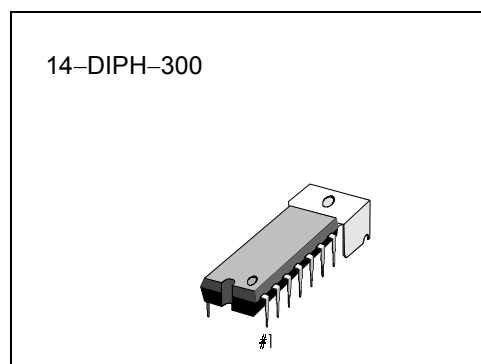


## INTRODUCTION

The KA2213 is a monolithic integrated circuit consisting of a preamplifier, ALC circuit, and power amplifier in a 14-pin plastic dual-in-line package with heat sink.

## FEATURES

- Suitable for playing and recording functions of mono cassette tape recorders
- Wide operating supply voltage range:  $V_{CC} = 4V \sim 12V$
- High gain pre-amplifier and power amplifier
- Output power of power amplifier state  
 $P_O = 1W$  at  $V_{CC} = 6V$ ,  $R_L = 4\Omega$ , THD = 10%
- Soft tone quality at the time of output saturation
- Wide ALC range and small variation in output voltage
- Reduced shock noise at the time of power on/off due to built-in prevention circuit
- Variable monitor capability due to recording amplifier consisting of pre-amplifier alone
- Minimum number of external parts required



## ORDERING INFORMATION

Device	Package	Operating Temperature
KA2213	14-DIPH-300	-20°C ~ +70°C

## BLOCK DIAGRAM

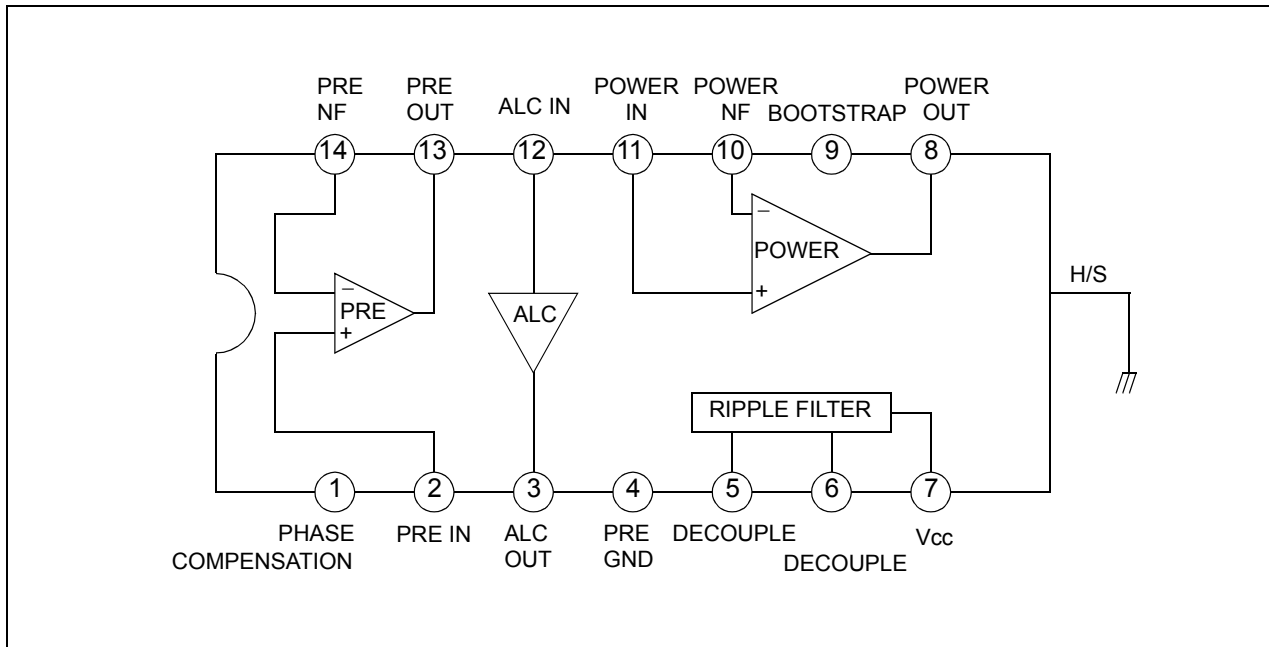


Figure 1.

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

Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	13	V
Power Dissipation	$P_D$	1.2 (2.25*)	W
Operating Temperature	$T_{OPR}$	- 20 ~ + 70	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	- 40 ~ +150	$^\circ\text{C}$

\* Mounted and soldered on a 50mm x 50mm copper foil of PCB

**ELECTRICAL CHARACTERISTICS**

(Ta = 25°C, Vcc = 6V, f = 1kHz, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Quiescent Circuit Current	I <sub>CCQ</sub>	V <sub>CC</sub> = 6V, V <sub>I</sub> = 0	–	18	30	mA
		V <sub>CC</sub> = 9V, V <sub>I</sub> = 0	–	23	40	mA
<b>Pre-Amplifier</b>						
Open Loop Voltage Gain	G <sub>VO</sub>	Open loop	–	85	–	dB
Closed Loop Voltage Gain	G <sub>VC</sub>	Closed loop, Play	–	40	–	dB
Output Voltage	V <sub>O</sub>	THD = 1%, Play	0.9	1.2	–	V
Input Resistance	R <sub>I</sub>	–	21	30	–	kΩ
Equivalent Input Noise Voltage	V <sub>NI</sub>	Play	–	1.0	2.0	μV
ALC Input Level	V <sub>I (ALC)</sub>	THD = 1%, Rec	–20	–12	–	dBm
<b>Power Amplifier</b>						
Closed Loop Voltage Gain	G <sub>VC</sub>	R <sub>F</sub> = 51Ω	43	45	47	dB
Output Power	P <sub>O</sub>	V <sub>CC</sub> = 6V, R <sub>L</sub> = 4Ω, THD = 10%	0.7	1.0	–	W
		V <sub>CC</sub> = 7.5V, R <sub>L</sub> = 4Ω THD = 10%	1.0	1.5	–	W
		V <sub>CC</sub> = 9V, R <sub>L</sub> = 4Ω, THD = 10%	1.7	2.2	–	W
Total Harmonic Distortion	THD	P <sub>O</sub> = 250mW	–	0.3	1.5	%
Input Resistance	R <sub>I</sub>	–	–	30	–	kΩ
Output Noise Voltage	V <sub>NO</sub>	R <sub>G</sub> = 10kΩ	–	0.6	1.8	mV
Ripple Rejection Ratio	RR	R <sub>G</sub> = 0Ω, V <sub>R</sub> = 150mV, f = 100Hz	40	45	–	dB

TEST CIRCUIT

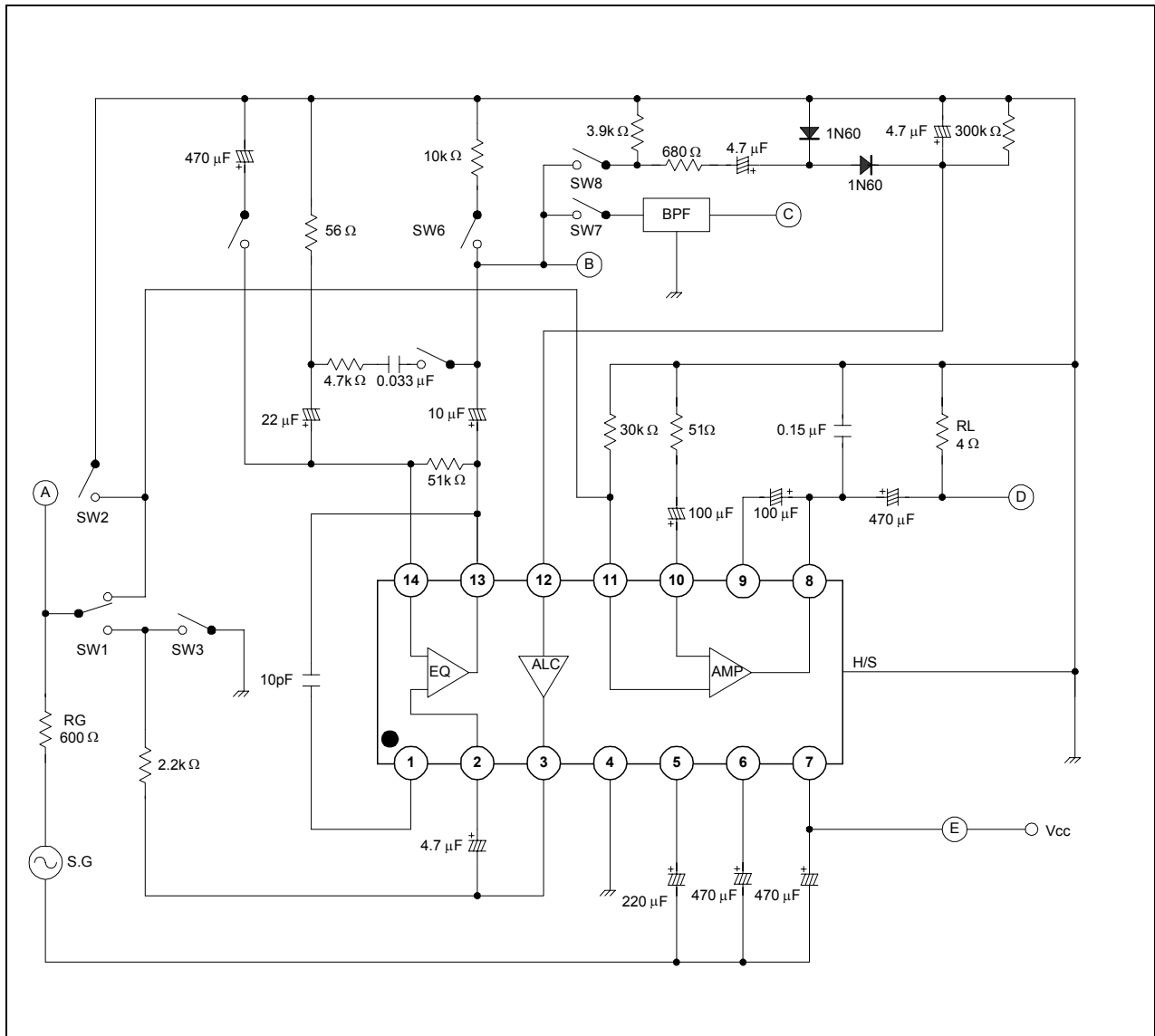


Figure 2.

## TEST METHOD

Characteristic	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	Test Point	Test Method	
Power Amplifier	I <sub>CCQ</sub>		on	on	off	on	on	off	off	E	Test circuit current
	G <sub>VC</sub>	2	off	off	off	on	on	off	off	A.D	$G_{VC} = 20 \log V_O/V_I$ (dB)
	P <sub>O</sub>	2	off	off	off	on	on	off	off	D	Test output voltage at THD = 10%
	THD	2	off	off	off	on	on	off	off	D	Test THD at output voltage V <sub>O</sub> = 1V
	V <sub>NO</sub>		on	off	off	on	on	off	off	D	Test output noise voltage
	RR		on	off	off	on	on	off	off	D	RR = 20 log VRO/150 (dB) Test output ripple voltage (VRO)
Pre-Amplifier	G <sub>VO</sub>	1	off	off	on	off	on	off	off	A.B	$G_{VO} = 20 \log V_O/V_I$ (dB)
	V <sub>O</sub>	1	off	off	off	on	on	off	off	B	Test output voltage at THD = 1%
	V <sub>NI</sub>		off	on	off	on	on	on	off	C	Convert output noise voltage at RG= 2.2kΩ, VNI = V <sub>NO</sub> /GV
	V <sub>I(ALC)</sub>	1	off	off	off	off	off	off	on	A.B	Test input voltage at THD = 1%

TYPICAL APPLICATION CIRCUITS

Mono Cassette Tape Recorder

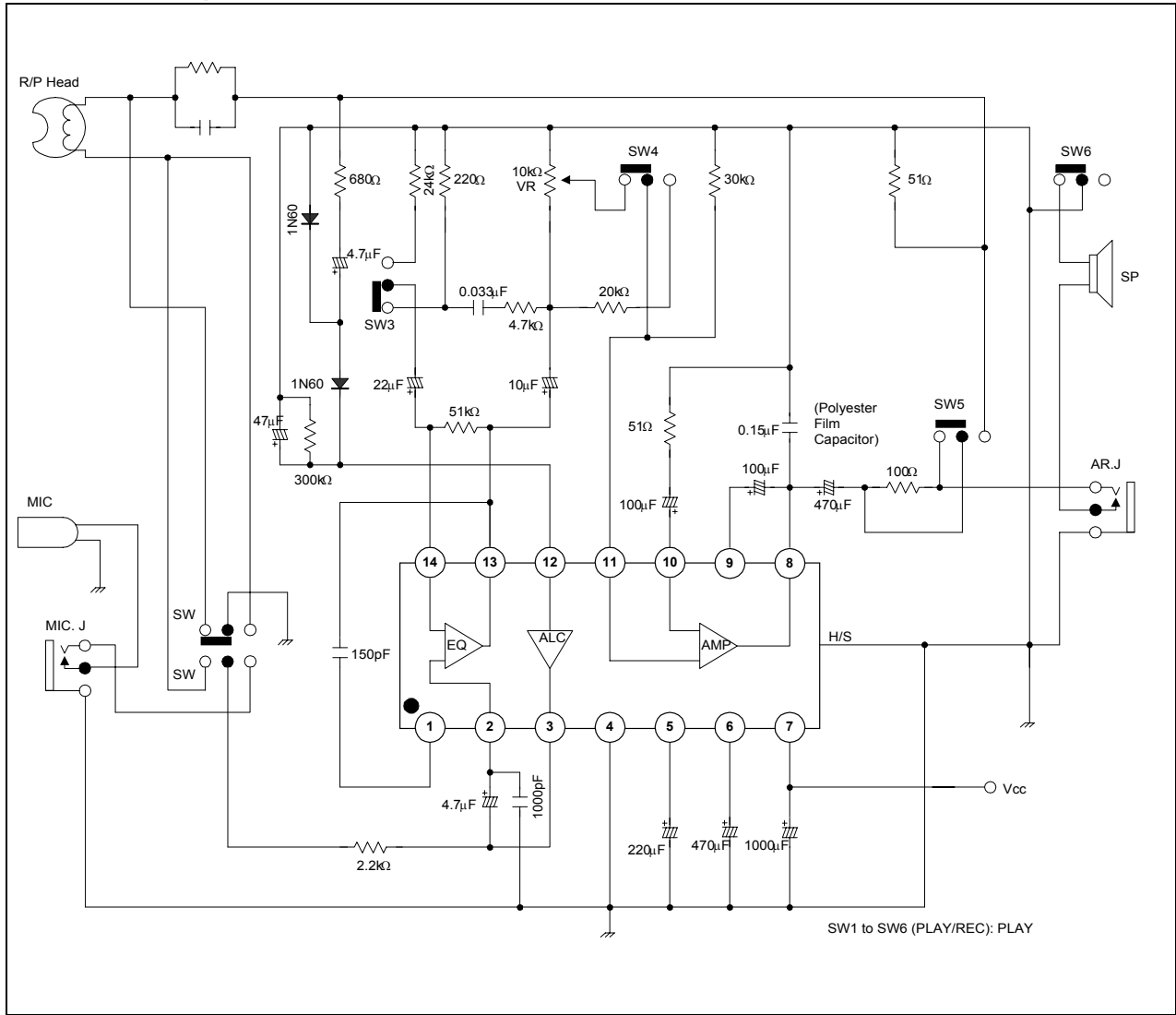


Figure 3.



Radio Cassette Tape Recorder

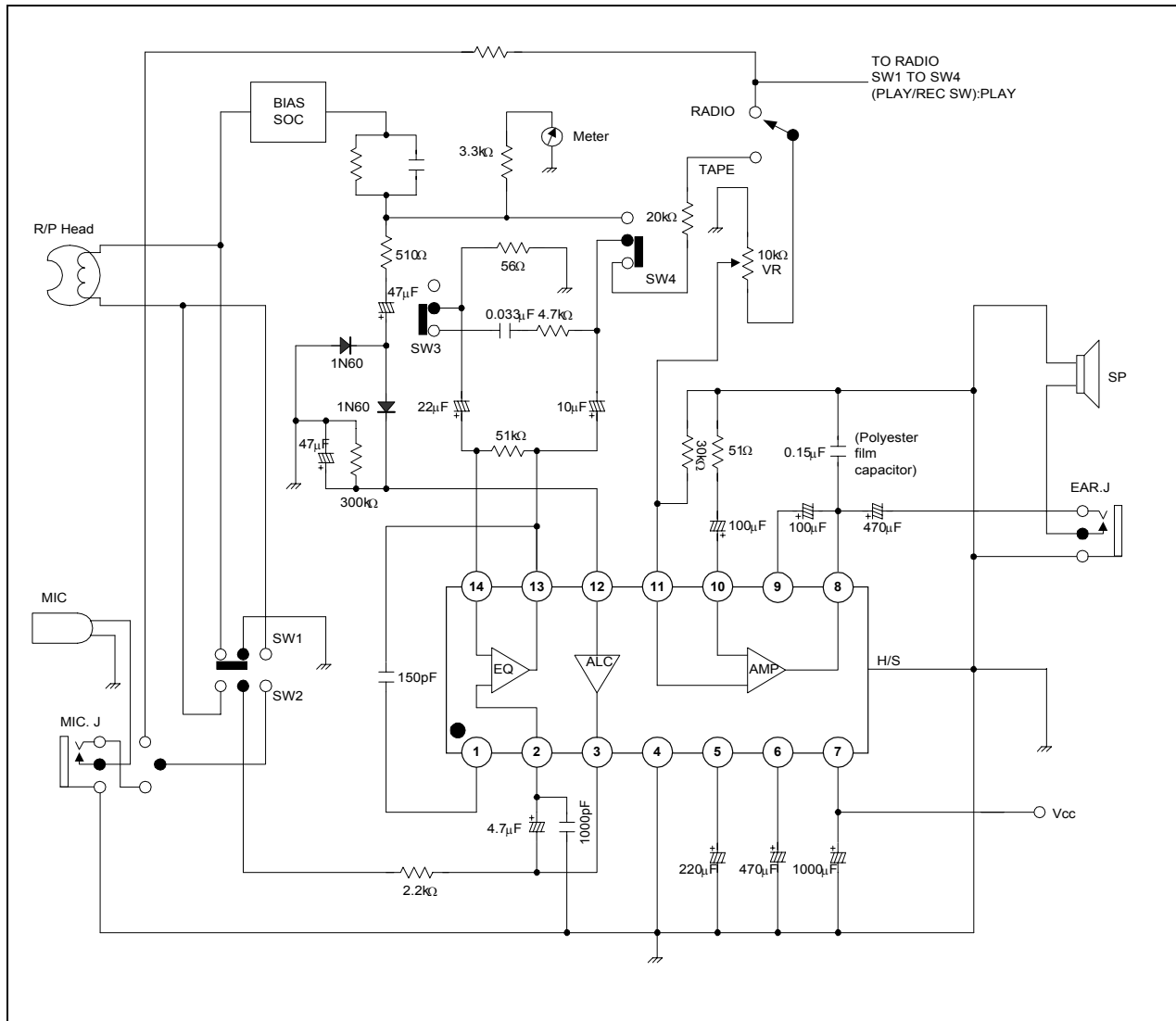


Figure 4.

NOTES