AN3224K

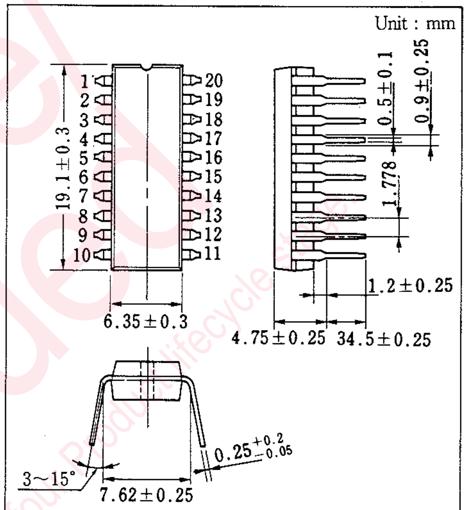
Recording Amplifier Circuit for Video Signal (2-Head Type)

■ Outline

The AN3224K is an integrated circuit designed for recording amplifier circuit for video signal (4-head type).

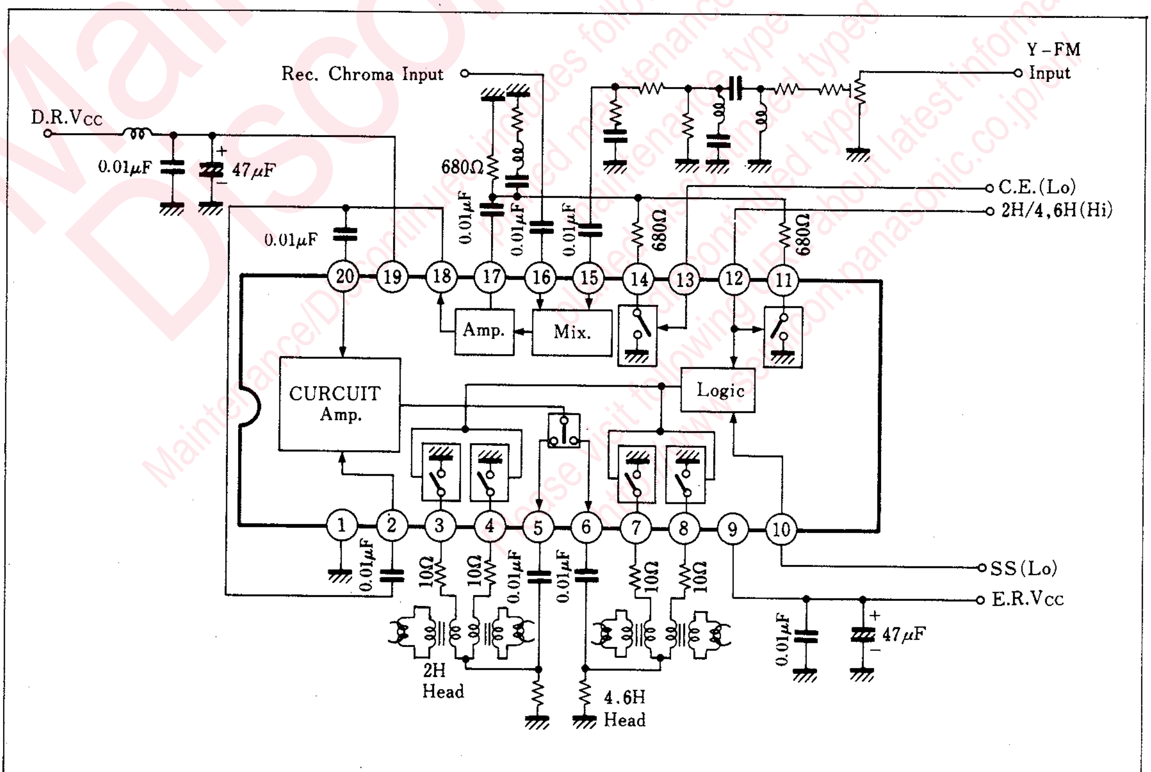
■ Features

- Constant current output amplifier
- Built-in current emphasis function
- Built-in switching transistor
- Supply voltage : V_{CC}=12V



20-Lead Shrunk DIL Plastic Package

■ Block Diagram



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■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	GND	11	2 H(SP)/4 , 6 H(LP)Switch
2	Current Amp. Input(NPN)	12	2 H(SP)/4 , 6 H(LP)Changeover
3	Switching Tr. (1)	13	Current Emphasis Changeover
4	Switching Tr. (2)	14	Current Emphasis switch
5	Recording Current Output(SP)	15	Recording FM Signal Input
6	Recording Current Output(LP)	16	Recording Chroma Signal Input
7	Switching Tr. (3)	17	Gain Changeover Amp. Control
8	Switching Tr. (4)	18	Gain Changeover Amp. Output
9	Except Rec. V_{CC}	19	Delayed Rec. V_{CC}
10	SS Changeover	20	Current Amp. Input(PNP)

■ Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	14.4	V
Power Dissipation	P_D	700	mW
Operating Ambient Temperature	T_{opr}	−20~+70	℃
Storage Temperature	T_{stg}	−55~+150	℃

■ Electrical Characteristics (Ta=25℃)

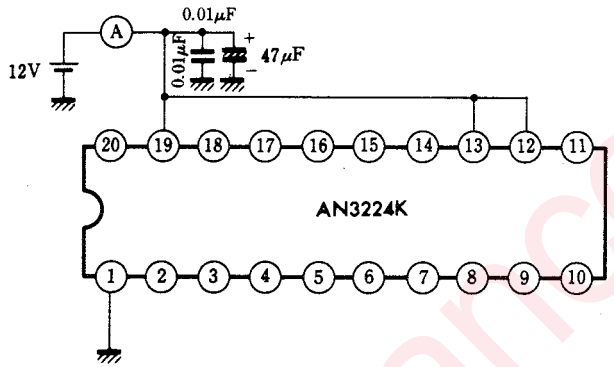
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Circuit Current(REC)	I_{19}	1	Delayed Rec. V_{CC} (D.R.V_{CC})=12V	31		50.5	mA
Circuit Current(PB)	I_9*1	2	Except Rec. V_{CC}=5V	9.3		17.5	mA
Recording Current Output(LP)	I_6	3	D.R.V_{CC}=12V, f_{IN}=4MHz	7.5		13.1	mA_{P-P}/ch.
Recording Current Output(SP)	I_5	3	D.R.V_{CC}=12V, f_{IN}=4MHz	15.8		24.2	mA_{P-P}/ch.
Chroma Recording Current Output	$I_{5\text{-}C}$	3	D.R.V_{CC}=12V, f_{IN}=4MHz	6.2		14	mA_{P-P}/ch.
2H(SP)/4,6H(LP)Changeover Voltage	V_{13}	4	D.R.V_{CC}=12V			2	V
Current Emphasis Changeover Voltage	V_{12}	4	D.R.V_{CC}=12V			2	V
SS Changeover Voltage	V_{10}	5	E.R.V_{CC}=5V			3	V
Switching Tr. ON Voltage(1)	v_3*2	6	D.R.V_{CC}=12V, f_{IN}=4MHz	25		150	mV_{P-P}
Switching Tr. ON Voltage(2)	v_4*2	6	D.R.V_{CC}=12V, f_{IN}=4MHz	25		150	mV_{P-P}
Switching Tr. ON Voltage(3)	v_7*2	6	D.R.V_{CC}=12V, f_{IN}=4MHz	10		135	mV_{P-P}
Switching Tr. ON Voltage(4)	v_8*2	6	D.R.V_{CC}=12V, f_{IN}=4MHz	10		135	mV_{P-P}
Recording Current Secondary Distortion(LP)	D_6*2	7	D.R.V_{CC}=12V			−28	dB
Recording Current Secondary Distortion(SP)	D_5*2	7	D.R.V_{CC}=12V			−28	dB
Cross−modulation Relative Level(LP)	$D_{6\pm f}$*2	7	D.R.V_{CC}=12V			−35	dB
Cross−modulation Relative Level(SP)	$D_{5\pm f}$*2	7	D.R.V_{CC}=12V			−35	dB
Recoading Current Rated Current Characteristics	I_5'/I_t*2	7	D.R.V_{CC}=12V	−0.8		0.8	dB

Note : Operating Supply Voltage Range : $V_{CC(opr)}$=11.0~12.5V

*1. Pin⑨ is EXCEPT REC. V_{CC} terminal and 5V is used. When the voltage is simultaneously applied to Pins⑨ and ⑲, ICs may be destroyed.

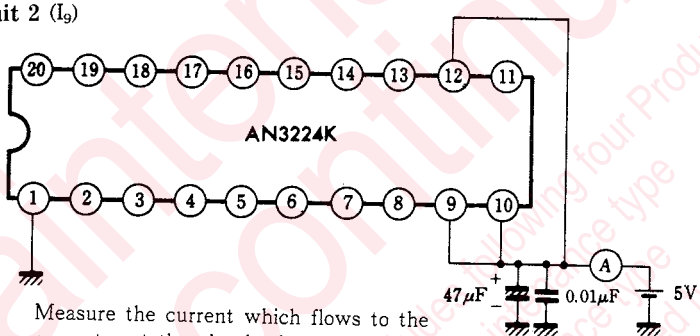
*2. It is a reference value for design but not a guaranteed value.

Test Circuit 1 (I_{19})



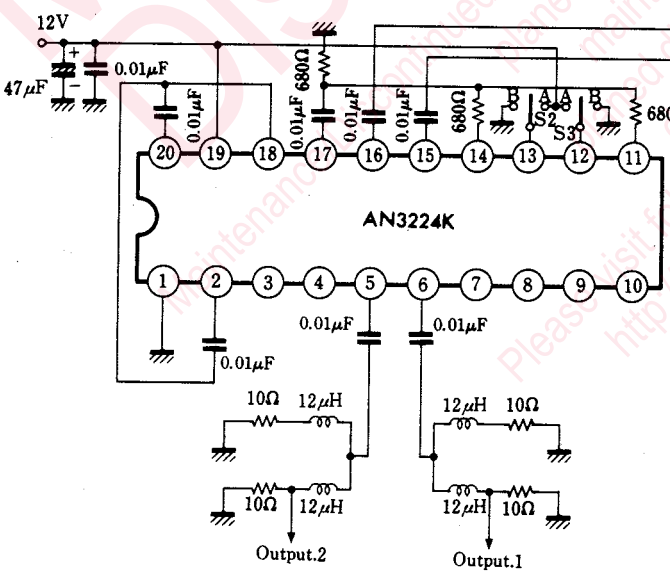
Measure the current which flows to the ammeter at the circuit above.

Test Circuit 2 (I_9)



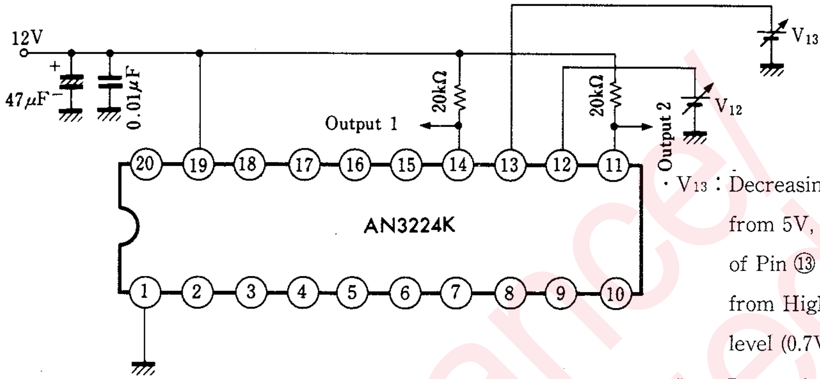
Measure the current which flows to the ammeter at the circuit above.

Test Circuit 3 (I_6, I_5, $I_{5\text{-}C}$)



- I_6 V_{IN} : 4MHz, 60m$V_{P\text{-}P}$ V_{CC} : 12V
  Switch : $S_1 \rightarrow B$, $S_2 \rightarrow A$, $S_3 \rightarrow A$
  Measure the voltage of output 1 at the circuit left, and divide it by 10 Ω.
- I_5 V_{IN} : 4MHz, 60m$V_{P\text{-}P}$ V_{CC} : 12V
  Switch : $S_1 \rightarrow B$, $S_2 \rightarrow A$, $S_3 \rightarrow B$
  Measure the voltage of output 2 at the circuit left, and divide it by 10 Ω.
- $I_{5\text{-}C}$ V_{IN} : 4MHz, 240m$V_{P\text{-}P}$ V_{CC} : 12V
  Switch : $S_1 \rightarrow A$, $S_2 \rightarrow A$, $S_3 \rightarrow B$
  Measure the voltage of output 2 at the circuit left, and divide it by 10 Ω.

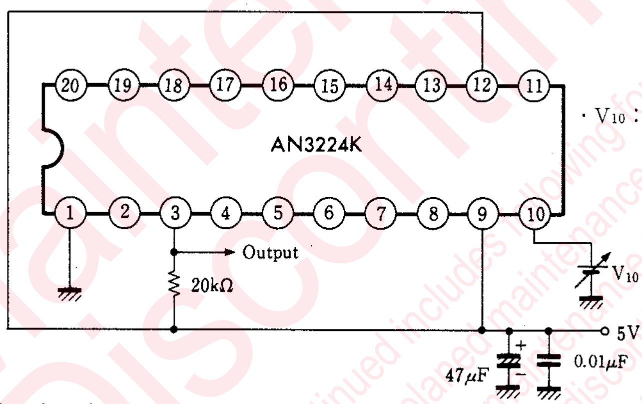
Test Circuit 4 (V_{13}, V_{12})



· V_{13} : Decreasing the electric potential of Pin ⑬ from 5V, measure the electric potential of Pin ⑬ when Pin ⑭ output is switched from High level (11V or more) to Low level (0.7V or less).

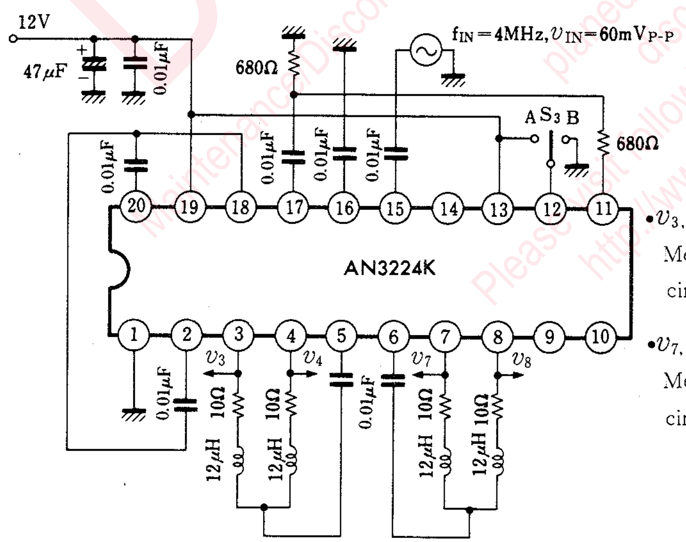
· V_{12} : Decreasing the electric potential of Pin ⑫ from 5V, measure the electric potential of Pin ⑫ when Pin ⑪ output is switched from High level (11V or more) to Low level (0.7V or less).

Test Circuit 5 (V_{10})



· V_{10} : Increasing the electric potential of Pin ⑩ from 0V, measure the electric potential of Pin ⑩ when Pin ③ output is switched from High level (4.2V or more) to Low level (0.6V or less).

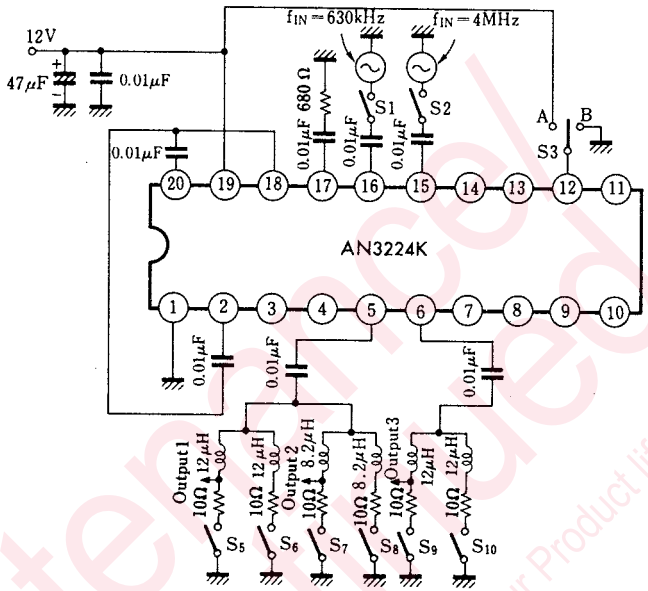
Test Circuit 6 (v_3, v_4, v_7, v_8)



•v_3, v_4 : (Switch condition : S_3→B)
Measure signal voltages of v_3 and v_4 at the circuit shown left.

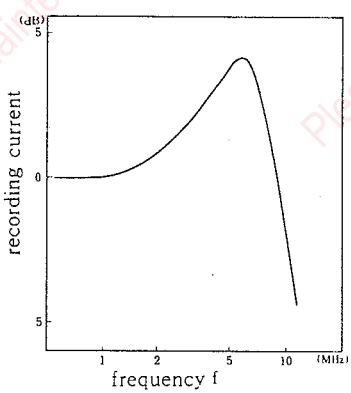
•v_7, v_8 : (Switch condition : S_3→B)
Measure signal voltages of v_7 and v_8 at the circuit shown left.

Test Circuit 7 (D_6, D_5, $D_{6\pm f}$, $D_{5\pm f}$, I_5'/I_5)



- D_6 : (Swich condition : $S_3 \rightarrow A$, S_2, S_9, $S_{10} \rightarrow$Short - circuit, Other switches→Open)
  After monitoring a waveform at Output 3, set the recording current to be $12mA_{P-P}/Ch.$ and then measure that secondary distortion with a spectrum analyzer.
- D_5 : (Swich condition : $S_3 \rightarrow B$, S_2, S_5, $S_6 \rightarrow$Short - circuit, Other switches→Open)
  After monitoring a waveform at Output 1, set the recording current to be $12mA_{P-P}/Ch.$ and then measure that secondary distortion with a spectrum analyzer.
- $D_{6\pm f}$: (Swich condition : $S_3 \rightarrow A$, S_9, $S_{10} \rightarrow$Short - circuit, Other switches→Open)
  After monitoring a waveform at Output 3, first short - circuit the switch S_2 to set the recording current to be $12mA_{P-P}/Ch.$ Next, open the switch S_2, while short the switch S_1, to set the recording current to be $4mA_{P-P}/Ch.$ Under this condition, short - circuit the switch S_2 to measure the cross - modulation at Output 1 with a spectrum analyzer.
- $D_{5\pm f}$: (Swich condition : $S_3 \rightarrow B$, S_5, $S_6 \rightarrow$Short - circuit, Other switches→Open)
  After monitoring a waveform at Output 1, first short - circuit the switch S_2 to set the recording current to be $12mA_{P-P}/Ch.$ Next, open the switch S_2, while short the switch S_1, to set the recording current to be $4mA_{P-P}/Ch.$ Under this condition, short - circuit the switch S_2 to measure the cross - modulation at Output 1 with a spectrum analyzer.
- I_5'/I_5 : (Swich condition : $S_3 \rightarrow B$, $S_2 \rightarrow$Short - circuit, Other switches→Open)
  After monitoring a waveform at Output 1, first short - circuit the switches S_5 and S_6 to set the recording current to be $12mA_{P-P}/Ch.$ Next, open the switch, while short the switches S_7, and S_8, to measure the recording current I_5' at Output 2.

(Reference)



An example of the frequency characteristics of recording current at Test Circuit 7

This characteristics varies depending on ICs.

Therefore, use ICs under the sufficient damping condition of a resonance peak.

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