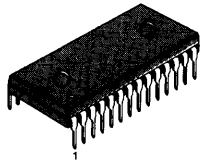
3 CHANNEL R.G.B VIDEO AMPLIFIER

The KA2139 is a monolithic integrated circuit for processing the R,G,B video in high resolution CRT display.
It contains 3 channel video amplifier, black level clamp comparator for brightness control and DC control attenuator for contrast control. this device is suitable for monitor.

28-DIP-600A



FUNCTIONS

- **R,G,B amplifier**
- **Contrast amplifier**
- **Clamp & brightness circuit**
- **Vref. circuit**

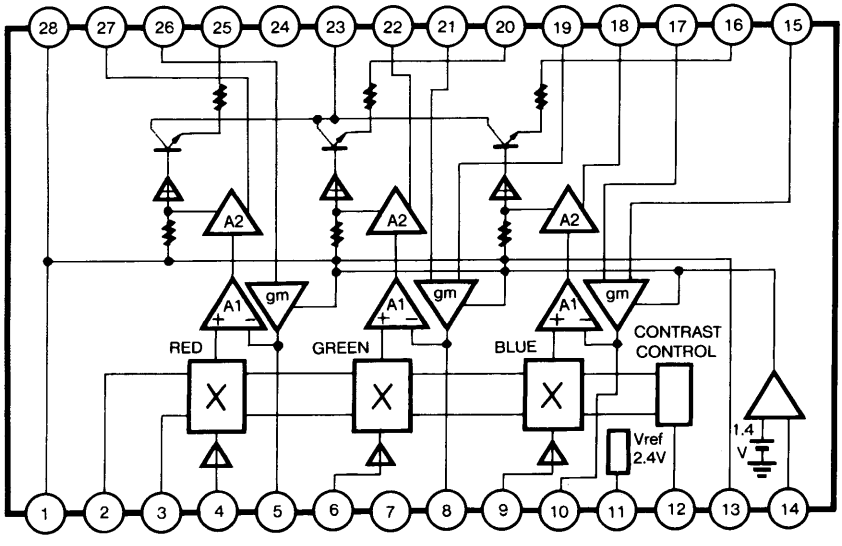
FEATURES

- 3 Channel R.G.B video amplifier (f_{-3dB}=70MHz:Typ)
- Superior linearity for contrast control
- Black level clamp comparator for brightness control
- Built-in clamp gate circuit to operate the clamp comparator at black level
- Vref 2.4V bandgap circuit

ORDERING INFORMATION

Device	Package	Operating Temperature
KA2139	28 DIP	−20°C~+70°C

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

(V_{CC} = 12V, Ta = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Supply Current	I_{CC}	V_{CC} = 12V V24 = 2V V12 = 6V V14 = 0V	75	90.0	105	mA
R,G,B CH Output Voltage 1	VH16,20,25		1.9	2.0	2.1	V
R,G,B CH Output Voltage 2	VH16,20,25		3.9	4.0	4.1	V
Input Reference Voltage	V_{ref}		2.0	2.4	2.8	V
R,G,B Input Bias Current	Iin		–	5.0	20.0	μA
Clamp Gate Low Input Voltage	V14L	V14 Variable	0.8	1.2	–	V
Clamp Gate High Inout Voltage	V14H	V14 Variable	–	1.6	2.0	V
Clamp Gate Low Input Current	IgateL	V14 = 0V	−5.0	−5.0	–	μA
Clamp Gate High Input Current	IgateH	V14 = 12V	–	0.05	1.0	μA
R,G,B Clamp CAP. Charge Current	Iclamp(+)	Vclamp cap. = 0V	0.5	0.85	1.2	mA
R,G,B Clamp CAP. Discharge Current	Iclamp(−)	Vclamp cap. = 5V	−0.5	−0.85	−1.2	mA
R,G,B Output Low Voltage	VOL16,20,25	Vclamp = 0V	–	1.0	1.4	V
R,G,B Output High Voltage	VOH16,20,25	Vclamp = 5V	8.0	8.5	–	V
Contrast Capacitor Voltage 1	Vcon1	Measure the contrast capacitor voltage	4.8	5.2	5.6	V
Contrast Capacitor Voltage 2	Vcon2		4.8	5.2	5.6	V
R,G,B Output DC Offset Low Voltage	ΔVR-GL	V24 = 2V	−50	0	50	mV
R,G,B Output DC Offset High Voltage	ΔVR-GH	V24 = 4V	−50	0	50	mV
R,G,B Video Amp. Gain 1	AVmax	V12 = 12V, Vin = 0.56 V_{p-p}	13.1	15.6	18.1	dB
R,G,B Video Amp. Gain 2	ΔAV5	V12 = 5V	−5	−10.0	−1.5	dB
R,G,B Video Amp. Gain 3	ΔAV2	V12 = 2V	−30	−40.0	−50	dB
R,G,B Output Gain Difference1	ΔAVR-G	V12 = 12V, Vin = 1.0V_{p-p}	−1.0	0	1.0	dB
R,G,B Output Gain VAR. 1	ΔAVR-G1	V12 = 5V	−1.0	0	1.0	dB
R,G,B Output Gain VAR. 2	ΔAVR-G2	V12 = 2V	−3.0	0	3.0	dB

PIN DESCRIPTION

No	Symbol	Description	No	Symbol	Description
1	V_{CC1}	Power supply 1	15	BCLAMP(+)	B brightness control
2	CONCAP1	Contrast capacitor 1	16	BOUT	B channel output
3	CONCAP2	Contrast capacitor 2	17	BCLAMP(−)	B-CH clamp feedback
4	RIN	R channel input	18	BDRIVE	B-CH drive output
5	RCAP	R-CH comparator cap.	19	GCLAMP(+)	G brightness control
6	GIN	G channel input	20	GOUT	G channel output
7	GND	Ground	21	GCLAMP(−)	G-CH clamp feedback
8	GCAP	G-CH comparator cap.	22	GDRIVE	G-CH drive output
9	BIN	B channel input	23	V_{CC2}	Power supply 2
10	BCAP	B-CH comparator cap.	24	RCLAMP(+)	R brightness control
11	V_{REF}	R,G,B amp. offset voltage	25	ROUT	R channel output
12	CON	Contrast control	26	RCLAMP(−)	R-CH clamp feedback
13	V_{CC1}	Power supply 1	27	RDRIVE	R-CH drive output
14	GATEIN	Clamp gate input	28	V_{CC1}	Power supply 1

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

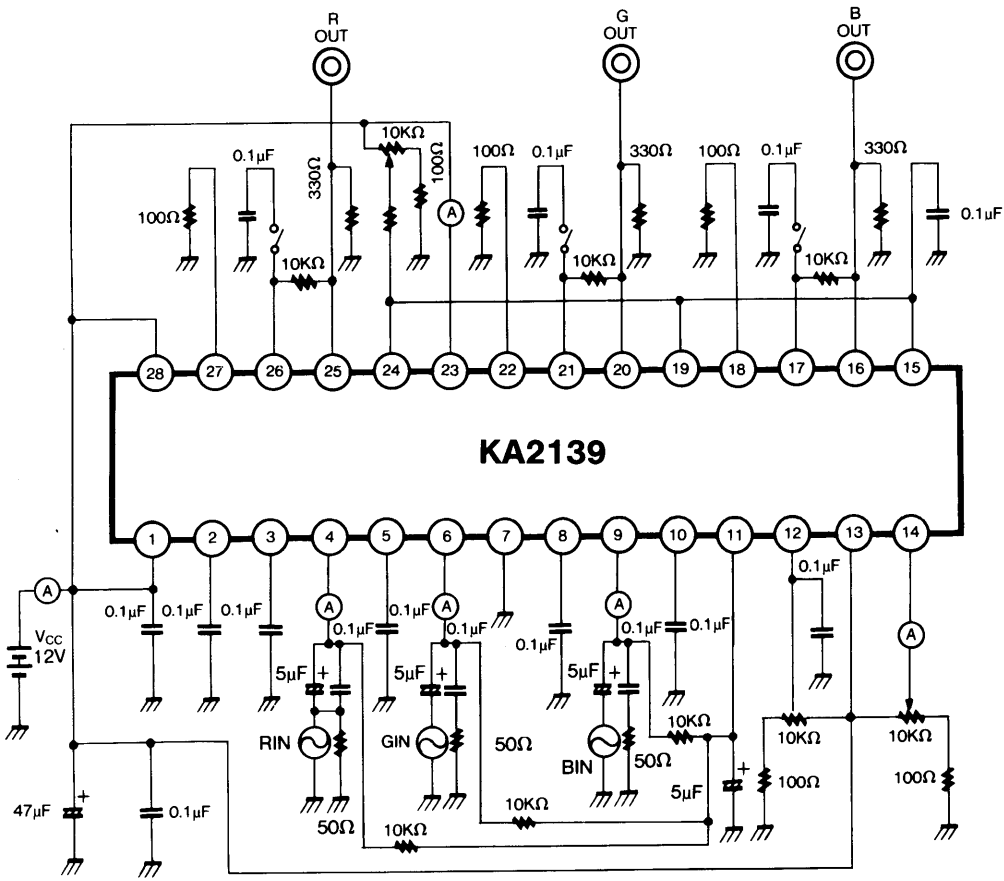
Characteristics	Symbol	Value	Unit
Maximum Supply Voltage	V_{CC}max	13.5	V
Maximum Supply Current	I_{CC}max	105.0	mA
Operating Voltage	V_{CC}opr	10.8~13.2	V
Maximum Power Dissipation	$P_d$max	2.5	W
Storage Temperature	T_{stg}	−55~+150	°C
Operating Temperature	T_{opr}	−20~+70	°C

ELECTRICAL CHARACTERISTICS

(V_{CC} = 12V, Ta = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
R,G,B Amp. Distortion	THD	V12 = 4 V	–	0.5	5.0	%
R,G,B Amp. Bandwidth	f-3dB	V12 = 12V	50	70	–	MHz
R,G,B Amp. rising time	Rtr, Gtr, Btr	V12 = 12V	–	5.0	7.2	nS
R Amp. Isolation1-100K	AR1iso100K	Measure the G output level	−40	−60	–	dB
R Amp. Isolation2-100K	AR2iso100K	Measure the B output level	−40	−60	–	dB
G Amp. Isolation1-100K	AG1iso100K	Measure the R output level	−40	−60	–	dB
G Amp. Isolation2-100K	AG2iso100K	Measure the B output level	−40	−60	–	dB
B Amp. Isolation1-100K	AB1iso100K	Measure the R output level	−40	−60	–	dB
B Amp. Isolation2-100K	AB2iso100K	Measure the G output level	−40	−60	–	dB
R Amp. Isolation1-100K	AR1iso100K	Measure the G output level	−25	−40	–	dB
R Amp. Isolation2-100K	AR2iso100K	Measure the B output level	−25	−40	–	dB
G Amp. Isolation1-100K	AG1iso100K	Measure the R output level	−25	−40	–	dB
G Amp. Isolation2-100K	AG2iso100K	Measure the B output level	−25	−40	–	dB
B Amp. Isolation1-100K	AB1iso100K	Measure the R output level	−25	−40	–	dB
B Amp. Isolation2-100K	AB2iso100K	Measure the G output level	−25	−40	–	dB

TEST CIRCUIT



APPLICATION CIRCUIT