

# KA2139

# VIDEO AMPLIFIER FOR MONITOR

## 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 control
- Clamp & brightness circuit
- Vref. circuit

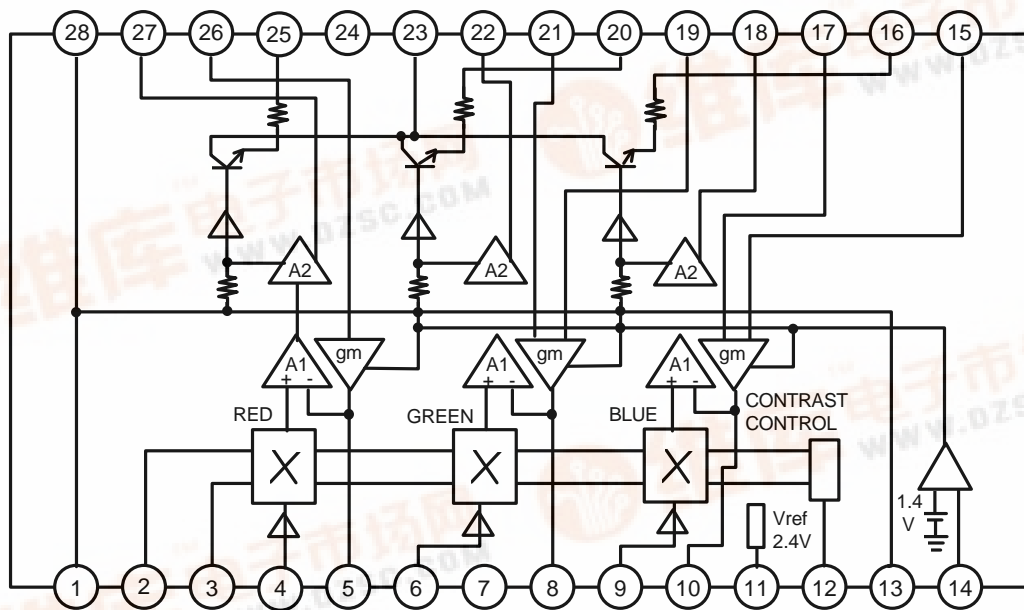
### FEATURES

- 3 Channel R.G.B video amplifier ( $f_{-3dB}=70\text{MHz:Typ}$ )
- Superior linearity 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



## PIN DESCRIPTION

No	Symbol	Description	No	Symbol	Description
1	V <sub>CC1</sub>	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	BDREVE	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 <sub>CC2</sub>	Power supply 2
10	BCAP	B-CH comparator cap.	24	RCLAMP(+)	R brightness control
11	V <sub>REF</sub>	R,G,B amp. offset voltage	25	ROUT	R channel output
12	CON	Contrast control	26	RCLAMP(-)	R-CH clamp feedback
13	V <sub>CC1</sub>	Power supply 1	27	RDRIVE	R-CH drive output
14	GATEIN	Clamp gate input	28	V <sub>CC1</sub>	Power supply 1

ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Characteristics	Symbol	Value	Unit
Maximum Supply Voltage	V <sub>CCmax</sub>	13.5	V
Maximum Supply Current	I <sub>CCmax</sub>	105.0	mA
Operating Voltage	V <sub>CCopr</sub>	10.8~13.2	V
Maximum Power Dissipation	P <sub>Dmax</sub>	2.5	w
Storage Temperature	T <sub>STG</sub>	- 55~+150	°C
Operating Temperature	T <sub>OPR</sub>	- 20~ + 70	°C

**ELECTRICAL CHARACTERISTICS**(V<sub>CC</sub> = 12V, T<sub>A</sub> = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Supply Current	I <sub>CC</sub>	V <sub>CC</sub> = 12V V24 = 2V V12 = 6V V14 = 0V	75	90.0	105	mA
R,G,B CH Output Voltage 1	V <sub>H</sub> 16,20,25		1.9	2.0	2.1	V
R,G,B CH Output Voltage 2	V <sub>H</sub> 16,20,25		3.9	4.0	4.1	V
Input Reference Voltage	V <sub>REF</sub>		2.0	2.4	2.8	V
R,G,B Input Bias Current	I <sub>in</sub>		-	5.0	20.0	μA
Clamp Gate Low Input Voltage	V14L	V14 Variable	0.8	1.2	-	V
Clamp Gate High Input Voltage	V14H	V14 Variable	-	1.6	2.0	V
Clamp Gate Low Input Current	I <sub>gateL</sub>	V14 = 0V	-5.0	-5.0	-	μA
Clamp Gate High Input Current	I <sub>gateH</sub>	V14 = 12V	-	0.05	1.0	μA
R,G,B Clamp CAP. Charge Current	I <sub>clamp(+)</sub>	V <sub>clamp</sub> cap. = 0V	0.5	0.85	1.2	mA
R,G,B Clamp CAP. Discharge Current	I <sub>clamp(-)</sub>	V <sub>clamp</sub> cap. = 5V	-0.5	-0.85	-1.2	mA
R,G,B Output Low Voltage	V <sub>OL</sub> 16,20,25	V <sub>clamp</sub> = 0V	-	1.0	1.4	V
R,G,B Output High Voltage	V <sub>OH</sub> 16,20,25	V <sub>clamp</sub> = 5V	8.0	8.5	-	V
Contrast Capacitor Voltage 1	V <sub>con1</sub>	Measure the contrast capacitor voltage	4.8	5.2	5.6	V
Contrast Capacitor Voltage 2	V <sub>con2</sub>		4.8	5.2	5.6	V
R,G,B Output DC Offset Low Voltage	ΔV <sub>R-GL</sub>	V24 = 2V	-50	0	50	mV
R,G,B Output DC Offset High Voltage	ΔV <sub>R-GH</sub>	V24 = 4V	-50	0	50	mV
R,G,B Video Amp. Gain 1	A <sub>Vmax</sub>	V12 = 12V, V <sub>in</sub> = 0.56 V <sub>P,P</sub>	13.1	15.6	18.1	dB
R,G,B Video Amp. Gain 2	ΔA <sub>V5</sub>	V12 = 5V	-5	-10.0	-1.5	dB
R,G,B Video Amp. Gain 3	ΔA <sub>V2</sub>	V12 = 2V	-30	-40.0	-50	dB
R,G,B Output Gain Difference 1	ΔA <sub>VR-G</sub>	V12 = 12V V <sub>IN</sub> = 1.0V <sub>P,P</sub>	-1.0	0	1.0	dB
R,G,B Output Gain VAR. 1	ΔA <sub>VR-G1</sub>	V12 = 5V	-1.0	0	1.0	dB
R,G,B Output Gain VAR. 2	ΔA <sub>VR-G2</sub>	V12 = 2V	-3.0	0	3.0	dB

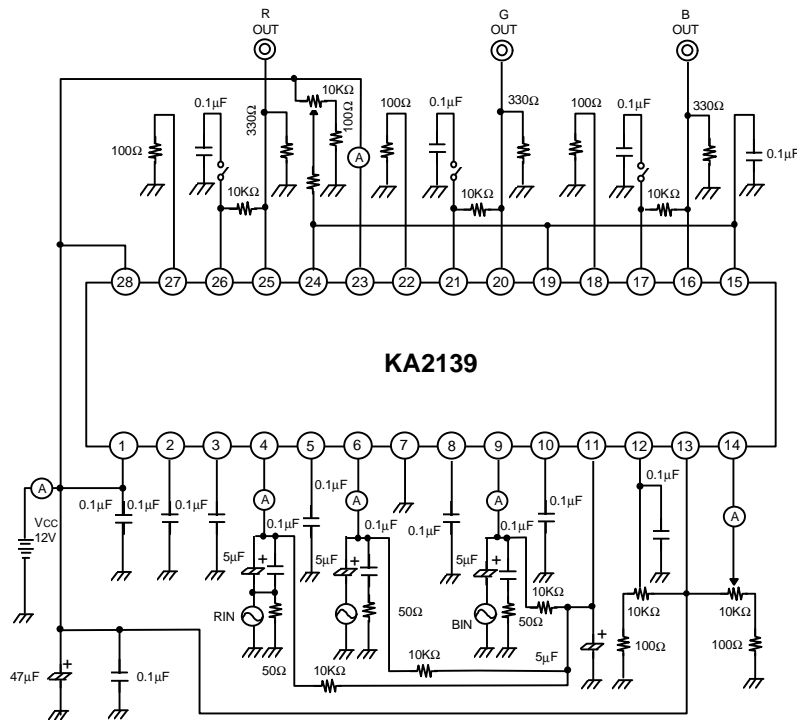
**ELECTRICAL CHARACTERISTICS**(V<sub>CC</sub> = 12V, T<sub>A</sub> = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
R,G,B Amp. Distortion	THD	V <sub>12</sub> = 4V	-	0.5	5.0	%
R,G,B Amp. Bandwidth	f-3dB	V <sub>12</sub> = 12V	50	70	-	MHz
R,G,B Amp. rising time	Rtr, Gtr, Btr	V <sub>12</sub> = 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

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## TEST CIRCUIT



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## APPLICATION CIRCUIT

