

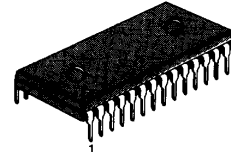
KA2139

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

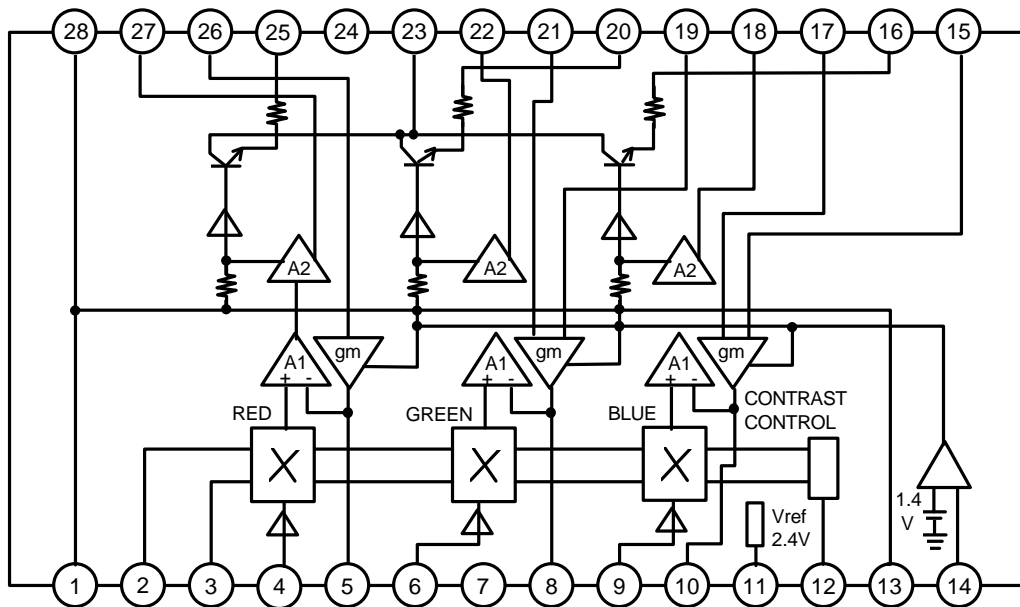
FEATURES

- 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 _{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 | 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 _{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 (T_A = 25°C)

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

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

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Unit |
|--|-----------------------|---|------|-------|------|------|
| Supply Current | I _{CC} | V _{CC} = 12V V ₂₄ = 2V V ₁₂ = 6V V ₁₄ = 0V | 75 | 90.0 | 105 | mA |
| R,G,B CH Output Voltage 1 | VH 16,20,25 | | 1.9 | 2.0 | 2.1 | V |
| R,G,B CH Output Voltage 2 | VH 16,20,25 | | 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 | I _{in} | | - | 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 _{gateL} | V14 = 0V | -5.0 | -5.0 | - | μA |
| Clamp Gate High Input Current | I _{gateH} | V14 = 12V | - | 0.05 | 1.0 | μA |
| R,G,B Clamp CAP. Charge Current | I _{clamp(+)} | V _{clamp} cap. = 0V | 0.5 | 0.85 | 1.2 | mA |
| R,G,B Clamp CAP. Discharge Current | I _{clamp(-)} | V _{clamp} cap. = 5V | -0.5 | -0.85 | -1.2 | mA |
| R,G,B Output Low Voltage | VOL 16,20,25 | V _{clamp} = 0V | - | 1.0 | 1.4 | V |
| R,G,B Output High Voltage | VOH 16,20,25 | V _{clamp} = 5V | 8.0 | 8.5 | - | V |
| Contrast Capacitor Voltage 1 | V _{con1} | Measure the contrast capacitor voltage | 4.8 | 5.2 | 5.6 | V |
| Contrast Capacitor Voltage 2 | V _{con2} | | 4.8 | 5.2 | 5.6 | V |
| R,G,B Output DC Offset Low Voltage | ΔVR-GL | V ₂₄ = 2V | -50 | 0 | 50 | mV |
| R,G,B Output DC Offset High Voltage | ΔVR-GH | V ₂₄ = 4V | -50 | 0 | 50 | mV |
| R,G,B Video Amp. Gain 1 | AV _{max} | V ₁₂ = 12V, V _{in} = 0.56 V _{P,P} | 13.1 | 15.6 | 18.1 | dB |
| R,G,B Video Amp. Gain 2 | ΔAV5 | V ₁₂ = 5V | -5 | -10.0 | -1.5 | dB |
| R,G,B Video Amp. Gain 3 | ΔAV2 | V ₁₂ = 2V | -30 | -40.0 | -50 | dB |
| R,G,B Output Gain Difference 1 | ΔAVR-G | V ₁₂ = 12V V _{IN} = 1.0V _{P,P} | -1.0 | 0 | 1.0 | dB |
| R,G,B Output Gain VAR. 1 | ΔAVR-G1 | V ₁₂ = 5V | -1.0 | 0 | 1.0 | dB |
| R,G,B Output Gain VAR. 2 | ΔAVR-G2 | V ₁₂ = 2V | -3.0 | 0 | 3.0 | dB |

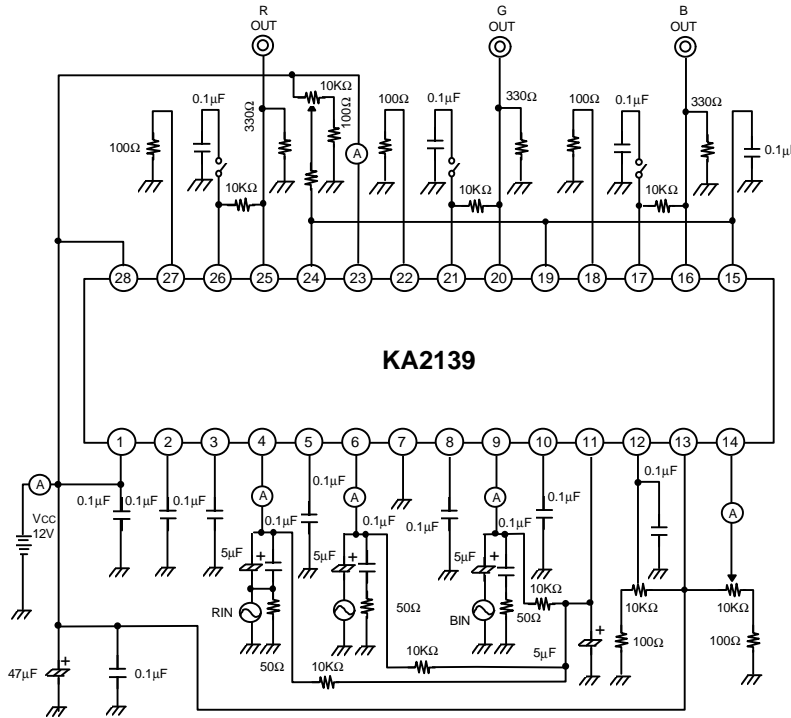
ELECTRICAL CHARACTERISTICS(V_{CC} = 12V, T_A = 25°C, unless otherwise specified)

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



KA2139

VIDEO AMPLIFIER FOR MONITOR

APPLICATION CIRCUIT

