

APRIL. 1998

DATA SHEET

KA2141



R/G/B VIDEO AMPLIFIER

The KA2141 is a very high frequency Video amplifier system to be used in Monitor. It contains 3 matched R/G/B video amplifiers with blank signal and clamp gate pulse and provides a flexible interfacing to DC controlled adjustment system

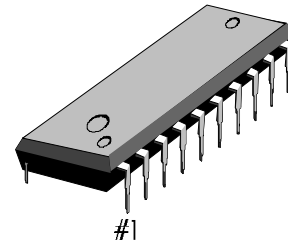
FUNCTIONS

- R/G/B Video Amplifier
- Contrast/SUB contrast control
- Brightness control
- Blank gate/Clamp gate
- Video clamp

FEATURES

- 3 - channel R/G/B Video Amplifier: 85MHz bandwidth.
- DC contrast control range: -38dB (0V ~ 4V)
- DC sub contrast control range: -11dB (0V ~ 4V)
- Maximum Video output level: 7Vpp
- DC Brightness control range: 0V ~ 4V
- Include blank gate and clamp gate signal processing block

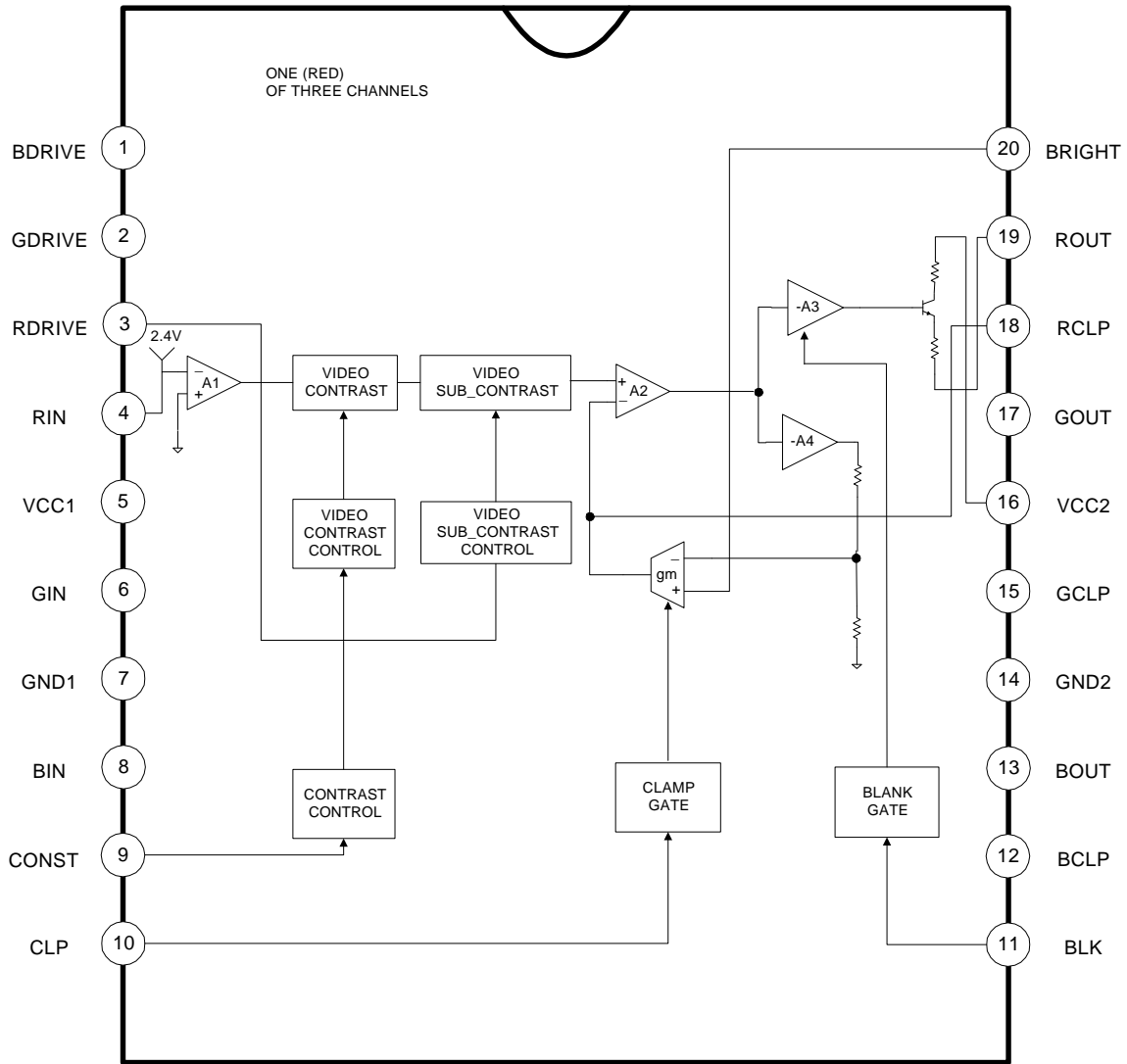
20-DIP-300A



ORDERING INFORMATION

| Device | Package | Operating Temperature |
|--------|------------|-----------------------|
| KA2141 | 20-DIP-300 | -25 °C ~ +70 °C |

BLOCK DIAGRAM



PIN CONFIGURATIONS

Table 1. Pin Configurations

| Pin No | Symbol | I/O | Configurations |
|--------|------------------|-----|--------------------------|
| 1 | BDRIVE | I | Blue Gain Control |
| 2 | GDRIVE | I | Green Gain Control |
| 3 | RDRIVE | I | Red Gain Control |
| 4 | RIN | I | Red Video Input |
| 5 | V _{CC1} | - | V _{CC1} = 12V |
| 6 | GIN | I | Green Video Input |
| 7 | GND1 | - | Ground1 |
| 8 | BIN | I | Blue Video Input |
| 9 | CONST | I | Contrast Control Input |
| 10 | CLP | I | Clamp Gate Pulse Input |
| 11 | BLK | I | Blank Gate Pulse Input |
| 12 | BCLP | - | Blue Clamp Capacitor |
| 13 | BOUT | O | Blue Video Output |
| 14 | GND2 | - | Ground2 |
| 15 | GCLP | - | Green Clamp Capacitor |
| 16 | V _{CC2} | - | V _{CC2} = 12V |
| 17 | GOUT | O | Green Video Output |
| 18 | RCLP | - | Red Clamp Capacitor |
| 19 | ROUT | O | Red Video Output |
| 20 | BRIGHT | I | Brightness Control Input |

PIN DESCRIPTION

Table 2. Pin Description

| Pin No | Pin Name | Schematic | Description |
|------------------|---|-----------|--|
| 4 6 8 | Red Video Input (RIN) Green Video input (GIN) Blue Video Input (BIN) | | Max input video signal is 0.7Vpp |
| 9 1 2 3 | Video Contrast (CONST) Blue Drive (BDRIVE) Green Drive (GDRIVE) Red Drive (RDRIVE) | | Video maximum contrast control range (0V ~ 4V) is -38dB Sub contrast control range (0V ~ 4V) is -11dB |
| 5 17 | V _{CC1} V _{CC2} | - | Supply voltage |
| 7 14 | GND1 GND2 | - | Ground |
| 10 | Clamp Gate Input (CLP) | | Video amp actives when clamp gate signal is in low TTL level |

Table 2. Pin Description(Continued)

| Pin No | Pin Name | Schematic | Description |
|----------------|--|-----------|--|
| 11 | Blank Gate Input (BLK) | | Video amp activates when blank gate signal is in low TTL level |
| 18 16 13 | Red Video output (ROUT) Green Video output (GOUT) Blue Video output (BOUT) | | Video signal output |
| 12 15 19 | Blue Clamp Cap (BCLP) Green Clamp Cap (GCLP) Red Clamp Cap (RCLP) | | Brightness controlling actives by charging and discharging of the external cap (0.1uF) |
| 20 | Bright Control (BRIGHT) | | During the clamp gate period, video signal's DC level (clamp level) is fixed according to the brightness control voltage |

ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)**Table 3. Absolute Maximum Ratings**

| No | Item | Symbol | Value | | | Unit |
|----|--|--------|-------|-----|------|------|
| | | | Min | Typ | Max | |
| 1 | Maximum Supply Voltage | Vccmax | - | - | 13.5 | V |
| 2 | Operating Temperature | Topr | -25 | - | 70 | °C |
| 3 | Storage Temperature | Tstg | -65 | - | 150 | °C |
| 4 | Maximum Power Dissipation | Pdmax | - | - | 1.7 | W |
| 5 | Thermal Resistance (Junction-ambient) | θja | - | 71 | - | °C/W |
| 6 | Junction Temperature | Tj | - | 150 | - | °C |

ELECTRICAL CHARACTERISTICS

DC Electrical Characteristics: Tamb = 25 °C, VCC = 12V

Table 4. DC Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--------------------------------|--------------------|--|-----|-----|-----|------|
| Supply Current | I _{CC} | V4.6.8=none, V12.15.18=none V1.2.3.9.11=4V, V10=0V, V20=1V | 60 | 80 | 100 | mA |
| Max. Supply Current | I _{CCmax} | Same conditions of Ica except Vic=12.6V | 75 | 95 | 115 | mA |
| R Input Bias Voltage | V _{Rb} | Same conditions of Ica Vcc=12V | 2.0 | 2.4 | 2.8 | V |
| G Input Bias Voltage | V _{Gb} | Same conditions of Icc Vcc=12V | 2.0 | 2.4 | 2.8 | V |
| B Input Bias Voltage | V _{Bb} | Same conditions of Icc Vcc=12V | 2.0 | 2.4 | 2.8 | V |
| R Clamp Gate Low Input Voltage | V _{10LR} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V V10=variable | 0.8 | 1.5 | 3.0 | V |
| G Clamp Gate Low Input Voltage | V _{10LG} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V V10=variable | 0.8 | 1.5 | 3.0 | V |
| B Clamp Gate Low Input Voltage | V _{10LB} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V V10=variable | 0.8 | 1.5 | 3.0 | V |

Table 4. DC Electrical Characteristics(Continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------------|---------------|--|-------|-------|-------|---------|
| R Clamp Gate High Input Voltage | V_{10HR} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V V10=variable | 0.8 | 1.5 | 3.0 | V |
| G Clamp Gate High Input Voltage | V_{10HG} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V V10=variable | 0.8 | 1.5 | 3.0 | V |
| B Clamp Gate High Input Voltage | V_{10HB} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V V10=variable | 0.8 | 1.5 | 3.0 | V |
| Clamp Gate Low Input Current | I_{10L} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V, V10=0V | -0.5 | -0.2 | - | μ A |
| Clamp Gate Low Input Current | I_{10H} | V4.6.8.12.15.18=none V1.2.3.9.11=4V, V20=1V, V10=12V | - | 0.01 | 1.0 | μ A |
| R Clamp-Cap Charge Current | $I_{clampR+}$ | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=4V | 0.45 | 0.75 | 1.05 | mA |
| G Clamp-Cap Charge Current | $I_{clampG+}$ | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=4V | 0.45 | 0.75 | 1.05 | mA |
| B Clamp-Cap Charge Current | $I_{clampB+}$ | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=4V | 0.45 | 0.75 | 1.05 | mA |
| R Clamp-Cap Discharge Current | $I_{clampR-}$ | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=0V | -1.05 | -0.75 | -0.45 | mA |
| G Clamp-Cap Discharge Current | $I_{clampG-}$ | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=0V | -1.05 | -0.75 | -0.45 | mA |
| B Clamp-Cap Discharge Current | $I_{clampB-}$ | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=0V | -1.05 | -0.75 | -0.45 | mA |
| R Blank Gate Low Input Voltage | V_{11LR} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11=variable | 0.8 | 1.5 | 3.0 | V |

Table 4. DC Electrical Characteristics(Continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------------|-------------------|--|------|-------|-----|------|
| G Blank Gate Low Input Voltage | V _{11LG} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (2V → 0V) | 0.8 | 1.5 | 3.0 | V |
| B Blank Gate Low Input Voltage | V _{11LB} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (2V → 0V) | 0.8 | 1.5 | 3.0 | V |
| R Blank Gate High Input Voltage | V _{11HR} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (0V → 2V) | 0.8 | 1.5 | 2.0 | V |
| G Blank Gate High Input Voltage | V _{11HG} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (0V → 2V) | 0.8 | 1.5 | 2.0 | V |
| B Blank Gate High Input Voltage | V _{11HB} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (0V → 2V) | 0.8 | 1.5 | 2.0 | V |
| Blank Gate Low Input Current | I _{11L} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11=0V | -5.0 | -2.0 | - | uA |
| Blank Gate High Input Current | I _{11RL} | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=0V | - | -0.01 | 1.0 | uA |
| R Output Low Voltage | V _{ORL} | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=0V | - | 0.1 | 0.2 | V |
| G Output Low Voltage | V _{OCTL} | V4.6.8=none, V12.15.18= variable V1.2.3.9.11=4V, V10=0V, V20=0V | - | 0.1 | 0.2 | V |
| B Output Low Voltage | V _{OBL} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11=variable | - | 0.1 | 0.2 | V |
| R Output High Voltage | V _{ORH} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (2V → 0V) | 6.2 | 7.0 | 8.3 | V |
| G Output High Voltage | V _{OGH} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (2V → 0V) | 6.2 | 7.0 | 8.3 | V |
| B Output High Voltage | V _{OBRL} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (0V → 2V) | 6.2 | 7.0 | 8.3 | V |
| R Black Level Output Voltage | V _{ORBL} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (0V → 2V) | 0.7 | 1.0 | 1.3 | V |

Table 4. DC Electrical Characteristics(Continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|----------------------------------|--------------------|---|------|------|------|------|
| G Black Level Output Voltage | B _{OGBL} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11 (0V → 2V) | 0.7 | 1.0 | 1.3 | V |
| B Black Level Output Voltage | V _{OBBL} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11=0V | 0.7 | 1.0 | 1.3 | V |
| R-G Black Level Output Voltage | ΔR-GBL | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V20=1V, V11=12V | -0.3 | - | 0.3 | V |
| G-B Black Level Output Voltage | ΔR-BBL | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V11=12V, V20=0V | -0.3 | - | 0.3 | V |
| B-R Black Level Output Voltage | ΔR-RBL | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V11=12V, V20=0V | -0.3 | - | 0.3 | V |
| R Blank Output Voltage | V _{ORB} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V11=12V, V20=0V | - | 0.05 | 0.5 | V |
| G Blank Output Voltage | B _{OGB} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V11=12V, V20=10V | - | 0.05 | 0.5 | V |
| B Blank Output Voltage | V _{OBB} | V4.5.8.12.15.18=none, V10=0V V1.2.3.9=4V, V11=12V, V20=10V | - | 0.05 | 0.5 | V |
| R Sub Drive Ctrl Input Current | IRd | V4.5.8.12.15.18=none, V10=0V V1.2.3=0/4V, V9=4V, V11=4V, V20=1V | - | 0.25 | 2.0 | μA |
| G Sub Drive Ctrl Input Current | IGd | V4.5.8.12.15.18=none, V10=0V V1.2.3=0/4V, V9=4V, V11=4V, V20=1V | - | 0.25 | 2.0 | μA |
| B Sub Drive Ctrl Input Current | IBd | V4.5.8.12.15.18=none, V10=0V V1.2.3=0/4V, V9=4V, V11=4V, V20=1V | - | 0.25 | 2.0 | μA |
| Contrast Control Input Current | I _{CON} | V4.5.8.12.15.18=none, V10=0V V1.2.3=4V, V9.20=0V, V11=4V | - | 0.25 | 2.0 | μA |
| Brightness Control Input Current | I _{brt} | V4.5.8.12.15.18=none, V10=0V V1.2.3=4V, V9.20=4V, V11=4V | - | 1.0 | 2.0 | μA |
| R Spot Killer Voltage | V _{spotR} | V4.5.8.12.15.18=none, V10=0V V1.2.3=4V, V9.20=4V, V11=4V | 8.0 | 10.0 | 11.2 | V |
| G Spot Killer Voltage | V _{spotG} | V4.5.8.12.15.18=none, V10=0V V1.2.3=4V, V9.20=4V, V11=4V | 8.0 | 10.0 | 11.2 | V |
| B Spot Killer Voltage | V _{spotB} | V4.5.8.12.15.18=none, V10=0V V1.2.3=4V, V9.20=4V, V11=4V | 8.0 | 10.0 | 11.2 | V |

AC Electrical Characteristics: $T_{amb} = 25\text{ }^{\circ}\text{C}$, $V_{CC} = 12\text{V}$

Table 5. AC Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|----------------------------------|--------|---|-------|-------|------|------|
| R Video Amp Gain | AvmaxR | V1.2.3.9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1/3V | 15.5 | 17.5 | 19.5 | dB |
| G Video Amp Gain | AvmaxG | V1.2.3.9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1/3V | 15.5 | 17.5 | 19.5 | dB |
| B Video Amp Gain | AvmaxB | V1.2.3.9.11 = 4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1/3V | 15.5 | 17.5 | 19.5 | dB |
| R-G Amp Gain Difference | AvR-G | V1.2.3.9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -1.0 | - | 1.0 | dB |
| G-B Amp Gain Difference | AvG-B | V1.2.3.9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -1.0 | - | 1.0 | dB |
| B-R Amp Gain Difference | AvB-R | V1.2.3.9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -1.0 | - | 1.0 | dB |
| R Sub Dr. Ctrl Gain Difference1 | AvDR1 | V1.2.3=2V, V9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -6.0 | -4.0 | -2.0 | dB |
| G Sub Dr. Ctrl Gain Difference1 | AvDG1 | V1.2.3=2V, V9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -6.0 | -4.0 | -2.0 | dB |
| B Sub Dr. Ctrl Gain Difference1 | AvDB1 | V1.2.3=2V, V9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -6.0 | -4.0 | -2.0 | dB |
| R Sub Dr. Ctrl Gain Difference2 | AvDR2 | V1.2.3=0.25V, V9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -13.0 | -10.0 | -7.0 | dB |
| G Sub Dr. Ctrl Gain Difference2 | AvDG2 | V1.2.3=0.25V, V9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -13.0 | -10.0 | -7.0 | dB |
| B Sub Dr. Ctrl Gain Difference | AvDB2 | V1.2.3=0.25V, V9.11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -13.0 | -10.0 | -7.0 | dB |
| R Contrast Ctrl Gain Difference1 | AvCR1 | V1.2.3=4V, V9=2V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -8.0 | -6.0 | -4.0 | dB |
| G Contrast Ctrl Gain Difference | AvCG1 | V1.2.3=4V, V9=2V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -8.0 | -6.0 | -4.0 | dB |
| B Contrast Ctrl Gain Difference | AvCB1 | V1.2.3=4V, V9=2V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -8.0 | -6.0 | -4.0 | dB |

Table 5. AC Electrical Characteristics(Continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--|----------------|--|------|-------|-------|------|
| R-G Amp Gain Difference | $\Delta AvR-G$ | V1.2.3=4V, V9=4/2V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -1.0 | - | 1.0 | dB |
| G-B Amp Gain Difference | $\Delta AvR-B$ | V1.2.3=4V, V9=4/2V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -1.0 | - | 1.0 | dB |
| B-R Amp Gain Difference | $\Delta AvR-R$ | V1.2.3=4V, V9=4/2V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | -1.0 | - | 1.0 | dB |
| R Contrast Ctrl Gain Difference ² | $AvCR2$ | V1.2.3=4V, V9=0.25V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | - | -38.0 | -30.0 | dB |
| G Contrast Ctrl Gain Difference ² | $AvCG2$ | V1.2.3=4V, V9=0.25V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | - | -38.0 | -30.0 | dB |
| B Contrast Ctrl Gain Difference ² | $AvCB2$ | V1.2.3=4V, V9=0.25V, V11=4V, V12.15.18=none, V4.6.8=S1, V10=S8, V20=1V | - | -38.0 | -30.0 | dB |
| R Video Amp Bandwidth | $Rf-3dB$ | V4.6.8=S2, V12.15.18=variable V10=4V, V20=1/3V | 70 | 85 | - | MHz |
| G Video Amp Bandwidth | $Gf-3dB$ | V4.6.8=S2, V12.15.18=variable V10=4V, V20=1/3V | 70 | 85 | - | MHz |
| B Video Amp Bandwidth | $Bf-3dB$ | V4.6.8=S2, V12.15.18=variable V10=4V, V20=1/3V | 70 | 85 | - | MHz |
| R Video Amp THD | R_{THD} | V4.5.8=S5, V12.15.18=none V1.2.3.10.11=4V, V9=Variable | - | 1.0 | 5.0 | % |
| G Video Amp THD | G_{THD} | V4.5.8=S5, V12.15.18=none V1.2.3.10.11=4V, V9=Variable | - | 1.0 | 5.0 | % |
| B Video Amp THD | B_{THD} | V4.5.8=S5, V12.15.18=none V1.2.3.10.11=4V, V9=Variable | - | 1.0 | 5.0 | % |
| R Video Amp IS01-10K | $R_{ISO1-10K}$ | V4=S3, V6.8=none, V20=1V V12.15.18=variable V1.2.3.9.10.11=4V | - | -65 | -45 | dB |
| R Video Amp IS02-10K | $R_{ISO2-10K}$ | V4=S3, V6.8=none, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -65 | -45 | dB |
| G Video Amp IS01-10K | $G_{ISO1-10K}$ | V4.8=none, V6=S3, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -65 | -45 | dB |
| G Video Amp IS02-10K | $G_{ISO2-10K}$ | V4.8=none, V6=S3, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -65 | -45 | dB |

Table 5. AC Electrical Characteristics(Continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|----------------------------|-----------------------|--|-----|-----|------|------|
| B Video Amp IS01-10K | B _{ISO1-10K} | V4.6=none, V8=S3, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -65 | -45 | dB |
| B Video Amp IS02-10K | B _{ISO2-10K} | V4.6=none, V8=S3, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -65 | -45 | dB |
| R Video Amp IS01-10M | R _{ISO1-10M} | V6.8=none, V4=S3, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -50 | -35 | dB |
| R Video Amp IS02-10M | R _{ISO2-10M} | V6.8=none, V4=S3, V20=1V V12.15.18=variable, V1.2.3.9.10.11=4V | - | -50 | -35 | dB |
| G Video Amp IS01-10M | G _{ISO1-10M} | V6=S3, V4.8=none | - | -50 | -35 | dB |
| G Video Amp IS02-10M | G _{ISO2-10M} | V6=S3, V4.8=none | - | -50 | -35 | dB |
| B Video Amp IS01-10M | B _{ISO1-10M} | V8=S3, V4.6=none | - | -50 | -35 | dB |
| B Video Amp IS02-10M | B _{ISO2-10M} | V8=S3, V4.6=none | - | -50 | -35 | dB |
| R Video Rising Time | trR | V4.6.8=S6, V12.15.18=none V1.2.3.11=4V, V10=S8, V20=1V V9=variable | - | 4.0 | 5.0 | ns |
| G Video Rising Time | trG | V4.6.8=S6, V12.15.18=none V1.2.3.11=4V, V10=S8, V20=1V V9=variable | - | 4.0 | 5.0 | ns |
| B Video Rising Time | trB | V4.6.8=S6, V12.15.18=none V1.2.3.11=4V, V10=S8, V20=1V V9=variable | - | 4.0 | 5.0 | ns |
| R Video Falling Time | tfR | V4.6.8=S6, V12.15.18=none V1.2.3.11=4V, V10=S8, V20=1V V9=variable | - | 4.0 | 5.0 | ns |
| G Video Falling Time | tfG | V4.6.8=S6, V12.15.18=none V1.2.3.11=4V, V10=S8, V20=1V V9=variable | - | 4.0 | 5.0 | ns |
| B Video Falling Time | tfB | V4.6.8=S6, V12.15.18=none V1.2.3.11=4V, V10=S8, V20=1V V9=variable | - | 4.0 | 5.0 | ns |
| R Blank Output Rising Time | trBlankR | V4.6.8.12.15.18=none V1.2.3.9=4V, V11=S7, V10=0V V20=variable | - | 6.0 | 15.0 | ns |

Table 5. AC Electrical Characteristics(Continued)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------------------------|----------|---|-----|-----|------|------|
| G Blank Output Rising Time | trBlankG | V4.6.8.12.15.18=none V1.2.3.9=4V, V11=S7, V10=0V V20=variable | - | 6.0 | 15.0 | ns |
| B Blank Output Rising Time | trBlankB | V4.6.8.12.15.18=none V1.2.3.9=4V, V11=S7, V10=0V V20=variable | - | 6.0 | 15.0 | ns |
| R Blank Output Falling Time | tfBlankR | V4.6.8.12.15.18=none V1.2.3.9=4V, V11=S7, V10=0V V20=variable | - | 7.0 | 20.0 | ns |
| G Blank Output Falling Time | tfBlankG | V4.6.8.12.15.18=none V1.2.3.9=4V, V11=S7, V10=0V V20=variable | - | 7.0 | 20.0 | ns |
| B Blank Output Falling Time | tfBlankB | V4.6.8.12.15.18=none V1.2.3.9=4V, V11=S7, V10=0V V20=variable | - | 7.0 | 20.0 | ns |

APPLICATION CIRCUIT

