

# AN2492FH

## Luminance and chrominance signal processing circuit for 8 mm video (NTSC)

### ■ Overview

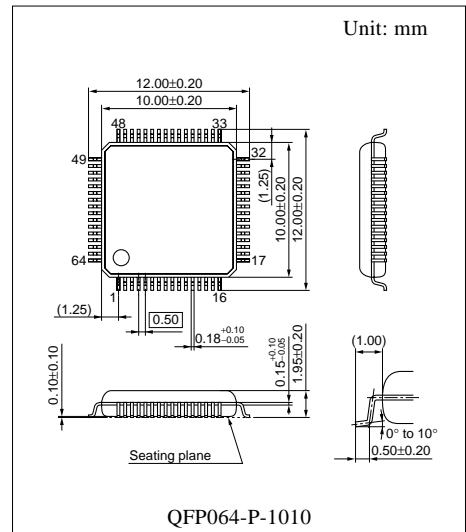
The AN2492FH is a single chip LSI on which Y/C main signal processing circuit of NTSC normal 8 mm VCR is integrated. It is possible to reduce the system cost drastically thanks to the introduction of an external filter on to the chip and fc auto adjustment.

### ■ Features

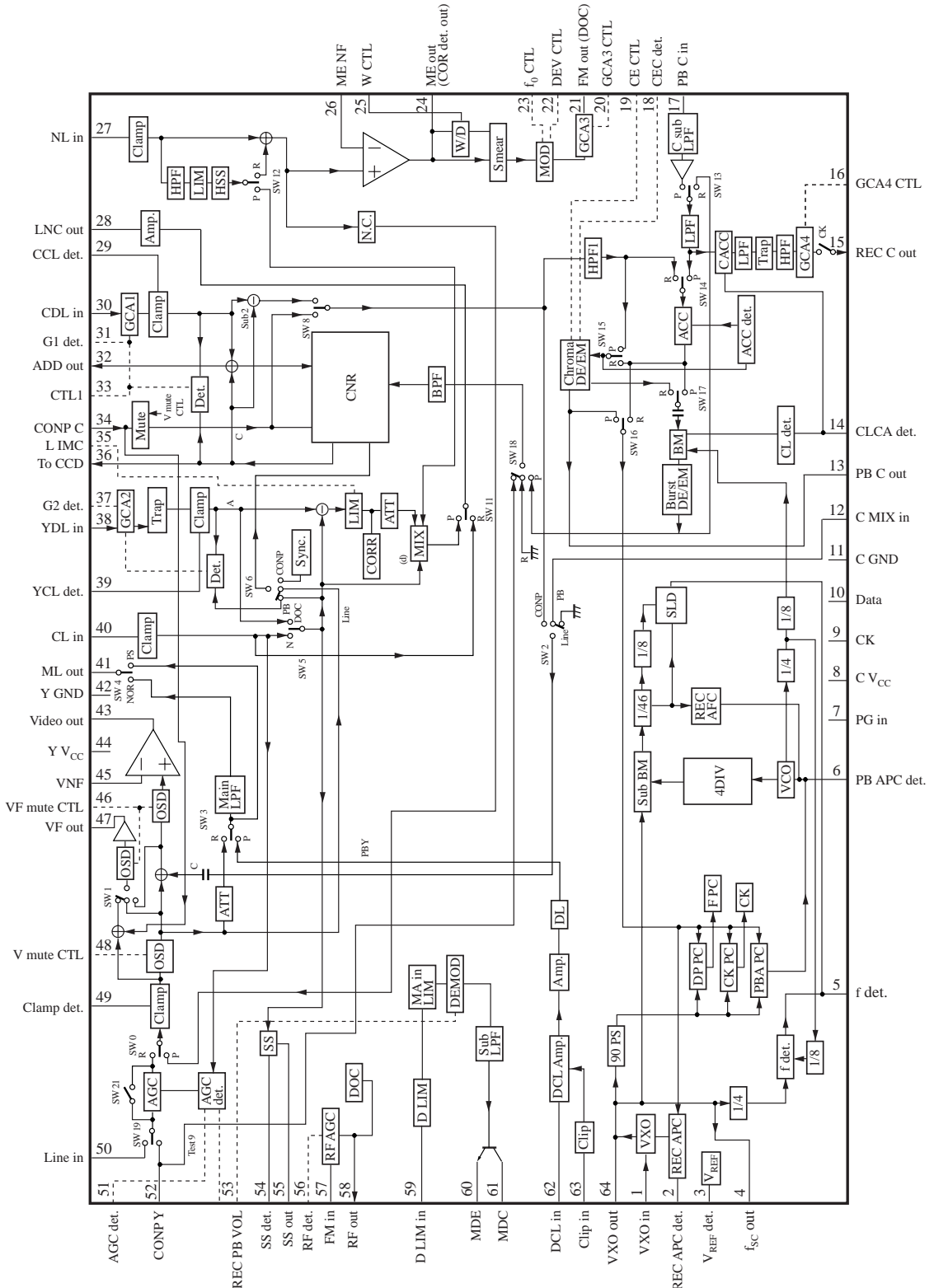
- 5 V single power supply
- Reduction of the external components and adjusting parts by adopting automatic adjustment filter
- No need of glass delay lines
- For NTSC (PAL: AN2493 pin-compatible)

### ■ Applications

- 8 mm VCR, 8 mm video camera



■ Block Diagram



### ■ Pin Descriptions

| Pin No. | Description           | Pin No. | Description       |
|---------|-----------------------|---------|-------------------|
| 1       | VXO in                | 33      | GCA1 CTL          |
| 2       | REC APC det.          | 34      | CONP C            |
| 3       | V <sub>REF</sub> det. | 35      | LIMC              |
| 4       | f <sub>SC</sub> out   | 36      | To CCD            |
| 5       | f det.                | 37      | G2 det.           |
| 6       | PB APC det.           | 38      | YDL in            |
| 7       | PG in.                | 39      | YCL det.          |
| 8       | C V <sub>CC</sub>     | 40      | CL in             |
| 9       | CK                    | 41      | ML out            |
| 10      | Data                  | 42      | Y GND             |
| 11      | C GND                 | 43      | Video out         |
| 12      | C MIX in              | 44      | Y V <sub>CC</sub> |
| 13      | PB C out              | 45      | VNF               |
| 14      | CLCA det.             | 46      | VF mute CTL       |
| 15      | REC C out             | 47      | VF out (BGP out)  |
| 16      | GCA4 CTL              | 48      | V mute CTL        |
| 17      | PB C in               | 49      | Clamp det.        |
| 18      | CEC det.              | 50      | Line in           |
| 19      | Chroma emph. CTL      | 51      | AGC det.          |
| 20      | GCA3 CTL (APT CTL)    | 52      | CONP Y            |
| 21      | FM out (DOC)          | 53      | REC PB VOL        |
| 22      | DEV CTL               | 54      | SS det.           |
| 23      | f <sub>0</sub> CTL    | 55      | SS out            |
| 24      | ME out (COR det. out) | 56      | RF det.           |
| 25      | W CTL                 | 57      | FM in             |
| 26      | MENF                  | 58      | RF out            |
| 27      | NL in                 | 59      | DLIM in           |
| 28      | LNC out               | 60      | MD E              |
| 29      | CCL det.              | 61      | MD C              |
| 30      | CDL in                | 62      | DCL in            |
| 31      | G1 det.               | 63      | Clip in           |
| 32      | ADD out               | 64      | VXO out           |

### ■ Absolute Maximum Ratings

| Parameter                            | Symbol    | Rating      | Unit |
|--------------------------------------|-----------|-------------|------|
| Supply voltage                       | $V_{CC}$  | 5.5         | V    |
| Supply current                       | $I_{CC}$  | 100         | mA   |
| Power dissipation *2                 | $P_D$     | 359         | mW   |
| Operating ambient temperature *1, *3 | $T_{opr}$ | -10 to +70  | °C   |
| Storage temperature *1               | $T_{stg}$ | -55 to +125 | °C   |

Note) \*1: Except for the power dissipation, operating ambient temperature and storage temperature, all ratings are for  $T_a = 25^\circ\text{C}$ .

\*2: The power dissipation shown is for the IC package at  $T_a = 70^\circ\text{C}$ .

$P_D = 696$  (mW) ( $T_a = 70^\circ\text{C}$ ) in mounting on the glass epoxy printed circuit board of  $50 \times 50 \times 0.8$  (mm).

\*3:  $P_D = 471$  (mW) at supply voltage  $V_{CC} = 4.8$  V.

### ■ Recommended Operating Range

| Parameter      | Symbol   | Range      | Unit |
|----------------|----------|------------|------|
| Supply voltage | $V_{CC}$ | 4.7 to 5.2 | V    |

### ■ Electrical Characteristics at $V_{CC} = 4.8$ V, $T_a = 25^\circ\text{C}$

| Parameter                                  | Symbol           | Conditions  | Min  | Typ  | Max | Unit    |
|--|------------------|---|------|------|-----|---------|
| Consumption current 1                      | $I_{CC1}$        | Consumption current for recording                             | 52   | 72   | 92  | mA      |
| Consumption current 2                      | $I_{CC2}$        | Consumption current for playback                              | 58   | 78   | 98  | mA      |
| Consumption current 3                      | $I_{CC3}$        | Power save mode   | 42   | 62   | 82  | mA      |
| Consumption current 4                      | $I_{CC4}$        | Camera power save mode  | -8   | -4.2 | -1  | mA      |
| Internal reference voltage source          | $V_{REF}$        | Pin 3 voltage   | —    | 2.5  | —   | V       |
| REC overall                                | $V_{ME}$         | Adjust pin 53 to set pin 47 output at 1 V[p-p]                | -14  | -12  | -10 | dB      |
| Y-AGC control characteristics              | $\Delta V_{AGC}$ | Pin 47 output gain ratio with input 0.5 V[p-p] and 2.0 V[p-p] | -1.5 | 0    | 1.5 | dB      |
| Y-AGC through mode                         | $V_{26S}$        | Pin 24 output at pin 50 input                                 | 200  | 250  | 300 | mV[p-p] |
| View finder amp. frequency characteristics | $f_{BA}$         | Output ratio of 5 MHz/100 kHz at input 100 kHz, 5 MHz         | -1.5 | 0    | 1.5 | dB      |
| Video-OSD white mute level                 | $V_{OW}$         | DC voltage based on a pedestal level                          | 56   | 68   | 80  | IRE     |
| Video-OSD black mute level                 | $V_{OB}$         | DC voltage based on a pedestal level                          | -7   | 0    | 12  | IRE     |
| Video-OSD white mute CTL voltage           | $V_{48W}$        | Pin 48 input at inserting a record character                  | 3.6  | —    | 4.8 | V       |
| Video-OSD black mute CTL voltage           | $V_{48B}$        | Pin 48 input at inserting a record character                  | 2.0  | —    | 2.6 | V       |
| Video-OSD through CTL voltage              | $V_{48S}$        | Pin 48 input at inserting a record character                  | 0    | —    | 1.0 | V       |

**■ Electrical Characteristics at  $V_{CC} = 4.8 \text{ V}$ ,  $T_a = 25^\circ\text{C}$  (continued)**

| Parameter                                | Symbol     | Conditions   | Min  | Typ | Max  | Unit    |
|--|------------|--|------|-----|------|---------|
| Video-OSD quasi V level                  | $V_{OV}$   | DC voltage difference based on sync. tip in PB mode  | -100 | -50 | 0    | mV      |
| Video-OSD quasi V mute CTL voltage       | $V_{48V}$  | PB mode, pin 48 input                                | 2.0  | —   | 4.8  | V       |
| Video-OSD through CTL voltage            | $V_{48G}$  | PB mode, pin 48 input                                | 0    | —   | 1.0  | V       |
| Y-main-LPF frequency characteristics 1   | $Df_{ML1}$ | Input: 100 kHz, 2.5 MHz<br>Output: 2.5 MHz/100 kHz   | -5   | -2  | 2    | dB      |
| Y-main-LPF frequency characteristics 2   | $Df_{ML2}$ | Input: 100 kHz, 3.58 MHz<br>Output: 3.58 MHz/100 kHz | —    | —   | -25  | dB      |
| Video amp. output amplitude              | $V_{VO}$   | VF out 1 V[p-p] adjustment                           | 1.75 | 2.0 | 2.25 | V[p-p]  |
| Video amp. frequency characteristics     | $f_{V1}$   | Input: 100 kHz, 5 MHz<br>Output: 5 MHz/100 kHz       | -1.5 | 0   | 1.5  | dB      |
| View finder OSD white mute level         | $V_{BOW}$  | DC voltage based on a pedestal level                 | 56   | 68  | 80   | IRE     |
| View finder OSD black mute level         | $V_{BOB}$  | DC voltage based on a pedestal level                 | -7   | 0   | 12   | IRE     |
| View finder OSD white mute CTL voltage   | $V_{46W}$  | Pin 48 = 0 V at inserting the display characters     | 3.6  | —   | 4.8  | V       |
| View finder OSD black mute CTL voltage   | $V_{46B}$  | Pin 48 = 0 V at inserting the display characters     | 2.0  | —   | 2.6  | V       |
| View finder OSD through CTL voltage      | $V_{46S}$  | Pin 48 = 0 V at inserting the display characters     | 0    | —   | 1.0  | V       |
| View finder OSD quasi V level            | $V_{BOV}$  | DC voltage based on sync. tip in PB mode             | -60  | -20 | 20   | mV      |
| View finder OSD quasi V mute CLT voltage | $V_{B48V}$ | PB mode, pin 48 input                                | 2.0  | —   | 4.8  | V       |
| View finder OSD through CTL voltage      | $V_{B48S}$ | PB mode, pin 48 input                                | 0    | —   | 1.0  | V       |
| PB OSD white mute level                  | $V_{POW}$  | DC voltage based on a pedestal level                 | 56   | 68  | 80   | IRE     |
| PB OSD black mute level                  | $V_{POB}$  | DC voltage based on a pedestal level                 | -7   | 0   | 12   | IRE     |
| PB OSD white mute CTL voltage            | $V_{46W}$  | Pin 48 = 0 V at inserting the display characters     | 3.6  | —   | 4.8  | V       |
| PB OSD black mute CTL voltage            | $V_{46B}$  | Pin 48 = 0 V at inserting the display characters     | 2.0  | —   | 2.6  | V       |
| PB OSD through CTL voltage               | $V_{46S}$  | Pin 48 = 0 V at inserting the display characters     | 0    | —   | 1.0  | V       |
| PB OSD off                               | $V_{VOO}$  | Pin 48 = 0 V at inserting the display characters     | 1.75 | 2.0 | 2.25 | V[p-p]  |
| Sync. separation min. input sensitivity  | $V_{SS}$   | Input sync. level                                    | —    | —   | 65   | mV[p-p] |
| Sync. separation pulse delay amount      | $t_{SS}$   | Measurement of sync. delay at pin 40 and pin 55      | 560  | 760 | 960  | ns      |

**■ Electrical Characteristics at  $V_{CC} = 4.8 \text{ V}$ ,  $T_a = 25^\circ\text{C}$  (continued)**

| Parameter  | Symbol           | Conditions   | Min   | Typ  | Max  | Unit    |
|--|------------------|--|-------|------|------|---------|
| Sync. separation output amplitude 1              | $V_{SSH}$        | Pin 55 output amplitude                                    | 4.0   | —    | —    | V       |
| Sync. separation output amplitude 2              | $V_{SSL}$        | Pin 55 output amplitude                                    | —     | —    | 0.4  | V       |
| Non linear emphasis 1                            | $f_{RNL1}$       | Input: 0 dB, output: 1 MHz/10 kHz                          | 1.0   | 3.0  | 5.0  | dB      |
| Non linear emphasis 2                            | $f_{RNL2}$       | Input: -10 dB, output: 1 MHz/10 kHz                        | 3.7   | 6.2  | 8.7  | dB      |
| Non linear emphasis 3                            | $f_{RNL3}$       | Input: -20 dB, output: 1 MHz/10 kHz                        | 6.3   | 9.3  | 12.3 | dB      |
| Non linear de-emphasis 1                         | $f_{PNL1}$       | Input: 0 dB, output: 1 MHz/10 kHz                          | -5.0  | -3.0 | -1.0 | dB      |
| Non linear de-emphasis 2                         | $f_{PNL2}$       | Input: -10 dB, output: 1 MHz/10 kHz                        | -10   | -7.5 | -5.0 | dB      |
| Non linear de-emphasis 3                         | $f_{PNL3}$       | Input: -20 dB, output: 1 MHz/10 kHz                        | -11.5 | -8.5 | -5.5 | dB      |
| Dark clip level                                  | $V_{CD}$         | Fixed  | 90    | 100  | 110  | %       |
| White clip level                                 | $V_{CW}$         | Adjust at pin 25   | —     | 220  | —    | %       |
| FM carrier interleave                            | $V_{CI}$         | Apply voltage to pin 7                                     | —     | 1.64 | —    | mV[p-p] |
| FM modulator oscillation frequency               | $f_0$            | Adjust at pin 23   | —     | 4.2  | —    | MHz     |
| FM modulator deviation CTL                       | $f_{DEV}$        | Apply voltage to pin 27, adjust at pin 22                  | —     | 2.4  | —    | MHz/V   |
| FM modulator secondary distortion                | $2f_{FM}$        | Pin 21 output  | —     | —    | -30  | dB      |
| Y-FM-GCA output amplitude 1                      | $V_{FMS}$        | Pin 20 = 0 V   | —     | —    | 100  | mV[p-p] |
| Y-FM-GCA output amplitude 2                      | $V_{FML}$        | Pin 20 = 4.8 V   | 370   | —    | —    | mV[p-p] |
| PB-Y-RFAGC output amplitude                      | $V_{58}$         | Input 50 mV[p-p], 200 mV[p-p], $f = 5 \text{ MHz}$         | 345   | 420  | 495  | mV[p-p] |
| PB-Y-RFAGC output secondary distortion           | $2f_{58}$        | Input 100 mV[p-p], $f = 5 \text{ MHz}$                     | —     | —    | -30  | dB      |
| PB-over-all 1 (NOR)                              | $V_{NOR}$        | Pin 47 output, adjust pin 53                               | —     | 1.0  | —    | V[p-p]  |
| FM demodulation linearity 1                      | $\Delta V_{NOR}$ | Input 3 MHz, 5 MHz, 7 MHz<br>Pin 63 = 4.8 V, adjust pin 53 | 90    | 97   | 110  | %       |
| Dropout detection on level                       | $V_{DOC}$        | Input pin 57, $f = 5 \text{ MHz}$                          | -17   | -12  | -7   | dB      |
| Dropout detection off hysteresis                 | $\Delta V_{DOC}$ | Input pin 57, $f = 5 \text{ MHz}$                          | 1     | 4    | 10   | dB      |
| Dropout detection ENV off                        | $V_{DOCH}$       | Input pin 57, $f = 5 \text{ MHz}$                          | 5     | 8    | 11   | H       |
| Dropout detection output high-level              | $V_{P21H}$       | Input pin 57, pin 21 output                                | 2.8   | —    | —    | V       |
| Dropout detection output low-level               | $V_{P21L}$       | Input pin 57, pin 21 output                                | —     | —    | 0.4  | V       |
| Noise canceller frequency characteristics 1      | $f_{NC11}$       | Input 0 dB, NC1 mode output<br>1 MHz/50 kHz                | -3    | -0.3 | 0.5  | dB      |
| Noise canceller frequency characteristics 2      | $f_{NC12}$       | Input -10 dB, NC1 mode output<br>1 MHz/50 kHz              | -3.5  | -0.8 | 0.5  | dB      |
| Noise canceller frequency characteristics 3      | $f_{NC13}$       | Input -20 dB, NC1 mode output<br>1 MHz/50 kHz              | -6    | -2.3 | 0    | dB      |
| Noise canceller frequency characteristics 4      | $f_{NC14}$       | Input -30 dB, NC1 mode output<br>1 MHz/50 kHz              | -10   | -6.5 | -3.0 | dB      |
| NC off mode                                      | $f_{NCOFF}$      | Input -30 dB, NC1 mode output<br>1 MHz/50 kHz, NC off      | -10   | -6.5 | -3.0 | dB      |
| Clip comp. limiter level                         | $V_{CL}$         | Input pin 63, pin 41 output                                | 45    | 70   | 95   | mV      |
| Line noise canceller frequency characteristics 1 | $f_{LNC1}$       | Input 0 dB   | -2.2  | -0.2 | 1.8  | dB      |

**■ Electrical Characteristics at  $V_{CC} = 4.8\text{ V}$ ,  $T_a = 25^\circ\text{C}$  (continued)**

| Parameter  | Symbol           | Conditions   | Min     | Typ    | Max    | Unit    |
|--|------------------|--|---------|--------|--------|---------|
| Line noise canceller frequency characteristics 2 | $f_{LNC2}$       | Input: $-30\text{ dB}$   | $-15.0$ | $-8.5$ | $-3.0$ | dB      |
| Line noise canceller (off)                       | $f_{LNC3}$       | Input: $-30\text{ dB}$   | $-1.5$  | $0$    | $1.5$  | dB      |
| C-BPF frequency characteristics 1                | $f_{BP1}$        | Input: $100\text{ mV[p-p]}$ ,<br>output: $3.28\text{ MHz}/3.58\text{ MHz}$               | $-2.5$  | $-0.5$ | $-1.5$ | dB      |
| C-BPF frequency characteristics 2                | $f_{BP2}$        | Input: $100\text{ mV[p-p]}$ ,<br>output: $3.88\text{ MHz}/3.58\text{ MHz}$               | $-2.5$  | $-0.5$ | $-1.5$ | dB      |
| C-BPF frequency characteristics 3                | $f_{BP3}$        | Input: $100\text{ mV[p-p]}$ ,<br>output: $2.09\text{ MHz}/3.58\text{ MHz}$               | —       | —      | $-20$  | dB      |
| C-BPF frequency characteristics 4                | $f_{BP4}$        | Input: $100\text{ mV[p-p]}$ ,<br>output: $5.07\text{ MHz}/3.58\text{ MHz}$               | —       | —      | $-20$  | dB      |
| REC APC pull-in range 1                          | $+\Delta f_{SC}$ | Input: $f_{SC} + 300\text{ Hz}$<br>Pin 4 output (specified Xtal)                         | $275$   | —      | —      | Hz      |
| REC APC pull-in range 2                          | $-\Delta f_{SC}$ | Input: $f_{SC} - 300\text{ Hz}$<br>Pin 4 output (specified Xtal)                         | —       | —      | $-275$ | Hz      |
| Xtal output amplitude                            | $V_{FSC}$        | Pin 4 output, at lock (specified Xtal)   | $320$   | $520$  | $720$  | mV[p-p] |
| Xtal oscillation frequency                       | $f_{SC}$         | Pin 4 frequency deviation at PB  | $-50$   | —      | $50$   | Hz      |
| ACC output amplitude                             | $V_{AC}$         | Pin 34 input, pin 15 output (test 3)   | $350$   | $450$  | $600$  | mV[p-p] |
| ACC control characteristics                      | $\Delta V_{AC}$  | Level ratio of $-14\text{ dB}$ to $6\text{ dB}$ input                                    | $-2.0$  | $0$    | $2.0$  | dB      |
| ACC maximum gain                                 | $V_{ACM}$        | Input/output level ratio   | $14$    | $20$   | —      | dB      |
| C ACC output characteristics                     | $V_{CAC}$        | Output burst ratio at input chroma signal $0\text{ dB}$ and $-14\text{ dB}$              | $1.0$   | $3$    | $5.0$  | dB      |
| Burst emphasis amount                            | $V_{BU}$         | Pin 34 input, pin 15 output  | $4.0$   | $6.0$  | $8.0$  | dB      |
| Burst de-emphasis amount                         | $V_{BD}$         | Pin 17 input, pin 13 output  | $-8.5$  | $-6.0$ | $-3.5$ | dB      |
| Chroma de-emphasis characteristics 1             | $V_{CE1}$        | Input: $0\text{ dB}$ , output: $f_{sc} + 500/f_{sc}$                                     | $-3.3$  | —      | $1.3$  | dB      |
| Chroma de-emphasis characteristics 2             | $V_{CE2}$        | Input: $0\text{ dB}$ , output: $f_{sc} - 500/f_{sc}$                                     | $-3.3$  | —      | $1.3$  | dB      |
| Chroma de-emphasis characteristics 3             | $V_{CE3}$        | Input: $-10\text{ dB}$ , output: $f_{sc} - 500/f_{sc}$                                   | $-5.8$  | —      | $-1.0$ | dB      |
| Chroma de-emphasis characteristics 4             | $V_{CE4}$        | Input: $-10\text{ dB}$ , output: $f_{sc} + 500/f_{sc}$                                   | $-5.8$  | —      | $-1.0$ | dB      |
| REC chroma out level 1                           | $V_{RCO1}$       | Pin 16 = $0\text{ V}$ , pin15 output   | —       | —      | $100$  | mV[p-p] |
| REC chroma out level 2                           | $V_{RCO2}$       | Pin 16 = $4.8\text{ V}$ , pin 15 output  | $230$   | —      | —      | mV[p-p] |
| Color killer on level                            | $CK_{ON}$        | Pin 34 input signal, $100\text{ mV[p-p]} \rightarrow 2\text{ mV[p-p]}$ , pin15 output DC | —       | —      | $0.4$  | V       |
| Color killer off level                           | $CK_{OFF}$       | Pin 34 input signal, $0\text{ mV[p-p]} \rightarrow 40\text{ mV[p-p]}$ , pin15 output DC  | $1.5$   | $1.9$  | $2.3$  | V       |
| PB APC pull-in range 1                           | $\Delta f_{XO1}$ | Pin 40, pin 17 input, pin 13 output  | $-100$  | —      | $100$  | Hz      |
| PB APC pull-in range 2                           | $\Delta f_{XO2}$ | Pin 40, pin 17 input, pin 13 output  | $-100$  | —      | $100$  | Hz      |
| CNR characteristics 1                            | CNR3             | Pin 40 white 50%, pin 52: B+C signal input   | $-13$   | $-9$   | $-5.5$ | dB      |
| CNR characteristics 2                            | CNR4             | Pin 40 white 50%, pin 52: B+C signal input   | $-13$   | $-9$   | $-5.5$ | dB      |
| PB burst level                                   | $V_{PBC}$        | Pin 13 output burst level  | $110$   | $200$  | $280$  | mV[p-p] |
| Clip comp. gain                                  | $V_{CG}$         | Input pin 63, pin 41 output  | $-8.5$  | $-6$   | $-3.5$ | dB      |

### ■ Terminal Equivalent Circuits

| Pin No. | Symbol         | Equivalent circuit | Description                                | Voltage (V)     |
|---------|----------------|--------------------|--|-----------------|
| 1       | VXO in         |                    | 500 mV[p-p]<br>$f = 3.5795 \text{ MHz}$    | DC 2.76         |
| 2       | REC APC det.   |                    | Det. pin                                   | DC $2 \pm 0.75$ |
| 3       | $V_{REF}$ det. |                    | Bias pin                                   | DC 2.48         |
| 4       | $f_{SC}$ out   |                    | AC 540 mV[p-p]<br>$f = 3.5795 \text{ MHz}$ | DC 2.7          |



■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol            | Equivalent circuit | Description   | Voltage (V)                         |
|---------|-------------------|--------------------|---|-------------------------------------|
| 5       | f det.            |                    | Det. pin  | —                                   |
| 6       | PB APC det.       |                    | Det. pin  | DC<br>1.974 ± 0.75                  |
| 7       | PG in             |                    | * FM out comes to high frequency with high carrier interleave | 0 ↔ 4.8<br>(reference:<br>DC 2.5 V) |
| 8       | C V <sub>CC</sub> | —                  | —   | —                                   |
| 9       | CK                |                    |   | 0 ↔ 4.8<br>(reference:<br>DC 2.5 V) |

### ■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol    | Equivalent circuit | Description   | Voltage (V)                         |
|---------|-----------|--------------------|---|-------------------------------------|
| 10      | Data      |                    |   | 0 ↔ 4.8<br>(reference:<br>DC 2.5 V) |
| 11      | C GND     | —                  | —   | —                                   |
| 12      | C MIX in  |                    | <p>B: 200 mV[p-p] (NTSC)<br/>f = 3.5795 MHz<br/>(Input at a low impedance.)</p> | DC 2.475                            |
| 13      | PB C out  |                    | <p>B: 200 mV[p-p]<br/>f = 3.5795 MHz</p>  | DC 2.145                            |
| 14      | CLCA det. |                    | Det. pin  | DC<br>3.62 ± 0.75                   |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol    | Equivalent circuit | Description  | Voltage (V)      |
|---------|-----------|--------------------|--|------------------|
| 15      | REC C out |                    | <p><math>f = 743 \text{ kHz}</math></p>  | REC mode<br>DC 2 |
| 16      | CTL 4     |                    | REC out level adjustment   | 0 to 4.8         |
| 17      | PB C in   |                    | <p>B: 100 mV[p-p]<br/><math>f = 743 \text{ kHz}</math></p> <p>Being inputted into PB-C-in with Y+C signal, Y signal is 400 mV[p-p]</p> | DC 2.75          |
| 18      | CE C      |                    | Det. pin   | DC 2.9           |

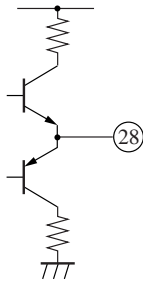
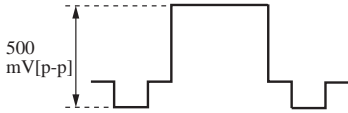
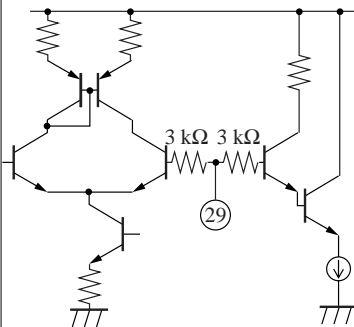
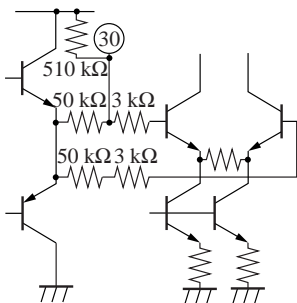
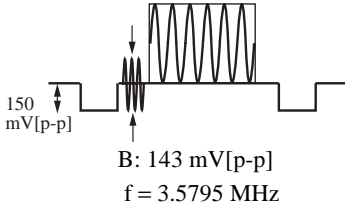
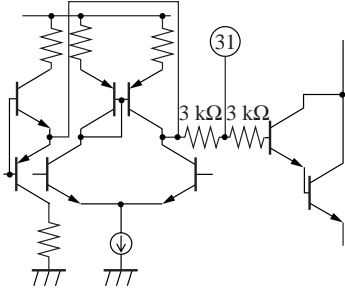
■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol             | Equivalent circuit | Description  | Voltage (V)              |
|---------|--------------------|--------------------|--|--------------------------|
| 19      | CE CTL             |                    | <p>Chroma emphasis, de-emphasis adjustment pin</p> <p>Adjustment off at 1 V or less</p>          | 0 to 4.8                 |
| 20      | CTL 3              |                    | REC mode (GCA3 control)  | 0 to 4.8<br>(1.5 to 3.0) |
| 21      | FM out             |                    | <p>100 mV to 400 mV</p> <p>PB mode:<br/>2.5 V or more at DOC on<br/>0.4 V or less at DOC off</p> | REC mode<br>DC 3.35      |
| 22      | DEV CTL            |                    | Adjust to 5.4 MHz with DC at 100% white.   | 1.3 to 3.7<br>typ. 2.5   |
| 23      | f <sub>0</sub> CTL |                    | Adjust FM out to 4.2 MHz at sync. tip.   | 1.3 to 3.7<br>typ. 2.5   |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol | Equivalent circuit | Description                        | Voltage (V)  |
|---------|--------|--------------------|------------------------------------|--|
| 24      | ME out |                    |                                    | DC 2.195   |
| 25      | W CTL  |                    | Adjust a white clip level to 220%. | 1.5 to 3.7<br>typ. 2.0   |
| 26      | MENF   |                    |                                    | DC 2.19<br>(sync. tip)<br>(With externally attached feedback resistor R) |
| 27      | NL in  |                    |                                    | DC 2.93<br>(sync. tip)   |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol   | Equivalent circuit  | Description   | Voltage (V)            |
|---------|----------|---|---|------------------------|
| 28      | LNC out  |    |  <p>500 mV[p-p]</p>   | DC 3.14<br>(sync. tip) |
| 29      | CCL det. |    | Det. pin  | DC<br>2.66 ± 0.75      |
| 30      | CDL in   |   |  <p>150 mV[p-p]<br/>B: 143 mV[p-p]<br/>f = 3.5795 MHz</p> | DC 2.755               |
| 31      | G1 det.  |  | Det. pin  | DC<br>3.515 ± 0.75     |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol  | Equivalent circuit                       | Description   | Voltage (V) |
|---------|---------|--|---|-------------|
| 32      | ADD out |  | Adjust pin 33 voltage (CTL1) so as not to mix a chroma signal.                              | DC 2.0      |
| 33      | CTL 1   |  | Adjust so that a comb shape chroma level adjustment pin 32 (ADD out) becomes Y signal only. | DC 2.994    |
| 34      | CONP C  | <p>B: 286 mV[p-p]<br/>f = 3.5795 MHz</p> |   | DC 1.96     |
| 35      | LIMC    |  | Det. pin  | DC 2.7      |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol   | Equivalent circuit | Description | Voltage (V)             |
|---------|----------|--------------------|-------------|-------------------------|
| 36      | To CCD   |                    |             | DC 2.031<br>(sync. tip) |
| 37      | G2 det.  |                    | Det. pin    | DC<br>3.515 ± 0.75      |
| 38      | YDL in   |                    |             | DC 2.622                |
| 39      | YCL det. |                    | Det. pin    | DC<br>2.66 ± 0.75       |



■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol            | Equivalent circuit | Description  | Voltage (V)             |
|---------|-------------------|--------------------|--|-------------------------|
| 40      | CL in             |                    | <p>143 mV[p-p]</p> <p>500 mV[p-p] with 100% white input</p>  | DC 3.4<br>(sync. tip)   |
| 41      | ML out            |                    | <p>143 mV[p-p]</p> <p>500 mV[p-p] with 100% white input</p>  | DC 1.897                |
| 42      | Y GND             | —                  | —  | —                       |
| 43      | Video out         |                    | <p>2 V[p-p] with 100% white input</p> <p>0.6V[p-p]</p> <p>B: 0.57 V[p-p]<br/>f = 3.5795 MHz</p>                | DC 1.236<br>(sync. tip) |
| 44      | Y V <sub>CC</sub> | —                  | —  | —                       |
| 45      | VNF               |                    | <p>150 mV[p-p]</p> <p>B: 143 mV[p-p]<br/>f = 3.5795 MHz</p> <p>Video amp. off when pin 45 is 0.3 V or less</p> | DC 1.237<br>(sync. tip) |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol     | Equivalent circuit | Description                | Voltage (V)          |
|---------|------------|--------------------|----------------------------|----------------------|
| 46      | VF mute    |                    | VF amp.-OSD-CTL voltage    | 0 V to 4.8 V         |
| 47      | VF out     |                    |                            | DC 1.968 (sync. tip) |
| 48      | V mute     |                    | Video amp.-OSD-CTL voltage | 0 to 5               |
| 49      | Clamp det. |                    | Det. pin                   | DC 3.506             |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol     | Equivalent circuit | Description   | Voltage (V)   |
|---------|------------|--------------------|---|---|
| 50      | Line in    |                    |   | DC 3.2  |
| 51      | AGC det.   |                    | Det. pin  | DC 1.63   |
| 52      | CONP Y     |                    |   | DC 3.2  |
| 53      | REC PB VOL |                    | <p>REC mode:<br/>Adjust to 2 V [p-p] at video out.<br/>0.7 V to 4.8 V</p> <p>PB mode:<br/>Adjust to 2 V [p-p] at video out.<br/>0.7 V to 4.8 V</p> <p>Filter off mode:<br/>0 V to 0.3 V</p> | <p>Normally<br/>0 ↔ 4.8</p> <p>Filter off<br/>0 ↔ 0.3</p> |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol  | Equivalent circuit | Description | Voltage (V) |
|---------|---------|--------------------|-------------|-------------|
| 54      | SS det. |                    | Det. pin    | DC 2.781    |
| 55      | SS out  |                    |             | 4 V ↔ 0.4 V |
| 56      | RF det. |                    | Det. pin    | DC 3        |
| 57      | FM in   |                    | 200 mV[p-p] | DC 3.26     |

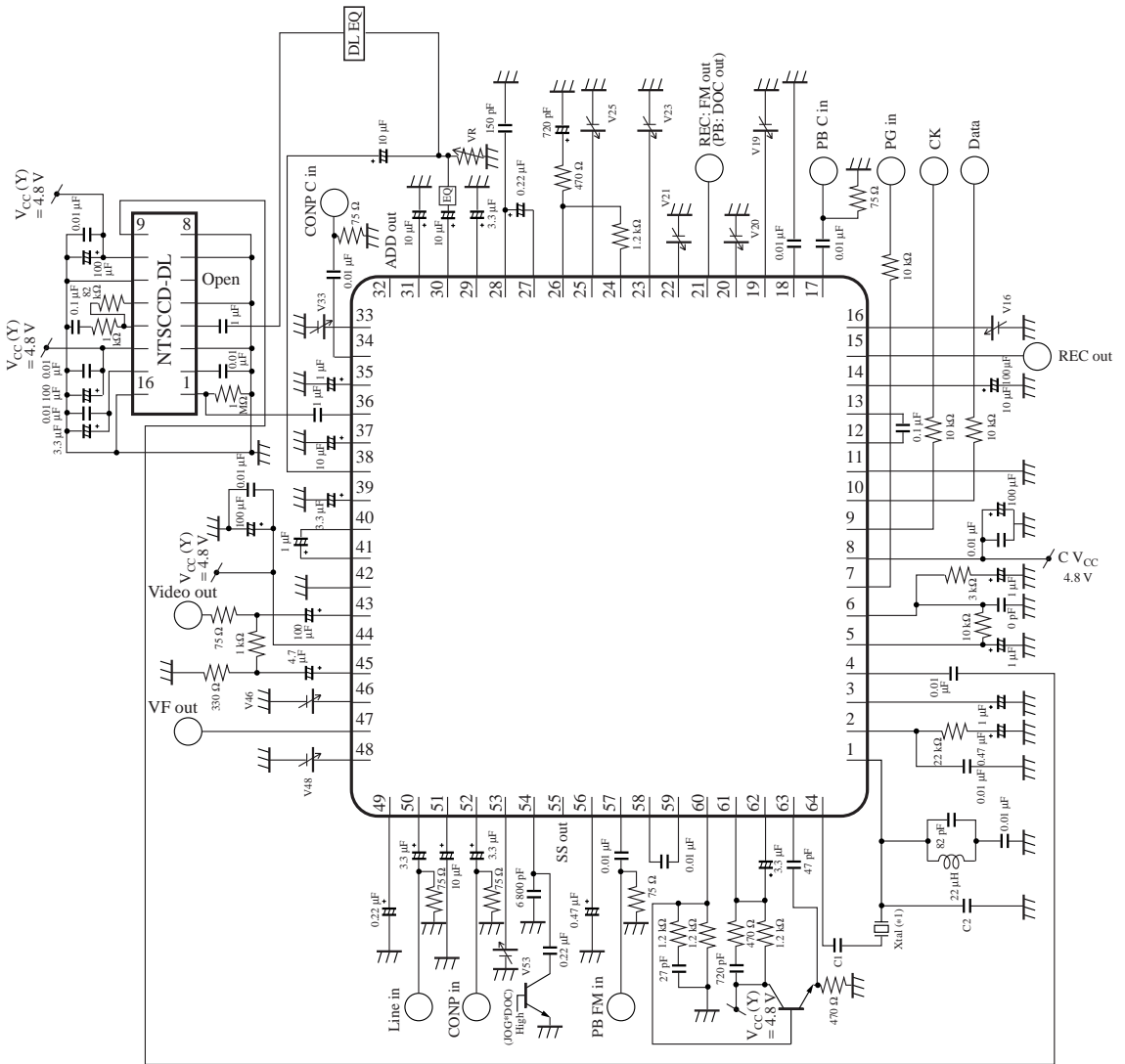
■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol  | Equivalent circuit | Description     | Voltage (V)         |
|---------|---------|--------------------|-----------------|---------------------|
| 58      | RF out  |                    | 400 mV[p-p]<br> | DC 2.40             |
| 59      | DLIM in |                    | 400 mV[p-p]<br> | DC 2.49             |
| 60      | MDE     |                    |                 | DC (emitter)<br>1.6 |
| 61      | MDC     |                    |                 | DC 3.4              |

■ Terminal Equivalent Circuits (continued)

| Pin No. | Symbol  | Equivalent circuit | Description           | Voltage (V) |
|---------|---------|--------------------|-----------------------|-------------|
| 62      | DCL in  |                    |                       | DC 3.421    |
| 63      | Clip in |                    |                       | DC 3.4      |
| 64      | VXO out |                    | <p>f = 3.5795 MHz</p> | DC 3.33     |

■ Application Circuit Example



Note) \*1: Optimize the C1 and C2 to meet Xtal characteristics.

1. Adjust variable resistor (VR), V33 voltage and variable resistor in that order so as to get a minimum level of chroma signal at ADD out (pin 32) output. (REC mode, line mode, chroma 100% input)
2. The application circuit diagram in this data is just a typical circuit example as a reference data for use, and whatever the loss caused or the infringement of the third party's industrial property right by the use of this circuit is not our responsibility.