

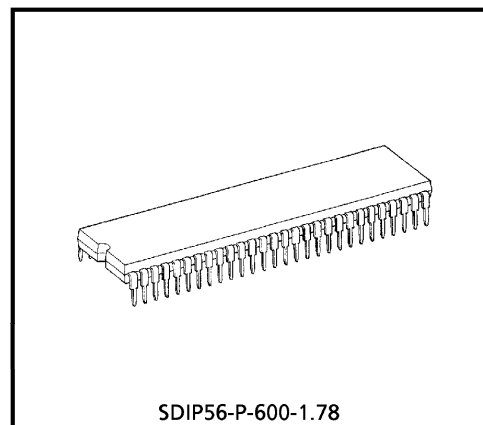
# T B 1 2 2 7 B N

## VIDEO, CHROMA AND SYNCHRONIZING SIGNALS PROCESSING IC FOR PAL / NTSC / SECAM SYSTEM COLOR TV

TB1227BN that is a signal processing IC for the PAL / NTSC / SECAM color TV system integrates video, chroma and synchronizing signal processing circuits together in a 56-pin shrink DIP plastic package.

TB1227BN incorporates a high performance picture quality compensation circuit in the video section, an automatic PAL / NTSC / SECAM discrimination circuit in the chroma section, and an automatic 50 / 60Hz discrimination circuit in the synchronizing section. Besides a crystal oscillator that internally generates 4.43MHz, 3.58MHz and M / N-PAL clock signals for color demodulation, there is a horizontal PLL circuit built in the IC.

The PAL / SECAM demodulation circuit which is an adjustment-free circuit incorporates a 1H DL circuit inside for operating the base band signal processing system. Also, TB1227BN makes it possible to set or control various functions through the built-in I<sup>2</sup>C bus line.



Weight : 5.55g (Typ.)

### FEATURES

#### Video section

- Built-in trap filter
- Black expansion circuit
- Variable DC regeneration rate
- Y delay line
- Sharpness control by aperture control
- $\gamma$  correction
- VSM output

#### Chroma section

- Built-in 1H Delay circuit
- PAL / SECAM base band demodulation system
- One crystal color demodulation circuit (4.43MHz, 3.58MHz, M / N-PAL)
- Automatic system discrimination, system forced mode
- 1H delay line also serves as comb filter in NTSC demodulation
- Built-in band-pass filter, SECAM bell filter
- Color limiter circuit
- Fsc output

#### Synchronizing deflecting section

- Built-in horizontal VCO resonator
- Adjustment-free horizontal / vertical oscillation by count-down circuit
- Double AFC circuit
- Vertical frequency automatic discrimination circuit
- Horizontal / vertical holding adjustment
- Vertical ramp output
- Vertical amplitude adjustment
- Vertical linearity / S-shaped curve adjustment
- SCP (Sand Castle Pulse) output

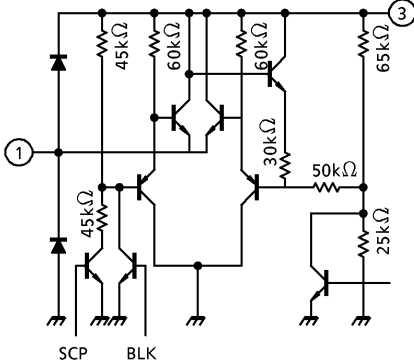
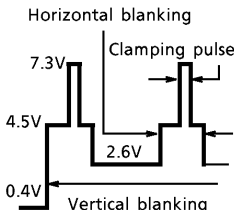
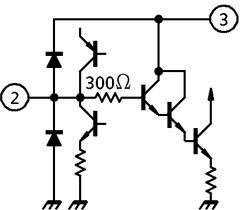
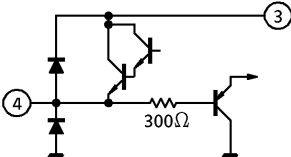
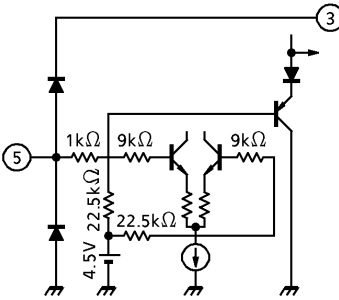
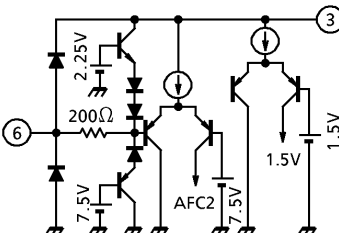
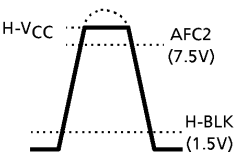
#### Text section

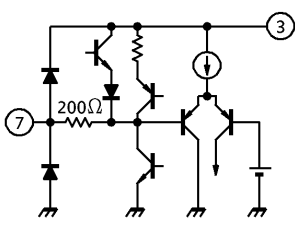
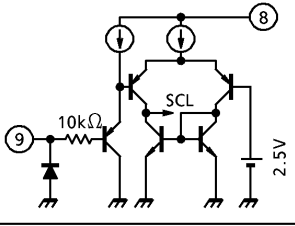
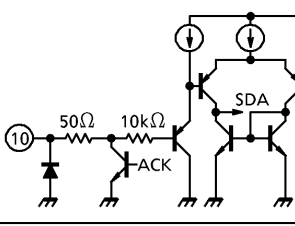
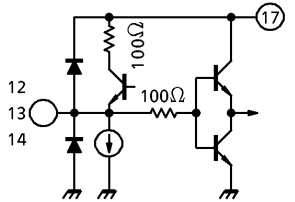
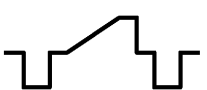
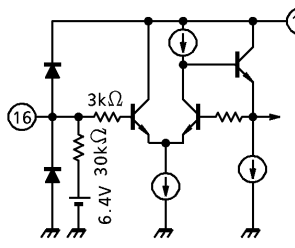
- Linear RGB input
- OSD RGB input
- Cut / off-drive adjustment
- RGB primary signal output

[illegible]

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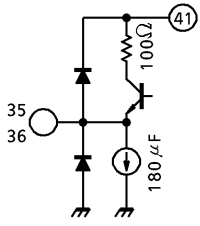
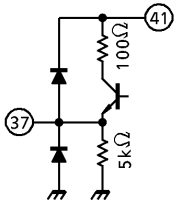
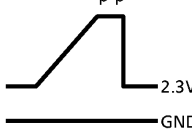
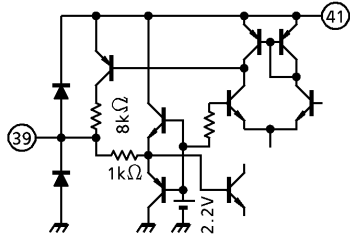
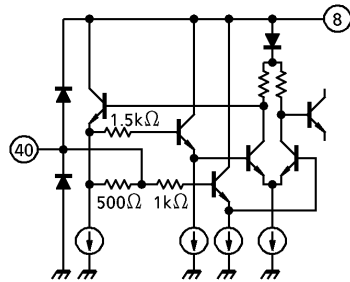
## TERMINAL FUNCTIONS

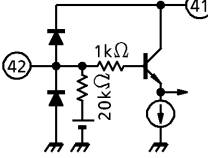
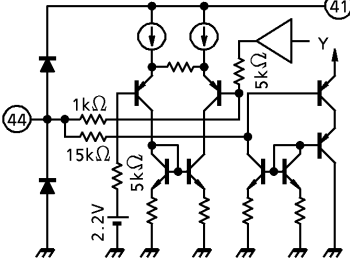
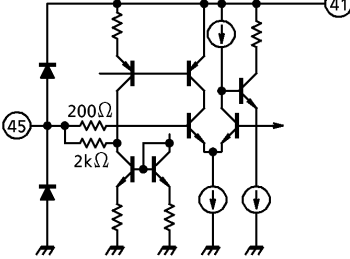
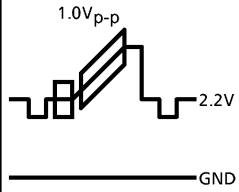
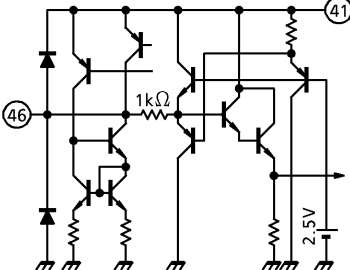
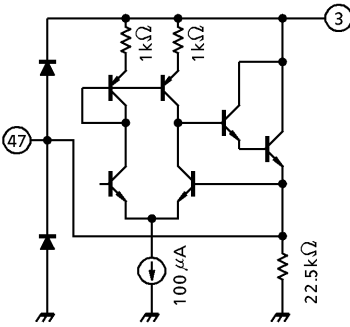
| PIN No. | PIN NAME                      | FUNCTION                                                                                                                                                                                                                                                         | INTERFACE CIRCUIT                                                                    | INPUT / OUTPUT SIGNAL                                                                 |
|---------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1       | SCP OUTPUT                    | Output terminal of Sand Castle Pulse. (SCP)<br>To connect drive resistor for SCP.                                                                                                                                                                                |    |    |
| 2       | V-AGC                         | Controls pin 52 to maintain a uniform V-ramp output.<br>Connect a current smoothing capacitor to this pin.                                                                                                                                                       |   | —                                                                                     |
| 3       | H-V <sub>CC</sub> (9V)        | V <sub>CC</sub> for the DEF block (deflecting system). Connect 9V (Typ.) to this pin.                                                                                                                                                                            | —                                                                                    | —                                                                                     |
| 4       | Horizontal Output             | Horizontal output terminal.                                                                                                                                                                                                                                      |  |  |
| 5       | Picture Distortion Correction | Corrects picture distortion in high voltage variation. Input AC component of high voltage variation.<br>For inactivating the picture distortion correction function, connect 0.01μF capacitor between this pin and GND.                                          |  | 4.5V at Open                                                                          |
| 6       | FBP Input                     | FBP input for generating horizontal AFC2 detection pulse and horizontal blanking pulse.<br>The threshold of horizontal AFC2 detection is set $H.V_{CC} - 2V_f$ ( $V_f \approx 0.75V$ ).<br>Confirming the power supply voltage, determine the high level of FBP. |  |  |

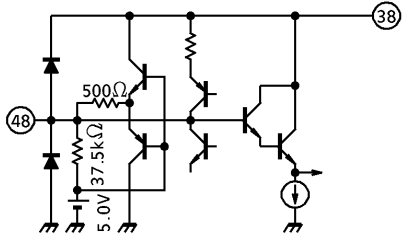
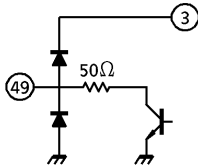
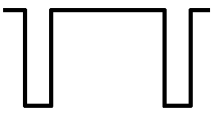
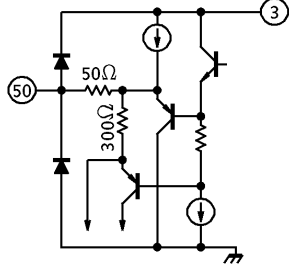
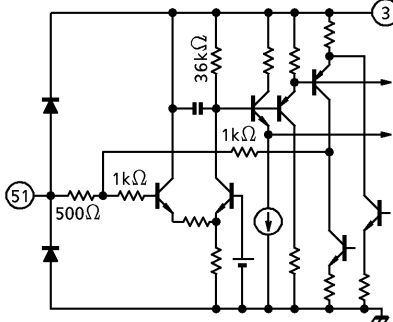
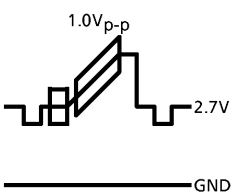
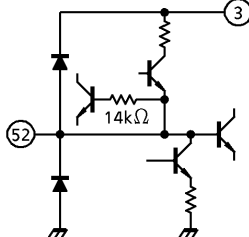
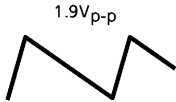
| PIN No.        | PIN NAME                         | FUNCTION                                                                                                      | INTERFACE CIRCUIT                                                                    | INPUT / OUTPUT SIGNAL                                                                 |
|----------------|----------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 7              | Coincident Det.                  | To connect filter for detecting presence of H. synchronizing signal or V. synchronizing signal.               |    | —                                                                                     |
| 8              | V <sub>DD</sub> (5V)             | V <sub>DD</sub> terminal of the LOGIC block. Connect 5V (Typ.) to this pin.                                   | —                                                                                    | —                                                                                     |
| 9              | SCL                              | SCL terminal of I <sup>2</sup> C bus.                                                                         |    | —                                                                                     |
| 10             | SDA                              | SDA terminal of I <sup>2</sup> C bus.                                                                         |   | —                                                                                     |
| 11             | Digital GND                      | Grounding terminal of LOGIC block.                                                                            | —                                                                                    | —                                                                                     |
| 12<br>13<br>14 | B Output<br>G Output<br>R Output | R, G, B output terminals.                                                                                     |  |  |
| 15             | TEXT GND                         | Grounding terminal of TEXT block.                                                                             | —                                                                                    | —                                                                                     |
| 16             | ABCL                             | External unicolor brightness control terminal. Sensitivity and start point of ABL can be set through the bus. |  | 6.4V at Open                                                                          |
| 17             | RGB-V <sub>CC</sub> (9V)         | V <sub>CC</sub> terminal of TEXT block. Connect 9V (Typ.) to this pin.                                        | —                                                                                    | —                                                                                     |

| PIN No.        | PIN NAME                                              | FUNCTION                                                                                                                           | INTERFACE CIRCUIT | INPUT / OUTPUT SIGNAL                                            |
|----------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------|
| 18<br>19<br>20 | Digital R Input<br>Digital G Input<br>Digital B Input | Input terminals of digital R, G, B signals. Input DC directly to these pins. OSD or TEXT signal can be input to these pins.        |                   | OSD<br>— 3.0V<br>TEXT<br>— 2.0V<br>— GND                         |
| 21             | Digital YS/YM                                         | Selector switch of halftone / internal RGB signal / digital RGB (pins 18, 19, 20).                                                 |                   | OSD<br>— 3.0V<br>TEXT<br>— 2.0V<br>H.T.<br>— 1.0V<br>TV<br>— GND |
| 22             | Analog YS                                             | Selector switch of internal RGB signal or analog RGB (pins 23, 24, 25).                                                            |                   | Analog RGB<br>— 0.5V<br>TV<br>— GND                              |
| 23<br>24<br>25 | Analog R Input<br>Analog G Input<br>Analog B Input    | Analog R, G, B input terminals. Input signal through the clamping capacitor. Standard input level : 0.5V <sub>p-p</sub> (100 IRE). |                   | 100IRE = 0.5V <sub>p-p</sub><br><br>4.6V<br>— GND                |
| 26             | Color Limiter                                         | To connect filter for detecting color limit.                                                                                       |                   | —                                                                |
| 27             | FSC Output                                            | Output terminal of FSC.                                                                                                            |                   | 3.58MHz<br><br>500mVp-p<br>Other                                 |

| PIN No.  | PIN NAME                 | FUNCTION                                                                                                                                        | INTERFACE CIRCUIT | INPUT / OUTPUT SIGNAL                                                                                          |
|----------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------|
| 28       | 1Bit DAC Output Terminal | Enable to change slave address to 8Ah by a connecting $V_{CC}$ with this terminal.                                                              |                   |                                                                                                                |
| 29       | VSM Output Terminal      | Power output the signal that is primary differentiated Y signal. Enable to change output amplifier and phase by the Bus.                        |                   | —                                                                                                              |
| 30       | APC Filter               | To connect APC filter for chroma demodulation.                                                                                                  |                   | DC<br>3.2V                                                                                                     |
| 31       | $Y_2$ Input              | Input terminal of processed Y signal. Input Y signal through clamping capacitor. Standard input level : $0.7V_{p-p}$                            |                   |                                                                                                                |
| 32       | Fsc GND                  | Grounding terminal of VCXO block. Insert a decoupling capacitor between this pin and pin 38 (Fsc $V_{DD}$ ) at the shortest distance from both. | —                 | —                                                                                                              |
| 33<br>34 | B-Y Input<br>R-Y Input   | Input terminal of B-Y or R-Y signal. Input signal through a clamping capacitor.                                                                 |                   | DC<br>2.5V<br><br>AC<br>B-Y : $650mV_{p-p}$<br>R-Y : $510mV_{p-p}$<br>(with input of PAL-75% color bar signal) |

| PIN No.  | PIN NAME                 | FUNCTION                                                                                                                                                                                                                                               | INTERFACE CIRCUIT                                                                    | INPUT / OUTPUT SIGNAL                                                                                                        |
|----------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 35<br>36 | R-Y Output<br>B-Y Output | Output terminal of demodulated R-Y or B-Y signal. There is an LPF for removing carrier built in this pin.                                                                                                                                              |    | DC<br>1.9V<br><br>AC<br>B-Y : 650mV <sub>p-p</sub><br>R-Y : 510mV <sub>p-p</sub><br>(with input of PAL-75% color bar signal) |
| 37       | Y Output                 | Output terminal of processed Y signal. Standard output level : 0.7V <sub>p-p</sub>                                                                                                                                                                     |    | 0.7V <sub>p-p</sub><br><br>2.3V<br>GND    |
| 38       | Fsc V <sub>DD</sub>      | V <sub>DD</sub> terminal of DDS block. Insert a decoupling capacitor between this pin and pin 32 (Fsc GND) at the shortest distance from both. If decoupling capacitor is inserted at a distance from the pins, it may cause spurious deterioration.   | —                                                                                    | —                                                                                                                            |
| 39       | Black Stretch            | To connect filter for controlling black expansion gain of the black expansion circuit. Black expansion gain is determined by voltage of this pin.                                                                                                      |  | DC<br>1.6V                                                                                                                   |
| 40       | 16.2MHz X'tal            | To connect 16.2MHz crystal clock for generating sub-carrier. Lowest resonance frequency (f <sub>0</sub> ) of the crystal oscillation can be varied by changing DC capacity. Adjust f <sub>0</sub> of the oscillation frequency with the board pattern. |  | DC<br>4.1V                                                                                                                   |

| PIN No. | PIN NAME                           | FUNCTION                                                                                                                               | INTERFACE CIRCUIT                                                                    | INPUT / OUTPUT SIGNAL                                                                 |
|---------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 41      | Y / C V <sub>CC</sub> (5V)         | V <sub>CC</sub> terminal of Y / C signal processing block.                                                                             | —                                                                                    | —                                                                                     |
| 42      | Chroma Input                       | Chroma signal input terminal. Input negative 1.0V <sub>p-p</sub> sync composite video signal to this pin through a coupling capacitor. |    | DC<br>2.4V<br>AC : 300mV <sub>p-p</sub> burst                                         |
| 43      | Y / C GND                          | Grounding terminal of Y / C signal processing block.                                                                                   | —                                                                                    | —                                                                                     |
| 44      | APL                                | To connect filter for DC regeneration compensation. Y signal after black expansion can be monitored by opening this pin.               |    | DC<br>2.2V                                                                            |
| 45      | Y <sub>1</sub> Input               | Input terminal of Y signal. Input negative 1.0V <sub>p-p</sub> sync composite video signal to this pin through a clamping capacitor.   |  |  |
| 46      | S-Demo-Adj.                        | To connect f <sub>0</sub> adjustment filter for SECAM demodulation.                                                                    |  | DC<br>3.2V                                                                            |
| 47      | DC Output Terminal For V Centering | Enable to control output DC voltage by the bus.                                                                                        |  | DC<br>2.7~6.3V                                                                        |

| PIN No. | PIN NAME    | FUNCTION                                                                                                                                                         | INTERFACE CIRCUIT                                                                    | INPUT / OUTPUT SIGNAL                                                                 |
|---------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 48      | AFC1 Filter | To connect filter for horizontal AFC1 detection. Horizontal frequency is determined by voltage of this pin.                                                      |    | DC 5.0V                                                                               |
| 49      | Sync Output | Output terminal of synchronizing signal separated by sync separator circuit. Connect a pull-up resistor to this pin because it is an open-collector output type. |    |    |
| 50      | V-Sepa.     | To connect filter for vertical synchronizing separation.                                                                                                         |   | DC 5.9V                                                                               |
| 51      | Sync Input  | Input terminal of synchronizing separator circuit. Input signal through a clamping capacitor to this pin. Negative 1.0V <sub>p-p</sub> sync.                     |  |  |
| 52      | V-Ramp      | To connect filter for generating V-ramp waveform.                                                                                                                |  |  |

| PIN No. | PIN NAME        | FUNCTION                                      | INTERFACE CIRCUIT | INPUT / OUTPUT SIGNAL |
|---------|-----------------|-----------------------------------------------|-------------------|-----------------------|
| 53      | Vertical Output | Output terminal of vertical ramp signal.      |                   |                       |
| 54      | V-NF            | Input terminal of vertical NF signal.         |                   |                       |
| 55      | DEF GND         | Grounding terminal of DEF (deflection) block. | —                 | —                     |
| 56      | V BLK Output    | Output terminal of V blanking                 |                   |                       |

## BUS CONTROL MAP

## WRITE DATA

Slave address : 88H (Pin28-High : 8AH)

| BLOCK        | SUB ADDR | MSB<br>7            | 6                   | 5                       | 4              | 3        | 2                | 1               | LSB<br>0          | PRESET            |                   |
|--------------|----------|---------------------|---------------------|-------------------------|----------------|----------|------------------|-----------------|-------------------|-------------------|-------------------|
| VIDEO / TEXT | 00       |                     |                     |                         | Uni-Color      |          |                  |                 |                   | 1 0 0 0 0 0 0 0 0 |                   |
|              | 01       |                     |                     |                         | BRIGHT         |          |                  |                 |                   | 1 0 0 0 0 0 0 0 0 |                   |
|              | 02       |                     |                     |                         | COLOR          |          |                  |                 |                   | 1 0 0 0 0 0 0 0 0 |                   |
|              | 03       | *                   |                     |                         | TINT           |          |                  |                 |                   | 0 1 0 0 0 0 0 0 0 |                   |
|              | 04       | P/N KIL             | ND SW               |                         | SHARPNESS      |          |                  |                 |                   | 0 0 1 0 0 0 0 0 0 |                   |
|              | 05       | DTrp-SW             | R-Mon               | B-Mon                   | Y SUB CONTRAST |          |                  |                 |                   | 1 0 0 1 0 0 0 0 0 |                   |
|              | 06       |                     |                     |                         | RGB-CONTRAST   |          |                  |                 |                   | 1 0 0 0 0 0 0 0 0 |                   |
| —            | 07       | *                   | *                   | *                       | *              | *        | *                | *               | *                 | 1 0 0 0 0 0 0 0 0 |                   |
| VIDEO / TEXT | 08       | Y $\gamma$          | WPL SW              | 0                       | BLUE BACK MODE |          |                  | Y-DL SW         |                   | 0 0 0 0 0 1 0 0 0 |                   |
|              | 09       |                     |                     |                         | G DRIVE GAIN   |          |                  |                 |                   | 1 0 0 0 0 0 0 0 0 |                   |
|              | 0A       |                     |                     |                         | B DRIVE GAIN   |          |                  |                 |                   | 1 0 0 0 0 0 0 0 0 |                   |
| DEF          | 0B       |                     | HORIZONTAL POSITION |                         |                |          | AFC MODE         | H-CK SW         |                   | 1 0 0 0 0 0 0 0 1 |                   |
| TEXT (P / N) | 0C       |                     |                     |                         | R CUT OFF      |          |                  |                 |                   | 0 0 0 0 0 0 0 0 0 |                   |
|              | 0D       |                     |                     |                         | G CUT OFF      |          |                  |                 |                   | 0 0 0 0 0 0 0 0 0 |                   |
|              | 0E       |                     |                     |                         | B CUT OFF      |          |                  |                 |                   | 0 0 0 0 0 0 0 0 0 |                   |
|              | 0F       | B. S. OFF           | C-TRAP              | OFST SW                 | C-TOF          | P / N GP | CLL SW           | WBLK SW         | WMUT SW           | 0 0 0 0 0 0 0 0 0 |                   |
|              | 10       | S-INHBT             | 358 Trap            | F-8 / W                 | X'tal MODE     |          |                  | COLOR SYSTEM    |                   | 0 0 0 0 0 0 0 0 0 |                   |
| SYSTEM       | 11       |                     | R-Y BLACK OFFSET    |                         |                |          | B-Y BLACK OFFSET |                 |                   | 1 0 0 0 1 0 0 0 0 |                   |
| P / N        | 12       | CLL LEVEL           |                     | PN CD ATT               |                | TOF Q    |                  | TOF FO          |                   | 1 0 0 1 1 0 1 0 0 |                   |
| Vi / C       | 13       | V-MODE              | VSM PHASE           | VSM GAIN                |                | C-TRAP Q |                  | C-TRAP FO       |                   | 1 0 1 1 1 0 1 0 0 |                   |
| VIDEO (DEF)  | 14       | BLACK STRETCH POINT |                     |                         | DC TRAN RATE   |          |                  | APA-CON FO / SW |                   | 1 0 0 0 0 0 0 1 0 |                   |
|              | 15       | ABL POINT           |                     |                         | ABL GAIN       |          |                  | HALF TONE SW    |                   | 0 0 0 0 0 0 0 0 0 |                   |
|              | 16       | H BLK PHASE         |                     |                         | V FREQ         |          | V OUT PHASE      |                 |                   | 0 0 0 0 0 0 0 0 0 |                   |
| GEOME TRY    | 17       |                     |                     | V-AMPLITUDE             |                |          |                  |                 | *                 |                   | 1 0 0 0 0 0 0 0 0 |
|              | 18       |                     |                     | V CENTERING             |                |          |                  | COINCIDENT DET  |                   | 1 0 0 0 0 0 0 1 0 |                   |
|              | 19       |                     |                     | V S-CORRECTION          |                |          |                  |                 | DRG SW            |                   | 1 0 0 0 0 0 0 0 0 |
| DEF-V        | 1A       |                     | V LINEARITY         |                         |                |          | V-CD MID         | DRV CNT         | VAGC SP           | 0 0 0 0 0 0 0 0 1 |                   |
|              | 1B       | MUTE MODE           |                     | WIDE V-BLK START PHASE  |                |          |                  |                 | 0 1 1 1 1 1 1 1 1 |                   |                   |
|              | 1C       | BLK SW              |                     | WIDE V-BLK STOP PHASE   |                |          |                  |                 | 0 0 0 0 0 0 0 0 0 |                   |                   |
|              | 1D       | NOISE DET LEVEL     |                     | WIDE P-MUTE START PHASE |                |          |                  |                 | 1 0 1 1 1 1 1 1 1 |                   |                   |
|              | 1E       | N COMB              |                     | WIDE P-MUTE STOP PHASE  |                |          |                  |                 | 0 0 0 0 0 0 0 0 0 |                   |                   |
| SECAM        | 1F       | S-field             | SCD ATT             | DEMP FO                 | S GP           | V-ID SW  | S KIL            | BELL FO         |                   | 0 0 0 0 0 0 0 0 1 |                   |

(Note) \* : Data is ignored.

TB1227BN - 11

## READ-IN DATA

Slave address : 89H (Pin28-High : 8BH)

|  |    | MSB<br>7 | 6            | 5                  | 4     | 3                  | 2      | 1     | LSB<br>0 |
|--|----|----------|--------------|--------------------|-------|--------------------|--------|-------|----------|
|  | 00 | PORES    | COLOR SYSTEM |                    | X'tal |                    | V-FREQ | V-STD | N-DET    |
|  | 01 | LOCK     | RGBOUT       | Y <sub>1</sub> -IN | UV-IN | Y <sub>2</sub> -IN | H      | V     | V-GUARD  |

## BUS CONTROL FUNCTION

## WRITE FUNCTION

| ITEM                | DESCRIPTION                            | NUMBER OF BITS | VARIABLE RANGE        | PRESET VALUE    |
|---------------------|----------------------------------------|----------------|-----------------------|-----------------|
| UNI-COLOR           | —                                      | 8bit           | − 18dB~0dB            | 80h MAX − 5.0dB |
| BRIGHT              | —                                      | 8bit           | − 1V~1V               | 80h 0V          |
| COLOR               | —                                      | 8bit           | ~0dB                  | 80h − 6dB       |
| TINT                | —                                      | 7bit           | − 45°~45°             | 40h 0°          |
| P / N KIL           | P / N KILLER sensitivity control       | 1bit           | Normal / Low          | 00h NORMAL      |
| SHARPNESS           | —                                      | 6bit           | − 6dB~12dB            | 20h + 3dB       |
| DTrp-SW             | SECAM double trap ON / OFF             | 1bit           | ON / OFF              | 01h OFF         |
| R-Mon               | TEXT-11 dB pre-amplification UV output | 1bit           | Normal / Monitor      | 00h Normal      |
| B-Mon               | (Pin 35 : Bo, Pin 36 : Ro)             | 1bit           | Normal / Monitor      | 00h Normal      |
| Y SUB CONTRAST      | —                                      | 5bit           | − 3dB~ + 3dB          | 10h 0dB         |
| RGB-CONTRAST        | EXT RGB UNI-COLOR control              | 8bit           | − 18dB~0dB            | 80h MAX − 5.0dB |
| Yγ                  | γ ON / OFF                             | 1bit           | OFF / 95 IRE          | 00h ON          |
| WPL SW              | White peak limit level                 | 1bit           | 130 IRE / OFF         | 00h 130 IRE     |
| BLUE BACK MODE      | Luminance selector switch              | 2bit           | IRE ; OFF, 40, 50, 50 | 00h OFF         |
| Y-DL SW             | Y-DL TIME (28, 33, 38, 43, 48)         | 3bit           | 280~480ns after Y IN  | 04h 480ns       |
| G DRIVE GAIN        | —                                      | 8bit           | − 5dB~3dB             | 80h 0dB         |
| B DRIVE GAIN        | —                                      | 8bit           | − 5dB~3dB             | 80h 0dB         |
| HORIZONTAL POSITION | Horizontal position adjustment         | 5bit           | − 3μs~ + 3μs          | 10h 0μs         |

| ITEM             | DESCRIPTION                                           | NUMBER OF BITS | VARIABLE RANGE                                                                                                                   | PRESET VALUE             |
|------------------|-------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| AFC MODE         | AFC1 detection sensitivity selector                   | 2bit           | dB ; AUTO, 0, - 10, - 10                                                                                                         | 00h AUTO                 |
| H-CK SW          | HOUT generation clock selector                        | 1bit           | 384fh-VCO, FSC-VCXO                                                                                                              | 01h FSC-VCXO             |
| R CUT OFF        | —                                                     | 8bit           | - 0.5~0.5V                                                                                                                       | 00h - 0.5V               |
| G CUT OFF        | —                                                     | 8bit           | - 0.5~0.5V                                                                                                                       | 00h - 0.5V               |
| B CUT OFF        | —                                                     | 8bit           | - 0.5~0.5V                                                                                                                       | 00h - 0.5V               |
| B. S. OFF        | Black expansion ON / OFF                              | 1bit           | ON / OFF                                                                                                                         | 00h ON                   |
| C-TRAP           | Chroma Trap ON / OFF SW                               | 1bit           | ON / OFF                                                                                                                         | 00h ON                   |
| FST SW           | Black offset SECAM discrimination interlocking switch | 1bit           | SECAM only / All systems                                                                                                         | 00h S only               |
| C-TOF            | P / N TOF ON / OFF SW                                 | 1bit           | ON / OFF                                                                                                                         | 00h ON                   |
| P / N GP         | PAL GATE position                                     | 1bit           | Standard / 0.5 $\mu$ s delay                                                                                                     | 00h Standard             |
| CL-L SW          | COLOR LIMIT ON / OFF                                  | 1bit           | ON / OFF                                                                                                                         | 00h ON                   |
| WBLK SW          | WIDE V-BLK ON / OFF                                   | 1bit           | OFF / ON                                                                                                                         | 00h OFF                  |
| WMUT SW          | WIDE Picture-MUTE ON / OFF                            | 1bit           | OFF / ON                                                                                                                         | 00h OFF                  |
| S-INHBT          | To detect or not to detect SECAM                      | 1bit           | Yes / No                                                                                                                         | 00h Yes                  |
| 3.58 Trap        | C Trap-f <sub>0</sub> , force 3.58MHz switch          | 1bit           | AUTO / Forced 3.58MHz                                                                                                            | 00h AUTO                 |
| F-B / W          | Force B / W switch                                    | 1bit           | AUTO / Forced B / W                                                                                                              | 00h AUTO                 |
| X'tal MODE       | APC oscillation frequency selector switch             | 3bit           | 000 ; European system AUTO, 001 ; 3N 010 ; 4P, 011 ; 4P (N inhibited) 100 ; S.American system AUTO, 101 ; 3N, 110 ; MP, 111 ; NP | 00h European system AUTO |
| COLOR SYSTEM     | Chroma system selection                               | 2bit           | AUTO, PAL, NTSC, SECAM                                                                                                           | 00h AUTO                 |
| R-Y BLACK OFFSET | R-Y color difference output black offset adjustment   | 4bit           | - 24~21mV STEP 3mV                                                                                                               | 08h 0mV                  |
| B-Y BLACK OFFSET | B-Y color difference output black offset adjustment   | 4bit           | - 24~21mV STEP 3mV                                                                                                               | 08h 0mV                  |
| CLL LEVEL        | Color limit level adjustment                          | 2bit           | 91, 100, 108, 116%                                                                                                               | 02h 108%                 |

(Note) 3N ; 3.58-NTSC, 4P ; 4.43-PAL, MP ; M-PAL, NP ; N-PAL  
European system AUTO ; 4.43-PAL, 4.43-NTSC, 3.58-NTSC, SECAM  
S.American system AUTO ; 3.58-NTSC, M-PAL, N-PAL

| ITEM                        | DESCRIPTION                                       | NUMBER OF BITS | VARIABLE RANGE                                                               | PRESET VALUE       |
|-----------------------------|---------------------------------------------------|----------------|------------------------------------------------------------------------------|--------------------|
| PN CD ATT                   | P/N color difference amplitude adjustment         | 2bit           | +1 ~ -2dB STEP 1dB                                                           | 01h 0dB            |
| TOF Q                       | TOF Q adjustment                                  | 2bit           | 1.0, 1.5, 2.0, 2.5                                                           | 02h 2.0            |
| TOF F <sub>0</sub>          | TOF f <sub>0</sub> adjustment                     | 2bit           | kHz ; 0, 500, 600, 700                                                       | 02h 600kHz         |
| VSM PHASE                   | VSM output phase                                  | 2bit           | +20ns, +20ns, 0ns, 0ns                                                       | 02h 0ns            |
| VSM GAIN                    | VSM output gain                                   | 2bit           | 0dB, 0dB, -6dB, OFF                                                          | 03h OFF            |
| C-TRAP Q                    | Chroma trap Q control                             | 2bit           | 1.0, 1.5, 2.0, 2.5                                                           | 02h 2.0            |
| C-TRAP F <sub>0</sub>       | Chroma trap f <sub>0</sub> control                | 2bit           | kHz ; -100, -50, 0, +50                                                      | 02h 0kHz           |
| BLACK STRETCH POI           | Black expansion start point setting               | 3bit           | 28~70% IRE × 0.4                                                             | 05h 56% IRE        |
| DC TRAN RATE                | Direct transmission compensation degree selection | 3bit           | 100~130% APL                                                                 | 00h 100%           |
| APA-CON PEAK F <sub>0</sub> | Sharpness peak frequency selection                | 2bit           | kHz ; 2.5, 3.1, 4.2, OFF                                                     | 02h 4.2kHz         |
| ABL POINT                   | ABL detection voltage                             | 3bit           | ABL point ; 6.5V~5.9V                                                        | 00h 6.5V           |
| ABL GAIN                    | ABL sensitivity                                   | 3bit           | Brightness ; 0 ~ -2V                                                         | 00h 0V             |
| HALF TONE SW                | Halftone gain selection                           | 2bit           | -3dB, -6dB, OFF, OFF                                                         | 00h -3dB           |
| H BLK PHASE                 | Horizontal blanking end position                  | 3bit           | 0~3.5μs step 0.5μs                                                           | 00h 0μs            |
| V FREQ                      | Vertical frequency                                | 2bit           | AUTO, 60Hz, Forced 60, 50, 60                                                | 00h AUTO           |
| V OUT PHASE                 | Vertical position adjustment                      | 3bit           | 0~7H STEP 1H                                                                 | 00h 0H             |
| V-AMPLITUDE                 | Vertical amplitude selection                      | 7bit           | -50~50%                                                                      | 40h 0%             |
| 1bit DAC                    | 1bit DAC output                                   | 1bit           | LOW, HIGH                                                                    | 00h LOW            |
| V CENTERING                 | V Centering                                       | 6bit           | 1~4V                                                                         | 20h 2.5V           |
| COINCIDENT MODE             | Discriminator output signal selection             | 2bit           | 00 ; DSYNC<br>01 ; DSYNC × AFC<br>10 ; Field counting<br>11 ; VP is present. | 02h Field counting |
| V S-CORRECTION              | Vertical S-curve correction                       | 7bit           | Reverse S-curve, S-curve                                                     | 40h —              |
| V-MODE                      | Force Sync Mode Selection                         | 1bit           | TELETEXT / Normal                                                            | 01h Normal         |
| DRG SW                      | Drive reference axis selection                    | 1bit           | R / G                                                                        | 00h R              |
| V LINEARITY                 | Vertical linearity correction                     | 5bit           | (one side)                                                                   | 00h —              |
| ND SW                       | Noise Det SW                                      | 1bit           | Normal, Low                                                                  | 00h Normal         |
| V-CD MD                     | Vertical count-down mode selection                | 1bit           | AUTO / Force synchronization                                                 | 00h AUTO           |

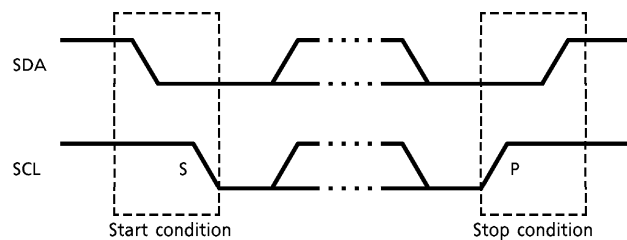
| ITEM                 | DESCRIPTION                                        | NUMBER OF BITS | VARIABLE RANGE                                                             | PRESET VALUE   |
|----------------------|----------------------------------------------------|----------------|----------------------------------------------------------------------------|----------------|
| DRV CNT              | All drive gains forced centering switch            | 1bit           | OFF / Force centering                                                      | 00h OFF        |
| VAGC SP              | Vertical ramp time constant selection              | 1bit           | Normal / High speed                                                        | 01h High speed |
| MUTE MODE            | OFF, RGB mute, Y mute, transverse                  | 2bit           | OFF, RGB, Y, Transverse                                                    | 01h RGB        |
| WIDE V-BLK START PH  | Vertical pre-position selection                    | 6bit           | - 64~ - 1H STEP 1H                                                         | 3Fh - 1H       |
| BLK SW               | Blanking ON / OFF                                  | 1bit           | ON / OFF                                                                   | 00h ON         |
| WIDE V-BLK STOP PH   | Vertical post-position selection                   | 7bit           | 0~128H STEP 1H                                                             | 00h 0H         |
| NOISE DET LEVEL      | Noise detection level selection                    | 2bit           | ND SW<br>Normal : 0.15, 0.125, 0.1, 0.075<br>Low : 0.5, 0.475, 0.45, 0.425 | 02h 0.1        |
| WIDE P-MUTE START PH | Video mute pre-position selection                  | 6bit           | - 64~ - 1H STEP 1H                                                         | 3Fh - 1H       |
| N COMB               | 1H addition selection                              | 1bit           | OFF / ADD                                                                  | 00h OFF        |
| WIDE P-MUTE STOP PH  | Video mute post-position selection                 | 7bit           | 0~128H STEP 1H                                                             | 00h 0H         |
| S-field              | SECAM color and Q selection in weak electric field | 1bit           | Weak electric field control ON / OFF                                       | 00h ON         |
| SCD ATT              | SECAM color difference amplitude adjustment        | 1bit           | 0 / - 1dB                                                                  | 00h 0dB        |
| DEMO F <sub>0</sub>  | SECAM deemphasis time constant selection           | 1bit           | 85kHz / 100kHz                                                             | 00h 85kHz      |
| S GP                 | SECAM gate position selection                      | 1bit           | Standard / 0.5 $\mu$ s delay                                               | 00h Standard   |
| V-ID SW              | SECAM V-ID ON / OFF switch                         | 1bit           | OFF / ON                                                                   | 00h OFF        |
| S KIL                | SECAM KILLER sensitivity selection                 | 1bit           | NORMAL / LOW                                                               | 00h NORMAL     |
| BELL F <sub>0</sub>  | Bell f <sub>0</sub> adjustment                     | 2bit           | - 46~92kHz STEP 46kHz                                                      | 01h 0kHz       |

# READ-IN FUNCTION

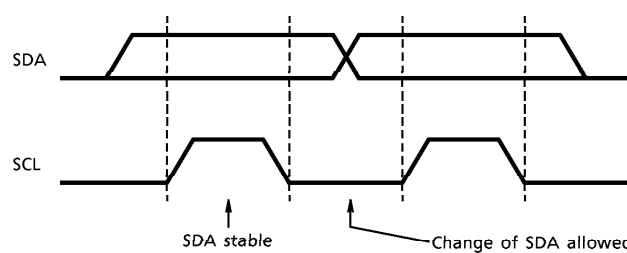
| ITEM                                                          | DESCRIPTION                                                                                  | NUMBER OF BITS |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------|
| PONRES                                                        | 0 : POR cancel, 1 : POR ON                                                                   | 1bit           |
| COLOR SYSTEM                                                  | 00 : B/W, 01 : PAL<br>10 : NTSC, 11 : SECAM                                                  | 2bit           |
| X'tal                                                         | 00 : 4.433619MHz<br>01 : 3.579545MHz<br>10 : 3.575611MHz (M-PAL)<br>11 : 3.582056MHz (N-PAL) | 2bit           |
| V-FREQ                                                        | 0 : 50Hz, 1 : 60Hz                                                                           | 1bit           |
| V-STD                                                         | 0 : NON-STD, 1 : STD                                                                         | 1bit           |
| N-DET                                                         | 0 : Low, 1 : High                                                                            | 1bit           |
| LOCK                                                          | 0 : UN-LOCK, 1 : LOCK                                                                        | 1bit           |
| RGBOUT, Y <sub>1</sub> -IN<br>UV-IN, Y <sub>2</sub> -IN, H, V | Self-diagnosis<br>0 : NG, 1 : OK                                                             | 1bit each      |
| V-GUARD                                                       | Detection of breaking neck<br>0 : Abnormal, 1 : Normal                                       | 1bit           |

## DATA TRANSFER FORMAT VIA I<sup>2</sup>C BUS

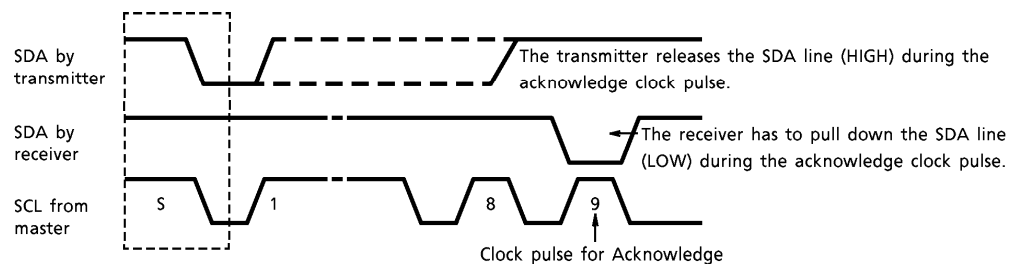
Start and stop condition



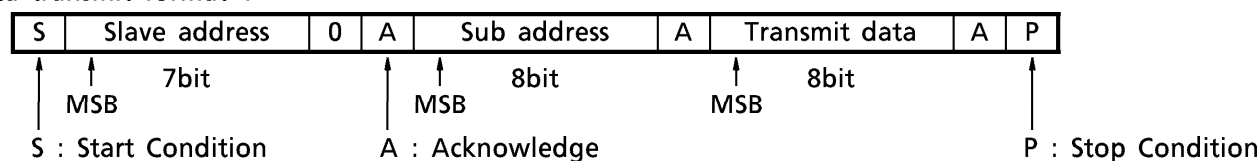
Bit transfer



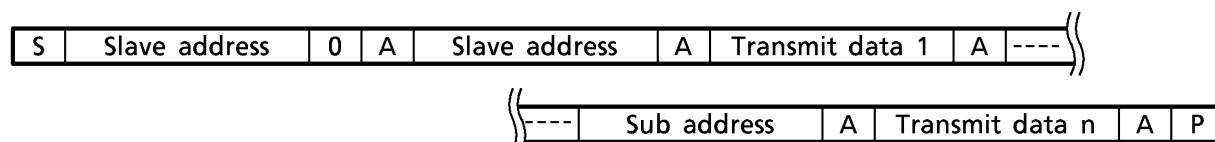
Acknowledge



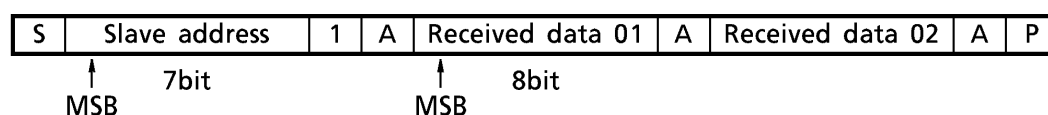
## Data transmit format 1



## Data transmit format 2



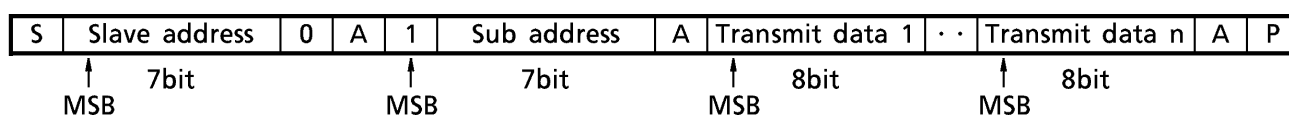
## Data receive format



At the moment of the first acknowledge, the master transmitter becomes a master receiver and the slave receiver becomes a slave transmitter. This acknowledge is still generated by the slave.

The STOP condition is generated by the master.

## Optional data transmit format : Automatic increment mode



In this transmission method, data is set on automatically incremented sub-address from the specified sub-address.

Purchase of TOSHIBA I<sup>2</sup>C components conveys a license under the Philips I<sup>2</sup>C Patent Rights to use these components in an I<sup>2</sup>C system, provided that the system conforms to the I<sup>2</sup>C Standard Specification as defined by Philips.

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC                     | SYMBOL  | RATING              | UNIT    |
|------------------------------------|---------|---------------------|---------|
| Supply Voltage                     | VCCMAX  | 12                  | V       |
| Permissible Loss                   | PDMAX   | 2190 (Note)         | mW      |
| Power Consumption Declining Degree | 1 / Qja | 17.52               | mW / °C |
| Input Terminal Voltage             | Vin     | GND – 0.3~VCC + 0.3 | V       |
| Input Signal Voltage               | ein     | 7                   | Vp-p    |
| Operating Temperature              | Topr    | – 20~65             | °C      |
| Conserving Temperature             | Tstg    | – 55~150            | °C      |

(Note) In the condition that IC is actually mounted. See the diagram below.

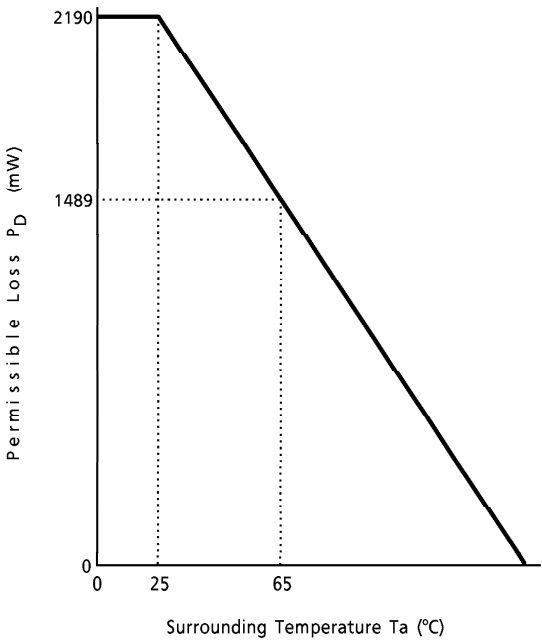


Fig. Power consumption declining curve relative to temperature change

## RECOMMENDED OPERATING CONDITION

| CHARACTERISTIC              | DESCRIPTION               | MIN. | TYP. | MAX. | UNIT      |
|-----------------------------|---------------------------|------|------|------|-----------|
| Supply Voltage              | Pin 3, pin 17             | 8.50 | 9.0  | 9.25 | V         |
|                             | Pin 8, pin 38, pin 41     | 4.75 | 5.0  | 5.25 |           |
| Video Input Level           | 100% white, negative sync | 0.9  | 1.0  | 1.1  | $V_{p-p}$ |
| Chroma Input Level          |                           | 0.9  | 1.0  | 1.1  |           |
| Sync Input Level            |                           | 0.9  | 1.0  | 2.2  |           |
| FBP Width                   | —                         | 11   | 12   | 13   | $\mu s$   |
| Incoming FBP Current (Note) | —                         | —    | —    | 1.5  | mA        |
| H. Output Current           | —                         | —    | 1.0  | 2.0  |           |
| RGB Output Current          | —                         | —    | 1.0  | 2.0  | V         |
| Analog RGB Input Level      | —                         | —    | 0.7  | 0.8  |           |
| OSD RGB Input Level         | In TEXT input             | 0.7  | 1.0  | 1.3  |           |
|                             | In OSD input              | —    | 4.2  | 5.0  |           |
| Incoming Current to Pin 49  | Sync-out                  | —    | 0.5  | 1.0  | mA        |

(Note) The threshold of horizontal AFC2 detection is set  $H.V_{CC}-2V_f$  ( $V_f \approx 0.75V$ ).  
Confirming the power supply voltage, determine the high level of FBP.

## ELECTRICAL CHARACTERISTIC

( Unless otherwise specified, H, RGB  $V_{CC} = 0V$ ,  $V_{DD}$ , Fsc  $V_{DD}$ ,  
Y/C  $V_{CC} = 5V$ ,  $T_a = 25 \pm 3^\circ C$  )

## CURRENT CONSUMPTION

| PIN No. | CHARACTERISTIC    | SYMBOL    | TEST CIRCUIT | MIN. | TYP. | MAX. | UNIT |
|---------|-------------------|-----------|--------------|------|------|------|------|
| 3       | H. $V_{CC}$ (9V)  | $I_{CC1}$ | —            | 16.0 | 19.0 | 23.5 | mA   |
| 8       | $V_{DD}$ (5V)     | $I_{CC2}$ | —            | 8.8  | 11.0 | 14.0 |      |
| 17      | RGB $V_{CC}$ (9V) | $I_{CC3}$ | —            | 25.0 | 31.5 | 39.0 |      |
| 38      | Fsc $V_{CC}$ (5V) | $I_{CC4}$ | —            | 6.8  | 8.5  | 11.0 |      |
| 41      | Y/C $V_{CC}$ (9V) | $I_{CC5}$ | —            | 80   | 100  | 130  |      |

## TERMINAL VOLTAGE

| PIN No. | PIN NAME                  | SYMBOL          | TEST<br>CIRCUIT | MIN. | TYP. | MAX. | UNIT |
|---------|---------------------------|-----------------|-----------------|------|------|------|------|
| 16      | ABCL                      | V <sub>16</sub> | —               | 5.9  | 6.4  | 6.9  | V    |
| 18      | OSD R Input               | V <sub>18</sub> | —               | —    | 0    | 0.3  | V    |
| 19      | OSD G Input               | V <sub>19</sub> | —               | —    | 0    | 0.3  | V    |
| 20      | OSD B Input               | V <sub>20</sub> | —               | —    | 0    | 0.3  | V    |
| 21      | Digital Ys                | V <sub>21</sub> | —               | —    | 0    | 0.3  | V    |
| 22      | Analog Ys                 | V <sub>22</sub> | —               | —    | 0    | 0.3  | V    |
| 23      | Analog R Input            | V <sub>23</sub> | —               | 4.2  | 4.6  | 5.0  | V    |
| 24      | Analog G Input            | V <sub>24</sub> | —               | 4.2  | 4.6  | 5.0  | V    |
| 25      | Analog B Input            | V <sub>25</sub> | —               | 4.2  | 4.6  | 5.0  | V    |
| 28      | DAC                       | V <sub>28</sub> | —               | 1.7  | 2.0  | 2.3  | V    |
| 31      | Y <sub>2</sub> Input      | V <sub>31</sub> | —               | 1.7  | 2.0  | 2.3  | V    |
| 33      | B-Y Input                 | V <sub>33</sub> | —               | 2.2  | 2.5  | 2.8  | V    |
| 34      | R-Y Input                 | V <sub>34</sub> | —               | 2.2  | 2.5  | 2.8  | V    |
| 35      | R-Y Output                | V <sub>35</sub> | —               | 1.5  | 1.9  | 2.3  | V    |
| 36      | B-Y Output                | V <sub>36</sub> | —               | 1.5  | 1.9  | 2.3  | V    |
| 37      | Y <sub>1</sub> Output     | V <sub>37</sub> | —               | 1.9  | 2.3  | 2.7  | V    |
| 40      | 16.2MHz X'tal Oscillation | V <sub>40</sub> | —               | 3.6  | 4.1  | 4.6  | V    |
| 42      | Chroma Input              | V <sub>42</sub> | —               | 2.0  | 2.4  | 2.8  | V    |
| 50      | V-Sepa.                   | V <sub>50</sub> | —               | 5.4  | 5.9  | 6.4  | V    |

## AC CHARACTERISTIC

## Video section

| CHARACTERISTIC                                               | SYMBOL | TEST CIRCUIT | TEST CONDITION         | MIN.   | TYP.   | MAX.   | UNIT  |
|--------------------------------------------------------------|--------|--------------|------------------------|--------|--------|--------|-------|
| Y Input Pedestal Clamping Voltage                            | VYclp  | —            | (Note) Y <sub>1</sub>  | 2.0    | 2.2    | 2.4    | V     |
| Chroma Trap Frequency                                        | ftr3   | —            | (Note) Y <sub>2</sub>  | 3.429  | 3.58   | 3.679  | MHz   |
|                                                              | ftr4   | —            |                        | 4.203  | 4.43   | 4.633  |       |
| Chroma Trap Attenuation<br>(3.58MHz)<br>(4.43MHz)<br>(SECAM) | Gtr3a  | —            | (Note) Y <sub>3</sub>  | 20     | 26     | 52     | dB    |
|                                                              | Gtr3f  | —            | (Note) Y <sub>4</sub>  | 20     | 26     | 52     |       |
|                                                              | Gtr4   | —            | (Note) Y <sub>5</sub>  | 18     | 26     | 52     |       |
|                                                              | Gtrs   | —            | (Note) Y <sub>6</sub>  | 90     | 95     | 99     |       |
| Y <sub>γ</sub> Correction Point                              | γp     | —            | (Note) Y <sub>7</sub>  | − 2.6  | − 2.0  | − 1.3  | dB    |
| Y <sub>γ</sub> Correction Curve                              | γc     | —            | (Note) Y <sub>8</sub>  | 15     | 20     | 25     | kΩ    |
| APL Terminal Output Impedance                                | Zo44   | —            | (Note) Y <sub>9</sub>  | 0.11   | 0.13   | 0.15   | times |
|                                                              | Adrmax | —            |                        | 0.44   | 0.06   | 0.08   |       |
| DC Transmission Compensation Amplifier Gain                  | Adrcnt | —            | (Note) Y <sub>10</sub> | 1.20   | 1.5    | 1.65   |       |
| Maximum Gain of Black Expansion Amplifier                    | Ake    | —            | (Note) Y <sub>11</sub> | 65     | 77.5   | 80     | IRE   |
| Black Expansion Start Point                                  | VBS9MX | —            | (Note) Y <sub>11</sub> | 55     | 62.5   | 70     |       |
|                                                              | VBS9CT | —            |                        | 48     | 55.5   | 63     |       |
|                                                              | VBS9MN | —            |                        | 35     | 42.5   | 50     |       |
|                                                              | VBS2MX | —            |                        | 25     | 31.5   | 38     |       |
|                                                              | VBS2CT | —            |                        | 19     | 25.5   | 32     |       |
|                                                              | VBS2MN | —            |                        |        |        |        |       |
| Black Peak Detection Period<br>(Horizontal)<br>(Vertical)    | TbpH   | —            | (Note) Y <sub>12</sub> | 15     | 16     | 17     | μs    |
|                                                              | TbpV   | —            |                        | 33     | 34     | 35     | H     |
| Picture Quality Control Peaking Frequency                    | fp25   | —            | (Note) Y <sub>13</sub> | 1.5    | 2.5    | 3.4    | MHz   |
|                                                              | fp31   | —            |                        | 1.9    | 3.1    | 4.3    |       |
|                                                              | fp42   | —            |                        | 3.0    | 4.2    | 5.4    |       |
| Picture Quality Control Maximum Characteristic               | GS25MX | —            | (Note) Y <sub>14</sub> | 12.0   | 14.5   | 17.0   | dB    |
|                                                              | GS31MX | —            |                        | 12.0   | 14.5   | 17.0   |       |
|                                                              | GS42MX | —            |                        | 10.6   | 13.5   | 16.4   |       |
| Picture Quality Control Minimum Characteristic               | GS25MN | —            | (Note) Y <sub>15</sub> | − 22.0 | − 19.5 | − 17.0 |       |
|                                                              | GS31MN | —            |                        | − 22.0 | − 19.5 | − 17.0 |       |
|                                                              | GS42MN | —            |                        | − 19.5 | − 16.5 | − 13.5 |       |
| Picture Quality Control Center Characteristic                | GS25CT | —            | (Note) Y <sub>16</sub> | 6.0    | 8.5    | 11.0   |       |
|                                                              | GS31CT | —            |                        | 6.0    | 8.5    | 11.0   |       |
|                                                              | GS42CT | —            |                        | 4.6    | 7.5    | 10.4   |       |
| Y Signal Gain                                                | Gy     | —            | (Note) Y <sub>17</sub> | − 1.0  | 0      | 1.6    |       |
| Y Signal Frequency Characteristic                            | Gfy    | —            | (Note) Y <sub>18</sub> | − 6.5  | 0      | 1.0    |       |
| Y Signal Maximum Input Range                                 | Vyd    | —            | (Note) Y <sub>19</sub> | 0.9    | 1.2    | 1.5    | V     |

## Chroma section

| CHARACTERISTIC                                                 | SYMBOL              | TEST CIR-<br>CUIT   | TEST CONDITION        | MIN. | TYP.  | MIN.  | UNIT              |                   |      |
|----------------------------------------------------------------|---------------------|---------------------|-----------------------|------|-------|-------|-------------------|-------------------|------|
| ACC Characteristic $f_o = 3.58$                                | 3N <sub>e</sub> AT  | —                   | (Note) C <sub>1</sub> | 30   | 35    | 90    | mV <sub>p-p</sub> |                   |      |
|                                                                | 3N <sub>F1</sub> T  | —                   |                       | 68   | 85    | 105   |                   |                   |      |
|                                                                | 3N <sub>A</sub> T   | —                   |                       | 0.9  | 1.0   | 1.1   |                   |                   |      |
|                                                                | 3N <sub>e</sub> AE  | —                   |                       | 18   | 35    | —     | times             |                   |      |
|                                                                | 3N <sub>F1</sub> E  | —                   |                       | 71   | 85    | 102   |                   |                   |      |
|                                                                | 3N <sub>A</sub> E   | —                   |                       | 0.9  | 1.0   | 1.1   |                   |                   |      |
|                                                                | $f_o = 4.43$        | 4N <sub>e</sub> AT  |                       | —    | 18    | 35    | —                 | mV <sub>p-p</sub> |      |
|                                                                |                     | 4N <sub>F1</sub> T  |                       | —    | 71    | 85    | 102               |                   |      |
|                                                                |                     | 4N <sub>A</sub> T   |                       | —    | 0.9   | 1.0   | 1.1               |                   |      |
|                                                                |                     | 4N <sub>e</sub> AE  |                       | —    | 18    | 35    | —                 | times             |      |
|                                                                |                     | 4N <sub>F1</sub> E  |                       | —    | 71    | 85    | 102               |                   |      |
|                                                                |                     | 4N <sub>A</sub> E   |                       | —    | 0.9   | 1.0   | 1.1               |                   |      |
| Band Pass Filter Characteristic<br>$f_o = 3.58$                | 3Nfo <sub>0</sub>   | —                   | (Note) C <sub>2</sub> | 3.43 | 3.579 | 3.73  | MHz               |                   |      |
|                                                                | 3Nfo <sub>500</sub> | —                   |                       | 3.93 | 4.079 | 4.23  |                   |                   |      |
|                                                                | 3Nfo <sub>600</sub> | —                   |                       | 4.03 | 4.179 | 4.33  |                   |                   |      |
|                                                                | 3Nfo <sub>700</sub> | —                   |                       | 4.13 | 4.279 | 4.43  |                   |                   |      |
|                                                                | $f_o = 4.43$        | 4Nfo <sub>0</sub>   |                       | —    | 4.28  | 4.433 |                   | 4.58              |      |
|                                                                |                     | 4Nfo <sub>500</sub> |                       | —    | 4.78  | 4.933 |                   | 4.58              |      |
|                                                                |                     | 4Nfo <sub>600</sub> |                       | —    | 4.88  | 5.033 |                   | 5.18              |      |
|                                                                |                     | 4Nfo <sub>700</sub> |                       | —    | 4.98  | 5.133 |                   | 5.28              |      |
| Band Pass Filter, – 3dB Band<br>Characteristic<br>$f_o = 3.58$ | fo <sub>0</sub>     | —                   | (Note) C <sub>3</sub> | 1.64 | 1.79  | 1.94  |                   |                   |      |
|                                                                | fo <sub>500</sub>   | —                   |                       |      |       |       |                   |                   |      |
|                                                                | fo <sub>600</sub>   | —                   |                       |      |       |       |                   |                   |      |
|                                                                | fo <sub>700</sub>   | —                   |                       |      |       |       |                   |                   |      |
|                                                                | $f_o = 4.43$        | fo <sub>0</sub>     |                       | —    | 2.07  | 2.22  |                   |                   | 2.37 |
|                                                                |                     | fo <sub>500</sub>   |                       | —    |       |       |                   |                   |      |
|                                                                |                     | fo <sub>600</sub>   |                       | —    |       |       |                   |                   |      |
|                                                                |                     | fo <sub>700</sub>   |                       | —    |       |       |                   |                   |      |
| Band Pass Filter, Q<br>Characteristic Check $f_o = 3.58$       | Q <sub>1</sub>      | —                   | (Note) C <sub>4</sub> | —    | 3.58  | —     |                   |                   |      |
|                                                                | Q <sub>1.5</sub>    | —                   |                       | —    | 2.39  | —     |                   |                   |      |
|                                                                | Q <sub>2.0</sub>    | —                   |                       | 1.64 | 1.79  | 1.94  |                   |                   |      |
|                                                                | Q <sub>2.5</sub>    | —                   |                       | —    | 1.43  | —     |                   |                   |      |
|                                                                | $f_o = 4.43$        | Q <sub>1</sub>      |                       | —    | —     | 4.43  |                   | —                 |      |
|                                                                |                     | Q <sub>1.5</sub>    |                       | —    | —     | 2.95  |                   | —                 |      |
|                                                                |                     | Q <sub>2.0</sub>    |                       | —    | 2.07  | 2.22  |                   | 2.37              |      |
|                                                                |                     | Q <sub>2.5</sub>    |                       | —    | —     | 1.77  |                   | —                 |      |

| CHARACTERISTIC                                           | SYMBOL             | TEST CIRCUIT | TEST CONDITION | MIN.   | TYP.   | MAX.   | UNIT |
|----------------------------------------------------------|--------------------|--------------|----------------|--------|--------|--------|------|
| 1/2 $f_c$ Trap Characteristic<br>$f_o = 3.58$            | $f_{o0}$           | —            | (Note) C5      | 1.45   | 1.60   | 1.75   | MHz  |
|                                                          | $f_{o500}$         | —            |                | 1.70   | 1.85   | 2.00   |      |
|                                                          | $f_{o600}$         | —            |                | 1.75   | 1.90   | 2.06   |      |
|                                                          | $f_{o700}$         | —            |                | 1.80   | 1.95   | 2.10   |      |
|                                                          | $f_{o0}$           | —            |                | 1.85   | 2.00   | 2.15   |      |
|                                                          | $f_{o500}$         | —            |                | 2.00   | 2.15   | 2.30   |      |
|                                                          | $f_{o600}$         | —            |                | 2.05   | 2.20   | 2.35   |      |
|                                                          | $f_{o700}$         | —            |                | 2.10   | 2.25   | 2.40   |      |
| Tint Control Range<br>( $f_o = 600\text{kHz}$ )          | $3N\Delta\theta 1$ | —            | (Note) C6      | 35.0   | 45.0   | 55.0   | °    |
|                                                          | $3N\Delta\theta 2$ | —            |                | – 55.0 | – 45.0 | – 35.0 |      |
|                                                          | $4N\Delta\theta 1$ | —            |                | 35.0   | 45.0   | 55.0   |      |
|                                                          | $4N\Delta\theta 2$ | —            |                |        |        |        |      |
| Tint Control Variable Range<br>( $f_o = 600\text{kHz}$ ) | $3N\Delta\theta T$ | —            | (Note) C7      | 70.0   | 90.0   | 110.0  |      |
|                                                          | $4N\Delta\theta T$ | —            |                |        |        |        |      |
| Tint Control Characteristic                              | $3T\theta Tin$     | —            | (Note) C8      | 39     | 40     | 47     | bit  |
|                                                          | $3E\theta Tin$     | —            |                |        |        |        |      |
|                                                          | $3N\Delta Tin$     | —            |                | 73     | 80     | 87     | Step |
|                                                          | $4T\theta Tin$     | —            |                | 39     | 40     | 47     | bit  |
|                                                          | $4E\theta Tin$     | —            |                |        |        |        |      |
|                                                          | $4N\Delta Tin$     | —            |                | 73     | 80     | 87     | Step |
| APC Lead-In Range<br>(Lead-In Range)                     | 4.433PH            | —            | (Note) C9      | 350    | 500    | 1500   | Hz   |
|                                                          | 4.433PL            | —            |                | – 350  | – 500  | – 1500 |      |
|                                                          | 3.579PH            | —            |                | 350    | 500    | 1700   |      |
|                                                          | 3.579PL            | —            |                | – 350  | – 500  | – 1700 |      |
|                                                          | 4.433HH            | —            |                | 400    | 500    | 1100   |      |
|                                                          | 4.433HL            | —            |                | – 400  | – 500  | – 1100 |      |
|                                                          | 3.579HH            | —            |                | 400    | 500    | 1100   |      |
|                                                          | 3.579HL            | —            |                | – 400  | – 500  | – 1100 |      |
| APC Control Sensitivity                                  | $3.58\beta 3$      | —            | (Note) C10     | 1.50   | 2.2    | 2.90   | —    |
|                                                          | $4.43\beta 3$      | —            |                | 1.70   | 2.4    | 3.10   |      |
|                                                          | M-PAL $\beta M$    | —            |                |        |        |        |      |
|                                                          | N-PAL $\beta N$    | —            |                | 1.50   | 2.2    | 2.90   |      |

| CHARACTERISTIC                                 | SYMBOL              | TEST CIRCUIT | TEST CONDITION         | MIN. | TYP. | MAX. | UNIT              |
|------------------------------------------------|---------------------|--------------|------------------------|------|------|------|-------------------|
| Killer Operation Input Level                   | 3N-VTK1             | —            | (Note) C <sub>11</sub> | 1.8  | 2.5  | 3.2  | mV <sub>p-p</sub> |
|                                                | 3N-VTC1             | —            |                        | 2.2  | 3.2  | 4.0  |                   |
|                                                | 3N-VTK2             | —            |                        | 2.5  | 3.6  | 4.5  |                   |
|                                                | 3N-VTC2             | —            |                        | 3.2  | 4.5  | 5.6  |                   |
|                                                | 4N-VTK1             | —            |                        | 1.8  | 2.5  | 3.2  |                   |
|                                                | 4N-VTC1             | —            |                        | 2.2  | 3.2  | 4.0  |                   |
|                                                | 4N-VTK2             | —            |                        | 2.5  | 3.6  | 4.5  |                   |
|                                                | 4N-VTC2             | —            |                        | 3.2  | 4.5  | 5.6  |                   |
|                                                | 4P-VTK1             | —            |                        | 1.8  | 2.5  | 3.2  |                   |
|                                                | 4P-VTC1             | —            |                        | 2.2  | 3.2  | 4.0  |                   |
|                                                | 4P-VTK2             | —            |                        | 2.5  | 3.6  | 4.5  |                   |
|                                                | 4P-VTC2             | —            |                        | 3.2  | 4.5  | 5.6  |                   |
|                                                | MP-VTK1             | —            |                        | 1.8  | 2.5  | 3.2  |                   |
|                                                | MP-VTC1             | —            |                        | 2.2  | 3.2  | 4.0  |                   |
|                                                | MP-VTK2             | —            |                        | 2.5  | 3.6  | 4.5  |                   |
|                                                | MP-VTC2             | —            |                        | 3.2  | 4.5  | 5.6  |                   |
|                                                | NP-VTK1             | —            |                        | 1.8  | 2.5  | 3.2  |                   |
|                                                | NP-VTC1             | —            |                        | 2.2  | 3.2  | 4.0  |                   |
|                                                | NP-VTK2             | —            |                        | 2.5  | 3.6  | 4.5  |                   |
|                                                | NP-VTC2             | —            |                        | 3.2  | 4.5  | 5.6  |                   |
| Color Difference Output<br>(Rainbow Color Bar) | 3NeB-Y              | —            | (Note) C <sub>12</sub> | 320  | 380  | 460  |                   |
|                                                | 3NeR-Y              | —            |                        | 240  | 290  | 350  |                   |
|                                                | 4NeB-Y              | —            |                        | 320  | 380  | 460  |                   |
|                                                | 4NeR-Y              | —            |                        | 240  | 290  | 350  |                   |
|                                                | 4PeB-Y              | —            |                        | 360  | 430  | 520  |                   |
|                                                | 4PeR-Y              | —            |                        | 200  | 240  | 290  |                   |
|                                                | 4Peb-y              | —            |                        | 540  | 650  | 780  |                   |
|                                                | 4Per-y              | —            |                        | 430  | 510  | 610  |                   |
| (75% Color Bar)                                |                     |              |                        |      |      |      |                   |
|                                                |                     |              |                        |      |      |      |                   |
|                                                |                     |              |                        |      |      |      |                   |
| Demodulation Relative Amplitude                | 3NG <sub>R</sub> /B | —            | (Note) C <sub>13</sub> | 0.69 | 0.77 | 0.86 | times             |
|                                                | 4NG <sub>R</sub> /B | —            |                        | 0.70 | 0.77 | 0.85 |                   |
|                                                | 4PG <sub>R</sub> /B | —            |                        | 0.49 | 0.56 | 0.64 |                   |
| Demodulation Relative Phase                    | 3N $\theta$ R-B     | —            | (Note) C <sub>14</sub> | 85   | 93   | 100  | °                 |
|                                                | 4N $\theta$ R-B     | —            |                        | 87   | 93   | 99   |                   |
|                                                | 4P $\theta$ R-B     | —            |                        | 85   | 90   | 95   |                   |
| Demodulation Output Residual Carrier           | 3N-SCB              | —            | (Note) C <sub>15</sub> | 0    | 5    | 15   | mV <sub>p-p</sub> |
|                                                | 3N-SCR              | —            |                        |      |      |      |                   |
|                                                | 4N-SCB              | —            |                        |      |      |      |                   |
|                                                | 4N-SCR              | —            |                        |      |      |      |                   |

| CHARACTERISTIC                                                                 | SYMBOL            | TEST CIR-<br>CUIT | TEST CONDITION         | MIN.   | TYP.  | MAX.   | UNIT              |
|--------------------------------------------------------------------------------|-------------------|-------------------|------------------------|--------|-------|--------|-------------------|
| Demodulation Output Residual Higher Harmonic                                   | 3N-HCB            | —                 | (Note) C <sub>16</sub> | 0      | 10    | 30     | mV <sub>p-p</sub> |
|                                                                                | 3N-HCR            | —                 |                        |        |       |        |                   |
|                                                                                | 4N-HCB            | —                 |                        |        |       |        |                   |
|                                                                                | 4N-HCR            | —                 |                        |        |       |        |                   |
| Color Difference Output ATT Check                                              | B-Y - 1dB         | —                 | (Note) C <sub>17</sub> | - 1.20 | - 0.9 | - 0.60 | dB                |
|                                                                                | B-Y - 2dB         | —                 |                        | - 2.30 | - 1.7 | - 1.55 |                   |
|                                                                                | B-Y + 1dB         | —                 |                        | 0.60   | 0.8   | 1.20   |                   |
| 16.2MHz Oscillation Frequency                                                  | $\Delta f_{oF}$   | —                 | (Note) C <sub>18</sub> | - 2.0  | 0     | 2.0    | kHz               |
| 16.2MHz Oscillation Start Voltage                                              | V <sub>Fon1</sub> | —                 | (Note) C <sub>19</sub> | 3.0    | 3.2   | 3.4    | V                 |
| f <sub>sc</sub> Free-Run Frequency<br>(3.58M)<br>(4.43M)<br>(M-PAL)<br>(N-PAL) | 3fr               | —                 | (Note) C <sub>20</sub> | - 100  | 50    | 200    | Hz                |
|                                                                                | 4fr               | —                 |                        | - 125  | 25    | 175    |                   |
|                                                                                | Mfr               | —                 |                        | - 140  | 10    | 160    |                   |
|                                                                                | Nfr               | —                 |                        | - 140  | 10    | 160    |                   |
| f <sub>sc</sub> Output Amplitude                                               | 4.43e27           | —                 | (Note) C <sub>21</sub> | 420    | 500   | 580    | mV <sub>p-p</sub> |
|                                                                                | 3.58e27           | —                 |                        |        |       |        |                   |
| f <sub>sc</sub> Output DC Voltage                                              | 3.58eV27          | —                 | —                      | 2.6    | 2.9   | 3.2    | V                 |
|                                                                                | 0th V27           | —                 |                        | 1.6    | 1.9   | 2.2    |                   |

## DEF section

| CHARACTERISTIC                         | SYMBOL           | TEST CIR-<br>CUIT | TEST CONDITION | MIN.  | TYP.   | MAX.  | UNIT    |
|----------------------------------------|------------------|-------------------|----------------|-------|--------|-------|---------|
| H. Reference Frequency                 | FHVCO            | —                 | (Note) DH1     | 5.95  | 6.0    | 6.10  | MHz     |
| H. Reference Oscillation Start Voltage | VSHVCO           | —                 | (Note) DH2     | 2.3   | 2.6    | 2.9   | V       |
| H. Output Frequency 1                  | fH1              | —                 | (Note) DH3     | 15.5  | 15.625 | 15.72 | kHz     |
| H. Output Frequency 2                  | fH2              | —                 | (Note) DH4     | 15.62 | 15.734 | 15.84 |         |
| H. Output Duty 1                       | H $\phi$ 1       | —                 | (Note) DH5     | 39    | 41     | 43    | %       |
| H. Output Duty 2                       | H $\phi$ 2       | —                 | (Note) DH6     | 35    | 37     | 39    |         |
| H. Output Duty Switching Voltage 1     | V <sub>5-1</sub> | —                 | (Note) DH7     | 1.2   | 1.5    | 1.8   | V       |
| H. Output Voltage                      | VHH              | —                 | (Note) DH8     | 4.5   | 5.0    | 5.5   |         |
|                                        | VHL              | —                 |                | —     | —      | 0.5   |         |
| H. Output Oscillation Start Voltage    | VHS              | —                 | (Note) DH9     | —     | 5.0    | —     | $\mu$ s |
| H. FBP Phase                           | $\phi$ FBP       | —                 | (Note) DH10    | 6.2   | 6.9    | 7.6   |         |
| H. Picture Position, Maximum           | HSFTmax          | —                 | (Note) DH11    | 17.7  | 18.4   | 19.1  |         |
| H. Picture Position, Minimum           | HSFTmin          | —                 | (Note) DH12    | 12.4  | 13.1   | 13.8  |         |
| H. Picture Position Control Range      | $\Delta$ HSFT    | —                 | (Note) DH13    | 4.5   | 5.3    | 6.1   |         |

| CHARACTERISTIC                                          | SYMBOL       | TEST CIR-<br>CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT        |
|---------------------------------------------------------|--------------|-------------------|----------------|------|------|------|-------------|
| H. Distortion Correction Control Range                  | $\Delta HCC$ | —                 | (Note) DH14    | 0.5  | 1.0  | 1.5  | $\mu s / V$ |
| H. BLK Phase                                            | $\phi BLK$   | —                 | (Note) DH15    | 6.2  | 6.9  | 7.6  | $\mu s$     |
| H. BLK Width, Minimum                                   | BLKmin       | —                 | (Note) DH16    | 9.8  | 10.5 | 11.3 |             |
| H. BLK Width, Maximum                                   | BLKmax       | —                 | (Note) DH17    | 13.2 | 14.0 | 14.7 |             |
| P / N-GP Start Phase 1                                  | SPGP1        | —                 | (Note) DH18    | 3.45 | 3.68 | 3.90 |             |
| P / N-GP Start Phase 2                                  | SPGP2        | —                 | (Note) DH19    | 3.95 | 4.18 | 4.40 |             |
| P / N-GP Gate Width 1                                   | PGPW1        | —                 | (Note) DH20    | 1.65 | 1.75 | 1.85 |             |
| P / N-GP Gate Width 2                                   | PGPW2        | —                 | (Note) DH21    | 1.70 | 1.75 | 1.85 |             |
| SECAM-GP Start Phase 1                                  | SSGP1        | —                 | (Note) DH22    | 5.2  | 5.4  | 5.6  |             |
| SECAM-GP Start Phase 2                                  | SSGP2        | —                 | (Note) DH23    | 5.7  | 6.0  | 6.2  |             |
| SECAM-GP Gate Width 1                                   | SGPW1        | —                 | (Note) DH24    | 1.9  | 2.0  | 2.1  |             |
| SECAM-GP Gate Width 2                                   | SGPW2        | —                 | (Note) DH25    | 1.9  | 2.0  | 2.1  | V           |
| Noise Detection Level 1                                 | NL1          | —                 | (Note) DH26    | 0.15 | 0.2  | 0.25 |             |
| Noise Detection Level 2                                 | NL2          | —                 | (Note) DH27    | 0.1  | 0.18 | 0.26 |             |
| Noise Detection Level 3                                 | NL3          | —                 | (Note) DH28    | 0.1  | 0.15 | 0.2  |             |
| Noise Detection Level 4                                 | NL4          | —                 | (Note) DH29    | 0.08 | 0.13 | 0.2  | $V_{p-p}$   |
| V. Ramp Amplitude                                       | Vramp        | —                 | (Note) DV1     | 1.62 | 2.0  | 2.08 |             |
| V. NF Maximum Amplitude                                 | VNFmax       | —                 | (Note) DV2     | 3.2  | 3.5  | 3.8  |             |
| V. NF Minimum Amplitude                                 | VNFmin       | —                 | (Note) DV3     | 0.8  | 1.0  | 1.2  | dB          |
| V. Amplification Degree                                 | GVA          | —                 | (Note) DV4     | 20   | 26   | 32   |             |
| V. Amplifier Max. Output                                | Vvmax        | —                 | (Note) DV5     | 5.0  | —    | —    | V           |
| V. Amplifier Min. Output                                | Vvmin        | —                 | (Note) DV6     | 0    | —    | 1.5  |             |
| V. S-Curve Correction, Max. Correction Quantity         | $V_S$        | —                 | (Note) DV7     | 9    | 11   | 13   | %           |
| V. Reverse S-Curve Correction, Max. Correction Quantity | $V_{SR}$     | —                 | (Note) DV8     |      |      |      |             |
| V. Linearity Max. Correction Quantity                   | $V_L$        | —                 | (Note) DV9     | 9    | 20   | 31   |             |

| CHARACTERISTIC                   | SYMBOL            | TEST CIRCUIT | TEST CONDITION | MIN. | TYP.  | MAX. | UNIT |
|----------------------------------|-------------------|--------------|----------------|------|-------|------|------|
| AFC-MASK Start Phase             | $\phi$ AFCf       | —            | (Note) DV10    | 2.6  | 3.2   | 3.8  | H    |
| AFC-MASK Stop Phase              | $\phi$ AFCE       | —            | (Note) DV11    | 4.4  | 5.0   | 5.6  |      |
| VNFB phase                       | $\phi$ VNFB       | —            | (Note) DV12    | 0.45 | 0.75  | 1.05 |      |
| V. Output Maximum Phase          | V $\phi$ max      | —            | (Note) DV13    | 7.3  | 8.0   | 8.7  |      |
| V. Output Minimum Phase          | V $\phi$ min      | —            | (Note) DV14    | 0.5  | 1.0   | 1.5  |      |
| V. Output Phase Variable Range   | $\Delta$ V $\phi$ | —            | (Note) DV15    | 6.3  | 7.0   | 7.7  |      |
| 50 System VBLK Start Phase       | V50BLKf           | —            | (Note) DV16    | 0.4  | 0.55  | 0.7  |      |
| 50 System VBLK Stop Phase        | V50BLKe           | —            | (Note) DV17    | 20   | 23    | 26   |      |
| 60 System VBLK Start Phase       | V60BLKf           | —            | (Note) DV18    | 0.4  | 0.55  | 0.7  |      |
| 60 System VBLK Stop Phase        | V60BLKe           | —            | (Note) DV19    | 15   | 18    | 21   |      |
| Pin 56 VBLK Max Voltage          | V56H              | —            |                | 4.7  | 5.0   | 5.3  | V    |
| Pin 56 VBLK Min Voltage          | V56L              | —            |                | 0    | —     | 0.3  |      |
| V. Lead-In Range 1               | VAcaL             | —            | (Note) DV20    | —    | 232.5 | —    | Hz   |
|                                  | VAcaH             | —            |                | —    | 344.5 | —    |      |
| V. Lead-In Range 2               | V60caL            | —            | (Note) DV21    | —    | 232.5 | —    |      |
|                                  | V60caH            | —            |                | —    | 294.5 | —    |      |
| W-VBLK Start Phase               | SWVB              | —            | (Note) DV22    | 9    | —     | 88   | H    |
| W-PMUTE Start Phase              | SWP               | —            | (Note) DV23    |      |       |      |      |
| W-VBLK Stop Phase                | STWVB             | —            | (Note) DV24    | 10   | —     | 120  |      |
| W-PMUTE Stop Phase               | STWP              | —            | (Note) DV25    |      |       |      |      |
| V Centering Center Voltage       | V51               | —            | (Note) DV26    |      | 4.55  |      | V    |
| V Centering Max Voltage          | V51Max            | —            | (Note) DV27    |      | 6.30  |      |      |
| V Centering Min Voltage          | V51Min            | —            | (Note) DV28    |      | 2.75  |      |      |
| Pin 28 DAC Output Voltage (High) | V28H              | —            |                | 4.0  | 4.5   | 5.0  |      |
| Pin 28 DAC Output Voltage (Low)  | V28L              | —            |                | —    | 0     | 0.1  |      |

## 1H DL section

| CHARACTERISTIC                                                           | SYMBOL | TEST CIR-<br>CUIT | TEST CONDITION         | MIN.   | TYP.  | MAX.  | UNIT |
|--------------------------------------------------------------------------|--------|-------------------|------------------------|--------|-------|-------|------|
| 1HDL Dynamic Range, Direct                                               | VNBD   | —                 | (Note) H <sub>1</sub>  | 0.8    | 1.2   | —     | V    |
|                                                                          | VNRD   | —                 |                        |        |       |       |      |
| 1HDL Dynamic Range, Delay                                                | VPBD   | —                 | (Note) H <sub>2</sub>  | 0.8    | 1.2   | —     |      |
|                                                                          | VPRD   | —                 |                        |        |       |       |      |
| 1HDL Dynamic Range,<br>Direct + Delay                                    | VSBD   | —                 | (Note) H <sub>3</sub>  | 0.9    | 1.2   | —     |      |
|                                                                          | VSRD   | —                 |                        |        |       |       |      |
| Frequency Characteristic,<br>Direct                                      | GHB1   | —                 | (Note) H <sub>4</sub>  | − 3.0  | − 2.0 | 0.5   | dB   |
|                                                                          | GHR1   | —                 |                        |        |       |       |      |
| Frequency Characteristic,<br>Delay                                       | GHB2   | —                 | (Note) H <sub>5</sub>  | − 8.2  | − 6.5 | − 4.3 |      |
|                                                                          | GHR2   | —                 |                        |        |       |       |      |
| AC Gain, Direct                                                          | GBY1   | —                 | (Note) H <sub>6</sub>  | − 2.0  | − 0.5 | 2.0   |      |
|                                                                          | GRY1   | —                 |                        |        |       |       |      |
| AC Gain, Delay                                                           | GBY2   | —                 | (Note) H <sub>7</sub>  | − 2.4  | − 0.5 | 1.1   |      |
|                                                                          | GRY2   | —                 |                        |        |       |       |      |
| Direct-Delay AC Gain<br>Difference                                       | GBYD   | —                 | (Note) H <sub>8</sub>  | − 1.0  | 0.0   | 1.0   |      |
|                                                                          | GRYD   | —                 |                        |        |       |       |      |
| Color Difference Output DC<br>Stepping                                   | VBD    | —                 | (Note) H <sub>9</sub>  | − 5    | 0.0   | 5     | mV   |
|                                                                          | VRD    | —                 |                        |        |       |       |      |
| 1H Delay Quantity                                                        | BDt    | —                 | (Note) H <sub>10</sub> | 63.7   | 64.0  | 64.4  | μs   |
|                                                                          | RDt    | —                 |                        |        |       |       |      |
| Color Difference Output                                                  | Bomin  | —                 | (Note) H <sub>11</sub> | 22     | 36    | 55    | mV   |
| DC-Offset Control                                                        | Bomax  | —                 |                        | − 55   | − 36  | − 22  |      |
| Bus-Min Data                                                             | Romin  | —                 |                        | 22     | 36    | 55    |      |
| Bus-Max Data                                                             | Romax  | —                 |                        | − 55   | − 36  | − 22  |      |
| Color Difference Output DC-<br>Offset Control / Min. Control<br>Quantity | Bo1    | —                 | (Note) H <sub>12</sub> | 1      | 4     | 8     |      |
|                                                                          | Ro1    | —                 |                        |        |       |       |      |
| NTSC Mode Gain / NTSC-COM<br>Gain                                        | GNB    | —                 | (Note) H <sub>13</sub> | − 0.90 | 0     | 1.20  | dB   |
|                                                                          | GNR    | —                 |                        | 0.92   | 0     | 1.58  |      |

## Text section

| CHARACTERISTIC                        | SYMBOL            | TEST CIR-<br>CUIT | TEST CONDITION         | MIN. | TYP.  | MAX.  | UNIT  |
|---------------------------------------|-------------------|-------------------|------------------------|------|-------|-------|-------|
| Y Color Difference Clamping Voltage   | Vcp31             | —                 | (Note) T <sub>1</sub>  | 1.7  | 2.0   | 2.3   | V     |
|                                       | Vcp33             | —                 |                        | 2.2  | 2.5   | 2.8   |       |
|                                       | Vcp34             | —                 |                        |      |       |       |       |
| Contrast Control Characteristic       | Vc12mx            | —                 | (Note) T <sub>2</sub>  | 2.50 | 3.00  | 3.50  |       |
|                                       | Vc12mn            | —                 |                        | 0.21 | 0.31  | 0.47  |       |
|                                       | D12c80            | —                 |                        | 0.83 | 1.24  | 1.86  |       |
|                                       | Vc13mx            | —                 |                        | 2.50 | 3.00  | 3.50  |       |
|                                       | Vc13mn            | —                 |                        | 0.21 | 0.31  | 0.47  |       |
|                                       | D13c80            | —                 |                        | 0.83 | 1.24  | 1.86  |       |
|                                       | Vc14mx            | —                 |                        | 2.50 | 3.00  | 3.50  |       |
|                                       | Vc14mn            | —                 |                        | 0.21 | 0.31  | 0.47  |       |
|                                       | D14c80            | —                 |                        | 0.83 | 1.24  | 1.86  |       |
| AC Gain                               | Gr                | —                 | (Note) T <sub>3</sub>  | 2.8  | 4.0   | 5.2   | times |
|                                       | Gg                | —                 |                        |      |       |       |       |
|                                       | Gb                | —                 |                        |      |       |       |       |
| Frequency Characteristic              | Gf                | —                 | (Note) T <sub>4</sub>  | —    | − 1.0 | − 3.0 | dB    |
| Y Sub-Contrast Control Characteristic | $\Delta V_{scnt}$ | —                 | (Note) T <sub>5</sub>  | 3.0  | 6.0   | 9.0   | V     |
| Y <sub>2</sub> Input Range            | Vy2d              | —                 | (Note) T <sub>6</sub>  | 0.7  | —     | —     |       |
| Unicolor Control Characteristic       | Vn12mx            | —                 | (Note) T <sub>7</sub>  | 1.6  | 2.3   | 4.3   |       |
|                                       | Vn12mn            | —                 |                        | 0.17 | 0.35  | 0.42  |       |
|                                       | D12n80            | —                 |                        | 0.67 | 1.16  | 1.68  |       |
|                                       | Vn13mx            | —                 |                        | 1.6  | 2.3   | 4.3   |       |
|                                       | Vn13mn            | —                 |                        | 0.17 | 0.35  | 0.42  |       |
|                                       | D13n80            | —                 |                        | 0.67 | 1.16  | 1.68  |       |
|                                       | Vn14mx            | —                 |                        | 1.6  | 2.3   | 4.3   |       |
|                                       | Vn14mn            | —                 |                        | 0.17 | 0.26  | 0.42  |       |
|                                       | D14n80            | —                 |                        | 0.67 | 1.16  | 1.68  |       |
|                                       | $\Delta V_{13un}$ | —                 |                        | 16   | 20    | 24    | dB    |
| Relative Amplitude (NTSC)             | Mnr-b             | —                 | (Note) T <sub>8</sub>  | 0.70 | 0.77  | 0.85  | times |
|                                       | Mng-b             | —                 |                        | 0.30 | 0.34  | 0.38  |       |
| Relative Phase (NTSC)                 | $\theta_{nr-b}$   | —                 | (Note) T <sub>9</sub>  | 87   | 93    | 99    | °     |
|                                       | $\theta_{ng-b}$   | —                 |                        | 235  | 241.5 | 248   |       |
| Relative Amplitude (PAL)              | Mpr-b             | —                 | (Note) T <sub>10</sub> | 0.50 | 0.56  | 0.63  | times |
|                                       | Mpg-b             | —                 |                        | 0.30 | 0.34  | 0.38  |       |
| Relative Phase (PAL)                  | $\theta_{pr-b}$   | —                 | (Note) T <sub>11</sub> | 86   | 90    | 94    | °     |
|                                       | $\theta_{pg-b}$   | —                 |                        | 232  | 237   | 242   |       |

| CHARACTERISTIC                                  | SYMBOL             | TEST CIR-<br>CUIT | TEST CONDITION         | MIN.  | TYP.  | MAX.  | UNIT              |
|-------------------------------------------------|--------------------|-------------------|------------------------|-------|-------|-------|-------------------|
| Color Control Characteristic                    | Vcmx               | —                 | (Note) T <sub>12</sub> | 1.50  | 1.80  | 2.10  | V <sub>p-p</sub>  |
|                                                 | e <sub>col</sub>   | —                 |                        | 80    | 128   | 160   | step              |
|                                                 | Δ <sub>col</sub>   | —                 |                        | 142   | 192   | 242   |                   |
| Color Control Characteristic,<br>Residual Color | e <sub>cr</sub>    | —                 | (Note) T <sub>13</sub> | 0     | 12.5  | 25    | mV <sub>p-p</sub> |
|                                                 | e <sub>cg</sub>    | —                 |                        |       |       |       |                   |
|                                                 | e <sub>cb</sub>    | —                 |                        |       |       |       |                   |
| Chroma Input Range                              | V <sub>cr</sub>    | —                 | (Note) T <sub>14</sub> | 700   | —     | —     |                   |
| Brightness Control<br>Characteristic            | V <sub>brmx</sub>  | —                 | (Note) T <sub>15</sub> | 3.05  | 3.45  | 3.85  | V                 |
|                                                 | V <sub>brmn</sub>  | —                 |                        | 1.05  | 1.35  | 1.65  |                   |
| Brightness Center Voltage                       | V <sub>bcnt</sub>  | —                 | (Note) T <sub>16</sub> | 2.05  | 2.30  | 2.55  |                   |
| Brightness Data Sensitivity                     | ΔV <sub>brt</sub>  | —                 | (Note) T <sub>17</sub> | 6.3   | 7.8   | 9.4   | mV                |
| RGB Output Voltage Axes<br>Difference           | ΔV <sub>bct</sub>  | —                 | (Note) T <sub>18</sub> | −150  | 0     | 150   |                   |
| White Peak Limit Level                          | V <sub>wpl</sub>   | —                 | (Note) T <sub>19</sub> | 2.63  | 3.25  | 3.75  | V                 |
| Cutoff Control Characteristic                   | V <sub>comx</sub>  | —                 | (Note) T <sub>20</sub> | 2.55  | 2.75  | 2.95  |                   |
|                                                 | V <sub>comn</sub>  | —                 |                        | 1.55  | 1.75  | 1.95  |                   |
| Cutoff Center Level                             | V <sub>coct</sub>  | —                 | (Note) T <sub>21</sub> | 2.05  | 2.3   | 2.55  |                   |
| Cutoff Variable Range                           | ΔD <sub>cut</sub>  | —                 | (Note) T <sub>22</sub> | 2.3   | 3.9   | 5.5   | mV                |
| Drive Variable Range                            | DR +               | —                 | (Note) T <sub>23</sub> | 2.7   | 3.85  | 5.0   | dB                |
|                                                 | DR −               | —                 |                        | −6.5  | −5.6  | −4.7  |                   |
| DC Regeneration                                 | TDC                | —                 | (Note) T <sub>24</sub> | 0     | 50    | 100   | mV                |
| RGB Output S/N Ratio                            | S <sub>No</sub>    | —                 | (Note) T <sub>25</sub> | —     | −50   | −45   | dB                |
| Blanking Pulse Output Level                     | V <sub>v</sub>     | —                 | (Note) T <sub>26</sub> | 0.7   | 1.0   | 1.3   | V                 |
|                                                 | V <sub>h</sub>     | —                 |                        |       |       |       |                   |
| Blanking Pulse Delay Time                       | t <sub>don</sub>   | —                 | (Note) T <sub>27</sub> | 0.05  | 0.25  | 0.45  | μs                |
|                                                 | t <sub>doff</sub>  | —                 |                        | 0.05  | 0.35  | 0.85  |                   |
| RGB Min. Output Level                           | V <sub>mn</sub>    | —                 | (Note) T <sub>28</sub> | 0.8   | 1.0   | 1.2   | V                 |
| RGB Max. Output Level                           | V <sub>mx</sub>    | —                 | (Note) T <sub>29</sub> | 6.85  | 7.15  | 7.45  |                   |
| Halftone Ys Level                               | V <sub>thtl</sub>  | —                 | (Note) T <sub>30</sub> | 0.7   | 0.9   | 1.1   |                   |
| Halftone Gain 1                                 | G3htl3             | —                 | (Note) T <sub>31</sub> | −4.5  | −3.0  | −1.5  | dB                |
| Halftone Gain 2                                 | G6htl3             | —                 | (Note) T <sub>32</sub> | −7.5  | −6.0  | −4.5  |                   |
| Text ON Ys Level                                | V <sub>ttxl</sub>  | —                 | (Note) T <sub>33</sub> | 1.8   | 2.0   | 2.2   | V                 |
| Text/OSD Output, Low Level                      | V <sub>txl13</sub> | —                 | (Note) T <sub>34</sub> | −0.45 | −0.25 | −0.05 |                   |
| Text RGB Output, High Level                     | V <sub>mt13</sub>  | —                 | (Note) T <sub>35</sub> | 1.15  | 1.4   | 1.85  |                   |
| OSD Ys ON Level                                 | V <sub>tosl</sub>  | —                 | (Note) T <sub>36</sub> | 2.8   | 3.0   | 3.2   |                   |
| OSD RGB Output, High Level                      | V <sub>mos13</sub> | —                 | (Note) T <sub>37</sub> | 1.75  | 2.15  | 2.55  |                   |
| Text Input Threshold Level                      | V <sub>txtg</sub>  | —                 | (Note) T <sub>38</sub> | 0.7   | 1.0   | 1.3   |                   |
| OSD Input Threshold Level                       | V <sub>osdg</sub>  | —                 | (Note) T <sub>39</sub> | 1.7   | 2.0   | 2.3   |                   |

| CHARACTERISTIC                                                | SYMBOL            | TEST CIRCUIT | TEST CONDITION         | MIN. | TYP. | MAX. | UNIT |
|---------------------------------------------------------------|-------------------|--------------|------------------------|------|------|------|------|
| OSD Mode Switching Rise-Up Time                               | $\tau_{Rosr}$     | —            | (Note) T <sub>40</sub> | —    | 40   | 100  | ns   |
|                                                               | $\tau_{Rosg}$     | —            |                        |      |      |      |      |
|                                                               | $\tau_{Rosb}$     | —            |                        |      |      |      |      |
| OSD Mode Switching Rise-Up Transfer Time                      | $t_{PRosr}$       | —            | (Note) T <sub>41</sub> | —    | 40   | 100  | ns   |
|                                                               | $t_{PRosg}$       | —            |                        |      |      |      |      |
|                                                               | $t_{PRosb}$       | —            |                        |      |      |      |      |
| OSD Mode Switching Rise-Up Transfer Time, 3 Axes Difference   | $\Delta t_{PRos}$ | —            | (Note) T <sub>42</sub> | —    | 15   | 40   | ns   |
| OSD Mode Switching Breaking Time                              | $\tau_{Fosr}$     | —            | (Note) T <sub>43</sub> | —    | 30   | 100  | ns   |
|                                                               | $\tau_{Fosg}$     | —            |                        |      |      |      |      |
|                                                               | $\tau_{Fosb}$     | —            |                        |      |      |      |      |
| OSD Mode Switching Breaking Transfer Time                     | $t_{PFosr}$       | —            | (Note) T <sub>44</sub> | —    | 30   | 100  | ns   |
|                                                               | $t_{PFosg}$       | —            |                        |      |      |      |      |
|                                                               | $t_{PFosb}$       | —            |                        |      |      |      |      |
| OSD Mode Switching Breaking Transfer Time, 3 Axes Difference  | $\Delta t_{FROS}$ | —            | (Note) T <sub>45</sub> | —    | 20   | 40   | ns   |
| OSD Hi DC Switching Rise-Up Time                              | $\tau_{Roshr}$    | —            | (Note) T <sub>46</sub> | —    | 20   | 100  | ns   |
|                                                               | $\tau_{Roshg}$    | —            |                        |      |      |      |      |
|                                                               | $\tau_{Roshb}$    | —            |                        |      |      |      |      |
| OSD Hi DC Switching Rise-Up Transfer Time                     | $t_{PRohr}$       | —            | (Note) T <sub>47</sub> | —    | 20   | 100  | ns   |
|                                                               | $t_{PRohg}$       | —            |                        |      |      |      |      |
|                                                               | $t_{PRohb}$       | —            |                        |      |      |      |      |
| OSD Hi DC Switching Rise-Up Transfer Time, 3 Axes Difference  | $\Delta t_{PRoh}$ | —            | (Note) T <sub>48</sub> | —    | 0    | 40   | ns   |
| OSD Hi DC Switching Breaking Time                             | $\tau_{Foshr}$    | —            | (Note) T <sub>49</sub> | —    | 20   | 100  | ns   |
|                                                               | $\tau_{Foshg}$    | —            |                        |      |      |      |      |
|                                                               | $\tau_{Foshb}$    | —            |                        |      |      |      |      |
| OSD Hi DC Switching Breaking Transfer Time                    | $t_{PFohr}$       | —            | (Note) T <sub>50</sub> | —    | 20   | 100  | ns   |
|                                                               | $t_{PFohg}$       | —            |                        |      |      |      |      |
|                                                               | $t_{PFohb}$       | —            |                        |      |      |      |      |
| OSD Hi DC Switching Breaking Transfer Time, 3 Axes Difference | $\Delta t_{PFoh}$ | —            | (Note) T <sub>51</sub> | —    | 0    | 40   | ns   |

| CHARACTERISTIC                                                 | SYMBOL | TEST CIR-<br>CUIT | TEST CONDITION         | MIN. | TYP.  | MAX. | UNIT  |
|----------------------------------------------------------------|--------|-------------------|------------------------|------|-------|------|-------|
| RGB Contrast Control Characteristic                            | Vc12mx | —                 | (Note) T <sub>52</sub> | 2.10 | 2.5   | 2.97 | V     |
|                                                                | Vc12mn | —                 |                        | 0.21 | 0.31  | 0.47 |       |
|                                                                | D12c80 | —                 |                        | 0.84 | 1.25  | 1.87 |       |
|                                                                | Vc13mx | —                 |                        | 2.10 | 2.5   | 2.97 |       |
|                                                                | Vc13mn | —                 |                        | 0.21 | 0.31  | 0.47 |       |
|                                                                | D13c80 | —                 |                        | 0.84 | 1.25  | 1.87 |       |
|                                                                | Vc14mx | —                 |                        | 2.10 | 2.5   | 2.97 |       |
|                                                                | Vc14mn | —                 |                        | 0.21 | 0.31  | 0.47 |       |
|                                                                | D14c80 | —                 |                        | 0.84 | 1.25  | 1.87 |       |
| Analog RGB AC Gain                                             | Gag    | —                 | (Note) T <sub>53</sub> | 4.0  | 5.1   | 6.3  | times |
| Analog RGB Frequency Characteristic                            | Gfg    | —                 | (Note) T <sub>54</sub> | −0.5 | −1.75 | −3.0 | dB    |
| Analog RGB Dynamic Range                                       | Dr24   | —                 | (Note) T <sub>55</sub> | 0.5  | —     | —    | V     |
| RGB Brightness Control Characteristic                          | Vbrmxg | —                 | (Note) T <sub>56</sub> | 3.05 | 3.25  | 3.45 |       |
|                                                                | Vbrmng | —                 |                        | 1.05 | 1.25  | 1.45 |       |
| RGB Brightness Center Voltage                                  | Vbcntg | —                 | (Note) T <sub>57</sub> | 2.05 | 2.25  | 2.45 |       |
| RGB Brightness Data Sensitivity                                | ΔVbrtg | —                 | (Note) T <sub>58</sub> | 6.3  | 7.8   | 9.4  | mV    |
| Analog RGB Mode ON Voltage                                     | Vanath | —                 | (Note) T <sub>59</sub> | 0.8  | 1.0   | 1.2  | V     |
| Analog RGB Switching Rise-Up Time                              | τRanr  | —                 | (Note) T <sub>60</sub> | —    | 50    | 100  | ns    |
|                                                                | τRang  | —                 |                        |      |       |      |       |
|                                                                | τRanb  | —                 |                        |      |       |      |       |
| Analog RGB Switching Rise-Up Transfer Time                     | tpRanr | —                 | (Note) T <sub>61</sub> | —    | 20    | 100  |       |
|                                                                | tpRang | —                 |                        |      |       |      |       |
|                                                                | tpRanb | —                 |                        |      |       |      |       |
| Analog RGB Switching Rise-Up Transfer Time, 3 Axes Difference  | ΔtpRas | —                 | (Note) T <sub>62</sub> | —    | 0     | 40   |       |
| Analog RGB Switching Breaking Time                             | τFanr  | —                 | (Note) T <sub>63</sub> | —    | 50    | 100  |       |
|                                                                | τFang  | —                 |                        |      |       |      |       |
|                                                                | τFanb  | —                 |                        |      |       |      |       |
| Analog RGB Switching Breaking Transfer Time                    | tpFanr | —                 | (Note) T <sub>64</sub> | —    | 30    | 100  |       |
|                                                                | tpFang | —                 |                        |      |       |      |       |
|                                                                | tpFanb | —                 |                        |      |       |      |       |
| Analog RGB Switching Breaking Transfer Time, 3 Axes Difference | ΔtpFas | —                 | (Note) T <sub>65</sub> | —    | 0     | 40   |       |

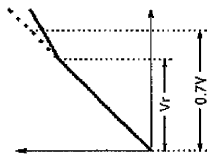
| CHARACTERISTIC                                                    | SYMBOL            | TEST CIR-<br>CUIT | TEST CONDITION         | MIN.  | TYP.  | MAX.  | UNIT |
|-------------------------------------------------------------------|-------------------|-------------------|------------------------|-------|-------|-------|------|
| Analog RGB Hi Switching Rise-Up Time                              | $\tau_{Ranhr}$    | —                 | (Note) T <sub>66</sub> | —     | 50    | 100   | ns   |
|                                                                   | $\tau_{Ranhg}$    | —                 |                        |       |       |       |      |
|                                                                   | $\tau_{Ranhb}$    | —                 |                        |       |       |       |      |
| Analog RGB Hi Switching Rise-Up Transfer Time                     | $t_{PRahr}$       | —                 | (Note) T <sub>67</sub> | —     | 20    | 100   |      |
|                                                                   | $t_{PRahg}$       | —                 |                        |       |       |       |      |
|                                                                   | $t_{PRahb}$       | —                 |                        |       |       |       |      |
| Analog RGB Hi Switching Rise-Up Transfer Time, 3 Axes Difference  | $\Delta t_{PRah}$ | —                 | (Note) T <sub>68</sub> | —     | 0     | 40    |      |
| Analog RGB Hi Switching Breaking Time                             | $t_{Fanhr}$       | —                 | (Note) T <sub>69</sub> | —     | 50    | 100   |      |
|                                                                   | $t_{Fanhg}$       | —                 |                        |       |       |       |      |
|                                                                   | $t_{Fanhb}$       | —                 |                        |       |       |       |      |
| Analog RGB Hi Switching Breaking Transfer Time                    | $t_{PFahr}$       | —                 | (Note) T <sub>70</sub> | —     | 20    | 100   |      |
|                                                                   | $t_{PFahg}$       | —                 |                        |       |       |       |      |
|                                                                   | $t_{PFahb}$       | —                 |                        |       |       |       |      |
| Analog RGB Hi Switching Breaking Transfer Time, 3 Axes Difference | $\Delta t_{PFah}$ | —                 | (Note) T <sub>71</sub> | —     | 0     | 40    |      |
| TV-Analog RGB Crosstalk                                           | Crtvag            | —                 | (Note) T <sub>72</sub> | − 80  | − 50  | − 40  | dB   |
| Analog RGB-TV Crosstalk                                           | Crantg            | —                 | (Note) T <sub>73</sub> |       |       |       |      |
| ABL Point Characteristic                                          | Vablpl            | —                 | (Note) T <sub>74</sub> | 5.5   | 5.6   | 5.7   | V    |
|                                                                   | Vablpc            | —                 |                        | 5.7   | 5.8   | 5.9   |      |
|                                                                   | Vablph            | —                 |                        | 5.9   | 6.0   | 6.1   |      |
| ACL Characteristic                                                | Vcal              | —                 | (Note) T <sub>75</sub> | − 19  | − 16  | − 13  | dB   |
| ABL Gain Characteristic                                           | Vabll             | —                 | (Note) T <sub>76</sub> | − 0.3 | 0     | 0.3   | V    |
|                                                                   | Vablc             | —                 |                        | − 1.3 | − 1.0 | − 0.7 |      |
|                                                                   | Vablh             | —                 |                        | − 2.3 | − 2.0 | − 1.7 |      |

## SECAM section

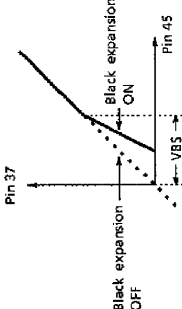
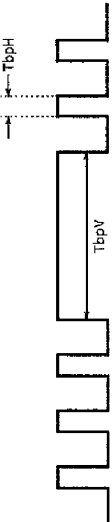
| CHARACTERISTIC                                          | SYMBOL  | TEST CIR-<br>CUIT | TEST CONDITION         | MIN.   | TYP. | MIN.   | UNIT              |
|---------------------------------------------------------|---------|-------------------|------------------------|--------|------|--------|-------------------|
| Bell Monitor Output Amplitude                           | embo    | —                 | (Note) S <sub>1</sub>  | 200    | 300  | 400    | mV <sub>p-p</sub> |
| Bell Filter f <sub>0</sub>                              | foB-C   | —                 | (Note) S <sub>2</sub>  | − 23   | 0    | 23     | kHz               |
| Bell Filter f <sub>0</sub> Variable Range               | foB-L   | —                 | (Note) S <sub>3</sub>  | − 69   | − 46 | − 23   |                   |
|                                                         | foB-H   | —                 |                        | 69     | 92   | 115    |                   |
| Bell Filter Q                                           | QBEL    | —                 | (Note) S <sub>4</sub>  | 14     | 16   | 18     | —                 |
| Color Difference Output Amplitude                       | VBS     | —                 | (Note) S <sub>5</sub>  | 0.50   | —    | 0.91   | V <sub>p-p</sub>  |
|                                                         | VRS     | —                 |                        | 0.39   | —    | 0.73   |                   |
| Color Difference Relative Amplitude                     | R / B-S | —                 | (Note) S <sub>6</sub>  | 0.70   | —    | 0.90   | —                 |
| Color Difference Attenuation Quantity                   | SATTB   | —                 | (Note) S <sub>7</sub>  | − 1.50 | —    | − 0.50 | dB                |
|                                                         | SATTR   | —                 |                        |        |      |        |                   |
| Color Difference S / N Ratio                            | SNB-S   | —                 | (Note) S <sub>8</sub>  | − 85   | —    | − 25   |                   |
|                                                         | SBR-S   | —                 |                        |        |      |        |                   |
| Linearity                                               | LinB    | —                 | (Note) S <sub>9</sub>  | 75     | —    | 117    | %                 |
|                                                         | LinR    | —                 |                        | 85     | —    | 120    |                   |
| Rising-Fall Time (Standard De-Emphasis)                 | trfB    | —                 | (Note) S <sub>10</sub> | —      | 1.3  | 1.5    | μs                |
|                                                         | trfR    | —                 |                        |        |      |        |                   |
| Rising-Fall Time (Wide-Band De-Emphasis)                | trfBw   | —                 | (Note) S <sub>11</sub> | —      | 1.1  | 1.3    |                   |
|                                                         | trfRw   | —                 |                        |        |      |        |                   |
| Killer Operation Input Level (Standard Setting)         | eSK     | —                 | (Note) S <sub>12</sub> | 0.5    | 1    | 2      | mV <sub>p-p</sub> |
|                                                         | eSC     | —                 |                        |        |      |        |                   |
| Killer Operation Input Level (VID ON)                   | eSFK    | —                 | (Note) S <sub>13</sub> |        |      |        |                   |
|                                                         | eSFC    | —                 |                        |        |      |        |                   |
| Killer Operation Input Level (Low Sensitivity, VID OFF) | eSWK    | —                 | (Note) S <sub>14</sub> |        |      |        |                   |
|                                                         | eSWC    | —                 |                        |        |      |        |                   |

TEST CONDITION  
VIDEO SECTION

| NOTE | ITEM                              | TEST CONDITION (Unless otherwise specified : H, RGB VCC = 9V ; VDD, Fsc VDD, Y/C VCC = 5V ; Ta = 25 ± 3°C) |     |     |     |     | MEASURING METHOD        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |
|------|-----------------------------------|------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
|      |                                   | SW MODE                                                                                                    |     |     |     |     | SUB-ADDRESS & BUS DATA  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |
|      |                                   | S39                                                                                                        | S42 | S44 | S45 | S51 | 04H 08H 0FH 10H 13H 14H |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |
| Y1   | Y Input Pedestal Clamping Voltage | A                                                                                                          | C   | B   | A   | A   | 20H 04H 80H 00H BAH 03H | (1) Short circuit pin 45 (Y <sub>1</sub> IN) in AC coupling.<br>(2) Input synchronizing signal to pin 51 (SYNC IN).<br>(3) Measure DC voltage at pin 45, and express the measurement result as V <sub>Yclp</sub> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |   |   |
| Y2   | Chroma Trap Frequency             | ↑                                                                                                          | ↑   | A   | B   | ↑   |                         | (1) Set the 358 TRAP mode to AUTO by setting the bus data.<br>(2) Set the bus data so that chroma trap is ON and f <sub>0</sub> is 0.<br>(3) Input TG7 sine wave signal whose frequency is 3.58MHz (NTSC) and video amplitude is 0.5V to pin 45 (Y <sub>1</sub> IN).<br>(4) While observing waveform at pin 37 (Y <sub>1out</sub> ), find a frequency with minimum amplitude of the waveform. The obtained frequency shall be expressed as fir3.<br>(5) Change the frequency of the signal 1 to 4.43MHz (PAL) and perform the same measurement as the preceding step 4. The obtained frequency shall be expressed as fir4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ↑ | ↑ | ↑ |
| Y3   | Chroma Trap Attenuation (3.58MHz) | ↑                                                                                                          | ↑   | ↑   | ↑   | ↑   | Vari-Vari-Variable able | (1) Set the 358 TRAP mode to AUTO by setting bus data.<br>(2) Set the bus data so that Q of chroma trap is 1.5.<br>(3) Set the bus data so that f <sub>0</sub> of chroma trap is 0.<br>(4) Input TG7 sine wave signal whose frequency is 3.58MHz (NTSC) and video amplitude is 0.5V to pin 45 (Y <sub>1</sub> IN).<br>(5) While turning on and off the chroma trap by controlling the bus, measure chroma amplitude (V <sub>Ton</sub> ) at pin 37 (Y <sub>1out</sub> ) with the chroma trap being turned on and measure chroma amplitude (V <sub>Off</sub> ) at pin 37 (Y <sub>1out</sub> ) with the chroma trap being turned off.<br>Gtr = 20f <sub>0</sub> g (V <sub>Off</sub> /V <sub>Ton</sub> )<br>(6) Change f <sub>0</sub> of the chroma trap to -100kHz, -50kHz, 0 and +50kHz, and perform the same measurement as the preceding steps 4 and 5 with the respective f <sub>0</sub> settings.<br>(7) Change Q of the chroma trap to 1, 1.5, 2 and 2.5, and perform the same measurement as the preceding steps 4 through 6. The maximum Gtr shall be expressed as Gtr3a.<br>(8) Set the 358 TRAP mode to the forces 358 mode by setting bus data, and perform the same measurement as the preceding steps 2 through 7 (Gtr3f). | ↑ | ↑ | ↑ |

| NOTE | ITEM                              | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C) |     |     |     |     |                        |     |           |           |           |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|-----------|-----------|-----------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                   | SW MODE                                                                                                                                                      |     |     |     |     | SUB-ADDRESS & BUS DATA |     |           |           |           |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|      |                                   | S39                                                                                                                                                          | S42 | S44 | S45 | S51 | 04H                    | 08H | 0FH       | 10H       | 13H       | 14H |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|      |                                   |                                                                                                                                                              |     |     |     |     |                        |     |           |           |           |     | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Y4   | Chroma Trap Attenuation (4.43MHz) | A                                                                                                                                                            | C   | A   | B   | A   | 20H                    | 04H | Vari-able | Vari-able | Vari-able | 03H | (1) Set the 358 TRAP mode to AUTO by setting bus data.<br>(2) Set the bus data so that Q of chroma trap is 1.5.<br>(3) Set the bus data so that f <sub>0</sub> of chroma trap is 0.<br>(4) Input TG7 sine wave signal whose frequency is 4.43MHz and video amplitude is 0.5V to pin 45 (Y <sub>1</sub> IN).<br>(5) Perform the same measurement as the steps 5 through 7 of the preceding item Y3. The measurement result shall be expressed as Gtr4.                                                                                                                                                                   |
| Y5   | Chroma Trap Attenuation (SECAM)   | ↑                                                                                                                                                            | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑         | ↑         | ↑         | ↑   | (1) Set the bus data so that the 358 TRAP mode is AUTO and the Dtrap is ON.<br>(2) Set the bus data so that Q of chroma trap is 1.5.<br>(3) Set the bus data so that f <sub>0</sub> of chroma trap is 0.<br>(4) Input SECAM signal whose amplitude in video period is 0.5V to pin 45 (Y <sub>1</sub> IN).<br>(5) Perform the same measurement as the steps 5 through 7 of the preceding item Y3 to find the maximum attenuation (Gtrs).                                                                                                                                                                                 |
| Y6   | Y <sub>γ</sub> Correction Point   | ↑                                                                                                                                                            | ↑   | ↑   | ↑   | ↑   | Vari-able              | 80H | 00H       | 8AH       | ↑         | ↑   | (1) Connect the power supply to pin 45 (Y <sub>1</sub> IN).<br>(2) Turn off Y <sub>γ</sub> by setting the bus data.<br>(3) While raising the supply voltage from the level measured in the preceding item Y <sub>1</sub> , measure voltage change characteristic of Y <sub>1</sub> output at pin 37.<br>(4) Set the bus data to turn on Y <sub>γ</sub><br>(5) Perform the same measurement as the above step 3.<br>(6) Find a gamma (γ) point from the measurement results of the steps 3 and 5.<br><br><br>$\gamma p = Vr \div 0.7V$ |
| Y7   | Y <sub>γ</sub> Correction Curve   | ↑                                                                                                                                                            | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑         | ↑         | ↑         | ↑   | From the measurement in the above item Y6, find gain of the portion that the γ correction has an effect on.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| NOTE | ITEM                                        | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ) |     |     |                        |     |                         |   | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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|      |                                             | SW MODE                                                                                                                               |     |     | SUB-ADDRESS & BUS DATA |     |                         |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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|      |                                             | S39                                                                                                                                   | S42 | S44 | S45                    | S51 | 04H 08H 0FH 10H 13H 14H |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Y8   | APL Terminal Output Impedance               | A                                                                                                                                     | C   | B   | A                      | A   | 20H 04H 80H 00H BAH 03H |   | (1) Short circuit pin 45 (Y <sub>1</sub> IN) in AC coupling.<br>(2) Input synchronizing signal to pin 51.<br>(3) Connect power supply and an ammeter to the APL of pin 44 as shown in the figure, and adjust the power supply so that the ammeter reads 0 (zero).<br>(4) Raise the voltage at pin 44 by 0.1V, and measure the current (I <sub>n</sub> ) at that time.<br>$Z_{o44} (\Omega) = 0.1V \div I_n (A)$                                                                                                                                                                                                                                                                                                                                                  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| Y9   | DC Transmission Compensation Amplifier Gain | ↑                                                                                                                                     | ↑   | ↑   | ↑                      | ↑   | ↑                       | ↑ | (1) Set the bus data so that DC transmission factor correction gain is maximum.<br>(2) In the condition of the Note Y <sub>8</sub> , observe Y <sub>1out</sub> waveform at pin 37 and measure voltage change in the video period.<br>(3) Set the bus data so that DC transmission factor correction gain is centered, and measure voltage in the same manner as the above step 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Y10  | Maximum Gain of Black Expansion Amplifier   | ↑                                                                                                                                     | ↑   | A   | B                      | ↑   | ↑                       | ↑ | <div><div>Pin 19 waveform</div><div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>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|

| NOTE | ITEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC} = 9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC} = 5V$ ; $T_a = 25 \pm 3^{\circ}C$ ) |     |     |     |                        |     |     |     |     |     |          |                                                                                    |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------------------------|-----|-----|-----|-----|-----|----------|------------------------------------------------------------------------------------|
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SW MODE                                                                                                                                       |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     |     |     |          |                                                                                    |
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | S39                                                                                                                                           | S42 | S44 | S45 | S51                    | 04H | 08H | 0FH | 10H | 13H | 14H      |                                                                                    |
| Y11  | Black Expansion Start Point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A                                                                                                                                             | C   | A   | A   | A                      | 20H | 04H | 00H | 00H | BAH | Variable |   |
|      | <p>(1) Set the bus data so that black expansion is on and black expansion point is maximum.</p> <p>(2) Supply 1.0V to pin 39 (Black Peak Hold).</p> <p>(3) Supply 2.9V to the APL of pin 44.</p> <p>(4) Connect the power supply to pin 45 (Y1 IN). While raising the supply voltage from the level measured in the preceding item Y1, measure voltage change at pin 37 (Y1out).</p> <p>(5) Set the bus data to center the black expansion point, and perform the same measurement as the above steps 2 through 4.</p> <p>(6) Set the black expansion point to the minimum by setting the bus data, and perform the same measurement as the above steps 2 through 4.</p> <p>(7) While supplying 2.2V to the APL of pin 44, perform the same measurement as the above step 4 with the black expansion point set to maximum, center and minimum.</p> |                                                                                                                                               |     |     |     |                        |     |     |     |     |     |          |                                                                                    |
| Y12  | Black Peak Detection Period (Horizontal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | B                                                                                                                                             | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑   | E3H      |  |
|      | Black Peak Detection Period (Vertical)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | In the condition of the Note Y1, measure waveform at pin 39 (Black Peak Hold).                                                                |     |     |     |                        |     |     |     |     |     |          |                                                                                    |

(1) Set the bus data so that black expansion is on and black expansion point is maximum.

(2) Supply 1.0V to pin 39 (Black Peak Hold).

(3) Supply 2.9V to the APL of pin 44.

(4) Connect the power supply to pin

45 (Y1 IN). While raising the

supply voltage from the level

measured in the preceding item

Y1, measure voltage change at

pin 37 (Y1out).

(5) Set the bus data to center the

black expansion point, and

perform the same measurement

as the above steps 2 through 4.

(6) Set the black expansion point to the minimum by setting the bus

data, and perform the same measurement as the above steps 2

through 4.

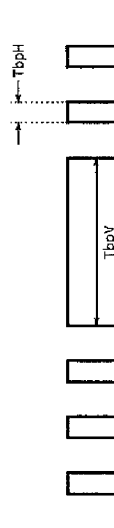
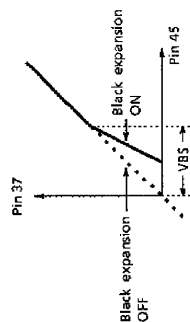
(7) While supplying 2.2V to the APL of pin 44, perform the same

measurement as the above step 4 with the black expansion point

set to maximum, center and minimum.

In the condition of the Note Y1, measure waveform at pin 39 (Black

Peak Hold).



| NOTE | ITEM                                           | TEST CONDITION (Unless otherwise specified : H, RGB VCC = 9V ; VDD, Fsc VDD, Y/C VCC = 5V ; Ta = 25 ± 3°C) |     |     |     |     |                        |     |     |     |          |
|------|------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|-----|-----|----------|
|      |                                                | SW MODE                                                                                                    |     |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     |          |
|      |                                                | S39                                                                                                        | S42 | S44 | S45 | S51 | 04H                    | 08H | 0FH | 10H | 13H 14H  |
| Y13  | Picture Quality Control Peaking Frequency      | A                                                                                                          | C   | A   | B   | A   | 3FH                    | 04H | 80H | 00H | 8AH      |
|      |                                                |                                                                                                            |     |     |     |     |                        |     |     |     | Variable |
| Y14  | Picture Quality Control Maximum Characteristic |                                                                                                            |     |     |     |     |                        |     |     |     |          |
|      |                                                | ↑                                                                                                          | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑        |

MEASURING METHOD

(1) Set the bus data so that picture quality control frequency is 2.5MHz.

(2) Input TG7 sine wave (sweeper) signal whose video level is 0.1V to pin 45 (Y<sub>1</sub> IN) and pin 51 (Sync. IN).

(3) Maximize the picture quality control data.

(4) While observing Y<sub>1</sub>out of pin 37, find an SG frequency as the waveform amplitude is maximum (fp25).

(5) Set the bus data so that picture quality control frequency is 3.1MHz and 4.2MHz, and perform the same measurement as the above steps 2 through 4 at the respective frequencies (fp31, fp42).

(1) Input TG7 sine wave (sweeper) signal whose video level is 0.1V to pin 45 (Y<sub>1</sub> IN) and pin 51 (Sync. IN).

(2) Set the picture quality control data to maximum.

(3) Set the picture quality control frequency is 2.5MHz by setting the bus data.

(4) Measure amplitude (V100k) of the output of pin 37 (Y<sub>1</sub> OUT) as the SG frequency is 100kHz, and the amplitude (Vp25) of the same as the SG frequency is 2.5MHz.  
GS25MX = 20f<sub>og</sub> (Vp25 / V100k)

(5) Set the picture quality control frequency data to 3.1MHz by setting the bus data.

(6) Measure amplitude (V100k) of the output of pin 37 (Y<sub>1</sub> OUT) as the SG frequency is 100kHz, and the amplitude (Vp31) of the same as the SG frequency is 3.1MHz.  
GS31MX = 20f<sub>og</sub> (Vp31 / V100k)

(7) Set the picture quality control frequency to 4.2MHz by setting the bus data.

(8) Measure amplitude (V100k) of the output of pin 37 (Y<sub>1</sub> OUT) as the SG frequency is 100kHz, and the amplitude (Vp42) of the same as the SG frequency is 4.2MHz.  
GS42MX = 20f<sub>og</sub> (Vp42 / V100k)

| NOTE | ITEM                                           | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , f <sub>sc</sub> V <sub>CC</sub> = 5V ; T <sub>a</sub> = 25 ± 3°C) |     |     |     |     |                        |     |     |     |              |
|------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|-----|-----|--------------|
|      |                                                | SW MODE                                                                                                                                                        |     |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     |              |
|      |                                                | S39                                                                                                                                                            | S42 | S44 | S45 | S51 | 04H                    | 08H | 0FH | 10H | 13H 14H      |
| Y15  | Picture Quality Control Minimum Characteristic | A                                                                                                                                                              | C   | A   | B   | A   | 00H                    | 04H | 80H | 00H | 8AH Variable |
|      |                                                |                                                                                                                                                                |     |     |     |     |                        |     |     |     |              |
| Y16  | Picture Quality Control Center Characteristic  | ↑                                                                                                                                                              | ↑   | ↑   | ↑   | ↑   | 20H                    | ↑   | ↑   | ↑   | ↑            |
|      |                                                |                                                                                                                                                                |     |     |     |     |                        |     |     |     |              |
| Y17  | Y Signal Gain                                  | ↑                                                                                                                                                              | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | 03H          |
|      |                                                |                                                                                                                                                                |     |     |     |     |                        |     |     |     |              |
| Y18  | Y Signal Frequency Characteristic              | ↑                                                                                                                                                              | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑            |
|      |                                                |                                                                                                                                                                |     |     |     |     |                        |     |     |     |              |

(1) In the condition of the Note Y14, set the picture quality control bus data to minimum.

(2) Perform the same measurement as the steps 3 through 8 of the Note Y14 to find respective gains as the picture quality control frequency is set to 2.5MHz, 3.1MHz and 4.2MHz.

GS25MN = 20log (Vp25 / V100k)

GS31MN = 20log (Vp31 / V100k)

GS42MN = 20log (Vp42 / V100k)

(1) In the condition of the Note Y14, set the picture quality control bus data to center.

(2) Perform the same measurement as the steps 3 through 8 of the Note Y14 to find respective gains as the picture quality control frequency is set to 2.5MHz, 3.1MHz and 4.2MHz.

GS25CT = 20log (Vp25 / V100k)

GS31CT = 20log (Vp31 / V100k)

GS42CT = 20log (Vp42 / V100k)

(1) Set the bus data so that black expansion is off, picture quality control is off and DC transmission compensation is minimum.

(2) Input TG7 sine wave signal whose frequency is 100kHz and video level is 0.5V to pin 45 (Y1 IN) and pin 51 (Sync. IN). (Vy100)

(3) Measure amplitude of Y1 output at pin 37 (V<sub>yout</sub>).

Gy = 20log (V<sub>yout</sub> / Vy100)

(1) Set the bus data so that black expansion is off, picture quality control is off and DC transmission compensation is minimum.

(2) Input TG7 sine wave signal whose frequency is 6MHz and video level is 0.5V to pin 45 (Y1 IN) and pin 51 (Sync. IN). (Vy16M)

(3) Measure amplitude of Y1 output at pin 37 (V<sub>y16M</sub>).

Gy6M = 20log (Vy16M / Vy16M)

(4) Find Gfy from the result of the Note Y17.

Gfy = Gy6M - Gy

| NOTE | ITEM                         | TEST CONDITION (Unless otherwise specified : H, RGB VCC=9V ; VDD, fsc VDD, Y/C VCC=5V ; Ta=25±3°C) |     |     |                        |     |                         |                                                                                                                                                                                                                                                                                                                                                                                             |
|------|------------------------------|----------------------------------------------------------------------------------------------------|-----|-----|------------------------|-----|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                              | SW MODE                                                                                            |     |     | SUB-ADDRESS & BUS DATA |     |                         |                                                                                                                                                                                                                                                                                                                                                                                             |
|      |                              | S39                                                                                                | S42 | S44 | S45                    | S51 | 04H 08H 0FH 10H 13H 14H | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                            |
| Y19  | Y Signal Maximum Input Range | A                                                                                                  | C   | A   | B                      | A   | 20H 04H 80H 00H BAH 03H | (1) Set the bus data so that black expansion is off, picture quality control is off and DC transmission compensation is minimum.<br>(2) Input TG7 sine wave signal whose frequency is 100kHz to pin 45 (Y1 IN) and pin 51 (Sync. IN).<br>(3) While increasing the amplitude Vyd of the signal in the video period, measure Vyd just before the waveform of Y1 output (pin 37) is distorted. |

CHROMA SECTION

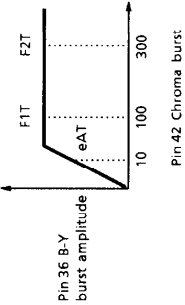
| NOTE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ITEM                  | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ) |    |     |     |     |     |     |     |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       | MEASURING METHOD                                                                                                                      |    |     |     |     |     |     |     |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       | S26                                                                                                                                   | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
| C1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ACC<br>Characteristic | ON                                                                                                                                    | A  | B   | B   | B   | A   | A   | A   | A   | B   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                                                                                                                                       |    |     |     |     |     |     |     |     |     |
| <p>(1) Activate the test mode (S26-ON, Sub Add 02 ; 01h).</p> <p>(2) Set as follows : band pass filter <math>Q=2</math>, <math>f_o=600kHz</math>, crystal clock = conforming to European, Asian system.</p> <p>(3) Set the gate to the normal status.</p> <p>(4) Input 3N rainbow color bar signal to pin 42 (Chroma IN).</p> <p>(5) When input signal to pin 42 is the same in the burst and chroma levels (10mV<sub>p-p</sub>), burst amplitude of B-Y output signal from pin 36 is expressed as eAT. When the level of input signal to pin 42 is 100mV<sub>p-p</sub> or 300mV<sub>p-p</sub>, burst amplitude of the B-Y output signal is expressed as F1T or F2T. The ratio between F1T and F2T is expressed as AT.</p> <p style="text-align: center;"><math>F2T / F1T = AT</math></p> <p>(6) Perform the same measurement in the EXT. mode (<math>f_o=0</math>).<br/>(eAE, F1E, AE)</p> <p>(7) Input 4N rainbow color bar signal to pin 42 (Chroma IN), and perform the same measurement as the above-mentioned steps with 3N rainbow color bar signal input.</p> |                       |                                                                                                                                       |    |     |     |     |     |     |     |     |     |

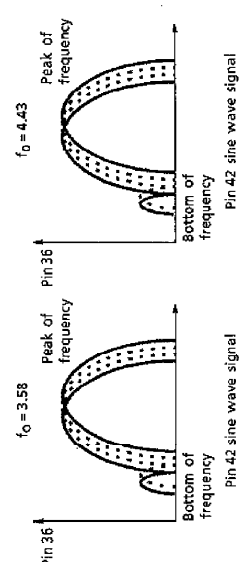
Pin 36 B-Y burst amplitude

F1T    F2T

10    100    300

Pin 42 Chroma burst



| NOTE           | ITEM                            | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> = 5V ; Ta = 25 ± 3°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |     |     |     |     |     |     |     |     |
|----------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|                |                                 | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |     |     |     |     |     |     |     |     |
|                |                                 | S26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
| C <sub>2</sub> | Band Pass Filter Characteristic | ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | A  | B   | B   | B   | A   | B   | A   | A   | B   |
|                |                                 | <p>(1) Activate the test mode (S26-ON, Sub Add 02 ; 01h).</p> <p>(2) Set as follows : band pass filter Q = 2, crystal clock = conforming to 3.579 / 4.43MHz, gate = normal status.</p> <p>(3) Input 3N composite sine wave signal (1V<sub>p-p</sub>) to pin 42 (Chroma IN).</p> <p>(4) Measure frequency characteristic of B-Y output of pin 36 and measure the peak frequency, too.</p> <p>(5) Changing f<sub>0</sub> to 0, 500, 600 and 700 by the bus control and measure peak frequencies respectively with different f<sub>0</sub>.</p> <p>(6) For measuring frequency characteristic as f<sub>0</sub> is 4.43, use 4.43MHz crystal clock.</p> <p>Measure the following items in the same manner.</p> <div></div> |    |     |     |     |     |     |     |     |     |

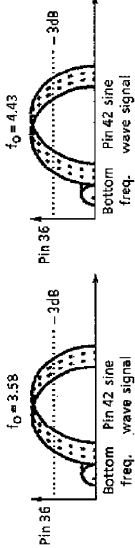
| NOTE | ITEM                                       | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^\circ C$ ) |    |     |     |     |     |     |     |     |     |
|------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |                                            | MEASURING METHOD                                                                                                                     |    |     |     |     |     |     |     |     |     |
|      |                                            | SW MODE                                                                                                                              |    |     |     |     |     |     |     |     |     |
|      |                                            | S26                                                                                                                                  | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
| C3   | Band Pass Filter, -3dB Band Characteristic | ON                                                                                                                                   | A  | B   | B   | B   | A   | B   | A   | A   | B   |
|      |                                            |                                                                                                                                      |    |     |     |     |     |     |     |     |     |
| C4   | Band Pass Filter, Q Characteristic Check   | ↑                                                                                                                                    | ↑  | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   |
|      |                                            |                                                                                                                                      |    |     |     |     |     |     |     |     |     |

(1) Activate the test mode (S26-ON, Sub Add 02 ; 01h).  
 (2) Set as follows : band pass filter Q = 2, crystal clock = conforming to 3.579 / 4.43MHz.  
 (3) Set the gate to the normal status.  
 (4) Input 3N composite sine wave signal (1V<sub>p-p</sub>) to pin 42 (Chroma IN).  
 (5) Measure frequency characteristic of B-Y output of pin 36, and measure peak frequency in the -3dB band.  
 (6) Changing  $f_0$  to 0, 500, 600 and 700 by the bus control and measure peak frequencies in the -3dB band respectively with different  $f_0$ .

Pin 36  $f_0 = 3.58$  -3dB Pin 42 sine wave signal  
 Pin 36  $f_0 = 4.43$  -3dB Pin 42 sine wave signal

(1) Activate the test mode (S26-ON, Sub Add 02 ; 01h).  
 (2) Set as follows : TV mode ( $f_0 = 600$ ), Crystal mode = conforming to 3.579 / 4.43MHz, gate = normal status.  
 (3) Input 3N composite sine wave signal (1V<sub>p-p</sub>) to pin 42 (Chroma IN).  
 (4) Measure frequency characteristic of B-Y output of pin 36, and measure peak frequency in the -3dB band.  
 (5) Changing  $f_0$  of the band pass filter to 0, 500, 600 and 700 by the bus control and measure peak frequencies in the -3dB band respectively with different  $f_0$ .

Pin 36  $f_0 = 3.58$  -3dB Pin 42 sine wave signal  
 Pin 36  $f_0 = 4.43$  -3dB Pin 42 sine wave signal

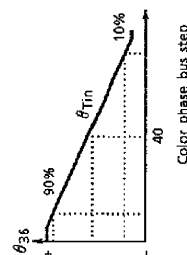
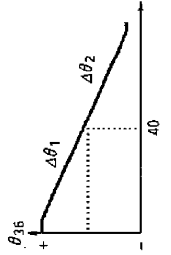
| NOTE | ITEM                                   | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> /Y/C V <sub>CC</sub> =5V ; Ta = 25 ± 3°C)                                                                                                                                                                                                                                                                                                                                                                                |    |     |     |     |     |     |     |     |     |
|------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |                                        | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |     |     |     |     |     |     |     |     |
|      |                                        | S26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
|      |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |     |     |     |     |     |     |     |
| C5   | 1/2 f <sub>o</sub> Trap Characteristic | ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A  | B   | B   | B   | A   | B   | A   | A   | B   |
|      |                                        | <p>(1) Activate the test mode (S26-ON, Sub Add 02 ; 01h).</p> <p>(2) Set as follows : band pass filter Q = 2, crystal clock = conforming to 3.579 / 4.43MHz, gate = normal status.</p> <p>(3) Input 3N composite sine wave signal (1V<sub>p-p</sub>) to pin 42 (Chroma IN).</p> <p>(4) Measure frequency characteristic of B-Y output of pin 36, and measure bottom frequency.</p> <p>(5) Changing f<sub>o</sub> to 0, 500, 600 and 700 by the bus control and measure bottom frequencies respectively with different f<sub>o</sub>.</p> |    |     |     |     |     |     |     |     |     |
|      |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |     |     |     |     |     |     |     |     |

| TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC} = 9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC} = 5V$ ; $T_a = 25 \pm 3^\circ C$ ) |                                                |         |    |     |     |     |     |     |     |     |     |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------|----|-----|-----|-----|-----|-----|-----|-----|-----|
| NOTE                                                                                                                                         | ITEM                                           | SW MODE |    |     |     |     |     |     |     |     |     |
|                                                                                                                                              |                                                | S26     | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
| C6                                                                                                                                           | Tint Control Sharing Range ( $f_o = 600kHz$ )  | ON      | A  | B   | B   | B   | A   | A   | A   | A   | B   |
|                                                                                                                                              |                                                |         |    |     |     |     |     |     |     |     |     |
| C7                                                                                                                                           | Tint Control Variable Range ( $f_o = 600kHz$ ) | ↑       | ↑  | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   |
|                                                                                                                                              |                                                |         |    |     |     |     |     |     |     |     |     |
| C8                                                                                                                                           | Tint Control Characteristic                    | ↑       | ↑  | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   |
|                                                                                                                                              |                                                |         |    |     |     |     |     |     |     |     |     |

## MEASURING METHOD

- Activate the test mode (S26=ON, Sub Add 02 ; 08h).
- Connect band pass filter ( $Q=2$ ), set crystal mode to conform to European, Asian system and set the gate to normal status.
- Input 3N rainbow color bar signal (100mV<sub>p-p</sub>) to pin 42 (Chroma IN).
- Measure phase shift of B-Y color difference output of pin 36.
- While shifting color phase (tint) from minimum to maximum by the bus control, measure phase change of B-Y color difference output of pin 36. On the condition that 6 bars in the center have the peak level (regarded as center of color phase), the side of 5 bars is regarded as positive direction while the side of 7 bars is regarded as negative direction when the 5 bars or the 7 bars are in the peak level. Based on this assumption, open angle toward the positive direction is expressed as  $\Delta\theta_1$  and that toward the negative direction is expressed as  $\Delta\theta_2$  as viewed from the phase center.  $\Delta\theta_1$  and  $\Delta\theta_2$  show the tint control sharing range.
- Variable range is expressed by sum of  $\Delta\theta_1$  sharing range and  $\Delta\theta_2$  sharing range.  

$$\Delta\theta_T = \Delta\theta_1 + \Delta\theta_2$$
- While shifting color phase from minimum to maximum with the bus control, measure phase shift of B-Y color difference output of pin 36. When center 6 bars have peak level, value of color phase bus step is expressed as  $\theta_{Tin}$ .
- While shifting color phase from minimum to maximum with the bus control, measure values of color phase bus step corresponding to 10% and 90% of absolutely variable phase shift of B-Y color difference output of pin 36. The range of color phase shifted by the bus control is expressed as While shifting color phase from minimum to maximum with the bus control, measure phase shift of B-Y color difference output of pin 36. When center 6 bars have peak level, value of color phase bus step is expressed as  $\Delta\theta_{Tin}$  (conforming to TV mode,  $f_o = 600kHz$ ).
- Input 4N rainbow color bar signal to pin 42 (Chroma IN), and perform the same measurement as the 3N signal.



| NOTE            | ITEM                    | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ) |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MEASURING METHOD                                                                                                                                                                                                                                                                              |
|-----------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                         | SW MODE                                                                                                                               |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                               |
|                 |                         | S26                                                                                                                                   | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                               |
| C <sub>9</sub>  | APC Lead-In Range       |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (1) Connect band pass filter (Q=2), set to TV mode ( $f_0=600kHz$ ) with X'tal clock conforming to European, Asian system.                                                                                                                                                                    |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (2) Set the gate to normal status.                                                                                                                                                                                                                                                            |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (3) Input 3N CW signal of 100mV <sub>p-p</sub> to pin 42 of the chroma input terminal.                                                                                                                                                                                                        |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (4) While changing frequency of the CW (continuous waveform) signal, measure its frequency when B-Y color difference signal of pin 36 is colored.                                                                                                                                             |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (5) Input 4N CW (continuous waveform) 100mV <sub>p-p</sub> signal to pin 42 (Chroma IN).                                                                                                                                                                                                      |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (6) While changing frequency of the CW signal, measure frequencies when B-Y color difference output of pin 36 is colored and discolored. Find difference between the measured frequency and $f_c$ (4.433619MHz) and express the differences as fPH and fPL, which show the APC lead-in range. |
|                 |                         | OFF<br>↓<br>ON                                                                                                                        | A  | B   | B   | B   | A   | A   | A   | A   | B   |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (7) Variable frequency of VCXO is used to cope with lead-in of 3.582MHz / 3.575MHz PAL system.                                                                                                                                                                                                |
| C <sub>10</sub> | APC Control Sensitivity |                                                                                                                                       |    |     |     |     |     |     |     |     |     | (8) Activate the test mode (S26-ON, Sub Add 02 ; 02h).                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                               |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     | (9) Input nothing to pin 42 (Chroma IN).                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                               |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     | (10) While varying voltage of pin 30 (APC Filter), measure variable frequency of VCXO at pin 35 (R-Y OUT) while observing color and discoloring of R-Y color difference signal. Express difference between the high frequency (fH) and $f_0$ center as 3.582HH, and difference between the low frequency (fL) and $f_0$ center as 3.582HL. Perform the same measurement for the NP system (3.575MHz PAL).                                                |                                                                                                                                                                                                                                                                                               |
|                 |                         |                                                                                                                                       |    |     |     |     |     |     |     |     |     | (1) Activate the test mode (S26-ON, Sub Add 02 ; 02h).                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                               |
|                 |                         | ON                                                                                                                                    | ↑  | ↑   | ↑   | ↑   | ↑   | C   | ↑   | ↑   | ↑   | (2) Connect band pass filter as same as the Note C <sub>9</sub> .<br>(3) Change the X'tal mode properly to the system.<br>(4) Input nothing to pin 42 (Chroma IN).<br>(5) When V <sub>30</sub> 's APC voltage $\pm 50mV$ is impressed to pin 30 (APC Filter) while its voltage is being varied, measure frequency change of pin 35 output signal as frH or frL and calculate sensitivity according to the following equation.<br>$b = (frH - frL) / 100$ |                                                                                                                                                                                                                                                                                               |

| NOTE | ITEM                         | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ) |    |     |     |     |     |     |     |     |     | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                              | S26                                                                                                                                   | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C11  | Killer Operation Input Level | OFF                                                                                                                                   | A  | B   | B   | B   | A   | A   | A   | A   | B   | <p>(1) Connect band pass filter (Q = 2) and set to TV mode (<math>f_0 = 600kHz</math>).</p> <p>(2) Set the crystal mode to conform to European, Asian system and set the gate to normal status.</p> <p>(3) Input 3N color signal having 200mV<sub>p-p</sub> burst to pin 42 (Chroma IN).</p> <p>(4) While attenuating chroma input signal, measure input burst amplitudes of the signal when B-Y color difference output of pin 36 is discolored and when the same signal is colored. Measured input burst amplitudes shall be expressed as 3N-VTK1 and 3N-VTC1 respectively (killer operation input level).</p> <p>(5) Killer operation input level in the condition that P/N killer sensitivity is set to LOW with the bus control is expressed as 3N-VTK2 or 3N-VTC2.</p> <p>(6) Perform the same measurement as the above step 4 with different inputs of 4N, 4P, MP, NP color signals having 200mV<sub>p-p</sub> burst to pin 42 (Chroma IN). (When measuring with MP/NP color signal, set the crystal system to conform to South American system.)</p> <p>(7) Killer operation input level at that time is expressed as follows.<br/> Normal killer operation input level in the 4N system is expressed as 4N-VTK1, 4N-VTC1.<br/> Normal killer operation input level in the 4P system is expressed as 4P-VTK1, 4P-VTC1.<br/> Killer operation input level with low killer sensitivity is expressed as 4P-VTK2, 4P-VTC2.<br/> Normal killer operation input level in the MP system is expressed as MP-VTK2, MP-VTC2.<br/> Normal killer operation input level in the NP system is expressed as NP-VTK1, NP-VTC1.<br/> Killer operation input level with low killer sensitivity is expressed as NP-VTK2, NP-VTC2.</p> <p>[Reference] 3N system : 3.579545MHz NTSC<br/> 4N system : 4.433619MHz False NTSC<br/> 4P system : 4.433619MHz PAL<br/> MP system : 3.575611MHz M-PAL<br/> NP system : 3.582056MHz N-PAL</p> |
|      |                              |                                                                                                                                       |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| NOTE | ITEM                            | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |     |     |     |     |     |     |     |     |
|------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |                                 | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     |     |     |     |     |
|      |                                 | SW MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |     |     |     |     |     |     |     |
|      |                                 | S26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
| C12  | Color Difference Output         | ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | A  | B   | B   | B   | A   | A   | A   | A   | B   |
|      |                                 | (1) Activate the test mode (S26-ON, Sub Add 02 ; 08h).<br>(2) Connect band pass filter (Q=2), set to TV mode ( $f_0=600kHz$ ) with 0dB attenuation.<br>(3) Set the crystal mode to conform to European, Asian system and set the gate to normal status.<br>(4) Input 3N, 4N and 4P rainbow color bar signals having 100mV <sub>p-p</sub> burst to pin 42 of the chroma input terminal one after another.<br>(5) Measure amplitudes of color difference signals of pin 36 (B-Y) and pin 35 (R-Y) respectively, and express them as 3NeB-Y/R-Y, 4NeB-Y/R-Y and 4PeB-Y/R-Y respectively.<br>(6) While inputting 4P 75% color bar signal (100mV <sub>p-p</sub> burst) to pin 42 of the chroma input terminal, measure amplitudes of color difference signals of pin 36 (B-Y OUT) and pin 35 (R-Y OUT) respectively. (Ratio of those amplitudes is expressed as 4PeB-y/r-y for checking color level of SECAM system.) |    |     |     |     |     |     |     |     |     |
| C13  | Demodulation Relative Amplitude | ↑                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ↑  | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   |
|      |                                 | (1) Activate the test mode (S26-ON, Sub Add 02 ; 08h).<br>(2) Connect band pass filter (Q=2), set to TV mode ( $f_0=600kHz$ ) with 0dB attenuation.<br>(3) Set the crystal mode to conform to European, Asian system and set the gate to normal status.<br>(4) Input 3N, 4N and 4P rainbow color bar signals having 100mV <sub>p-p</sub> burst to pin 42 of the chroma input terminal one after another.<br>(5) Measure amplitudes of color difference signals of pin 36 (B-Y) and pin 35 (R-Y) respectively, and express ratio between the two amplitudes as 3NG R/B, 4NG R/B and 4PG R/B respectively.<br>(Note) Relative amplitude of G-Y color difference signal shall be checked later in the Text section.                                                                                                                                                                                                 |    |     |     |     |     |     |     |     |     |

| NOTE            | ITEM                                          | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC} = 9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC} = 5V$ ; $T_a = 25 \pm 3^\circ C$ ) |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                                               | MEASURING METHOD                                                                                                                             |    |     |     |     |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                 |                                               | S26                                                                                                                                          | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| C <sub>14</sub> | Demodulation<br>Relative Phase                | ON                                                                                                                                           | A  | B   | B   | B   | A   | A   | A   | A   | B   | <p>(1) Activate the test mode (S26-ON, Sub Add 02 ; 08h).</p> <p>(2) Connect band pass filter (Q = 2), set to TV mode (<math>f_0 = 600kHz</math>) with 0dB attenuation.</p> <p>(3) Set the crystal mode to conform to European, Asian system and set the gate to normal status.</p> <p>(4) Input 3N, 4N and 4P rainbow color bar signals having 100mV<sub>p-p</sub> burst to pin 42 of the chroma input terminal one after another.</p> <p>(5) Measure phases of color difference signals of pin 36 (B-Y) and pin 35 (R-Y) respectively, and express them as 3N<math>\theta</math>R-B, 4N<math>\theta</math>R-B and 4P<math>\theta</math>R-B respectively.</p> <p>(6) For measuring with 3N and 4N color bar signals in NTSC system, set six bars of the B-Y color difference waveform to the peak level with the Tint control and measure its phase difference from phase of R-Y color difference signal of pin 35 (R-Y OUT).</p> <p>(Note) Relative phase of G-Y color difference signal shall be checked later in the Text section.</p> |
| C <sub>15</sub> | Demodulation<br>Output<br>Residual<br>Carrier | ↑                                                                                                                                            | ↑  | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | <p>(1) Activate the test mode (S26-ON, Sub Add 02 ; 08h).</p> <p>(2) Connect band pass filter (Q = 2), set to TV mode (<math>f_0 = 600kHz</math>) with 0dB attenuation.</p> <p>(3) Set the crystal mode to conform to European, Asian system.</p> <p>(4) Set the gate to normal status.</p> <p>(5) Input 3N and 4N rainbow color bar signals having 100mV<sub>p-p</sub> burst to pin 42 of the chroma input terminal one after another.</p> <p>(6) Measure subcarrier leak of 3N and 4N color bar signals appearing in color difference signals of pin 36 (B-Y OUT) and pin 35 (R-Y OUT) respectively, and express those leaks as 3N-SCB/R and 4N-SCB/R.</p>                                                                                                                                                                                                                                                                                                                                                                               |

| NOTE | ITEM                                                     | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ) |    |     |     |     |     |     |     |     |     |
|------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |                                                          | MEASURING METHOD                                                                                                                      |    |     |     |     |     |     |     |     |     |
|      |                                                          | S26                                                                                                                                   | S1 | S31 | S33 | S34 | S39 | S42 | S44 | S45 | S51 |
| C16  | Demodulation<br>Output<br>Residual<br>Higher<br>Harmonic | ON                                                                                                                                    | A  | B   | B   | B   | A   | A   | A   | A   | B   |
|      |                                                          |                                                                                                                                       |    |     |     |     |     |     |     |     |     |
| C17  | Color<br>Difference<br>Output ATT<br>Check               | ↑                                                                                                                                     | ↑  | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   |
|      |                                                          |                                                                                                                                       |    |     |     |     |     |     |     |     |     |

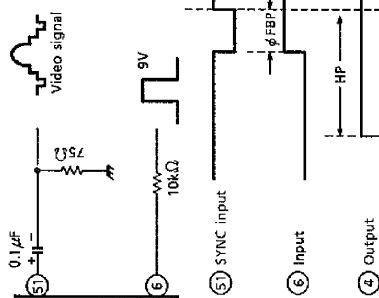
- (1) Activate the test mode (S26-ON, Sub Add 02 ; 08h).  
 (2) Connect band pass filter (Q=2), set to TV mode ( $f_0=600kHz$ ) with 0dB attenuation.  
 (3) Set the crystal mode to conform to European, Asian system and set the gate to normal status.  
 (4) Input 3N and 4N rainbow color bar signals having 100mV<sub>p-p</sub> burst to pin 42 of the chroma input terminal one after another.  
 (5) Measure higher harmonic ( $2f_c=7.16MHz$  or  $8.87MHz$ ) of 3N and 4N color bar signals appearing in color difference signals of pin 36 (B-Y OUT) and pin 35 (R-Y OUT) respectively, and express them as 3N-HCB / R and 4N-HCB / R.
- (1) Activate the test mode (S26-ON, Sub Add 02 ; 08h).  
 (2) Connect band pass filter (Q=2) and set bus data for the TV mode ( $f_0=600kHz$ ).  
 (3) Set the X'tal clock mode to conform to European, Asian system and set the gate to normal status.  
 (4) Input 3N rainbow color bar signal whose burst is 100mV<sub>p-p</sub> to pin 42 of the chroma input terminal.  
 (5) Measure amplitude of color difference output signal of pin 36 (B-Y OUT) with 0dB attenuation set by the bus control.  
 Set the amplitude of the color difference output of pin 36 (B-Y OUT) to 0dB, and measure amplitude of the same signal with different attenuation of -2dB, -1dB and +1dB set by the bus control.

| NOTE | ITEM                              | TEST CONDITION (Unless otherwise specified : H, RGB.VCC = 9V ; VDD, Fsc VDD, Y/C VCC = 5V ; Ta = 25 ± 3°C) |                 |    |    |     |    |    |    |                           |    |    |          |    |    |                                                                                                                                                                                                                                                                                 | MEASURING METHOD |                 |
|------|-----------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|----|----|-----|----|----|----|---------------------------|----|----|----------|----|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|
|      |                                   | S                                                                                                          | BUS : TEST MODE |    |    |     |    |    |    | BUS : NORMAL CONTROL MODE |    |    |          |    |    |                                                                                                                                                                                                                                                                                 |                  |                 |
|      |                                   |                                                                                                            | 02H             |    |    | 07H |    |    |    | 10H                       |    |    |          |    |    |                                                                                                                                                                                                                                                                                 |                  | OTHER CONDITION |
|      |                                   |                                                                                                            | D5              | D2 | D1 | D0  | D7 | D4 | D3 | D5                        | D4 | D3 | D2       | D1 | D0 |                                                                                                                                                                                                                                                                                 |                  |                 |
| C18  | 16.2MHz Oscillation Frequency     | ON                                                                                                         | 0               | 0  | 0  | 1   | 0  | 0  | 0  | 0                         | 0  | 0  | 0        | 0  | 0  | (1) Input nothing to pin 42.<br>(2) Measure frequency of CW signal of pin 35 as fr, and find oscillation frequency by the following equation.<br>$\Delta f_{OF} = (fr - 0.05MHz) \times 4$                                                                                      |                  |                 |
| C19  | 16.2MHz Oscillation Start Voltage | ON                                                                                                         | 0               | 0  | 0  | 1   | 0  | 0  | 0  | 0                         | 0  | 0  | 0        | 0  | 0  | Impress pin 38 individually with separate power supply.<br><br>While raising voltage of pin 38, measure voltage when oscillation waveform appears at pin 40.                                                                                                                    |                  |                 |
| C20  | fsc Free-Run Frequency            | ON                                                                                                         | 0               | 0  | 0  | 1   | 0  | 0  | 0  | 0                         | 0  | 0  | Variable | 0  | 0  | (1) Input nothing to pin 42.<br>(2) Change setting of SUB (10H) D4, D3 and D2 according to respective frequency modes, and measure frequency of CW signal of pin 35.<br>Detail of D4, D3 and D2<br>3.58M = 1 : (001), 4.43M = 2 : (010)<br>M-PAL = 6 : (110), N-PAL = 7 : (111) |                  |                 |
| C21  | fsc Output Amplitude              | OFF                                                                                                        | 0               | 0  | 0  | 0   | 0  | 0  | 0  | 0                         | 0  | 0  | 0        | 0  | 0  | (1) Input nothing to pin 42.<br>(2) Change setting of SUB (10H) D4, D3 and D2 according to respective frequency modes.<br>Measure the amplitude of output signal of pin 27.                                                                                                     |                  |                 |

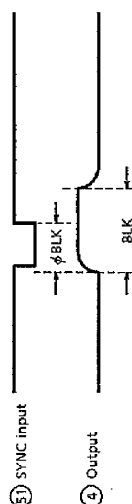
## DEF SECTION

| NOTE | ITEM                                   | TEST CONDITION<br>( Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ; )<br>pin 51 input video signal = 50 system<br>(Note) " x " in the data column represents preset value at power ON. |   |   |   |   |   |   |   |   |                                                                                                                                                                                     |
|------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                        | MEASURING METHOD                                                                                                                                                                                                                                                                                          |   |   |   |   |   |   |   |   |                                                                                                                                                                                     |
|      |                                        | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                                                                                    |   |   |   |   |   |   |   |   |                                                                                                                                                                                     |
| DH1  | H. Reference Frequency                 | Sub 02H                                                                                                                                                                                                                                                                                                   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | (1) Supply 5V to pin 26.<br>(2) Set bus data as indicated on the left.<br>(3) Measure the frequency of sync. output of pin 49.                                                      |
| DH2  | H. Reference Oscillation Start Voltage | Sub 02H                                                                                                                                                                                                                                                                                                   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | In the test condition of the Note DH1, turning down the voltage supplied to pin 26 from 5V, measure the voltage when oscillation of pin 49 stops.                                   |
| DH3  | H. Output Frequency 1                  | Sub 10H                                                                                                                                                                                                                                                                                                   | x | x | x | x | x | x | x | 1 | (1) Set bus data as indicated on the left.<br>(2) In the condition of the above step 1, measure frequency (TH1) at pin 4.                                                           |
| DH4  | H. Output Frequency 2                  | Sub 10H                                                                                                                                                                                                                                                                                                   | x | x | x | x | x | x | x | 0 | (1) Set the input video signal of pin 51 to the 60 system.<br>(2) Set bus data as indicated on the left.<br>(3) In the above-mentioned condition, measure frequency (TH2) at pin 4. |
| DH5  | H. Output Duty 1                       | —                                                                                                                                                                                                                                                                                                         | — | — | — | — | — | — | — | — | (1) Supply 4.5V DC to pin 5 (or, make pin 5 open-circuited).<br>(2) Measure duty of pin 4 output.                                                                                   |
| DH6  | H. Output Duty 2                       | —                                                                                                                                                                                                                                                                                                         | — | — | — | — | — | — | — | — | (1) Make a short circuit between pin 5 and ground.<br>(2) Measure duty of pin 4 output.                                                                                             |
| DH7  | H. Output Duty Switching Voltage       | —                                                                                                                                                                                                                                                                                                         | — | — | — | — | — | — | — | — | Supply 2V DC to pin 5. While turning down the voltage from 2V, measure voltage when the output duty ratio becomes 41 to 37%.                                                        |
| DH8  | H. Output Voltage                      | —                                                                                                                                                                                                                                                                                                         | — | — | — | — | — | — | — | — | Measure the low voltage and high voltage of pin 4 output whose waveform is shown below.<br>        |
| DH9  | H. Output Oscillation Start Voltage    | —                                                                                                                                                                                                                                                                                                         | — | — | — | — | — | — | — | — | While raising H. V <sub>CC</sub> (pin 3) from 0V, measure voltage when pin 4 starts oscillation.                                                                                    |

| NOTE | ITEM                                   | TEST CONDITION<br>( Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25 \pm 3^{\circ}C$ ; BUS = preset value ; )<br>(Note) " x " in the data column represents preset value at power ON. |  |  |  |  |                  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|------------------|--|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                        | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                     |  |  |  |  | MEASURING METHOD |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|      |                                        |                                                                                                                                                                                                                                            |  |  |  |  |                  |  |  |  |  | (1) Supply 4.5V DC to pin 5.<br>(2) Input video signal to pin 51.<br>(3) Set the width of pin 6 input pulse to $8\mu s$ .<br>(4) Measure $\phi FBP$ shown in the figure below ( $\phi FBP$ ).<br>(5) Adjust the phase of pin 6 input pulse so that the center of pin 4's output pulse corresponds to the trailing edge of input sync. signal.<br>(6) Set bus data as indicated on the left and measure the horizontal picture position with respective bus data settings (HSFTmax, HSFTmin).<br>(7) Find HP difference between the conditions mentioned in the above step 6 ( $\Delta HSFT$ ).<br>(8) Reset bus data to the preset value.<br>(9) While impressing 5V DC to pin 5, measure HP.<br>(10) While impressing 4V DC to pin 5, measure HP.<br>(11) Find difference between the two measurement results obtained in the preceding steps 9 and 10 ( $\Delta HCC$ ). |
| DH10 | H. FBP Phase                           |                                                                                                                                                                                                                                            |  |  |  |  |                  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| DH11 | H. Picture Position, Maximum           |                                                                                                                                                                                                                                            |  |  |  |  |                  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| DH12 | H. Picture Position, Minimum           |                                                                                                                                                                                                                                            |  |  |  |  |                  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| DH13 | H. Picture position Control Range      |                                                                                                                                                                                                                                            |  |  |  |  |                  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| DH14 | H. Distortion Correction Control Range |                                                                                                                                                                                                                                            |  |  |  |  |                  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



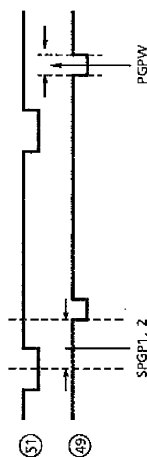
| NOTE | ITEM                      | TEST CONDITION<br>( Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ;<br>pin 51 input video signal = 50 system<br>(Note) "x" in the data column represents preset value at power ON. ) |   |   |   |   |   |   |   |   |   |   |
|------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|
|      |                           | MEASURING METHOD                                                                                                                                                                                                                                                                                        |   |   |   |   |   |   |   |   |   |   |
|      |                           | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                                                                                  |   |   |   |   |   |   |   |   |   |   |
| DH15 | H. BLK Phase              | Sub 02H                                                                                                                                                                                                                                                                                                 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DH16 | H. BLK Width,<br>Minimum  | Sub 16H                                                                                                                                                                                                                                                                                                 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|      | H. BLK Width,<br>Maximum  |                                                                                                                                                                                                                                                                                                         | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| DH18 | P/N-GP Start<br>Phase 1   | Sub 0FH                                                                                                                                                                                                                                                                                                 | x | x | x | x | x | x | x | x | x | x |
| DH19 | P/N-GP Start<br>Phase 2   |                                                                                                                                                                                                                                                                                                         | x | x | x | x | x | x | x | x | x | x |
| DH20 | P/N-GP Gate<br>Width 1    |                                                                                                                                                                                                                                                                                                         | x | x | x | x | x | x | x | x | x | x |
| DH21 | P/N-GP Gate<br>Width 2    |                                                                                                                                                                                                                                                                                                         | x | x | x | x | x | x | x | x | x | x |
| DH22 | SECAM-GP Start<br>Phase 1 | Sub 1FH                                                                                                                                                                                                                                                                                                 | x | x | x | x | x | x | x | x | x | x |
| DH23 | SECAM-GP Start<br>Phase 2 |                                                                                                                                                                                                                                                                                                         | x | x | x | x | x | x | x | x | x | x |
| DH24 | SECAM-GP Gate<br>Width 1  |                                                                                                                                                                                                                                                                                                         | x | x | x | x | x | x | x | x | x | x |
| DH25 | SECAM-GP Gate<br>Width 2  |                                                                                                                                                                                                                                                                                                         |   |   |   |   |   |   |   |   |   |   |



(1) Supply 5V to pin 26.

(2) Set bus data as indicated on the left.

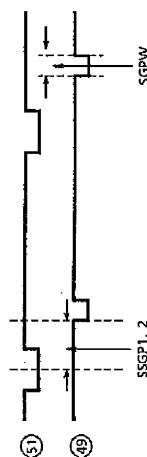
(3) With the respective bus data settings mentioned above, measure the phase and gate width as shown in the figure below.

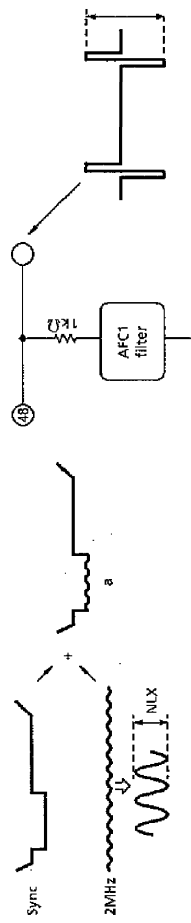


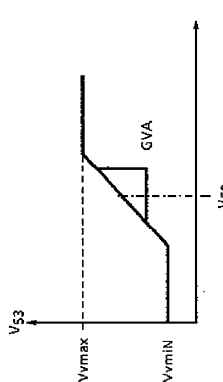
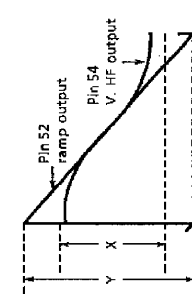
(1) Supply 5V to pin 26.

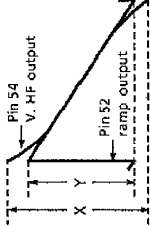
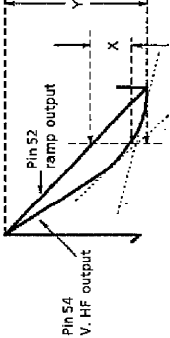
(2) Set bus data as indicated on the left.

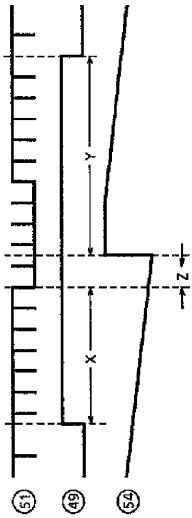
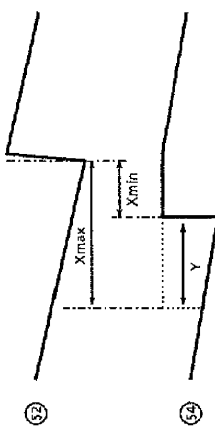
(3) With the respective bus data settings mentioned above, measure the phase and gate width as shown in the figure below.

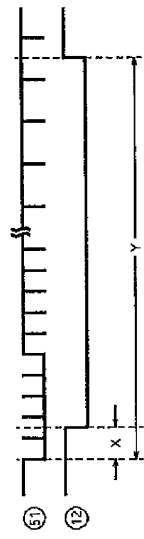
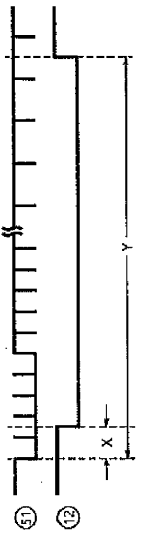


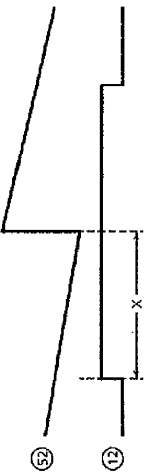
| NOTE | ITEM                    | TEST CONDITION<br>( Unless otherwise specified : H, RGB VCC=9V ; VDD, Fsc VDD, Y/C VCC=5V ; Ta=25±3°C ; BUS=preset value ; )<br>pin 51 input video signal=50 system<br>(Note) "x" in the data column represents preset value at power ON.                                                                                                                                                                                                                                                                                                                                                                        |   |   |   |   |   |   |   |   |                                                                                         |
|------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|-----------------------------------------------------------------------------------------|
|      |                         | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |   |   |   |   |   |   |   |                                                                                         |
|      |                         | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |   |   |   |   |   |                                                                                         |
|      |                         | (1) Input such a signal as shown by "a" of the following figure to pin 51.<br>(2) Set bus data as indicated in the first line of the left table.<br>(3) Measure NLX when amplitude of pin 41 changes. → NL1<br>(4) Set bus data as indicated in the second line of the left table.<br>(5) Measure NLX when amplitude of pin 41 changes. → NL2<br>(6) Set bus data as indicated in the third line of the left table.<br>(7) Measure NLX when amplitude of pin 41 changes. → NL3<br>(8) Set bus data as indicated in the fourth line of the left table.<br>(9) Measure NLX when amplitude of pin 41 changes. → NL4 |   |   |   |   |   |   |   |   |                                                                                         |
|      |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |   |   |   |   |   |   |   |                                                                                         |
| DH26 | Noise Detection Level 1 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0 | x | x | x | x | x | x | x | (1) Measure amplitude of V. ramp waveform of pin 52.                                    |
| DH27 | Noise Detection Level 2 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1 | x | x | x | x | x | x | x |                                                                                         |
| DH28 | Noise Detection Level 3 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0 | x | x | x | x | x | x | x |                                                                                         |
| DH29 | Noise Detection Level 4 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1 | x | x | x | x | x | x | x |                                                                                         |
| DV1  | V. Ramp Amplitude       | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | — | — | — | — | — | — | — | — |                                                                                         |
| DV2  | V. NF Maximum Amplitude | Sub 17H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | (1) Set data bus as indicated on the left.<br>(2) Measure amplitude of pin 54's signal. |
| DV3  | V. NF Minimum Amplitude | Sub 17H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0 | 0 | 0 | 0 | 0 | 0 | 0 | x | (1) Set data bus as indicated on the left.<br>(2) Measure amplitude of pin 54's signal. |

| NOTE | ITEM                                            | TEST CONDITION<br>( Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , f <sub>sc</sub> V <sub>PD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ; )<br>pin 51 input video signal = 50 system<br>(Note) " x " in the data column represents preset value at power ON. |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                  |
|------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                 | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                                                                                                |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                  |
|      |                                                 | MEASURING METHOD                                                                                                                                                                                                                                                                                                      |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                  |
| DV4  | V. Amplification Degree                         |                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |   |   |   | (1) Set bus data as indicated on the left.<br>(2) Change 5.0V of pin 54 voltage by +0.1V and -0.1V, and measure V <sub>53</sub> output voltage in both the conditions.<br>(3) Find GVA shown in the figure below.<br>(4) Measure V <sub>vmax</sub> and V <sub>vmin</sub> shown in the figure below.                                                              |
| DV5  | V. Amplifier Max. Output                        | Sub 1BH                                                                                                                                                                                                                                                                                                               | 1 | 1 | x | x | x | x | x | x |                                                                                                                                                                                                                                                                                                                                                                  |
| DV6  | V. Amplifier Min. Output                        |                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                  |
|      |                                                 |                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                 |
| DV7  | V. S-Curve Correction, Max. Correction Quantity | Sub 19H                                                                                                                                                                                                                                                                                                               | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | (1) Adjust the oscilloscope's amplitude with the UNCAL so that pin 52 and pin 54 waveforms overlap each other as the bus data is set to the preset value.<br>(2) Change the bus data as indicated on the left, and measure values of X and Y shown in the figure below.<br>(3) Find V <sub>S</sub> according to the equation that V <sub>S</sub> = (X/Y) × 100%. |
|      |                                                 |                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                |

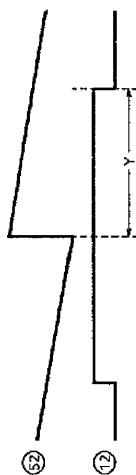
| NOTE | ITEM                                                             | TEST CONDITION<br>( Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ;<br>pin 51 input video signal = 50 system<br>(Note) " x " in the data column represents preset value at power ON.                                                                                                                                                                      |   |   |   |   |   |   |   |   |   |
|------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|
|      |                                                                  | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |   |   |   |   |
| DV8  | V. Reverse S-Curve<br>Correction, Max.<br>Correction<br>Quantity | Sub 19H                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | x |
|      |                                                                  | <p>(1) Adjust the oscilloscope's amplitude with the UNCAL so that pin 52 and pin 54 waveforms overlap each other as the bus data is set to the preset value.</p> <p>(2) Change the bus data as indicated on the left, and measure values of X and Y shown in the figure below.</p> <p>(3) Find V<sub>S</sub> according to the equation that <math>V_S = (X / Y) \times 100\%</math>.</p>    |   |   |   |   |   |   |   |   |   |
| DV9  | V. Linearity Max.<br>Correction<br>Quantity                      | Sub 1AH                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x |
|      |                                                                  | <p>(1) Adjust the oscilloscope's amplitude with the UNCAL so that pin 52 and pin 54 waveforms overlap each other as the bus data is set to the preset value.</p> <p>(2) Change the bus data as indicated on the left, and measure values of X and Y shown in the figure below.</p> <p>(3) Find V<sub>S</sub> according to the equation that <math>V_S = (X / 2Y) \times 100\%</math>.</p>  |   |   |   |   |   |   |   |   |   |

| NOTE | ITEM                           | TEST CONDITION<br>( Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ; )<br>(Note) "x" in the data column represents preset value at power ON. |   |   |   |   |   |   |   |   |                                                                                                                                                                                         |
|------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                | SUB-ADDRESS & BUS DATA<br>MEASURING METHOD                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |                                                                                                                                                                                         |
| DV10 | AFC-MASK Start Phase           | Sub 02H                                                                                                                                                                                                                                                        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | (1) Supply 5V DC to pin 26.<br>(2) Set bus data as indicated on the left and activate the test mode.<br>(3) Measure the AFC-MASK start phase (X) and AFC-MASK stop phase (Y) of pin 49. |
| DV11 | AFC-MASK Stop Phase            | Sub 16H                                                                                                                                                                                                                                                        | x | x | x | x | x | x | x | 0 | (4) Set the Sub 16H as indicated on the left.<br>(5) Measure the VNFB start phase (Z) of pin 54.                                                                                        |
| DV12 | VNFB Phase                     |                                                                                                                                                                                                                                                                |   |   |   |   |   |   |   |   |                                                                                                       |
| DV13 | V. Output Maximum Phase        |                                                                                                                                                                                                                                                                |   |   |   |   |   |   |   |   | (1) input video signal to pin 51.<br>(2) Measure both phases (Xmax, Xmin) of pin 52 and pin 54 with the respective bus data settings shown on the left.                                 |
| DV14 | V. Output Minimum Phase        |                                                                                                                                                                                                                                                                |   |   |   |   |   |   |   |   | (3) Find difference between the two phases measured in the above step 2.<br>Y = Xmax - Xmin                                                                                             |
| DV15 | V. Output Phase Variable Range | Sub 16H                                                                                                                                                                                                                                                        | x | x | x | x | x | x | x | 1 |                                                                                                       |

| NOTE | ITEM                       | TEST CONDITION<br>( Unless otherwise specified : H, RGB VCC=9V ; VDD, Fsc VDD, Y/C VCC=5V ; Ta = 25 ± 3°C ; BUS = preset value ; )<br>pin 51 input video signal = 50 system<br>(Note) "x" in the data column represents preset value at power ON. |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                            | SUB-ADDRESS & BUS DATA                                                                                                                                                                                                                            |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|      |                            | MEASURING METHOD                                                                                                                                                                                                                                  |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| DV16 | 50 System VBLK Start Phase | Sub 1BH                                                                                                                                                                                                                                           | 0 | 1 | x | x | x | x | x | x | (1) Input such a video signal of the 50 system as shown in the figure to pin 51.<br>(2) Set bus data as indicated on the left.<br>(3) Measure the VBLK start phase (X) and VBLK stop phase (Y) of pin 12.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| DV17 | 50 System VBLK Stop Phase  | Sub 1CH                                                                                                                                                                                                                                           | 0 | x | x | x | x | x | x | x |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| DV18 | 60 System VBLK Start Phase | Sub 1BH                                                                                                                                                                                                                                           | 0 | 1 | x | x | x | x | x | x | (1) Input such a video signal of the 60 system as shown in the figure to pin 51.<br>(2) Set bus data as indicated on the left.<br>(3) Measure the VBLK start phase (X) and VBLK stop phase (Y) of pin 12.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| DV19 | 60 System VBLK Stop Phase  | Sub 1CH                                                                                                                                                                                                                                           | 0 | x | x | x | x | x | x | x |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| DV20 | V. Lead-In Range 1         | Sub 16H                                                                                                                                                                                                                                           | x | x | x | 0 | 0 | 0 | 0 | 0 | (1) Set bus data as indicated on the left.<br>(2) Input 262.5 H video signal to pin 51.<br>(3) Set a certain number of field lines in which signals of pin 51 and pin 54 completely synchronize with each other as shown in the figure below.<br>(4) Decrease the field lines in number and measure number of lines in which pin 51 and pin 54 signals do not synchronize with each other.<br>(5) Again set a certain number of field lines in which pin 51 and pin 52 signals synchronize with each other.<br>(6) Increase the field lines in number and measure number of lines in which pin 51 and pin 52 signals do not synchronize with each other. |
|      |                            |                                                                                                                                                                                                                                                   |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| NOTE | ITEM                | TEST CONDITION<br>( Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a = 25 \pm 3^\circ C$ ; BUS = preset value ; )<br>Pin 51 input video signal = 50 system<br>(Note) "x" in the data column represents preset value at power ON. |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                     | SUB-ADDRESS & BUS DATA<br>MEASURING METHOD                                                                                                                                                                                                                                         |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| DV21 | V. Lead-In Range 2  | Sub 16H                                                                                                                                                                                                                                                                            | x | x | x | 0 | 1 | 0 | 0 | 0 | <p>(1) Set bus data as indicated on the left.</p> <p>(2) Input 262.5 H video signal to pin 51.</p> <p>(3) Set a certain number of field lines in which signals of pin 51 and pin 54 completely synchronize with each other as shown in the figure below.</p> <p>(4) Decrease the field lines in number and measure number of lines in which pin 51 and pin 54 signals do not synchronize with each other.</p> <p>(5) Again set a certain number of field lines in which pin 51 and pin 52 signals synchronize with each other.</p> <p>(6) Increase the field lines in number and measure number of lines in which pin 51 and pin 52 signals do not synchronize with each other.</p>  |
|      |                     |                                                                                                                                                                                                                                                                                    |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| DV22 | W-VBLK Start Phase  | Sub 18H                                                                                                                                                                                                                                                                            | x | x | 0 | 0 | 0 | 0 | 0 | 0 | <p>(1) Set bus data as specified for the Sub 18H in the left columns, and measure the value of X shown in the figure below.</p> <p>W-VBLK start phase : MAX, MIN</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DV23 | W-PMUTE Start Phase | Sub 1DH                                                                                                                                                                                                                                                                            | x | x | 1 | 1 | 1 | 1 | 1 | 1 | <p>(2) Set bus data as specified for the Sub 1DH in the left columns, and measure the value of X shown in the figure below.</p> <p>W-PMUTE start phase : MAX, MIN</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|      |                     |                                                                                                                                                                                                                                                                                    |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

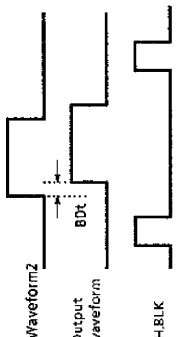
| NOTE | ITEM                                                | TEST CONDITION<br>( Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ; )<br>(Note) "x" in the data column represents preset value at power ON. |   |   |   |   |   |   |   |   |                                                                                                                                                           |
|------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                     | SUB-ADDRESS & BUS DATA<br>MEASURING METHOD                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |                                                                                                                                                           |
| DV24 | W-VBLK Stop Phase                                   | Sub 1CH                                                                                                                                                                                                                                                        | x | 0 | 0 | 0 | 0 | 0 | 0 | 0 | (1) Set bus data as specified for the Sub 1CH in the left columns, and measure the value of Y shown in the figure below.<br>W-VBLK stop phase : MAX, MIN  |
| DV25 | W-PMUTE Stop Phase                                  | Sub 1CH                                                                                                                                                                                                                                                        | x | 1 | 1 | 1 | 1 | 1 | 1 | 1 | (2) Set bus data as specified for the Sub 1EH in the left columns, and measure the value of Y shown in the figure below.<br>W-PMUTE stop phase : MAX, MIN |
|      | (Note) Only the 60 system is subject to evaluation. | Sub 1EH                                                                                                                                                                                                                                                        | x | 0 | 0 | 0 | 0 | 0 | 0 | 0 |                                                                                                                                                           |
|      |                                                     | Sub 1EH                                                                                                                                                                                                                                                        | x | 1 | 1 | 1 | 1 | 1 | 1 | 1 |                                                                                                                                                           |
| DV26 | V Centering Center Voltage                          |                                                                                                                                                                                                                                                                | 1 | 0 | 0 | 0 | 0 | 0 | 0 | x | (1) Set bus data as indicated on the left.<br>(2) Measure the voltage of pin 47 with respective bus data settings.                                        |
| DV27 | V Centering Max Voltage                             | Sub 18H                                                                                                                                                                                                                                                        | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x |                                                                                                                                                           |
| DV28 | V Centering Min Voltage                             |                                                                                                                                                                                                                                                                | 0 | 0 | 0 | 0 | 0 | 0 | 0 | x |                                                                                                                                                           |



## 1H DL SECTION

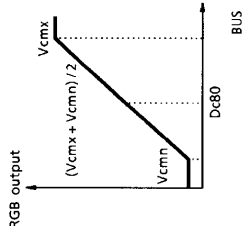
| NOTE | ITEM                               | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ; pin3 = 9V ; pin8·38·41 = 5V) |                    |     |     |     |                  |                                                                                                                                                                                                                                                                                                              |                                                 |  |  |
|------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----|-----|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--|--|
|      |                                    | SW MODE                                                                                                                                                                                                         | SUB ADDRESS & DATA |     |     |     | MEASURING METHOD |                                                                                                                                                                                                                                                                                                              |                                                 |  |  |
|      |                                    |                                                                                                                                                                                                                 | S26                | 07H | 0FH | 11H |                  |                                                                                                                                                                                                                                                                                                              |                                                 |  |  |
| H1   | 1HDL Dynamic Range Direct          | ON                                                                                                                                                                                                              |                    | 94H | —   |     |                  | (1) Input waveform 1 to pin 33 (B-Yin) , and measure VNBD, that pin 36 (B-Yout) is saturated input level.<br>(2) Measure VNBD of R-Y input in the same way as VNBD.                                                                                                                                          | <br>Waveform1<br>f = 100kHz (typ)<br>0.7V (typ) |  |  |
| H2   | 1HDL Dynamic Range Delay           | ↑                                                                                                                                                                                                               |                    | 8CH | —   |     |                  | (1) Input waveform 1 to pin 33 (B-Yin), and measure VPBD, that pin 36 (B-Yout) is saturated input level.<br>(2) Measure VPRD of R-Y input in the same way as VPBD.                                                                                                                                           |                                                 |  |  |
| H3   | 1HDL Dynamic Range, Direct + Delay | ↑                                                                                                                                                                                                               |                    | A4H | —   |     |                  | (1) Input waveform 1 to pin 33 (B-Yin), and measure VSBD, that pin 36 (B-Yout) is saturated input level.<br>(2) Measure VNRD of R-Y input in the same way as VSBD.                                                                                                                                           |                                                 |  |  |
| H4   | Frequency Characteristic, Direct   | ↑                                                                                                                                                                                                               |                    | 94H | —   |     |                  | (1) In the same measuring as H1, set waveform 1 to 0.3V <sub>p-p</sub> and f = 100kHz. Measure VB100, that is pin 36 (B-Yout) level. And set waveform 1 to f = 700kHz. Measure VB700, that is pin 36 (B-Yout) level.<br>GBH1 = 20log (VB700 / VB100)<br>(2) Measure GHR1 of R-Y out in the same way as GBH1. |                                                 |  |  |
| H5   | Frequency Characteristic, Delay    | ↑                                                                                                                                                                                                               |                    | 8CH | —   |     |                  | (1) In the same measuring as H1, set waveform 1 to 0.3V <sub>p-p</sub> and f = 100kHz. Measure VB100, that is pin 36 (B-Yout) level. And set waveform 1 to f = 700kHz. Measure VB700, that is pin 36 (B-Yout) level.<br>GBH2 = 20log (VB700 / VB100)<br>(2) Measure GHR2 of R-Y out in the same way as GBH2. |                                                 |  |  |
| H6   | AC Gain Direct                     | ↑                                                                                                                                                                                                               |                    | 94H | —   |     |                  | (1) In the same measuring as H1, set waveform 1 to 0.7V <sub>p-p</sub> . Measure VByt1, that is pin 36 (B-Yout) level.<br>GBY1 = 20log (VByt1 / 0.7)<br>(2) Measure GRY1 of R-Y out in the same way as GBY1.                                                                                                 |                                                 |  |  |
| H7   | AC Gain Delay                      | ↑                                                                                                                                                                                                               |                    | 8CH | —   |     |                  | (1) In the same measuring as H1, set waveform 1 to 0.7V <sub>p-p</sub> . Measure VByt2, that is pin 36 (B-Yout) level.<br>GBY2 = 20log (VByt2 / 0.7)<br>(2) Measure GRY2 of R-Y out in the same way as GBY2.                                                                                                 |                                                 |  |  |

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| NOTE | ITEM                                                                       | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value ; pin3 = 9V ; pin8-38-41 = 5V) |                    |     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MEASURING METHOD                                                                  |
|------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|      |                                                                            | SW MODE                                                                                                                                                                                                         | SUB ADDRESS & DATA |     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                   |
|      |                                                                            |                                                                                                                                                                                                                 | 526                | 07H | 0FH               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                   |
| H8   | Direct-Delay<br>AC Gain<br>Difference                                      | ↑                                                                                                                                                                                                               | 94H<br>8CH         | —   | —                 | (1) GBYD = GBY1 – GBY2<br>(2) GRYD = GRY1 – GRY2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   |
| H9   | Color Difference<br>Output DC<br>Stepping                                  | ↑                                                                                                                                                                                                               | 8CH                | —   | —                 | (1) Measure pin 36 (B-Yout) DC stepping of the picture period.<br>(2) Measure pin 35 (R-Yout) DC stepping of the picture period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   |
| H10  | 1H Delay Quantity                                                          | ON                                                                                                                                                                                                              | 8CH                | —   | —                 | (1) Input waveform 2 to pin 33 (B-Yin). And measure the time deference BDt of pin 36 (B-Yout).<br>(2) Input waveform 2 to pin 34 (R-Yin). And measure the time difference RDt of pin 36 (B-Yout).                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| H11  | Color Difference<br>Output DC-Offset<br>Control                            | ↑                                                                                                                                                                                                               | 8CH                | 20H | 00H<br>88H<br>FFH | (1) Set Sub-Address 11h ; data 88h. Measure the pin 36 DC voltage, that is BDC1.<br>(2) Set Sub-Address 11h ; data 88h. Measure the pin 35 DC voltage, that is RDC1.<br>(3) Set Sub-Address 11h ; data 00h. Measure the pin 36 DC voltage, that is BDC2.<br>(4) Set Sub-Address 11h ; data 00h. Measure the pin 35 DC voltage, that is RDC2.<br>(5) Set Sub-Address 11h ; data FFh. Measure the pin 36 DC voltage, that is BDC3.<br>(6) Set Sub-Address 11h ; data FFh. Measure the pin 35 DC voltage, that is RDC3.<br>(7) Bomin = BDC2 – BDC1, Bomax = BDC3 – BDC1, Romin = RDC2 – RDC1, Romax = RDC3 – RDC1 |                                                                                   |
| H12  | Color Difference<br>Output DC-Offset<br>Control / Min.<br>Control Quantity | ↑                                                                                                                                                                                                               | A4H                | 00H | 89H               | (1) Measure the pin 36 DC voltage, that is BDC4.<br>(2) Measure the pin 35 DC voltage, that is RDC4.<br>(3) Bo1 = BDC4 – BDC1, Ro1 = RDC4 – RDC1                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                   |
| H13  | NTSC Mode Gain /<br>NTSC-COM Gain                                          | ↑                                                                                                                                                                                                               | 94H                | 80H | —                 | (1) Input waveform 1, that is set 0.3V <sub>p-p</sub> and f = 100kHz, to pin 33. Measure pin 36 output level, that is VBNC.<br>(2) GNB = 20log (VBNC / VB100)<br>(3) In the same way as (1) and (2), measure the pin 36 output level, that is VRNC.<br>GNR = 20log (VRNC / VR100)                                                                                                                                                                                                                                                                                                                              |                                                                                   |

## TEXT SECTION

| NOTE           | ITEM                                | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>CC</sub> = 5V ; V <sub>DD</sub> , Fsc V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |                        |   |   |     |     |     | MEASURING METHOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|------------------------|---|---|-----|-----|-----|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                     | SW MODE                                                                                                                                                                                                  |     |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |     |     |     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                |                                     | S21                                                                                                                                                                                                      | S22 | S31 | S33 | S34 | S51 | —                      | — | — | —   | —   | —   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| T <sub>1</sub> | Y Color Difference Clamping Voltage | B                                                                                                                                                                                                        | B   | B   | B   | B   | A   | —                      | — | — | FFH | 00H | —   | —                | (1) Short circuit pin 31 (Y IN), pin 34 (R-Y IN) and pin 33 (B-Y IN) in AC coupling.<br>(2) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(3) Measure voltage at pin 31, pin 34 and pin 33 (Vcp31, Vcp34, Vcp33).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| T <sub>2</sub> | Contrast Control Characteristic     | ↑                                                                                                                                                                                                        | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | FFH | 80H | 00H | —                | (1) Input TG7 sine wave signal whose frequency is 100kHz and video amplitude is 0.7V to pin 31 (Y IN).<br>(2) Input 0.3V Synchronizing Signal to pin 51 (Sync IN).<br>(3) Connect both pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.<br>(4) Set bus data so that Y sub contrast and drive are set at each center value and color is minimum.<br>(5) Varying data on contrast from maximum (FF) to minimum (00), measure maximum and minimum amplitudes of respective outputs of pin 14 (R OUT), pin 13 (G OUT) and pin 12 (B OUT) in video period, and read values of bus data at the same time.<br>Also, measure the respective amplitudes with the bus data set to the center value (80).<br>(Vc12mx, Vc12mn, D12c80)<br>(Vc13mx, Vc13mn, D13c80)<br>(Vc14mx, Vc14mn, D14c80)<br>(6) Find ratio between amplitude with maximum unicolor and that with minimum unicolor in conversion into decibel (ΔV13ct). |
| T <sub>3</sub> | AC Gain                             | ↑                                                                                                                                                                                                        | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | —   | —   | —   | —                | In the test condition of Note T <sub>2</sub> , find output /input gain (double) with maximum contrast.<br>G = Vc13mx / 0.7V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



| NOTE | ITEM                     | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value)                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |     |     |                        |   |   |   |   |
|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|---|---|---|---|
|      |                          | SW MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |   |   |
|      |                          | S21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | S22 | S31 | S33 | S34 | S51                    | — | — | — | — |
| T4   | Frequency Characteristic | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | B   | B   | B   | B   | A                      | — | — | — | — |
|      |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |                        |   |   |   |   |
|      |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |                        |   |   |   |   |
|      |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |                        |   |   |   |   |
|      |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |                        |   |   |   |   |
|      |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |                        |   |   |   |   |
|      |                          | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |     |     |                        |   |   |   |   |
|      |                          | (1) Input TG7 sine wave signal whose frequency is 6MHz and video amplitude is 0.7V to pin 31 (Y IN).<br>(2) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(3) Connect both pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.<br>(4) Set bus data so that contrast is maximum, Y sub contrast and drive are set at each center value and color is minimum.<br>(5) Measure amplitude of pin 13 signal (G OUT) and find the output /input gain (double) (G6M).<br>(6) From the results of the above step 5 and the Note T3, find the frequency characteristic.<br>Gf = 20log (G6M / G) |     |     |     |     |                        |   |   |   |   |

| NOTE           | ITEM                                  | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> =5V ; T <sub>a</sub> =25±3°C ; BUS = preset value) |     |     |     |     |                        |     |   |   |     |     |     |     |     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|---|---|-----|-----|-----|-----|-----|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                       | SW MODE                                                                                                                                                                                  |     |     |     |     | SUB-ADDRESS & BUS DATA |     |   |   |     |     |     |     |     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                |                                       | S21                                                                                                                                                                                      | S22 | S31 | S33 | S34 | S51                    | S42 | — | — | 00H | 02H | 05H | 1BH | 08H | — | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| T <sub>5</sub> | Y Sub-Contrast Control Characteristic |                                                                                                                                                                                          |     |     |     |     |                        |     |   |   |     |     |     |     |     |   | (1) Connect both pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.<br>(2) Input TG7 sine wave signal whose frequency is 100kHz and video amplitude is 0.7V to pin 31 (Y IN).<br>(3) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(4) Set bus data so that contrast is maximum, drive is set at center value and color is minimum.<br>(5) Set bus data on Y sub contrast at maximum (FF) and measure amplitude (Vscmx) of pin 14 output (R OUT). Then, set data on Y sub contrast at minimum (00), measure the same (Vscmn).<br>(6) From the results of the above step 5, find ratio between Vscmx and Vscmn in conversion into decibel (ΔVscnt). |
|                |                                       | B                                                                                                                                                                                        | B   | B   | B   | B   | A                      | —   | — | — | FFH | 00H | 1FH | —   | —   | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                |                                       |                                                                                                                                                                                          |     |     |     |     |                        |     |   |   |     |     |     |     |     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| T <sub>6</sub> | Y <sub>2</sub> Input Level            | ↑                                                                                                                                                                                        | ↑   | ↑   | ↑   | ↑   | ↑                      | —   | — | — | —   | —   | —   | BFH | 44H | — | (1) Set bus data so that contrast is maximum, Y sub contrast and drive are at each center value.<br>(2) Input 0.3V synchronizing signal to pin 51 while inputting TG7 sine wave signal whose frequency is 100kHz to pin 31 (TY IN).<br>(3) While increasing the amplitude of the sine wave signal, measure video amplitude of signal 1 just before R output of pin 14 is distorted. (Vy2c)                                                                                                                                                                                                                                                                      |

| NOTE | ITEM                            | TEST CONDITION (Unless otherwise specified : H, RGB VCC=9V ; VDD, Fsc VCC=5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |                        |   |   |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|---------------------------------|--------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|------------------------|---|---|-----|-----|-----|-----|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                 | SW MODE                                                                                                            |     |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|      |                                 | S21                                                                                                                | S22 | S31 | S33 | S34 | S51 | S42                    | — | — | 00H | 02H | 05H | 18H | 08H | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| T7   | Unicolor Control Characteristic | B                                                                                                                  | B   | B   | B   | B   | A   | —                      | — | — | —   | —   | —   | —   | —   | <p>(1) Input 0.3V synchronizing signal to pin 51 (Sync IN).</p> <p>(2) Input 100kHz, 0.3V<sub>p-p</sub> sine wave signal to both pin 33 (B-Y IN) and pin 34 (R-Y IN).</p> <p>(3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.</p> <p>(4) Set bus data so that drive is at center value and Y mute is on.</p> <p>(5) While changing bus data on unicolor from maximum (FF) to minimum (00), measure maximum and minimum amplitudes of pin 13 (G OUT) and pin 12 (B OUT) in video period respectively, and read the bus data together with., Also, measure respective amplitudes as unicolor data is set at center value (80).</p> <p>(6) Find ratio between amplitude with maximum unicolor data and that with minimum unicolor data in conversion into decibel (ΔV13un).</p> |
|      |                                 |                                                                                                                    |     |     |     |     |     |                        |   |   |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| T8   | Relative Amplitude (NTSC)       | ↑                                                                                                                  | ↑   | A   | A   | A   | ↑   | A                      | — | — | FFH | —   | —   | ↑   | —   | <p>While inputting rainbow color bar signal (3.58MHz for NTSC) to pin 42 and 0.3V synchronizing signal to pin 51 so that video amplitude of pin 33 is 0.38V<sub>p-p</sub>, find the relative amplitude.</p> <p>(Mnr-b = Vu14mx/Vu12mx, Ming-b = Vu13mx/Vu12mx)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T9   | Relative Phase (NTSC)           | ↑                                                                                                                  | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | ↑ | —   | —   | ↑   | —   | —   | <p>(1) In the test condition of the Note Tg, adjust bus data on tint so that output of pin 12 (B OUT) has the peak level in the 6th bar.</p> <p>(2) Regarding the phase of pin 12 (B OUT) as a reference phase, find comparative phase differences of pin 14 (R OUT) and pin 13 (G OUT) from the reference phase respectively (θnr-b, θng-b).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| NOTE | ITEM                                         | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^\circ C$ ; BUS = preset value) |     |     |     |     |     |     |     |     |     |     |
|------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |                                              | MEASURING METHOD                                                                                                                                         |     |     |     |     |     |     |     |     |     |     |
|      |                                              | SUB-ADDRESS & BUS DATA                                                                                                                                   |     |     |     |     |     |     |     |     |     |     |
|      |                                              | S21                                                                                                                                                      | S22 | S31 | S33 | S34 | S51 | S42 |     | 00H | 02H | 1BH |
| T10  | Relative Amplitude (PAL)                     | B                                                                                                                                                        | B   | A   | A   | A   | A   | A   | FFH | —   | BFH | —   |
| T11  | Relative Phase (PAL)                         | ↑                                                                                                                                                        | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | —   | —   | —   |
| T12  | Color Control Characteristic                 | ↑                                                                                                                                                        | ↑   | B   | B   | B   | ↑   | —   | ↑   | FFH | ↑   | —   |
| T13  | Color Control Characteristic, Residual Color | ↑                                                                                                                                                        | ↑   | ↑   | ↑   | ↑   | ↑   | —   | ↑   | 00H | ↑   | —   |

While inputting rainbow color bar signal (4.43MHz for PAL) to pin 42 and 0.3V synchronizing signal to pin 51 so that video amplitude of pin 33 is 0.38V<sub>p-p</sub>, find the relative amplitude. (Mpr-b = Vu14mx / Vu12mx, Mpg-b = Vu13mx / Vu12mx)

(1) In the test condition of the Note T10, adjust bus data on tint so that output of pin 12 (B OUT) has the peak level in the 6th bar.

(2) Regarding the phase of pin 12 (B OUT) as a reference phase, find comparative phase differences of pin 14 (R OUT) and pin 13 (G OUT) from the reference phase respectively ( $\theta_{pr-b}$ ,  $\theta_{pg-b}$ ).

(1) Input 0.3V synchronizing signal to pin 51 (Sync IN).

(2) Input 100kHz, 0.1V<sub>p-p</sub> sine wave signal to both pin 33 (B-Y IN) and pin 34 (R-Y IN).

(3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.

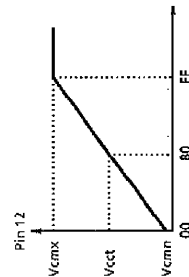
(4) Set bus data so that unicolor is maximum, drive is at center value and Y mute is on.

(5) Measure amplitude of pin 12 (B OUT) as bus data on color is set maximum (FF). (Vcmx)

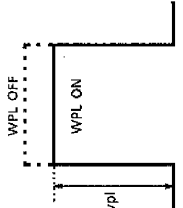
(6) Read bus data when output level of pin 12 is 10%, 50% and 90% of Vcmx respectively (Dc10, Dc50, Dc90).

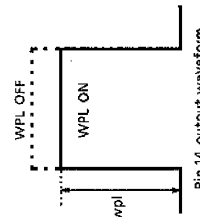
(7) From results of the above step 6, calculate number of steps from Dc10 to Dc90 ( $\Delta col$ ) and that from 00 to Dc50 (ecol).

(8) Measure respective amplitudes of pin 12 (B OUT), pin 13 (G OUT) and pin 14 (R OUT) with color data set at minimum, and regard the results as color residuals (ecb, ecg, ecr).



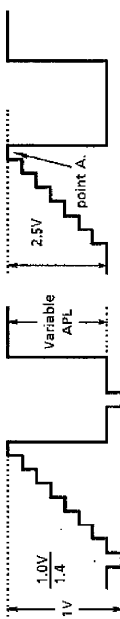
| NOTE | ITEM               | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |     |     |                        |     |     |     |     |
|------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|
|      |                    | SW MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     |     |
|      |                    | S21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | S22 | S31 | S33 | S34 | S51                    | S42 | —   | —   | —   |
| T14  | Chroma Input Range | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B   | A   | A   | A   | A                      | A   | —   | —   | —   |
|      |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |     |     |                        |     | FFH | 88H | BFH |
|      |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |     |     |                        |     | —   | —   | —   |
|      |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |     |     |                        |     |     |     |     |
|      |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |     |     |                        |     |     |     |     |
|      |                    | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |     |     |                        |     |     |     |     |
|      |                    | (1) Input rainbow color bar signal (3.58MHz for NTSC or 4.43MHz for PAL) to pin 42 (C IN) and 0.3V synchronizing signal to pin 51 (Sync IN).<br>(2) Connect pin 36 (B-Y OUT) and pin 33 (B-Y IN), pin 35 (R-Y OUT) and pin 34 (R-Y IN) in AC coupling respectively.<br>(3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.<br>(4) Set bus data so that unicolor is maximum, drive and color are set at each center value (80) and mute is on.<br>(5) While increasing amplitude of chroma signal input to pin 42, measure amplitude just before any of pin 12 (B OUT), pin 13 (G OUT) and pin 14 (R OUT) output signals is distorted (Vcr). |     |     |     |     |                        |     |     |     |     |

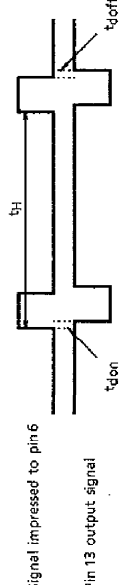
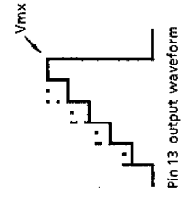
| NOTE | ITEM                               | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |                        |   |     |     |     |   | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|------------------------|---|-----|-----|-----|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                    | SW MODE                                                                                                                                                                           |     |     |     |     |     | SUB-ADDRESS & BUS DATA |   |     |     |     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|      |                                    | S21                                                                                                                                                                               | S22 | S31 | S33 | S34 | S51 | —                      | — | —   | 01H | 05H | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T15  | Brightness Control Characteristic  | B                                                                                                                                                                                 | B   | B   | B   | B   | A   | —                      | — | FFH | 10H | —   | — | (1) Short circuit pin 31 (Y IN), pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.<br>(2) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(3) Set bus data so that R, G, B cut off data are set at center value.<br>(4) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.<br>(5) While changing bus data on brightness from maximum to minimum, measure video voltage of pin 13 (G OUT) to find maximum and minimum voltages (max : Vbrmx, min : Vbrmn).<br>(6) With bus data on brightness set at center value, measure video voltage of pin 13 (G OUT) (Vbct).<br>(7) On the condition that bus data with which Vbrmx is obtained in measurement of the above step 5 is Dbrmx and bus data with which Vbrmn is obtained in measurement of the above step 5 is Dbrmn, calculate sensitivity of brightness data (ΔVbrt).<br>$\Delta Vbrt = (Vbrmx - Vbrmn) / (Dbrmx - Dbrmn)$ |
| T16  | Brightness Center Voltage          | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | 80H | ↑   | —   | — | (1) In the same manner as the Note T16, measure video voltage of pin 12 (B OUT) with bus data on brightness set at center value.<br>(2) Find maximum axes difference in the brightness center voltage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| T17  | Brightness Data Sensitivity        | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | —   | —   | —   | — | (1) Set bus data so that contrast and Y sub contrast are maximum and brightness is minimum.<br>(2) Input TG7 sine wave signal whose frequency is 100kHz and amplitude in video period is 0.9V to pin 31 (Y IN).<br>(3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.<br>(4) While turning on/off WPL with bus, measure video amplitude of pin 14 (R OUT) with WPL being activated (Vwpl)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T18  | RGB Output Voltage Axes Difference | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | —   | —   | —   | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T19  | White Peak Limit Level             | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | 00H | 1FH | —   | — | <br>Pin 14 output waveform                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



| NOTE | ITEM                          | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |                        |                    |                    |     |   |
|------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|--------------------|--------------------|-----|---|
|      |                               | SW MODE                                                                                                                                                                           |     |     |     |     | SUB-ADDRESS & BUS DATA |                    |                    |     |   |
|      |                               | S21                                                                                                                                                                               | S22 | S31 | S33 | S34 | S51                    | —                  | —                  | —   | — |
|      |                               |                                                                                                                                                                                   |     |     |     |     |                        | 09H 0AH            | 0CH 0DH            | 0EH | — |
|      | Cutoff Control Characteristic | B                                                                                                                                                                                 | B   | B   | B   | B   | A                      | 80H 80H            | FFH FFH<br>00H 00H | FFH | — |
| T20  |                               |                                                                                                                                                                                   |     |     |     |     |                        |                    |                    |     |   |
|      | Cutoff Center Level           | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑                  | 80H 80H            | 80H | — |
| T21  |                               |                                                                                                                                                                                   |     |     |     |     |                        |                    |                    |     |   |
|      | Cutoff Variable Range         | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑                      | —                  | —                  | —   | — |
| T22  |                               |                                                                                                                                                                                   |     |     |     |     |                        |                    |                    |     |   |
|      | Drive Variable Range          | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑                      | FFH FFH<br>00H 00H | 80H 80H            | 80H | — |
| T23  |                               |                                                                                                                                                                                   |     |     |     |     |                        |                    |                    |     |   |

- MEASURING METHOD
- (1) Short circuit pin 31 (Y IN), pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.
- (2) Input 0.3V synchronizing signal to pin 51 (Sync IN).
- (3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.
- (4) Set bus data on brightness at center value.
- (5) While changing data on cutoff from maximum to minimum, measure video voltage of pin 13 (G OUT) to find maximum and minimum values (max : Vcomx, min : Vcomn).
- (6) Set cutoff data at center value and measure video voltage of pin 13 (G OUT) (Vcct).
- (7) On the condition that bus data with which Vcomx is obtained in measurement of the above step 5 is Dcomx and bus data with which Vcomn is obtained in the same is Dcomn, calculate number of steps ( $\Delta Dcut$ ).
- $\Delta Dcut = Dcomx - Dcomn$
- (1) Short circuit pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.
- (2) Input a stepping signal whose amplitude in video period is 0.3V to pin 31 (Y IN).
- (3) Input 0.3V synchronizing signal to pin 51 (Sync IN).
- (4) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.
- (5) Set bus data so that contrast is maximum and Y sub contrast is minimum.
- (6) While changing drive data from minimum to maximum, measure video amplitude of pin 13 (G OUT) to find maximum and minimum values (max : Vdrmx, min : Vdrmn).
- (7) Set drive data at center value and measure video amplitude of pin 13 (G OUT) (Vdrct). Calculate amplitude ratio of the measured value to the maximum and minimum amplitudes measured in the above step 6 respectively (DR +, DR -).

| NOTE | ITEM                 | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC} = 9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC} = 5V$ ; $T_a = 25 \pm 3^\circ C$ ; BUS = preset value) |     |     |     |                        |     |     |     |                  |                                                                                                        |  |  |
|------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------------------------|-----|-----|-----|------------------|--------------------------------------------------------------------------------------------------------|--|--|
|      |                      | SW MODE                                                                                                                                                          |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     | MEASURING METHOD |                                                                                                        |  |  |
|      |                      | S21                                                                                                                                                              | S22 | S31 | S33 | S34                    | S51 | S45 | S39 | S44              |                                                                                                        |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (1) Short circuit pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.                                  |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (2) Input such the step-up signal as shown below to pin 45 (Y IN) and pin 51 (Sync IN).                |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.                                      |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (4) Set bus data so that contrast is maximum and DC transmission correction factor is minimum.         |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (5) Adjust data on Y sub contrast so that video amplitude of pin 13 (G OUT) is 2.5V.                   |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (6) While varying APL of the step-up signal from 10% to 90%, measure change in voltage at the point A. |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  |                       |  |  |
| T24  | DC Regeneration      | B                                                                                                                                                                | B   | A   | B   | B                      | A   | B   | A   | A                |                                                                                                        |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (1) Short circuit pin 31 (Y IN), pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.                   |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (2) Input synchronizing signal of 0.3V in amplitude to pin 51 (Sync IN).                               |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.                                      |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (4) Set bus data on contrast at maximum.                                                               |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (5) Set bus data on Y sub contrast at center value.                                                    |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | (6) Measure video noise level of pin 13 (G OUT) with oscilloscope (no).                                |  |  |
|      |                      |                                                                                                                                                                  |     |     |     |                        |     |     |     |                  | SNo = $-20\log (2.5/(1/5) \times no)$                                                                  |  |  |
| T25  | RGB Output S/N Ratio | ↑                                                                                                                                                                | ↑   | B   | ↑   | ↑                      | ↑   | —   | —   | —                |                                                                                                        |  |  |

| NOTE | ITEM                        | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ; BUS = preset value) |     |     |     |     |                        |   |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|---|-----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                             | SW MODE                                                                                                                                                   |     |     |     |     | SUB-ADDRESS & BUS DATA |   |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|      |                             | S21                                                                                                                                                       | S22 | S31 | S33 | S34 | S51                    |   |     |     | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| T26  | Blanking Pulse Output Level | B                                                                                                                                                         | B   | B   | B   | B   | A                      | — | —   | —   | <p>(1) Input synchronizing signal of 0.3V in amplitude to pin 51 (Sync IN).</p> <p>(2) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.</p> <p>(3) Set bus data so that blanking is on.</p> <p>(4) Measure voltage of pin 13 (G OUT) in V. blanking period (V<sub>y</sub>).</p> <p>(5) Measure voltage of pin 13 (G OUT) in H. blanking period (V<sub>h</sub>).</p>                                                                                                                                                                                                                                                                                 |
| T27  | Blanking Pulse Delay Time   | ↑                                                                                                                                                         | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑ | ↑   | ↑   | <p>In the setting condition of the Note T26, find "t<sub>don</sub>" and "t<sub>doff</sub>" (see figure below) between the signal impressed to pin 6 (BFP IN) and output signal of pin 13 (G OUT).</p>  <p>Signal impressed to pin 6</p> <p>Pin 13 output signal</p> <p>t<sub>don</sub></p> <p>t<sub>doff</sub></p>                                                                                                                                                                                                                                                              |
| T28  | RGB Min. Output Level       | ↑                                                                                                                                                         | ↑   | ↑   | ↑   | ↑   | ↑                      | — | 00H | 00H | <p>(1) Short circuit pin 31 (Y IN), pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.</p> <p>(2) Input synchronizing signal of 0.3V in amplitude to pin 51 (Sync IN).</p> <p>(3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.</p> <p>(4) Set bus data so that brightness and RGB cutoff are minimum.</p> <p>(5) Measure video voltage of pin 13 (G OUT) (V<sub>mn</sub>).</p>                                                                                                                                                                                                                                                                 |
| T29  | RGB Max. Output Level       | ↑                                                                                                                                                         | ↑   | ↑   | ↑   | ↑   | ↑                      | — | 80H | 1fH | <p>(1) Short circuit pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.</p> <p>(2) Input stepping signal to pin 31 (Y IN) and synchronizing signal of 0.3V in amplitude to pin 51 (Sync IN).</p> <p>(3) Connect pin 21 (Digital Ys) and pin 22 (Analog Ys) to ground.</p> <p>(4) Set bus data so that contrast and Y sub contrast are maximum.</p> <p>(5) While increasing amplitude of the stepping signal, measure maximum output level just before video signal of pin 13 (G OUT) is distorted (V<sub>mx</sub>).</p>  <p>Pin 13 output waveform</p> <p>V<sub>mx</sub></p> |

| NOTE | ITEM                       | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |     |     |     |     |                        |   |   | MEASURING METHOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|      |                            | SW MODE                                                                                                                                                                           |     |     |     |     |     |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|      |                            | S18                                                                                                                                                                               | S19 | S20 | S21 | S22 | S31 | S33 | S34 | S51 | 15H | 1CH                    | — | — |                  | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| T30  | Half-tone Ys Level         | B                                                                                                                                                                                 | B   | B   | A   | B   | B   | B   | B   | A   | 00H | 80H                    | — | — | —                | (1) Input stepping signal whose amplitude is 0.3V in video period to pin 31 (Y IN) and pin 51 (Sync IN).<br>(2) Set bus data so that blanking is off and half-tone is -3dB in on status.<br>(3) Connect power supply to pin 21 (Digital Ys). While impressing 0V to it, measure amplitude and pedestal level of pin 13 (G OUT) in video period (Vm13, Vp13).<br>(4) Raising supply voltage to pin 21 gradually from 0V, measure level (Vtht1) of pin 21 when amplitude of pin 13 output signal changes. At the same time, measure amplitude and pedestal level of pin 13 in video period after the pin 13 output signal changed in amplitude. (Vm13b, Vp13b)<br>(5) According to results of the above steps 3 and 4, calculate gain of -3dB half-tone and variation of pedestal level.<br>G3ht13 = 20log (Vm13b /Vm13)<br>(6) Set bus data so that half-tone is -6dB in on status, and perform the same measurement as the above steps 4 and 5 to find gain of -6dB half-tone and variation of pedestal level (G6th13).<br>(7) Raising supply voltage to pin 21 further from Vtht1, measure level (Vtx1) of pin 21 when output signal of pin 13 (G OUT) changes in amplitude and DC level of pin 13 after the change of its output (Vtx13).<br>(8) From results of the above steps 3 and 7, calculate low level of the output in the text mode.<br>Vtx13 = Vtx13 - Vp13<br>(9) Raising supply voltage to pin 21 by 3V from that in the above step 7, confirm that there is no change in output level of pin 13. |
| T31  | Half-tone Gain 1           | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | —                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| T32  | Half-tone Gain 2           | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | 01H | ↑                      | — | — | —                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| T33  | Text ON Ys, Low Level      | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | —                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| T34  | Text/OSD Output, Low Level | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | —                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| NOTE | ITEM                           | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |     |     |     |         |   |   |   |
|------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|---------|---|---|---|
|      |                                | MEASURING METHOD                                                                                                                                                                  |     |     |     |     |     |     |     |     |         |   |   |   |
|      |                                | SW MODE                                                                                                                                                                           |     |     |     |     |     |     |     |     |         |   |   |   |
|      |                                | S18                                                                                                                                                                               | S19 | S20 | S21 | S22 | S31 | S33 | S51 | 15H | 1CH     | — | — | — |
| T35  | Text RGB Output,<br>High Level | A                                                                                                                                                                                 | A   | A   | A   | B   | B   | B   | A   | —   | 02H 80H | — | — | — |
| T36  | OSD Ys ON, Low<br>Level        | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | —   | ↑       | — | — | — |
| T37  | OSD RGB Output,<br>High Level  | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | —   | ↑       | — | — | — |

(1) Input stepping signal whose amplitude is 0.3V in video period to pin 31 (Y IN) and pin 51 (Sync IN).  
 (2) Set bus data so that blanking and half-tone are off.  
 (3) Connect power supply to pin 21 (Digital Ys). While impressing 0V to it, measure pedestal level of pin 13 output signal (G OUT) (V<sub>p13</sub>).  
 (4) Connect power supply to pin 19 (Digital G IN) and impress it with 2V.  
 (5) Raising supply voltage to pin 21 gradually from 0V, measure video level of pin 21 after output signal of pin 13 changed (V<sub>lx13</sub>).  
 (6) From measurement results of the above steps 3 and 5, calculate high level in the text mode.  
 $V_{mt13} = V_{tx13} - V_{pt13}$   
 (7) Raising supply voltage to pin 21 further from that in the step 5, measure level (V<sub>tost</sub>) of pin 21 when the level of pin 13 output signal changes from that in the step 5 to -6dB as half-tone data is set to ON (the 6th step of Notes T30 to T34).  
 (8) In the condition of the above step 7, raise voltage impressed to pin 19 to 3V and measure output voltage of pin 13 (V<sub>os13</sub>).  
 (9) From results of the above steps 3 and 7, calculate high level of the output in the OSD mode.  
 $V_{mos13} = V_{os13} - V_{pt13}$

| NOTE | ITEM                       | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |                        |     |     |     |     |                  |     |     |     |     |
|------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|
|      |                            | SW MODE                                                                                                                                                                           |     |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     |     | MEASURING METHOD |     |     |     |     |
|      |                            | S18                                                                                                                                                                               | S19 | S20 | S21 | S22 | S23                    | S24 | S25 | S26 | S27 | S28              | S29 | S30 | S31 | S32 |
| T38  | Text Input Threshold Level | A                                                                                                                                                                                 | A   | A   | A   | B   | B                      | B   | B   | B   | B   | B                | B   | B   | B   | B   |
| T39  | OSD Input Threshold Level  | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑                | ↑   | ↑   | ↑   | ↑   |

(1) Connect power supply to pin 21 (Digital Ys) and impress 1.5V to it.

(2) Connect power supply to pin 19 (Digital G IN). While raising supply voltage gradually from 0V, measure supply voltage when output signal of pin 13 (G OUT) changes (V<sub>txt</sub>).

(3) Raising the supply voltage to pin 19 furthermore to 4V, confirm that there is no change in the output signal of pin 13 (G OUT).

(1) Connect power supply to pin 21 (Digital Ys) and impress 2.5V to it.

(2) Connect power supply to pin 19 (Digital G IN). While raising supply voltage gradually from 0V, measure supply voltage when output signal of pin 13 (G OUT) changes (V<sub>osd</sub>).

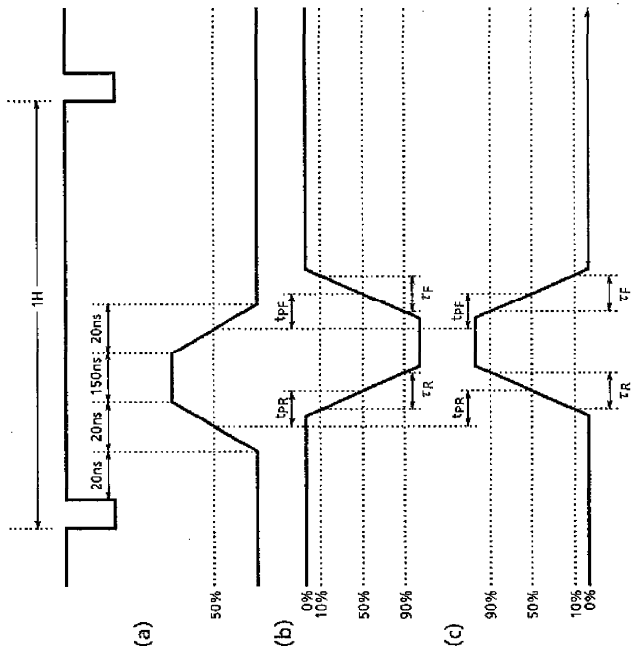
(3) Raising the supply voltage to pin 19 furthermore to 4V, confirm that there is no change in the output signal of pin 13 (G OUT).

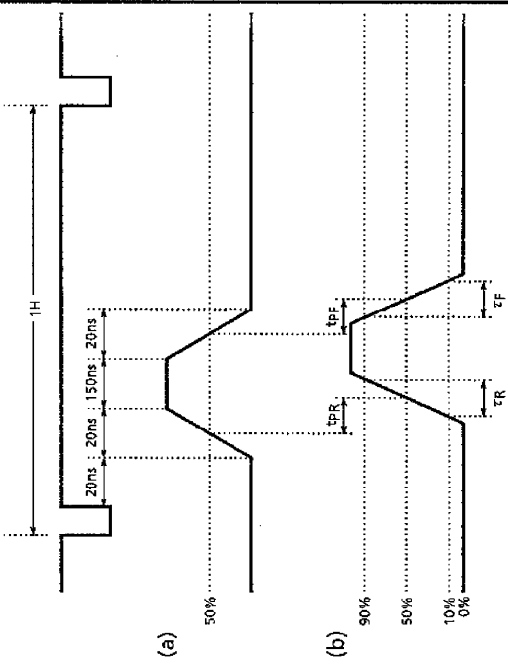
| NOTE | ITEM                                                                  | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |     |     |     |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | MEASURING METHOD |
|------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|
|      |                                                                       | SW MODE                                                                                                                                                                          |     |     |     |     |     |     |     |     |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |
|      |                                                                       | S18                                                                                                                                                                              | S19 | S20 | S21 | S22 | S31 | S33 | S34 | S51 |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |
| T40  | OSD Mode<br>Switching Rise-Up<br>Time                                 | A                                                                                                                                                                                | A   | A   | A   | B   | B   | B   | B   | A   | — | — | — | — | — | (1) Input a Signal Shown by (a) in the following figure to pin 21 (Digital Ys).<br>(2) According to (b) in the figure, measure $\tau_{R\text{osd}}$ , $\tau_{P\text{Ros}}$ , $\tau_{F\text{osd}}$ and $\tau_{P\text{Fos}}$ for output signals of pin 14 (R OUT), pin 13 (G OUT) and pin 12 (B OUT) respectively.<br>(3) Find maximum values of $\tau_{P\text{Ros}}$ and $\tau_{P\text{Fos}}$ respectively ( $\Delta\tau_{P\text{Fos}}$ ). |  |                  |
| T41  | OSD Mode<br>Switching Rise-Up<br>Transfer Time                        | ↑                                                                                                                                                                                | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |
| T42  | OSD Mode<br>Switching Rise-Up<br>Transfer Time, 3<br>Axes Difference  | ↑                                                                                                                                                                                | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |
| T43  | OSD Mode<br>Switching Breaking<br>Time                                | ↑                                                                                                                                                                                | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |
| T44  | OSD Mode<br>Switching Breaking<br>Transfer Time                       | ↑                                                                                                                                                                                | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |
| T45  | OSD Mode<br>Switching Breaking<br>Transfer Time, 3<br>Axes Difference | ↑                                                                                                                                                                                | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | ↑   | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |

(a)

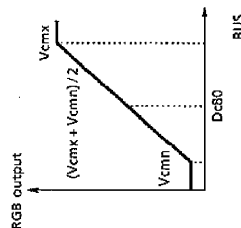
(b)

(c)



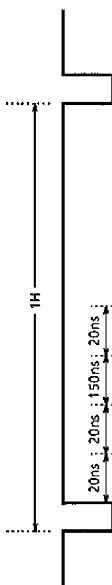
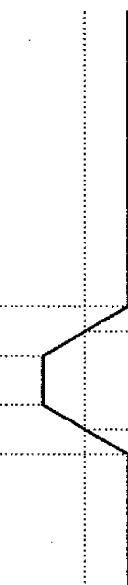
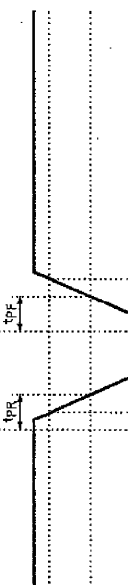
| NOTE | ITEM                                                                   | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; T <sub>a</sub> = 25 ± 3°C ; BUS = preset value) |     |     |     |     |                        |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
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|      |                                                                        | SW MODE                                                                                                                                                                                       |     |     |     |     | SUB-ADDRESS & BUS DATA |     |     |     |     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|      |                                                                        | S18                                                                                                                                                                                           | S19 | S20 | S21 | S22 | S23                    | S31 | S32 | S33 | S34 | S51 | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| T46  | OSD Hi DC<br>Switching Rise-Up<br>Time                                 | A                                                                                                                                                                                             | A   | A   | A   | B   | B                      | B   | B   | B   | B   | A   | <p>(1) Supply pin 21 (Digital Ys) with 2.5V.<br/>           (2) Input 5V<sub>pp</sub> signal shown by (a) in the figure to pin 18 (Digital R IN).<br/>           (3) Referring to (b) of the following figure, measure <math>\tau_{Roh}</math>, <math>\tau_{Foh}</math> and <math>\tau_{Foh}</math> for output signal of pin 14 (R OUT).<br/>           (4) Input 5V<sub>pp</sub> signal shown by (a) in the figure to pin 19 (Digital G IN).<br/>           (5) Perform the same measurement as the above step 3 for pin 13 output (G OUT) referring to (b) of the following figure.<br/>           (6) Input 5V<sub>pp</sub> signal shown by (a) in the figure to pin 20 (Digital B IN).<br/>           (7) Perform the same measurement as the above step 3 for pin 12 output (B OUT) referring to (b) of the following figure.<br/>           (8) Find maximum axes differences in <math>\tau_{Roh}</math> and <math>\tau_{Foh}</math> among the three outputs (<math>\Delta\tau_{Roh}</math>, <math>\Delta\tau_{Foh}</math>).</p>  |  |
| T47  | OSD Hi DC<br>Switching Rise-Up<br>Transfer Time                        | ↑                                                                                                                                                                                             | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| T48  | OSD Hi DC<br>Switching Rise-Up<br>Transfer Time, 3<br>Axes Difference  | ↑                                                                                                                                                                                             | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| T49  | OSD Hi DC<br>Switching Breaking<br>Time                                | ↑                                                                                                                                                                                             | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| T50  | OSD Hi DC<br>Switching Breaking<br>Transfer Time                       | ↑                                                                                                                                                                                             | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| T51  | OSD Hi DC<br>Switching Breaking<br>Transfer Time, 3<br>Axes Difference | ↑                                                                                                                                                                                             | ↑   | ↑   | ↑   | ↑   | ↑                      | ↑   | ↑   | ↑   | ↑   | ↑   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |

| NOTE | ITEM                                | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |                        |     |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|-----|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                     | SW MODE                                                                                                                                                                           |     |     |     |     | SUB-ADDRESS & BUS DATA |     |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|      |                                     | S21                                                                                                                                                                               | S22 | S31 | S33 | S34 | S51                    |     |   |   | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| T52  | RGB Contrast Control Characteristic |                                                                                                                                                                                   |     |     |     |     |                        | —   | — | — | (1) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(2) Supply 5V of external supply voltage to pin 22 (Analog Ys).<br>(3) Set bus data on drive at center value.<br>(4) Input TG7 sine wave signal (f = 100kHz, video amplitude = 0.5V) to pin 23 (Analog R IN).<br>(5) While changing data on RGB contrast from maximum (FF) to minimum (00), measure maximum and minimum amplitudes of pin 14 (R OUT) in video period. At the same time, measure video amplitude of pin 14 when the bus data is set at the center value (80). (Vc14mx, Vc14mn, D14c80)<br>(6) In the same manner as the above steps 4 and 5, measure output signal of pin 13 with input of the same external power supply to pin 24 (Analog G IN), and measure output signal of pin 12 with input of the same power supply to pin 25 (Analog B IN). (Vc12mx, Vc12mn, D12c80).<br>(7) Find amplitude ratio between signal with maximum unicolor data and signal with minimum unicolor data in conversion into decibel (ΔV13ct). |
|      |                                     |                                                                                                                                                                                   |     |     |     |     |                        | FFH | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|      |                                     |                                                                                                                                                                                   |     |     |     |     |                        | 80H | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|      |                                     |                                                                                                                                                                                   |     |     |     |     |                        | 00H | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



[illegible]

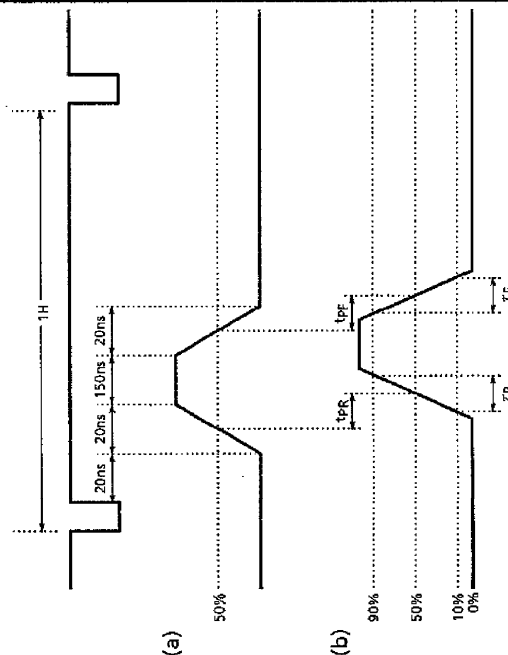
| NOTE | ITEM                                        | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> =5V ; T <sub>a</sub> =25±3°C ; BUS=preset value) |     |     |     |     |     |   |                        |   |     |     | MEASURING METHOD |   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|---|------------------------|---|-----|-----|------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                             | SW MODE                                                                                                                                                                                |     |     |     |     |     |   | SUB-ADDRESS & BUS DATA |   |     |     |                  |   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|      |                                             | S21                                                                                                                                                                                    | S22 | S31 | S33 | S34 | S51 | — | —                      | — | 01H | 06H |                  | — | —                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| T55  | Analog RGB<br>Dynamic Range                 | B                                                                                                                                                                                      | A   | B   | B   | B   | A   | — | —                      | — | —   | 00H | —                | — | (1) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(2) Supply 5V of external supply voltage to pin 22 (Analog Ys).<br>(3) Set bus data so that contrast is minimum and drive is set at center value.<br>(4) While inputting stepping signal to pin 24 (Analog G IN), increase video amplitude gradually from 0.<br>(5) Measure video amplitude of pin 24 when video voltage of pin 13 (G OUT) does not change.                  |
| T56  | RGB Brightness<br>Control<br>Characteristic | ↑                                                                                                                                                                                      | ↑   | ↑   | ↑   | ↑   | ↑   | — | —                      | — | —   | FFH | —                | — | (1) Short circuit pin 31 (Y IN), pin 33 (B-Y IN) and pin 34 (R-Y IN) in AC coupling.<br>(2) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(3) Set bus data on RGB cutoff at center value.<br>(4) Supply 5V of external supply voltage to pin 22 (Analog Ys).<br>(5) While changing data brightness from maximum to minimum, measure maximum and minimum voltages of pin 13 (G OUT) in video period. (max : Vbrmx, min : Vbrmn) |
| T57  | RGB Brightness<br>Center<br>Voltage         | ↑                                                                                                                                                                                      | ↑   | ↑   | ↑   | ↑   | ↑   | — | —                      | — | —   | 80H | —                | — | (6) Set bus data on brightness at center value and measure video voltage of pin 13 (G OUT) (Vbrnt).<br>(7) On the condition that bus data with which Vbrmx is obtained in measurement of the above step 5 is Dbrmx and bus data with which Vbrmn is obtained in measurement of the above step 5 is Dbrmn, calculate sensitivity of brightness data (ΔVbrt).<br>ΔVbrt = (Vbrmx - Vbrmn) / (Dbrmx - Dbrmn)                                 |
| T58  | RGB Brightness<br>Data<br>Sensitivity       | ↑                                                                                                                                                                                      | ↑   | ↑   | ↑   | ↑   | ↑   | — | —                      | — | —   | —   | —                | — | (1) Input TG7 sine wave signal (f=100kHz, video amplitude=0.3V) to pin 23 (Analog R IN).<br>(2) Supply 5V of external supply voltage to pin 22 (Analog Ys) and raise the voltage gradually from 0V.<br>(3) Measure voltage at pin 22 when signal 1 is output from pin 14 (R OUT) (Vanath).                                                                                                                                               |
| T59  | Analog RGB Mode<br>ON<br>Voltage            | ↑                                                                                                                                                                                      | ↑   | ↑   | ↑   | ↑   | ↑   | — | —                      | — | —   | 80H | —                | — | (1) Input TG7 sine wave signal (f=100kHz, video amplitude=0.3V) to pin 23 (Analog R IN).<br>(2) Supply 5V of external supply voltage to pin 22 (Analog Ys) and raise the voltage gradually from 0V.<br>(3) Measure voltage at pin 22 when signal 1 is output from pin 14 (R OUT) (Vanath).                                                                                                                                               |

| NOTE | ITEM                                                           | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |                        |   |   |   |   |   | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|------------------------|---|---|---|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                | SW MODE                                                                                                                                                                           |     |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|      |                                                                | S21                                                                                                                                                                               | S22 | S31 | S33 | S34 | S51 |                        |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T60  | Analog RGB Switching Rise-Up Time                              | B                                                                                                                                                                                 | A   | B   | B   | B   | A   | —                      | — | — | — | — | — | <p>(1) Supply signal (2V<sub>p-p</sub>) shown by (a) in the following figure to pin 22 (Analog Ys).</p> <p>(2) Referring to (b) of the following figure, measure τ<sub>Rana</sub>, τ<sub>PRan</sub>, τ<sub>Fana</sub> and τ<sub>PFan</sub> for outputs of pin 14 (R OUT), pin 13 (G OUT) and pin 12 (B OUT).</p> <p>(3) Find maximum values of τ<sub>PRan</sub> and τ<sub>PFan</sub> respectively (Δτ<sub>PRan</sub>, Δτ<sub>PFan</sub>).</p>    |
| T61  | Analog RGB Switching Rise-Up Transfer Time                     | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T62  | Analog RGB Switching Rise-Up Transfer Time, 3 Axes Difference  | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T63  | Analog RGB Switching Breaking Time                             | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T64  | Analog RGB Switching Breaking Transfer Time                    | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| T65  | Analog RGB Switching Breaking Transfer Time, 3 Axes Difference | ↑                                                                                                                                                                                 | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| NOTE | ITEM                                                              | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , F <sub>sc</sub> V <sub>DD</sub> , Y/C V <sub>CC</sub> =5V ; T <sub>a</sub> =25±3°C ; BUS=preset value) |     |     |     |     |                        |   |   |   |   | MEASURING METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|---|---|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                   | SW MODE                                                                                                                                                                                            |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|      |                                                                   | S21                                                                                                                                                                                                | S22 | S31 | S33 | S34 | S51                    | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T66  | Analog RGB Hi Switching Rise-Up Time                              | B                                                                                                                                                                                                  | A   | B   | B   | B   | A                      | — | — | — | — | (1) Supply 2V to pin 22 (Analog Ys).<br>(2) Input 0.5V <sub>p-p</sub> signal shown by (a) in the following figure to pin 23 (Analog R IN).<br>(3) Referring to (b) of the following figure, measure τ <sub>Rah</sub> , τ <sub>Fah</sub> and t <sub>pFah</sub> for output of pin 14 (R OUT).<br>(4) Input 0.5V <sub>p-p</sub> signal shown by (a) in the following figure to pin 24 (Analog G IN).<br>(5) Referring to (b) of the following figure, perform the same measurement as the above step 3 for output of pin 13 (G OUT).<br>(6) Input 0.5V <sub>p-p</sub> signal shown by (a) in the following figure to pin 25 (Analog B IN).<br>(7) Referring to (b) of the following figure, perform the same measurement as the above step 3 for output of pin 12 (B OUT).<br>(8) Find maximum axes difference in t <sub>pRoh</sub> and t <sub>pFoh</sub> among the three outputs (Δt <sub>pRah</sub> , Δt <sub>pFah</sub> ). |
| T67  | Analog RGB Hi Switching Rise-Up Transfer Time                     | ↑                                                                                                                                                                                                  | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T68  | Analog RGB Hi Switching Rise-Up Transfer Time, 3 Axes Difference  | ↑                                                                                                                                                                                                  | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T69  | Analog RGB Hi Switching Breaking Time                             | ↑                                                                                                                                                                                                  | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T70  | Analog RGB Hi Switching Breaking Transfer Time                    | ↑                                                                                                                                                                                                  | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| T71  | Analog RGB Hi Switching Breaking Transfer Time, 3 Axes Difference | ↑                                                                                                                                                                                                  | ↑   | ↑   | ↑   | ↑   | ↑                      | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

(a)

(b)



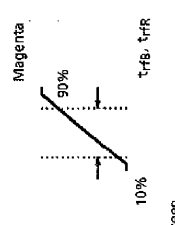
| NOTE | ITEM                    | TEST CONDITION (Unless otherwise specified : H, RGB $V_{CC}=9V$ ; $V_{DD}$ , Fsc $V_{DD}$ , Y/C $V_{CC}=5V$ ; $T_a=25\pm3^{\circ}C$ ; BUS = preset value) |     |     |     |     |     |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MEASURING METHOD |
|------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|      |                         | SUB-ADDRESS & BUS DATA                                                                                                                                    |     |     |     |     |     |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
|      |                         | SW MODE                                                                                                                                                   |     |     |     |     |     |   |   |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
|      |                         | S21                                                                                                                                                       | S22 | S31 | S33 | S34 | S51 | — | — | — | — | — | — | — | — |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| T72  | TV-Analog RGB Crosstalk | B                                                                                                                                                         | A   | B   | B   | B   | A   | — | — | — | — | — | — | — | — | (1) Input TG7 sine wave signal ( $f=4MHz$ , video amplitude =0.5V) to pin 31 (Y <sub>2</sub> IN).<br>(2) Short circuit pin 25 (Analog G IN) in AC coupling.<br>(3) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(4) Set bus data so that contrast is maximum, Y sub contrast and drive are set at center value.<br>(5) Supply pin 22 (Analog Ys) with 0V of external power supply.<br>(6) Measure video voltage of output signal of pin 13 (G OUT) (Vtg).<br>(7) Supply pin 22 (Analog Ys) with 2V of external power supply.<br>(8) Measure video voltage of output signal of pin 13 (G OUT) (Vana).<br>(9) From measurement results of the above steps 5 and 7, calculate crosstalk from TV to analog RGB.<br>Cr <sub>tva</sub> = 20log (Vana / Vtg)                       |                  |
| T73  | Analog RGB-TV Crosstalk | ↑                                                                                                                                                         | ↑   | ↑   | ↑   | ↑   | ↑   | — | — | — | — | — | — | — | — | (1) Short circuit pin 31 (Y <sub>2</sub> IN), pin 34 (R-Y IN) and pin 33 (B-Y IN) in AC coupling.<br>(2) Input 0.3V synchronizing signal to pin 51 (Sync IN).<br>(3) Set bus data so that contrast is maximum and drive is set at center value.<br>(4) Input TG7 sine wave signal ( $f=4MHz$ , video amplitude =0.5V) to pin 24 (Analog G IN).<br>(5) Supply pin 22 (Analog Ys) with 0V of external power supply.<br>(6) Measure video voltage of output signal of pin 13 (G OUT) (Vant).<br>(7) Supply pin 22 (Analog Ys) with 2V of external power supply.<br>(8) Measure video voltage of output signal of pin 13 (G OUT) (Vtan).<br>(9) From measurement results of the above steps 6 and 8, calculate crosstalk from analog RGB to TV.<br>Cr <sub>ant</sub> = 20log (Vant / Vtan) |                  |

| NOTE | ITEM                     | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> =5V ; Ta = 25 ± 3°C ; BUS = preset value) |     |     |     |     |     |                        |   |   |   |     |     | MEASURING METHOD |   |                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|------------------------|---|---|---|-----|-----|------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                          | SW MODE                                                                                                                                                                         |     |     |     |     |     | SUB-ADDRESS & BUS DATA |   |   |   |     |     |                  |   |                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                              |
|      |                          | S21                                                                                                                                                                             | S22 | S31 | S33 | S34 | S51 | —                      | — | — | — | 01H | 15H |                  | — | —                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                                                                            |
| T74  | ABL Point Characteristic |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (1) Input TG7 sine wave signal (f = 4MHz, video amplitude = 0.5V) to pin 31 (Y <sub>2</sub> IN).                                                                                                                                                                                                                                                                                                             |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (2) Short circuit pin 23 (Analog R IN), pin 25 (Analog G IN), pin 26 (Analog B IN) in AC coupling.                                                                                                                                                                                                                                                                                                           |
|      |                          | B                                                                                                                                                                               | B   | B   | B   | B   | A   | —                      | — | — | — | FFH | 90H | —                | — | —                                                                                                                                                                                | (3) Set bus data so that brightness is maximum and ABL gain is at center value, and supply pin 16 with external supply voltage. While turning down voltage supplied to pin 16 gradually from 7V, measure voltage at pin 16 when the voltage supplied to pin 12 decreases by 0.3V in three conditions that data on ABL point is set at minimum, center and maximum values respectively. (Vabl1, Vabl2, Vabl3) |
| T75  | ACL Characteristic       |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (1) Input TG7 sine wave signal (f = 4MHz, video amplitude = 0.5V) to pin 31 (Y <sub>2</sub> IN).                                                                                                                                                                                                                                                                                                             |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (2) Input 0.3V synchronizing signal to pin 51 (Sync IN).                                                                                                                                                                                                                                                                                                                                                     |
|      |                          | ↑                                                                                                                                                                               | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | —   | —   | —                | — | (3) Measure video amplitude at pin 12. (Vacl1)                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                              |
| T76  | ABL Gain Characteristic  |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (4) Measure DC voltage at pin 16 (ABCL).                                                                                                                                                                                                                                                                                                                                                                     |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (5) Supply pin 16 with a voltage that the voltage measured in the above step 4 minus 2V.                                                                                                                                                                                                                                                                                                                     |
|      |                          | ↑                                                                                                                                                                               | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | FFH | 10H | —                | — | (6) Measure video amplitude at pin 12 (Vacl2) and its ratio to the amplitude measured in the above step 3.<br>Vacl = 20log (Vacl2/Vacl1)                                         |                                                                                                                                                                                                                                                                                                                                                                                                              |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (1) Short circuit pin 31 (Y <sub>2</sub> IN), pin 34 (R-Y IN) and pin 33 (B-Y IN) in AC coupling.                                                                                                                                                                                                                                                                                                            |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (2) Input 0.3V synchronizing signal to pin 51 (Sync IN).                                                                                                                                                                                                                                                                                                                                                     |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (3) Set bus data on brightness at maximum and measure video DC voltage at pin 12 (Vmax).                                                                                                                                                                                                                                                                                                                     |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (4) Measure voltage at pin 16 which is being supplied with the voltage measured in the step 5 of the preceding Note 75.                                                                                                                                                                                                                                                                                      |
|      |                          |                                                                                                                                                                                 |     |     |     |     |     |                        |   |   |   |     |     |                  |   |                                                                                                                                                                                  | (5) Changing setting of bus data on ABL gain at minimum, center and maximum values one after another, measure video DC voltage at pin 12. (Vabl1, Vabl2, Vabl3)                                                                                                                                                                                                                                              |
|      |                          | ↑                                                                                                                                                                               | ↑   | ↑   | ↑   | ↑   | ↑   | —                      | — | — | — | FFH | 10H | 1CH              |   | (6) Find respective differences of Vabl1, Vabl2 and Vabl3 from the voltage measured in the above step 3.<br>Vabl1 = Vmax - Vabl1<br>Vabl2 = Vmax - Vabl2<br>Vabl3 = Vmax - Vabl3 |                                                                                                                                                                                                                                                                                                                                                                                                              |

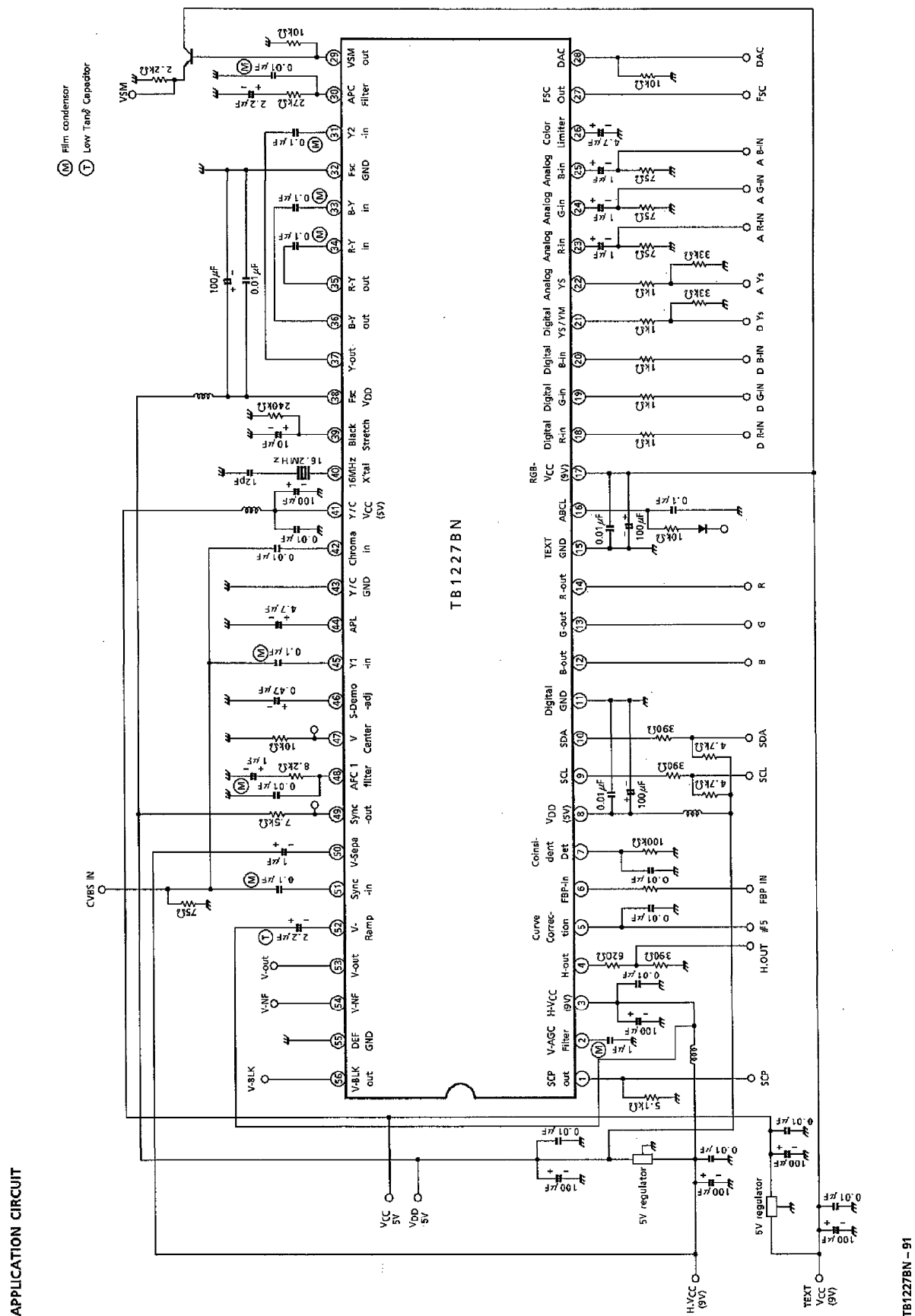
## SECAM SECTION

| NOTE           | ITEM                                      | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> =9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> =5V ; Ta=25±3°C) |                 |    |    |    |                           |    |    |    |    |    |    |    |    |    |    |    |    |    |    | MEASURING METHOD                                                                                                                                                                                                                                                                                           |                                                                                                                                                             |
|----------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----|----|----|---------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                           | S                                                                                                                                                      | BUS : TEST MODE |    |    |    | BUS : NORMAL CONTROL MODE |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                             |
|                |                                           |                                                                                                                                                        | 02H             | D4 | D3 | D2 | D7                        | D5 | D4 | D4 | D4 | D3 | D2 | D1 | D0 | D7 | D6 | D5 | D4 | D3 | D2 |                                                                                                                                                                                                                                                                                                            | D1                                                                                                                                                          |
| S <sub>1</sub> | Bell Monitor Output Amplitude             | ON                                                                                                                                                     | 0               | 1  | 0  | 0  | 0                         | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 1                                                                                                                                                                                                                                                                                                          | (1) Input 200mV <sub>p-p</sub> (R-Y ID), 75% chroma color bar signal (SECAM system) to pin 42.<br>(2) Measure amplitude of R-Y ID output of pin 36 as ebmo. |
| S <sub>2</sub> | Bell Filter f <sub>0</sub>                | ↑                                                                                                                                                      | ↑               | ↑  | ↑  | ↑  | ↑                         | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | (1) While supplying 20mV <sub>p-p</sub> CW sweep signal from network analyzer to pin 42 and monitoring output signal of pin 36 with the network analyzer, measure frequency having maximum gain as foBEL of the bell frequency characteristic.<br>(2) Find difference between foBEL and 4.286MHz as foB-C. |                                                                                                                                                             |
| S <sub>3</sub> | Bell Filter f <sub>0</sub> Variable Range | ↑                                                                                                                                                      | ↑               | ↑  | ↑  | ↑  | ↑                         | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | (1) The same procedure as the steps 1 and 2 of the Note S <sub>2</sub> .<br>(2) Measure foBEL in different condition that SUB (IF) D <sub>1</sub> D <sub>0</sub> = (00) or (11), and find difference of each measurement result from 4.286MHz as foB-L or foB-H.                                           |                                                                                                                                                             |
| S <sub>4</sub> | Bell Filter Q                             | ↑                                                                                                                                                      | ↑               | ↑  | ↑  | ↑  | ↑                         | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | 0  | 1  | (1) The same procedure as the step 1 of the Note S <sub>2</sub> .<br>(2) While monitoring output signal of pin 36 with network analyzer, measure Q of bell frequency characteristic as QBEL.<br>QBEL = (QMAX - 3dB band width) / FoBEL                                                                     |                                                                                                                                                             |
| S <sub>5</sub> | Color Difference Output Amplitude         | OFF                                                                                                                                                    | —               | —  | —  | —  | —                         | —  | 0  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | (1) Input 200mV <sub>p-p</sub> (R-Y ID), 75% chroma color bar signal (SECAM system) to pin 42.                                                                                                                                                                                                             |                                                                                                                                                             |
| S <sub>6</sub> | Color Difference Relative Amplitude       | ↑                                                                                                                                                      | —               | —  | —  | —  | —                         | —  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | (2) Measure color difference levels VRS and VBS with signals of pin 35 and pin 36.<br>(3) Calculate relative amplitude from VRS/VBS.                                                                                                                                                                       |                                                                                                                                                             |

| NOTE | ITEM                                  | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; Ta = 25 ± 3°C) |    |                 |    |    |    |                           |    |    |    |    |    |    |    |    |    |     |    | MEASURING METHOD |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                              |
|------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------|----|----|----|---------------------------|----|----|----|----|----|----|----|----|----|-----|----|------------------|----|----|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                       | S                                                                                                                                                            |    | BUS : TEST MODE |    |    |    | BUS : NORMAL CONTROL MODE |    |    |    |    |    |    |    |    |    | 1FH |    |                  |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                              |
|      |                                       |                                                                                                                                                              |    | 02H             | D4 | D3 | D2 | D7                        | D5 | D4 | D3 | D2 | D1 | D0 | D7 | D6 | D5 |     | D4 |                  | D3 | D2 | D1 | D0                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                              |
| S7   | Color Difference Attenuation Quantity | 26                                                                                                                                                           | D4 | D3              | D2 | D7 | D5 | D4                        | D4 | D7 | D5 | D4 | D3 | D2 | D1 | D0 | D7 | D6  | D5 | D4               | D3 | D2 | D1 | D0                                                                                                                                                                                                                                                                                                                                                                                                                    | (1) The same procedure as the steps 1 and 2 of the Note S5.<br>(2) In the condition that SUB (IF) D6 = 1, measure amplitudes of color difference signals of pin 35 and pin 36 as VRSA and VBSA respectively, and find SATTR and SATTB from measurement results.<br>SATTR = 20log (VRSA / VRS),<br>SATTB = 20log (VBSA / VBS) |
|      |                                       | OFF                                                                                                                                                          | —  | —               | —  | —  | —  | —                         | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1   | 0  | 0                | 0  | 0  | 0  | 1                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                              |
| S8   | Color Difference S/N Ratio            | ↑                                                                                                                                                            | —  | —               | —  | —  | —  | —                         | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | 0   | ↑  | ↑                | ↑  | ↑  | ↑  | (1) The same procedure as the steps 1 and 2 of the Note S5.<br>(2) Input non-modulated 200V <sub>p-p</sub> (R-Y) chroma signal to pin 42.<br>(3) Measure noise amplitude nR and nB (mV <sub>p-p</sub> ) appearing in color difference signals of pin 35 and pin 36 respectively.<br>(4) Find S/N ratio by the following equation.<br>SNB-S = 20log (2 × VBS / nB × 10E - 3)<br>SNR-S = 20log (2 × VRS / nR × 10E - 3) |                                                                                                                                                                                                                                                                                                                              |
|      |                                       |                                                                                                                                                              |    |                 |    |    |    |                           |    |    |    |    |    |    |    |    |    |     |    |                  |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                              |
| S9   | Linearity                             | ↑                                                                                                                                                            | —  | —               | —  | —  | —  | —                         | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑  | ↑   | ↑  | ↑                | ↑  | ↑  | ↑  | (1) The same procedure as the step 1 of the Note S5.<br>(2) Measure and calculate amplitude of black bar levels in output waveforms of pin 35 and pin 36 as shown below.<br>LinB = V [cyan] / V [red] (Maximum positive / negative amplitudes in respective axes)<br>LinR = V [yellow] / V [blue]                                                                                                                     |                                                                                                                                                                                                                                                                                                                              |
|      |                                       |                                                                                                                                                              |    |                 |    |    |    |                           |    |    |    |    |    |    |    |    |    |     |    |                  |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                              |

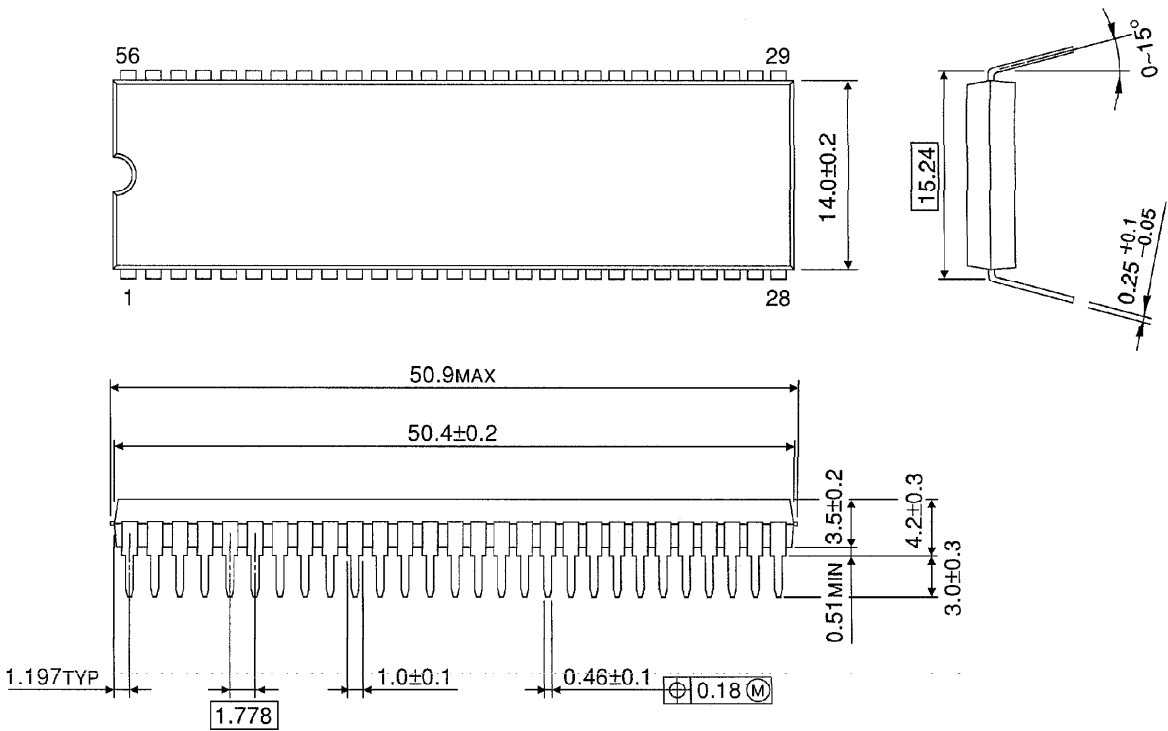
| NOTE | ITEM                                                             | TEST CONDITION (Unless otherwise specified : H, RGB V <sub>CC</sub> = 9V ; V <sub>DD</sub> , Fsc V <sub>DD</sub> , Y/C V <sub>CC</sub> = 5V ; T <sub>a</sub> = 25 ± 3°C) |                 |    |    |    |                           |     |    |    |    |    |    |    |    |    |     |   | MEASURING METHOD                                                                                                                                                                                                                |
|------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----|----|----|---------------------------|-----|----|----|----|----|----|----|----|----|-----|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                  | S                                                                                                                                                                        | BUS : TEST MODE |    |    |    | BUS : NORMAL CONTROL MODE |     |    |    |    |    |    |    |    |    |     |   |                                                                                                                                                                                                                                 |
|      |                                                                  |                                                                                                                                                                          | 02H             | D3 | D2 | D1 | 07H                       | 0FH | D4 | D7 | D5 | D4 | D3 | D2 | D1 | D0 | 1FH |   |                                                                                                                                                                                                                                 |
| S10  | Rising-Fall Time<br>(Standard De-<br>Emphasis)                   | OFF                                                                                                                                                                      | —               | —  | —  | —  | —                         | —   | —  | —  | —  | —  | —  | —  | —  | —  | —   | — | (1) The same procedure as the step 1 of the Note S5.<br>(2) Measure output waveforms of pin 35 and pin 36 to find the period between the two points shown in the figure in time.                                                |
| S11  | Rising-Fall Time<br>(Wide-Band De-<br>Emphasis)                  | ↑                                                                                                                                                                        | —               | —  | —  | —  | —                         | —   | —  | —  | —  | —  | —  | —  | —  | —  | —   | — |                                                                                                                                                |
|      |                                                                  | ↑                                                                                                                                                                        | —               | —  | —  | —  | —                         | —   | —  | —  | —  | —  | —  | —  | —  | —  | —   |   |                                                                                                                                                                                                                                 |
| S12  | Killer Operation<br>Input Level<br>(Standard Setting)            | ↑                                                                                                                                                                        | —               | —  | —  | —  | —                         | —   | —  | —  | —  | —  | —  | —  | —  | —  | —   | — | (1) Input 200mV <sub>p-p</sub> (R-Y ID) standard 75% color bar signal (SECAM system) to pin 42.<br>(2) Attenuate the input signal to pin 42. Measure R-Y ID signal level at pin 42 that turns on/off the killer as eSK and eSC. |
| S13  | Killer Operation<br>Input Level<br>(VID ON)                      | ↑                                                                                                                                                                        | —               | —  | —  | —  | —                         | —   | —  | —  | —  | —  | —  | —  | —  | —  | —   | — | (3) In the condition that SUB (IF) D <sub>3</sub> = 1, perform the same measurement as the above step 2 and express the measurement results as eSK and eSC.                                                                     |
| S14  | Killer Operation<br>Input Level<br>(Low Sensitivity,<br>VID OFF) | ↑                                                                                                                                                                        | —               | —  | —  | —  | —                         | —   | —  | —  | —  | —  | —  | —  | —  | —  | —   | — | (4) In the condition that SUB (IF) D <sub>3</sub> = 0, D <sub>2</sub> = 1, perform the same measurement as the above step 2 and express the measurement results as eSWK and eSWC.                                               |





PACKAGE DIMENSIONS  
SDIP56-P-600-1.78

Unit : mm



Weight : 5.55g (Typ.)

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000707EBA

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