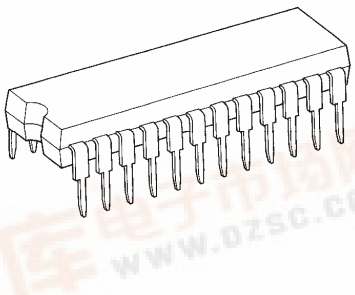
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA1241AN

## DEFLECTION PROCESSOR IC FOR TVs

Ideal for large-inch CRT, the TA1241AN is an IC for deflection correction and vertical / horizontal picture size adjustment, with a 24-pin plastic package.
The TA1241AN can control all kinds of picture adjustment functions through $I^2C$-bus communications.



SDIP24-P-300-1.78

Weight : 1.22 g (Typ.)

### FEATURES

BUS write mode

- Vertical amplitude adjustment
- Vertical position adjustment
- Vertical linearity correction
- Vertical S correction
- Vertical ∫ correction
- Vertical EHT correction
- Trapezium correction
- Horizontal amplitude correction
- Horizontal EHT correction
- Parabola correction
- Corner correction
- Center curve correction (SAW, PAR)

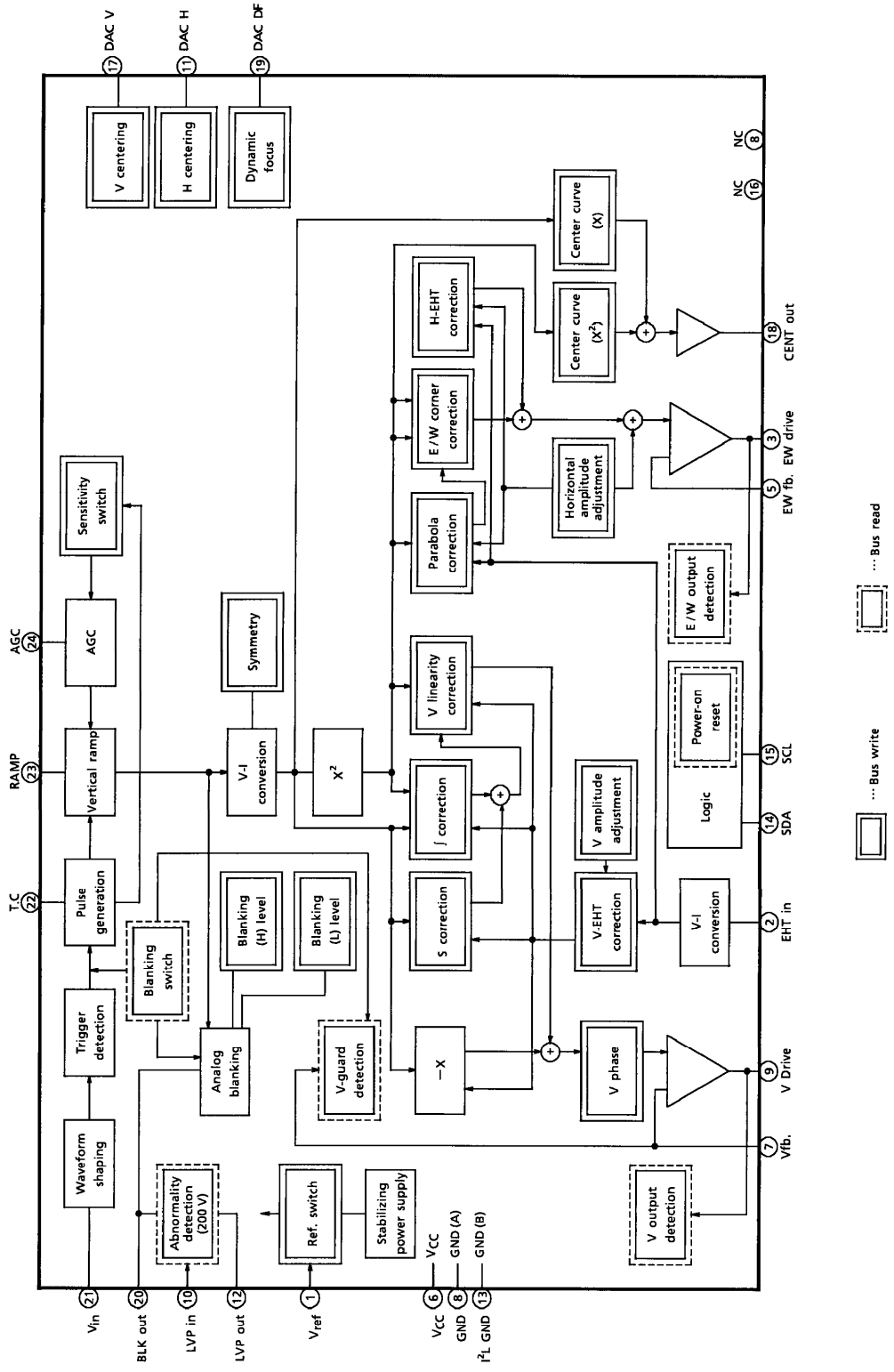
BUS read mode

- V-guard detection
- LVP detection
- V output detection
- E / W output detection

Pin output

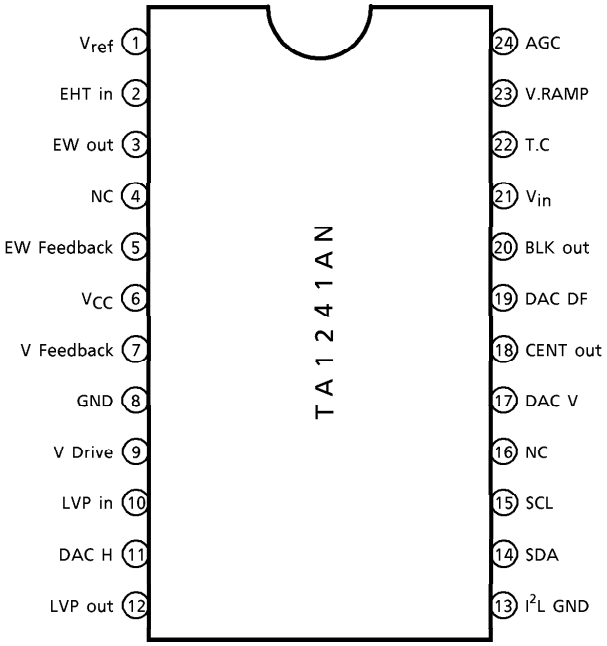
- V centering (DAC)
- H centering (DAC)
- Dynamic focus (DAC)
- Analog blanking
- LVP detection

## BLOCK DIAGRAM

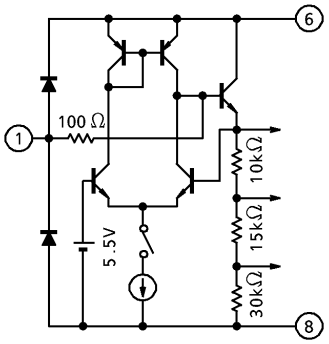
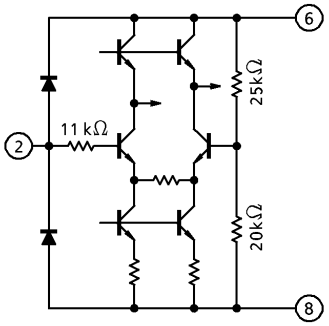
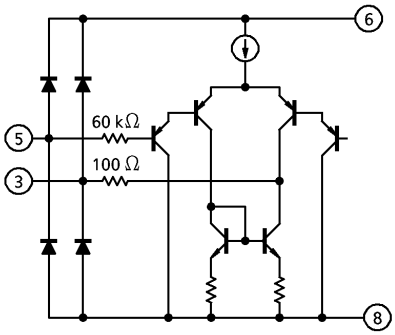


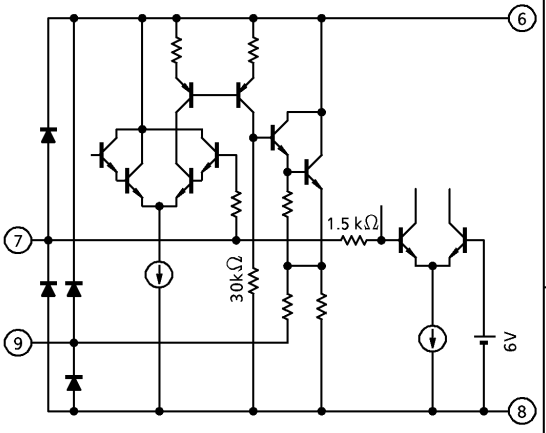
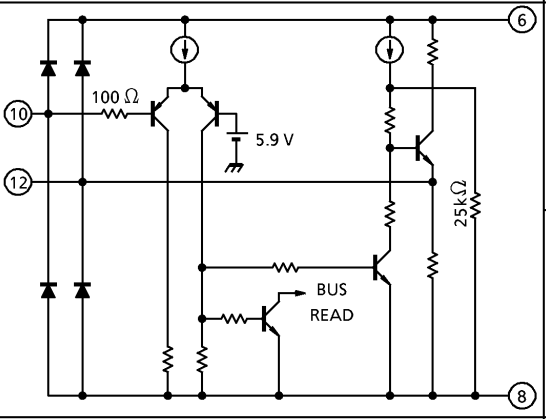
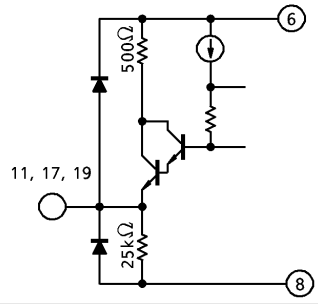
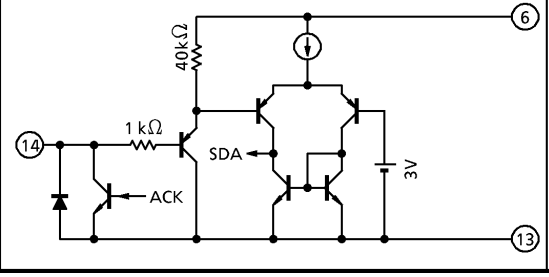

TA1241AN—2

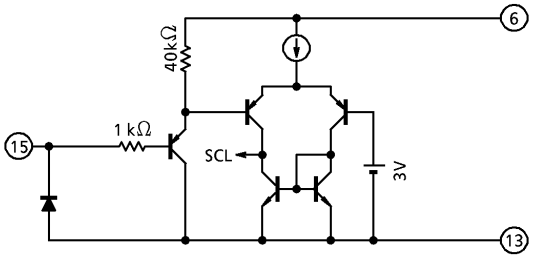
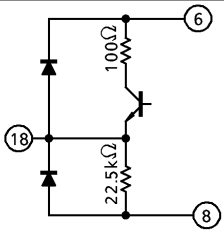
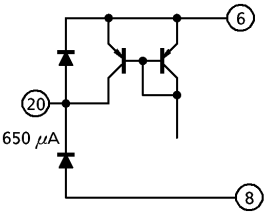
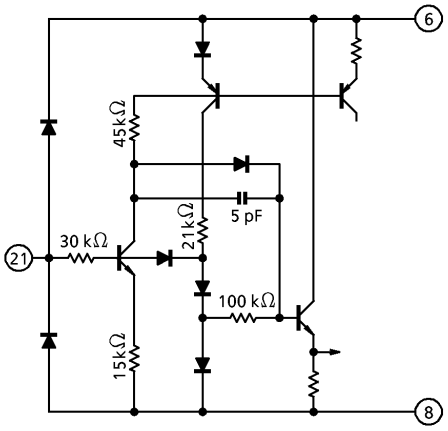
**PIN CONNECTION**

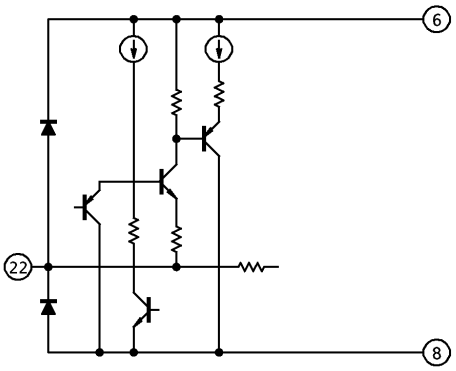
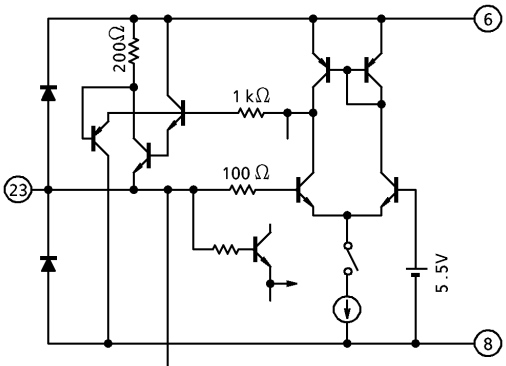
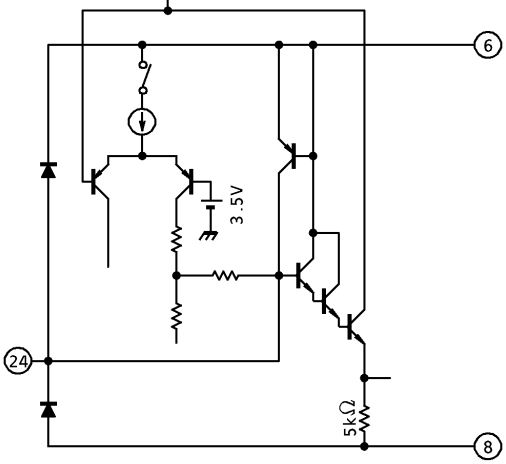


**PIN FUNCTION**

| PIN No. | PIN NAME | FUNCTION | INTERFACE | INPUT / OUTPUT SIGNAL |
|---|---|---|---|---|
| 1 | $V_{ref}$ | Bias voltage external input pin for the V and E/W blocks. BUS write mode controls the switching. |  | — |
| 2 | EHT in | EHT input pin. |  | — |
| 3 | EW Drive | E/W drive output pin. Also performs E/W detection in BUS read mode. |  |  |
| 5 | EW Feedback | E/W feedback pin. | | — |
| 4 | NC | — | — | — |
| 6 | $V_{CC}$ | $V_{CC}$ pin. Connect 9 V (Typ.). | — | — |

| PIN No. | PIN NAME | FUNCTION | INTERFACE | INPUT / OUTPUT SIGNAL |
|---|---|---|---|---|
| 7 | V Feedback | Vertical negative feedback input pin. When voltage on this pin equals or exceeds 6 V, the device outputs a blanking signal to pin 20 and sends discriminating data to BUS read. |  | — |
| 9 | V Drive | Vertical signal output pin. Also performs vertical output detection in BUS read mode. | |  |
| 8 | GND | GND pin. | — | — |
| 10 | LVP in | Used to connect reference voltage to protect the deflection block from a low-voltage. |  | — |
| 12 | LVP out | Outputs abnormal power supply detection result. Also performs LVP detection in BUS read mode. | | OK : DC0.7 V<br>NG : DC5.0 V |
| 11 | DAC H | DAC output pin for horizontal centering. |  | — |
| 17 | DAC V | DAC output pin for vertical centering. | | — |
| 19 | DAC DF | DAC output pin for dynamic focus. | | — |
| 13 | $I^2L$ GND | GND pin for the $I^2L$ block. | — | — |
| 14 | SDA | SDA pin for the $I^2C$ BUS. |  | — |

| PIN No. | PIN NAME | FUNCTION | INTERFACE | INPUT / OUTPUT SIGNAL |
|---|---|---|---|---|
| 15 | SCL | SCL pin for the $I^2C$ BUS. |  | — |
| 16 | NC | — | — | — |
| 18 | CENT out | Outputs center curve correction waveform. |  | — |
| 20 | BLK out | Analog blanking output pin. Open collector output. In BUS write mode, outputs a vertical blanking signal for the vertical RAMP. |  |  |
| 21 | V in | Inputs trigger pulse. Detects the falling edge of the input pulse and generates a trigger pulse to the next-stage circuit. |  |  |

| PIN No. | PIN NAME | FUNCTION | INTERFACE | INPUT / OUTPUT SIGNAL |
|---|---|---|---|---|
| 22 | T.C | This pin connects a pulse-shaping filter. |  | — |
| 23 | V RAMP | Used to connect a capacitor to generate a vertical RAMP signal. |  |  |
| 24 | AGC | Used to connect a filter to automatically adjust the vertical RAMP oscillation amplitude. |  | |

**I²C BUS MAP**

Write data map — IC address : 10001100 (8CH)

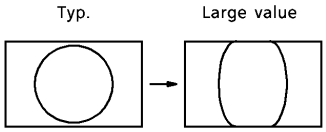
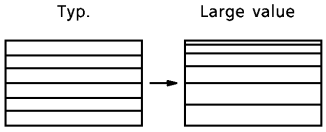
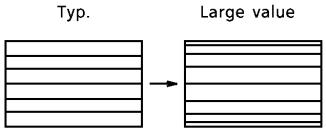
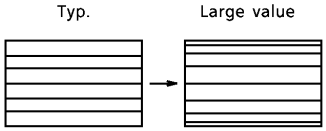
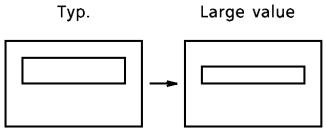
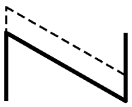
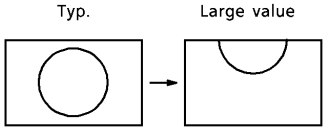
| FUNCTION | SUB ADDRESS MSB LSB | DATA MSB LSB | PRESET MSB LSB | RANGE |
|---|---|---|---|---|
| PICTURE HEIGHT | 0 0 0 0 0 0 0 0 | × ○ ○ ○ ○ ○ ○ ○ | 0 1 0 0 0 0 0 0 | −48~ +48% |
| V-LINIARITY | 0 0 0 0 0 0 0 1 | × × × ○ ○ ○ ○ ○ | 0 0 0 1 0 0 0 0 | −13~ +13% |
| V-S CORRECTION | 0 0 0 0 0 0 1 0 | × × ○ ○ ○ ○ ○ ○ | 0 0 1 0 0 0 0 0 | −24~ +24% |
| V-SHIFT. AGC, REG | 0 0 0 0 0 0 1 1 | × v × A × ○ ○ × | 0 0 0 0 0 0 1 0 | −570~ +570 mV |
| v-COMPENSATION | 0 0 0 0 0 1 0 0 | × × × × × ○ ○ ○ | 0 0 0 0 0 0 0 0 | 0~9% |
| PICTURE WIDTH | 0 0 0 0 0 1 0 1 | × × ○ ○ ○ ○ ○ ○ | 0 0 1 0 0 0 0 0 | 1.7~6.5 V |
| E-W PARABORA | 0 0 0 0 0 1 1 0 | × × ○ ○ ○ ○ ○ ○ | 0 0 0 0 0 0 0 0 | 0~4.4 V |
| E-W CORNER | 0 0 0 0 0 1 1 1 | × × × ○ ○ ○ ○ ○ | 0 0 0 1 0 0 0 0 | −3.2~ +3.2% |
| TRAPEZIUM | 0 0 0 0 1 0 0 0 | × ○ ○ ○ ○ ○ ○ ○ | 0 1 0 0 0 0 0 0 | 0~2.4 V |
| H-COMP, H-CENT DAC | 0 0 0 0 1 0 0 1 | × (H-CENT DAC: ○ ○ ○) × ○ ○ ○ | 0 0 0 0 0 0 0 0 | 0~9%, 1~5 V |
| V-∫CORRECT, BLK-SW | 0 0 0 0 1 0 1 0 | × × B × ○ ○ ○ ○ | 0 0 0 0 0 0 0 0 | 0~4% |
| V CENT DAC | 0 0 0 0 1 0 1 1 | × ○ ○ ○ ○ ○ ○ ○ | 0 0 0 0 0 0 0 0 | 0.5~5 V |
| ANAROG BLK-VH | 0 0 0 0 1 1 0 0 | × × × ○ ○ ○ ○ ○ | 0 0 0 1 0 0 0 0 | −640~ +640 mV |
| ANAROG BLK-VL | 0 0 0 0 1 1 0 1 | × × × ○ ○ ○ ○ ○ | 0 0 0 1 0 0 0 0 | −640~ +640 mV |
| CENT PAR, SAW | 0 0 0 0 1 1 1 0 | × ○ ○ ○ × ○ ○ ○ | 0 1 0 0 0 1 0 0 | −4~ +4 V, −2~ +2 V |
| DYNAMIC FORCUS | 0 0 0 0 1 1 1 1 | × × ○ ○ ○ ○ ○ ○ | 0 0 0 0 0 0 0 0 | −0.5~5 V |

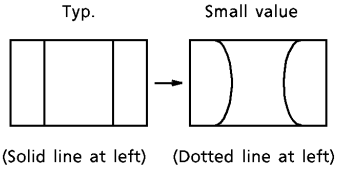
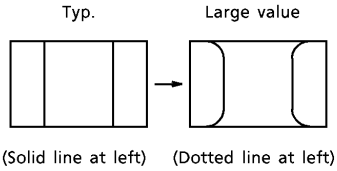
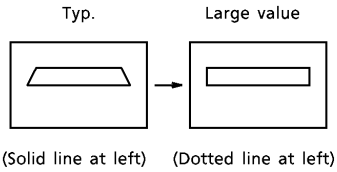
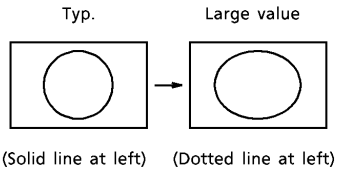
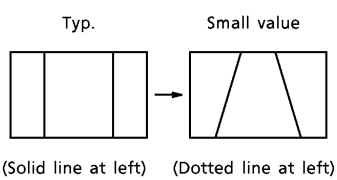
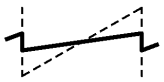
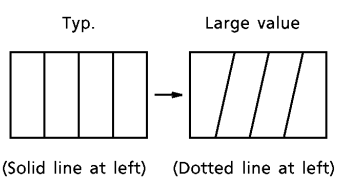
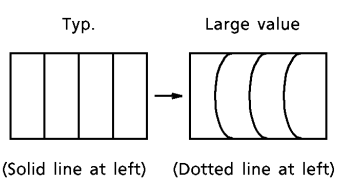
(Note) ○ : Used bit, × : Unused bit
A : AGC switching (DATA = 0⋯HIGH response, DATA = 1⋯LOW response)
V : Power supply switching
(DATA = 0⋯Stabilization power supply, DATA = 1⋯External power supply)
B : Blanking switch (DATA = 0⋯Enabled, DATA = 1⋯Disabled)
When the uppermost bit of the subaddress is high, auto-increment mode is set.

Read data map — IC address 10001101 (8DH)

| FUNCTION / DATA (MSB → LSB) | NON | NON | NON | LVP | V-GUAD | E-Wout | Vout | POW DISCRIMI-NATION |
|---|---|---|---|---|---|---|---|---|
| 0 | — | — | — | OFF | OFF | No signal | No signal | OFF |
| 1 | — | — | — | ON | ON | Signal | Signal | ON |

**DEFLECTION CORRECTION TABLE**

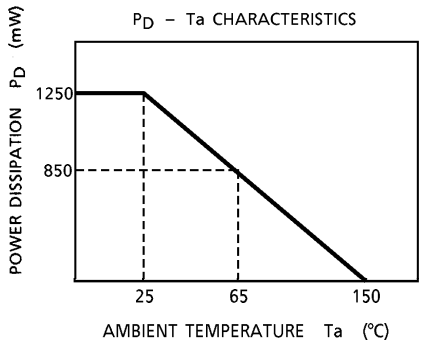
| FUNCTION | OUTPUT WAVEFORM | PICTURE CHANGE | VARIABLE RANGE |
|---|---|---|---|
| Vertical Amplitude Adjustment [PICTURE HEIGHT] |  |  (Solid line at left) (Dotted line at left) | – 48~ + 48% |
| Vertical Linearity Correction [V-LINEARITY] |  |  (Solid line at left) Lower stretching, upper compression | – 13~ + 13% |
| Vertical S Correction [V-S CORRECTION] |  |  (Solid line at left) Upper and lower compression | – 24~ + 24% |
| Vertical ∫ Correction [V-∫ CORRECTION] |  |  (Solid line at left) Upper and lower compression | 0~4% |
| Vertical EHT Correction [V-COMPENSATION] |  |  (Solid line at left) (Dotted line at left) | 0~9% |
| Vertical Phase Correction [V-SHIFT] |  |  (Solid line at left) (Dotted line at left) | – 800~ + 800 mV |

| FUNCTION | OUTPUT WAVEFORM | PICTURE CHANGE | VARIABLE RANGE |
|---|---|---|---|
| Parabola Amplitude Adjustment [E-W PARABOLA] |  |  | 0~5.6 V |
| Corner Correction [E-W CORNER] |  |  | −3.2~+3.2 V |
| Horizontal EHT Correction [H-COMPENSATION] |  |  | 0~+9% |
| Horizontal Amplitude Adjustment [PICTURE WIDTH] |  |  | 1.6~7.3 V |
| Parabola Symmetry Correction [TRAPEZIUM] |  |  | −9~+9% |
| Center Curve SAW Correction [CENT SAW] |  |  | −2~+2 V |
| Center Curve Parabola Correction [CENT PAR] |  |  | −1~+1 V |

**MAXIMUM RATINGS** (Ta = 25°C)

| CHARACTERISTICS | SIGNAL | RATING | UNIT |
|---|---|---|---|
| Power Supply Voltage | $V_{CC}$ | 12 | V |
| Power Dissipation | $P_D$ MAX | 1250 (Note) | mW |
| Input Signal Voltage | $e_{in}$ | 9 | $V_{p-p}$ |
| Operating Temperature | $T_{opr}$ | − 20 to 65 | °C |
| Storage Temperature | $T_{stg}$ | − 55 to 150 | °C |

(Note) When using at temperatures higher than 25°C, decrease maximum power dissipation by 10 mW for every 1°C over 25°C.




**RECOMMENDED POWER SUPPLY VOLTAGE**

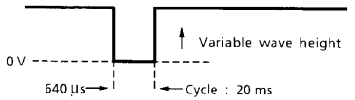
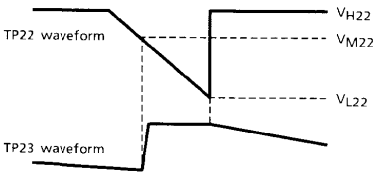
| CHARACTERISTICS | SYMBOL | MIN | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|
| Power Supply Voltage | $V_{CC}$ | 8.5 | 9.0 | 9.5 | V |

**ELECTRICAL CHARACTERISTICS**

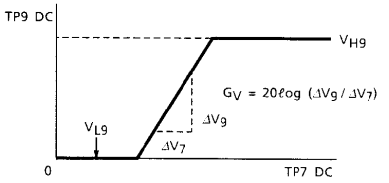
DC ELECTRICAL CHARACTERISTICS (Test circuit 1)

| PIN No. | PIN NAME | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS | | | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) | |
|---|---|---|---|---|---|---|---|---|
| | | | | LIMITS | | | BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
| | | | | MIN | TYP. | MAX | | |
| 1 | $V_{ref}$ | $V_1$ | V | 6.0 | 6.3 | 6.6 | No bus input | Measure the DC voltage of each pin. |
| 2 | EHT | $V_2$ | | 5.7 | 6.2 | 6.7 | | |
| 3 | EW Drive | $V_3$ | | 5.2 | 5.5 | 5.8 | | |
| 5 | EW Feedback | $V_5$ | | 8.7 | 9.0 | 9.3 | | |
| 7 | V Feedback | $V_7$ | | 2.0 | 2.4 | 2.8 | | |
| 9 | V Drive | $V_9$ | | 0.5 | 0.8 | 3.4 | | |
| 10 | LVP in | $V_{10}$ | | 8.85 | 8.95 | 9.05 | | |
| 11 | DAC H | $V_{11}$ | | 0.5 | 1.3 | 2.1 | | |
| 12 | LVP out | $V_{12}$ | | 0.0 | 0.8 | 1.6 | | |
| 14 | SDA | $V_{14}$ | | 4.8 | 5.1 | 5.4 | | |
| 15 | SCL | $V_{15}$ | | 4.8 | 5.1 | 5.4 | | |
| 17 | DAC V | $V_{17}$ | | 0.0 | 0.8 | 1.6 | | |
| 18 | CENT out | $V_{18}$ | | 5.5 | 6.0 | 6.5 | | |
| 19 | DAC DF | $V_{19}$ | | 0.0 | 0.8 | 1.6 | | |
| 20 | BLK out | $V_{20}$ | | 0.0 | 0.0 | 1.0 | | |
| 21 | $V_{in}$ | $V_{21}$ | | — | 0.0 | — | | |
| 22 | T.C | $V_{22}$ | | 3.7 | 4.0 | 4.3 | | |
| 23 | V.RAMP | $V_{23}$ | | 2.2 | 2.5 | 2.8 | | |
| 24 | AGC | $V_{24}$ | | — | 0.0 | — | | |
| Power Supply Current ($V_{CC}$ = 9 V) | | $I_{CC}$ | mA | 31.0 | 47.0 | 63.0 | No bus input | Open openland, connect an ammeter between TP4A and TP4B, and measure the sink current. |

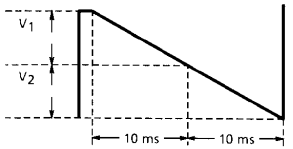
AC ELECTRICAL CHARACTERISTICS (Test circuit 2)

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 1 | Vertical Trigger Input Shaping Voltage | $V_{TH21}$ | V | 0.7 | 1.0 | 1.4 | All PRESET values, all SW-A | (1) TP21 input : The following symbols (trigger pulse)<br>  <br>(2) Change the wave height of the trigger pulse on TP21. Then read the wave height of the trigger pulse when a timing pulse is output to TP22. |
| 2 | Pulse Generator Circuit Clamping Voltage | $V_{H22}$ | V | 3.8 | 4.0 | 4.2 | All PRESET values, all SW-A | (1) TP21 input : The above trigger pulse Wave height = 3 V<br>(2) Observe the TP22 and TP23 waveforms with an oscilloscope. Measure the following $V_{H22}$ voltage:<br>  |
| 3 | Pulse Generator Circuit Shaping Voltage 1 | $V_{M22}$ | V | 2.8 | 3.0 | 3.2 | All PRESET values, all SW-A | Measure $V_{M22}$ as above. |
| 4 | Pulse Generator Circuit Shaping Voltage 2 | $V_{L22}$ | V | 0.9 | 1.0 | 1.1 | All PRESET values, all SW-A | Measure $V_{L22}$ as above. |
| 5 | Vertical Ramp Amplitude | $V_{P23}$ | $V_{p-p}$ | 1.9 | 2.0 | 2.1 | All PRESET values, all SW-A | (1) TP21 input : Same as 2 above (trigger pulse).<br>(2) Measure the TP23 waveform (vertical ramp) amplitude. |

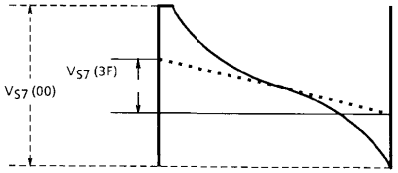
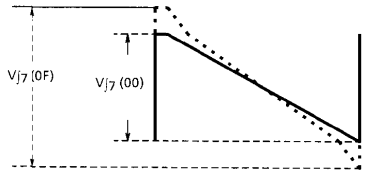
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 6 | Vertical AMP Amplification | $G_V$ | dB | 20 | 23 | 26 | All PRESET values, all $SW_7$-B | (1) No TP21 input<br>(2) $V_{DC}$ input : DC voltage is variable (0 to 6 V)<br>(3) Measure the TP9 voltage change in relation to the change in the TP7 voltage and calculate the following $G_V$.<br>  |
| 7 | Vertical AMP Maximum Output Voltage | $V_{H9}$ | V | 1.80 | 2.60 | 3.40 | All PRESET values, $SW_7$-B | Measure $V_{H9}$ as above. |
| 8 | Vertical AMP Minimum Output Voltage | $V_{L9}$ | V | 0 | 0 | 0.3 | All PRESET values, $SW_7$-B | Measure $V_{L9}$ as above. |
| 9 | Vertical AMP Maximum Output Current | $I_{max9}$ | mA | 18.0 | 25.0 | 32.0 | All PRESET values, $SW_7$-B | (1) Set $V_{DC}$ to 6V as above.<br>(2) Connect an ammeter between TP9 and GND and measure the current. |
| 10 | Vertical NF Saw Wave Amplitude | $V_{P7}$ | $V_{p-p}$ | 1.40 | 1.60 | 1.80 | All PRESET values, all SW-A | (1) TP21 input : Same as 2 above (trigger pulse).<br>(2) Measure the TP7 vertical saw wave amplitude. |
| 11 | Vertical Amplitude Variable Range | $V_{PH}$ | % | ±45.0 | ±48.0 | ±51.0 | [00] (00) (7F), all SW-A | (1) TP21 input : Same as 2 above (trigger pulse).<br>(2) Measure the TP7 amplitude $V_{P7}$ (00) when set the subaddress [00] to (00).<br>(3) Next, measure the TP7 amplitude $V_{P7}$ (7F) when set the subaddress [00] to (7F).<br>$V_{PH} = \pm \frac{V_{P7}(7F) - V_{P7}(00)}{V_{P7}(7F) + V_{P7}(00)} \times 100\ (\%)$ |

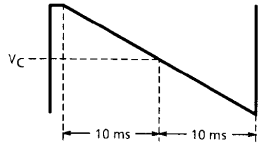
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 12 | Vertical Linearity Maximum Correction | $V_L$ | % | ±10.0 | ±12.5 | ±15.0 | [08] adjustment, all SW-A [01] (00) (10) (1F) | (1) Set the data of subaddress [06] to (3F). Set the data of subaddress [05] to (3F). Change the subaddress [08] data so that the TP5 parabola waveform is symmetrical.<br>(2) Set the data of subaddress [06] to (00). Set the data of subaddress [05] to (20).<br>(3) When set the data of subaddress [01] to (10), measure the TP7 waveform $V_1$ (10) and $V_2$ (10).<br>(4) Likewise, when set the data of subaddress [01] to (00) and (1F), measure $V_1$ (00), $V_2$ (00), $V_1$ (1F), and $V_2$ (1F).<br>  <br>$V_L = \pm\frac{V_1(00) - V_1(1F) + V_2(1F) - V_2(00)}{2 \times [V_1(10) + V_2(10)]} \times 100$ |

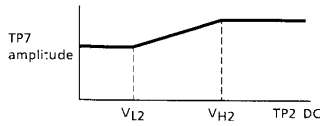
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; Data | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 13 | Vertical S<br>Maximum Correction | $V_S$ | % | ±20.0 | ±24.0 | ±28.0 | [08] adjustment, all SW-A<br>[02] (00) (3F) | (1) Same as 12 above.<br>(2) Measure the amplitude $V_{S7}$ (00) of TP7 when set the data of subaddress [02] to (00).<br>(3) Measure the amplitude $V_{S7}$ (3F) of TP7 when set the data of subaddress [02] to (3F).<br>  <br><br>$V_S = \pm\frac{V_{S7}(00) - V_{S7}(3F)}{V_{S7}(00) + V_{S7}(3F)} \times 100\%$ |
| 14 | Vertical ∫<br>Maximum Correction | $V_{\int}$ | % | 3.0 | 5.0 | 7.0 | [08] adjustment, all SW-A<br>[0A] (00) (0F) | (1) Same as 13 above.<br>(2) Measure the amplitude $V_{\int 7}$ (00) of TP7 when set the data of subaddress [0A] to (00).<br>(3) Measure the amplitude $V_{\int 7}$ (0F) of TP7 when set the data of subaddress [0A] to (0F).<br>  <br><br>$V_{\int} = \frac{V_{\int 7}(0F) - V_{\int 7}(00)}{V_{\int 7}(00)} \times 100\%$ |

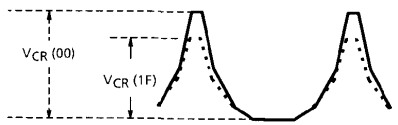
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 15 | Vertical NF Center Voltage | $V_C$ | V | 3.8 | 4.0 | 4.2 | [08] adjustment, all SW-A | (1) Same as 12 above.<br>(2) Observe the TP7 waveform and measure the $V_C$ shown below.<br>  |
| 16 | Vertical NF DC Change | $V_{DC}$ | mV | ±480 | ±560 | ±640 | [08] adjustment, all SW-A<br>[03] (00) (06) | (1) Same as 15 above.<br>(2) Measure the vertical NF center voltage $V_C$ (00) when set the data of subaddress [03] to (00).<br>(3) Measure the vertical NF center voltage $V_C$ (06) when set the data of subaddress [03] to (06).<br>$V_{DC} = \pm \frac{V_C(06) - V_C(00)}{2}$ (mV) |
| 17 | Vertical NF EHT Correction | $V_{EHT}$ | % | 8 | 9 | 10 | [08] adjustment, $SW_2$-B<br>[04] (00) (07) | (1) Same as 12 above.<br>(2) $V_{DC}$ input : DC voltage = 0V<br>(3) Observe TP7 waveform.<br>(4) Measure the amplitude $V_{EHT}$ (00) of TP7 when set the data of subaddress [04] to (00).<br>(5) Measure the amplitude $V_{EHT}$ (07) of TP7 when set the data of subaddress [04] to (07).<br>$V_{EHT} = \frac{V_{EHT}(00) - V_{EHT}(07)}{V_{EHT}(00)} \times 100$ (%) |

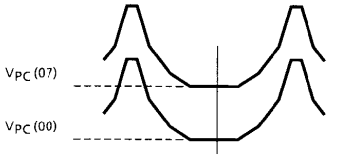
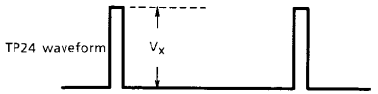
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 18 | EHT Input<br>D Range 1 | $V_{H2}$ | V | 5.7 | 6.2 | 6.7 | [08] adjustment, $SW_2$-B<br>[04] (07) | (1) Same as 17 above.<br>(2) Change the $V_{DC}$ voltage from 1V to 7V.<br>(3) Measure the change in the TP7 voltage at this time and measure the TP2 voltage $V_{H2}$.<br>  |
| 19 | EHT Input<br>D Range 2 | $V_{L2}$ | V | 1.3 | 1.8 | 2.3 | [08] adjustment, $SW_2$-B<br>[04] (07) | Measure the TP2 voltage $V_{L2}$ as above. |
| 20 | E/W NF<br>Maximum DC Value | $V_{H5}$ | V | 5.5 | 6.2 | 6.9 | [08] adjustment, SW-A<br>[05] (00) | (1) Same as 12 above.<br>(2) Measure the TP5 voltage. |
| 21 | E/W NF<br>Minimum DC Value | $V_{L5}$ | V | 1.5 | 1.7 | 1.9 | [08] adjustment, all SW-A<br>[05] (3F) | (1) Same as 12 above.<br>(2) Measure the TP5 voltage. |
| 22 | E/W NF<br>Maximum Parabola Value | $V_{PB}$ | $V_{p-p}$ | 3.0 | 3.9 | 4.8 | [08] adjustment, $SW_2$-B<br>[05] (3F)<br>[06] (3F) | (1) $V_{DC}$ input : 7V.<br>(2) Measure the TP5 parabola amplitude.<br>  |

(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 23 | E/W NF<br>Corner Correction 1 | $V_{CR1}$ | $V_{p-p}$ | 1.80 | 2.50 | 3.20 | [08] adjustment, $SW_2$-B<br>[05] (3F)<br>[06] (3F)<br>[07] (10) (1F) | (1) $V_{DC}$ input : 7 V<br>(2) Observe the TP5 parabola amplitude.<br>(3) Measure the amplitude $V_{CR1}$ (10) when set the data of subaddress [07] to (10).<br>(4) Measure the amplitude $V_{CR1}$ (1F) when set the data of subaddress [07] to (1F).<br>  <br><br>$V_{CR1} = V_{CR1}(10) - V_{CR1}(1F)$ |
| 23' | E/W NF<br>Corner Correction 2 | $V_{CR2}$ | $V_{p-p}$ | 2.30 | 3.20 | 4.10 | [08] adjustment, $SW_2$-B<br>[05] (3F)<br>[06] (20)<br>[07] (00) (1F) | (1) $V_{DC}$ input : 7 V<br>(2) Measure the TP5 parabola amplitude.<br>(3) Measure the amplitude $V_{CR2}$ (00) when set the data of subaddress [07] to (00).<br>(4) Measure the amplitude $V_{CR2}$ (1F) when set the data of subaddress [07] to (1F).<br>$V_{CR2} = V_{CR2}(00) - V_{CR2}(1F)$ |
| 24 | Parabola<br>Symmetry Correction Change | $V_{TR}$ | % | ±11.0 | ±13.0 | ±15.0 | [08] (00) (7F), all SWA | (1) Measure the following as in 15 above.<br>(2) Measure the TP7 center voltage $V_C$ (00) when set the data of subaddress [08] to (00).<br>(3) Measure the voltage $V_C$ (7F) when set the data of subaddress [07] to (7F).<br>$V_{TR} = \pm\frac{V_C(00) - V_C(7F)}{2 \times V_{P7}} \times 100\,(\%)$<br>$V_{P7}$ is the value measured in 10 above. |

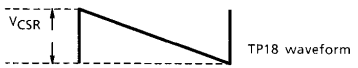
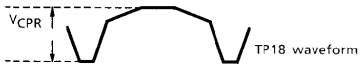
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 25 | E/W Parabola EHT Correction | $V_{EH1}$ | % | 2.0 | 3.3 | 4.5 | [08] adjustment, $SW_2$-B<br>[05] (3F)<br>[06] (3F) | (1) $V_{DC}$ input : DC voltage is variable<br>(2) Measure the TP5 parabola amplitude $V_{EH}$ (7) when DC = 7 V.<br>(3) Likewise, measure the amplitude $V_{EH}$ (1) when DC = 1 V.<br>$V_{EH1} = \frac{V_{EH}(7) - V_{EH}(1)}{V_{EH}(7)} \times 100\ (\%)$ |
| 26 | E/W DC EHT Correction | $V_{EH2}$ | V | 0.6 | 1.0 | 1.4 | [08] adjustment, $SW_2$-B<br>[05] (3F)<br>[06] (3F)<br>[09] (00) (07) | (1) $V_{DC}$ input : DC voltage = 1 V<br>(2) Measure the TP5 parabola phase center voltage $V_{PC}$ (00) when set the data of subaddress [09] to (00).<br>(3) Likewise, measure the voltage $V_{PC}$ (07) when set the data of subaddress [09] to (07).<br>  <br>$V_{EH2} = V_{PC}(07) - V_{PC}(00)$ (V) |
| 27 | E/W Amp Maximum Output Current | $I_{max3}$ | mA | 0.14 | 0.20 | 0.27 | All PRESET values, all SW-A | (1) Connect an ammeter between TP3 and GND.<br>(2) Read the current. |
| 28 | AGC Operating Current 1 | $I_{AGC0}$ | µA | 250 | 330 | 410 | All PRESET values, $SW_{24}$-B | (1) TP21 input : Same as 2 above (trigger pulse).<br>(2) Monitor the TP24 waveform. Measure the $V_x$ below.<br>  <br>$I_{AGC0} = V_x \div 200\ (\mu A)$<br>($I_{AGC1}$) |

(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 29 | AGC Operating Current 2 | $I_{AGC1}$ | μA | 60 | 83 | 105 | [03] (12) $SW_{24}$-B | Calculate, as above, $I_{AGC1}$ when set the data of subaddress [03] to (12). |
| 30 | Analog Blanking Output Current | $I_{B20}$ | mA | 0.400 | 0.650 | 0.800 | All PRESET values, $SW_7$-B | (1) $V_{DC}$ input : DC voltage = 5.5 V<br>(2) Connect an ammeter between TP20 and GND and measure the current. |
| 31 | Upper Blanking Level | $V_{H20}$ | V | 5.25 | 5.50 | 5.75 | All PRESET values, $SW_7$-B | (1) Same as 30 above.<br>(2) $V_{DC}$ input : DC voltage = variable (4.0 to 5.5 V)<br>(3) Measure the $V_{DC}$ input voltage $V_{H20}$ when the output current reaches half the output current measured above. |
| 32 | Upper Blanking Change | $V_{HC20}$ | mV | ±485 | ±570 | ±655 | [0C] (00) (1F) $SW_7$-B | Measure $V_{H20}$ (00) and $V_{H20}$ (1F) when set the data of subaddress [0C] to (00) and (1F) respectively.<br>$V_{HC20} = \pm[V_{H20}(1F) - V_{H20}(00)] / 2$ (mV) |
| 33 | Lower Blanking Level | $V_{L20}$ | V | 3.30 | 3.50 | 3.70 | All PRESET values, $SW_7$-B | (1) Same as 30 above.<br>(2) $V_{DC}$ input : DC voltage = variable (2.5 to 4.0 V)<br>(3) Measure the $V_{DC}$ input voltage $V_{L20}$ when the output current reaches half the output current of 30 above. |
| 34 | Lower Blanking Change | $V_{LC20}$ | mV | ±485 | ±570 | ±655 | [0D] (00) (1F) $SW_7$-B | Measure $V_{L20}$ (00) and $V_{L20}$ (1F) when set the data of subaddress [0D] to (00) and (1F) respectively.<br>$V_{LC20} = \pm[V_{L20}(1F) - V_{L20}(00)] / 2$ (mV) |
| 35 | Center Curve Saw Positive Correction Maximum Amplitude | $V_{CSF}$ | $V_{p-p}$ | 3.2 | 3.6 | 4.0 | [08] adjustment, all SW-A<br>[0E] (47) | (1) Same as 12 above.<br>(2) Measure the TP18 output amplitude when set the data of subaddress [0E] to (47).<br>  |

(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 36 | Center Curve Saw Negative Correction Maximum Amplitude | $V_{CSR}$ | $V_{p-p}$ | 3.2 | 3.6 | 4.0 | [08] adjustment, all SW-A<br>[0E] (40) | As above, measure the TP18 output amplitude when set the data of subaddress [0E] to (40).<br>  |
| 37 | Center Curve Parabola Positive Correction Maximum Amplitude | $V_{CPF}$ | $V_{p-p}$ | 1.2 | 1.8 | 2.4 | [08] adjustment, all SW-A<br>[0E] (74) | (1) Same as 12 above.<br>(2) Measure the TP18 output amplitude when set the data of subaddress [0E] to (74).<br>  |
| 38 | Center Curve Parabola Negative Correction Maximum Amplitude | $V_{CPR}$ | $V_{p-p}$ | 1.2 | 1.8 | 2.4 | [08] adjustment, all SW-A<br>[0E] (04) | As above, measure the TP18 output amplitude when set the data of subaddress [0E] to (04).<br>  |
| 39 | Horizontal Centering Maximum Output Voltage | $V_{H11}$ | V | 4.8 | 5.0 | 5.2 | [09] (40), all SW-A | Measure the TP11 voltage $V_{H11}$ when set the data of subaddress [09] to (70). |
| 40 | Horizontal Centering Minimum Output Voltage | $V_{L11}$ | V | 0.5 | 1.3 | 2.1 | All PRESET values, all SW-A | Measure the TP11 voltage $V_{L11}$ when set the data of subaddress [09] to (00). |
| 41 | Vertical Centering Maximum Output Voltage | $V_{H17}$ | V | 4.8 | 5.0 | 5.2 | [0B] (4F), all SW-A | Measure the TP17 voltage $V_{H17}$ when set the data of subaddress [0B] to (7F). |
| 42 | Vertical Centering Minimum Output Voltage | $V_{L17}$ | V | 0.0 | 5.0 | 1.6 | All PRESET values, all SW-A | Measure the TP17 voltage $V_{L17}$ when set the data of subaddress [0B] to (00). |
| 43 | Dynamic Focus Correction Maximum Output Voltage | $V_{H19}$ | V | 4.8 | 5.0 | 5.2 | [0F] (3F), all SW-A | Measure the TP19 voltage $V_{H19}$ when set the data of subaddress [0F] to (3F). |

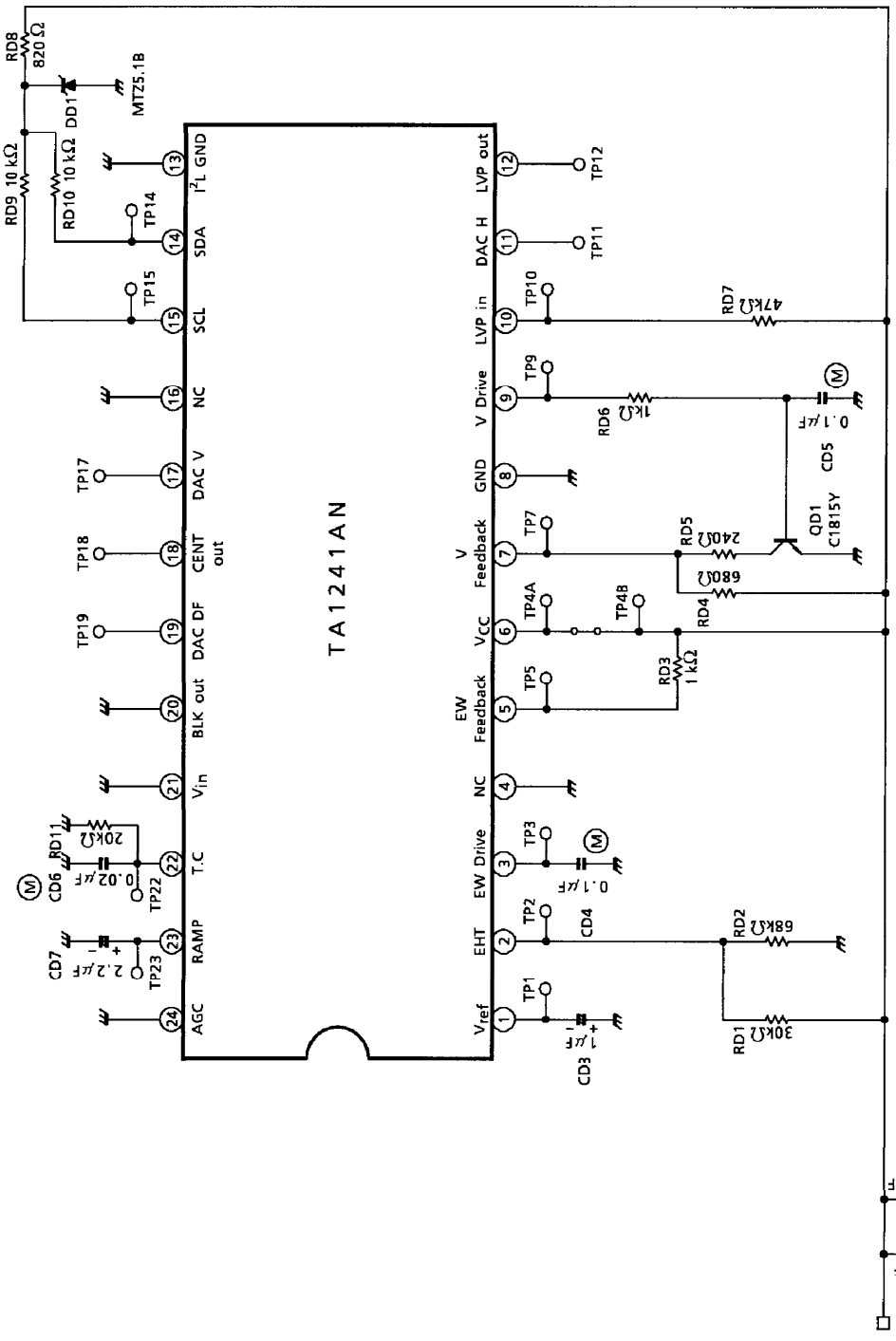
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 44 | Dynamic Focus Correction Minimum Output Voltage | $V_{L19}$ | V | 0.0 | 0.8 | 1.6 | All PRESET values, all SW-A | Measure the TP19 voltage $V_{L19}$ when set the data of subaddress [0F] to (00). |
| 45 | LVP Input Discrimination Voltage | $V_{LVP}$ | V | 5.5 | 5.8 | 6.1 | All PRESET values, $SW_{10}$-B, READ-MODE | (1) $V_{DC}$ input : DC voltage = variable; Initial value = 9 V<br>(2) Lower the $V_{DC}$ input voltage and measure the TP10 voltage when the fifth bit from the LSB (in READ mode) changes from 0 to 1. |
| 46 | LVP Maximum Output Voltage | $V_{H12}$ | V | 4.8 | 5.0 | 5.2 | All PRESET values, $SW_{10}$-B | (1) $V_{DC}$ input : DC voltage = 0 V<br>(2) Measure the TP12 voltage. |
| 47 | LVP Minimum Output Voltage | $V_{L12}$ | V | 0.0 | 0.8 | 1.6 | All PRESET values, $SW_{10}$-B | (1) $V_{DC}$ input : DC voltage = 9 V<br>(2) Measure the TP12 voltage. |
| 48 | LVP Detection Output Current | $I_{L20}$ | mA | 0.43 | 0.65 | 0.87 | All PRESET values, $SW_{10}$-B, $SW_7$-B | (1) $V_{DC}$ input : DC voltage = 4 V<br>(2) Connect an ammeter between TP20 and GND and measure the current. |
| 49 | V-GUARD Discrimination Voltage | $V_{GRD}$ | V | 5.8 | 6.0 | 6.2 | All PRESET values, $SW_7$-B, READ-MODE | (1) $V_{DC}$ input : DC voltage = variable; Initial value = 4 V<br>(2) Raise the $V_{DC}$ input voltage and measure the TP7 voltage when the data of the fourth bit from the LSB (when in READ mode) changes from 0 to 1. |
| 50 | V-GUARD Detection Output Current | $I_{G20}$ | mA | 0.43 | 0.65 | 0.87 | All PRESET values, $SW_7$-B | (1) $V_{DC}$ input : DC voltage = 7 V<br>(2) Connect an ammeter between TP20 and GND and measure the current. |
| 51 | $V_{ref}$ Vertical Amplitude Control Ratio | $V_r$ | % | 24 | 30 | 36 | [03] (44) $SW_1$-B | (1) $V_{DC}$ input : DC voltage = variable; Initial value = 6.2 V<br>(2) Set the data of subaddress [03] to (42).<br>(3) Measure the change in the TP7 amplitude when the DC voltage changes from 6.1 to 6.3V.<br>$V_r = \frac{V(6.1) - V(6.3)}{0.2} \times 100\ (\%)$ |

(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.

| No. | CHARACTERISTIC | SYMBOL | UNIT | ELECTRICAL CHARACTERISTICS LIMITS MIN | TYP. | MAX | TEST METHOD (CONDITIONS $V_{CC}$ = 9 V, Ta = 25±3°C) BUS DATA AND SWITCHING MODE [ ] ; SUBADDRESS, ( ) ; DATA | TEST METHOD |
|---|---|---|---|---|---|---|---|---|
| 52 | Self-Diagnosis Vertical Output | — | — | — | Check | — | All PRESET values, all SW-A, READ-MODE | (1) Turn the power on with no input to TP21.<br>(2) Check that in READ mode, the $B_2$ data = 0.<br>(3) Check that when a trigger pulse is input to TP21, the $B_2$ data = 1. |
| 53 | Self-Diagnosis E / W Output | — | — | — | Check | — | All PRESET values, all SW-A, READ-MODE | Check the $B_3$ data in the same way as above. |
| 54 | Power On Reset Read Detection | — | — | — | Check | — | All PRESET values, all SW-A, READ-MODE | — |
| 55 | Blanking Switch Operation Check | — | — | — | Check | — | [0A] (20), all SW-A | (1) Input a trigger pulse to TP21.<br>(2) Measure TP22 when set the data of subaddress [0A] to (20). Check that TP22 outputs no signal. |

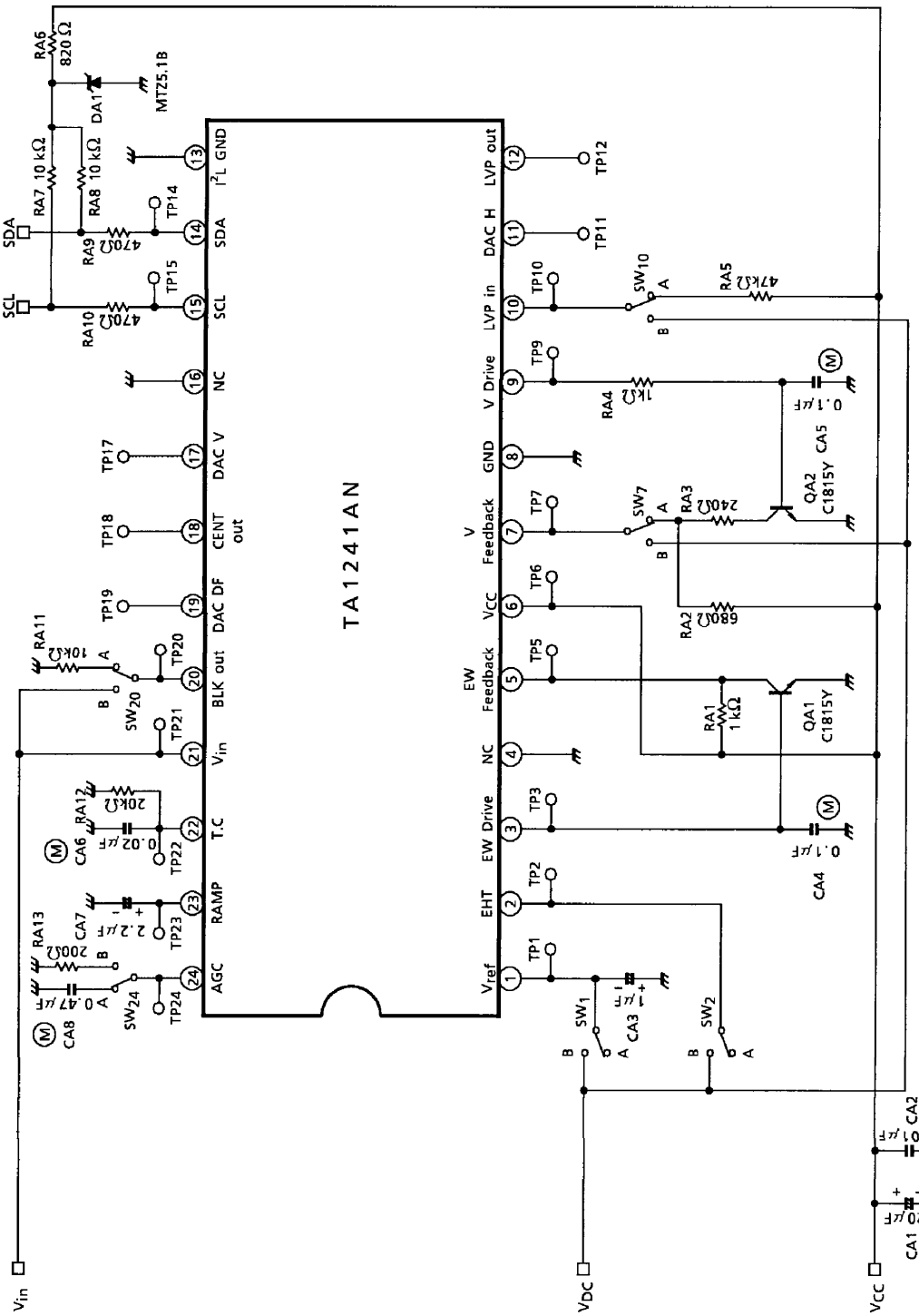
(Note) Unless otherwise specified in the bus data and SW mode column, use PRESET values and SW-A.



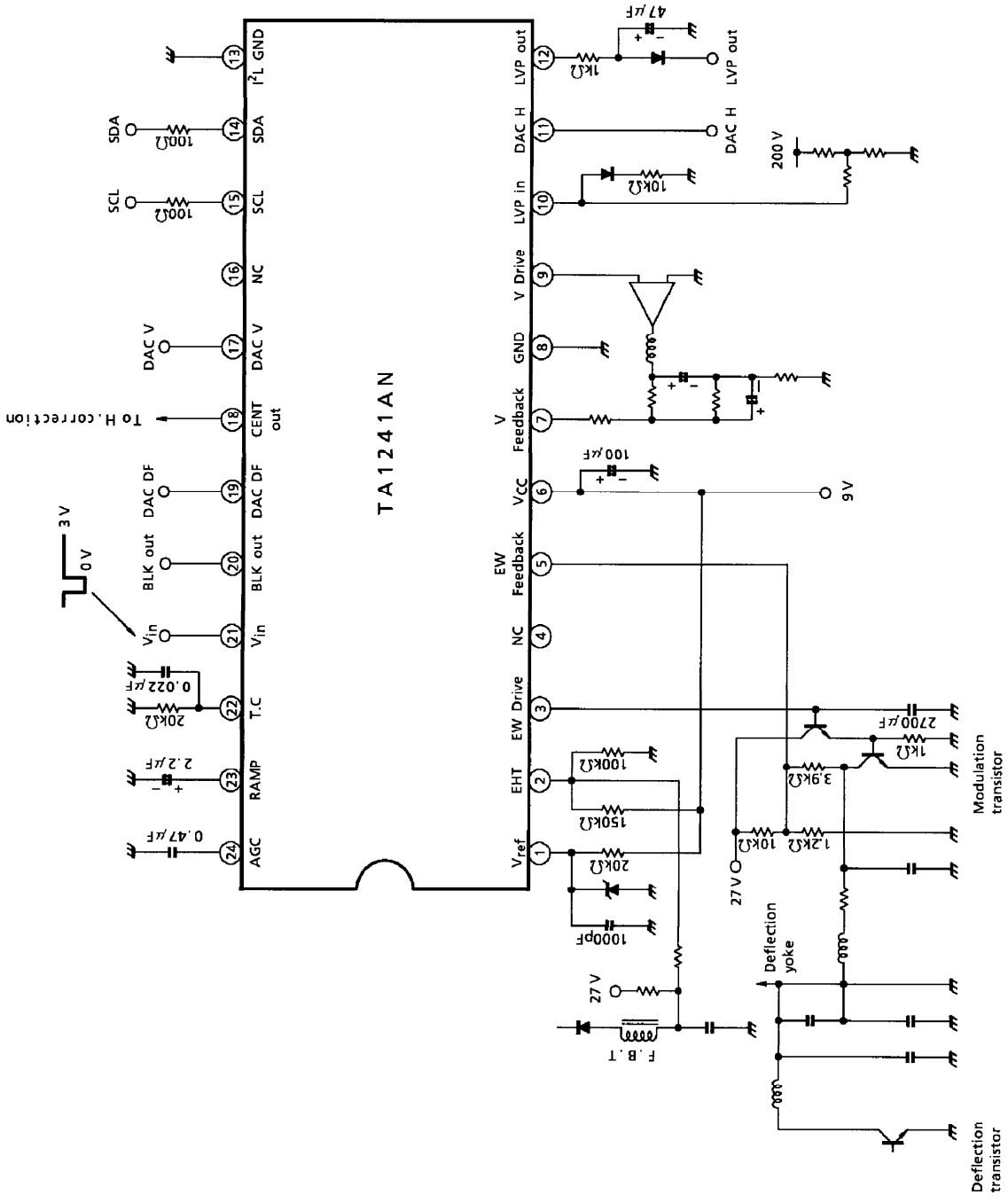

**TEST CIRCUIT 1**
DC characteristics

TA1241AN—25

**TEST CIRCUIT 2**
AC characteristics



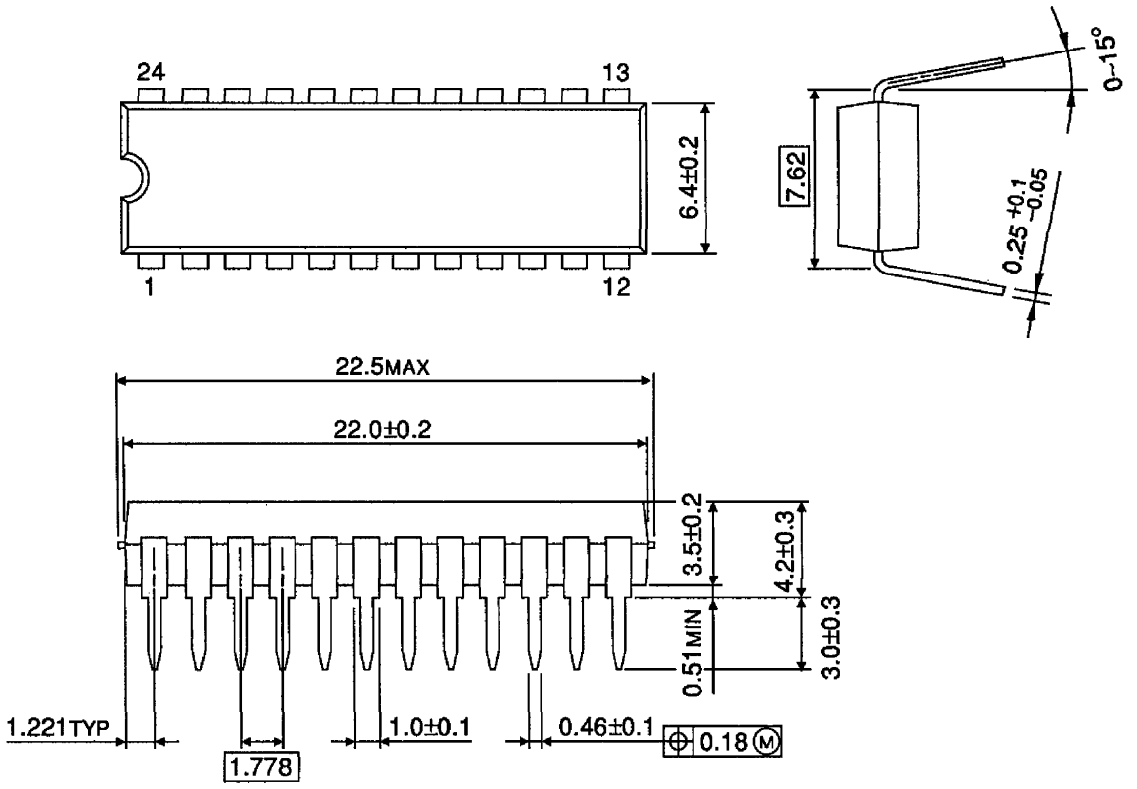
APPLICATION CIRCUIT




TA1241AN—27

**OUTLINE DRAWING**

SDIP24-P-300-1.78 Unit : mm




Weight : 1.22 g (Typ.)