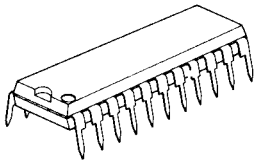
# VIDEO ON-SCREEN DISPLAY

## ■ GENERAL DESCRIPTION

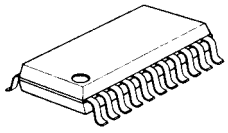
The **NJM2214** is a video display convertive integrated circuit. Its function is below.

- Character superimpose.
- 8 color generating function.
- Luminance signal wave shape-up function.
- Video effecter function of painting to background superimposed character or some part of video signal.

## ■ PACKAGE OUTLINE



**NJM2214L**



**NJM2214M**

## ■ FEATURES

- Operating Voltage (+4.7V to +5.3V)
- Internal 8 Color Generating Circuit.
- Package Outline SDIP22, DMP24
- Bipolar Technology

## ■ RECOMMENDED OPERATING CONDITION

- Operating Voltage 4.7 to 5.3V

## ■ APPLICATION

- VCR, Video Camera

## ■ ABSOLUTE MAXIMUM RATINGS

($T_a$=25°)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+$ | 10 | V |
| Power Dissipation | $P_D$ | (SDIP22) 700<br>(DMP24) 700 | mW |
| Operating Temperature Range | $T_{opr}$ | -20 to +75 | °C |
| Storage Temperature Range | $T_{stg}$ | -40 to +125 | °C |

## ■ ELECTRICAL CHARACTERISTICS

($T_a$=25°, $V^+$=5V)

| PARAMETER | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Operating Curret | | $I_{CC}$ | No signal, No load | 17 | 25 | 33 | mA |
| Video Switch Voltage Gain | | $G_V$ | 10, 11, 15, 22 (11, 12, 17) Pin=Low<br>10STEP Stair wave, 2.2$V_{P-P}$, R1=5K | -1 | 0 | +1 | dB |
| Frequency Characteristics | | $G_F$ | 10, 11, 15, 22 (11, 12, 17) Pin=Low<br>2$V_{P-P}$, 4MHz, R1=5K | -1 | 0 | +1 | dB |
| Differential Gain | | DG | 10, 11, 15, 22 (11, 12, 17) Pin=Low<br>10STEP Stair wave, 2.2$V_{P-P}$, R1=5K | -3 | 0 | +3 | % |
| Differential Phase | | DP | 10STEP Stair wave, 2.2$V_{P-P}$, R1=5K | -3 | 0 | +3 | degree |
| 8 Color Output | | | 15 (17) Pin=High, 10, 11, 22 (11, 12) Pin=Low (Note) | | | | |
| White | Amplitude | $C_{1A}$ | | - | 0 | 100 | $mV_{P-P}$ |
| | Luminance | $C_{1D}$ | | 1.56 | 1.66 | 1.76 | V |
| | Phase | $C_{1P}$ | | - | - | - | degree |
| Yellow | Amplitude | $C_{2A}$ | | 810 | 900 | 990 | $mV_{P-P}$ |
| | Luminance | $C_{2D}$ | | 1.45 | 1.55 | 1.65 | V |
| | Phase | $C_{2P}$ | Phase : Ref. to Yellow | -10 | 0 | 10 | degree |
| Cyan | Amplitude | $C_{3A}$ | | 1160 | 1290 | 1420 | $mV_{P-P}$ |
| | Luminance | $C_{3D}$ | | 1.26 | 1.36 | 1.46 | V |
| | Phase | $C_{3P}$ | | 106 | 116 | 126 | degree |

( ) : DMP

## ■ ELECTRICAL CHARACTERISTICS

($T_a$=25°, $V^+$=5V)

| PARAMETER | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Green | Amplitude | $C_{4A}$ | | 1080 | 1200 | 1320 | $mV_{P-P}$ |
| | Luminance | $C_{4D}$ | | 1.14 | 1.24 | 1.34 | V |
| | Phase | $C_{4P}$ | | 63 | 73 | 83 | degree |
| Magenta | Amplitude | $C_{5A}$ | | 1080 | 1200 | 1320 | $mV_{P-P}$ |
| | Luminance | $C_{5D}$ | | 0.96 | 1.06 | 1.16 | V |
| | Phase | $C_{5P}$ | | 243 | 253 | 263 | degree |
| Red | Amplitude | $C_{6A}$ | | 1160 | 1290 | 1420 | $mV_{P-P}$ |
| | Luminance | $C_{6D}$ | | 0.85 | 0.95 | 1.05 | V |
| | Phase | $C_{6P}$ | | 286 | 296 | 306 | degree |
| Blue | Amplitude | $C_{7A}$ | | 810 | 900 | 990 | $mV_{P-P}$ |
| | Luminance | $C_{7D}$ | | 0.66 | 0.76 | 0.86 | V |
| | Phase | $C_{7P}$ | | 170 | 180 | 190 | degree |
| Black | Amplitude | $C_{8A}$ | | - | 0 | 100 | $mV_{P-P}$ |
| | Luminance | $C_{8D}$ | | 0.54 | 0.64 | 0.74 | V |
| | Phase | $C_{8P}$ | | - | - | - | degree |
| Blanking Pulse Input Threshold Voltage | | $V_{TH-19}$ | Pin 19 (21) | 1.0 | 1.5 | 2.0 | V |
| HD | | $V_{TH-18}$ | Pin 18 (20) | 1.0 | 1.5 | 2.0 | V |
| Invert | | $V_{TH-11}$ | Pin 11 (12) | 1.0 | 1.5 | 2.0 | V |
| 2 Value Selection | | $V_{TH-10}$ | Pin 10 (11) | 1.0 | 1.5 | 2.0 | V |
| Background ON/OFF | | $V_{TH-15}$ | Pin 15 (17) | 1.0 | 1.5 | 2.0 | V |
| Matrix 1 | | $V_{TH-M1}$ | Pin 1 (1) | 3.3 | 3.9 | 4.5 | V |
| Matrix 2 | | $V_{TH-M2}$ | Pin 2 (2) | 3.3 | 3.9 | 4.5 | V |
| Matrix 3 | | $V_{TH-M3}$ | Pin 3 (3) | 3.3 | 3.9 | 4.5 | V |
| Character Input | | $V_{TH-21}$ | Pin 21 (23) | 0.5 | 1.0 | 1.5 | V |
| EXT/Character Selection | | $V_{TH-20}$ | Pin 20 (22) | 1.0 | 1.5 | 2.0 | V |

( ) : DMP

(Note) : $f_{SC1}$,$f_{SC2}$=3.58MHz, 300$mV_{PP}$

$f_{SC1}$,=same phase of color burst signal.

$f_{SC2}$,=90 degree phase lag from $f_{SC1}$.

## ■ RELATION BETWEEN 8 COLOR OUTPUT AND MATRIX INPUT

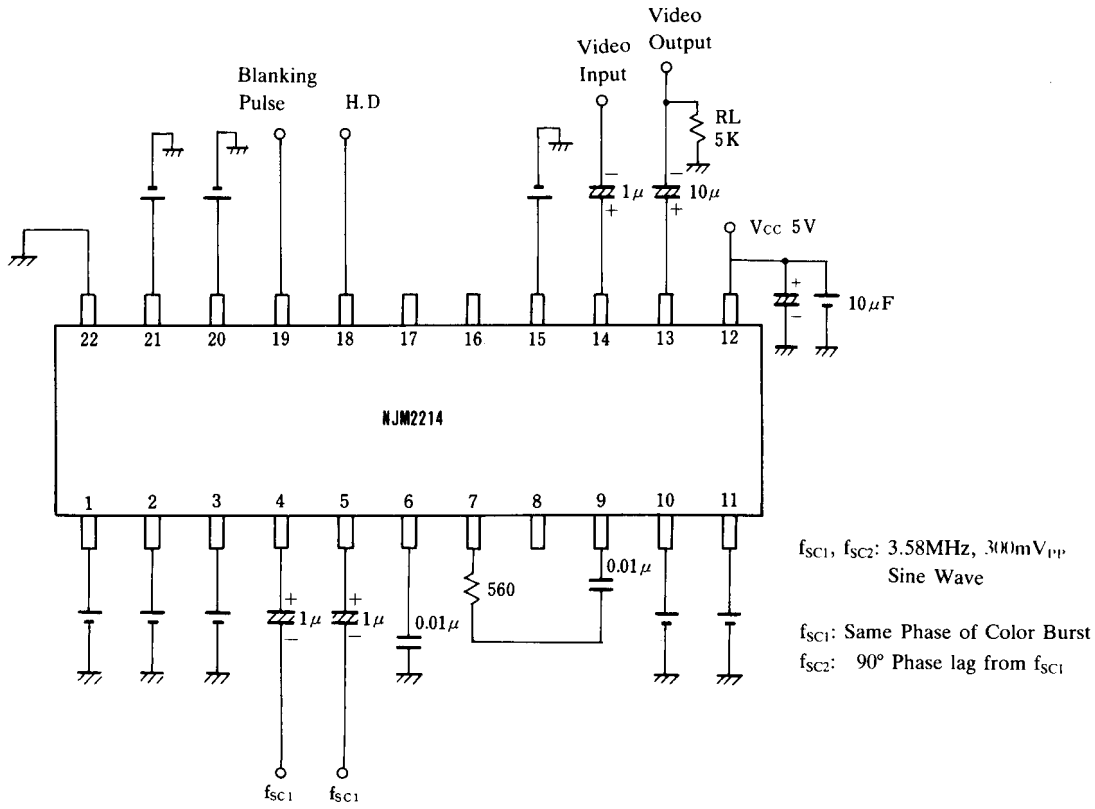
| COLOR | MATRIX 1 | MATRIX 2 | MATRIX 3 |
|---|---|---|---|
| White | L | L | L |
| Yellow | H | L | L |
| Cyan | L | H | L |
| Green | H | H | L |
| Magenta | L | L | H |
| Red | H | L | H |
| Blue | L | H | H |
| Black | H | H | H |

L=0V (DC)
H=5V (DC)

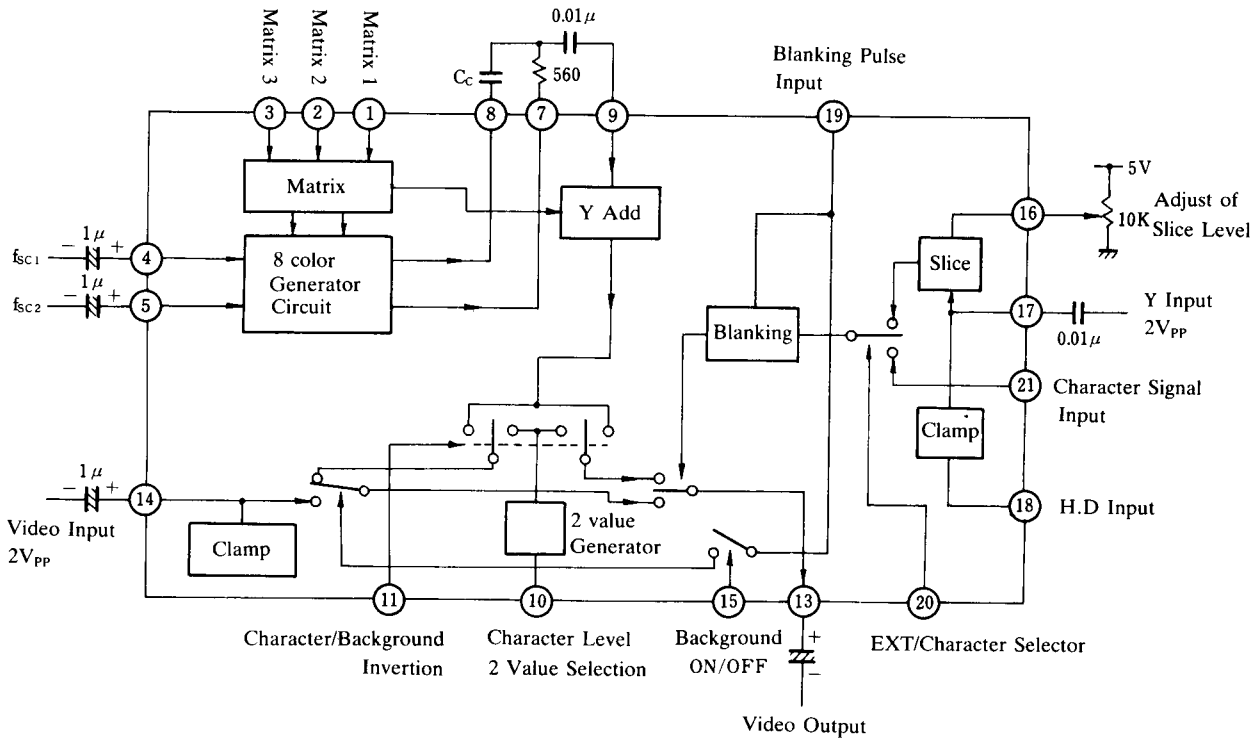
## ■ CONTROL SIGNAL AND FUNCTION

| 15 PIN | 10 PIN | 11 PIN | 20 PIN | |
|---|---|---|---|---|
| L | L/H | L | L | Character superimposer (White/Black) on video through signal output. |
| H | L/H | L | L | Character superimposer (White/Black) on background (8 color). |
| H | L/H | H | L | Character superimposer (color) on background (White/Black). |
| L | L | H | L | Character superimposer (color) on video through signal. |
| L | L/H | L | H | Luminance modification. Strong bright point is White/Black. |
| H | L/H | L | H | Colored except strong bright point. |
| H | L/H | H | H | Colored at strong bright point and others is White/Black. |
| L | H | H | H | Colored at strong bright point and others is video through. |

## ■ TEST CIRCUIT




## ■ TYPICAL APPLICATION



■ APPLICATION

This IC requires 1MΩ resistance between INPUT and GND pin for clamp type input since the minute current causes an unstable pin voltage.