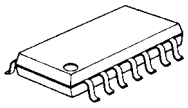
# VIDEO PICTURE ENHANCER

## ■ GENERAL DESCRIPTION

The **NJM2209** is the video IC for quality improvement of the video picture to get high quality by rectifying the picture contour.

## ■ PACKAGE OUTLINE



**NJM2209M**

## ■ FEATURES

- Operating Voltage (+4.5V to +5.5V)
- By Differential From, Picture Enhance
- at Minimal External Components
- Internal Switch of Hirough/Picture Enhance
- Package Outline DMP14
- Bipolar Technology

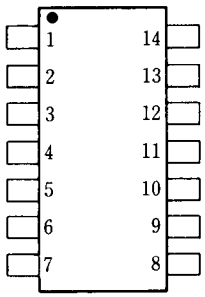
## ■ RECOMMENDED OPERATING CONDITION

- Operating Voltage 4.5 to 5.5V

## ■ APPLICATION

- Upgrading of picture quality on VCR, personal computer and other video picture.

## ■ PIN CONFIGURATION

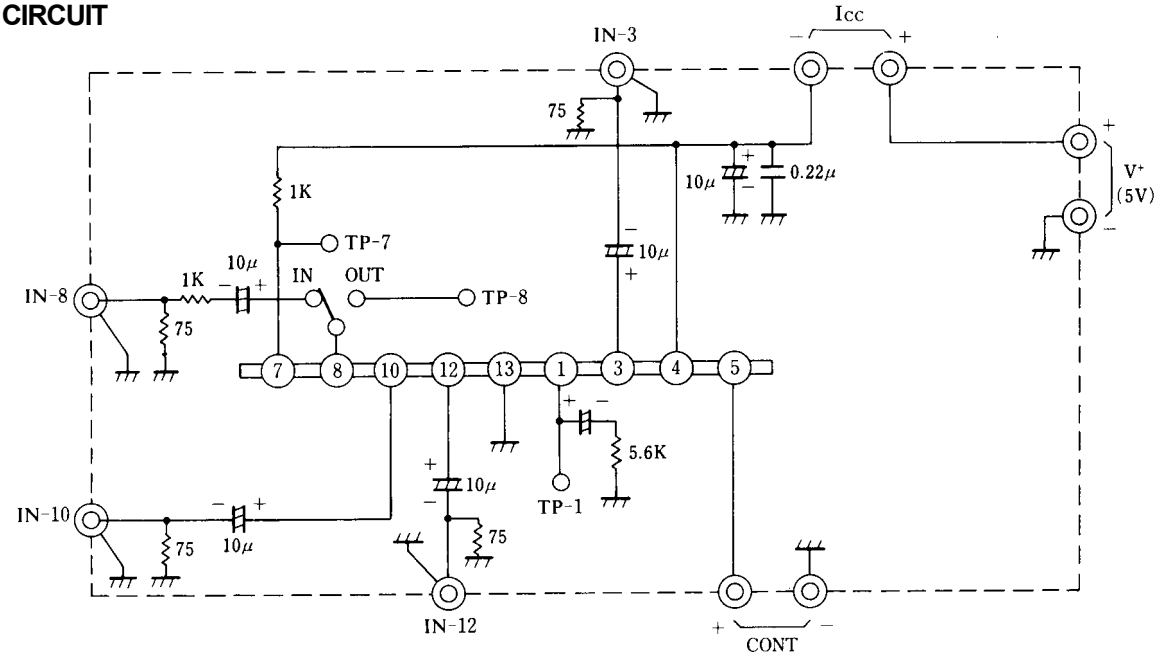



**NJM2209M**

PIN FUNCTION

| | |
|---|---|
| 1. Video Signal Output | 8. Frequency Compensation |
| 2. N.C. | 9. N.C. |
| 3. Differential Input | 10. Video Signal Input |
| 4. $V^+$ | 11. N.C. |
| 5. Control Input | 12. Phase Delay |
| 6. N.C. | 13. GND |
| 7. Differential Output | 14. N.C. |

## ■ TEST CIRCUIT



## ■ ABSOLUTE MAXIMUM RATINGS

($T_a$=25°C)

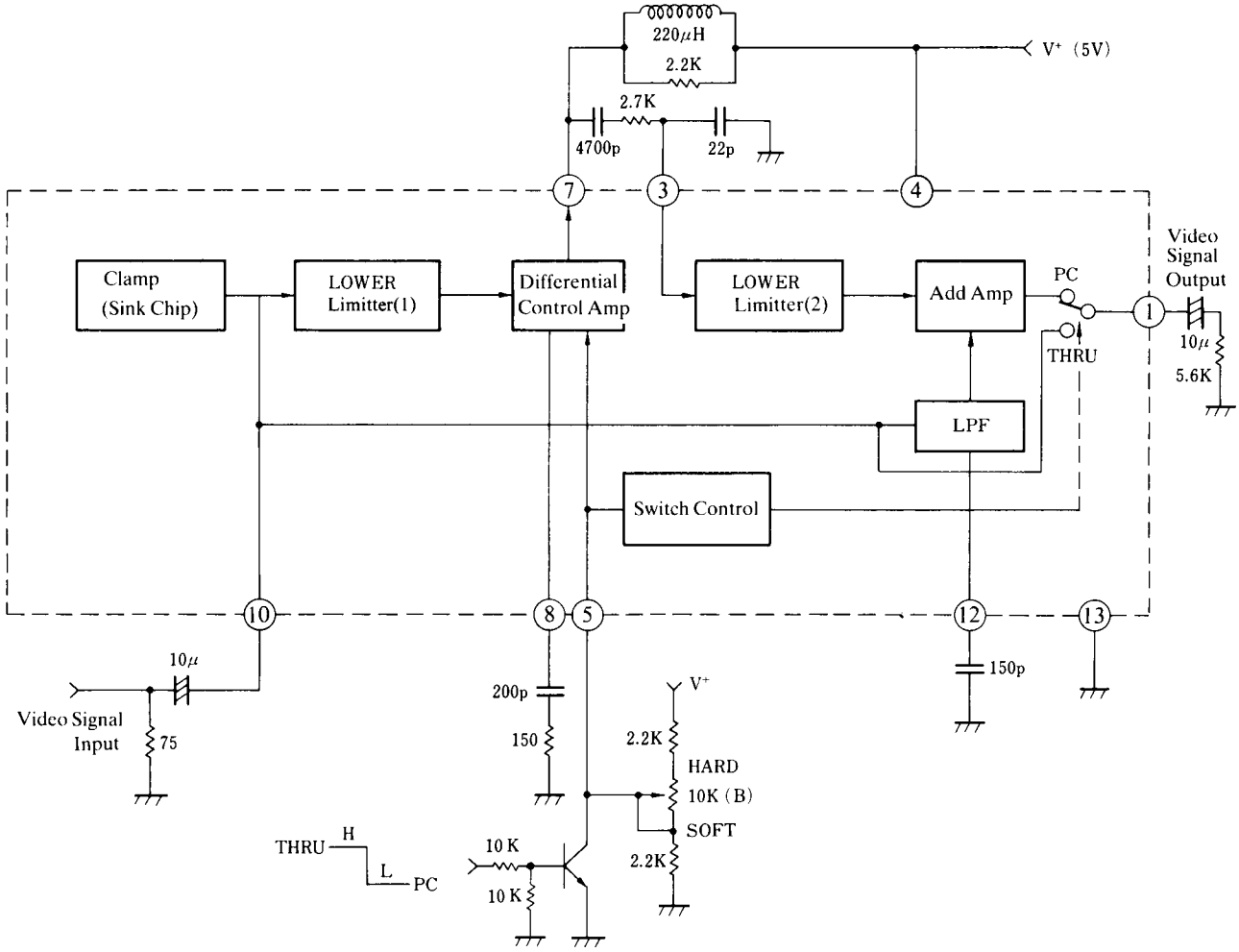
| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+$ | 8 | V |
| Power Dissipation | $P_D$ | (DMP8)300<br> | mW<br>mW |
| Operating Temperature Range | $T_{opr}$ | -20 to +75 | °C |
| Storage Temperature Range | $T_{stg}$ | -40 to +125 | °C |

## ■ ELECTRICAL CHARACTERISTICS

($V^+$=5V, $T_a$=25°C, Refer to Test Cricuit)

| PARAMETER | | SYMBOL | SIGNAL PIN | TEST PIN | CONT. VOLTAGE | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| Operating Current | | $I_{CC}$ | | | 2.8V | No Input Signal | - | 7.5 | 10 | mA |
| Limitter Level (1) | | LIM1 | 10 | 8 | - | SYNC level>0.35V, Input Video Signal | 0.23 | 0.27 | 0.31 | V |
| Limitter Level (2) | | LIM2 | 3 | 1 | - | f=100kHz, $1V_{P-P}$ Sine Wave Input | 0.21 | 0.25 | 0.29 | V |
| Control Amp Gain | H | $G_H$ | 8 | 7 | 2.8V | f=100kHz, 0.1Vrms. Sine Wave Input<br>$G=20\log_{10}V_{OUT}/V_{IN}$ (dB) | -2 | -0.9 | 0 | dB |
| | M | $G_M$ | 8 | 7 | 1.3V | | -12 | -10 | -8 | dB |
| | L | $G_L$ | 8 | 7 | 0.45V | | - | - | -28 | dB |
| Add Amp Gain | 3 pin input | $G_7$ | 3 | 1 | 2.8V | f=100kHz, $200mV_{P-P}$ Sine Wave<br>$G=20\log_{10}V_{OUT}/V_{IN}$ (dB) | -1.6 | -0.6 | 0.4 | dB |
| | 10 pin input | $G_3$ | 10 | 1 | 2.8V | $1V_{P-P}$ Video Signal Input<br>$G=20\log_{10}V_{OUT}/V_{IN}$ (dB) | -1 | 0 | +1 | dB |
| Switch Cross Talk | | $C_{SW}$ | 12 | 1 | 2.8→0V | f=2MHz, $1V_{P-P}$ Sine Wave<br>$C_{SW}=20\log_{10}V(0V)/V(2.8V)$ (dB) | - | -50 | - | dB |
| Through Gain | | $G_T$ | 10 | 1 | 0V | $1V_{P-P}$ Video Signal Input<br>$G_T=20\log_{10}V_{OUT}/V_{IN}$ (dB) | -1 | 0 | 1 | dB |
| Switch Control Threshold Voltage | | $V_{TH}$ | 12 | 1 | | f=100kHz, $1V_{P-P}$ Sine Wave Input<br>$-40dB=20\log_{10}V_{OUT}/V_{IN}$ | 0.2 | 0.3 | 0.4 | V |
| Differential Gain (Note 1) | | $DG_{PC}$ | 10 | 1 | 2.8V | DGDP Tester<br>Video Signal $1V_{P-P}$ (Stair Step) | - | 1 | 3 | % |
| Differential Gain (Note 2) | | $DG_T$ | 10 | 1 | 0V | | - | 0 | 3 | % |
| 1 PIN Voltage (Note 1) | | $V_{6PC}$ | | 1 | 2.8V | | - | 1.8 | - | V |
| 1 PIN Voltage (Note 2) | | $V_{6T}$ | | 1 | 0V | | - | 2.0 | - | V |

## ■ TYPICAL APPLICATION




## ■ PRINCIPLES OF OPERATION, BI BLOCK DIAGRAM

The **NJM2209** is a video signal IC which converts an input video signal to a compensated video signal of the picture outline by adding an input signal through a differential amplifier to the original input signal.

The compensating (enhanced) ratio is decided by pin 5 voltage and so the original signal comes when pin 5 voltage is zero.

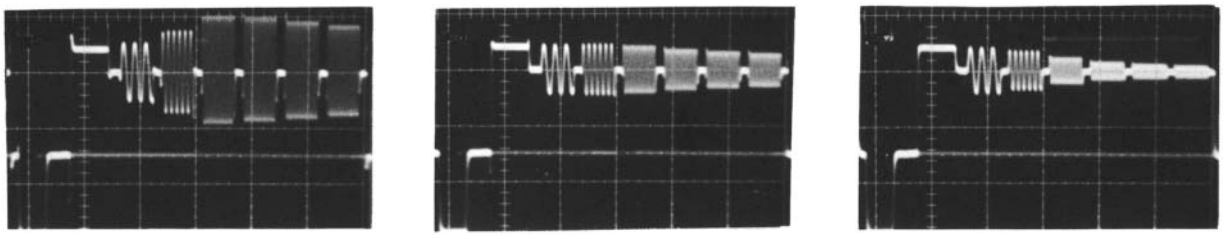
A peaking frequency compensation of the internal

differential amplifier is changed by C,R attached to pin 8 and L,R to pin 7.

The compensation signal and the original video signal are delayed the phase by low pass filter.These are done by a capacitor attached to pin 12. The compensated ratio is originally settled by the coupling condenser between pin 7 and pin 3.

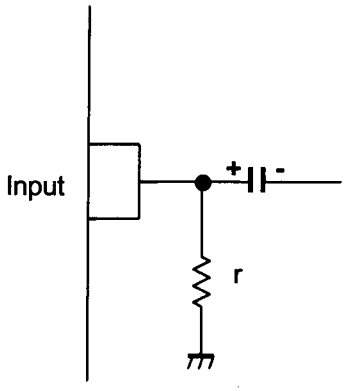
Example (Multi-Burst Enhancer)

HARD MID SOFT



## ■ APPLICATION

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




C ≅ 10uF

r ≅ 1MΩ

# Mouser Electronics

Authorized Distributor

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NJR:

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