

## NTE7081 Integrated Circuit RGB Video Amplifier System

**Description:**

The NTE7081 is a wideband video amplifier system in a 28-Lead DIP type package intended for high resolution RGB color monitor applications. In addition to three matched video amplifiers, the NTE7081 contains three gated differential input black level clamp comparators for brightness control and three matched attenuator circuits for contrast control. Each video amplifier contains a gain set or "Drive" node for setting maximum system gain ( $A_V = 4$  to 10) as well as providing trim capability. The NTE7081 also contains a voltage reference for the video inputs.

**Features:**

- Three Wideband Video Amplifiers (70MHz @ -3dB)
- Inherently Matched ( $\pm 0.5$ dB) Attenuators for Contrast Control
- Three Externally Gated Comparators for Brightness Control
- Provisions for Independent Gain Control (Drive) of each Video Amplifier
- Video Input Voltage Reference
- Low Impedance Output Driver

**Absolute Maximum Ratings:**

Supply Voltage (Pin1, Pin13, Pin23, Pin28, Note 1), $V_{CC}$ .....	13.5V
Voltage at Any Input Pin, $V_{IN}$ .....	$V_{CC} \geq V_{IN} \geq GND$
Video Output Current, $I_{16}$ , $I_{20}$ , or $I_{28}$ .....	28mA
Power Dissipation (Note 2), $P_D$ .....	2.5W
Junction Temperature, $T_J$ .....	+150°C
Operating Temperature Range, $T_A$ .....	0° to +70°C
Storage Temperature Range, $T_{stg}$ .....	-65° to +150°C
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	50°C/W
Lead Temperature (During Soldering, 10sec.) , $T_L$ .....	+265°C
ESD susceptibility .....	2kV

Note 1.  $V_{CC}$  supply pins 1, 13, 23, and 28 must be externally wired together to prevent internal damage during  $V_{CC}$  power ON/OFF cycles.

Note 2. Derate above +25°C based on  $R_{thJA}$  and  $T_J$ .

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC1} = V_{CC2} = 12\text{V}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Typ	Tested (Note 3)	(Limits) Unit
<b>DC Static Test</b> (S17, S21, S26 Open, $V_{12} = 6\text{V}$ , $V_{14} = 0\text{V}$ , $V_{15} = 2\text{V}$ unless otherwise specified)					
Supply Current	$I_S$	$V_{CC1}$ Only	73	90	mA Max
Video Input Reference Voltage	$V_{11}$		2.4	2.2	$V_{MIN}$
			–	2.6	$V_{MAX}$
Video Input Bias Current	$I_b$	Any One Amplifier	5	20	$\mu\text{A}$ Max
Clamp Gate Low Input Voltage	$V_{14L}$	Clamp Comparators ON	1.2	0.8	$V_{MIN}$
Clamp Gate High Input Voltage	$V_{14H}$	Clamp Comparators OFF	1.6	2.0	$V_{MAX}$
Clamp Gate Low Input Current	$I_{14L}$	$V_{14} = 0\text{V}$	–0.5	–5.0	$\mu\text{A}$ Max
Clamp Gate High Input Current	$I_{14H}$	$V_{14} = V_{CC}$	0.005	1.0	$\mu\text{A}$ Max
Clamp Cap Charge Current	$I_{\text{clamp}(+)}$	$V_5, V_8, \text{ or } V_{10} = 0\text{V}$	850	–	$\mu\text{A}$
Clamp Cap Discharge Current	$I_{\text{clamp}(-)}$	$V_5, V_8, \text{ or } V_{10} = 5\text{V}$	–850	–	$\mu\text{A}$
Video Output Low Voltage	$V_{OL}$	$V_5, V_8, \text{ or } V_{10} = 0\text{V}$	1.2	–	V
Video Output High Voltage	$V_{OH}$	$V_5, V_8, \text{ or } V_{10} = 5\text{V}$	8.9	–	V
Video Output Offset Voltage	$\Delta V_O(2\text{V})$	Between Any Two Amplifiers, $V_{15} = 2\text{V}$	$\pm 0.5$	$\pm 50$	mV Max
	$\Delta V_O(4\text{V})$	Between Any Two Amplifiers, $V_{15} = 4\text{V}$	$\pm 0.5$	$\pm 50$	mV Max
<b>AC Dynamic Test</b> (S17, S21, S26 Closed, $V_{14} = 0\text{V}$ , $V_{15} = 4\text{V}$ , $f = 10\text{kHz}$ unless otherwise specified)					
Video Amplifier Gain	$A_{V\text{max}}$	$V_{12} = 12\text{V}$ , $V_{IN} = 560\text{mV}_{P-P}$	6.6	–	V/V
	$A_{V\text{mid}}$	$V_{12} = 5\text{V}$ , $V_{IN} = 560\text{mV}_{P-P}$	2.0	–	V/V
$V_{12}$ for $A_V$ Low	$V_{12\text{low}}$	$V_{IN} = 1\text{V}_{P-P}$ , Note 4	2.0	–	V
Video Gain Match at $A_{V\text{max}}$	$\Delta A_{V\text{max}}$	$V_{12} = 12\text{V}$ , Note 5	$\pm 0.2$	–	dB
Video Gain Match at $A_{V\text{mid}}$	$\Delta A_{V\text{mid}}$	$V_{12} = 5\text{V}$ , Note 5	$\pm 0.2$	–	dB
Video Gain Match at $A_{V\text{low}}$	$\Delta A_{V\text{low}}$	$V_{12} = V_{12\text{low}}$ , Note 4, Note 5	$\pm 0.3$	–	dB
Video Amplifier Distortion	THD	$V_{12} = 3\text{V}$ , $V_{IN} = 1\text{V}_{P-P}$	0.5	–	%
Video Amplifier Bandwidth	$f$ (–3dB)	$V_{12} = 12\text{V}$ , Note 6, Note 8	70	–	MHz
Video Amplifier, 10kHz Isolation	$V_{\text{sep}10\text{kHz}}$	$V_{12} = 12\text{V}$ , Note 7	–60	–	dB
Video Amplifier, 10MHz Isolation	$V_{\text{sep}10\text{MHz}}$	$V_{12} = 12\text{V}$ , Note 7, Note 8	–40	–	dB

Note 3. These parameters are guaranteed and 100% tested.

Note 4. Determine  $V_{12}$  low for –40dB attenuation of output. Reference  $A_V$  to max.

Note 5. Measure gain difference between any two amplifiers.  $V_{IN} = 1\text{V}_{P-P}$ .

Note 6. Adjust input frequency,  $f_{IN}$ , from 10kHz ( $A_V$  max ref level) to the –3dB corner frequency ( $f$  –3dB).  $V_{IN} = 560\text{mV}_{P-P}$ .

Note 7.  $V_{IN} = 560\text{mV}_{P-P}$  at  $f_{IN} = 10\text{kHz}$  to any one amplifier. Measure output levels of the other two undriven amplifiers relative to driven amplifier to determine channel separation. Terminate the undriven amplifier inputs to simulate generator loading. Repeat test at  $f_{IN} = 10\text{MHz}$  for  $V_{\text{sep}} = 10\text{MHz}$ .

Note 8. Special test fixture without socket required.

### Pin Connection Diagram

V <sub>CC1</sub>	<b>1</b>	<b>28</b>	V <sub>CC1</sub>
Contrast Cap	<b>2</b>	<b>27</b>	R Drive
Contrast Cap	<b>3</b>	<b>26</b>	R Clamp (-)
R Video Input	<b>4</b>	<b>25</b>	R Video Output
R Clamp Cap	<b>5</b>	<b>24</b>	R Clamp (+)
G Video Input	<b>6</b>	<b>23</b>	V <sub>CC2</sub>
GND	<b>7</b>	<b>22</b>	G Drive
G Clamp Cap	<b>8</b>	<b>21</b>	G Clamp (-)
B Video Input	<b>9</b>	<b>20</b>	G Video Output
B Clamp Cap	<b>10</b>	<b>19</b>	G Clamp (+)
V <sub>INREF</sub>	<b>11</b>	<b>18</b>	B Drive
Contrast	<b>12</b>	<b>17</b>	B Clamp (-)
V <sub>CC1</sub>	<b>13</b>	<b>16</b>	B Video Output
Clamp Gate	<b>14</b>	<b>15</b>	B Clamp (+)

