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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 (± 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
DC Static Test (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	μA 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	μA Max
Clamp Gate High Input Current	I_{14H}	$V_{14} = V_{CC}$	0.005	1.0	μA Max
Clamp Cap Charge Current	$I_{\text{clamp}(+)}$	$V_5, V_8, \text{ or } V_{10} = 0\text{V}$	850	–	μA
Clamp Cap Discharge Current	$I_{\text{clamp}(-)}$	$V_5, V_8, \text{ or } V_{10} = 5\text{V}$	–850	–	μA
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, $V_{15} = 2\text{V}$	± 0.5	± 50	mV Max
	$\Delta V_O(4\text{V})$	Between Any Two Amplifiers, $V_{15} = 4\text{V}$	± 0.5	± 50	mV Max
AC Dynamic Test (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	± 0.2	–	dB
Video Gain Match at $A_{V\text{mid}}$	$\Delta A_{V\text{mid}}$	$V_{12} = 5\text{V}$, Note 5	± 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	± 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 _{CC1}	1	28	V _{CC1}
Contrast Cap	2	27	R Drive
Contrast Cap	3	26	R Clamp (-)
R Video Input	4	25	R Video Output
R Clamp Cap	5	24	R Clamp (+)
G Video Input	6	23	V _{CC2}
GND	7	22	G Drive
G Clamp Cap	8	21	G Clamp (-)
B Video Input	9	20	G Video Output
B Clamp Cap	10	19	G Clamp (+)
V _{INREF}	11	18	B Drive
Contrast	12	17	B Clamp (-)
V _{CC1}	13	16	B Video Output
Clamp Gate	14	15	B Clamp (+)

