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NTE7139 Integrated Circuit Video Output Amplifier

Description:

The NTE7139 is a monolithic video output amplifier with a 6MHz bandwidth in a 9-Lead Staggered SIP type medium power package. This device uses high-voltage DMOS technology and is intended to drive the cathode of a CRT. To obtain maximum performance, the amplifier should be used with black current control.

Features:

- No External Heatsink Required
- Black Current Measurement Output for Automatic Black Current Stabilization (ABS)
- Internal 2.5V Reference Circuit
- Internal Protection Against Positive Appearing CRT Flashover Discharges
- Single Supply Voltage of 200V
- Simple Application with a Variety of Color Decoders
- Controlled Switch-Off Behaviour

Absolute Maximum Ratings: (Voltages referenced to GND (Pin4) unless otherwise specified)

Supply Voltage, V_{DD}	250V
Inverting Input Voltage, V_{in}	8V
Black Current Measurement Output Voltage, V_{om}	6V
Cathode DC Output Voltage, V_{ov}	V_{DD}
Feedback Output Voltage, V_{of}	V_{DD}
Low Non-Repetitive Peak Cathode Output Current, $I_{oc(l)}$ (Flashover Discharge = 100 μ C, Note 2)	5A
High Non-Repetitive Peak Cathode Output Current, $I_{oc(h)}$ (Flashover Discharge = 100 μ C, Note 3)	10A
Maximum Power Dissipation, P_{max}	tbw W
Junction Temperature Range, T_J	-20° to +150°C
Storage Temperature Range, T_{stg}	-55° to +150°C
Electrostatic Discharge, V_{esd}	
Note 4	\pm 2000V
Note 5	\pm 300V
Thermal Resistance, Junction-to-Ambient (In Free Air, Note 6), R_{thJA}	56K/W
Thermal Resistance, Junction-to-Case (Note 6), R_{thJC}	12K/W

- Note 1. Inputs and output are protected against electrostatic discharge in normal handling. However, to be totally safe, it is desirable to take normal precautions appropriate to handling MOS devices.
- Note 2. The cathode output is protected against peak currents (caused by positive voltage peaks during high-resistance flash) of 5mA maximum with a charge content of 100 μ C.
- Note 3. The cathode output is also protected against peak currents (caused by positive voltage peaks during low-resistance flash) of 10mA maximum with a charge content of 100 μ C.
- Note 4. Human body model: equivalent to discharging a 100pF capacitor through a 1.5k Ω resistor.
- Note 5. Machine model: equivalent to discharging a 200pF capacitor through a 0 Ω resistor.
- Note 6. External heatsink not required.

Recommended Operation Conditions:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	Note 7	180	–	210	V
Black Current Measurement Output Voltage	V_{om}		1.4	–	6.0	V
Operating Ambient Temperature Range	T_A		–20	–	+65	°C

Note 7. The rating of supply voltage is 250V, but because of flash the maximum operating range for supply voltage is 210V.

Electrical Characteristics: ($V_{DD} = 200V$, $V_{om} = 4V$, $T_A = +25^\circ C$, $C_L = 10pF$ (C_L consists of parasitic and cathode capacitance) unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Voltage Supply Current	I_{DD}	$V_{ocDC} = 100V$	2.8	3.0	3.3	mA
Input Bias Current (Pin3)	I_{bias}	$V_{ocDC} = 100V$	0	–	20	μA
Internal Reference Voltage Input Stage	V_{int}	$V_{ocDC} = 100V$	–	2.5	–	V
Offset Current of Black Current Measurement Output	$I_{om(os)}$	$I_{oc} = 0\mu A$, $V_{in} = 1.5$ to $3.5V$, $V_{om} = 1.4$ to $6V$	–10	–	+10	μA
Temperature Drift of Internal Reference Voltage Input Stage	ΔV_{Tint}	$V_{ocDC} = 100V$	–	0.5	–	mV/K
Linearity of Current Transfer	$\frac{\Delta I_{om}}{\Delta I_{oc}}$	$I_{oc} = -10\mu A$ to $3mA$, $V_{in} = 1.5$ to $3.5V$, $V_{om} = 1.4$ to $6V$	0.9	1.0	1.1	
Maximum Peak Output Current (Pin9)	$I_{of(max)}$	$V_{oc} = 20V$ to $V_{DD}-30V$	–	25	–	mA
Minimum Output Voltage (Pin8)	$V_{oc(min)}$	$V_{in} = 3.5V$	–	7	12	V
Maximum Output Voltage (Pin8)	$V_{oc(max)}$	$V_{in} = 1.5V$	$V_{DD}-14$	$V_{DD}-10$	–	V
Gain Bandwidth Product of Open-Loop Gain $V_{os}/V_{i, dm}$	GB	$f = 500kHz$, $V_{ocDC} = 100V$	–	0.52	–	GHz
Small Signal Bandwidth	BW_S	$V_{ocAC} = 60V_{(p-p)}$, $V_{ocDC} = 100V$	5.0	6.0	–	MHz
Large Signal Bandwidth	BW_L		4.7	5.7	–	MHz
Cathode Output Propagation Delay Time 50% Input to 50% Output	t_{pd}	$V_{oc} = 50$ to $150V$ Square Wave, $f < 1MHz$, $t_{rin} = t_{fin} = 40ns$	38	49	60	ns
Cathode Output Rise Time 10% Output to 90% Output	t_r	$V_{oc} = 50$ to $150V$ Square Wave, $f < 1MHz$, $t_{fin} = 40ns$	62	74	87	ns
Cathode Output Fall Time 90% Output to 10% Output	t_f	$V_{oc} = 150$ to $10V$ Square Wave, $f < 1MHz$, $t_{rin} = 40ns$	62	74	87	ns
Setting Time 50% Input to (99% < Output < 101%)	t_s	$V_{oc} = 50$ to $150V$ Square Wave, $f < 1MHz$, $t_{rin} = t_{fin} = 40ns$	–	–	350	ns
Slew Rate Between 50 and 150V	SR	$V_{in} = 2V_{(p-p)}$ Square Wave, $f < 1MHz$, $t_{rin} = t_{fin} = 40ns$	–	1200	–	V/ μs
Cathode Output Voltage Overshoot	O_V	$V_{oc} = 50$ to $150V$ Square Wave, $f < 1MHz$, $t_{rin} = t_{fin} = 40ns$	–	1	–	%
Power Supply Rejection Ratio	SRR	$f < 50kHz$, Note 8	–	60	–	dB

Note 8. PSSR: The ratio of the change in supply voltage to the change in input voltage when there is no change in output voltage.

Pin Connection Diagram
(Front View)

