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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 Automatice Black Current Stabilization (ABS)
- Internal 2.5V Reference Circuit
- Internal Protection Against Positive Apperaing 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) unbless 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 = 100µC, Note 2) 5A
High Non–Repetitive Peak Cathode Output Current, $I_{oc(h)}$
(Flashover Discharge = 100µC, Note 3) 10A
Maximum Power Dissipation, P_{max} . . . . tbf W
Junction Temperatrure Range, T_J . . . . –20° to +150°C
Storage Temperature Range, T_{stg} . . . . –55° to +150°C
Electrostatic Discharge, V_{esd}
Note 4 . . . . ±2000V
Note 5 . . . . ±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 100µC.
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 100µC.
Note 4. Human body model: equivalent to discharging a 100pF capacitor through a 1.5kΩ resistor.
Note 5. Machine model: equivalent to discharging a 200pF capacitor through a 0Ω 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°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} = 0µA, 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} = –10µA 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} = 60$V_{(p–p)}$, 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} = 2$V_{(p–p)}$ 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)